Improving Business Processes for More Effective TSMO

Work Zone Management Case Study (E-tool Example)

*North Carolina DOT: Traffic and Safety Operations Committee**

Overview/Background:

This case study features a proactive approach to managing the impacts of the project work zone and continuous coordination between several involved agencies. The North Carolina Department of Transportation (NCDOT) implemented an interagency coordination process for the planning and monitoring of major construction work zones. The coordination process begins before construction, ideally in the planning stage, and is continued throughout the project. The process is determined by the needs of each unique construction project. Initially, internal planning level meetings are conducted to establish the scope of a work zone. A project-specific Safety and Traffic Operations Committee is created to oversee the implementation of a work zone.

Source: North Carolina Department of Transportation

The NCDOT Safety and Traffic Operations Committee is composed of representatives from the Work Zone Traffic Control (WZTC) Section, the NCDOT field office, safety engineers, incident management personnel, public safety agencies, North Carolina State Highway Patrol (NCSHP), the public information representative, and the contractor. These representatives coordinate to ensure the safety of the workers and travelers, as well as the efficiency of the work zone and the transportation network. The NCDOT Safety and Traffic Operations Committee focuses on significant projects as defined by the Work Zone Safety and Mobility Policy, where mobility and potential safety concerns exist. This allows the committee to provide better focus and attention to those construction projects, which will allow them to have the greatest positive impact. NCDOT guidelines clearly define four activity levels of significance. The criteria for determining the level of significance includes lane closures, annual average daily traffic (AADT), truck traffic, additional travel times expected, level of adverse impacts to existing transportation infrastructure/high-volume traffic generators, duration of traffic impacts and user value or cost. The coordination process and committee involvement are then based on the determined level and specific needs of the project.

*Source: *E-tool for Business Processes to Improve Travel Time Reliability*, Final Report, 2014.
www.fhwa.dot.gov/goshrp2/Content/Documents/Factsheets/SHRP2_L34_Final_Report1401.pdf

Step 1: Influences

The influence to create the Safety and Traffic Operations Committee was event driven. The impetus was a fatality that occurred within a construction project work zone. Because of the fatality, a coordination meeting with key stakeholders was conducted, and these meetings continued throughout the remainder of the project. The collaboration was useful and productive. Subsequent meetings were held for the next major interstate construction project to address upcoming traffic shifts, enforcement, speed limits, incidents, public information, and a construction update on the project. The meetings were again successful, and NCDOT created the Safety and Traffic Operations Committee, which is now involved in significant projects and seeks to address work zone safety and mobility requirements.

Step 2: Define the Specific Reliability Goal(s)

The reliability goal NCDOT desires to achieve is mitigating work zone effects on travel time reliability. Work zones are categorized as planned events but can generate long-term negative effects on traffic. Work zones modify the roadway operations for specific time periods, and these modifications must be evaluated to minimize impacts to mobility, safety, and travel time reliability.

Step 3: Identify and Document Current Business Processes

The NCDOT WZTC Section is responsible for developing traffic management plans (TMPs) that maintain mobility and safety through a work zone. The WZTC section initiated an effort to continually monitor and evaluate the effectiveness and safety of work zones. Based on observed conditions, the committee can initiate speed or safety studies to validate concerns in the vicinity of the construction project. The resulting information is available to guide decisions aimed at revising and improving the existing TMP. The Safety and Traffic Operations Committee also considers the impacts of the project work zone on the surrounding network and seeks to efficiently plan for and minimize those impacts where possible. Lane and ramp closures are carefully considered because of their impact on the surrounding network. In addition, modifications or improvements to specific segments of the network may be recommended to handle the additional traffic resulting from the construction project. Since the inception of this coordination process, the committee has been responsible for managing the planning and monitoring of work zones for several significant projects. An example of the process used by the Safety and Traffic Operations Committee is shown in Figure 1.

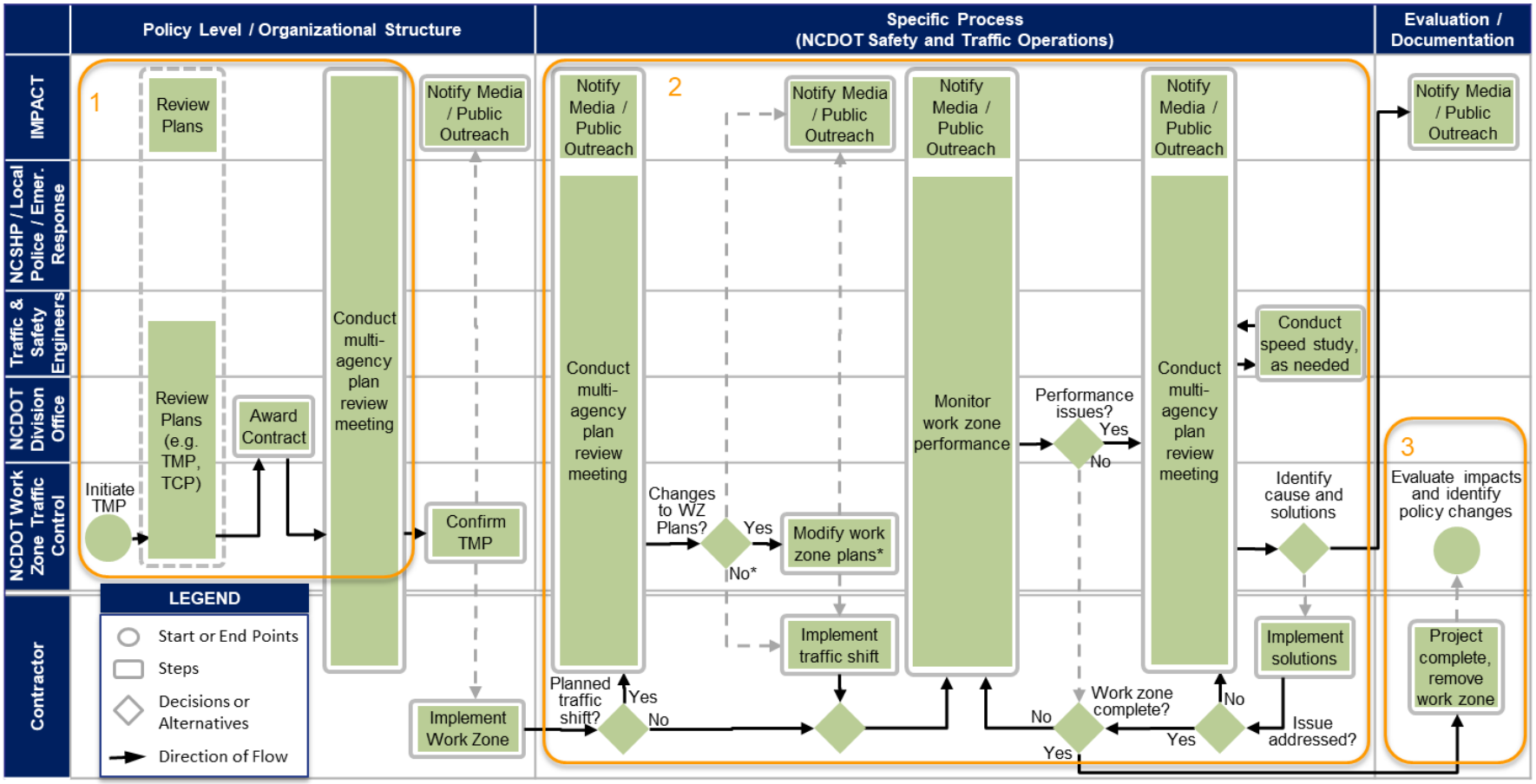

Figure 1. Business Process Diagram of NCDOT Safety and Traffic Operations Committee

Step 4a: Develop/Change Process

The Safety and Traffic Operations Committee meetings are conducted to evaluate the impact of a project work zone on traffic on the major routes. Meetings are conducted before the implementation of the traffic management plan and continue throughout the life of the construction project. Corridors are designated as major routes based on the project location and the perceived regional impact of the work zone. The meetings are conducted based on key milestones of the project and when certain issues are identified within or in the vicinity of the work zone. The milestones include scheduled traffic shifts or changes in the work zone that can result in major impacts on traffic. The committee also provides the contractor with another avenue to seek direction and communicate concerns. The contractor is aware of daily experiences in the work zone and can identify unsafe scenarios within the work zone and when traffic patterns, such as increased speeds, begin to change. Possible solutions include ramp closures, added presence of law enforcement, or restrictions in the contractor's available working hours. The committee also attempts to minimize incidents that occur by carefully establishing the appropriate speed limits within the work zone.

Step 4b: Implement Process

The committee coordinates to identify viable mitigation strategies in response to the issues observed in the work zone. Several key integration points were identified in the NCDOT Safety and Traffic Operations Committee process, including the following:

- Integration between the NCDOT Division Office, the NCDOT WZTC Section, and the contractor to review work zone traffic control plans
- Integration between NCDOT, the contractor, and the NCSHP to review final plans before implementation
- Integration between NCDOT and the contractor for revised work zone plans before implementation
- Integration across all players to monitor performance of the work zone once implemented
- Integration between agencies to review potential solutions when issues are identified and implemented
- Coordination with North Carolina's Information Management Public Affairs, Construction and Traffic Control (IMPACT) group for public information assistance to provide outreach and information specific to the work zone.

The committee also plans for secondary incidents and considers how emergency responders can efficiently respond within the work zone. Successful implementation of effective strategies also can lead to policy-level changes to guide future traffic management plans and work zone implementations.

Step 5: Assess Process

The NCDOT Safety and Traffic Operations Committee is focused on continually monitoring the effect of a work zone on the roadway capacity. The strategies are implemented and continually monitored for effectiveness until other negative trends are identified or the construction project is complete. The work zone plans are reviewed for effectiveness based on observed conditions in the work zone. The field personnel, contractor, and law enforcement agencies provide input into the actual traffic conditions

experienced in the work zone. The committee has established a process to identify, evaluate, and implement mitigation strategies to offset negative impacts on travel time reliability, and these strategies have proven successful in recent projects. Once a mitigation strategy has been implemented, the safety and mobility of the area are monitored to ensure that the strategy has been effective and does not generate more problems, such as an increase in congestion. The committee has identified specific performance measures, such as speed and crash rates, to continually evaluate the safety and mobility of the work zone. When these measures demonstrate negative trends, the committee works to address issues that promote the variation in driver behavior.

Step 6: Document Process

Documenting the impacts of work zones will provide reference points for decisions made on future traffic management plans based on well documented successful practices. The WZTC Section must produce traffic management plans for every construction project on NCDOT-maintained roadways. Any modification to the work zone must be based on traffic control plans sealed by a professional engineer. Each time there is a change, a new set of plans are developed and sealed. As modifications are made in the field, it is important for the changes to be documented in the existing plans. It also is important that detailed meeting minutes are captured for each Safety and Traffic Operations Committee meeting. Since the work is occurring in an active work zone, the resident engineer should maintain these records through the construction life of the project and as long as state law requires. Additionally, construction contracts specify that the contractor will be required to clear incidents in a set amount of time and requires that a towing company be identified within the contract as a subcontractor.

Step 7: Institutionalize Process

NCDOT has published "Guidelines for Implementation of the Work Zone Safety and Mobility Policy," which outlines the goals, objectives, and strategies for all projects and identifies key stakeholders who are responsible for the implementation of each objective. The document also provides a method of determining the project level of significance, which, in turn, determines the required management practice. Projects that are determined to be significant within the guidelines require the establishment of a Safety and Traffic Operations Committee, which is composed of representatives from the WZTC Section, the NCDOT field office, safety engineers, incident management personnel, public safety agencies, NCSHP, the public information representative, and the contractor.

The committee provides a means to evaluate traffic management plans before implementation and during construction. The continuous monitoring of the work zone provides a safer work environment and roadway. Modifications to the traffic management plan can be easily implemented because everyone is continually involved. The continuous evaluation of the work zone assesses the average speed and crash rates so that problem locations can be identified early and addressed. The attention to observed issues results in greater mobility and safety within the project limits and better travel time reliability on the network.