



UDOT PROJECT MANAGER GUIDE

A Resource for UDOT Project Managers
2013 EDITION



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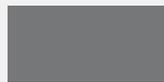
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Background Information/Details



Definitions



Examples/Hints



Local Government

1 INTRODUCTION TO PROJECT MANAGEMENT GUIDE



1.0 OVERVIEW

UDOT Project Management was created as an organizational tool in 1997 to build on UDOT's commitment to strengthen the coordination and delivery of our projects. The Project Manager's (PM's) role to lead a team of skilled technical experts to meet a project's goals (scope, schedule, budget, and quality) and objectives is important in today's challenging transportation environment.

1.1 WHAT IS A PM?

A PM is the project's key regional leader who is familiar with the project needs and serves as a single point of contact for stakeholder issues. The PM leads throughout the project life-cycle (from concept through financial close-out), managing smooth transitions between team handoffs. The PM operates in a matrix organizational structure that can easily adjust team staffing and resources, as needed.

As the team leader, the PM is accountable for the planning, execution, monitoring, and closing of a project. However, the PM role is larger than simply managing. The PM also serves as a project coach, mentor, risk manager, and primary decision maker. The PM may also act as a crisis manager, if unplanned high-risk events occur. A PM breathes life into a project, ensuring it has the appropriate level of support and resources needed for a self-supporting, easily maintained, quality project. The PM must ensure a project stands on its own merits and contributes to the larger transportation system.

A PM may ask:

- Does the project support UDOT's Strategic Goals?
- Is it an asset to the surrounding communities and environment?
- Does it increase safe and efficient travel, not only through its project limits but by how it connects travelers with the transportation system?
- Rather than hold project resources for its own expansion, does the project consider efficiencies to benefit the whole program?

These are some of the high-level challenges a PM may have to deal with as they lead their team of specialists through concept development, design, advertisement, and construction.

This leadership role also requires strong communication skills: the ability to ask penetrating questions, detect unstated assumptions, resolve conflicts, and guide a team through unknown, changing obstacles. While the structure of the project team can vary widely from project to project, the one constant is the PM's role as the leader of the project team, regardless of their authority over the team members.

The responsibilities of a PM seem daunting. Fortunately, there are numerous resources to turn to for guidance. Consultant Services, Central Construction, Central Project Management, Program Managers, Functional Managers, Comptrollers, and Programming are ready to provide assistance. The most valuable resources may be sitting near you: your fellow PMs and Region PM Support Specialist.

A PM's job is like that of a skilled orchestra conductor who leads the musicians to produce the character and tempo of the music. Conductors don't need to be able to play any instrument; however, the conductor must understand the musical score and know how the instruments sound when combined. From this high-level, the conductor's job is to direct instrumentalists to achieve a pleasing musical outcome.

Like a conductor, a PM manages a project from a high-level. For example, to ensure the quality of the project a PM does not need to know the details of each technical area's Quality Control and Quality Assurance (QC/QA.) However, a skilled PM takes every opportunity to remind team members that each is responsible to know and certify the QC/QA for their area's deliverables.

PARTICULAR FOCUS AREAS FOR THIS GUIDE INCLUDE:

- **Clarifying the responsibilities of a UDOT Project Manager throughout each phase of the project life-cycle**
- **Providing UDOT-specific guidance**
- **Gathering communication and leadership resources that focus on UDOT leadership practices**

1.2 HOW WILL THIS GUIDE HELP?

The mastery of Project Management requires continued learning and practice similar to any other engineering or professional area of expertise. The main goal of this guide is to introduce the principles of project management and provide resources that can help both new and experienced PMs continue to build their skills, thus creating a consistent, statewide, high standard of management. Functional Managers and Project Team members will also find value in this guide to better understand their team role, along with the role of the PM.

There are many Project Management resources available online, such as the [PMI \(Project Management Institute\)](#), which offers industry-recognized resources for project management. But there are few resources available that relate more specifically to the transportation field. This guide combines skill-building resources with transportation related resources.

1.3 HOW IS THIS GUIDE ORGANIZED?

The guide is organized by the project life-cycle workflow, with project management and business system practices included in each section. The sections cover areas such as how to:

- Initiate, plan and scope a project
- Develop, negotiate, and administer contracts
- Manage, adjust and execute your team plan
- Lead a team of diverse technical specialists

A list of related resources, including helpful links, tools, relevant contacts, and business systems are included at the end of each chapter.

2 HOW PROJECTS ARE CREATED



“Projects happen when a transportation need receives funding.”

~Unknown

2.0 PURPOSE

It is important for PMs and teams to know how projects are created and who is creating them. It is also important to be familiar with the different types of project funding and know the unique rules and limitations of each funding type. The following information will provide PMs with an understanding of how projects receive their funding.

2.1 GROUPS THAT GENERATE PROJECTS

- UDOT Program Managers
- UDOT Portfolio Managers
- Metropolitan Planning Organizations
- Joint Highway Committee
- Legislative Intent

2.1.1 UDOT PROGRAM MANAGERS

Each Region has a **Program Manager** who plans and develops methods and procedures to implement their region program. The program consists of all projects associated within the Region that stretch across all different types of funding and portfolios. They coordinate program activities and manage personnel responsible for Project Management functions. They are ultimately responsible for the program’s success. Each Program Manager reports directly to the Region Director.

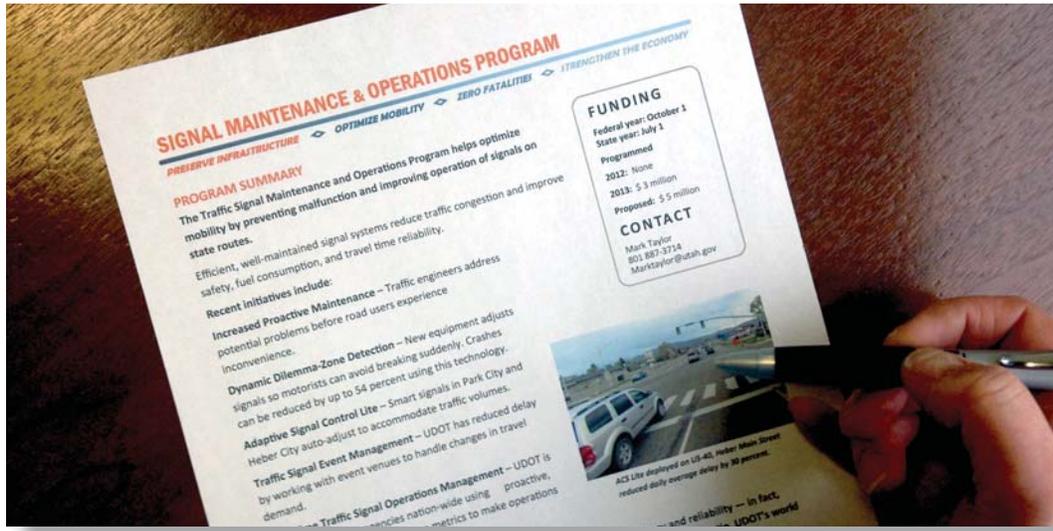
2.1.2 UDOT PORTFOLIO MANAGERS

Portfolio Managers typically reside at UDOT Central and manage funding sources for specific types of projects. **UDOT Portfolios** can create stand-alone projects, or can add resources to other projects to complete a particular need. Portfolio projects are coordinated with Region Program Managers and assigned to Region PMs. [UDOT’s Fund Fact Sheets](#) identify the different funding categories and portfolios available for projects. These fact sheets detail the program goals, recent accomplishments, programming amounts, and contact information. A sample Fund Fact Sheet for the New Traffic Signals Program is as follows:

PROGRAM MANAGER ROLES AND RESPONSIBILITIES

- Responsible to Deliver Region’s Program
- Lead Region STIP Process
- Supervise Region Project Managers
- Sponsor for Most Region Projects
- Contact for UDOT Planning, MPOs, & Local Government Coordination

UDOT Fund Fact Sheet



2.1.3 METROPOLITAN PLANNING ORGANIZATIONS

A *Metropolitan Planning Organization (MPO)* is a federally-mandated and federally-funded transportation policy-making organization made up of representatives from local and governmental transportation authorities. MPO's are federally mandated for any urbanized area with a population greater than 50,000. Federal funding for transportation projects and programs are channeled through their planning process. The U.S. Congress created MPOs to ensure that existing and future expenditures of Federal governmental funds for transportation is based on a continuing, cooperative, and comprehensive planning process. Statewide and metropolitan transportation planning processes are governed by federal law (23 U.S.C. §§ 134–135).

2.1.4 JOINT HIGHWAY COMMITTEE

The *Joint Highway Committee* administers several types of federal funds that are allocated to Utah each year by Congress for use on transportation facilities in rural and small urban areas throughout the State. In addition to these funds, specific dollars are also set aside for bridges on the local system in all areas of the State. In Utah, the *Joint Highway Committee* (JHC) provides coordination and yearly project recommendations to the *Utah Transportation Commission* (UTC) for the use of these federal funds.

UTAH MPOS

- Wasatch Front Region Council (WFRC)
- Mountainland Association of Governments (MAG)
- Dixie MPO
- Cache MPO (CMPO)

2.2 DIFFERENT TYPES OF PROJECT FUNDING

2.2.1 FEDERAL-AID FUNDING

Federal-Aid Highway Funds are authorized by Congress to assist States in providing for construction, reconstruction, and improvement of highways and bridges on eligible federal-aid highway routes, and for other special purpose programs and projects. Most federal-aid projects

require a funding match from either State or local government sources. Each funding category is designated for certain types of projects and work. For example, National Highway Performance Program funding is to be used only for projects on the National Highway System. FHWA has prepared a “[Guide to Federal-Aid Programs and Projects](#)” to provide basic information concerning the Federal-Aid Highway Program.

2.2.2 STATE FUNDING

State Funding is generated from state levied gas tax, vehicle registration fees, auto related sales tax, and the general fund. The gas tax provides UDOT with funding to meet the required match for federal-aid projects and also provides funding for bridges, pavement preservation, and safety projects. The Utah State Legislature also provides funding through the Transportation Investment Fund (known as the TIF) for projects that typically improve capacity. These funds are programmed each year by the Utah Transportation Commission.

Some Projects have multiple funding sources. These can be a combination of both Federal and State funding sources.

TIP

It's important to understand that federal funding on any project requires that the entire project conform to federal rules and regulations.

Local Government federal-aid projects must meet the same requirements as State federal-aid projects.

MAJOR FEDERAL FUNDING PROJECT TYPES

- **NHPP – National Highway Performance Program**
- **STP – Surface Transportation Program**
- **HSIP – Highway Safety Improvement Program**
- **CMAQ – Congestion Mitigation/ Air Quality**
- **Metropolitan Planning**
- **FA – Federal Aid for public lands roads**
- **TA – Transportation Alternatives**

2.3 PROCESS FOR CREATING PROJECTS

Every **Project** and **Program** must be approved by the Utah Transportation Commission (UTC) for the [State Transportation Improvement Program](#) (STIP). A **Project** is an effort, having a defined beginning and end, undertaken to meet unique transportation needs. **Programs** are approved on the STIP as an allotment of money that is designated for a certain type of work. Projects are then selected by a Program/Portfolio Manager based on criteria designated for that Program. Members of the UTC are appointed by the Governor and serve as part of an independent advisory committee. The group prioritizes and decides how funds are spent.

The STIP is a five-year plan of highway and transit projects for the State of Utah. The STIP is maintained regularly and includes all transportation projects and programs on the state highway system, as well as all federal aid projects on city and county highway systems. It also includes projects in national parks, national forests, and Tribal lands.

Program Managers, Portfolio Managers, MPOs, and the JHC all go through a yearly process to prioritize and recommend projects to be placed on the STIP, following UTC approval.

2.4 CHAPTER SUMMARY

Projects are created through the collaboration of UDOT Program Managers, UDOT Portfolio Managers, MPOs, and the JHC. UDOT projects can be funded by a variety of one or more fund types. It is important to know the specific type of funding a project receives and the specific

conditions that dictate the type of work performed with those funds. Once projects and programs are created and funding sources are identified, they are submitted for approval to the UTC for placement on the STIP. The STIP is UDOT's official work plan for the development of projects and programs through concept, environmental studies, right of way acquisition, design, and construction for all sources of funds.



2.5 RESOURCES

2.5.1 HELPFUL LINKS

2.5.2 TOOLS

2.5.3 CONTACT

2.5.4 BUSINESS SYSTEMS

- Wasatch Front Regional Council
- Mountainland Association of Governments
- Cache MPO
- Dixie MPO
- Joint Highway Committee
- UDOT Commission
- UDOT Fund Fact Sheets
- [Fund Fact Sheets](#)
- [UDOT Data Portal](#)
- [UDOT Project Finance Guide](#)
- UDOT Finance Director
- UDOT STIP Coordinator
- Region Program Managers
- ePM
- Project Scheduling
- eGIS
- Guide to Federal Aid Projects and Programs
- Transportation Alternative Program
- State Transportation Improvement Program
- Federal-aid Essentials for Local Public Agencies
- UDOT Local Govt Programs Engineer
- UDOT Safety Programs Engineer
- Traffic and Safety Design Engineer
- ProjectWise
- CADD
- PDBS

3 PLANNING THE PROJECT



“The more you plan, the luckier you get.”

~Unknown

3.0 PURPOSE

A successful project starts with the development of a project plan. This plan will promote efficiency, quality, and direction in the completion of the project. The plan is created through establishing project context with the Definition Team and refined with the Delivery Team at the initiation of the project. These teams are explained later in this chapter.

UDOT'S STRATEGIC GOALS

- **Preserve Infrastructure**
- **Optimize Mobility**
- **Zero Fatalities**
- **Strengthen the Economy**

3.1 ESTABLISHING PROJECT CONTEXT

The Project Manager (PM) and Definition Team are responsible to define and document the project's purpose, goals and scope. These will align with [UDOT's Strategic Goals](#).

SOURCES OF PROJECT INFORMATION

- **Planning / Corridor Studies**
- **Previous Project Plan Sets**
- **Concept Report**
- **EA or EIS Document**
- **Preliminary Cost Estimates**
- **Project Sponsor**
- **Portfolio Managers**
- **Program Manager**
- **Region Director**
- **Traffic Engineer**
- **Pavement Engineer**
- **Local Governments**
- **MPOs (Metropolitan Planning Organizations)**

3.1.1 REVIEW PROJECT INFORMATION

The PM is assigned to a project by the Program Manager. The Program Manager will provide the PM with as much project information as possible, including a contact for the sponsor of the project. Upon project commencement, the PM collects and reviews the existing **Project Information** to gain a basic understanding of the project purpose and to identify any gaps in knowledge. This includes a preliminary understanding of the purpose and context of the project, in addition to the anticipated scope, schedule, and project value (budget).

The amount of available project information varies greatly, based on multiple factors. These factors can include funding sources, project types, political issues, and region preference.

Project Sponsor

The Senior Leader or Portfolio Manager:

- Defines the project objectives and expected outcomes
- Champions the project
- Obtains project funds
- Supports the PM with the project Scope, Schedule, and Budget
- Supports the Project Manager resolving escalated issues

3.1.2 PROJECT SPONSOR EXPECTATIONS

The PM reviews the existing project information with the Project Sponsor(s) and identifies any gaps in knowledge. The Project Sponsor should consider and address two questions:

- Who is the most affected by the project?
- Who is the most able to contribute to the project?

The PM confirms support of the project, and secures the expected project completion date(s) and project value with the Sponsor.

3.1.3 SELECT THE DEFINITION TEAM

The PM, Functional Managers, and Sponsor select the appropriate members for the **Definition Team**. These team members should represent the needs of all project stakeholders. The team’s purpose is to complete a draft **Project Definition Document (PDD)**. The Program Manager is not typically on the Definition Team, but should be included if project circumstances require their participation.

The size and composition of the Definition Team depends on the project characteristics. It should consist of two to seven team members, with the main criteria for selection based upon the major components of the project. Definition Team members are responsible to represent their area of expertise in developing the strategy to deliver the project. A Definition Team member may also be part of the Project Delivery Team.

Federal Aid Local Government projects will have at least one representative from the local entity and/or MPO on the Definition Team. On UDOT projects with major impacts to local governments, the PM may consider including a representative from the local entity on the Definition Team.

Proposed Advertise/ Proposed Due Date

The PA/PD Date is established by the Program or Portfolio Manager, prior to project funding, and is used to communicate project delivery expectations.

Example Definition Teams

Pavement Preservation Project

- Project Manager
- Region Pavement Engineer

New Traffic Signal Project

- Project Manager
- Region Traffic Engineer
- Central Traffic Engineer
- Preconstruction Engineer

Capacity Project with New Bridge

- Project Manager
- UDOT Structures Engineer
- Region Utility Coordinator
- Central ROW Representative
- Preconstruction Engineer
- Maintenance

This process is scalable. This means that the Definition Team’s effort could be a brief discussion for simple projects, or expand to a series of meetings for more complex projects.

If a project has a recently completed detailed concept report or major environmental document (EA or EIS), the Definition Team’s work will likely be minimal. They will be responsible to complete the draft PDD based on the project Scope and Budget, as detailed in the concept documents approved by the Utah Transportation Commission.

If the concept report or environmental document is non-existent or dated, then the Definition Team will develop or update the project concept report in conjunction with

PROJECT DEFINITION DOCUMENT

- Create Objective Statement
- Develop Goals and Metrics for success
- Develop Project Scope Statements
- Project Delivery Method
- Identify Major Potential Risks
- Preliminary Project Estimate
- Project Schedule

Project Objective Statement

Reconstruct and widen (to 12 lanes) I-15 from 11400 South Interchange to Bangerter Highway by December 31st 2014 for \$160 Million.

Teams throughout the development and execution of the project.

3.1.4.2 PROJECT GOALS

The Project Goals and associated metrics are developed by the Definition Team. Project Goals are high level statements that declare what the project is trying to achieve. Project Goals should be measurable in the before and after conditions. A metric is a quantifiable measurement of a project's performance. Metrics are to be project specific. If the project is supporting programmatic goals, metrics are not required. The PM is responsible to collect, store, and document the Project Goals and metrics.

Project Scope Statements

Overlay Project

- Overlay road with 2 to 3 inches of HMA in travel lanes and shoulders
- Replace all safety signs on project limits
- Mill and fill existing asphalt in Provo River bridge
- Do not install, replace, or improve guardrail
- Do not replace drainage pipes

completing the draft PDD. This may require additional time, resources, and field investigations as needed.

3.1.4 ESTABLISH THE PROJECT FRAMEWORK

The Definition Team's purpose is to create the draft PDD. This document defines the project for the Project Delivery Team.

The PDD is created and stored in the Project Management folder in ProjectWise, UDOT's document management system. The PDD consists of several parts, as detailed below.

3.1.4.1 PROJECT OBJECTIVE STATEMENT

The Project Objective Statement is a brief high-level summary of the major work elements to be accomplished, the expected delivery date and project value. The summary should be less than 25 words and serve to focus the Definition and Project Delivery

Project Goals and Metrics

Capacity Project

Goal: Improve Level of Service on corridor from E to D

Metric: Use traffic data prior to and after project completion

Safety Spot Improvement Project

Goal: Reduce crashes at intersection by 50%.

Metric: Use Central Traffic and Safety data to compare crashes before and after the project completion

3.1.4.3 PROJECT SCOPE STATEMENTS

Project Scope Statements define the work that needs to be accomplished to satisfy the Project Goals. These statements document the major components of the project. The team should also document what "is not" included in the project. The "is not" statements are important because they help to reduce scope creep during delivery of the project. The Project Delivery Team will use these statements to better understand their role and effort on the project.

UDOT's Practical Design initiative eliminates "over designing" improvements by aiming to achieve, but not exceed, the project objectives. The documented project scope

statements define the project. Any additional features outside of the scope statements should not be included in the project.

3.1.4.4 CONSTRAINT MATRIX

The Constraint Matrix tool defines the relative flexibility of Scope, Schedule and Budget for the project. This simple tool can assist the Project Delivery Team in making project decisions when project constraints are in conflict.

Constraint Matrix

	Most	Moderate	Least
Scope	X		
Schedule			X
Budget		X	

3.1.4.5 PROJECT DELIVERY METHOD

Major Project Risks

Risk to Schedule

- Timely Right of Way (ROW) acquisition
- Presence of historic site endangered species or wetlands

Risk to Schedule and Budget

- Unexplored utility impacts
- Local community request for facility upgrades

The Project Delivery Method selection is based on the type, details and needs of the project. The default delivery method is the traditional Design-Bid-Build (DBB), but [Design-Build \(DB\)](#), [Construction Manager / General Contractor \(CMGC\)](#), or [procurement](#) can be selected. The UDOT Technical team approves the use of DB and CMGC for projects. Each method has its advantages and disadvantages. To better understand the delivery methods, refer to Chapter 6 - “Alternative Delivery Contracts” in this UDOT PM Guide.

3.1.4.6 POTENTIAL PROJECT RISKS

The Definition Team identifies **Major Potential Project Risks** which could impact the project schedule or budget. The identified risks should be documented in the Project Risk Management Plan, as discussed in Chapter 7 of this PM Guide. The Definition Team does not need to identify risk management strategies for the identified risks because the Project Delivery Team will expand upon, add to, and manage the project risks throughout project delivery.

3.1.4.7 REVIEW AND UPDATE PROJECT ESTIMATE

The Definition Team reviews the current Engineer’s Estimate. If an Engineer’s Estimate does not exist, it may be a good idea to generate one using the [Concept Cost Estimate Form](#). This estimate is updated based on the scope developed by team and is broken out to at least the level of detail of the ePM 505 screen. The Project Manager inputs this estimate into the ePM 505 Screen. For project budget guidance, see the [Project Financial Management Guide](#).

3.1.4.8 SELECT PROJECT DELIVERY TEAM

The Definition Team evaluates all the project features and selects the necessary disciplines to form the project delivery team.

Project team selection is often driven by the Sponsor’s proposed date. Other deciding factors for the composition of the Project Delivery Team are UDOT core competency, availability, experience, and unique project characteristics.

The PM and the Functional Managers determine which

Engineer’s Estimate CATEGORIES

- ePM 505 screen
- Environmental
- Concept Development (CD)
- Preconstruction Engineering (PE)
- Right of Way
- Utilities
- Construction
- Construction Engineering (CE)
- Incentives
- Miscellaneous
- Contingency

individuals will work on the project based on their availability and skill set, relative to the project needs.

The Project Delivery Team can consist solely of UDOT employees, or both UDOT and consultant team members. If a consultant is needed on the Project Delivery Team, then the PM should initiate consultant selection and contracting as soon as possible. The PM can then use the Project Scope Statements to help develop the Scope of Services for consultant selection and hiring. The consultant should be under contract prior to the Kickoff meeting. More information on consultant procurement can be found in Chapter 6 – “Contract Administration” of this UDOT PM Guide.

Local Government (LG) projects are always designed by consultants and a LG representative assists with the consultant selection and project management.

3.1.5 PROJECT SPONSOR SCOPE & APPROACH VALIDATION

The final step of establishing the Project Context is for the PM to review the PDD with the Project Sponsor. This completes the Definition Team’s efforts on this project. However, the PM can reconvene the Definition Team if major project scope issues arise during delivery of the project.

3.2 INITIATE THE PROJECT

3.2.1 CREATE THE INITIAL RESOURCED SCHEDULE

Prior to Project Kickoff, the PM creates the draft resource loaded schedule based on the Definition Team’s resource recommendations. This schedule is created using UDOT’s MS Project schedule program to select the required scope activities.

Transportation project management requires the application of many specialty skills, knowledge, tools, and techniques. These projects are complex and require coordination between interrelated activities to achieve the project goal. If the PM is inexperienced in any area they need to contact experienced specialists to help them define the project scope. Meaningful communication between disciplines is a critical leadership component of project management.

UDOT created [Project Delivery Network \(PDN\)](#) and similar project templates to help the PM set up and manage a resourced project schedule. The network templates are located in [UDOT’s MS Project](#) in business system tool, used to manage project delivery. MS Project pushes information to UDOT’s ePM system, enabling sharing of data with other divisions, stakeholders, and the public.

3.2.2 PROJECT KICKOFF MEETING

The purpose of the Kickoff Meeting is for the project team members to obtain a clear understanding of the project, the associated scope, and their individual roles in delivering the project. The PM will use the draft or working PDD, the initial resourced schedule, and other essential project information to familiarize the Delivery Team with the project.

The Kickoff Meeting also sets the tone and tempo for the Delivery Team, and provides the first opportunity to clearly identify roles, establish expectations, and coordinate milestones. For additional ideas about how to begin to build a successful high-performing team, refer to Key 1 –

Prior to the Kickoff Meeting, the Delivery Team Should:

- Review the PDD from their technical perspective
- Review and question all Scope Statements to determine gaps and inconsistencies
- Review the Risk Register

“Building and Uniting the Team” in the [Team UDOT: Team Building Guide](#).

Most projects should have a Kickoff Meeting but some simple projects can be commenced via email or other coordination. Any consultant working on the design phase of the project is selected and under contract prior to project Kickoff.

3.2.3 PROJECT SCOPING

Between the Kickoff Meeting and the Scoping Meeting, the team members will determine their effort (hours) and the duration (days) for all the activities assigned to them in the initial resourced schedule. Team Members will investigate and prove the assumptions in the Project Scope Statements prior to determining effort and duration of their activities. This can include field visits and investigation. Any discrepancies, issues or gaps between the PDD and their investigation should be promptly brought to the PM for resolution. The PM may need to check back with the Definition Team, and possibly the sponsor, to resolve any new major issues.

After the Project Delivery Team members input the hours and durations for activities, the PM will review and compare the resulting schedule completion date with the Sponsor’s submit/due date. If the resulting delivery date is beyond the Sponsor’s date, the PM will reconcile the schedule with the Project Delivery Team and Sponsor. If the Sponsor’s PA/PD Date is not flexible, then the PM and Project Delivery Team could look for activities that might be shortened by using additional resources and effort. If the Sponsor’s date is flexible, confirm with the Sponsor that the Project Delivery Team’s schedule is acceptable. In some cases, a combination of moving both dates will occur. The PM is responsible to ensure that the Sponsor agrees with the Project Delivery Team’s schedule before moving forward with the project.

Consultant designed projects hold the Kickoff Meeting after the effort and duration were negotiated in executing the contract. If significant changes arise in the scope or schedule at the Kickoff Meeting, the PM should immediately address these with the consultant as it relates to the contract.

Baseline Schedule

A fixed project schedule used to measure future project progress.

3.2.4 PROJECT SCOPING MEETING

The PM schedules and conducts the Scoping Meeting with the Project Delivery Team in order to finalize the project plan. This plan consists of the project scope, schedule, and

estimate. Any changes to the scope since the Kickoff Meeting should be discussed and agreed upon.

The reconciled project schedule should be reviewed and **baselined**. The Project Delivery Team should “walk” through the initial resourced schedule to identify the critical path and to recognize all vital steps, milestones, and risks to the schedule. The team members need to understand the interlinking of all the project activities and their respective responsibility to the project schedule. All parties need to agree, or commit to the dates in this schedule. This reconciled schedule

PROJECT RISK REGISTER

The Risk Register is the central repository for all the identified risks and should include:

- Risk Description
- Risk Probability
- Impact (scope/schedule or both)
- Counter-measures
- Risk Owner

becomes the ‘baseline’ schedule for the project.

Special care must be taken during this planning process to communicate and coordinate with all project stakeholders which include but are not limited to Region Maintenance, Region Traffic, and the Traffic Operations Center.

Scope changes after the scoping meeting should be infrequent and discouraged. Changes may occur due to unforeseen conditions, inaccurate assumptions or senior leader request.

The final Scoping Team task is to update or create the **UDOT Qualitative Risk Worksheet**. More information on this worksheet and risk management can be found in Chapter 7 – “Managing Project Risk” of this UDOT PM Guide.

3.2.5 PROJECT SPONSOR APPROVAL OF PROJECT PLAN

The PM will review the project’s baselined schedule and budget with the Project Sponsor. The PM will also recommend to the Program Manager the approval of the PDD document, which includes the baseline management reserve and committed advertising date. Upon review and approval by the Program Manager, the Region Director signs final approval and the Program Manager then moves the project from Scoping to Active Status in ePM.

3.3 CHAPTER SUMMARY

The Definition Team develops the project framework and the Delivery Team completes the plan details within that framework. By completing this process, all team members should understand the purpose and scope of the project, and the scope will be in line with the Project Value (budget). The team will have an initial, vetted schedule outlining the path to successful completion. If a major scope change occurs later, the PM should revisit this process to properly define the new scope and get input and buy-in from all affected stakeholders.

A well-developed project plan starts the project in the right direction. This process can be scaled-down for simple projects but the PM should not excessively diminish the process. If proper planning does not occur, the PM will spend time putting out “fires” rather than managing, and the project will have a greater chance of being late and over-budget.

3.4 RESOURCES

- Project Definition Document
- Engineer’s Estimate
- UDOT Project Financial Management Guide
- UDOT Team Building Guide

3.4.1 HELPFUL LINKS

3.4.2 TOOLS

- Project Definition Document
- Engineer’s Estimating Tool
- Kick Off Meeting Agenda
- UDOT Qualitative Risk Worksheet
- Sign In Roster

3.4.3 CONTACTS

- Region Program Managers
- Innovative Contracting & Project Controls Manager

3.4.4 BUSINESS SYSTEMS

- ProjectWise
- ePM
- UDOT MS Project

4 MANAGE PROJECT EXECUTION



“The Pertinent Question is NOT how to do things right – but how to find the right things to do, and to concentrate resources and efforts on them”
~ Peter Drucker

4.0 PURPOSE

The PM's role changes when the project transitions from the Definition process to the Delivery process. During the Definition process, the PM actively leads the Definition and Project Team to develop the Project Plan. Once developed, approved, and initiated, the PM's role is to oversee and manage the execution of the Project Plan and adopt the team's efforts as changes occur.

It is important that the PM maintain the proper leadership level as the project plan is carried out. Some PMs micro-manage the project team members by inserting themselves into their processes and work. Other PMs know little about the current project issues and they abdicate their management responsibilities to Delivery Team members. The “art” of Project Management is to know where the appropriate leadership level is for each specific project and Delivery Team. This level will vary from project to project and is dependent on factors, such as team member experience, project risk, and project type.

The PM manages the execution of the project Scope, Schedule, Budget, and Team throughout the project execution phase using the management principle of **MITAR: Monitor, Investigate, Take Action, Report**. As work progresses and changes occur, the PM investigates the root causes for the change from the baseline, takes action to resolve the changed condition, then reports the actions taken to those affected by the change.

4.1 MANAGING THE SCOPE

Project scope is tracked throughout the delivery phase of the project. The scope of the project is refined during the project Definition phase. Comprehensive work by the Definition Team enables effective and efficient scope management during execution of the Project Plan.

MITAR

Monitor

Track and compare project progress to the baselined Project Plan

Investigate

Explore the causes and possible resolutions to changes in Scope, Schedule, Budget, and Team

Take Action

Manage and record the changes, issues, and risks that emerge as the project progresses

Report

Communicate actual performance, progress, variances, and actions taken to appropriate members of the organization

Scope MITAR

Monitor

During a weekly team meeting, the PM discovers that the designer has added the replacement of all the small drainage culverts that cross the road. This was not in the original scope of the project.

Investigate

The PM questions the designer and finds that the Maintenance Engineer requested that he add these culvert replacements to the project. The PM follows up with the Maintenance Engineer and finds a recent inspection revealed that most of the culverts were partially collapsed.

Take Action

The PM meets with the Designer, the Maintenance Engineer and region management to decide if this additional scope should be added to the project. If so, the PM will have to determine if the project has sufficient funds or if additional funds are required.

Report

The PM communicates to all team members the actions taken and consequences of this resolved issue.

4.1.1 MONITOR

At a minimum, at each milestone meeting the Project Manager and Team should compare the project scope defined in the Project Definition Document to the scope detailed in the project plans. Further scope refinement is expected during project delivery, but special care should be taken to ensure that additional scope (scope creep) is not added to the project.

4.1.2 INVESTIGATE

The PM and Delivery Team need to understand the source of the scope change issues. These can include: unforeseen conditions, stakeholder requests, work to be accomplished, misunderstandings, success criteria, rumors, changes in quality, and perceptions.

4.1.3 TAKE ACTION

Once the root cause(s) for the scope changes are identified, the PM and Delivery Team brainstorm possible solutions to resolve the scope change issues. Multiple solutions should be developed with their associated strengths and weaknesses, and impacts to schedule and budget. The PM, with input from key project team members, decides on project scope modifications. The PM then notifies

the Program Manager of the potential scope change to decide next steps, including a possible request to the Utah Transportation Commission for a project scope modification.

4.1.4 REPORT

Communicate any changes in project scope to all team members following decisions made by Region Management or the Utah Transportation Commission.

Scope Creep

Uncontrolled additions in a project's scope. This occurs when the scope of a project is not properly defined, documented, or communicated.

4.2 MANAGING THE SCHEDULE

The PM and Delivery Team members use MS Project to track and manage the progress of work and use of resources against the baseline Project Plan, and to report schedule status and progress to the team and management. This tracking and reporting process focuses the team on getting work done within the negotiated durations and personnel effort.

4.2.1 MONITOR

The **Critical Path** should be monitored with high rigor. Any changes to Activity durations on the Critical Path will affect the finish date of the project. Analyze activities not on the Critical Path to determine if delay would put them on the Critical Path. The Project Team reviews and discusses the project schedule especially at each Milestone Meeting where any variance from the baseline schedule is identified and noted.

Schedule MITAR

Monitor

During a review of the project schedule, the PM discovers that the utility coordinator has extended completion of a critical path activity by 3 weeks.

Investigate

The PM talks with the utility coordinator and finds that they have been assigned to a large project and can only work half-time on the other region projects. This will delay all of their project work.

Take Action

The PM meets with the utility coordinator and Region Management to brainstorm solutions. They decide to hire a consultant to work for the utility coordinator to help relieve the utility coordinator's workload.

Report

The PM reports the resolution to the Delivery Team.

Critical Path

The longest sequence of activities in the Project Plan. It must be completed within the planned amount of time for the project to finish on schedule.

4.2.2 INVESTIGATE

If Activity durations start to slip and exceed the baseline, then the PM and Delivery Team investigate the root causes. Some of the sources of delay could be due to inaccurate original estimates, overscheduled resources, or lack of effort made by Project Team members. It is important to understand the true root cause(s) of the schedule delay in order to resolve the problem.

4.2.3 TAKE ACTION

Once the root cause(s) for the schedule delay are identified, the Project Team and Manager brainstorm possible solutions. These solutions can include, but are not limited to, acquiring additional resources, improving coordination between team members, or extending the project schedule.

4.2.4 REPORT

Actions taken to resolve schedule issues are reported to the Project Delivery Team and Region Management. Any major schedule modifications that change the committed dates are documented, reviewed and approved by the Program Manager.

4.3 MANAGING THE BUDGET

During the pre-construction phase, the PM is responsible for tracking the total project budget. Also known as the Engineer's Estimate, the total project budget combines the design resource budget and the construction cost estimate. Every effort should be taken to ensure that the total project budget doesn't exceed the Project Value. These costs are documented and tracked through the [ePM 505](#) screen.

The construction cost estimate is integrally tied to scope and is continually addressed and verified throughout the pre-construction phase. For the majority of projects, the construction cost estimate is much larger than the design resource budget. It is important to understand that an appropriate amount of design effort can notably decrease the project construction costs.

An "under-designed" project can increase project risk in both schedule and budget. This increased risk can result in construction change orders for impacts to utilities, right of way, and other project features. Conversely, an "over-designed" project can often waste resources and time with excessive detail and specifications.

For studies, environmental documents, and other non-construction projects, the design budget is the only budget that is tracked. For guidance, see the [Project Financial Management Guide](#).

4.3.1 MONITOR

The PM regularly compares actual versus negotiated pre-construction costs. These costs are typically broken down by scheduled Activity, which helps to easily identify exceeded Activities.

At a minimum, the PM and Delivery Team develop, update and review the project construction estimate at every Milestone meeting. If the construction estimate has increased and exceeds the construction budget, the team then identifies which items have caused the increase.

4.3.2 INVESTIGATE

If pre-construction costs for individual activities exceed the negotiated cost, the PM will investigate the basis for the exceeded costs. Some of the causes could be unforeseen conditions, inaccurate estimates, scope creep, and poor team member effort. If portions of the project are externally (consultant) performed, then the PM requests written justification for the exceeded cost for those individual activities to provide support documentation for possible future contract modification negotiations.

When the project construction estimate increases beyond the construction budget, then the PM and

Budget MITAR

Monitor

The lead designer sends the PM the latest construction estimate based on the Plan in Hand design package. The PM notices that the Utility relocation estimate has increased significantly. This has caused the Engineer's Estimate to be greater than the Project Value.

Investigate

The PM talks to the lead designer. They state that recent utility information indicates a large, high-pressure gas line is too shallow and has to be lowered.

Take Action

The PM holds a brainstorming session with the appropriate team members to develop and select a shallower pavement design that avoids the gas line. This alternative design costs more than the original design, but is much less than relocating the gas line. The new Engineer's Estimate is now less than the Project Value.

Report

The PM will report this new pavement design solution to the Project Team and region management.

TOTAL PROJECT BUDGET ePM 505 SCREEN

Design Resource Budget

- Environmental
- Conceptual Design (CD)
- Preliminary Engineering (PE)
- Right of Way

Construction Resource Estimate

- Construction
- Construction Engineering (CE)
- Utilities
- Miscellaneous (agreements & other costs associated with construction)

Team investigates the root cause for this increase. Some of the causes could be inaccurate prices or quantities in previous estimates, unforeseen conditions, and scope creep.

4.3.3 TAKE ACTION

The PM and Delivery Team brainstorms resolutions to both the “exceeded pre-construction costs” and the “exceeded project construction estimate.” When pre-construction costs are exceeded, the primary thing to do is to reassess activities that have been, or could be, exceeded. After analysis, these activities are validated and the baseline is adjusted accordingly.

When the construction estimate exceeds the construction budget, the PM and Team can cut project scope, request additional funds from the project sponsor, or combine the two options. Apply the Constraint Matrix to make the initial decision and include the Project Sponsor and Program Manager in the discussion. Cuts that impact project customers and stakeholders may

be necessary if additional project funding is not possible. The PM then notifies the Program Manager of the potential budget impacts so it can be decided if a budget adjustment request should be made to the Utah Transportation Commission.

4.3.4 REPORT

Document all report actions taken to resolve budget issues and share reports with the Project Team.

4.4 MANAGING THE TEAM

Technical and management skills are not enough to ensure a project's success. The PM has a continuous leadership role across all stages of the project. It is important to monitor team participation in order to ensure open communications and to maintain a positive, success-oriented work environment.

The PM should get to know the team members to better understand what motivates their performance. Learning and understanding each team member's strengths and weaknesses helps to assess and manage project staffing. A well-managed team results in a higher level of trust, productivity, positive team attitude, and the ability to resolve issues in a creative, fact-based manner.

An important tool available to the PM is the [Team UDOT: Team Building Guide](#). The PM should use this guide often during team and Milestone meetings throughout each project phase.

It's important that the PM effectively manage and unite the Project Team because dysfunction can cause significant schedule delay and mediocre project quality.

4.4.1 MONITOR

It's important that the PM continually monitors the Delivery Team. Some common concerns for a PM to consider while monitoring the Delivery Team include changes in team membership, resource over-allocation, effectiveness of Project Team communication, and team member participation and motivation.

4.4.2 INVESTIGATE

If the PM identifies issues and problems within the Project Team, they should further investigate the root causes for these problems. The PM and Functional Manager should review the team member's resource schedule to decide if they are

Team MITAR

Monitor

While discussing your project with the Design Leader, she states that the Structures Lead will not return her calls or emails about some key elevation information that is needed to complete the Plan-in-Hand review package.

Investigate

The PM promptly sets up a meeting with the structures lead. The Structures Lead states that he was extremely offended by some comments made by the Design Leader at the last meeting. He does not think the plan set needs the requested information and does not want to talk to the Design Leader, so he has ignored her information requests.

Take Action

The PM sets up a meeting with the Design Leader and the structures lead. The PM initiates the meeting by reviewing the "Developing Trust" section in the [Team UDOT: Team Building Guide](#). The PM should make certain that the atmosphere in this meeting is non-threatening and open. It is important to elicit solutions for this issue from the two contending team members.

The Team members resolve this conflict by agreeing to certain rules of communication. They also agree to treat each other professionally and respectfully.

Report

This resolution should be reported to leadership and those team members affected by this conflict. There is no need to inform other team members who are unaware of this conflict.

overscheduled. The PM and Functional Manager should also understand the team members' experience and skill sets to make sure they align with their role on the project. The PM should recognize and identify personality differences within the team, particularly if those differences are causing conflict. If appropriate, the PM should reassess the Team's communication plan to make sure it is efficient and appropriate for the project.

4.4.3 TAKE ACTION

Once the root cause(s) for team problems are identified, the Project Team and Manager should brainstorm possible solutions. These solutions can include modifying or clarifying Team Member roles and responsibilities, adjusting the team's communication plan, coaching or mentoring inexperienced members, acquiring additional team members, or replacing current team members.

4.4.4 REPORT

Actions taken to resolve Team conflict or communication issues should be shared with both core and extended team members, as well as management. This allows the opportunity to support and strengthen the project team.

4.5 CHAPTER SUMMARY

The Project Manager's responsibility during delivery of the project is to effectively lead and manage the Project Team. Using the principle of MITAR, the PM and team will monitor the Project Scope, Schedule, Budget, and Team, then act when issues arise that change the baseline. Those actions are to Monitor, Investigate, Take Action, and Report. The PM should understand and perform their role as project leader to set the tempo for the project, and help lead the team quickly through any conflicts or unexpected changes.

4.6 RESOURCES

4.6.1 HELPFUL LINKS

- UDOT Project Financial Management Guide
- UDOT Team Building Guide

4.6.2 TOOLS

- Team Meeting Agenda
- Milestone Meeting Agenda

4.6.3 CONTACTS

4.6.4 BUSINESS SYSTEMS

- ePM
- UDOT MS Project

5 PROJECT CONSTRUCTION AND CLOSEOUT



*“If there is a 50% chance of something going wrong, then 9 times out of 10 it will.”
~ Unknown*

5.0 CHAPTER PURPOSE

It is important to understand the roles and responsibilities of the Project Manager and the Resident Engineer during advertising, construction, construction closeout, and financial closeout.

5.1 MANAGING ADVERTISING

This stage encompasses all activities from project advertisement up to the Notice to Proceed (NTP). Advertising includes addendum submission, the Pre-bid meeting, contract bid opening, contract award and NTP.

5.1.1 ADDENDUM SUBMISSION

Any changes to the project plans and/or documents required during the advertisement period will be made through an [Addendum](#) submission. It is common for errors and omissions in the project documents to be identified by contractors during the advertisement period. The PM is responsible to coordinate with the RE to initiate and manage the addendum submission process.

UDOT’s [Addendum Manual](#) describes the process and required information to modify the project documents during advertisement.

5.1.2 PRE-BID MEETING

Project Pre-bid meetings are recommended if there are unique project features. The PM schedules the meeting and, together with the RE, organize the agenda items. The invitees should include the project designer and any other key members of the project team. The PM is responsible to communicate unique project issues with the RE, prior to the Pre-bid Meeting. The PM and RE conduct the meeting and convey all pertinent information regarding the project to the contractors present. In order to ensure consistency in responding to contractor questions, the PM and RE will collaborate on any responses they provide, then document who asked the question and who

CONSTRUCTION STAGES

Advertising

Project advertisement up to Notice to Proceed

Construction

Notice to Proceed up to Substantial Completion

Construction Closeout

Substantial Completion through Contract Completion

Financial Closeout

Termination of Authority through Financial Closure

provided the answer. If the PM or RE is contacted by a contractor, or any other construction related personnel, with questions concerning a project that has already gone to advertise, the PM and RE will coordinate the answer and document the response. The RE will provide administrative resources to document attendance and meeting minutes. FHWA has issued a [Pre-bid Meeting Guidance Document](#) that gives further direction on Pre-bid meetings.

5.1.3 CONTRACT BID OPENING AND AWARD

The Central Construction Advertisement Division is responsible for public advertising and bid-letting of UDOT construction contracts, conducted through the [Project Development Business System](#) (PDBS). Their process is designed to ensure a fair and consistent bid process. The bid items and Engineer’s Estimate are entered into PDBS by the design engineer. The contractors submit their bids through the system and upon bid opening, their bids are then compared against one another, as well as the Engineer’s Estimate.

If the lowest responsive bid is equal to or less than 110% of the Engineer’s Estimate, the PM is allowed to review the bids. The PM and RE will review the bid abstract for potential areas of risk before award of the contract. For guidance on analyzing bids, see FHWA’s Bid Analysis and Award of Contract Core Curriculum Guide. Areas of risk could include unbalanced bids, large differences in specific bid items that reflect apparent errors in the advertising package, etc. The PM will then coordinate with the Region Program Manager to decide whether or not to award a contract to the apparent low bidder.

Pre-construction Conference Discussion Items	
Specifications	Quarries
Subcontractors	Surveying
Materials	Contract Administration
Waste Areas	Partnering
Major Work Operations	Traffic Control/Signing
Insurance	Right of Way
Goals and Action Plans	Environmental Consideration
Schedule	Issues/Conflict
Utilities/RR Schedules	Escalation Plan
Prosecution & Progress	EEO and Labor
Affirmative Action Plan	Compliance
DBE Participation	Partnering Maintenance
Communication	
Suppliers	

If the lowest responsive bid is greater than 110% of the Engineer’s Estimate, the PM will follow the [UDOT 08B-12](#) policy for contract award guidance.

UDOT Central Construction maintains the [Project Management Forms](#) and [Project Advertising Assistance](#) required during the Advertising Stage.

5.2 PM RESPONSIBILITIES DURING CONSTRUCTION

The PM’s role during construction is to monitor and ensure that the project scope, contract schedule, and budget do not unreasonably vary from the project’s contracted intent. The PM is also responsible to see that all Right of Way acquisitions, utility and third party commitments are fully satisfied and completed on schedule.

Once the contract is awarded to the apparent low bidder, the PM adjusts the ePM 505 screen amounts in accordance with the [Project Budget Recovery Process](#). This step is essential to recovering unused project funds for re-programming to new projects.

The day-to-day management of the project during construction, including construction schedule monitoring, resides with the Resident Engineer (RE).

The preconstruction plans and documents detail the intent and scope of the project. The contractor executes and the RE inspects and verifies that the

project is built in accordance with those contract documents. The District Engineer (DE) has oversight responsibility for change orders, contractor claims, and FHWA stewardship issues.

During construction, all communication with contractors, sub contractors, and suppliers is routed through the project RE. This single point of contact ensures that all answers to project questions are consistent. The RE and PM will discuss all significant issues and responses, prior to contractor communication. Significant issues may include costly change orders, schedule increases, or additional impact to highway users, residents, and businesses.

If the project requires consultant Construction Engineering or consultant Public Involvement during the construction stage, select and contract these services prior to the Plans, Specifications, & Estimate (PS&E) review meeting. If it is determined that such services are necessary at the time of the Plan in Hand review meeting, it's beneficial to have CE or PI under contract in time to attend the meeting whenever a project is complicated or controversial.

The [Construction Manual of Instruction](#) defines and establishes the responsibilities of a UDOT RE, DE, and field personnel regarding the administration of contract provisions.

Project management roles on projects using alternate contracting methods, such as Design Build or CMGC, will be different than described in this chapter and vary greatly based on circumstances of the project. Contact the UDOT Project Development Division's [Innovative Contracting](#) Engineer for additional information, resources, and help with innovative contracting methods.

Alternative Delivery Methods

Design Build

UDOT develops documents that identify the end result product. Prospective bidders will develop design proposals based on these documents.

CMGC

A modified Design Build process in which the owner holds the contract for both the consultant designer and the contractor.

5.3 MANAGING CONSTRUCTION PHASE

This stage starts at the NTP and ends at the notice of Physical Completion. It encompasses the pre-construction conference, partnering meetings, weekly project meetings, and the change orders process.

5.3.1 PRE-CONSTRUCTION CONFERENCE

The PM will attend a Pre-construction Conference. The purpose of a Pre-construction Conference is to discuss the contractor's plans and schedule, and to coordinate construction activities with others impacted by their work. This meeting is the initial coordination with the Contractor's team, subcontractors, utilities and any other stakeholders, such as a local city, who need to be aware



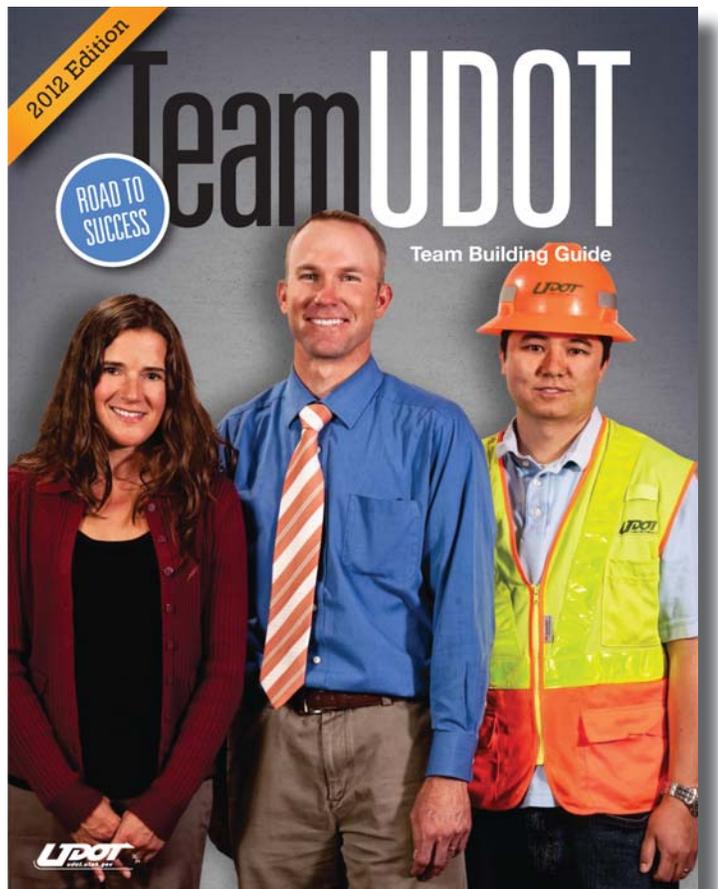
of the Construction plans and schedule. This conference should include a discussion of the Prosecution and Progress Specification (555) and any other unique or special details of the project. This meeting is arranged and conducted by the Construction RE, who will utilize UDOT's [Preconstruction Partnering Meeting Agenda](#). The PM's role at the meeting is to ensure that all commitments made during design are communicated to the contractor and to help resolve any issues that arise.

5.3.2 PARTNERING

Partnering with the contractor is a valuable standard practice for all UDOT projects. Partnering occurs when two or more organizations make long-term commitments to achieve mutual goals. Effective partnering requires trust, open communication, understanding and teamwork among all participants.

It is recommended that all UDOT PMs take Partnering Trainings 1, 2, and 3. For additional information about Partnering, please refer to the [UDOT and AGC Partnering Field Guide](#) and [Partnering Team Weekly Agenda](#).

A PM supports the RE in resolving project issues by staying sufficiently involved to ensure that constructive relationships are being maintained among team members. If conflicts arise see the [TeamUDOT Team Building Guide](#) for conflict resolution ideas.



5.3.3 WEEKLY PROJECT MEETINGS

Project coordination meetings are held weekly on most construction projects to discuss the project issues, schedules, and the upcoming activities. These meetings are scheduled jointly by the RE and contractor and can include subcontractors, utility personnel, and any other relevant participants of the project. It is recommended that the PM attend as often as possible, especially during critical transitions and events, such as the beginning of paving. Higher risk projects may require more frequent attendance. Attending the weekly project coordination meetings helps the PM maintain a connection to the project and better understand project problems and issues. If a PM is not able to attend at least one of these meetings in a given month, the PM should contact the RE to discuss the progress of the project and any other relevant project information.

5.3.4 CHANGE ORDERS

The RE coordinates with the PM on all change orders. The RE has authority to approve change orders of less than \$25,000, as long as the Project Value is not exceeded. The PM will help the RE ensure change orders do not exceed the Project Value. The Active Project Summary Report (ePM 506) helps determine if there are sufficient funds to cover proposed change orders. Change orders greater than \$25,000 require additional approvals. This is explained in UDOT's policy on Change Orders ([UDOT 08B-10](#)), which gives detailed information on change order policies and procedures. If an item overruns the original contract amount, the RE initiates a Construction Overrun Funding Need (COFN) and sends the form to the PM for approval. Detailed instructions for completing the COFN can be found on the [UDOT COFN Form C118](#).

5.4 MANAGING POST-CONSTRUCTION

The Post Construction stage begins with the Notice of Substantial Completion, followed by Final Inspection/Final Acceptance, and ends when contractor is issued the “Construction Final Letter.”

The PM will assist the RE in the construction closeout stage. Timely project closeout allows for re-programming of excess project funds.

5.4.1 SUBSTANTIAL COMPLETION

Substantial Completion of the construction project initiates the Post Construction Phase. The RE designates this status through the Project Acceptance Report after he has inspected the project to verify that the Substantial Completion criteria are met. Construction time charges to the contract end at Substantial Completion.

To facilitate gathering all the appropriate closeout documents, a post-construction closeout meeting is recommended. This meeting is scheduled by the RE and would include the PM, Region Contract Specialist (RCS), and the contractor. This meeting creates the opportunity for the RE & RCS to clearly communicate any missing documentation that needs to be completed for Construction Closeout. If the project construction is especially problematic, the PM should recommend holding a post-construction closeout meeting.

5.4.2 FINAL INSPECTION AND FINAL ACCEPTANCE

The PM will participate in the final inspection and communicate any concerns to the RE. This inspection is set up by the RE and includes all relevant project stakeholders. The contractor is responsible to immediately resolve and repair any unsatisfactory work. Upon correction or resolution of unsatisfactory work, the RE notifies the contractor in writing on the date of final acceptance.

The RE completes all the necessary construction paperwork and collects all required documents from the Contractor. He then submits all appropriate documents to the Region Contract Specialist (RCS). The RCS reviews and quality checks all submitted documents, verifying that the construction contract is ready for closure. The RCS then submits all the appropriate documentation to Central Construction. Central Construction issues the “Construction Final Letter” once they verify completeness of the construction documentation and distribution of the contractor’s final payment.

5.5 MANAGING FINANCIAL CLOSEOUT

This stage starts after the issuance of the “Construction Final Letter” and ends when all payments are made, issues are resolved, funds are reconciled, and the PIN status is closed in ePM.

SUBSTANTIAL COMPLETION CRITERIA

- Vehicles and pedestrians have full unrestricted use of the facility
- All safety features are installed and fully functional
- Only minor incidental work remains for physical completion
- The Contractor and Engineer mutually agree that the remaining work will not impact trail, sidewalk, or roadway disruptions or closures

Upon notice of substantial completion the Project Manager confirms any under-runs on the project and estimates any remaining contingency money for the Step 2 Budget Recovery Process. Any excess funds that will not be expended are transferred back into the appropriate funding area for efficient use on other projects.

Financial Closeout Acronyms

ePM – electronic Program Management
 FINET – Utah State Government finance and accounting system
 FMIS – Fiscal Management Information System

5.5.1 TERMINATION OF AUTHORITY (FORM R-77)

Form R-77 terminates spending authority for a project or program. The completed Form R-77 is submitted to the UDOT Comptroller's Office to initiate financial close out.

For construction projects, Program Finance initiates Form R-77 when they receive the Construction Final Letter from Central Construction. The [Project Closeout Network](#) is set-up by the PM after Substantial Completion.

Non-construction projects (i.e. procurement projects, any type of study, etc.) are closed when the PM and Project Sponsor conclude that the project is complete. At this point, the PM sets-up the Project Closeout Network and emails Program Finance to initiate Form R-77, Termination of Authority.

5.5.2 UTILITY AGREEMENT CLOSURE

The RE manages, tracks, and recommends payment of utility and railroad agreements during construction. After utility construction is complete, the RE works with the Utilities and Railroads Coordinator in the Region to reconcile the agreements and final payments. Upon receiving final utility payment approval and closeout documents, Central Construction will close the utility and railroads agreements.

5.5.3 RIGHT OF WAY CLOSURE

After Substantial Completion, the PM meets with the Central Right of Way lead and Comptroller to verify that all ROW processes are completed. If all parcels are not acquired and/or ROW activities are not completed, they will develop a strategy plan to complete the remaining ROW activities.

5.5.4 CONSULTANT CONTRACT CLOSURE

The PM closes all consultant contracts as soon as their work is complete, as well as verifies that the Consultant has performed all tasks described by the contract. The PM will evaluate and score the Consultant on their performance to execute the contract, using the [Consultant Project Evaluation Form](#). The PM then completes and signs the evaluation form, followed by the Consultant's review and signature. The evaluation is submitted with the final invoice.



5.5.5 AUDIT

Utility and consultant contracts are subject to internal UDOT audit. Audits are triggered by dollar amount thresholds, identified in the UDOT Project AUDIT Cost Estimates sheet. Upon completion of final utility and railroad payments, Central Construction forwards the contracts for audit. If a Consultant contract warrants an audit, the Comptroller's office forwards the contract to the UDOT Auditor.

5.5.6 FINANCIAL CLOSURE

When the utility agreements, ROW acquisition, consultant contracts, and audits are closed, the project can be financially closed. These activities are performed by both Program Finance and the Comptrollers.

The Comptrollers reconciles FINET, closes Local Government agreements, and prepares and

distributes the Final Voucher (FV). Program Finance reconciles the final project funding and closes the business systems (FINET, ePM, FMIS).

5.6 CHAPTER SUMMARY

A Project Manager's role shifts as the project progresses. During design and advertisement, the PM is responsible for day-to-day management of a project. During construction, the PM should allow the RE to direct day-to-day construction activities but stay sufficiently involved during construction to ensure that the project scope, schedule, and budget does not vary unreasonably, and that all ROW acquisitions and other commitments are fully satisfied and completed on schedule.

A PM can ensure the success of the project by:

- Effectively communicating unique project details along with other commitments to the RE
- Attending Weekly Project Meetings as often as possible and contacting the RE once a month to discuss the project
- Keeping aware of any escalating issues, or loss of trust, between the contractor and RE field crew
- Thoroughly reviewing all change orders with the RE in a timely fashion to ensure the project budget is not exceeded
- Setting-up the Project Closeout Network and assisting the RE during the Construction Closeout stage

Frequent and open communication between the PM and RE is essential for successful project construction and closeout. Well-defined and agreed upon roles for the PM and RE, in advance, will reduce conflicts and common problems that arise from shared project responsibilities.

5.7 RESOURCES

5.7.1 HELPFUL LINKS

- Construction Manual of Instruction
- Innovative Contracting
- Addendum Manual: Pre-bid Guidance Document
- UDOT Policy 08-12
- FHWA Pre-bid Meeting Guidance Document
- Project Budget Recovery Guidance
- UDOT Partnering Field Guide
- UDOT Team Building Guide
- UDOT Policy 08B-10
- Project Closeout Network

5.7.2 TOOLS

- UDOT Construction Assignment Order
- Engineer Estimate Setup PDBS Request
- Preconstruction Partnering Meeting Agenda
- Partnering Team Weekly Agenda
- Construction Overrun Funding Need (COFN)
- Consultant Project Evaluation Form

5.7.3 CONTACTS

- Innovative Contracting and Project Controls Manager
- Region District Engineer
- UDOT Advertising

5.7.4 BUSINESS SYSTEMS

- ePM
- PDBS

6 CONTRACT ADMINISTRATION



6.0 OVERVIEW

UDOT contracting methods encourage innovation and speed, and seek a fair and equitable balance for everyone, including the consultant, the contractor, and the general public.

Consultants provide a valuable service to UDOT project teams, supplementing internal staff resources and bringing specialty experts as

you need them. Other benefits are a scalable workforce, bringing experience to an inexperienced team, and sharing innovations learned from work on other projects. All PMs will eventually hire consultants to perform work for their projects. Services could range from small tasks to complete design. The PM is responsible to direct this work through executed contracts.

This chapter will focus on the contract administration responsibilities of the PM. The [Consultant Services Manual of Instruction](#) provides further assistance for contract procurement.

The primary reason for contracting is the limited resources available within UDOT.

6.0.1 NEED FOR CONTRACTING

If the PM and Functional Managers decide that sufficient in-house staff is unavailable to meet the schedule, it becomes necessary to hire consultants. Other reasons to contract include unavailable expertise within UDOT; a local government projects; third party agreements, such as ROW and utilities; and highly sensitive or high profile projects.

6.0.2 CONFLICT OF INTEREST

There are situations where [conflicts of interest](#) could occur for both UDOT employees and consultants. Examples may include, among others, a consultant working as UDOT PM, consultants working on environmental documents, or consultants working as designer and construction management of the same project.

TIP

The Consultant Services Manual of Instruction's Conflict of Interest section should be reviewed prior to every project.

6.1 CONTRACTING FOR ENGINEERING SERVICES

Contract management requires high-level skills, good judgment, and independent decision-making that represent the UDOT organization, its goals, and ethics. The foundation of selecting by qualifications is the negotiation of a fair and reasonable price, with the firm most qualified

to minimize design errors and reduce rework. A UDOT PM must always maintain high ethical standards and confidentiality throughout the advertisement, selection, negotiation, and execution of the contract. (See [UDOT Ethics Policy](#) for more information and clarification of responsibilities.)

6.1.1 CONTRACT TYPES

The three typical types of UDOT engineering services contracts are detailed below. The most frequently used is a contract tied to a specific project. An On Call contract is established with a firm for specific services or functions. A Current Expense contract is used when the funding originates from a UDOT Division's current expense budget to provide staff augmentation. Other contracts, such as those with utility companies and local governments, are discussed later in this chapter.

6.1.1.1 PROJECT SPECIFIC CONTRACT

This is the most common contract a PM will encounter. The scope identifies a specific project to accomplish. EXAMPLE: Design services to widen a state route.

6.1.1.2 CURRENT EXPENSE CONTRACT

Current Expense funding is normal operating funds programmed to UDOT by the Legislature. Due to UDOT staffing limitations, consultants are often contracted to perform in a staff support role to a Division. Individuals may co-locate with UDOT staff on these contracts. EXAMPLE: Contracting with private staff to aide in consultant contract preparation.

6.1.1.3 ON CALL CONTRACT

On Call contracts are an agreement between UDOT and pre-selected consultant for the purpose of augmenting UDOT staff. These contracts have a one year duration for a maximum amount of \$200,000. The PM may issue a Work Task Order (WTO) to the consultant for a maximum of \$40,000 per project and consultant. As these amounts do occasionally change, refer to UDOT's [Consultant Services](#) website. EXAMPLE: Executing a WTO for the drainage design on a project designed by UDOT staff.

Engineering and engineering related services are always selected based on the competency, qualifications, and experience of the consultant, and not on price. The exceptions are PI and CMGC contracts with contractors.

6.1.2 CONSULTANT SELECTION METHODS

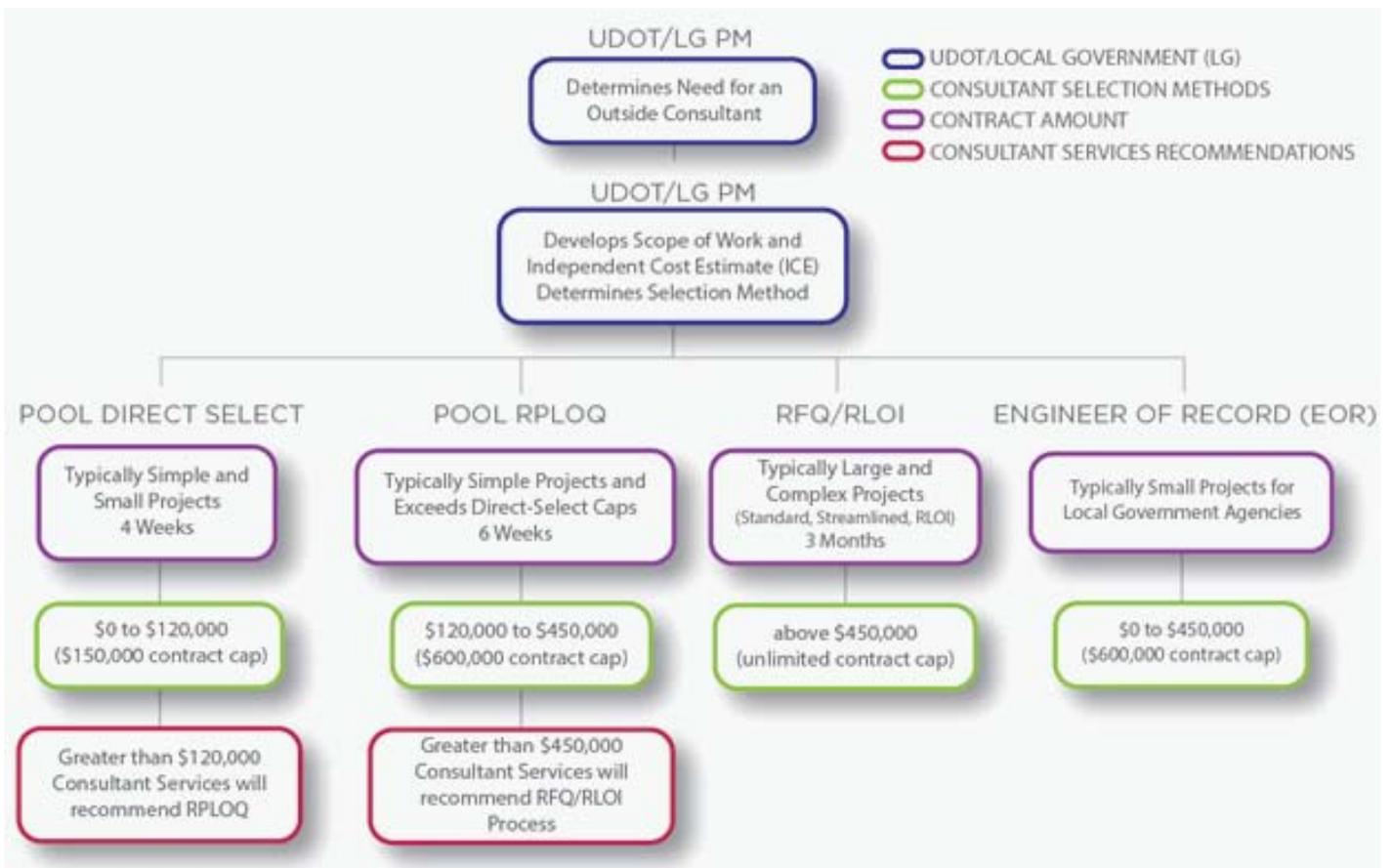
Coordinate with the Program and Functional Managers to determine if staff resources are available, or whether a consultant will be needed. They will also help you decide what selection method is most appropriate. Critical considerations in method selection will be the anticipated dollar amount of the contract, along with the complexity of the project. Some of the selection methods count against the consultant's established UDOT pool limits, so the PM must verify the consultants have UDOT pool dollars available.

6.1.2.1 WORK TASK ORDERS

Due to quick time frame in procuring the consultant, this is an excellent option for a PM if the expected contract amount is less than \$40,000 and the consultant has a current On Call Contract for the required discipline, as well as a sufficient remaining pool amount. Select this method only if the services are simple and will complete in a short time frame.

6.1.2.2 DIRECT POOL SELECT

For a project with an initial contract amount of \$120,000 or less, and the flexibility to modify the



contract up to \$150,000, the PM may select a consultant that has available pool funding directly from the qualified pool lists. The contract is then negotiated and executed. Special caution must be exercised because the \$150,000 cap is a hard limit and cannot be exceeded. Select this method for straight forward tasks that slightly exceed the amount for WTOs, or when the desired consultant does not have an On Call contract in place.

6.1.2.3 REQUEST FOR POOL LETTER OF QUALIFICATIONS (RPLOQ)

When the estimated contract amount is greater than \$120,000 but less than \$450,000, the PM can select a firm through the RPLOQ method. The PM will select a minimum of five consultants, then send each of them the project information, goals, scope of work, and submission deadline. The consultants then prepare a two-page letter detailing their approach to the project, as well as a one page experience chart and proposed staffing plan. The project team evaluates and selects the consultant. Again the PM must be certain the ultimate contract cost will be less than \$600,000, including contract modifications. This limit cannot be exceeded. The PM is also responsible to ensure each proposer has sufficient UDOT pool fund balances. The benefits of this selection method include the ability to “short list” several firms and make a quick selection.

6.1.2.4 STREAMLINED RFQ

The PM can select a streamlined RFQ to select a consultant. This process requires administration by Consultant Services. Streamlined RFQs are normally used for projects that are not overly complex and have an estimated contract amount over \$450,000. The PM will form a Selection Team to assist in the preparation of the RFQ and Independent Cost Estimate (ICE). Consultants submit their Statements of Qualifications for evaluation, ranking, and selection by the Selection Team. Typically, consultant interviews are not conducted unless there is a tie for first in the overall

SOQ ranking.

6.1.2.5 REQUEST FOR LETTERS OF INTEREST (RLOI)

This process requires the administration by Consultant Services. The PM recommends a selection team of technical experts to the Consultant Services Manager for approval. This team prepares the short-listing criteria, the interview format, and ICE. Consultants' response to the advertised RLOI includes a two page letter, a one page experience chart, and a staffing plan. The Selection Team reviews the submitted LOIs and short lists the most qualified consultants. The PM and Selection Team choose a consultant based on the scoring in the mandatory interview. The RLOI method is best for projects where the team decides they would like to quickly short-list consultants and ask in-depth questions in an interview. This method is used for contracts greater than \$450,000.

6.1.2.6 STANDARD RFQ

Administration by Consultant Services is also required for a Standard RFQ. For a complex project with a Consultant contract of greater than \$450,000, the RFQ selection method provides the PM with the most information and flexibility. It also takes the longest amount of time, up to 3 months, to have an executed contract. The PM assembles a Selection Team to assist in preparing the RFQ and ICE. The Selection Team helps the PM refine the scope of services, decide the format and number of pages for the SOQ proposals, and decide on the weighting for scores. The Selection Team reviews and ranks the submitted SOQs. Typically interviews are then held for the top ranked teams. The successful consultant is selected based on combined "selection by consent" scoring of the SOQ and interview.

6.1.2.7 ENGINEER OF RECORD FOR LOCAL GOVERNMENTS

The UDOT Engineer of Record (EOR) Selection Process, accomplished through the EOR RFQ selection method, provides for a Local Government (LG) to establish a relationship with one or more engineering firms to provide professional services for federal aid transportation projects. The PM must certify that the LG has selected an EOR through an approved selection method administered by Consultant Services. (See [Local Government EOR Guidelines](#))

The LG is not required to utilize the EOR for all projects and may select a consultant through previously mentioned UDOT selection methods. If the LG decides not to use the EOR, the PM will guide the LG through the appropriate UDOT selection method.

6.2 THIRD PARTY CONTRACTS AND AGREEMENTS

The PM will regularly deal with third party contracts and agreements. Since the PM is responsible for the project budget and schedule, it is important to monitor these closely. These could include reimbursing for utility relocations/betterments, ROW purchase, and [Federal Aid Agreements](#) with local governments. Timely execution of these agreements are critical to limit their associated risks. These can greatly impact the construction schedule and increase costs, as well as extend impacts to highway users, businesses, and residents.

6.2.1 UTILITY AGREEMENTS

The PM and Region Utility Coordinator work closely to identify the potential conflicts of each project. Early coordination with the affected companies reduce the amount of risk to schedule



and budget. Agreements with each utility company are necessary for cost reimbursement. Utility companies will often seek to improve their facilities during the project through a betterment. These improvements are not reimbursable. Accurate cost estimates and schedules need to be established and monitored.

6.2.2 ROW PURCHASES



ROW acquisition presents one of the greatest risks to project schedule and budget. The PM and Region ROW Coordinator will work with the design team to identify potential impacts to property owners. The UDOT [Project Design Network](#) provides a detailed time line of milestones necessary to meeting the acquisition schedule.

6.2.3 FEDERAL AID AGREEMENTS

UDOT is the steward for LGs using federal funds. In order to use these funds, a cooperative agreement is necessary. This obligates the municipality to provide a small percentage of local funds to gain access to the federal funds, as well as makes them responsible for any additional project costs. The PM may execute several agreements for each project; including PE, CE, construction, etc. [LG Federal Funding Agreements](#) can also be used to share project costs between a municipality and UDOT.

6.3 ALTERNATIVE DELIVERY CONTRACTS

UDOT is a national leader in executing innovative contracting. Many PMs will have the opportunity to utilize Design Build, Contract Manager/General Contractor, and procurement contracts. It is important to contact the UDOT's Innovative Contracting Division (for DB and CMGC) or UDOT Procurement Division immediately after selecting one of these methods. They will provide guidance throughout the process.

6.3.1 DESIGN BUILD (DB)

DB is a method where the construction contractor and the designer partner and bid to design and construct a project, with both processes taking place simultaneously. The advantages of this method include speed of completion and low cost. The PM will work closely with Central Construction to develop documents that identify the results of an end product, as well as establish the design criteria and a preliminary design. This will provide information on the project's unknown factors, such as geotechnical data, thereby minimizing the contractor's risk. Overall, DB Provides the contractor maximum flexibility for innovation.

6.3.2 CONTRACT MANAGER/GENERAL CONTRACTOR (CMGC)

CMGC is a value-based approach that factors in price, schedule, risk elements, and a project cost model. UDOT hires a contractor during the design process to provide constructability input, including scheduling, pricing, and phasing. The PM coordinates with Central Construction during the selection, which will be based upon qualifications, experience, or best value. An independent cost estimator analyzes the proposal to ensure the price is fair, then UDOT executes a contract to build the project. UDOT retains the option to hire the Construction Manager to perform the work, or select another contractor after design completion.



6.3.3 PROCUREMENT CONTRACTS

The PM can use existing executed contracts with contractors to perform certain types of work. UDOT's [Procurement Services](#) manages this program.

6.4 CONSTRUCTION CONTRACTS

The PM's responsibilities continue after the design project is awarded to a contractor. The RE will handle the day-to-day field work. The RE is also authorized to make decisions to keep the project on track. The PM will be consulted on decisions affecting scope, schedule, and budget. Change orders require the PM's approval. (See [Change Order Approval Authority Amounts](#))

6.5 PM RESPONSIBILITY IN CONTRACTING

The PM is the leader of the project team. With this leadership role comes the responsibility to initiate and perform various tasks to ensure the contracted services meet the project goals. It is extremely important the PM demonstrates high ethical principles throughout the contracting process.

6.5.1 CONSULTANT SELECTION METHOD

Although some previously discussed methods are limited by the dollar amount of the contract, the PM has the flexibility to choose the best fit for their project. The construction contracting method (DB, CMGC, etc) must be considered at this time.

6.5.2 REQUESTING A CONTRACT IN CMS

The PM will submit contract requests through UDOT's [CMS](#). The ePM business system module streamlines and tracks the contracting process between UDOT and Consultant staff.

6.5.3 SELECT THE SELECTION TEAM

The PM assembles and recommends the consultant selection team if the contracting method requires one. The PM works with the Program Manager to assign the selection team. This team recommendation is approved by the Consultant Services Manager.

6.5.4 PREPARE SCOPE OF SERVICES AND SCHEDULE

The PM prepares the scope and schedule to perform the work, relying on technical experts in unfamiliar area disciplines, such as environmental or geotechnical. A well thought out scope will limit the amount of contract modifications later in the project. The scope will be submitted to Consultant Services to prepare the contract advertisement. Now is the time to recommend the contract fee type, which is typically a cost plus fixed fee, unit price, or lump sum. The PM works with the Selection Team and Consultant Services to determine the criteria and weighting

to evaluate each consultant's proposal. The criteria should align with the project's goals. For example, if the project is very unique and controversial, the highest weighting may be assigned to similar project experience.

6.5.5 PREPARE INDEPENDENT COST ESTIMATE (ICE)

The PM uses support from Functional Managers to prepare an estimated cost for the requested services. This is vital to help negotiate the contract once the selection is made.



6.5.6 SELECT CONSULTANT

The PM and Selection Team will use the developed criteria identified in the contracting method to select the consultant. This process is overseen by Consultant Services.

6.5.7 NEGOTIATE SCOPE, COST AND SCHEDULE

The PM, with assistance from Consultant Services or technical specialists (if needed), negotiates the schedule and cost, including consultant's profit, to perform the work. Any scope questions are clarified prior to negotiation.

Prior to negotiation, the UDOT PM sets up the project schedule in MS Project and assigns the consultant tasks. The consultant then enters durations and the preliminary schedule is established for the contract.

6.5.8 SUBMIT PROJECT IN CMS

The PM submits the approved scope, schedule, and budget to Consultant Services through CMS for contract preparation.

6.5.9 OVERSEE CONSULTANT PROGRESS

The PM monitors the consultant's progress as it relates to scope, schedule, budget, and quality. When issues arise, it is the responsibility of the PM to immediately address them with the consultant.

6.5.10 REVIEW AND APPROVE PAYMENT REQUESTS

The PM reviews each invoice to ensure the payment request corresponds to the services in the contract. Any questions should be immediately raised with the consultant. It is also important that these are reviewed and approved in a timely fashion. The Comptroller's Office's goal is to complete payment of all invoices within 2 working days.



6.5.11 CONTRACT MODS

The PM is responsible to negotiate all [contract modifications](#). Using the MITAR principles outlined in Chapter 4 of this manual, the PM can control the amount of contract modifications. Controlling the scope and immediately addressing issues as they arise will limit the amount of modifications. MITAR will also help provide the proper documentation to prepare a modification, if it becomes

necessary. Contract modifications may include added or modified scope that increase the work and cost, or a simple no-cost time extension. The PM must ensure available project funds exist to cover any cost increases.

6.5.12 CONSULTANT EVALUATION

When the project is complete, the consultant will submit a final invoice. The PM will complete a consultant evaluation (See [Consultant Evaluation Form](#)) based on the contract performance. A face-to-face conversation is the best way to explain the results of the evaluation. Evaluations should always be fair and unbiased. They provide an opportunity to review successes and failures, identify things to do differently next time, and offer constructive criticism.

6.5.13 CLOSE CONTRACT

After the final payment is made and consultant evaluation is complete, the PM must close the contract. The quicker this happens, the less likely inaccurate charges are to occur.

6.6 RESOURCES

6.6.1 HELPFUL LINKS

- Consultant Services Manual of Instruction
- UDOT Ethics Slides
- Consultant Services Website
- Local Government EOR Guidelines
- Change Order Approval Authority Amounts
- Approved Procurement Contractors
- UDOT Project Design Network

6.6.2 TOOLS

- Conflict of Interest and Confidentiality Form
- [Environmental Study Conflict of Interest Disclosure Statement](#)
- Federal Aid Agreements (most used)
- Consultant Evaluation Form

6.6.3 CONTACTS

- Consultant Services
- Region Program Manager
- Region Functional Managers
- Innovative Contracting and Project Controls Manager
- UDOT Procurement

6.6.4 BUSINESS SYSTEMS

- ePM
- UDOT MS Project
- ProjectWise

7 MANAGING PROJECT RISK



*“Remember, Contractors don’t take risks, they price them.”
~ Unknown*

7.0 CHAPTER PURPOSE

This chapter serves as an introduction to Risk Management, as practiced at UDOT. It is not intended to be all encompassing. For additional information please contact the Deputy Engineer for Preconstruction.

7.1 DEFINITIONS

7.1.1 FLAVORS OF RISK

To better understand the types of risks that UDOT faces and who is responsible for managing them, we have divided them into three broad categories: programmatic, formal, and project-level.

7.1.2 TRADITIONAL RISK MANAGEMENT

These issues can have a direct effect on individual projects. They may include the requirement to use OCIP (Owner Controlled Insurance Program), which will necessitate different specifications and estimates, different bonding requirements depending on the type of work, extra vigilance during construction for contractors with poor safety records, etc. If the Project Team does not coordinate with the Risk Program Manager at appropriate times, delays and unforeseen costs may result. Every project that advertises requires a [Risk Assessment Checklist](#) be prepared and submitted to the UDOT Risk Manager, who will then determine what levels of insurance and bonding are required for the project. This must be completed before the project is submitted for advertising.

Risk

Risk is the realization of an outcome other than the expected outcome. Outcomes that are better than the expected are referred to as “Opportunities,” while outcomes worse than the expected are labeled “Threats.”

PROJECT LEVEL RISK MANAGEMENT

The purpose of Project Level Risk Management is to minimize the likelihood that a project will be negatively impacted by Threats and to take maximum advantage of Opportunities. This is accomplished by identifying potential risks to a project and assigning staff to manage those risks.

TRADITIONAL RISK MANAGEMENT

This area is overseen by the Department’s Risk Manager and includes items such as:

- OSHA
- Work Place Safety
- Claims
- Project Insurance and Bonding

7.1.2.1 PROGRAMMATIC RISK

These risk areas are managed by the Department's Director of Policy and Legislative Services, the Director of Communications, and Program Managers. Project Managers also play an important role in managing this risk on their project through the Public Involvement process. It is important that the Project Team coordinates these efforts with the relevant Regional Communications Coordinator (RCM). The Department has developed a [Project Outreach Planner](#) to help RCMs and PMs develop an effective Public Involvement effort for their project.

PROGRAMMATIC RISK

This area encompasses many areas that are not usually considered in traditional Risk Management. These include:

- Department Funding Levels
- Legislative actions that impact the Department
- Legislative relations
- Reputation/Community Relations

7.1.2.2 PROJECT LEVEL RISK

The Department has had staff assigned to Traditional Risk Management for a very long time. It is well integrated into the Department's processes and work flows. Likewise, Programmatic Risk Management is a major focus of many people within the Department who have been very successful in this area. Formal Project Level Risk Management is relatively new to the Department. The remainder of this chapter will focus on this aspect of Risk Management.

PROJECT LEVEL RISK

These risks are best managed by the PM and Project Team Members, because of their direct project affects:

- Scope
- Schedule
- Budget
- Quality

7.2 PROJECT LEVEL RISK MANAGEMENT

Project Level Risk Management refers to the identification and management of risks for a specific project.

Every project UDOT develops should incorporate some form of Risk Management.

The process that UDOT has elected to use is a cost based risk analysis. In this process risks are quantified by their potential cost to the project in terms of dollars and time. Time, of course, can also be assigned a dollar value. By quantifying risks using a common value, risks can be compared relative to each other allowing the largest potential risks to be identified. This helps the project team focus their efforts where they will have the biggest effect.

COST-BASED RISK ANALYSIS

In this process, risks are quantified by their potential cost to the project in terms of dollars and time.

7.2.1 WHO IS RESPONSIBLE FOR RISK MANAGEMENT?

In general, the PM is responsible to ensure that Risk Analyses are performed for every project at the appropriate time(s). Effective Risk Management, however, is truly a team effort. A broad cross-section of functional areas should be present at the Risk Workshop.

On simple projects, the Project Manager may elect to lead the Risk Workshop themselves, or they may ask the Design Lead or RE to lead it. On more complex projects, outside help should be brought in to assist. This may be a Consultant or a Central resource. See section 7.5 for available resources.

One of the benefits of a cost based risk analysis is the ability to predict the potential cost of a project. If the analysis is done while there is still time to adjust the Project Value it will maximize the benefits of this process.

7.2.2 WHEN SHOULD RISK MANAGEMENT BE IMPLEMENTED?

Risk Management should begin as soon as possible on each project. Ideally it would begin in the Concept Phase or, for larger projects, in the Environmental Phase.

7.2.3 WHAT IS THE RISK MANAGEMENT PROCESS?

Uncertainties are the greatest at the project’s beginning. As the project progresses, more and more information is known and the uncertainties are reduced. However, the only time that we truly know the actual cost of a project is after construction is complete and all the bills are paid. This could be years after the project began (See Figure 7.1). In this figure, the total project cost is divided into three categories: the costs that we can actually quantify at any point in time; the costs that we know we are going to incur, but which we cannot yet quantify; and those costs that we do not yet recognize.

Traditionally we have developed the Engineer’s Estimate by being conservative in estimating those items that we can quantify either by inflating the quantity of those items, or by inflating the estimated cost or, usually, both. To that we add a contingency to account for the items that we cannot quantify and to cover the unrecognized costs (Risks). The contingency is usually a percentage of the known costs. This is represented in Figure 7.1 as the red lines.

The Project Level Risk Management process attempts to develop a more realistic estimate by removing the intentional overestimates of the known items, providing an allowance for those items that cannot be quantified, and developing an estimate of the potential costs of risks based on a thorough understanding of the project’s specific risks.

To help Project Managers decide what form of Risk Management to use, we have developed a decision tree as shown in Figure 7.2. Given the scope of the project, the current phase of development, and the anticipated cost, the tool will suggest which of three Risk Management tools to use.

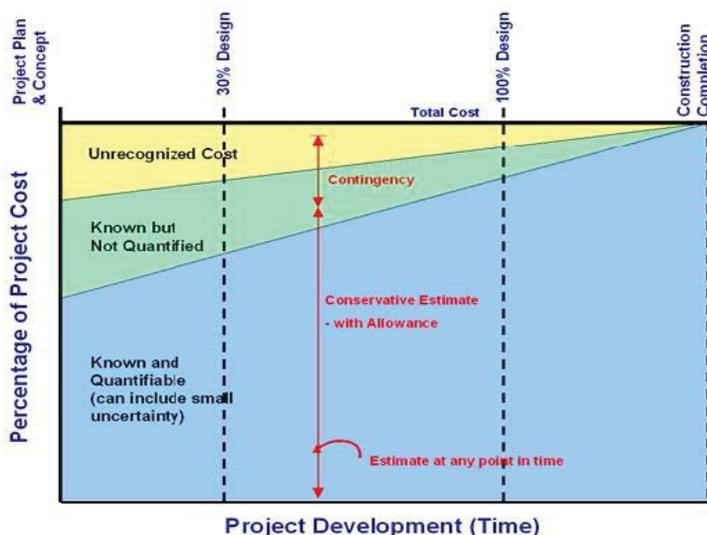


FIGURE 7.1

The tools that UDOT has elected to use are based on tools developed by Washington State DOT (WSDOT). The first tool is the Cost Estimate Validation Process (CEVP®). It allows for an unlimited number of risk items to be tracked and uses very sophisticated modeling methods. It requires the use of a consultant to run the models.

CRA stands for Cost Risk Analysis which is a simplified form of CEVP®. CRA uses a much simpler computer model for the analysis and can be run by UDOT or consultant staff. It is not as sophisticated as CEVP®, but is usually well suited for Medium sized projects.

CRAVE (Cost Risk Analysis with Value

Engineering) is a process whereby a risk study (either CRA or CEVP®) is performed and the identified risks are the basis for a Value Engineering (VE) study. This allows the VE study to be focused on the areas of the project that have the greatest uncertainty. CRAVE fulfills the Federal requirements for VE.

CEVP® is a very rigorous process that is best suited for large to mega-sized projects.

CEVP® and CRA are both probability based risk estimating tools. The basic process is the same for both tools but the CEVP® tool allows a much more sophisticated model. Both tools require the same input; namely, the current estimate and schedule for the project with all contingency,

Project Management Decision Tree

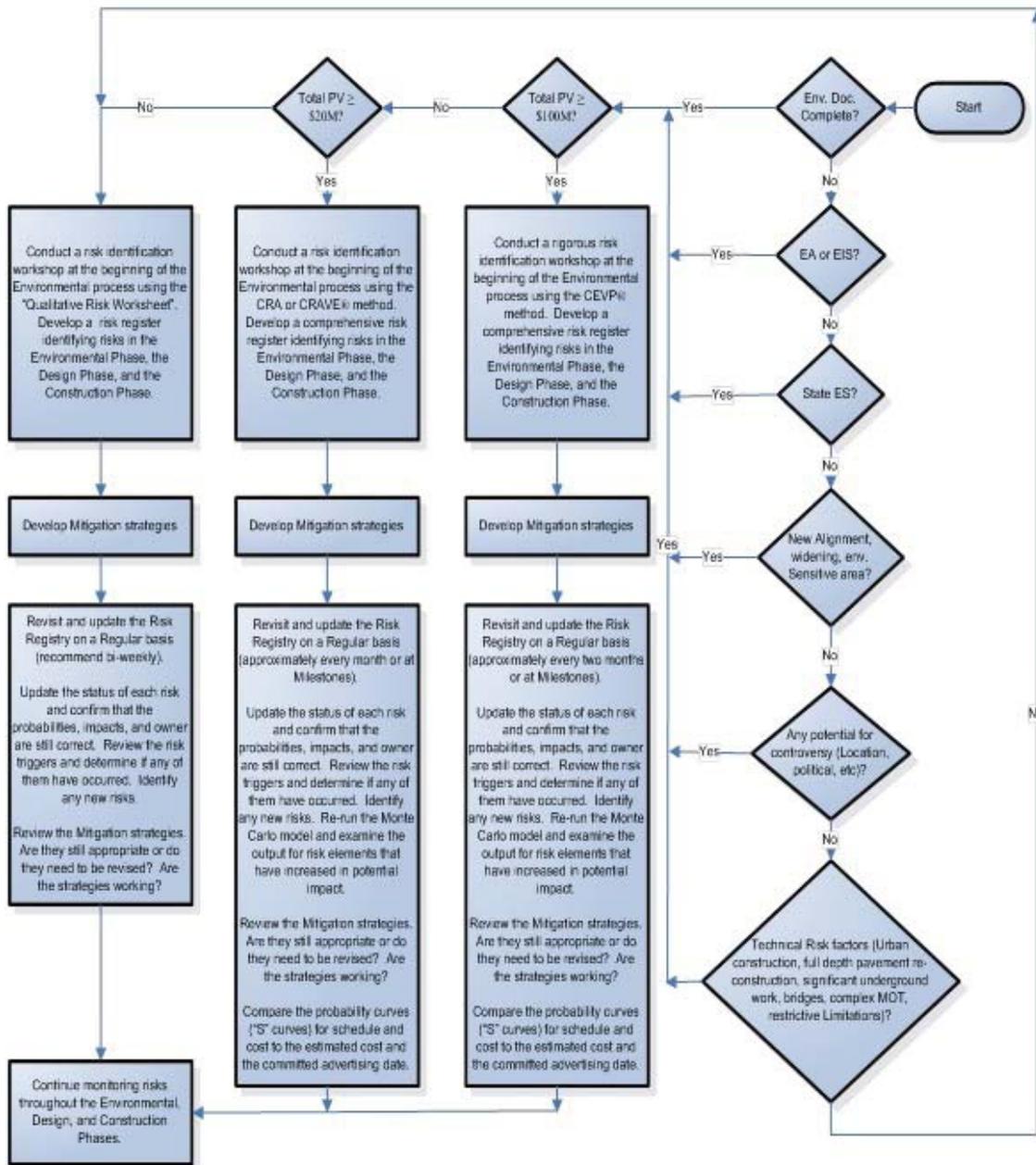


FIGURE 7.2

allowances, and risks removed. A Risk Assessment Team is assembled and can include members of the project team and possibly outside experts, depending on the project needs. The team will hold a workshop to brainstorm potential risks for the project and assign a probability of occurrence, as well as the range of potential outcomes if the risk does occur.

The result of the workshop is a Risk Registry, which is entered into a computer model that uses the Monte Carlo method to develop the range of potential costs and schedules for the project. The output of the Monte Carlo model can be plotted in what is known as an “S-Curve.” S-Curves are developed for both cost and schedule and show the probability of delivering the project at any given cost or date (See Figure 7.3). In addition, the risk factors which contribute the greatest uncertainty to the cost and/or schedule are identified and plotted on a “Tornado Diagram” (See Figure 7.4). These two graphs provide a quick and powerful tool for the Project Manager and the Project Team to use for identifying risks and assigning them appropriately.

Value Engineering
 Value Engineering is required on all federally-funded projects with a total project budget of \$45M or more. The only exception is for Design Build.

The third Risk Management tool, and the one most often used, is a simpler spreadsheet that simply allows the project team to identify risk and rank them qualitatively. The [Qualitative Risk Worksheet](#) is a tool that can be used by anyone and it is recommended for simple projects.

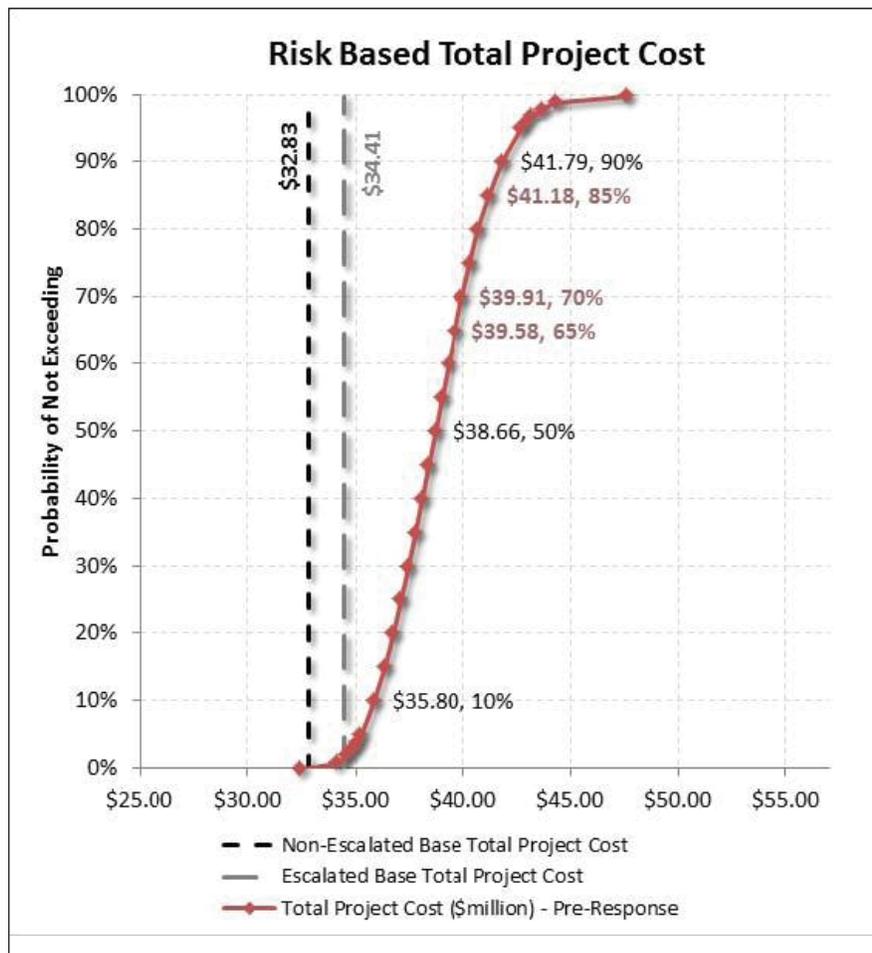


FIGURE 7.3

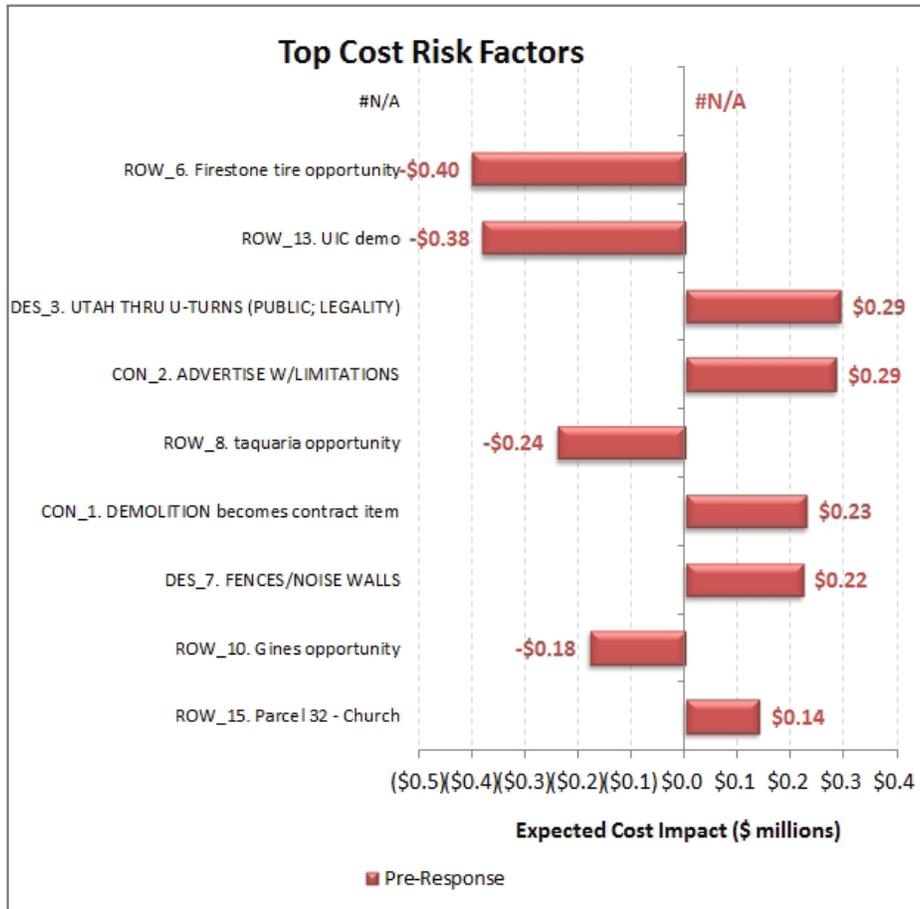


FIGURE 7.4

7.3 HOW TO USE THIS INFORMATION

Regardless of the tool used to identify risk, the real value of the process lies in developing mitigation strategies for the risks identified. By developing a plan to mitigate the risks and then tracking the team’s progress, the likelihood of avoiding threats and taking advantage of opportunities increases greatly. Risk Management is an ongoing process. There should be a standing item on the regular team meeting agenda to review the current state of risk items.

Each of the tools discussed above includes the ability to identify and track response strategies for each identified risk. This typically consists of choosing a response approach, assigning responsibility to an individual, and then tracking progress. Additionally, costs associated with the response should be estimated.

Each of the risks identified by the team should be assigned to an individual who will be responsible to implement the response strategy. In the “Mitigate” example below, this would probably be assigned to the roadway designer. They would be responsible to meet with Maintenance, incorporate the changes in the plans, develop the bid items, and write a special provision.

At each team meeting the Project Manager should go through the Risk Registry and get a status from the responsible party. This is especially important at all Milestone meetings.

Four Basic Risk Response Strategies

ACCEPT

These are risks that are outside of the project teams ability to affect. They are what they are and the team chooses to accept them.

AVOID

Some risks can be avoided all together. Can the design can be changed to alleviate this risk? EXAMPLE: If an area of wetlands is identified as a risk because of the time and costs involved in obtaining permits and developing mitigation, an avoidance strategy might be to change the alignment to miss the wetlands or to design a retaining wall to keep the fill out of the wetlands. In these cases the risk is entirely eliminated.

MITIGATE

The most common response strategy is Mitigation. Mitigating a Threat involves taking action to reduce the probability of occurrence or reduce the impacts if the risk does occur. EXAMPLE: The Team has identified sub-grade soft spots as a potential threat to the project cost, one mitigation might be to drive the project with the local Shed Foreman and have him identify all of the areas of pavement that give him problems. These areas can be identified in the plans and a pay item developed for Soft Spot Repair. This does not eliminate the possibility that additional areas will need to be repaired but it does lessen it. It also establishes a contract price for the work which tends to be cheaper that the change order price.

TRANSFER

Sometimes the appropriate strategy to a risk is to make someone else own the risk. It is not common but there are some risks that rightly belong to someone else. Remember though, if a risk is transferred to the Contractor, he will include a cost in his bid to cover his potential liability. EXAMPLE: The Department's Fuel Escalation specification. It directly transfers the risk of fuel price fluctuation, up to a certain percentage, to the Contractor. Above that level the Department owns the risk. It is up to the Contractor to estimate what he feels fuel prices will do over the course of the project and then prepare his bid accordingly. In this example the Contractor may elect to Avoid this risk by pre-purchasing fuel from his supplier at a fixed price, eliminating the possibility of price fluctuations.

7.4 CHAPTER SUMMARY

It is the rare project indeed where everything goes exactly to plan. These variances from the plan can lead to significant costs and schedule slippage. Risk Management is a tool to help Project Teams identify risks, prioritize them based on their expected impacts, develop response strategies, and track the response implementation. It can also help identify potential budget and schedule issues early in the projects development process. The use of Risk Management on several dozen projects has proved it's usefulness.

The Department has elected to implement some form of Risk Management on every project; from the largest, most complex reconstruction job to the average Orange Book project. We have developed a range of tools for Project Managers and Project Teams to use on their projects. Now it is up to them to move forward and use these tools to better manage their projects!

7.5 RESOURCES

7.5.1 HELPFUL LINKS

- [Risk Assessment and Allocation for Highway Construction Management](#)

7.5.2 TOOLS

- Risk Assessment Checklist
- Project Outreach Planner (POP)
- Qualitative Risk Worksheet

7.5.3 CONTACTS

- UDOT Risk Manager
- Deputy Preconstruction Engineer
- Public Involvement Manager

7.5.4 BUSINESS SYSTEMS

Benefits of Risk Management

Understanding the project risks will allow project teams to deliver their projects more efficiently by:

- Allowing the project team to focus their efforts on areas of greatest potential return
- Giving the Project Team a range of probable project cost and schedule early in the project development process
- Providing a tool for Project Managers in their communications with Management and others concerning the cost and schedule of a project, based on a quantitative analysis of the project
- Allowing the project team to properly allocate risk in the contract documents
- Supplying all levels of UDOT information to make better decisions

GLOSSARY

23CFR

Title 23 – Code of Federal Regulations
Regulation to implement and carry out the provisions of Federal law relating to the administration of Federal aid for highways. (FHWA)

ABC

Accelerated Bridge Construction
A method of bridge construction that uses innovative planning, design, materials, and construction methods in a safe and cost-effective manner to reduce the onsite construction time that occurs when building new bridges or replacing and rehabilitating existing bridges. (FHWA)

AC Agreement

Advanced Construction Agreement
An AC agreement allows the State to advance a federal construction project without obligating the Federal Aid. The State or Local Agency bears all expenditure outlay to cover the agreement. This is typically handled through Systems Planning & Programming.

AC Conversion

Advanced Construction Conversion
When the intended Federal Aid and/or Obligation Authority is available, a portion or the entire AC amount may be converted to obligated funds. Eligible expenditures may be billed for reimbursement to the State or Local Agency after the AC Conversion. (23CFR Chapter I Subpart G 630.709)

ARRA

American Recovery and Reinvestment Act of 2009

The primary objective for ARRA was to save and create jobs almost immediately. Secondary objectives were to provide temporary relief programs for those most impacted by the recession and invest in infrastructure, education, health, and 'green' energy. (Wikipedia)

ATMS

Automated Traffic Management System
ATMS is a component of an Intelligent Transportation System (ITS). ATMS integrates technology primarily to improve the flow of vehicle traffic and improve safety. Real-time traffic data from cameras, speed sensors, etc. flows into the Transportation Operations

Center (TOC) where it is integrated and processed (e.g. for incident detection), and may result in actions taken (e.g. traffic routing, DMS messages) with the goal of improving traffic flow. (Wikipedia)

Additives

During the design process contractors are required to bid add-on portions of work in anticipation of receiving low bid prices where additives can be selected.

Administrative Record

The record which reflects all communications, media events, meeting minutes, etc. applicable for environmental NEPA documents.

Amendment

An audit trail for any changes made to a project in ePM.

Apportionment

Apportionment is a term which refers to a statutorily-prescribed division or assignment of funds. An apportionment is based on prescribed formulas in the law and consists of dividing authorized obligation authority for a specific program among the states. Examples include National Highway Performance Program (NHPP), Surface Transportation Program (STP), and Congestion Mitigation and Air Quality (CMAQ), programs. (txdot.gov)

Approved Amount

Requested funds that have been authorized by the FHWA.

Arterial

A functional classification of a roadway that is found in both rural and urban environments, which primarily focuses on high levels of mobility through relatively higher overall speeds rather than land access. (fhwa.dot.gov)

Arterial, Minor

Streets and highways linking cities and larger towns in rural areas in distributing trips to small geographic areas in urban areas (not entering identifiable neighborhoods). (fhwa.dot.gov)

Arterial, Principal

Major streets or highways, many with multi-lane or freeway design, serving high-volume traffic corridor movements that connect major generators of travel. (fhwa.dot.gov)

Audit (see Post Audit)

The act of scrutinizing files for infractions to the 23CFR.

Authorization

Federal &/or State spending approval for STIP projects & programs.

Authorization Signature

Signature required from authorized UDOT &/or FHWA representative(s), after requesting funds from FHWA or other officials, before spending can occur.

Award

Owner's notice to a bidding contractor of the acceptance of their submitted bid on a project.

BVI

Bid Variation Index

A statistical comparison that measures the variation of construction bid prices among bidding contractors on a given project.

Betterment

Facility construction improvements, beyond the scope of the project, that are added to a UDOT project and are funded by a 3rd party (i.e. local government, etc.).

Betterment Agreement

A signed document detailing the facility construction improvement items to be constructed, and the financial responsibility between UDOT & the 3rd party.

Bid Opening

A price validation process used to accept, compare & evaluate construction bids or proposals submitted by Contractors, to ensure fair and equitable selection.

Blue Book Project

Projects that may include new construction, rehabilitation, &/or reconstruction; in order to extend the life of bridges and pavement. Funding consists of Federal and State funds on Interstates, National Highway System, & Federal aid eligible routes.

C128

Report on Assembly of Final Estimate
Is used to ensure complete documentation for the closing of a contract and is required by FHWA for the project closing process. This is included in the final letter packet.

C190

Project Acceptance Report
Is used to document substantial and physical

completion and is required by FHWA for the project closing process. This is included in the final letter packet.

C196-A

Project Materials Certification & Attachment A
Provides certification of the project materials to the District Engineer and is required by FHWA for the project closing process. This is included in the final letter packet.

CAA

Commission Approved Amount
Initial funding amount programmed on each project in the STIP. The Utah Transportation Commission Approved Amount found in the ePM Program Development module, on the 710 screen under "Project Number" tab. The cost of the project is not to exceed this number.

CatEx

Environmental Categorical Exclusion
A CatEx is prepared for actions that do not individually or cumulatively have a significant effect on the environment. These are actions that do not: induce significant impacts to planned growth or land use for the area; require the relocation of significant numbers of people; have a significant impact on any natural, cultural, recreational, historic, or other resource; involve significant air, noise, or water quality impacts; have significant impacts on travel patterns; and otherwise, either individually or cumulatively, have any significant environmental impacts (23 CFR 771.117(a)). (*UDOT Environmental Process Manual of Instruction*)

CCP

Construction Completion Packet
From central construction stating the construction has been completed on a project. A series of forms designed to summarize the Construction phase of a project, including time to complete, material acceptance, DBE commitments, change orders, material over/under runs and Contractor payments.

CD Budget

Concept Development
A nominal amount (usually \$10K) assigned to a project to conduct a study to determine the feasibility of that project. Funds assigned to concept development are always non-participating.

CE Budget**Construction Engineering**

Is the portion of a project budget that provides construction engineering oversight on a project.

CFC**County of the First Class Fund**

House Bill 287 from the 2001 General Legislative Session created a special revenue fund that receives 25 percent of Salt Lake County's 0.25 percent public transit sales tax that was approved by voters in the November 2000 general election. Funds can be used for I-15 and other state highway projects within Salt Lake County and for debt service on bonds issued to pay for such projects as prioritized by the Transportation Commission. (udot.utah.gov)

CHF**Centennial Highway Fund**

The CHF is an allocation of state and federal money for use in building capacity-driven transportation projects. Uses include construction, major reconstruction or major renovation of state and federal highways, the most prominent of which was the I-15 reconstruction in Salt Lake County. (udot.utah.gov)

CHNF**Critical Highway Needs Fund**

During the 2007 Utah Legislative Session, House Bill 314 created the CHNF. This fund is used on various transportation projects throughout the state as prioritized by the Transportation Commission based on recommendations developed by UDOT under criteria identified in state law. (udot.utah.gov)

CMAQ**Congestion Mitigation Air Quality**

A type of federal funding that may be added to a project to assist in obtaining or maintaining a certain standard of air quality.

CMGC**Construction Manager General Contractor**

This is a modified Design Build process in which the owner holds the contract for both the consultant designer and the contractor.

CMGC Project**Construction Manager General Contractor Project**

Contracting process in which a contractor is selected to aid with the design and is then

invited to propose a price for the construction of the project. This is intended to identify and reduce project risk and cost of construction, by involving the contractor in design decisions. Time is saved while the project is in design and construction risk is minimized.

CMPO**Cache Metropolitan Planning Organization**

Is responsible for comprehensive transportation planning in portions of Cache County, Utah. (cachempo.org)

CMS**Contract Management System**

Module in ePM used for consultant contracting.

CO**Change Order**

Change orders modify the contract and are required for, but not limited to, the following conditions: Plan or specification change or addition, differing site condition or significant change in the character of work, change in DBE commitment, extension of contract time, extra work required that cannot be tied to an original bid item, and acceptance of a value engineering proposal. (*UDOT Construction Manual of Instruction*)

CO-OP (see FAA)**Cooperative Agreement****CPM****Critical Path Method**

A scheduling technique that uses activity durations and dependencies to calculate the longest path of planned activities to the end of the project, and the earliest and latest that each activity can start and finish without *making the project longer*. (*Wikipedia*)

Capital Costs

The value of the physical features on a project

Commission Minutes

Minutes taken during UDOT Transportation Commission meetings that contain pertinent information regarding projects.

Congressional Districts

Required 2-digit numeric field identifying the congressional district in which a project is located.

Construction Final Letter

A letter issued from the Engineer for Construction & Materials that terminates

a construction contract & releases the contractor.

Consultant Contract

A contract written by UDOT Consultant Services for architectural/engineering services or engineering related services for either UDOT or local government projects. The funding may be State, Federal, or Local Government. A consultant contract has various methods of qualification-based selection (i.e. General Engineering Services and Local Government Pool, Request for Qualifications, Request for Letter of Interest, or Engineer of Record).

Corridor Preservation

Land purchase in anticipation of future road construction.

DB

Design Build

There are several types of DB projects, including best value and low bid. Generally, UDOT develops documents which identify the end result product, establishes the design criteria and a preliminary design which provides information on unknowns such as the geotechnical data to minimize a contractor's risk. Prospective bidders develop design proposals based on these documents. The design-build concept allows a contractor maximum flexibility for innovation in the selection of design, materials and construction methods. With DB, the contractor assumes a much larger role in the control of the project, with UDOT handling more of an advisory and quality assurance role. (*UDOT PM Guide*)

DBB

Design Bid Build

UDOT designs the project and develops a set of plans, specifications, and an estimate (PS&E). These documents are advertised to the contracting population and they submit bids for the work. The lowest responsive bidder is selected to perform the work. UDOT maintains control of the construction project. (*UDOT PM Guide*)

DBE

Disadvantaged Business Enterprise
DBEs are for-profit small business concerns where socially and economically disadvantaged individuals (i.e. African Americans, Hispanics, Native Americans, Asian-Pacific and Subcontinent Asian

Americans, and women) own at least a 51% interest and also control management and daily business operations. (*USDOT*)

DE

Design Engineer

An engineer that designs roadway projects.

DUNS Number

Data Universal Numbering System Number
Is a universal numeric identifier used to track entities receiving federal awards and must be provided on all federal grant applications.

Dixie MPO

Dixie Metropolitan Planning Organization
The Dixie MPO is designated by the state of Utah to oversee transportation planning in the urbanized and urbanizing areas in Utah's Washington County — historically known as "Utah's Dixie." (*dixiempo.wordpress.com*)

EA

Environmental Assessment

A NEPA document prepared for a project that is not on the CatEx list, and does not have significant environmental impacts (i.e. minor widening project).

EBS

Electronic Bidding System

A UDOT software application that manages the project construction bidding process.

EE

Environmental Engineer

An engineer that manages the NEPA process.

EIS

Environmental Impact Statement

A NEPA document for a project that is determined to pose significant environmental impacts. Typical for projects with a new alignment and can take three to four years to complete.

ePM

Electronic Program Management

A UDOT software application that holds all spending information regarding STIP projects and programs.

ePM, 495 Screen – Expenditure Summary

Specific screen found in the ePM Project Development module under the "Financial" tab. shows the project expenditure summary.

ePM, 505 Screen – Cost Estimate

Engineer's Estimate

Specific screen found in the ePM Project

Development module under the “Financial” tab. shows the Project Manager’s planned cost estimate of a project.

ePM, 710 Screen – Pin/Project Setup

Project Information

Specific screen found in the ePM Project Development module under the “Setup” tab. Shows detailed project and funding information (i.e. descriptions, route name, location, etc.).

ePM, 861 Screen – Report Selection

Specific screen found in the ePM Project Development module under the “Reports” tab which can generate various reports (i.e. budgeting, projects, Gantt, etc.).

Earmark

Federal funds that are "earmarked" for a specific project. This funding can only be used for specified project. Any unexpended funds are returned to the FHWA.

Eligible

Costs that meet federal standards for reimbursement of federal funds.

Encumbrance

Reflects contractual project financial commitments prior to an actual expenditure. Management tool to prevent overspending.

Engineer’s Estimate

Term given to a document found in PDBS that is created by the project engineer, which gives a detailed breakdown of costs in all phases of the project to advertise for construction contractor. This document must remain within the project value.

Environmental Documentation/Project File

A file that contains all the relevant environmental documents for a given project. Maintaining an accurate and up-to-date project file is an important task in any NEPA study. This documentation includes the Administrative Record. (*UDOT Environmental Process Manual of Instruction*)

Expenditure

Any incurred cost to a project.

FAA

Federal Aid Agreement

A signed agreement between UDOT and a local government which describes the funding responsibility for a local project.

FHWA

Federal Highway Administration

The Federal Highway Administration (FHWA) is an agency within the U.S. Department of Transportation that supports State and local governments in the design, construction, and maintenance of the Nation’s highway system (Federal Aid Highway Program) and various federally and tribal owned lands (Federal Lands Highway Program). (*fhwa.dot.gov*)

FMIS

Fiscal Management Information System

Federal system used to enter and track obligation of funds, expenditures, information and financial changes and adjustments on federally funded projects.

FMIS Action

Any adjustment or obligation within the FMIS system that requires signature authorization.

FMIS Number

A unique number generated for each project in ePM which identifies it within the FMIS system.

FONSI

Finding of No Significant Impact

A FONSI is both the decision by FHWA that the project has no significant impacts and the documentation of that decision. A determination that the project will have no significant impacts is made by FHWA, following consideration of the analysis presented in the EA, consideration of comments on the EA made by agencies and the public, UDOT’s selection of the preferred alternative, and any changes in the proposed action based on the comments received. (*UDOT Environmental Process Manual of Instruction*)

Final Voucher (FV)

A document generated by the Comptroller’s office that breaks down all costs on all sub phases of a project or program. Every penny that was programmed for the project is accounted for by this final document.

Federal Aid Program

All federal funds that states are allowed to expend, providing federal criteria is met.

Federal Bill – Reimbursement

A weekly bill submitted to FHWA for reimbursement to the state for costs incurred on federal projects. Initially, the state covers

the funding of any given federal project. Only after submitting necessary documents and receiving authorization of funds by FHWA, does this qualify the state to be reimbursed by FHWA.

Federal Funding

Monies from the federal government to fund UDOT's federal aid program.

FINET

A Utah State software accounting application used to track costs. The FINET program is a cost accounting of Chart of Accounts element inputted on expenditure documents. A FINET program with a prefix of 5 or 4 identifies involvement of federal funds on the project.

Fiscal Year

Dates within a specific time frame in which fiscal expenditures are recorded. The Utah State fiscal year differs from the Federal fiscal year.

Flexible Match

Allows a variety of public and private contributions to be counted toward the non-Federal match for Federal-Aid projects. Candidate Federal-Aid projects for flexible match must be identified at the time of project application. The candidate project requires evaluation of the total project funding for determination of flexible match feasibility and pre-approval by the UDOT Local Government Programs Engineer. Soft match is a match credit to a project derived from a non-project source, i.e., toll credits, off-system bridge credits. The amount the state spends on these projects can be credited to another using Federal-Aid funds. The Federal share on the Federal aid project does not change with the non-Federal share satisfied by a soft match. However, the billing ratio is up to 100% of cost incurred depending on the amount of soft match.

Funded Year

Funds that show in the current year in the STIP. Only current funded year funds can be reimbursed.

Funding Priority

The funding source that is determined or required to be the first to be expended on a project that has more than one funding source.

GIS

Geographic Information System

A technological field that incorporates geographical features with tabular data in order to map, analyze, and assess real-world problems. (*GISlounge.com*)

Green Book Project

Projects which may include new construction, rehabilitation and/or reconstruction for extending the life of bridges and pavements. Funding consists of State construction funds or dedicated federal funds.

HCP

Highway Construction Program

The HCP contains revenue from legislative appropriations. These funds are used for construction and reconstruction of state and federal highways as assigned by the Transportation Commission. The projects funded by this program are intended to be smaller in scale and for congestion relief. Once the projects included in the current Statewide Transportation Improvement Program (STIP) are complete, the program is finished; there is no additional funding. (udot.utah.gov)

HPP

High Priority Project

Term given to a project that is deemed more important to construct and is funded with earmarked funds.

ICE

Independent Cost Estimate

A cost estimate performed by responsible UDOT agent to estimate the amount needed for contracted work to be performed.

ITS

Intelligent Transportation System

Information and communication technology (applied to transport infrastructure and vehicles) that improve transport outcomes such as transport safety, transport productivity, travel reliability, informed travel choices, social equity, environmental performance and network operation resilience. (Wikipedia)

Incentives

Financial rewards for completion of a portion of the work on a project on or before schedule.

Inkind Match (see Flexible Match)

Innovative Contracting

Any method of contracting that varies from low-bid contracting. Includes incentive/disincentives, warranties, Price + Time

Bidding, lane rental, additives, alternate bidding, Design-Build, and CMGC.

Interstate System

A network of limited-access roads including freeways, highways, and expressways forming part of the National Highway System. (*Wikipedia*)

JHC

Joint Highway Committee

Administers several types of federal funds that are allocated to Utah each year by Congress for use on transportation facilities in the rural and small urban areas throughout the state. In addition to these funds, specific dollars are also set aside for bridges on the local system in all areas of the state. (*UDOT PM Guide*)

Jurisdictional Transfer

The process for the transfer of a highway or roadway from one jurisdiction to another. The transfer of jurisdiction is usually from the state to a city or county when the highway's function or management objectives are more aligned with local functions.

LG

Local Government

A city or county government which operates independent of UDOT.

Local Match

Funds contributed to a project by a local entity that are required as a pre-determined percentage match for federal funds on a given project.

Local Route

A local road that is not maintained by UDOT.

MAG MPO

Mountainland Association of Governments
Metropolitan Planning Organization
MAG MPO serves the three county region of Summit, Wasatch and Utah Counties, Utah, population of 588,003 (2008 Census Estimate). (*mountainland.org*)

Memorandum of Understanding (MOU)

A formal letter describing an agreement defining stewardship & responsibilities between FHWA & UDOT.

MilePost (MP)

A system used to designate exact points along a roadway alignment. All Interstate routes are mileposted beginning at the most westerly

or southerly point. The beginning point is milepost '0'. If the first interchange on the route is located between milepost 4.0 and 5.0, it is numbered as Interchange #4. The next interchange, if located at milepost 8.7, would be numbered as Interchange #8, etc. With this system the motorist can easily determine the location and distance to a desired interchange. (*fhwa.dot.gov*)

MPO

Metropolitan Planning Organization

A federally mandated and federally funded transportation policy-making organization in the United States that is made up of representatives from local government and governmental transportation authorities. Utah has four MPOs: CMPO, DIXIE, MAG, and WFRM. (*Wikipedia.org*)

Master PIN

A method of grouping PINs with similar objectives into categories. The 3 uses of Master PINs include Region, Portfolio, & Megaprojects. A Region uses a Master PIN to track all projects in the region that are not part of a Portfolio or a Megaproject. A Portfolio uses a Master PIN to track all the projects that are funded by that Portfolio. Megaprojects will often use a Master PIN to capture all the various PINs that cumulatively make-up the Megaproject.

NBI

National Bridge Inventory

The aggregation of structure inventory and appraisal data collected to fulfill the requirements of the National Bridge Inspection Standards that each State shall prepare and maintain an inventory of all bridges subject to the National Bridge Inspection Standards. (*fhwa.dot.gov*)

NBIS

National Bridge Inspection Standards

Federal regulations establishing requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a State bridge inventory. (*fhwa.dot.gov*)

NBIS Inventory #

Each structure over 20' measured along the center of the roadway is given a structure number assigned by UDOT Structures to track

inspections, maintenance, & projects (this also includes LG structures).

NEPA

National Environmental Protection Act
NEPA requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. (*epa.gov*)

NHS

National Highway System
This system of highways designated and approved in accordance with the provisions of 23 U.S.C. 103b. (*fhwa.dot.gov*)

Nonparticipating

Activities or items that are determined to be ineligible for federal participation and must be paid with non-federal funds. (*mdt.mt.gov*)

OA

Obligation Authority
The total amount of funds that may be obligated in a given fiscal year. This is comprised of the obligation limitation amount plus the amounts for programs that are exempt from the obligation limitation. (*fhwa.dot.gov*)

Obligation

A Federally committed dollar amount for a specific project sub-phase.

Obligation Limitation

An annual Congressional restriction or ceiling on the amount of Federal assistance that may be obligated during a specific period of time. This is a statutory budgetary contract that does not affect the apportionment or allocation of funds. Rather, it controls the rate at which these funds may be used. (*fhwa.dot.gov*)

On-Call Contract

A contract with a consultant for architectural / engineering services to perform particular tasks to supplement UDOT staff for peak periods or for particular expertise currently unavailable within the Department that may be billed to various projects. There are various limitations on this contracting method, which include, a) Contract limit, b) Project limit within the contract, c) Fee type is unit price, d) Selection rules still apply, e) Duration limit of one-year with the ability to extend for one additional year, f) No retainage is required.

Operating Costs

Project costs that are not used to fund the physical features of a roadway; such as studies, design, construction oversight, etc.

Orange Book Project

(See Pavement Preservation Program)
Preservation projects that include pavement and bridge preventive maintenance. Funding may consist of state and/or federal funds.

Out Year

Refers to a fiscal year in the future.

Overflow

Project cost in excess of programmed funding on Federal-Aid projects. Additional funding sources must be identified for overflow expenditures.

Overrun

An unexpected contract item cost that exceeds the contracted quantity due to an under-estimation of the item quantity. (*LoDaRy*)

OSR

Operational Safety Report
A report which includes a review of accident history, existing features, and a recommendation to correct these issues. OSRs are provided at the beginning of projects during the concept and scoping phases so that safety planning can be a part of the entire project development process. (*udot.utah.gov*)

PDBS

Project Development Business System
A UDOT software application that allows UDOT, its consultants, and contractors to document and control construction projects.

PDC

Project Design Criteria
Established state and national standards and procedures that guide the establishment of roadway layouts, alignments, geometry and dimensions for specified types of roadways in certain defined conditions; the principal design criteria for roadways are traffic volume, design speed, the physical characteristics of vehicles, the classification of vehicles and the percentage of various vehicle classification types that use the roadway. (*iowadot.gov*)

PDD

Project Definition Document
Defines the project scope, goals, metrics, and delivery method; identifies major potential

risks; provides a preliminary cost estimate; and establishes the schedule.

PE

Preliminary Engineering

Work necessary to advance a project from concept stage to award of contract. Includes scooping, planning studies, developing alternatives, environmental documentation, project design and preparation of all project plans and contract documents. (*Idaho DOT*)

PFV

Preliminary Final Voucher

Document generated by the Comptroller's office that defines all expenditures on a project. This differs from a final voucher in that consultant and/or utility contracts may not be complete at the time it is issued. This document precedes the final voucher.

PIN

Project Identification Number

Identification number assigned to a project in ePM.

PM

Project Manager

The individual responsible for the execution and completion of a project from cradle to grave, which involves managing a team comprised of UDOT employees &/or consultants.

PM Tech

Project Management Technician

The UDOT individual responsible to provide support services for the PMs in a given region.

PS&E

Plans, Specifications, & Estimates

Plans, Specifications and Estimates (PS&E) are the detailed plans and accompanying specifications and construction cost estimates which serve as documents for construction contract letting purposes. Plans are the contract drawings which show the location, character, and dimensions of the prescribed work, including layouts, profiles, cross section, other miscellaneous details, and quantity summaries. Specifications are the compilation of provisions and requirements for the performance of prescribed work. The estimate is a list of all bid items and quantities estimated bid prices, total cost for each bid item, and the total estimated cost for the proposed project. (*txdot.gov*)

Pass Through

Federal funds that are passed directly through UDOT to the receiving entity. The state never deposits the funds, but distributes them only. Example: The state receives funds from FHWA and distributes them to the City, County, private party, or other entity.

Pavement Preservation Program

Consists of preventive maintenance projects that includes that include pavement maintenance. Funding may consist of state and/or federal funds.

Pending Action

Anything entered into FMIS that is waiting for federal approval and/or authorization.

Planned Funds

Funds that are part of the Federal apportionment for a fiscal year. These funds are programmed in the STIP and ePM to be obligated with specific criteria set by FHWA.

Policy

Defines the broad guidelines by which the UDOT's administrative groups develop their administrative rules. (*udot.utah.gov*)

Post Audit (see Audit)

UDOT Internal Audit Division performs post audits on utility contracts (over \$25K) and consultant contracts (over \$250K). Contracts less than the threshold amount may also be selected for post audit if there have been past audit problems with an entity, the entity is not familiar with federal regulations, or otherwise selected for audit review.

Pro Rata

Proportional Ratio

The percentage at which federally funded projects are matched by either the state or local funds.

Procedure

States how policy will be implemented.

Program

Programs are approved on the STIP as an allotment of money that is designated for a certain type of work. Projects are then selected by a Program/Portfolio Manager based on criteria designated for that Program. (*UDOT PM Guide*)

Program Finance

The UDOT department responsible for the obligation and authorization of funding.

Project

Projects are approved individually on the STIP. A project is an effort, having a defined beginning and end undertaken to meet unique transportation needs. (*UDOT PM Guide*)

ProjectWise

A Bentley application that UDOT uses for project file management and collaboration.

Project Definition Document (see PDD)**Project File**

Hard and electronic copies of all required documents and necessary e-mails for a given project or program for program finance.

Project Value

The total funds available for a project.

Purple Book Project

Projects that address only the pavement surface, which includes resurfacing for asphalt pavements or work of similar scope and function for concrete pavements; work items are limited to pavement resurfacing and other work that is necessitated by that resurfacing. (*UDOT Purple Book Scoping & Development Process Guidelines*)

R-76

State-Only Funded Project Funding Authorization Form

Form generated by Program Finance and used by UDOT that authorizes the spending of state funds on a project.

R-77

Termination of Authority Form

Document generated by Program Finance after receipt of the final letter, or email from the PM for non-construction projects, that terminates the spending authority of a project.

R-709

Federal Funding Authorization Form
UDOT Form generated by Program Finance that authorizes the spending of funds on a program or specific sub phases of a project.

RE

Resident Engineer

The individual responsible for the day to day construction management of a project.

RFP

Request for Proposal

An invitation to contractors or consultants to submit a proposal on a specific project.

RFQ

Request for Qualifications

An invitation to consultants to submit a statement of qualifications on a specific scope of work for a project. The RFQ process is a qualifications-based selection following the Brooks Act in 1972, which requires that engineering firms are selected based upon their competency, qualifications, and experience rather than by price. (*Wikipedia*)

ROD

Record of Decision

The ROD (signed by FHWA) constitutes the official federal decision and action for the project under NEPA, meaning that FHWA and UDOT can proceed with right-of-way acquisition and final design of the project. (UDOT Environmental Process Manual of Instruction)

ROW

Right of Way

A division within UDOT Project Development who's primary responsibility is to acquire property needed for highway purposes and relocate displaced businesses or persons. The division is also responsible for the management of properties acquired, the oversight of local government highway projects using state and federal funds, utilities, access management, statewide permits, right of way plans, maps and records. (*udot.utah.gov*)

ROW, Acquisition

The process of acquiring real property (real estate) or some interest therein. (*UDOT Acquiring Property Brochure*)

ROW, Incidentals

Any expenses incurred from the acquisition of right of way, i.e. appraisals, relocation costs, closing costs, lawyer fees, etc.

ROW, Shotgun Estimate

Document created by the Right of Way agent when properties must be acquired for the building of roads. The property purchased could be multiple parcels that are fully or partially impacted by a road construction project. The shotgun is a breakdown of the costs of the acquisition. An R-709 must be submitted along with this document for requesting funds from FHWA.

RUE Engineer

Right of Way, Utilities, & Environmental Engineer that oversees Right of Way, Utilities, & Environmental.

Red Book Project

Safety Spot Improvement projects, which may include new signal equipment at warranted intersections, guardrail end treatments, intersection lighting route markers, school zone sign upgrades, turn lanes, shoulder treatments, passing lanes and other spot safety work.

Rescission

Legislation enacted by Congress that cancels the availability of budget authority previously enacted before the authority would otherwise expire. (*fhwa.dot.gov*)

Systems Planning & Programming (SP&P)

Division that supports UDOT's overall efforts through four major business areas: 1) monitor transportation system conditions, 2) identify transportation needs, 3) establish transportation plans, 4) determine program. (*udot.utah.gov*)

SR

State Route

Roads that comprise the state road system.

STIP

Statewide Transportation Improvement Program

UDOT's Statewide Transportation Improvement Program (STIP) is a five-year plan of highway and transit projects for the State of Utah. The STIP is approved by the FHWA and Federal Transit Administration (FTA) and includes all TIP projects as adopted by the Metropolitan Planning Organizations (MPO) and approved by the Transportation Commission.

SUE

Subsurface Utility Engineering

A branch of engineering practice that involves managing certain risks associated with utility mapping at appropriate quality levels, utility coordination, utility relocation design and coordination, utility condition assessment, communication of utility data to concerned parties, utility relocation cost estimates, implementation of utility accommodation policies, and utility design. (ASCE)

Scenic Byway

Roads designated on the National Scenic Byways Program (NSBP) that have outstanding scenic, historic, cultural, natural, recreational, and archaeological qualities. (*fhwa.dot.gov*)

Soft Match (see Flexible Match)**State Forces/Furnished**

State employed man power or state owned materials that may be used on a project. Must have justification for use, due to noncompetitive selection.

State Funding

Funding that will not be reimbursed by federal funds. No federal authorization is needed.

Stewardship Agreement

An agreement to formalize the roles and responsibilities of the FHWA, Utah Division and UDOT in administering the Federal Aid Program.

Sub Phase

Each project is sub divided into several phases. A sub phase denotes one of these divisions. Examples include: 01D for in house PE, 06K for construction, 03C for construction CE, etc.

T-725

Project Authorization Memo

Document that shows the breakdown of costs on each sub phase of a project along with the funding source/sources. This document is submitted to the Deputy Director for signature prior to the advertisement of the project.

TIF

Transportation Improvement Fund

The TIF was created in the 2005 Special Session by House Bill 1008 and contains revenue from legislative appropriations, sales tax and vehicle registration fees. These funds are used for maintenance, construction and reconstruction of state and federal highways as assigned by the Transportation Commission. (*udot.utah.gov*)

TIGS

Transparency in Government Spending

A UDOT website that shows the public how funds are being spent on projects.

TIP

Transportation Improvement Program

The Transportation Improvement Program is

a staged, multi-year, intermodal program of transportation projects covering a metropolitan planning area that is consistent with the metropolitan transportation plan. (*txdot.gov*)

TOC

Traffic Operations Center

UDOT central location for gathering traffic information using advanced technologies such as cameras and traffic and weather sensors. Operators use this information to monitor traffic, detect accidents/problems, and take actions necessary to return traffic flow to normal. (*udot.utah.gov*)

UDOT

Utah Department of Transportation
State agency that constructs roads, bridges, highways, paths, etc. for the state.

uGate

A UDOT software application which provides spatial and non-spatial data from throughout UDOT in one location.

uPlan

UDOT Planning Network
A UDOT developed web-based mapping and information tool designed to assist local agencies and UDOT during the transportation planning process

Unexpended Funds

Programmed funds on a project that have not been expended.

Utah Transportation Commission

A committee of members appointed by the governor to serve as part of an independent advisory committee which prioritizes projects and decides how funds are spent. (*udot.utah.gov*)

Utility Agreement

An agreement that establishes how a utility company will be partially or completely reimbursed for utility work required due to a UDOT project. Traffic lights, electricity, gas, sewer, rail roads, etc. are all considered types of utilities that may have an impact on a project. A utility agreement is created to determine what type of utility services will impact a road construction project. The utility agreements are usually between UDOT and the utility company and costs are typically reimbursed by UDOT to the utility company at 50% or 100%, although other ratios can apply.

VMS

Variable Message Sign

Electronic roadway signs that provide changing but specific information to roadway users. Messages are controlled by the TOC and may be used for the purpose of construction, incident management, traveler information and maintenance activities. (*cotrip.org*)

Various Routes

When a project has multiple routes that are not defined/mapable in ePM.

W10A

Federal Funding Balance Report
FMIS report that shows exact federal funding amounts obligated and remaining to be expended by the state.

W96A

Federal Authorization Form
FMIS report that shows all obligated funding on a project.

WFRC MPO

Wasatch Front Regional Council
The WFRC is an association of 60 cities and five counties organized for the purpose of pursuing goals of common interest. The WFRC area of service comprises Davis, Weber, Morgan, Salt Lake and Tooele Counties and the cities contained therein. (*wfrc.org*)

WTO

Work Task Order
A request for specific consultant work using a preapproved on call contract. (*LoDaRy*)

Yellow Book Project

Emergency UDOT bridge repair projects.

