

NEBRASKA DEPARTMENT OF TRANSPORTATION

**GUIDELINES FOR ADDRESSING WORK
ZONE MOBILITY AND SAFETY**

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Nebraska Department of Transportation Mission Statement

"We provide and maintain, in cooperation with public and private organizations, a safe, reliable, affordable, environmentally compatible, and coordinated statewide transportation system for the movement of people and goods."

In keeping with this mission statement, the Nebraska Department of Transportation is committed to developing, implementing, and improving these guidelines as a means to provide an adequate level of service and work zone safety for motorists and highway workers alike.

SECTION 1 - PURPOSE (23 C.F.R §630.1002)

In keeping with the mission of the Department of Transportation, these guidelines for addressing work zone mobility and safety have been adopted so that reasonable effort is made from inception of the project to construction and final acceptance to accommodate the safety and mobility of all workers and travelers in our work zones for which the Department is responsible, including federal and local projects.

This guide was developed by a multi-disciplinary team including representatives of the Nebraska Department of Transportation and the Federal Highway Administration. This document is a guide and is intended for use as a resource document.

SECTION 2 - DEFINITIONS AND TERMS (23 C.F.R § 630.1004)

Design Process Outline (DPO) --- A summary of major activities (tasks or work categories) to be completed during the course of a project's design.

Highway Workers --- Include, but are not limited to, personnel of the contractor, subcontractor, NDOT, local agencies, utilities, and law enforcement, performing work within the right-of-way of a work zone.

Mobility --- The ability to move from place to place and is significantly dependent on the availability of transportation facilities and on system operating conditions. With specific reference to work zones, mobility pertains to moving road users efficiently through or around a work zone area with a minimum delay compared to baseline travel when no work zone is present, while not compromising the safety of highway workers or road users. The commonly used performance measures for the assessment of mobility include delay, speed, travel time and queue lengths.

Safety --- A representation of the level of exposure to potential hazards for users of transportation facilities and highway workers. With specific reference to work zones, safety refers to minimizing potential hazards to road users in the vicinity of a work zone and highway workers at the work zone interface with traffic.

Significant Project --- Generally, a project, whether alone or in combination with other projects nearby, that may cause sustained work zone impacts on such things as capacity, delay times, levels of service, congestion, etc. that are greater than what is considered tolerable or desirable based on policy and/or engineering judgment.

Surveillance of Temporary Traffic Control Devices --- A contractor-managed pay item utilized to compensate the contractor for the continuous (24/7) monitoring and maintenance activities required in association with the work zone traffic control on the projects. Contractor employees assigned to these tasks require training and certification by the Contractor.

Traffic Control Plan (TCP) --- A plan used for facilitating road users through a work zone or an incident area.

Traffic Control Management (TCM) --- A contractor-managed pay item which normally requires three daily inspections of the work zone, monitoring of corrective action required, and documentation of the inspections made and corrective action taken. Contractor employees assigned to these tasks require training and certification by the Contractor.

Transportation Management Plan (TMP) --- An organized strategy to manage the work zone impacts of a project. Its scope, content, and degree of detail will vary depending on project requirements, these guidelines, and the anticipated impacts of the project on the traveling public.

Transportation Operations Component (TO) --- That component of a Transportation Management Plan (TMP) that identifies strategies that may be used to mitigate impacts of the work zone on the operation and management of the transportation system within the work zone impact area.

Work Zone --- An area within the right of way of a highway with construction, maintenance, or utility work activities. A work zone is typically marked by signs, channelizing devices, barriers, pavement markings, and/or work vehicles. It extends from the first warning sign to the END ROAD WORK sign. In the case of mobile operation, it extends from the first warning sign or identifiable warning light to the last temporary control device.

Work Zone Crash --- A traffic crash in which the first harmful event occurs within the boundaries of a work zone or on an approach to or exit from a work zone, resulting from an activity, behavior, or control related to the movement of the traffic units through the work zone. This includes crashes occurring on approach to, exiting from or adjacent to work zones that are related to the work zone.

Work Zone Impacts --- Work zone-induced deviations from the normal range of transportation system safety and mobility. The extent of the work zone impacts may vary based on factors such as, road classification, area type (urban, suburban, and rural), traffic and travel characteristics, type of work being performed, time of day/night, and complexity of the project. These impacts may extend beyond the physical location of the work zone itself and may occur on the roadway on which the work is being performed, as well as other highway corridors, other modes of transportation, and/or the regional transportation network.

Additionally, the Department includes the following acronyms in these guidelines:

- **AASHTO** --- American Association of State Highway and Transportation Officials

ATSSA --- American Traffic Safety Services Association

CBD --- Central Business District

CFR --- Code of Federal Regulations

CMS --- Changeable Message Signs

DPO --- Design Process Outline

FHWA --- Federal Highway Administration

ER - Federal Register

ITS --- Intelligent Transportation System

MAPA --- Metropolitan Area Planning Agency

MUTCD --- Manual on Uniform Traffic Control Devices

PI --- Public Information

PS & E --- Plans, Specifications, and Estimates

TCM --- Traffic Control Management

TCP --- Traffic Control Plan (same as TTC --- Temporary Traffic Control)

TMA --- Transportation Management Area

TMP --- Transportation Management Plan

TO --- Transportation Operations

SECTION 3 - STATE-LEVEL PROCESSES AND PROCEDURES (23 C.F.R § 630.1008)

(a.) Section Description

This section addresses the Department's state-level processes and procedures for work zone assessment, work zone data, training, and periodic evaluations (process reviews).

(b.) Work Zone Assessment and Management

The Construction Division's Final Plans Section reviews all plans for constructability, establishes time allowances, and estimates the signing quantities for each project. These tasks should be accomplished with consideration given to the standard or special traffic control plans developed by Traffic Engineering Division and any phasing plans developed by the Roadway Design Division. The Final Plans Section, in consultation with the Traffic Engineering Division, may make additions or deletions to the various plans when appropriate and necessary.

The Final Plans Section writes "Special Prosecution and Progress" specifications, when needed, which relate to traffic control. These special provisions address incentives/disincentives, internal District liquidated damages, peak hours, lane closures, and phasing required for the construction of the project where applicable.

This work is accomplished in collaboration with the District involved, the Roadway Design Division, and the Construction Division, by considering such factors as traffic volumes, anticipated delays, detour routes, the need to maintain two lanes of traffic on multilane facilities, and impacts to communities, schools, and emergency services.

Throughout the design process of a project, the Final Plans Section is available for project review to determine preliminary time allowances, assess constructability issues, and discuss phasing and traffic control. This preliminary review process is part of the Design Process Outline (DPO).

For projects that do not go through the Roadway Design Division (such as pavement rehabilitation projects generated in the Materials & Research Division), the Traffic Engineering Division determines the applicable standard or special traffic control plans. The Final Plans Section, in cooperation with the District and Traffic Engineering Division, determines the signing quantities, phasing, peak hours, or special prosecution/progress specifications that may be required.

The Department may utilize "Traffic Control Management" or "Surveillance of Temporary Traffic Control Devices" in addition to the standard and/or special traffic control plans. Each District, in cooperation with the Construction Division, determines whether to use "Traffic Control Management", "Surveillance", or just the normal traffic control methods provided by the Plans and Specifications. This determination is done just prior to the Final Plans Section review.

(c.) Work Zone Data

The Accident Records Section of the Traffic Engineering Division collects work zone crash data.

The Traffic Engineering Division summarizes the information received and processed by the Highway Safety Section and then prepares and distributes a Work Zone Accident Report Summary to the Districts on a monthly basis. The District project managers and other District staff are then expected to address any work zone mobility and safety issues by reacting to the Work Zone Accident Report Summary and making field observations of travel speed, delays, and other factors which might affect travel through the work zone.

Whenever the District's review and analysis of the work zone and Work Zone Accident Report Summary identifies opportunities for improvement or results in positive changes to work zone safety and mobility, the nature of the findings or improvements are communicated to the Traffic Engineering and/or Construction Divisions, or others as appropriate.

Additionally, the Department utilizes work zone crash data as one of its own performance measures. The work zone crash data shall be available for use during work zone process reviews and used as a tool to improve traffic control plans and guidelines.

(d.) Training

The Department currently generates the forms used to report crash data and provides to law enforcement some limited training on the proper and consistent collection of work zone crash data. The Department monitors the crash data being collected and pursues additional training for law enforcement if it is deemed necessary by the Department.

The Department provides appropriate training for employees involved in the development, design, implementation, management, and inspection of work zone-related transportation management and traffic control. The Department to the extent practical maintains a record of required training provided and provides appropriate training updates when necessary. Additionally, the Department will provide other training when necessary by the Department or the Federal Highway Administration (FHWA).

The Department selects training which is compatible with the needs involved and the class and position of employees to be trained. The Department avails itself of on-the-job training by peers and supervisors, electronic media presentations, and large and small group presentations, or at informal safety meetings.

Department personnel actively involved in the workzone (project managers, key inspectors, etc.) are encouraged to complete flagger and Assistant Traffic Control Manager certification training.

District personnel involved in the review and analysis of the monthly Work Zone Accident Report Summaries and District personnel responsible for implementing and monitoring the Traffic Management Plan on a significant project will, when available, attend American Traffic Safety Services Association (ATSSA) training for Traffic Control Technicians or Traffic Control Supervisors. Certification from ATSSA is not required.

Additionally, for positions or circumstances requiring more formal training, the Department will either provide appropriate in-house training or arrange for training which may be available from the Federal Highway Administration, (including National Highway Institute), ATSSA, or other outside training sources as needed.

When appropriate, the Department will make its training available to contractors.

By specification, the Department requires training and certification of contractor employees utilized as flaggers. The Department enforces the specification and provides training and certification materials as appropriate.

When provided in the Proposal, the Department requires that the contractor assign an individual as a Traffic Control Manager. Assistant Traffic Control Managers may be assigned and utilized by the contractor to perform required tasks on the project. The Department establishes training and certification requirements for Traffic Control Managers and Assistant Traffic Control Managers, enforces the specifications and provides training and certification materials as appropriate.

The Department utilizes Traffic Control Management or a similar level of traffic monitoring on significant projects. In so doing, the contractor's designated Traffic Control Manager will have received training in the implementation and monitoring of the Traffic Management Plan.

The Construction Division maintains (for the period of their respective certifications) a database of individuals (non-NDOT employees) who have been trained, certified, and reported as having completed the training and certification requirements for Flaggers and Assistant Traffic Control Managers. The Human Resources Division maintains a database of Department employees who have received flagger training.

(e.) Process Reviews

The Traffic Engineering Division, in partnership with the FHWA, conducts an annual statewide work zone inspection and process review. Construction and appropriate District personnel may be included in the reviews.

Observations made during the inspection and process review are summarized and analyzed by the Traffic Engineering Division and then shared with the Districts involved. The information is used to evaluate current work zone procedures and make recommendations for improvements.

Additional process reviews may be conducted in concert with the FHWA when deemed necessary.

SECTION 4-SIGNIFICANT PROJECTS (23 C.F.R § 630.1010)

(a) Acknowledgement of Significant Projects

The Department acknowledges that some projects, whether alone or in combination with other concurrent projects nearby, may cause sustained work zone impacts that are greater than what is considered tolerable or desirable based on policy and/or engineering judgment. These projects shall be identified as "significant projects".

(b.) Identification of Significant Projects

A project is considered a "Significant Project" when it will impede traffic by closing lanes for several days or restricting width to the point that it slows traffic enough to cause delays and as described below.

Based on their experience and considering the criteria identified in 630.1010 (c.) below, each District Engineer identifies on the DR Form 73, Highway Improvement Programming Request, their recommendation as to whether a programmed project should be significant.

The Project Scheduling & Program Management Section, in consultation with the District Engineer and other Divisions and by evaluating one or more of the criteria referenced in 630.1010 (c), shall make the initial determination of whether a project is to be identified as a "significant project" as it relates to Subpart J of 23 CFR Part 630.

A final determination of significance shall be made during the Plan-in-Hand inspection.

(c.) Criteria for Identification of Significant Projects

In addition to other projects that may qualify, the Department shall identify all projects on the Interstate System that are located within the boundaries of the Transportation Management Areas (TMA) of Omaha and Lincoln as "significant projects" if they are expected to occupy a location for more than three (3) days with either intermittent or continuous lane closures.

The TMA limits for Omaha include all of 1-680, all of 1-480, and that portion of 1-80 between Highway N-50 and the Missouri River. The TMA limits for Lincoln include all of 1-180 and that portion of 1-80 from 1 mile west of the NW 48th Street Interchange to 98th Street (1 mile west of the Waverly interchange). These limits are current as of 2007 but are subject to periodic review. The Metropolitan Area Planning Agency (MAPA) or the Lincoln/Lancaster County MPO should be consulted to verify the current TMA limits for Omaha and Lincoln.

Additionally, using the following criteria, the Department, including the District Engineer's initial assessment, will review other non-Interstate projects on the freeway or expressway system, projects located in a central business district or a major metropolitan area, and any other major projects to see if their work zone impacts are expected to be greater than what is considered tolerable. These projects may also be identified and treated as "significant projects".

Potential Criteria for Assessing the "Significance" of a Project:

1. Project Characteristics --- to include but not be limited to project type, type of work zone (full closure, lane reductions, cross-overs, night work, etc.), project schedule, area type (urban, suburban, rural).
2. Travel and Traffic Characteristics --- to include but not be limited to traffic volumes, seasonal and temporal variations, vehicle mix, type of travel (commuter, tourist, freight), public and private access, special events, impacts of weather.
3. Work Zone Characteristics --- to include but not be limited to impacts on local and regional transportation networks, capacity issues, level of public interest, number of travelers impacted, expected safety impacts, expected delays, impacts on nearby commercial, public, and private facilities and properties.

(d.) Exceptions

When the Department's analysis of a project on the Interstate System indicates that the work will not cause sustained work zone impacts, though otherwise meeting the criteria identified in 4c., the Department may request from the FHWA an exception to the applicability of 5b.2 and 5b.3 by showing that the project does not, in fact, cause sustained work zone impacts.

SECTION 5 - PROJECT LEVEL PROCEDURES (23 C.F.R § 630.1012)

(a.) Section Description

This section provides guidance and establishes procedures to manage the work zone impacts of individual projects.

The Department addresses the traffic concerns on the Plan-In-Hand. While some Interstate projects can maintain two lanes of traffic, the majority of projects maintain one lane of traffic. Some projects use detours or phasing to maintain traffic at acceptable levels.

(b.) Transportation Management Plans-Mandate for Significant Projects

For projects determined to be significant, the Department will develop a Transportation Management Plan (TMP) which consists of a Traffic Control Plan (TCP), a component to address Transportation Operations (TO), and a component to address the dissemination of Public Information (PI). In general, the construction project manager is designated as being responsible for monitoring the TMP.

For individual projects or classes of projects determined not to be significant, only a TCP is required. However, TO and PI components may be considered and utilized on any project.

(b.1.) Traffic Control Plans

The Department prepares a TCP for every project where traffic is affected. TCP's are consistent with the applicable provisions of the MUTCD, and the AASHTO Roadside Design Guide.

The selection of standard TCP's and any special plans are made by the Traffic Engineering Division and submitted to the PS&E Section for inclusion in the project plans. Standard and special plans included in the contract documents may be modified or supplemented by other site-specific plans prepared by the District Highway Project Manager (or a designee).

The project TCP, as described above, addresses phasing when appropriate and is updated and modified when circumstances dictate. On relatively simple and uncomplicated projects, the project manager may find it sufficient to utilize only the standard and special plans (if any) provided in the contract documents.

In the case of existing obstacles adjacent to the traveled way which may be encountered or affected during construction, the obstacles will be reviewed in regard to the posted speed, traffic volumes, and the length of time the obstacle may present a hazard in accordance with the Roadside Design Guide and a cost/benefit analysis. Based on the review, obstacles will then either be left in place, delineated or shielded as appropriate for the project.

(b.2.) Transportation Operations (TO) Component Transportation Operations

On projects that have been determined to be significant, Transportation Operations (TO) strategies will be considered throughout the design process. The TO component of the TMP will include strategies that will be used to mitigate the impacts of the work zone on the operation and management of the highway system within the work zone impact area.

Transportation Operation strategies may include, but are not limited to:

1. Demand management,
2. Corridor/network management,
3. Work zone safety management, and
4. Traffic/Incident Management and Enforcement

The scope of the TO component will be determined by the project characteristics and the transportation operation and safety strategies identified by the Department.

1. Demand Management Strategies

Demand management strategies include techniques intended to reduce the volume of traffic traveling through the work zone by such methods as diverting travelers to alternate modes of transportation, shifting trips to off-peak hours, or shifting vehicles to alternate routes. When determining strategies to be used, the following may be considered:

- Transit Services - improvements, incentives, shuttles, residential/carpool, park and ride
- Ramp Metering, ramp closures
- Variable work hours; telecommuting

2. Corridor/Network Management Strategies

Corridor/network management strategies include strategies to optimize traffic flow through the work zone and adjacent roadways. The following traffic operations techniques and technologies may be considered:

- Maintaining existing number of through lanes
- Designing crossovers/shooflies for posted or 85th percentile speed
- Utilizing off-peak work hours
- Utilizing temporary traffic signals; monitoring signal timing/coordination
- Utilizing roadway/intersection improvements; turn lanes, bus turn outs
- Implementing traffic restrictions; turns, parking, trucks
- Implementing lane restrictions; trucks, reversible lanes
- Monitoring railroad crossing controls
- Coordinating with adjacent construction sites
- Utilizing automated work zones; detection systems, changeable message signs, highway advisory radio, web page, 511
- Various computer computations analyses (such as traffic modeling, Quickzone, etc.)

3. Work Zone Safety Management Strategies

Work zone safety management strategies include devices, features, and management procedures used to address traffic safety issues in the work zone. Work zone safety management strategies include:

- Reasonable speed limits through work area
- Temporary traffic signals
- Temporary traffic barriers - concrete protection barriers
- Impact attenuators/crash-cushions
- Intrusion alarms - warning lights
- Project task force/committee
- Work zone traffic control supervisors/inspectors
- Project partnering - weekly meetings
- Peer-to-peer work zone reviews
- Windshield surveys, night-time reviews

4. Traffic/Incident Management and Enforcement Strategies

Traffic/incident management and enforcement includes various strategies to manage work zone traffic operations. Work zone traffic management strategies involve monitoring traffic conditions and making adjustments to traffic operations based on changing conditions. Strategies in this area include:

- Automated work zones, traffic monitoring
- Transportation management centers, District Operations Centers
- Detecting and monitoring traffic for speed, volume, and density
- Traffic screens, glare screens
- Enhanced Reference Post markers
- Quick removal policies, push bumpers, hi-tech accident documentation
- Coordination with media
- Local detour routes

- Contract support for incident management
- Incident/emergency management coordination and response planning
- Utilizing automated work zones; detection systems, changeable message signs, highway advisory radio, web page, 511
- Law enforcement- cooperative, dedicated, or overtime
- Double fines for speeding

The strategies identified above are not all inclusive. Other strategies may be used.

While the Department is committed to implementing the appropriate strategies listed above on all projects determined to be "significant", many of these strategies may be implemented on other projects having a "less significant" impact on work zone safety and mobility.

(b.3) Public Information (PI) Component

The Department makes a conscious effort to gather and share information regarding current and future projects with the public.

For projects identified as being "significant", the individual Districts take the lead in advising the Communication Division that the project is likely to be significant and that some special efforts may be needed to enhance the distribution of public information. The Districts provide as much lead time as possible.

The Department, through collaboration with other agencies, considers one or more of the following strategies when establishing a public information plan for an individual project. Each project is considered on its own merits in evaluating the types of strategies utilized and the extent to which resources are expended on them.

- Participation in National Work Zone Awareness Week activities.
- Maintenance of the Department of Transportation website. (The website is available to disseminate information both prior to and after the letting of a project.)
- Publication and distribution of various printed materials (flyers, doorhangers, newsletters, special mailings, etc.)
- Issuance of news releases to the media
- Placing project information on the "511" system.
- Conducting public information meetings at scheduled times throughout the life of a project.
- Deploying and employing various ITS options (e.g. Dynamic Message Signs).
- Utilizing paid advertising in the media, when justified and appropriate (this would include both print and electronic media).
- Utilizing free media advertising when available.
- Establishing a project-specific "hot line" when appropriate.
- Participate in public outreach whenever possible and appropriate (appearances at organizational meetings, public gatherings, etc.)
- Develop project-specific art work and graphics to identify special projects.

The individual Districts responsible for the projects involved, along with the Communication Division, monitors the results of the public information effort by surveying Department personnel and affected local agencies and individuals. Public information strategies may be modified as necessary.

(b.4.) Implementation of TMP with Stakeholders

The Department seeks the input of and keeps all affected agencies and individuals aware of the key details in the TMP and also encourages their continued involvement in the process.

It is understood that the actual list of stakeholders identified for any project will be unique, and it is not possible to outline the make-up of the list until the project is developing. However, the Department maintains a role in the functioning of the transportation management teams in the Omaha and Lincoln areas providing an ongoing involvement in the development of TMPs affecting most significant projects.

Current Inter-Agency Transportation Management Teams:

1. The Omaha "Transportation Systems Management" (TSM) Committee is represented by engineers and managers from the Nebraska Department of Transportation District and Central headquarters; Nebraska State Patrol; the City of Omaha Public Works Department, Police, Fire, and Transit Divisions; Douglas County and Sarpy County; Omaha Public Power District (OPPD), FHWA and the Metropolitan Area Planning Agency (MAPA). This group meets quarterly to discuss, coordinate, and mitigate the impact of road construction projects scheduled by the various jurisdictions. The TSM committee is led by the District 2 Office of the Nebraska Department of Transportation.
2. The Lincoln "Transportation Liaison Committee" (TLC) is represented by engineers and managers from multiple agencies in the Lincoln area. Included in this committee are representatives from the Nebraska Department of Transportation, District and Central Headquarters, FHWA, the City of Lincoln Public Works, Lancaster County and the Lincoln Electric System (LES). This committee meets bi-annually to discuss, coordinate, and mitigate the impact of road construction projects scheduled by the various jurisdictions. The Lincoln TLC is led by the City of Lincoln.

(c.) PS&E Requirements for TMP

The Department is responsible for the TMP. Contractors shall not be responsible for its development.

The Department identifies in the contract Proposal that the project is significant, and or identifies specific components of the TMP that are required for the project. Special provisions, special plans, and references to other pertinent documents are considered part of the TMP even if not separately identified and labeled as such. Items in the TMP that are the Department's sole responsibility are not included in the Proposal.

(d.) Method of Payment

In general, the Department utilizes method-based specifications for traffic control items. The Department's Standard Specifications do contain some isolated guidance that could be construed as "performance-based" (e.g., a pilot car is expected to make a round trip through a construction zone in 15 minutes). However, the Department utilizes individual pay items in the contract to pay for traffic control operations and devices. In some instances, payment for certain devices may be made subsidiary to others. For example, payment for the standard set of warning signs required for a flagging operation is subsidiary to the pay item, "Flagging".

Unless some project-specific special circumstances dictate, no specific items will be established to pay for implementation of the TMP. It is the Department's practice that payment for individual traffic control devices and for items such as "Traffic Control Management" provides the necessary compensation.

(e.) Designation of Responsible Persons

Unless special circumstances dictate, the NDOT Project Manager assigned to the construction of a project has the primary responsibility for implementing and monitoring the TMP. The Contractor shall identify, prior to construction, to the Department's Project Manager the individual(s) responsible for guaranteeing that the contractor's responsibilities under the TMP are properly and promptly carried out.

SECTION 6 - IMPLEMENTATION
(23 C.F.R § 630.1014)


The Department acknowledges that its implementation of these guidelines is subject to review and reassessment annually. The Department is working in partnership with the FHWA Division office to implement its policies and procedures to improve work zone safety and mobility.


A copy of this document, or revised and amended copies thereof, shall be addressed in stewardship agreements with the FHWA.

SECTION 7 - COMPLIANCE DATE
(23 C.F.R § 630.1016)

As of October 12, 2007, these guidelines shall be applied to all projects.

For projects that are in the final stages of development on or about October 12, 2007, and for which it can be demonstrated that complete compliance with these guidelines would create a significant negative impact upon their delivery, the Department agrees to request a variance, on a project-by-project basis, from the FHWA.

Recommended:

Deputy Director – Engineering 10/15/07 Date

Recommended:

Deputy Director – Operations 10-15-07 Date

Approved:

NDOR – Director 10/17/07 Date

Approved:

FHWA Division Administrator 10/16/07 Date

