

# MnDOT Scoping Process

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# Transportation Project Scoping Process

## Overview

### Definition of Project Scope

A project scope is a statement of what will be built as part of the project.

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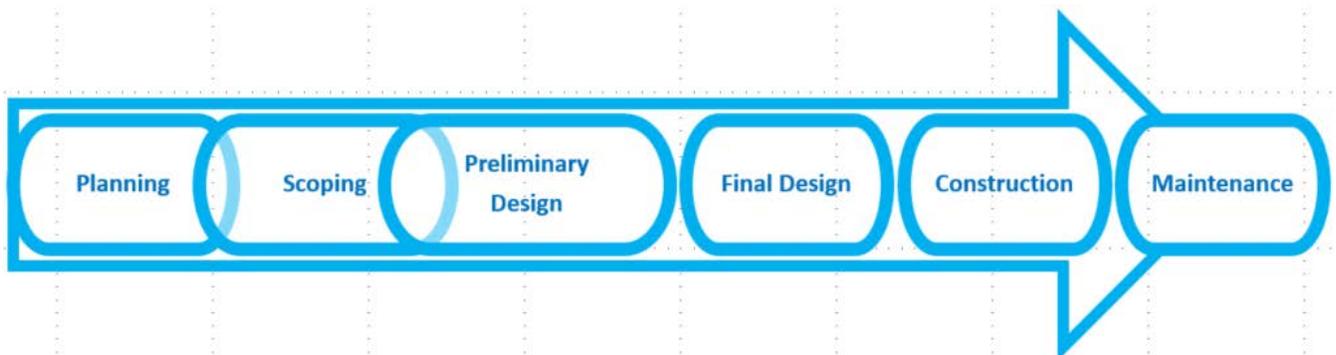
Scoping is the process of developing the project scope. It begins when a transportation need is identified and management decides to invest resources in addressing the need. Scoping is a stakeholder engagement activity that involves gathering engineering and environmental data and public input, analyzing the information, and following a decision making process to determine the scope of the project. It is complete when a preferred alternative has been identified and the construction work necessary to meet the project objectives has been defined and documented.

### Objective of Project Scoping

A well-defined project scope is critical to plan resources including staff time and funding to deliver the project. Each project is unique and requires thoughtful planning and execution of scoping.

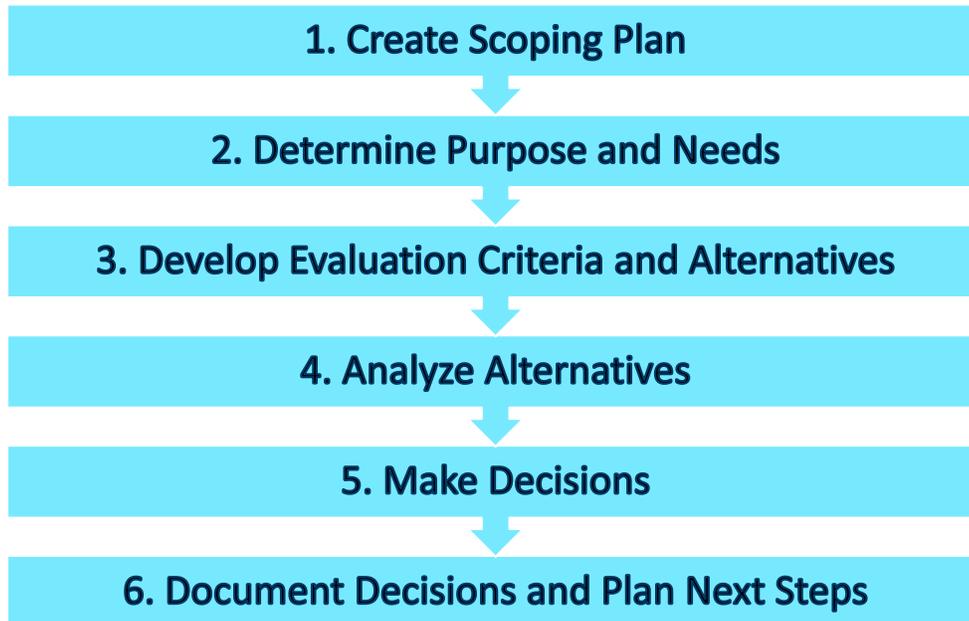
### Scoping within the Context of the Project Development Process

Scoping is an early part of the project development process that follows transportation planning, often overlaps with preliminary design, and guides the rest of the project development process.



## Scoping Process Overview

The scoping process is a systematic approach to gathering stakeholder, engineering, and environmental data, analyzing that data to guide decision making, and documenting the decisions. The process is summarized here and described in greater detail in later sections.



## Project Scoping Process

### 1. Create a Scoping Plan Customized for the Project

The purpose of this phase of the scoping process is to plan how scoping will be done on a given, specific, unique project. Each project has different needs and the scoping process below is intended to be customizable. Some tasks within each step will apply and some won't. Recognize that for some projects, scoping will involve elements of extensive preliminary design and extensive environmental review with iterative decision making. Project managers should consult with experienced staff to develop the scoping plan for their project.

- a) Read the [charter](#) and other background information, including any corridor plans or studies covering the project area.
- b) Consider the project [context](#) to identify other problems and opportunities.
- c) Assemble a [team](#) to develop the scoping plan and make scoping decisions. At a minimum this will include the sponsor and project manager.
- d) Identify [stakeholders](#) (internal and external) that will help define needs, develop alternatives, identify impacts, and guide decisions. This may have already been developed during planning.
- e) Determine how stakeholders will be engaged at each step in the scoping process and document in the public engagement plan.
- f) Develop a plan for scoping the project that will minimize risk of rework or budget issues including putting together a [P6 schedule](#) that includes the work of all district and statewide functional groups. Note that scoping complex projects may take several years.

## 2. Determine Problems/Opportunities and Goals (aka Purpose and Needs)

The purpose of this phase is to identify [problems and opportunities on the corridor and determine the goals of the project](#).

- a) Inform the stakeholders that a potential project is being scoped.
- b) Engage the stakeholders on what they see as issues and opportunities.
- c) Gather data related to identified issues and opportunities including safety and operational performance, asset condition, and environmental resources.
- d) Analyze collected data and compare data against the vision and plans for the corridor to define problems and opportunities. Write these out as a draft [needs statement](#).
- e) Determine which needs will be addressed as part of the project. Write this out as a draft [purpose statement](#).
- f) Inform the stakeholders on what we have heard from them and the results of the data analysis.
- g) Engage the stakeholders on the draft purpose and need.
- h) Finalize purpose and need.

## 3. Develop Evaluation Criteria and Alternatives

The purpose of this phase is twofold: 1) to determine the criteria for selecting a preferred alternative and 2) to identify alternatives that address the purpose and need.

- a) Identify objective and measurable evaluation criteria based on [technical performance](#).
- b) Identify [social, economic, and environmental \(SEE\)](#) areas that will be assessed during alternative evaluation
- c) Identify alternatives.
- d) Inform the stakeholders of the evaluation criteria, SEE areas, and alternatives.
- e) Engage the stakeholders to determine if they accept the evaluation criteria, have concerns about other SEE areas, and support the alternatives.

## 4. Analyze Alternatives

The purpose of this phase is to flesh out the alternatives, gather additional data, and assess the alternatives to select a recommended alternative.

- a) Lay out alternatives in enough detail to permit analysis of evaluation criteria and SEE impacts.
- b) Determine anticipated performance benefits of each alternative.
- c) [Estimate the cost](#) of each alternative.
- d) Identify potential [cost participation](#) requirements for partners.
- e) Assess the cost effectiveness of each alternative and determine whether it is practical to pursue.
- f) Assess alternatives against the evaluation criteria.
- g) Assess SEE impacts of each alternative if not already included in evaluation criteria.
- h) Identify remaining viable alternatives and a recommended alternative if one stands out
- i) Consult with Sponsor and FHWA (when necessary) on analysis and remaining/recommended alternatives to verify they will be supported.
- j) Inform the stakeholders of the alternative analysis results and remaining/recommended alternatives.

- k) Engage the stakeholders on the alternative analysis and remaining/recommended alternatives to obtain input.

## 5. Make Decisions

The purpose of this phase is to make the final decisions of what will be in the project scope.

- a) Consider stakeholder input
- b) Determine the preferred alternative.
- c) Inform the stakeholders of the preferred alternative.
- d) Identify specific construction and any environmental mitigation work to be performed to build the preferred alternative.

## 6. Document Decisions and Plan Next Steps

The purpose of this phase is to document the scope, the rationale for the decisions, and to plan the next steps to execute the project.

- a) Document the preferred alternative process and decision in the appropriate [NEPA/MEPA document](#) (if being developed in parallel with scoping).
- b) Document the specific construction work to be performed in the [Scoping Report](#).
- c) Document the cost effectiveness analyses made during the scoping process.
- d) Distribute the Scoping Report to relevant district and statewide functional areas for final review.
- e) Obtain Sponsor approval of the Scoping Report.
- f) Distribute the approved Scoping Report to team members.
- g) Identify project delivery work needed to complete the project (create a Work Breakdown Structure).
- h) Determine and document the delivery method (DBB, DB, CMGC).
- i) Prepare a schedule for project delivery following the [Project Scheduling Process](#).
- j) Prepare a total project cost estimate following the [Project Cost Estimating Process](#).
- k) Identify risks to scope, schedule, and cost and develop management strategies and update the schedule and estimate as needed following the [Project Risk Management Process](#).
- l) Update the [Public Engagement Plan](#) based on the completed scope and schedule.
- m) When the project is to be added to the STIP follow the [Project Budgeting Process](#).

## Scope Change Process

New information or changing opinions during the project delivery process may necessitate scope changes. The change process should be as orderly and thorough as the original scoping process.

- a) Identify if a modification constitutes a scope change by applying these criteria:
  - 1) Adds work that wasn't in the original scope or eliminates work that was in the original scope.
  - 2) Changes the dimensions of scope items (length, width, depth, number) such that it requires a budget change (see Project Budgeting Process).
  - 3) As determined by PM, PM Lead or Sponsor.
- b) If the change constitutes a scope change, revisit steps 1-6, especially:

- 1) Re-engage the stakeholders.
  - 2) Review environmental impacts.
  - 3) Review impacts to schedule and budget.
- c) Engage the project team to determine whether to recommend the scope change.
  - d) Obtain sponsor approval of the scope change.
  - e) Update other components of the project plan as necessary (e.g.: schedule, budget, documentation, etc.)
  - f) Inform stakeholders of the change

## Relationship to Other Processes

### Project Complexity Level

The [Project Budgeting Process](#) describes projects of three complexity levels:

- Level 1 – highest level of complexity with statewide implications
- Level 2 – moderate level of complexity with districtwide implications
- Level 3 – lowest level of complexity with minor risks

### Transportation Planning

Planning involves stakeholder engagement processes to develop goals for the transportation system and plans to achieve those goals. These efforts culminate in identifying projects to improve the transportation system. Broadly, the planning process progressively narrows the focus from system to project through these steps:

- Identify [strategic objectives, system goals, performance measures and targets](#), and [investment strategies](#).
- Identify a realistic vision for the corridor that is consistent with local and regional plans.
- Identify high level problems and opportunities through one (or more) of the following paths:
  - Planning studies – including corridor, regional, MPO, and other studies.
  - Asset management reviews – including the project selection process.
  - Identified standalone issues.
- Document identified problems and opportunities for a segment of the system in a [project charter](#).

### Asset Management

During planning and scoping [asset management](#) tools are used to identify problems with existing transportation assets and recommending potential rehabilitation and replacement options. Asset management consists of keeping a database of asset locations and condition, planning work to optimize dollars spent to maintain the asset over its expected life, and tracking work completed. Some assets are inspected regularly and the condition data is available for output during scoping. For other assets, the location data points functional group staff to assets that need review during scoping. Assets should always be field reviewed during scoping to ensure the location and condition information is correct before using it as a basis for decision making.

## Context

Roads do not exist in isolation. Roads are part of places where people live, work, learn, play and access services. It is important for MnDOT staff to understand the multiple, often overlapping contexts for each segment of road within the scope of their work. A road's context includes how it fits into the broader transportation system as well as the surrounding past, present and future communities, cultures, ecosystems and economies. A given highway project may have many different contexts along the length of the project.

Projects should result in facilities that fit the context in which they are built. Coming to understand the context through time on the ground, engaging with locals, and reviewing existing plans is critical to developing solutions that fit. For more guidance see the [Context Sensitive Solutions website](#), the [Complete Streets Policy](#), and the [Tech Memo on Land Use Context](#).

## Public Engagement

To determine what a project will entail, a project manager needs [to identify and engage people who have a stake in the outcome](#). This is an essential part of the scoping process. A stakeholder is defined as an individual, group, or organization, who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project. This includes both internal and external stakeholders. Project leaders identify stakeholders, assess the level of engagement necessary, develop a plan for informing and engaging them, and execute that plan. The public engagement plan is a living document and should be updated accordingly throughout the life of a project.

Throughout the scoping process guidance “inform” and “engage” are shown as separate steps in order to emphasize that they are not the same thing and to encourage optimizing engagement by getting information into stakeholders' hands ahead of needing to react to that information.

When it comes to decision making there are many good reasons why stakeholder input should influence the outcome. Below are typical reasons for why the recommended alternative may differ from what the evaluation criteria indicated based on stakeholder input:

- Multiple alternatives meet the purpose and need, are feasible, are prudent, and a preference is shown by the public for a somewhat equivalent alternative.
- Local partners who are expected to cost participate in the preferred alternative are not willing to contribute financially, and MnDOT isn't willing to pursue an exception to the cost participation policy.
- Local partners are willing to bring dollars to the table that make their desired alternative more attractive and MnDOT can live with it.
- Municipal Consent is required and the local jurisdiction has indicated in writing they are not supportive of the preferred alternative, and MnDOT:
  - Isn't willing to jeopardize a project's schedule
  - Isn't willing to damage the relationship
  - Is willing to make modifications to receive that support. (i.e. free rights at roundabouts)

- The MnDOT preferred alternative is too strongly opposed that the decision is likely to be overturned politically. This does not get the ideal solution, damages stakeholder trust, and reinforces for the stakeholders the political route for getting things done.

Some project managers shy away from extensive public engagement early on as a means of managing expectations. The idea is that by not asking for input we can avoid creating false hopes. The scoping process takes a different approach and reflects MnDOT's commitment and responsibility to involve those affected by our decisions in the process of making the decisions. The goal is to create trust by asking for input at moments in the process where it can influence our decisions and then being transparent in the decision making process.

## Environmental Review

MnDOT follows the intent of the [National Environmental Policy Act \(NEPA\) and Minnesota Environmental Policy Act \(MEPA\)](#) in that we consider immediate and ongoing effects on the social, economic, and natural environments in decision making. To do that the project team needs to acquire sufficient environmental information during scoping. For low risk projects this may only require input from the District Environmental Coordinator and possibly some coordination with the Office of Environmental Stewardship. On the other end of the spectrum are projects with multiple location alternatives that require complete environmental studies and a prepared NEPA document before scoping can be completed. It is the project manager's responsibility to understand the NEPA process and include it in the scoping plan as appropriate.

The [Highway Project Development Process \(HPDP\) website](#) contains extensive information about the wide range of environmental considerations. Those that most frequently impact scoping decisions include:

- [Cultural Resources](#) (historic properties, archaeology, aka Section 106)
- [Wetlands](#)
- [Threatened and Endangered Species](#)
- [Contaminated Materials](#)
- [Environmental Justice](#)
- Public Recreation Lands ([Section 4\(f\)](#), [Section 6\(f\)](#)) )
- [Public Waters](#)
- [Air Quality](#)
- [Noise](#)
- [Right of Way](#)
- [Impacts to Non-motorized Modes](#)

## Engineering

MnDOT's policy is to apply the principles and processes of [Performance Based Practical Design](#) (PBPD) in engineering decision making. "Performance Based" refers to developing solutions that solve documented performance problems. "Practical" refers to a financially sustainable design process at both the program and project levels. It means right-sizing, avoiding overdesign and underdesign, in order to optimize the use of public funds in solving problems and meeting needs. Designers applying performance based practical design follow these general steps:

- Identify problems by comparing measured performance against desired performance.
- Generating alternatives to address the problems.
- Determining the benefits of the alternatives and comparing them against estimated life cycle costs to identify the most cost effective alternatives.
- Providing the information generated to program managers to determine the priority of funding elements of the project against other system needs and goals.
- Documenting the decisions.

Engineering decision making involves progressive refinement. First decisions are made relative to design parameters, including:

- Design years
- Design/control vehicles
- Design speed
- Acceptable delay
- Gap acceptance
- Capacity

Then decisions are made relative to design elements, including:

- Lane widths
- Shoulder widths
- Median widths
- Bridge widths
- Pedestrian facility presence & width
- Bicycle facility presence & width
- Roadside geometry
- Horizontal and vertical alignments
- Sight distances
- Vertical clearances
- Interchange design
- Drainage features
- Pavement

## Project Management

Developing a complete scope is critical to subsequent project management processes. Schedule and budget problems are often the result of incomplete scopes.



## Scheduling

Using the scope a project manager can develop a work breakdown structure for the project. The work packages identified are used to pull in standard P6 work packages to build the schedule. For details on scheduling see the [Project Scheduling Process](#).

## Cost Estimating

The scope provides the basis for the construction cost estimate. The schedule provides the basis for the project delivery cost estimate. When there is a scope change the estimate needs to be reviewed and potentially updated. For details on cost estimating see the [Cost Estimating Process](#).

## Risk Management

Project risks include potential changes the scope, potential changes to the schedule, and uncertainty in unit costs and quantities. Risks identified during scoping should be captured in a risk register and a plan developed to manage those risks. Common risks are for additional scope that may be determined necessary as design progresses. Risk management strategies include allowing additional schedule time and cost contingencies in the budget. As risks are realized or retired, the scope, schedule, estimate, and budget should be reviewed for possible changes. For details on risk management see the [Risk Management Process](#).

## Budgeting

The budget is the sponsor approved funding allowance for the project. This is set before projects enter the STIP. Changes in project scope, schedule, and cost estimate may result in budget changes. For details on budgeting see the Project Budgeting Process.

## Programming

A complete scope is necessary to determine when a project can be let and how much it will cost. Therefore, scoping precedes scheduling and budgeting. In order to set a budget, scoping should be complete before the project enters the [State Transportation Improvement Program \(STIP\)](#) unless it is funded with setaside funds in which case it is scoped when those funds are converted to specific projects.



# Practical Guidance for Successful Scoping

## Identify the Sponsor, Project Manager, and Scoping Team

Key roles in the scoping process is the Sponsor and the Project Manager. The Sponsor is accountable for the scope and is the final approver of the scoping report. Identification of the Sponsor needs to happen before scoping commences, based on the project complexity level. The Project Manager is responsible for developing the scope and leads the team in recommending a scope for approval by the Sponsor. The scoping team consists of the sponsor and project manager and any other individuals deemed necessary to set the direction for scoping and decision making. There may be many others that contribute to developing the scope, but the scoping team are those managing that development.

## Provide Adequate Resources

Functional group leads need to dedicate resources to scoping. The process requires people to carry it out. This means shifting resources to earlier in project development. This is the responsibility of functional group leads and the managers that direct resources.

## Utilize Experienced Staff

It is impossible to capture in a process the nuances of what can become challenges during scoping and later in project development. Utilizing experienced staff as part of the scoping team and as participants in the scoping process will help a project manager foresee potential issues. Every project manager should have an experienced mentor.

## Start Early Enough

The time and effort needed to complete scoping before the project appears in the STIP is highly variable depending on the complexity of the engineering, environmental, and public issues. Here are some rules of thumb:

- The simplest of projects involving a single problem and straightforward solution may only take a few months to scope.
- Rural preservation projects can be scoped in a year.
- Projects in urban areas or involving intersection modifications usually require two years to scope.
- Some districts start scoping a minimum of two years before the project enters the STIP to allow for discovery of complexity.
- Projects with greater potential for environmental impacts and controversy often require more than two years to scope and should be allowed plenty of time to investigate and analyze the issues and complete environmental documentation.
- Take some time when the project enters the CHIP to determine when to start scoping it.

## When Time is Limited – Focus on Highest Risks

What if you are given a project and don't have enough time to scope it properly?

- Some scoping is better than no scoping. Step 1 in the Scoping Process should be carefully planned to focus limited time on the highest risk items.
- Remaining risks should be captured in the risk register and systematically managed.

## Big Projects are Hard

Allow a lot of time. Make a plan. Line up the resources. Be flexible. Document well.

## Focus on Problems and Goals

Identifying problems and agreeing to what the project will solve is critical for scoping decision making. This starts with developing a vision for the corridor (usually as part of planning), then gathering data to discover where the reality falls short of the vision (the problems), and finally deciding which of those problems to fix with the project (the goals). Alternative evaluation criteria should relate to these goals. Keeping a focus on the problems and goals during scoping and throughout project development reduces distractions that slow down decision making and result in scope bloat. The following are desirable components of a corridor and how problems are identified.

<b>What People Want</b>	<b><i>How Problems are Identified</i></b>
Smooth Pavement	Ride Quality Index (RQI), Surface Rating (SR), field review, cores, pavement degradation curves
Safe Bridges	Condition rating, field review, BRIM
Safety	Multi-modal crash data, geometric deficiencies, guardrail inventory, structure inspection, field review
Reliable Travel Time	Congestion, modeling, signal warrants, speed studies, field review
Effective Driver Guidance	Pavement marking retroreflectivity, sign retroreflectivity, signal system logs, ITS logs, connected vehicle device logs, field review
Accessibility (ped, bike, transit, freight)	Sidewalk inventory, volume data, fare data, complaints, user surveys, field review
Good Drainage	Condition ratings, complaints, field review
Aesthetically Pleasing	Complaints, field review, noise levels
Environmentally Sustainable	Emissions

## Sometimes the Answer is No

In the scoping process we seek to identify all the problems and opportunities that exist in the project area. However, the project cannot typically fix everything. Some proposed goals or scope items will be considered but rejected. It is still worth asking the questions so all partners are aware of the issues and the rationale for the decisions. And sometimes the process will identify problems and goals that are beyond what can be addressed through the project, but there may be other means to solve the problem such as playing a convening or supporting role for other agencies.

## Considered but Rejected

When the answer is no, it is imperative to document items that were considered but rejected along with the reasons why. There is space in the scoping report for this. If not documented, the topics re-emerge and, when people don't recall the reasons, the whole discussion begins again.

## What's Good for the Project May Not Be Good for the Program

Some proposed project elements can be very good for the project and have a high benefit/cost ratio, but from a program perspective they aren't the top priority. The [State Multimodal Transportation Plan \(SMTP\)](#) breaks the work down into Objective Areas and the [Minnesota State Highway Investment Plan \(MnSHIP\)](#) further breaks project elements out into Investment Categories. The distribution of funds between these categories is provided in the MnSHIP guidance. Project sponsors or others responsible for program management may say no to proposed scope items on a project in order to align overall program spending with the MnSHIP targets.

What People Want	MnSHIP Investment Category	SMTP Objective Area
Smooth Pavement	Pavement Condition	System Stewardship
Safe Bridges	Bridge Condition	System Stewardship
Safety	Traveler Safety	Transportation Safety
Reliable Travel Time	Twin Cities/Greater MN Highway Mobility	Critical Connections
Effective Driver Guidance	Traveler Safety	Transportation Safety
Accessibility (ped, bike, transit, freight)	Bicycle/Accessible Pedestrian Infrastructure	Critical Connections
Good Drainage	Roadside Infrastructure Condition	System Stewardship
Aesthetically Pleasing	Regional and Community Improvement Priorities Needs	Healthy Communities
Environmentally Sustainable	Regional and Community Improvement Priorities Needs	Healthy Communities

## Make Decisions

The following items should be resolved before scoping is considered complete:

- Construction Scope Items – specified in enough detail in order to prepare a cost estimate and schedule and to guide subsequent design efforts:
  - Geometric changes – alignment, profile, turn lanes, inslopes, etc.
  - Intersection Control modifications – signal, roundabout, RCUT
  - Roadway Structure – milling, reclaiming, recycling, grading, paving, aggregates, edge drains including mainline, shoulders, turnlanes, ramps, side roads, entrances
  - Bridge – for each bridge in limits: Work/No Work, Bridge Work Type, Accelerated Bridge Construction
  - Pedestrian Facilities – upgrade pedestrian ramps, driveway cross slopes, replace sidewalks, new sidewalks, widen shoulders, countdown timers, APS
  - Bicycle Facilities – sidepath/trails, bike lanes, wide shoulders
  - Transit Facilities – pullouts, shelters, pedestrian access to stops
  - Roadside Infrastructure
    - Access changes
    - Guardrail
    - Signing
    - Lighting
    - Fencing
    - Retaining walls
    - Noise walls
    - Blowing snow mitigation
  - Drainage Improvements
    - Culvert repairs
    - Storm sewer repairs
    - Stormwater ponds
  - Local infrastructure improvements (city utilities, other streets)
  - Railroad work – approaches, bridges, shoo-fly
- Traffic Control and Detour
- Major utility moves
- Right of Way Acquisition – likely or not, approximate acres, major sites
- Work items considered, but not included in construction scope – explain why
- Cost effectiveness analyses

## Require Accountability

With a scoping plan that identifies roles and timelines, the PM should track to make sure deliverables are on time and complete. If not, the PM needs to engage with the people responsible early on because without the information, decision making will suffer and the likelihood of scope change, rework, schedule slips, and budget changes increases.