

11-1 General/Introduction

Maintenance operations staff are major stakeholders as they utilize, maintain and operate the facilities/assets that are designed and constructed throughout the lifecycle of the assets. They also have a personal connection and vested interest as they live in the communities they serve.

Given the nature and cost of maintaining assets throughout their lifecycle, as well as the inherent exposure to staff during maintenance and operational activities, it is important for designers to consider maintenance and operations staff as major stakeholders in every project.

11-2 Maintenance and Preservation Roles

Maintenance considerations should be included early in the design process, capitalizing on the intimate knowledge the crews have from being the “boots on the ground” experts that maintain and care for the highway infrastructure throughout its lifecycle.

- Maintenance describes work that is performed to maintain the condition of the transportation system or to respond to specific conditions or events that restore the highway system to a functional state of operation. Maintenance is a critical component of an agencies asset management plan that is comprised of both routine and preventive maintenance. Preventive maintenance is a pro-active cost-effective means of extending service life.
- Preservation consists of work that is planned and performed to improve or sustain the condition of the transportation facility in a state of good repair. Preservation activities generally do not add capacity or structural value, but do restore the overall condition of the transportation facility.

Organizational roles are key when communicating within the department. As it is with Engineering, Maintenance has multiple specialty groups, each with focused expertise and specific needs that are relevant to different highway assets and projects. When Regional Area offices are involved with reviewing a project, Maintenance should extend the communication past the superintendents and supervisors. All crews should be contacted as knowledge of regional area highways is spread across all groups:

- Traffic Operations
- Bridge Crews
- Signal Crews
- Striping Crews

11-3 Communication and Coordination

Maintenance has knowledge that is key to the fundamental components of plan development. The historical, systematic, and problematic areas and assets that exist on WSDOT routes are maintained by regional area crews. They have the knowledge of the day to day tasks necessary to sustain our highway infrastructure.

The following questions are covered in *Design Manual Chapter 301* (DM 301), which is a critical chapter to Maintenance that cannot be overlooked:

- Who are you communicating with?
- What methods of communication are being used?
- What is being communicated?
- How are you responding to communication?
- Where is the communication taking place?
- When does the communication need to occur to maximize effectiveness?
- Is the roadway experiencing any reoccurring maintenance issues?
- Are there drainage concerns?
- What other problems are present that may not be known?

All these are questions that the Regional Area and Maintenance Operations crews have intimate knowledge of, and live every day while at work.

The earlier Maintenance is heard the better for the designer to work in concerns and issues important to maintaining the highway infrastructure. Engage design staff early in the project design phase (prior to 30% design) to communicate maintenance issues potentially impacted or addressed by the project, and to establish expectations with respect to maintenance staff involvement through the entire design process. Review the project management plan (where available), and provide input on how region maintenance staff intend to get involved during the design phase. Contact region program management regularly to identify projects that will be scoped soon, and work with project scoping staff to determine how best to engage projects of interest.

11-4 Practical Solutions for Practical Decision Making

Practical Decision Making is an approach that considers each situation, aligns with a financially constrained budget environment, and encourages incremental, flexible, and sustainable investments by focusing on identified performance needs and engaging stakeholders at the right time.

In the case of Design and Maintenance coordination, Practical Decision Making aligns with the department's intention to deliver a scalable approach to the design delivery process that integrates across all divisions, including Operations and Maintenance, Environmental, Planning, and Engineering. It also assumes an approach to program investments that incorporates asset management and lifecycle costs that inform identification of performance measures and goals on a project level, as well as department wide.

Practical decision making occurs every day in the life of Maintenance personnel, from the amount of salt applied to the roadway, bridge deck patching, pavement repair, materials and equipment used; basically all actions in a given day.

11-5 Asset Management

Asset management is a strategic, risk-based approach to cost-effectively and efficiently manage the assets of Washington's transportation system. WSDOT uses transportation investment strategies to preserve and maintain the system on an ongoing systematic basis. Preserving the state's transportation assets saves money while maximizing performance across the transportation network. WSDOT considers asset management a key component of Practical Solutions, as a way to cost-effectively manage the assets of the transportation system.

Maintenance operations staff will need to maintain the assets placed or retained within a project location. It is important to make design aware of the various asset management systems:

- Maintenance Management System (HATS)
- Signal Maintenance Management System (SIMMS)
- Maintenance Productivity Enhancement Tool (MPET)
- Traffic Sign Management System (TSMS)

The asset management system reviews are necessary to confirm:

- Asset management and life cycle costs
 - How maintenance costs drive life cycle costs
 - If construction does not account for maintenance costs then life cycle costs are driven up

Asset Information should be compiled into an owner's manual for maintenance to reference (see DM 301.03(2)(e).

11-6 Design and Build for Maintainability

When reviewing a scoping or design project, maintenance needs to provide designers an understanding of the full life cycle costs for maintaining different assets/features.

Maintenance needs to communicate with design the following issues:

- The frequency of maintaining the asset
- Labor costs
- Material costs
- Traffic control costs
- Utility costs
- Accessibility
- Equipment Considerations:
 - cost to repair if equipment owned, rental costs
 - purchase cost of new equipment needed specifically for specialty designs
 - Cost of procuring replacement parts for the asset

Maintenance needs to attend or participate with program management and design meetings from the planning stage and scoping, all the way through to the pre-contract review or 90% of PS&E development. The expectation should be documented in the project management plan.

Document and record all concerns and recommendations Maintenance has with projects. Examples of checklists and input can be found in [DM 301](#) - Exhibits 301-1 through 301-3.

Maintenance needs to be part of the solution, engagement with boots on the ground, even if all things Maintenance would like to see done cannot be completed.

Design deliverables expectation matrix covers the level of coordination needed between design, maintenance, and construction. The matrix exhibits maintenance at different phases of construction, with maintenance activities like snow and ice, veg. management, etc.

**Deliverables Expectations Matrix on the Project management website provide the link – wsdot.wa.gov/sites/default/files/2021-11/DeliverablesExpectationsMatrix.pdf

11-7 Examples of Maintenance Challenges

- Construction of a high mast lighting on SR 405 and Maintenance not having the man lifts to complete PM's or repairs, 100' mast height installed instead of 75'.
- Operational Right of Way
 - Reducing shoulders- reduction of a 6-8 foot shoulder to 4 foot- goes from being able to pull over and maintain assets vs. full traffic control to complete maintenance work
 - Maintaining accessibility to assets- being able to get to storm water pond, electrical service, cable barrier, etc.

See Below- Picture of the round about what should be used to implement solutions to reduce asset life cycle costs.



Roundabout with Landscape –increases lifecycle/maintenance costs.

Solutions are often available to reduce asset life cycle costs. For example, in the case of this roundabout, the most practical landscaping solution was to have the center areas hardscaped, rather than planted with non-native species which usually require ongoing and labor intensive maintenance. However, hardscapes can also attract weedy species that may not be desirable to the local community, and degrade the visual quality, resulting in the need for regular and long term application of herbicides. In that case, there are other options that can mitigate long term maintenance. In urban locations for example, project offices may negotiate a Maintenance Agreement with the local jurisdiction establishing their commitment to planned maintenance tasks and timing. In the case of rural locations where WSDOT is expected to maintain the area, planting low-maintenance vegetation may be another option.



Roundabout with hardscape- reduces life cycle/maintenance costs.