Plan Overview

A Data Management Plan created using DMP Tool

DMP ID: https://doi.org/10.48321/D1391BB329

Title: SMART METRO

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

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Template: SMART Grants Stage 1 Data Management Plan (DMP)

Project abstract:

The Broward Metropolitan Planning Organization (BMPO) planning process is continuous and must adapt to evolving needs. It involves collaboration among various stakeholders and considers factors such as economic development, infrastructure hardening, and efficiency. The BMPO process requires plans and policies to be coordinated, relevant, and aligned with local, regional, state, and national goals and initiatives.

Currently, regional planning processes and tools are limited in their ability to quickly and easily compare alternatives and their multidimensional impacts and interrelationships. MPOs often rely on single-use models, each with its own data dependencies and implementation schedules. This inefficient approach increases costs, extends timeframes, and reduces the reliability of complex planning efforts and investments.

With support from the USDOT SMART Grant Stage 1 Prototyping Grant, BMPO is developing SMART METRO, an innovative regional application of systems integration to create and

implement an efficient foundational digital twin platform. Accelerating threats to infrastructure, housing costs, congestion impacts, and population growth pose significant risks to Broward County, Florida. SMART METRO will integrate data science, geospatial analytics, and simulation tools and models for efficient transportation, infrastructure hardening, economic development, and land-use analysis.

SMART METRO will provide a virtual representation of the region to:

- Plan smarter, efficiently, and holistically to support informed investment of resources and infrastructure.

- Sustain effective multi-modal mobility hardened to extreme weather and a changing natural environment.

- Enable development that reduces housing and transportation costs, enhances access to jobs, fosters workforce development, and promotes concurrent economic growth in the region.

By integrating models, analytics, and data into a single platform and making them accessible to planners, engineers, and leaders, SMART METRO will optimize resources, enable comparison of diverse alternatives, and enhance the efficiency of data-driven decision-making to achieve measurable outcomes. Recognizing these challenges and their relevance to regions beyond South Florida, BMPO has partnered with the Association of Metropolitan Planning Organizations (AMPO), which has been instrumental in understanding the needs and perceptions of MPOs nationwide. This partnership and support from private sector organizations, regional governments, and academic institutions underscore a collaborative effort to address the increasingly complex planning and investment landscape. This broad coalition not only enhances the development of the SMART METRO platform but also ensures its applicability and effectiveness in improving planning and investment in Broward County and beyond.

Start date: 11-21-2024

End date: 01-31-2026

Last modified: 05-18-2026

Copyright information:

SMART METRO

Project Contact Information

Please provide as much of the the following information as possible:

1. **Name of the project;**
2. **Grant number;**
3. **Name of the person submitting this DMP;**
4. **ORCiD of the person submitting this DMP (need an ORCID? Register here: https://orcid.org/);**
5. **Email and phone number of the person submitting this DMP;**
6. **Name of the organization for which the person submitting this DMP is working;**
7. **Email and phone number for the organization;**
8. **Link to organization or project website, if applicable; and,**
9. **Date the DMP was written.**

1. SMART METRO
2. 69A3552441016
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6. Broward Metropolitan Planning Organization
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8. https://www.browardmpo.org/major-initiatives/transformation
9. December 15, 2024, revised May 18, 2026

Data Description

Please provide as much information as possible:

1. **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 any;**
    1. **If there will be no data collected or re-used from another source, state that this is case;**
        1. **If you answered "No data" above, then you are finished and may skip the most of the steps and sections below, after you:**
            1. **Save your DMP as it exists;**
            2. **Submit it to your Grant Manager or the NTL staff for review.**
2. **Address the expected nature, scope, and scale of the data that will be collected, as best as you can at this stage;**
3. **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;**
    1. **If data might be sensitive, please describe how you will protect privacy and security, if you know that now;**
    2. **You may need to update your DMP later to add more detail;**
4. **Discuss the expected value of the data over the long-term.**

The Broward MPO is committed to ensuring that all data collected through this process is organized and accessed in accordance with data standards and compliance requirements. The data compiled will support the SMART Stage 1 Prototyping Grant of the SMART METRO development and will include:

- Transportation Data:
- Traffic counts (Florida DOT),
- Travel mode share (Broward MPO),
- Transit routes and stops (Broward County Transit),
- Regional travel demand model outputs (Broward MPO)
- Demographic and Land-Use Data:
- Future land use from municipalities (Broward County),
- Zoning districts (Municipalities),
- Parcel data (Broward County),
- Redevelopment plans (Municipalities),
- Housing finance bond assignments (Broward County),
- US Census data (US Census),
- Broward County Property Appraiser data (Broward County).
- Environmental Data:
- Flood projections (Broward County),
- Broward County's hydraulic and hydrologic models (Broward County),
- Flooding inundation, sea elevation, storm surge tidal conditions, rainfall, groundwater, heat (absorption and re-emission of heat) data (Broward County).

These data and planning documents will be gathered from state, regional, and local levels.

SMART METRO Stage 1 ingested 146 datasets, 37 manual documents, and 31,536 website documents, totaling approximately 11GB. The platform's data integration framework supports both structured (tabular) and unstructured data, enabling scalable and robust data management. For long-term storage and processing, we will leverage the Google Cloud Platform (GCP) and its storage solutions.

Our sources may include, but are not limited to:

- National: ArcGIS Hub, US Census Bureau.
- Regional: BMPO Open Data Hub, Broward Housing Finance Authority, Broward County GeoHub, Broward County Resilient Environment Department, City of Miramar, Florida Department of Transportation (FDOT) Open Data Hub, University of Florida Bureau of Economic and Business Research (BEBR).

Data Format and Metadata Standards Employed

Please provide as much information as you can:

1. **Describe the anticipated file formats of your data and related files;**
2. **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;**
    1. **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.**
3. **Identify the metadata standards you will use to describe the data.**
    1. **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.**

The data formats currently include, but are not limited to:

- Shapefiles (.shp, .shx, .dbf, .prj) are a popular geospatial vector data format for geographic information system (GIS) software. They contain location, shape, and attribute information of geographic features.

- Comma-separated Values (.xlsx, .xls, .csv) are spreadsheets that contain tabular data in rows and columns or plain text files that contain data separated by commas. A spreadsheet can include multiple sheets.

- PDFs (.pdf) are versatile and can contain text, images, and other elements in a fixed layout, and are commonly used for reports. They are widely used to share and consistently present information across different platforms.

- JavaScript Object Notation (.json) is an easy-to-read and write format for humans and machines. This format is used for data exchange between a server and a web application.

The data management and metadata guiding principles for SMART METRO include:

- Central Cloud-Based Repository: All data will be stored in a central, cloud-based repository.

- Automated Processing: Where applicable, data processing will be automated.

- Secure Environment: The data environment will be secure, maintaining access control and privacy.

- Quality Standards: Quality standards will be developed to ensure data integrity and assurance.

Data pipelines will be established to standardize data transformation and migration into the repositories. All datasets include table and column descriptions to enable traceability and transparency for the insights and analytics provided to users. Data goes through a sequence of processing stages to clean, standardize, transform, aggregate, and prepare it for generating insights for users. Additionally, data dictionaries will be created to help secondary users understand and effectively use the data.

BMPO reviewed community and industry case studies demonstrating cutting-edge data management practices to address challenges similar to those in South Florida (e.g., TRANSCOM, City of Coral

Gables, State of Tennessee).

From these studies, initial documentation will include:

- Governance Structure
- Legal, Privacy, and Metadata Sharing Framework
- Regional Agreements
- Workshop Reports

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;**
3. **Describe any access restrictions that may apply to your data;**
4. **If necessary, describe any division of responsibilities for stewarding and protecting the data among Principal Investigators or other project staff.**

As part of the SMART METRO project, no PII or sensitive data will be collected. To manage access and security, however, BMPO will utilize role-based access control (RBAC). The following measures will be implemented to ensure secure data storage and access:

1. Role-Based Access Control (RBAC): Access to data will be managed through RBAC, ensuring that only authorized personnel can access specific data based on their roles.

Access levels will be assigned based on the principle of least privilege, granting the minimum necessary access for each role.

2. Access Controls and Security Measures: Strict access controls will be enforced through role assignments, ranging from least to most privileged.

Multi-factor authentication (MFA) or similar methods may be implemented to add an extra layer of security for accessing sensitive data.

3. Secure Data Access for Collaborators: Collaborators will access data securely through GCP's managed services, which provide robust security features.

4. Compliance with Security Standards: GCP's managed services comply with ISO/IEC 27001 (Information Security Management) and ISO/IEC 27017 (Cloud Security) standards. By leveraging GCP's advanced security features and adhering to best practices, BMPO aims to maintain a secure and compliant data management environment throughout the project.

Re-use, Redistribution, and Derivatives Products Policies

Recipients are reminded:

1. **Data, as a collection of facts, cannot be copyrighted under US copyright law;**
2. **Projects carried out under a US DOT SMART Grants is federally funded; therefore, as stated in grant language:**
    1. **Recipients must comply with the US DOT Public Access Plan, meaning, among other requirements, project data must be shared with the public, either by the researchers or by US DOT;**
    2. **That by accepting US DOT funding through this grant, recipients have granted to US DOT a comprehensive non-exclusive, paid-up, royalty-free copyright license for all project outputs (publications, datasets, software, code, etc.). 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; and,**
    3. **In accordance with Chapter 18 of Title 35 of the United States Code, also known as the Bayh-Dole Act, where grant recipients elect to retain title to any invention developed under this grant, US DOT 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.**

Please provide as much information as possible:

1. **Describe who will hold the intellectual property rights for the data created or used during the project;**
2. **Describe whether you will transfer those rights to a data archive, if appropriate;**
3. **Identify whether any licenses apply to the data;**
    1. **If you will be enforcing terms of use or a requirement for data citation through a license, indicate as much in your DMP;**
4. **Describe any other legal requirements that might need to be addressed.**

As outlined in OST's program description, BMPO is committed to protecting intellectual property (IP) rights and adhering to legal and ethical practices in IP matters. This commitment includes:

- Respect for IP Rights: Acknowledging and respecting the IP rights of others.

- Compliance with Laws and Regulations: Making for all activities involving IP comply with applicable laws and regulations.

- Proper Use of IP: Using IP in accordance with the terms of any licenses or agreements.

- Protection of BMPO and Contractor IP: Safeguarding the IP created by BMPO and its contractors.

IP created during the project utilizing grant funds shall be "open" to the public (no ownership).

In the event of IP issues, BMPO will follow a structured procedure to resolve them:

- Identification and Documentation: When an IP issue is identified, it shall be thoroughly documented. This includes detailing the nature of the IP, the parties involved, and the specific issue or dispute.

- Internal Review: The issue will be reviewed internally by the appropriate BMPO department(s) to assess its validity and potential impact.

- Consultation with Legal Experts: If necessary, BMPO will consult with legal experts specializing in IP law to gain a deeper understanding of the issue and explore potential resolutions.

- Negotiation and Settlement: BMPO may seek to resolve IP disputes through negotiation and settlement, which may involve licensing agreements, financial compensation, or other mutually agreeable terms.

- Litigation: If a resolution cannot be reached through negotiation, BMPO may pursue or defend against litigation to protect its IP rights or resolve the dispute.

- Training and Awareness: BMPO will provide training and resources so that all personnel are aware of IP laws and BMPO's policies to prevent IP issues and ensure proper handling when they arise.

Archiving and Preservation Plan

Please provide as much information as possible:

1. **State where you intend to archive your data and why you have chosen that particular option;**
2. **Provide a link to the repository;**
3. **You must describe the dataset that is being archived with a minimum amount of metadata that ensures its discoverability;**
    1. **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/**
4. **In addition, 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;**

5. **Your plan should address how your archiving and preservation choices meet these requirements.**

The final dataset will be deposited into the National Transportation Library's Repository & Open Science Access Portal (ROSA-P). The ROSA-P repository does provide persistent identifiers to its published data and supports the capture and provision of the DCAT-US Metadata Schema.

Data of long-term value will be identified based on its potential for reuse, its ability to validate research findings, and its contribution to future studies or teaching. This includes data that provides critical insights into project outcomes.

Data that defines baseline (e.g., existing and future land use, transportation, equity, and housing conditions, and other datasets) that are foundational to predicting impacts and modeling scenarios are deemed to be of long-term value.

The platform will utilize AI components to generate an answer or a set of answers. These answers can be saved to projects to add long-term value. BMPO will develop appropriate time limits for storing specific datasets or scenario analysis results. BMPO will communicate with stakeholders to ensure such data is downloaded and retained offline for future needs. The data will be preserved in formats that support long-term accessibility and usability, including standard file formats and metadata documentation (outlined in the documentation and metadata question 1), and will be shared through secure communication pipelines (e.g., Google Cloud Platform).

The data retention period will be determined by the current BMPO data retention plans.

The long-term preservation plan for the SMART METRO dataset involves leveraging Google Cloud Platform (GCP) for secure, scalable storage, ensuring the dataset's accessibility and usability beyond the grant's lifetime. GCP provides robust data management and preservation capabilities, including persistent storage, automated backups, and compliance with industry standards for data security and integrity.

To prepare the data for sharing and archiving, BMPO will allocate resources for thorough documentation, including detailed metadata, variable definitions, and methodological descriptions. This preparation will ensure that the data is comprehensible and reusable by future users. Regional and local agencies should consider offsetting these additional costs with savings from reducing or eliminating duplicate data management and storage.

By leveraging GCP's advanced storage solutions and allocating the necessary resources for data preparation and documentation, BMPO aims for long-term preservation and accessibility of the SMARTMETRO dataset, supporting its reuse and contributions to future use and educational endeavors (e.g., workforce development). This approach provides a scalable and secure environment for data preservation, ensuring that the dataset remains a valuable resource for years to come.
