

# Lane Closure Management Application



By North Texas Tollway Authority

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## Benefits Statement

NTTA's automated lane closure system improves safety by reducing driver confusion and enabling faster response to incidents via real-time contact with on-site crews. It saves time through automated approvals, conflict detection, and streamlined public notifications, eliminating hours of manual processing. The system saves money by optimizing staff resources, improving traffic flow, and preventing inefficient or overlapping closures. Overall, the application enhances roadway operations with data-driven, coordinated decision-making that boosts reliability and reduces disruptions.

## In this case study you will learn:

1. How NTTA uses automation and data improve lane closure planning and safety.
2. How NTTA uses streamlined workflows reduce delays, staff workload, and public confusion.
3. How NTTA uses real-time coordination and standardized processes to enhance traffic flow and cut costs.

## BACKGROUND

The North Texas Tollway Authority's (NTTA) toll road system has been expanding across the Dallas Ft-Worth region continuously for several decades. The demand for main lanes and ramp closures increased significantly because of the multiple construction projects and ongoing maintenance activities, recently averaging about 4,000 closures per year. Previously, closures were submitted in multiple ways, then reviewed and processed manually by the engineering staff using spreadsheets, hand-drawn maps, and email lists maintained for different users and stakeholders. It took considerable effort to coordinate closures among various departments and outside agencies to avoid potential conflicts on the roadway. The confusion was often caused by each requestor using different abbreviations, roadway names, or station markers to identify closure location. Furthermore, the closures would not mention ramps in the area that needed to be closed, or at least addressed with a proper traffic control plan. As the roadway system continued to expand, the need for automating the lane closure system became evident.

## TSMO PLANNING, STRATEGIES AND DEPLOYMENT

The person requesting the lane closure only sees the easy-to-understand user interface, but behind the scenes is where the automation has tremendously improved the processing time of the closures.

To build the application, NTTA started by dividing each roadway into multiple segments. The segments include the number of lanes and shoulders, the presence of entrance or exit ramps, and the existing traffic flow for each hour of the day and day of the week. The application of the Highway Capacity Manual calculations for the Level of Service were applied to each segment, creating a method to measure

the impact of the closure on the flow of the roadway.

The impact on the traffic flow was used to develop an acceptable level of service unique to each roadway and roadway segment. In other words, if the requestor was to try to request a single lane closure during the peak hour on a busy segment of roadway, it would automatically be denied. However, if they requested a single lane closure during off peak hours, it could be approved quickly. The automated system cut down the number of times staff would go back and forth with the requestor to find a time for their closure.

Project Name	Tracking #	State	Request	Type Of Work	Roadway	Direction	Cross Street
123859 I_M_DNT_Bon...	123859	Saved	Freddy...	Lighting	DNT	North	Bondaux Ave
123848 F_M_DNT_DALLA...	123848	Pending	Freddy...	Lighting	DALLAS PKWY (DNT...	South	Quorum Dr/Verde V...
123848 I_M_O_DNT_EL...	123848	Approved	Freddy...	Lighting	DNT	North	Eldorado Pkwy
123847 I_M_O_PGRT...	123847	Approved	Rodna...	Lighting	PGRT	West	Shiloh Rd
123848 I_O_X_SRT_Pu...	123848	Pending	Reddy...	Structures	SRT	North	Hapo Pkwy/Pajaje Rd
123845 I_O_X_SRT_Pu...	123845	Pending	Reddy...	Structures	SRT	South	Flano Pkwy/Pajaje Rd
123844 I_M_O_PGRT...	123844	Approved	Rodna...	Lighting	PGRT	West	Shiloh Rd
123843 I_X_DNT_Alp...	123843	Approved	Rodco...	Pavement	DNT	North	Alpha Rd
123842 I_M_DNT_Pw...	123842	Denied	Rodco...	Pavement	DNT	North	Park Ln
123841 I_X_DNT_Hig...	123841	Approved	Rodco...	Pavement	DNT	North	Highway Hill Rd
123840 I_X_DNT_Fer...	123840	Approved	Rodco...	Pavement	DNT	North	Forest Ln
123839 I_X_DNT_Roy...	123839	Approved	Rodco...	Pavement	DNT	North	Royal Ln
123838 I_X_DNT_Roy...	123838	Approved	Rodco...	Pavement	DNT	North	Royal Ln
123837 I_O_X_PGRT...	123837	Approved	Merce...	Maintenance	PGRT WE	South	H 30
123836 I_M_DNT_Pw...	123836	Approved	Rodco...	Pavement	DNT	North	Park Ln
123835 I_M_DNT_Pw...	123835	Approved	Rodco...	Pavement	DNT	North	Park Ln
123834 I_M_O_X_PGRT...	123834	Approved	Merce...	Signing	PGRT WE	North	Jefferson St
123833 I_O_X_PGRT E...	123833	Approved	Rodna...	Lighting	PGRT EE	South	S Merritt Rd
123832 I_O_X_SRT_Pu...	123832	Approved	Willi...	Investigation	SRT	North	Huffman Blvd/MarCh...
123830 I_M_O_PGRT...	123830	Approved	Rodna...	Lighting	PGRT	East	Shiloh Main Lane Ga...
123829 I_M_O_PGRT...	123829	Approved	Jacob...	Maintenance	PGRT	East	Valley View Ln
123828 I_M_O_PGRT E...	123828	Approved	Jacob...	Maintenance	PGRT EE	South	Lakeview Pkwy/SH 66
123827 I_M_O_SRT_La...	123827	Approved	Jacob...	Maintenance	SRT	South	Legacy Dr
123826 I_X_DNT_Slo...	123826	Denied	Edgar...	Structures	DNT	North	Stonewall Pkwy
123825 I_M_O_DNT_L...	123825	Approved	Edgar...	Structures	DNT	North	John Hickman

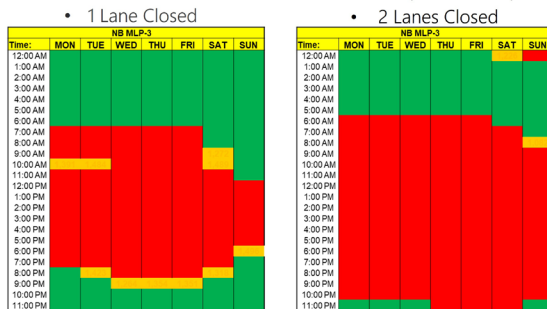
In addition, the breakdown by segment allows the requestor to look for conflicts with their closure, not only in the immediate area but nearby closures that may cause confusion among drivers. If the system detects a conflict with an already approved closure, it red flags the request for staff to review. This feature has allowed staff to get contractors to coordinate closures with others to be able to reduce the confusion to the customers, which also creates a safer work environment.

Once the closures are approved, the application has simplified how the public is notified of closures. The system provided a standard nomenclature for each roadway, cross street, and roadway segment for the requestor to select.

In addition, a standard list of types of work was developed for the requestor to select from. As a result, the information provided to the public through the website can be pulled directly from the initial request. This eliminated the need for each closure to be retyped into a format that then could be posted to the internet.

### Closure Evaluation – Main Lane Sections

Traffic Conditions on Northbound DNT at MLG-3 (Parker Road)



In addition to the public facing website, the application is integrated with an existing application in NTTA's 24x7 traffic management center (TMC). In the TMC, operators can determine which closures are active versus planned by the color code of each display. In addition, the operator can click the display to get additional information, including the length of the closure, number of lanes closed, and a cell phone contact for someone on-site. In the event of an incident, the operator can immediately reach out to an on-site representative to coordinate with. As a result of the contact information being readily available, the operators have been able to notify crews of wrong-way drivers in the area, nearby crashes, or incoming severe weather.

## COMMUNICATIONS PLANNING AND EXECUTION

The development of the Lane Closure Management Application required the input from multiple departments in the agency, consultants, and construction contractors that are all impacted by the lane closure process. In the end, NTTA developed a performance-based data driven decision making process that integrated with existing software. From the beginning of the project, it was emphasized to gather input from various user groups on the new application's objectives and practical scenarios. It was evident in the development of a new application that each group was unhappy with the existing process, and each group wanted the output to fit their required needs.

The key stakeholders were identified and representatives for each group were identified. In addition, a larger oversight group was kept informed during the development process and included in the proto-type testing. Many training sessions were conducted to further assist the users' understanding and familiarity with the new process, as well as, to identify adjustments before the application went live.

Extensive testing and trainings were conducted with the contractors as the new application was rolled out. These trainings were held during regular project meetings, so it did not inconvenience them. In addition, relevant documents were created and linked to the application page for easier reference by the users.

In the end, the public was able to get better information about the planned closures, the contractor liked the simplified method to enter the closures, and the traffic management center can get in touch with on-site personnel faster. In addition, it reduced the stress on the staff processing the closures.

## OUTCOME, BENEFITS AND LEARNINGS

The new application has significantly improved the efficiency of the process by reducing the staff workloads from tens of hours by several full-time employees per week to just a few hours per day by one full time employee. Closure requesters are also benefited from the new advanced features such as the ability to save and clone closure requests easily and view the status of all requests. The accuracy of the information passed along in the process was significantly improved by the standardization of the associated data fields which were entered only once.

As a result of the performance-based data driven approach of the new process, a high level of service is maintained most of the time across the system. Both peak hour travel time and the reliability metrics are improved by minimizing the disruption from any potentially poorly scheduled activities. The consistent application of the business rules and data driven approach provide the foundation for reasonable expectation from the closure requesters. Although it takes the initial training and continuous education of the principles behind the new process, more and more closure requests are now submitted in compliance with the lane closure guidelines. This is another major factor contributing to the efficiency gain of the new process.

## Lane Closure Map

