



FDM 11-52-1 Intelligent Transportation Systems (ITS) Guidance

August 15, 2019

The purpose of the Wisconsin DOT Intelligent Transportation Systems Design and Operations Guide is to familiarize engineers with ITS elements and the process and information necessary to design and implement Intelligent Transportation System (ITS) elements for WisDOT. The intended audience for the guide is WisDOT regional traffic staff, regional project development staff, and consultants. The guide is written at a level that assumes working knowledge of signal design, roadway signing design, and electrical design as it applies to roadway design and installation elements. Information about the following ITS elements are included in the guide:

- ramp meters,
- system detector stations
- closed-circuit television cameras
- dynamic message signs
- portable message signs
- dynamic trailblazer signs
- ramp gates
- crash investigation sites
- law enforcement pads
- roadside weather stations
- smart work zones

The Division of Transportation System Development - Bureau of Traffic Operations (DTSD-BTO) Traffic Engineering Section, maintains the guide. The developer is required to contact WisDOT BTO for any ITS inquiries after determining the need for such ITS devices.

The ITS Design and Operations Guide can be found at:

<https://wisconsin.gov/Pages/doing-business/local-government/traffic-operations/manuals-and-standards/its/its.aspx>

FDM 11-52-5 Traffic Engineering, Operations and Safety Manual (TEOpS)

August 15, 2019

The Traffic Engineering, Operations and Safety Manual (TEOpS) contains policy, guidelines and procedures related to traffic engineering and related functions as practiced within the Wisconsin Department of Transportation. More specifically, the region field and office forces of the Division of Transportation Systems Development, the staff of the Bureau of Traffic Operations, and other agencies of the Department which may be involved in traffic engineering. Traffic engineering functions include the installation and maintenance of traffic control devices, highway lighting facilities, traffic regulations, safety analyses, and support for the improvement program.

The TEOpS manual can be found at:

<https://wisconsin.gov/Pages/doing-business/local-government/traffic-operations/manuals-and-standards/teops/default.aspx>

FDM 11-52-10 Traffic Signal Design Manual (TSDM)

March 4, 2009

The guidance supplied by the Traffic Signal Design Manual (TSDM), is based on established practices of the Wisconsin Department of Transportation and is supplemented by research. It is applicable to all types of new traffic signal installations and revisions. The TSDM does not describe all possible situations; rather, it is intended to promote sound engineering and uniformity in the design process and operational aspects of traffic signals on the State Trunk Highway system in the State of Wisconsin. This document does not constitute a legal standard, specification, or regulation.

The TSDM can be found at:

<https://wisconsin.gov/Pages/doing-business/local-government/traffic-operations/manuals-and-standards/tsdm/tsdm.aspx>

15.1 General

15.1.1 Overview

The Operations Certification Process (OCP) is a performance-based, data-driven process for determining whether to consider the inclusion of operational-driven intersection or mainline improvements as part of a project already prioritized for program approval for non-operational reasons. The process includes quantifying alternatives, monetizing the resulting operational benefits, completing benefit-cost comparisons of the alternatives, and documenting decisions and judgements made throughout the process.

The OCP is for use on locations where a less than desirable level of operation may exist and has the potential for improvement through geometric modifications or a change in traffic control. These locations, known as Operational Sites of Promise (OSOP), can be generated through local knowledge, or can be identified through the WisDOT network screening tools.

The OCP applies asset management and traffic operational benefit-cost metrics to determine if the proposed improvements provide sufficient benefit to the State Trunk Network (STN) to validate consideration for prioritization and to justify partial or total State Highway Rehabilitation (SHR) improvement funding.

The regional analyst does not need to complete the OCP for every location identified as an OSOP. However, unless other asset management certification processes (pavement treatment, safety, bike/pedestrian needs, structures, etc.) can justify the improvement, regional staff must complete the OCP to warrant inclusion of any operational-driven improvement as part of a perpetuation or rehabilitation project.

WisDOT's Bureau of Traffic Operations - Traffic Analysis and Safety Unit (BTO-TASU) is the lead for the OCP. Direct any questions regarding the OCP to DOTTrafficAnalysisModeling@dot.wi.gov.

15.1.2 Purpose

The primary purpose of the OCP is to assess the asset management validity of intersection or mainline improvements solely intended to fix an operational issue on the STN. The improvements must address the operational issue without degrading the overall safety.

15.1.3 When to Apply

15.1.3.1 Typical Applications

Identification of an operational site of promise alone does not trigger the need to complete the OCP. The OCP becomes required when there is a desire to include operational-driven improvements as part of a perpetuation or rehabilitation project. These improvements could include geometric modifications or a change in traffic control.

If completed, the OCP is a certification element necessary for the Final Scope Certification (FSC) approval as it helps to define an improvement project's purpose and need. Mainline facilities, intersection, or interchange improvements can have significant impacts on scope, schedule, and budget. WisDOT regional staff should apply the OCP as early as possible during the Financial Integrated Improvement Program System (FIIPS) Life Cycle 10 (LC10) to maximize the time that the Programmatic Scoping and FSC processes have for identifying all the resultant scoping impacts from any OCP justified improvement. If any improvements trigger an Intersection Control Evaluation (ICE) analysis, complete the OCP in conjunction with that effort. For additional information on the ICE process, see [FDM 11-25-3](#).

15.1.3.2 When Not Applicable

The OCP is not applicable for modernization projects; however, the WisDOT regional analyst can use the OCP economic appraisal tools to evaluate the potential benefit of operational improvement alternatives under consideration.

15.1.3.3 Local Considerations

Local agencies can follow a process similar to the OCP to evaluate operational improvements along their local roadway network; however, since the focus of the OCP is on the STN, use of the OCP tools may require modification to address local needs. WisDOT's BTO-TASU is available to provide guidance to the local agency on the OCP and associated tools; however, completion, review, and approval of any documentation on the analysis methodology and results is the responsibility of the local agency.

15.1.4 Acronyms

Table 1.1 provides common acronyms that are used throughout the Operations Certification Process.

Table 15.1 Acronyms

Acronym	Definition
BTO	Bureau of Traffic Operations
FSC	Final Scope Certification
OCP	Operations Certification Process
SHR	State Highway Rehabilitation
STN	State Trunk Network
TASU	Traffic Analysis and Safety Unit
TEOpS	Traffic Engineering, Operations and Safety Manual

15.2 Policy

To be considered for inclusion in an approved perpetuation or rehabilitation project, operational improvements must satisfy the following three safety and operational checks:

1. Safety-only benefit-cost ratio must be 0 or greater
2. No increase in fatal and injury (KABC) crashes calculated in accordance with [FDM 11-38](#)
3. Combined operations and safety benefit-cost ratio must be 3.0 or greater

The project scope can include operational improvements with a benefit-cost ratio of less than 3.0, provided funding of the improvements is through 100% local cost-share or through another approved non-STH improvement funding source. This will require a signed State Municipality Financial Agreement within the FSC to document the local share for the scope of the operational improvements.

Refer to [WisDOT's Traffic Engineering, Operations and Safety \(TEOpS\) Manual 16-30](#) for a detailed description of the OCP policy.

15.3 Documentation

15.3.1 Operations Certification Summary

The purpose of the Operations Certification Summary is to articulate the purpose and need of the proposed improvements. A successful purpose and need clearly defines the system's needs, identifies the negative impacts to the system from those needs, and describes how each proposed improvement works individually and in harmony with any other individually proposed project improvements to cost effectively resolve the need.

The Operations Certification Summary must clearly explain and robustly justify the inter-dependent necessity of each improvement. The Operations Certification Summary shall identify the specific existing operational problem(s) at the operational site of promise, define the proposed improvements, and clearly illustrate how the improvements directly reduce or eliminate the operational problem(s) without degrading the overall safety of the operational site of promise.

The reason for requiring this type of documentation is illustrated in the following ways:

- It is very possible that one improvement element out of the several proposed for a site could be singularly generating more than the required benefit-cost ratio. Satisfying all the required checks within the OCP, should not arbitrarily allow the inclusion of other proposed improvements.
- The Operations Certification Summary must explain how and why all the individual improvement elements are necessary for the totality of the project as proposed.
- Failure to clearly identify and explain those engineering and operational linkages within the Operations Certification Summary could result in the rejection of some or all the proposed improvement elements.
- State Statutes 20.395(3)(cq) and 20.395(3)(cx) prohibit WisDOT from spending SHR-improvement funds on the local system without having documented justification on the direct STN benefits that expenditure provides. If the proposed project includes improvements to the local system, the Operations Certification Summary must clearly articulate the inter-dependent necessity of those

improvements to the total project and how they provide direct operational or safety benefit to the STN to justify any expenditure of SHR Improvement funds on them.

An Operations Certification Summary template is available to guide the user on the content and format for the Operations Certification Summary itself. The [Operations Certification Summary template](#) and [guidance document](#) can be found on the following web pages:

- <https://wisconsindot.gov/Pages/doing-bus/local-gov/traffic-ops/manuals-and-standards/manuals.aspx>
- <https://wisconsindot.gov/Pages/doing-bus/local-gov/traffic-ops/programs/analysis/default.aspx>

Submit the Operations Certification Summary as an attachment to the Safety and Operations Certification Document and submit to BTO-TASU for review. See [FDM 11-38-15](#) for additional details on the Safety and Operations Certification Document.

15.3.2 Operations Certification Amendment

An amendment must be submitted if WisDOT regional staff want to consider other alternatives or additional operational improvements after the Safety and Operations Certification Document has been signed and the Operations Certification Summary has been approved. The new alternatives or additional operational improvements will need to follow the OCP. Document the results in the Operations Certification Summary amendment and attach to the Safety and Operations Certification Document amendment (see [FDM 11-38-15.2, Attachment 10.6](#)). If the project is still within the scoping phase, the WisDOT regional analyst shall include the amended Safety and Operations Certification Document within the FSC. The amended Safety and Operations Certification Document will supersede the original. If the amendment occurs after the scoping phase, the WisDOT regional analyst shall document the amended Safety and Operations Certification Document within the Design Study Report and environmental document, as appropriate.

15.3.3 Approval Process

The OCP serves as an aid, not an absolute determinant, in the WisDOT SHR Scoping process. The OCP identifies when it is a valid asset management consideration to add the proposed operational improvements to a perpetuation or rehabilitation project.

Inclusion of operational improvements in the project's scope requires BTO-TASU approval of the OCP analysis methodology, Operations Certification Summary, and Safety and Operations Certification Document. BTO approval; however, does not guarantee funding. The regional programming unit (3R Program) or the Bureau of State Highway Programs (Backbone Program) has the final approval for including operational improvements into the FSC. WisDOT regional staff should work with the respective programming sections early in the process to discuss the system health impacts of adding additional operational improvement project costs to the program.