Plan Overview

A Data Management Plan created using DMP Tool

Title: Integrating Work Zone Data Exchange In Illinois for a Safer Highway System

Creator: Juan Pava

Affiliation: United States Department of Transportation (transportation.gov)

Principal Investigator: Steven Parker, Sarah Malik, Yang Cheng

Funder: United States Department of Transportation (transportation.gov)

Funding opportunity number: NOFO #20.941

Grant: https://www.transportation.gov/grants/smart/fy23-smart-stage-1-notice-funding-opportunity-nofo

Template: SMART Grants Data Management Plan (DMP) Updated 2025

Project abstract:

The Illinois Department of Transportation (IDOT) USDOT Stage 1 SMART Grant project will support planning efforts to develop a framework for the advancement of Work-Zone Data Exchange (WZDx)-compliant systems that will make travel on roadways safer and more efficient by harmonizing work zone activity data, increasing the quantity of available data fields, and making data available for third-party use. IDOT currently lacks a comprehensive inventory of the data sources, quality of data available, and understanding of data architecture systems, that along with the lack of common data standards across the industry is making it difficult and costly for third parties and IDOT to implement safety solutions that need data to provide information to road users and other stakeholders (i.e., contractors, emergency responders, etc.). During this Stage 1 SMART project, the IDOT project team will develop a comprehensive plan for the publication of WZDx-compliant data feeds in Illinois and will develop and evaluate a prototype system with respect to several work zone locations throughout the state. The project tasks will include evaluating statewide availability of work zone data, identification of data collection processes, evaluation of data systems architecture, and identification of gaps in data fields and processes. Planning will include meetings with stakeholders to build buy-in and to refine project concepts.

Implementation will consist of data automation and data inconsistency reduction to advance the management, availability, deployment, and integration of work zone data.

Start date: 09-15-2023

End date: 06-30-2026

Last modified: 10-21-2026

Integrating Work Zone Data Exchange In Illinois for a Safer Highway System - SMART Grants Data Management Plan (DMP): Stage 1

Stage 1 Instructions: Please Review Before Starting Your DMP

Do you agree to fill out this template to the best of your ability and contact NTLDataCurator@dot.gov if you need any assistance?

- Yes

Project Contact Information

What is the name of the project?

Integrating Work Zone Data Exchanges In Illinois for a Safer Highway System

What is your Grant Number?

69A3552341055

What is the name of the person submitting this DMP?

Steven T. Parker

What is the ORCID ID of the person submitting this DMP?

https://orcid.org/0000-0003-3104-5116

What is the name of the organization for which the person submitting this DMP is working? List their email and phone number. Also list the project website, if applicable.

Organization: University of Wisconsin-Madison

Email: sparker@engr.wisc.edu

Phone: (608) 265-4921

Website: https://www.topslab.wisc.edu/

Data Description

Provide a description of the data that you will be gathering in the course of your project or data from a third party that you will re-use. If there will be no data collected or re-used from another source, state that this is case.

The project generated and archived work zone activity data (WZAD) and related evaluation datasets used to assess the performance of the Illinois Department of Transportation (IDOT) Connected Work Zone (CWZ) data exchange platform. The datasets consist of operational transportation records describing planned, active, and mobile work zones, together with transformed CWZ feed outputs and system monitoring data.

The archived source data were obtained from five operational work zone information systems integrated through the IDOT Work Zone Activity Data Hub (WZDH):

- ITAP Ops Roadway - Statewide database of approved construction, maintenance, and utility closures.
- District 1 Lane Closure System (LCS) - Operational system for tracking lane closures on the District 1 expressway network.
- District 1 Arterial Construction Tracking System (ACTS) - Operational system for tracking construction and utility lane closures on arterial roadways in District 1.
- Illinois Tollway WZDx Feed - Work zone data feed covering Illinois Tollway facilities.
- Traveling Work Zones - Real-time location and activity status information from IDOT maintenance vehicles.

Together, these sources provide statewide coverage of a range of work zone activities and operating conditions.

Address the expected nature, scope, and scale of the data that will be collected, as best as you can at this stage.

Three primary datasets were archived during the evaluation period (June 15 through July 31, 2026):

- Archived source data collected from the five contributing systems. Source systems were polled every five minutes, and only records that changed since the previous collection cycle were retained.
- CWZ 1.0 feed outputs generated by the WZDH transformation service and archived at five-minute intervals. These records represent the standardized work zone information made available to data consumers through the USDOT Work Zone Data Exchange (WZDx) Registry.
- System health monitoring logs generated hourly during the evaluation period to document feed availability, validation results, and operational performance.

These datasets provide a record of the work zone data transformation process, including source system inputs, normalized CWZ outputs, and operational performance measures. The project scope expanded from three pilot locations to statewide coverage during the project period. As a result, the archived source data and CWZ datasets represent full statewide coverage rather than a geographically limited sample.

As best as you can, describe the characteristics of the data, their relationship to other data, and provide sufficient detail so that reviewers will understand any disclosure risks that may apply. If data might be sensitive, please describe how you will protect privacy and security.
You may need to update your DMP later to add more detail.

The data consist primarily of structured transportation operations data, including roadway locations, work zone characteristics, lane restrictions, schedules, and system performance information. The archived source datasets provide the original operational records, the CWZ datasets provide the

corresponding standardized outputs generated by the WZDH transformation process, and the system health logs document operational performance during the evaluation period. The datasets do not contain personally identifiable information (PII) and are considered low risk from a disclosure perspective.

Discuss the expected value of the data over the long-term.

The long-term value of these datasets is that they provide a documented record of source work zone activity data, corresponding CWZ outputs, and system performance over the evaluation period. The data may support future work related to work zone data integration, data quality assessment, standards-based data exchange, and evaluation of connected work zone deployments.

Data Format and Metadata Standards Employed

To the maximum extent practicable, your DMP should address how you will use platform-independent and non-proprietary formats to ensure maximum utility of the data in the future. If you are unable to use platform-independent and non-proprietary formats, you should specify the standards and formats that will be used and the rationale for using those standards and formats.

The data generated and collected during this project will utilize platform-independent and widely accepted non-proprietary formats wherever possible to ensure long-term accessibility and compatibility.

Describe the anticipated file formats of your data and related files.

The project datasets and related documentation are archived using platform-independent, widely supported formats to support long-term accessibility and reuse.

Archived source data and CWZ 1.0 feed outputs are provided as comma-separated value (CSV) text files. Individual records correspond to timestamped source snapshots stored in JavaScript Object Notation (JSON). These formats were retained because they represent the native structure of the source data and preserve the original information exchanged by the operational systems.

System health monitoring reports are provided as plain text files generated by an automated batch process. Plain text was used because it is easily generated, supports automated processing, and can be readily incorporated into project monitoring and reporting workflows.

Technical documentation developed during the project is provided in Portable Document Format (PDF) to facilitate consistent viewing and distribution across computing platforms.

Technical appendices accompanying the dataset include the IDOT WZAD data model in GeoJSON schema format, WZAD transformation rules documented in JSON format, and a data dictionary provided in XLSX format. GeoJSON, JSON, and CSV are open, machine-readable formats commonly used for geospatial data exchange, system integration, and data analysis applications.

The archived datasets are stored in CSV, JSON, GeoJSON, plain text, and PDF formats. CSV, JSON, GeoJSON, and plain text are open, machine-readable formats that either represent the native output of

the operational systems being evaluated or are widely used standards for data exchange and analysis. PDF is used for human-readable technical documentation.

Identify the metadata standards you will use to describe the data. At least one metadata file should be a DCAT-US v1.1 (https://resources.data.gov/resources/dcat-us/) .JSON file, the federal standard for data search and discovery. Take the default answer for compliance and then add any addition metadata standards you intend to use if applicable.

The final data package will include a DCAT-US version 1.1 (https://resources.data.gov/resources/dcat-us/). JSON metadata file, which is the federal standard for datasets and required for compliance with the USDOT Public Access Plan.

Access Policies

In general, data from DOT-funded projects must be made publicly accessible. Exceptions to this policy are: data that contain personally identifiable information (PII) that cannot be anonymized; confidential business information; or classified information. Protecting research participants and guarding against the disclosure of identities and/or confidential business information is an essential norm in scientific research. Your DMP should address these issues and outline the efforts you will take to provide informed consent statements to participants, the steps you will take the protect privacy and confidentiality prior to archiving your data, and any additional concerns. In general, in matters of human subject research, your DMP should describe how your informed consent forms will permit sharing with the research community and whether additional steps, such as an Institutional Review Board (IRB), may be used to protect privacy and confidentiality. Additionally, when working with, or conducting research that includes Indigenous populations or Tribal communities, researcher will adhere to the CARE Principles for Indigenous Data Governance https://www.gida-global.org/care and make an explicit statement to that effect in this portion of the DMP. Please provide as much information as possible:

1. **Describe any sensitive data that may be collected or used;**
2. **Describe how you will protect PII or other sensitive data, including IRB review, application of CARE Principles guidelines, or other ethical norms and practices;**
    1. **If you will not be able to deidentify the data in a manner that protects privacy and confidentiality while maintaining the utility of the dataset, you should describe the necessary restrictions on access and use;**

The project datasets consist primarily of operational transportation records describing roadway work zones, lane restrictions, schedules, geographic locations, and related system performance measures. The project did not involve human subjects research, collection of participant information, surveys, interviews, or other activities requiring informed consent, Institutional Review Board (IRB) review, or application of the CARE Principles for Indigenous Data Governance.

While work zone activity data generally do not contain personally identifiable information (PII), certain source systems may contain administrative or operational elements such as work zone contact information, internal usernames, or other agency-specific identifiers. These elements were not required

for project evaluation and were therefore not included in the data extracts used to create the archived datasets or the standardized Connected Work Zone (CWZ) outputs.

Describe any access restrictions that may apply to your data

The archived datasets and supporting documentation were reviewed by the project team and confirmed not to contain personally identifiable information (PII), sensitive operational information, or other non-public administrative data. As a result, the archived datasets do not contain PII, confidential business information, or classified information. No special access restrictions apply. The public dataset will be made available through the USDOT ROSA P repository under a Creative Commons Attribution 4.0 (CC BY 4.0) license to support broad access and reuse.

If necessary, describe any division of responsibilities for stewarding and protecting the data among Principal Investigators or other project staff.

The TOPS Lab serves as the custodian of the IDOT WZAD project data on behalf of the Illinois Department of Transportation (IDOT). All project data are managed by the TOPS Lab at the University of Wisconsin-Madison utilizing computing infrastructure and services provided by UW-Madison Division of Information Technology (DoIT). The TOPS Lab collaborates closely with the IW-Madison DoIT and adheres to all applicable research data management requirements. Additionally, the TOPS Lab coordinates with IDOT information technology and data governance offices to ensure compliance with project stewardship and data protection requirements. The TOPS Lab will retain project archives in accordance with applicable federal, university, and sponsor requirements.

Re-use, Redistribution, and Derivatives Products Policies

Please provide as much information as possible:

- **Describe who will hold the intellectual property rights for the data created or used during the project;**
- **Describe whether you will transfer those rights to a data archive, if appropriate;**
- **Describe any other legal requirements that might need to be addressed.**

Intellectual property rights for data created or used:

1. All Illinois Work Zone Activity Data created or used for the IDOT WZAD project are owned by the Illinois Department of Transportation.
2. Intellectual property rights to derivative data products created or used for the IDOT WZAD project will be retained by the respective project teams responsible for their development.
3. The Illinois Department of Transportation and the U.S. Department of Transportation (USDOT) shall have a non-exclusive, perpetual right to unlimited use of any and all datasets created for the IDOT WZAD project.
4. A copy of the IDOT WZAD project datasets will be made available through the USDOT ROSA P repository for long-term preservation and public access. The publicly available dataset will be released under the Creative Commons Attribution 4.0 International (CC BY 4.0) license.
5. No additional legal restrictions are anticipated for use of the archived dataset.

Please take the default answer for compliance with the USDOT Public Access Plan.

By receiving USDOT funding, this project has granted the USDOT a comprehensive non-exclusive, paid-up, royalty-free copyright license for all project outputs, including but not limited to publications, datasets, software, code, and other derivate products. This includes all rights under copyright, including but not limited to the rights to copy, distribute, prepare derivative works, and the right to display and/or perform a work in public. In accordance with Chapter 18 of Title 35 of the United States Code, also known as the Bayh-Dole Act, if this project elects to retain title to any invention developed under this grant, USDOT retains a statutory nonexclusive, nontransferrable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any such invention throughout the world.

In compliance with the USDOT Public Access Plan, this project will transfer data rights to a public data repository, ensuring the data and project outputs are accessible to the public and other stakeholders.

Identify whether any licenses apply to the data; If you will be enforcing terms of use or a requirement for data citation through a license, indicate as much in your DMP.

This project plans to use the Creative Commons 4.0 International CC-BY license, which provides open access with attribution rights to the dataset. By being an open access license, this license fulfills the requirements outlined in the USDOT Public Access Plan for open data.

Archiving and Preservation Plan

How do you intended to store your data during the course of the project and ensure protections or access restrictions if needed?

All data for the IDOT WZAD project are managed by the TOPS Lab at the University of Wisconsin-Madison. The TOPS Lab operates a large-scale transportation data management platform that has been developed over the past 20 years through ongoing agency collaboration and research project sponsorship.

The WisTransPortal infrastructure consists of a combination of virtual and on-premises servers and storage systems managed by full-time TOPS Lab information technology staff in coordination with the University of Wisconsin-Madison Division of Information Technology (DoIT). The WZAD platform utilizes Microsoft SQL Server and Esri ArcGIS technologies to support data storage, integration, analysis, and geospatial processing. Project source code is managed through the University of Wisconsin-Madison's secure GitLab environment.

Access to project data is restricted to authorized project personnel with appropriate network, domain, and application credentials. All databases and servers are managed in accordance with University and IDOT security requirements, including authentication, access controls, logging, monitoring, backup, and disaster recovery practices. Data are encrypted both in transit and at rest.

The platform has been successfully used to support state and federally funded transportation data management, operations, and research projects, including the Wisconsin WZDx Stage 1 SMART Grant project.

This question's focus is on where the data is going to be at the end of a research project so we know the public is able to find it and access it without restrictions. If you need

some recommendations on where to store the data please check out, Data Repositories Conformant with the DOT Public Access Plan at https://doi.org/10.21949/1520566. All of these recommended repositories "support the creation and maintenance of persistent identifiers" and the requirements regarding DCAT-US. All of which we include as required information, to include, in this section when describing the repository where the data will be stored. So, if you do choose a repository from the conformant list, you would simply need a statement like the one below: If you choose a repository not on the list, please link to policies to show how it is conformant, so that it can be verified.

- **State where you intend to archive your data and why you have chosen that particular option;**
- **Provide a link to the repository;**

The primary project deliverables, including reports, data, and technical documentation, will be archived in the ROSA P (Repository & Open Science Access Portal). This is the USDOT's designated repository for transportation-related research and data. It was selected because it complies with federal open data policies, supports the DCAT-US Metadata Schema, and enables the assignment and maintenance of persistent identifiers such as DOIs to ensure long-term accessibility and discoverability of archived materials.

Link to ROSA P: https://rosap.ntl.bts.gov/

The archived dataset will document the Illinois Department of Transportation (IDOT) Work Zone Activity Data (WZAD) project and will include:

- Archived source work zone activity data collected from the five participating operational systems during the evaluation period (June 15 through July 31, 2026).
- Connected Work Zone (CWZ) 1.0 feed outputs generated by the Work Zone Activity Data Hub (WZDH) during the evaluation period.
- System health monitoring and validation reports documenting feed performance and availability.
- Supporting technical documentation, including the final implementation plan, final data management plan, data model documentation, transformation rules, and data dictionary.

The CWZ output files contain complete snapshots of active work zones in Illinois at five-minute intervals, whereas the archived source data files are created only when there has been a change in the feed since the previous collection cycle.

The archived materials will be provided in widely supported formats including CSV, JSON, GeoJSON, plain text, and PDF. Metadata describing the dataset, project, authors, sponsoring agencies, temporal coverage, geographic coverage, file formats, and licensing terms will be provided through ROSA P to support discovery, access, and reuse.

Whatever archive option you choose, that archive should support the capture and provision of the US Federal Government DCAT-US Metadata Schema https://resources.data.gov/resources/dcat-us/. The archive you choose should support the creation and maintenance of persistent identifiers (e.g., DOIs, handles, etc.) and must provide for maintenance of those identifiers throughout the preservation lifecycle of the data. Your plan should address how your archiving and preservation choices meet the above requirements.

ROSA P supports the capture and provision of US Federal Government DCAT-US Metadata Schema. ROSA P supports the creation of DOI persistent identifiers. ROSA P adheres to the USDOT Public

Access Plan requirements for archiving and preservation, meeting all the above requirements.