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# TRAFFIC SIGNAL BRIEF

Tech Brief Series

Tech Brief - 2018-3

## Developing a Traffic Signal Management Plan

The purpose of a Traffic Signal Management Plan (TSMP) is to provide a framework for delivery of high-quality service to the public through an efficient and well-maintained traffic signal system. The plan describes the objectives of traffic signal management within the context of an organization’s goals and sets out strategies to guide the maintenance, design and operation of the traffic signal system. It also defines appropriate measures of performance to determine the extent to which the objectives are being met.



For an agency’s management and the public, the TSMP shows how all the system management activities support the agency’s goals and defines specific objectives for traffic signal management. For agency staff, the TSMP describes in detail the strategies they will employ while maintaining, designing and operating system.

## Why Do I Need a Traffic Signal Management Plan?

To receive federal funding for traffic signal projects, Title 23 of the Code of Federal Regulations requires that agencies follow a Systems Engineering (SE) process. Systems engineering is a process used to successfully construct, implement, and maintain a system. It is used to ensure that the right system is built, on time and within budget, while considering how it will be operated over its life cycle. In a nutshell, the SE process ensures that the user can figure out what they truly need and get what they pay for.

In Connecticut, adherence to the SE process is only demonstrated through development and approval of the CTDOT/FHWA Systems Engineering Analysis Form (SEAFORM). Consideration of a well-developed TSMP is a component of the SEAFORM.

## Why Are Some Agencies Successful?

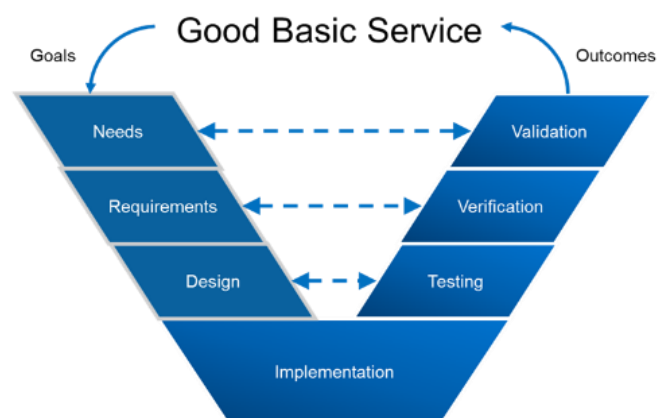
An FHWA study found that organizations that were most successful in operating and maintaining their traffic signal systems, regardless of their level of resources, all had the following characteristics:

- ⇒ Strong concept of basic service;
- ⇒ Clear evaluation of objectives;
- ⇒ Close coordination of design, operations, and maintenance resources and limitations;
- ⇒ Good understanding of measuring; and
- ⇒ Commitment to staff development.

The development of a TSMP promotes the development of these characteristics.

## What is Good Basic Service?

The short answer is that **given a set of resources, do what is most important**. The definition of “important” is up to the agency to determine, but it should align closely with user expectations. The most effective agencies place a high priority on providing good basic service first before attempting advanced service techniques. Defining what basic service means and then committing to it helps optimize the use of available resources where they will have the most impact to the user.



## Clarity of Objectives

From their definition of basic service, successful agencies craft clear objectives that describe what needs to occur to accomplish those goals. Objectives for traffic management typically relate to:

- Preserving a state of good repair, i.e. maintained to a minimum threshold;
- Moving traffic in accordance with motorist expectations; and
- Designing infrastructure to achieve operations and maintenance objectives.

### Good Objectives have SMARTS!

**Specific:** Provides sufficient detail to formulate viable alternatives without dictating approach;

**Measurable:** The objective facilitates quantitative evaluation;

**Agreed:** There is stakeholder consensus on a common objective;

**Realistic:** The objective can reasonably be accomplished within the limitations of resources and other demands;

**Time-related:** The objective identifies a timeframe within which it will be achieved;

**Sustainable:** The objective can continue to be achieved and is not a one-off improvement.

## Design, Operations, and Maintenance Coordination

Each agency must develop strategies that put the capabilities in place to implement their objectives. These strategies should be mutually supportive. Successful agencies avoid constructing infrastructure elements that cannot be maintained, and they avoid operations that demand such infrastructure and maintenance.



## Measuring Results

There needs to be a clear evaluation of how the operations meet objectives. The evaluation may be quantitative or qualitative, but measures must be directly linked to the objective and how the system is operating according to design. Examples of maintenance-specific performance measures are provided below:

Maintenance Performance Measure	Target	Timing
Time to respond to emergency calls	Varies by type of reported fault	Report monthly
Time to provide requested information (e.g., mark underground facilities)	Three days	Report monthly
Number of staff trained to maintain equipment, by type	Varies by type of equipment	Report annually
Time to clear failures, by type	Varies by type of fault	Report monthly
Detector status report Tabulation of maintenance work orders	Fix detection problems before public notices	Report monthly
Report equipment and spares inventory, actual vs planned.	Zero variance	Report quarterly
Report staff status actual vs planned	Zero variance	Report quarterly



# Measuring Results

The Connecticut DOT is in the process of developing a new Traffic Signal Management Plan for state-owned assets. A workshop was held at CTDOT Headquarters in Newington on November 8 and 9, 2018, to kick off the process and discuss goals, objectives and strategies.

## How Can I Get Started?

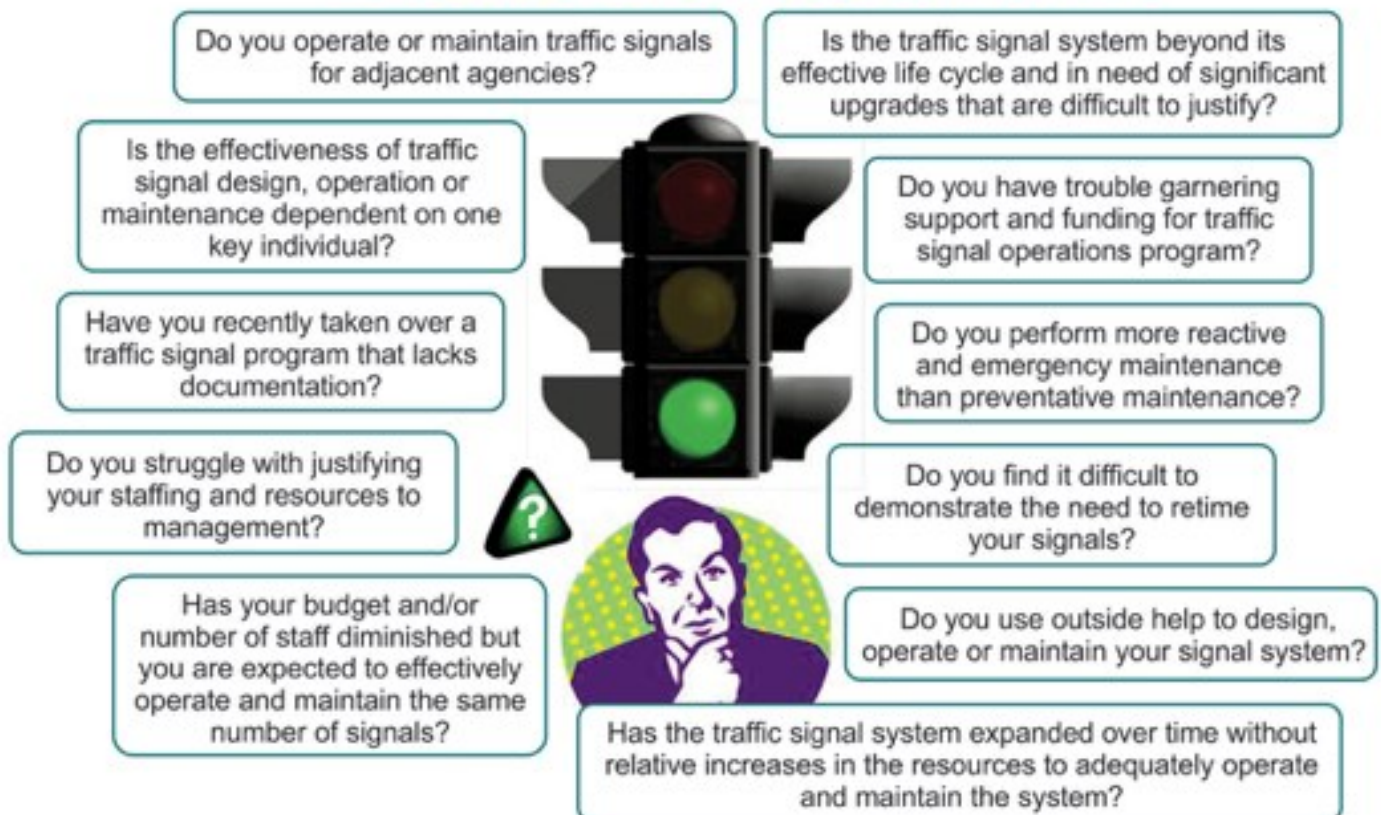
The T2 Center has worked with several municipalities to draft TSMPs for their communities. The TSMP for the City of New Britain is complete and has been approved by the city council. It can serve as a starting point for other municipalities and is provided as a resource below. Additionally, the Traffic Signal Circuit Rider is available to assist individual municipalities in developing their TSMPs. For assistance, contact Theresa Schwartz, PE, PTOE at [theresa.schwartz@uconn.edu](mailto:theresa.schwartz@uconn.edu).

*“It was a pleasure to work with the T2 Center to prepare the City of New Britain’s Traffic Signal Management and Operations Plan. The Traffic Signal Systems Circuit Rider was critical in the preparation of this important document.”*

- Carl J. Gandza, Engineering Project Manager, City of New Britain

To view the City of New Britain’s TSMP visit this link: <http://www.t2center.uconn.edu/pdfs/New%20Britain%20TSMOP%20rev%202017-01-25.pdf>

## Should I develop a TSMP?





## References and Resources

- Traffic Signal Management Plans: An Objectives- and Performance-based Approach for Improving the Design Operations and Maintenance of Traffic Signal Systems  
FHWA-HOP-15-038  
<http://www.ops.fhwa.dot.gov/publications/fhwahop15038/fhwahop15038.pdf>
- Improving Traffic Signal Management and Operations: A Basic Service Model  
FHWA-HOP-09-055  
<http://ops.fhwa.dot.gov/publications/fhwahop09055/index.htm>
- Advancing Metropolitan Planning for Operations: An Objectives-Driven, Performance-Based Approach  
FHWA-HOP-10-026  
<http://www.ops.fhwa.dot.gov/publications/fhwahop10026/>
- Bridging the Gap between Agencies and Citizens: Performance Journalism as a Practical Solution to Communicate Performance Measures and Results  
TRB—Transportation Research Record 2046  
<http://trrjournalonline.trb.org/doi/abs/10.3141/2046-03>
- Systems Engineering Guidebook for Intelligent Transportation Systems  
Version 3.0, FHWA  
<https://www.fhwa.dot.gov/cadiv/segb/>



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