**Data Management Plan**

The data management is an integral part of this project and, the success of the scientific and engineering outcomes will depend upon a robust data sharing and data management plan. This project will generate data related to experimental testing, field observations, and computational analyses/modeling. PI will work closely with his students and other collaborators to ensure a sound data management and data dissemination plan.

**Types of data that the Center anticipates gathering in the course of conducting research activities, including whether the data should be preserved for long-term access**

The data generated as part of this project includes data from mechanical testing of asphalt concrete samples (e.g., load, deformation), physical testing of samples (e.g., density, physical dimensions), and field observations (e.g., pavement surface cracks and overall condition). The mechanical testing will be done following applicable AASHTO standards, including TP-125: Provisional Standard Method of Test for Determining the Flexural Creep Stiffness of Asphalt Mixtures Using the Bending Beam Rheometer (BBR) and TP-124: Provisional Standard Method of Test for Determining the Fracture Potential of Asphalt Mixtures Using Semicircular Bend Geometry (SCB) at Intermediate Temperature. This testing will be conducted using equipment with electronic data acquisition from load and displacement sensors. These data will be collected in non-proprietary CSV format. Physical measurements will also be done following applicable standards and will be recorded in a laboratory notebook and then transferred to spreadsheets for further analysis. Field observations will be recorded in a laboratory notebook along with digital photographs where appropriate. Data summaries, simulations, and secondary data from previous projects will also be collected and summarized as notes in an electronic laboratory book. All of these data will be presented in interim and final reports as well as peer-reviewed publications.

All of the data will be preserved for long-term access as explained in this document.

**A proposed outline of the standards and machine-readable formats that will be used for the entire scope of research activities.**

All of the data from the mechanical testing will be done using electronic data acquisition of force, displacement, and temperature sensors. The data will be maintain in non-proprietary CSV format as generated by the data acquisition system. The data will be transfer daily from the machine where the testing was conducted to LabArchives. Spreadsheets will be used to summarize and analyzed the data and will also be uploaded to LabArchives.

The research will be conducted using LabArchives, a secure cloud-based electronic lab notebook application enabling researchers to easily create, store, share, and manage their research. LabArchives is interdisciplinary, supports collaboration anytime and anywhere, and supports both Mac and PC platforms. LabArchives is secure for sensitive data and all data is regularly backed up and maintained in multiple locations. No data can be deleted from the notebooks; therefore, an audit trail is available for reviewing. LabArchives’ notebooks will be developed for this project using the University of Utah site license and all metadata for this research project (e.g. proposals, SOPs, applications, templates, etc.) will be stored within the LabArchives’ notebooks.

**A description of any data access policies that govern (and prevent) the disclosure of identities, confidential business information, national security information, etc., and whether public use files may be generated from the data.**

There are no data access policies that govern (and prevent) the disclosure of identities, confidential business information, and national security information.

**A general discussion of policies for re-use and re-distribution of research data**

The data generated as part of this work will be of interest to the transportation community. The data will be available for access and sharing as soon as it is reasonable possible and not longer than 60 days from the time it is generated. If data is requested, a reply within 30-days will direct users to the data repository and provide instructions on how to access and download the data. The repository will provide proper citation for users to incorporate the data into their publications and will have a memorandum of understanding (MOU) stating that users may not re-release the data to a third party, but direct them back to the repository.

There are no private claims on the intellectual property developed within this effort.

**A high level description of how, when and where the Center plans to archive, preserve, and deposit the research data.**

Primary data will be preserved and archived at Zenodo (<https://zenodo.org/>), an international repository/archive of research outputs from across all fields of research. Zenodo is listed as conforming with the DOT Public Access Plan (<https://ntl.bts.gov/publicaccess/repositories.html>). If a more appropriate subject-based repository is discovered during the course of the research, then it may be used. The data will be submitted to the repository no later than 60 days after filing the final report with MPC. A README file, including the metadata/information required to repeat the research, will be included along with the data. According to Zenodo’s policy, data entries remain accessible forever. If another repository is used then data will be archived a minimum of three years to comply with federal and university policy.