HPMS Reassessment 2010+

Data Specifications

Prepared by:
Office of Highway Policy Information
Federal Highway Administration

U.S. Department of Transportation
Federal Highway Administration

Version 9

May 2008

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1. INTRODUCTION

1.1. Background

The Federal Highway Administration (FHWA) has the responsibility to assure that adequate highway transportation information is available to support its functions and responsibilities, including those of the Administration and the Congress. The primary purpose of the Highway Performance Monitoring System (HPMS) is to serve these data and information needs.

The provision of HPMS data is a cooperative effort with State Highway Agencies (SHAs), local governments and metropolitan planning organizations (MPOs) working in partnership to collect, assemble, and report the necessary information. In consultation with its HPMS partners, stakeholders, and customers, FHWA has identified the data to be reported and has provided data definitions and standards. FHWA has developed and maintains PC-based software and analytical models and techniques that FHWA and a number of States use with HPMS data to do policy sensitive system, corridor, and subarea planning and programming. Taken together, these activities support informed highway planning, policy making, and decision making at the national, state, and local levels.

1.1.1. Purpose of the *HPMS Data Specifications*

The *HPMS Data Specifications* document is intended to be a dynamic document that will evolve and:

- function as the data dictionary for HPMS
- list commonly used acronyms, abbreviations and decode tables
- provide frequently used definitions in preparing HPMS data for FHWA

The *HPMS Data Specifications* will continue as the primary document to support the HPMS database and software development activities. The HPMS data structure and format however is not anticipated to change significantly from this point forward.

1.1.2. Other Related HPMS Reassessment 2010+ Documents

The HPMS Reassessment Final Recommendation Report, prepared by Federal Highway Administration, explains the requested data changes and how these items will be used. The document outlines the:

- Original Issue Area Recommendations
- Impacts of Reassessment
- Summary of data additions/deletions/changes
- Final Recommendations

The HPMS Field Manual, prepared by the office of Highway Policy Information, Federal Highway Administration, will describe in more detail the collection and reporting of HPMS data. Some of the additional detailed information on specific data coding, sample selection, and technical procedures and requirements will be included in the Appendices of the Field Manual. Those collecting and reporting HPMS data should consult these appendices for a thorough explanation of specific requirements, techniques, or procedures to be used in developing the HPMS data for FHWA. Information related to the use of the HPMS submittal software is included in the software documentation and will not be included in the Field Manual. The document contains:

- Reporting specifications for the various types of data in HPMS
- Timetable for coordinating and updating the various data items and components of the HPMS
- Information on maintaining the HPMS sample

This Data Specification document together with the HPMS Reassessment Final Recommentations Report and HPMS Field Manual describe the 2006 - 2007 HPMS Reassessment and the resulting changes to HPMS. The post-Reassessment HPMS is often referred to in this and other Reassessment documents as "HPMS 2010+" with 2010 being the data reporting year that most of the changes resulting from the 2006 – 2007 Reassessment take effect.

1.1.3. Uses of HPMS Data

HPMS is the official source of data on the extent, condition, performance, use, and operating characteristics of the nation's highways. Certain data items are provided for all public roads, including length, lane-miles, and travel, which are used in the apportionment of Federal-Aid highway funds. HPMS data are also used for assessing and reporting highway system performance under FHWA's strategic planning process. HPMS data also form the basis of the analyses that support the Conditions and Performance Reports to Congress and are the source for a substantial portion of the information published in *Highway Statistics* and in other FHWA publications and media. Finally, the HPMS data are widely used throughout the transportation community, including other governmental interests, business and industry, institutions of higher learning, the media and general public. Table I-1 contains information on the source of selected length, lane-mile, and travel data from the HPMS data set.

Table I-1 -- Sources of Selected HPMS data

Rural								
HPMS Data	Federal-Aid						Non-Federal-Aid	
	National Highway System (NHS)		Non-National Highway System (non-NHS)					
	Interstate	Non-Interstate	Other Freeways & Expressways	Other Principal Arterials	Minor Arterial	Major Collector	Minor Collector	Local
Miles	Universe	Universe	Universe	Universe	Universe	Universe	Summary	Summary
Lane-Miles	Universe	Universe	Universe	Universe	Universe	Universe	Summary 1/	Summary 1/
Total VMT	Universe	Universe	Universe	Universe	Universe	Universe	Summary 2/	Summary 2/
Truck VMT	Universe	Universe	Sample	Sample	Sample	Sample	Summary	Summary
International Roughness Index (IRI)	Universe	Universe	Universe	Universe	Sample	Optional		
Total Public Road Miles	Certified Mileage ----------							

Urban								
HPMS Data	Federal-Aid							Non-Federal-Aid
	National Highway System (NHS)		Non-National Highway System (non-NHS)					
	Interstate	Non-Interstate	Other Freeways & Expressways	Other Principal Arterials	Minor Arterial	Major Collector	Minor Collector	Local
Miles	Universe	Universe	Universe	Universe	Universe	Universe	Universe	Summary
Lane-Miles	Universe	Universe	Universe	Universe	Universe	Universe	Universe	Summary 1/
Total VMT	Universe	Universe	Universe	Universe	Universe	Universe	Universe	Summary 2/
Truck VMT	Universe	Universe	Sample	Sample	Sample	Sample	Sample	Summary
International Roughness Index (IRI)	Universe	Universe	Universe	Universe	Sample	Optional	Optional	
Total Public Road Miles	Certified Mileage ----------							

1/ Universe miles times 2 (lanes) are used. States are not required to report number of through lanes on these systems, except for NHS sections.

2/ Summary data are used. States are not required to report section level AADT on these systems, except for NHS sections.

Definitions:

Universe: Data reported for all roadway links in the system.

Sample: Data reported for a randomly selected sample of roadway links in the system.

Summary: Data reported in aggregate form by functional system.

Table I-2 provides information on how HPMS data are used in the Federal-Aid Highway Program apportionment formulae.

Table I-2 -- HPMS Data Used for Apportionment

Fund	Factors	Weight
Interstate Maintenance (IM)	Interstate System Lane-Miles	33 1/3 %
	Vehicle-Miles Traveled on the Interstate System	33 1/3 %
National Highway System (NHS)	Lane-Miles of Principal Arterial Highways (excluding Interstate System)	25 %
	Vehicle-Miles Traveled on Principal Arterial Highways (excluding Interstate System)	35 %
	Total Lane-Miles of Principal Arterial Highways divided by the State's Population	10 %
Surface Transportation Program (STP)	Lane-Miles of Federal-Aid Highways	25 %
	Vehicle-Miles Traveled on Federal-Aid Highways	40 %
Highway Safety Improvement Programs	Lane-Miles of Federal-Aid Highways	33 1/3 %
	Vehicle-Miles Traveled on Federal-Aid Highways	33 1/3 %
State and Community Highway Safety Grants	State Population	75 %
	Public Road Miles	25 %

1.1.4. Scope of the HPMS

The HPMS is a national data program that includes inventory data for **all** of the Nation's public road mileage as certified by the States' Governors on an annual basis. All roads open to public travel are reported in HPMS regardless of ownership including Federal, State, county, city, and some privately owned roads such as toll facilities. Each State is required to annually furnish all data per the reporting requirements specified in the *HPMS Field Manual*. The District of Columbia and the Commonwealth of Puerto Rico are considered to be States for HPMS reporting purposes. United States Territories (Guam, the Commonwealth of the Northern Marianas, American Samoa, and the Virgin Islands of the United States) are required to annually report limited HPMS summary data only; in addition to the separate reporting of certified public road mileage.

1.1.5. Overview of HPMS Reporting Requirements

Regulations governing the FHWA State Planning and Research (SPR) funded work programs [23 Code of Federal Regulations (CFR), Part 420] outline responsibilities for furnishing FHWA adequate information for administering the Federal-Aid highway program. Maintaining a valid HPMS database is an item of national significance, and therefore must be adequately addressed in each State's annual SPR work program. This extends beyond the simple reporting of data each year and includes taking actions to assure that all data are complete, current, and accurate. Although there may be other participants in the collection and reporting process, the ultimate responsibility for the timely reporting of accurate HPMS data lies with the State highway agency. The submission of false data is a violation of the United States Code (U.S.C.), Title 18, Section 1020.

All HPMS data are to represent conditions as of December 31 of the data year. Since length, lane-miles, and highway travel are used to apportion funds, it is important that these data represent the entire calendar year. Each State is expected to make an annual submittal of HPMS data in accordance with the procedures, formats, and codes specified in this document. Each State should also assure that there is agreement between the Certified Public Road Mileage and the total length (kilometers or miles) reported to FHWA via HPMS.

HPMS due date: June 15th of the year following the data year e.g. data collected in calendar year 2009 are due to FHWA by June 15, 2010.

Send items that are in other than electronic format to:

- FHWA Division Office

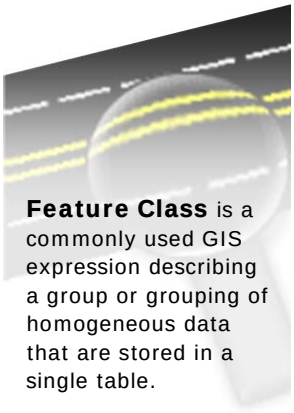
- Office of Highway Policy Information
  Attention: HPPI-20, Room E83-428
  Federal Highway Administration
  1200 New Jersey Avenue, S.E.
  Washington, D.C. 20590

Arrangements for delivery of items to be provided in electronic format should be made with the Office of Highway Policy Information and the FHWA Division Office on a State specific basis.

1.2. The HPMS Data Model

HPMS data are organized into seven catalogs (Table I-3 and individual catalog exhibits): Shapes, Summaries, Metadata, Points, Estimates, Sections, and References.

Each catalog contains Feature Classes in the form of tables that group data by type and/or function. Data for specific highway segments are in the Sections Catalog. Area wide summary data are in the Summaries Catalog. Virtual and spatial relationships between the catalogs, and the tables within them, provide users with the ability to format reports, export data, and provide mapping analytical tools from multiple catalogs and tables.



Feature Class is a commonly used GIS expression describing a group or grouping of homogeneous data that are stored in a single table.

The majority of the HPMS data are within the Sections Catalog. These are section specific data that are grouped into several tables that create layers by program area. Data related to traffic, for example, are in a separate table from pavement data. The separate tables are linked together through a state supplied linear referenced network (SHAPES_ROUTE). SHAPES_ROUTE is found in the Shapes Catalog. A data intersection of one or more tables in the Sections Catalog with SHAPES_ROUTE can be used to parse out the data as needed.

Data on lower functional systems (Locals and Rural Minor Collectors) are summarized and reported in Summaries Catalog tables. The level of data for these functional systems is commensurate with the federal need for these data.

The Metadata Catalog contains tables that describe the collection and reporting of traffic, pavement, and ramp data.

The Data Model is designed to be flexible and grow as data becomes available. Data referenced to the network only needs to be put in a section table and it can be related spatially with the other existing tables within the system.

The modular design of the system allows future modification in a particular data area or table to have little impact on data in other tables. If a change to the pavement model is required, it can be made without impacting the traffic section data.

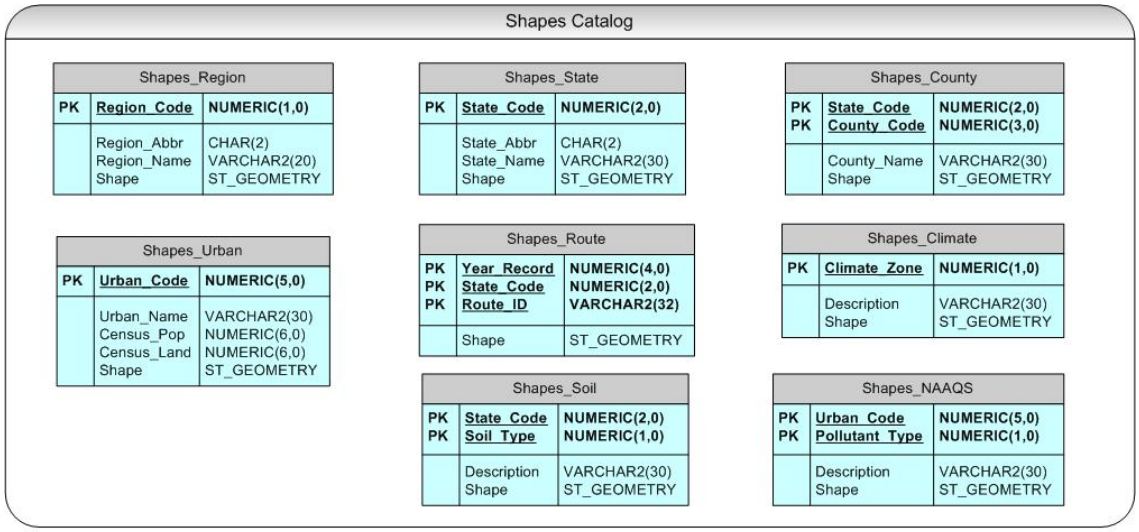
The system allows opportunities to use data from outside sources to populate fields in HPMS. Census Population data could be used to calculate the RU_CODE designation. Non-attainment boundaries could be used to cut the data by several different pollutant types without a need to collect additional data.

Official networks such as the National Freight Network (NN), National Highway System (NHS) and Strategic Highway Network (STRAHNET) can be either maintained by FHWA in HPMS or brought in from other organizations such as the Department of Defense in the case of STRAHNET. By doing this, States would be relieved of the burden of maintaining and reporting these networks.

Migration to this model will take some effort, some education and a little patience. Hopefully the benefits stated above will be realized.

Table I-3 -- Catalog and Table Reference

4.0 Shapes Catalog	
4.1	Shapes_Route
4.2.1	Shapes_Region
4.2.2	Shapes_State
4.2.3	Shapes_County
4.2.4	Shapes_Urban
4.2.5	Shapes_NAAQS
4.2.6	Shapes_Catalog
4.2.7	Shapes_Climate
5.0 Summaries Catalog	
5.1	Summaries_Vehicle
5.2	Summaries_Urban
5.3	Summaries_County
5.4	Summaries_Statewide
5.5	Summaries_NAAQS
6.0 Estimates Catalog	
6.1	Estimates_Pavement
7.0 Metadata Catalog	
7.1	Metadata_Traffic
7.2	Metadata_Pavement
7.3	Metadata_Ramp
8.0 Sections_Catalog	
8.1	Sections_Fsystem
8.2	Sections_Urban
8.3	Sections_Lane
8.4	Sections_Traffic
8.5	Sections_Signage
8.6	Sections_Jurisdiction
8.7	Sections_Sample
8.8	Sections_Geometric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PK Region_Code NUMERIC(1,0)
Region_Abbr CHAR(2)
Region_Name VARCHAR2(20)
Shape ST_GEOMETRY
Shapes_State
PK State_Code NUMERIC(2,0)
State_Abbr CHAR(2)
State_Name VARCHAR2(30)
Shape ST_GEOMETRY
Shapes_County
PK State_Code NUMERIC(2,0)
PK County_Code NUMERIC(3,0)
County_Name VARCHAR2(30)
Shape ST_GEOMETRY
Shapes_Urban
PK Urban_Code NUMERIC(5,0)
Urban_Name VARCHAR2(30)
Census_Pop NUMERIC(6,0)
Census_Land NUMERIC(6,0)
Shape ST_GEOMETRY
Shapes_Route
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Shape ST_GEOMETRY
Shapes_Climate
PK Climate_Zone NUMERIC(1,0)
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Shape ST_GEOMETRY
Shapes_Soil
PK State_Code NUMERIC(2,0)
PK Soil_Type NUMERIC(1,0)
Description VARCHAR2(30)
Shape ST_GEOMETRY
Shapes_NAAQS
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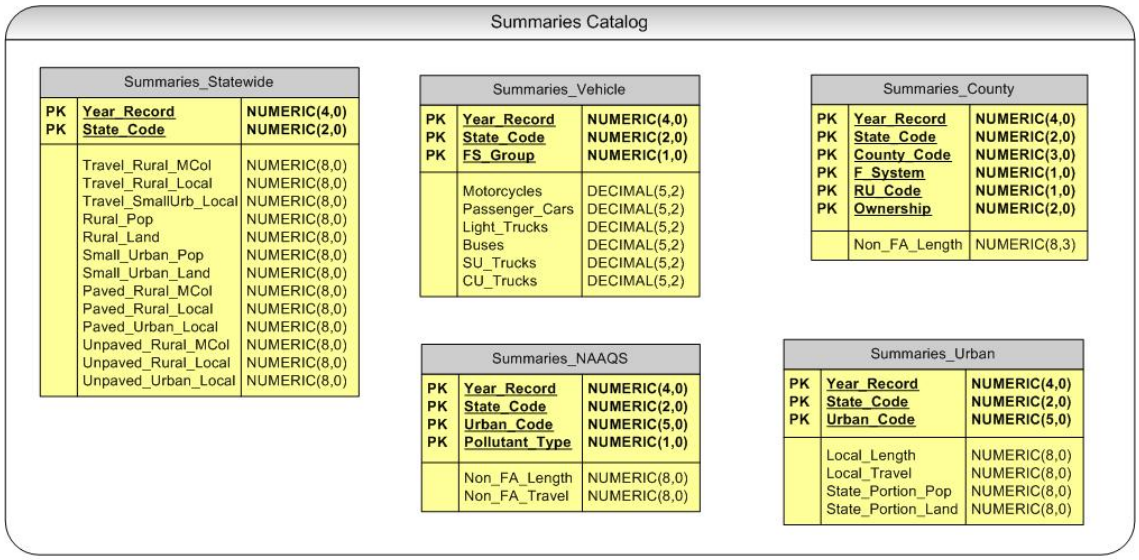
PK Pollutant_Type NUMERIC(1,0)
Description VARCHAR2(30)
Shape ST_GEOMETRY


Summaries Catalog
Summaries_Statewide
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PK State_Code NUMERIC(2,0)
Travel_Rural_MCol NUMERIC(8,0)
Travel_Rural_Local NUMERIC(8,0)
Travel_SmallUrb_Local NUMERIC(8,0)
Rural_Pop NUMERIC(8,0)
Rural_Land NUMERIC(8,0)
Small_Urban_Pop NUMERIC(8,0)
Small_Urban_Land NUMERIC(8,0)
Paved_Rural_MCol NUMERIC(8,0)
Paved_Rural_Local NUMERIC(8,0)
Paved_Urban_Local NUMERIC(8,0)
Unpaved_Rural_MCol NUMERIC(8,0)
Unpaved_Rural_Local NUMERIC(8,0)
Unpaved_Urban_Local NUMERIC(8,0)
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PK FS_Group NUMERIC(1,0)
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Passenger_Cars DECIMAL(5,2)
Light_Trucks DECIMAL(5,2)
Buses DECIMAL(5,2)
SU_Trucks DECIMAL(5,2)
CU_Trucks DECIMAL(5,2)
Summaries_County
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PK State_Code NUMERIC(2,0)
PK County_Code NUMERIC(3,0)
PK F_System NUMERIC(1,0)
PK RU_Code NUMERIC(1,0)
PK Ownership NUMERIC(2,0)
Non_FA_Length NUMERIC(8,3)
Summaries_NAAQS
PK Year_Record NUMERIC(4,0)
PK State_Code NUMERIC(2,0)
PK Urban_Code NUMERIC(5,0)
PK Pollutant_Type NUMERIC(1,0)
Non_FA_Length NUMERIC(8,0)
Non_FA_Travel NUMERIC(8,0)
Summaries_Urban
PK Year_Record NUMERIC(4,0)
PK State_Code NUMERIC(2,0)
PK Urban_Code NUMERIC(5,0)
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Local_Travel NUMERIC(8,0)
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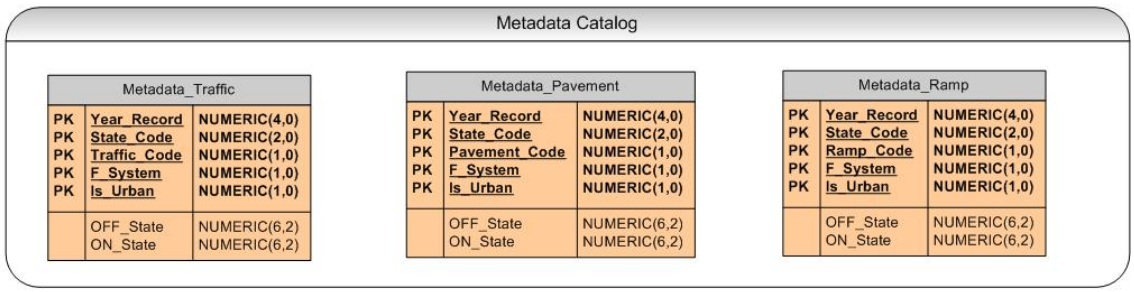
State_Portion_Land NUMERIC(8,0)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ON_State NUMERIC(6,2)
Metadata_Pavement
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PK Pavement_Code NUMERIC(1,0)
PK F_System NUMERIC(1,0)
PK Is_Urban NUMERIC(1,0)
OFF_State NUMERIC(6,2)
ON_State NUMERIC(6,2)
Metadata_Ramp
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PK State_Code NUMERIC(2,0)
PK Ramp_Code NUMERIC(1,0)
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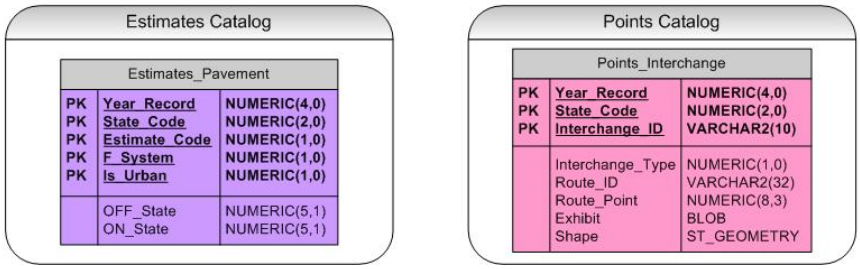
PK Is_Urban NUMERIC(1,0)
OFF_State NUMERIC(6,2)
ON_State NUMERIC(6,2)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PK Estimate_Code NUMERIC(1,0)
PK F_System NUMERIC(1,0)
PK Is_Urban NUMERIC(1,0)
OFF_State NUMERIC(5,1)
ON_State NUMERIC(5,1)
Points Catalog
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PK State_Code NUMERIC(2,0)
PK Interchange_ID VARCHAR2(10)
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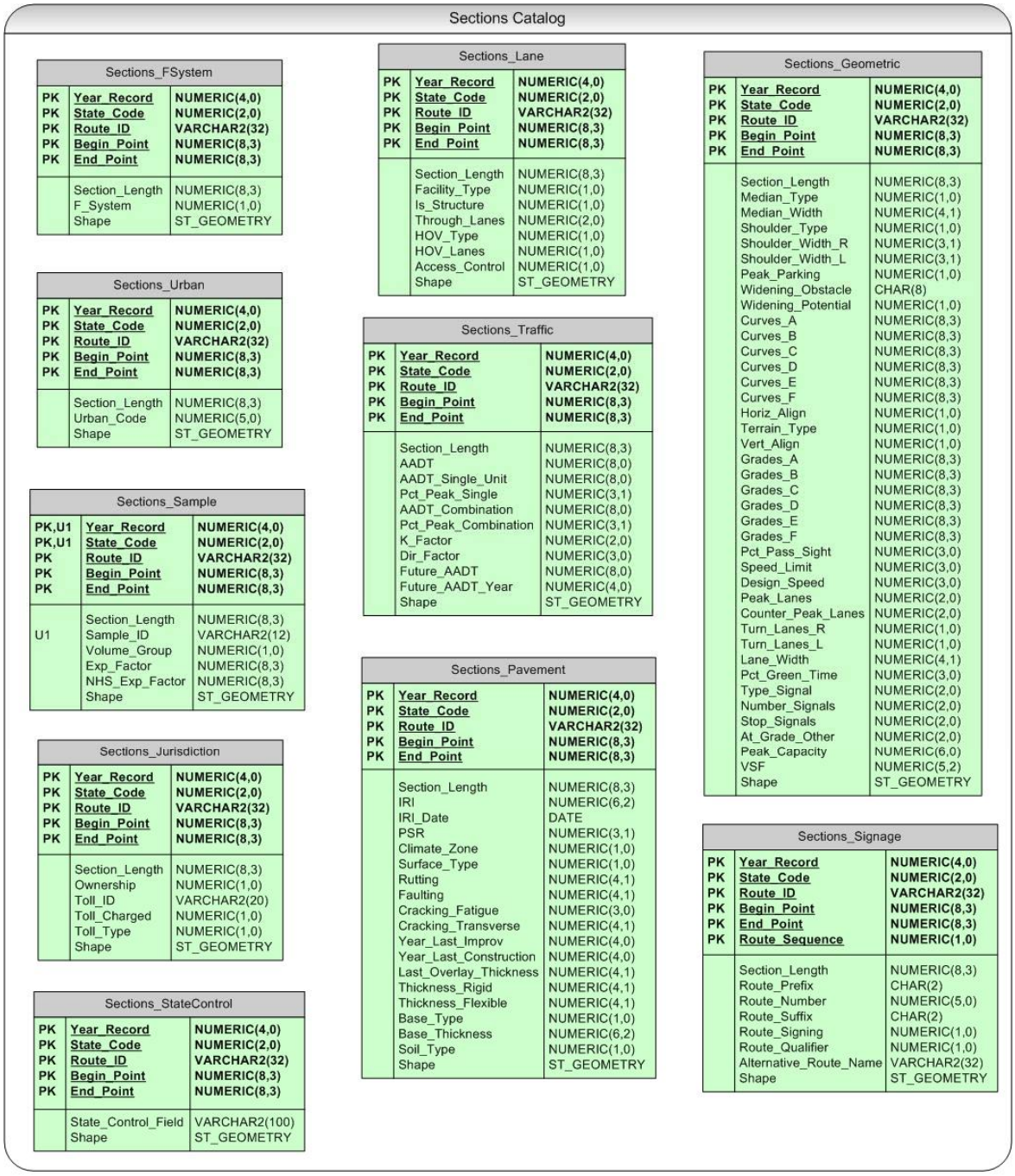
Exhibit BLOB
Shape ST_GEOMETRY


Sections Catalog
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PK End_Point NUMERIC(8,3)
Section_Length NUMERIC(8,3)
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Shape ST_GEOMETRY
Sections_Urban
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PK End_Point NUMERIC(8,3)
Section_Length NUMERIC(8,3)
Urban_Code NUMERIC(5,0)
Shape ST_GEOMETRY
Sections_Sample
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PK,U1 State_Code NUMERIC(2,0)
PK Route_ID VARCHAR2(32)
PK Begin_Point NUMERIC(8,3)
PK End_Point NUMERIC(8,3)
U1 Section_Length NUMERIC(8,3)
U1 Sample_ID VARCHAR2(12)
U1 Volume_Group NUMERIC(1,0)
U1 Exp_Factor NUMERIC(8,3)
U1 NHS_Exp_Factor NUMERIC(8,3)
U1 Shape ST_GEOMETRY
Sections_Jurisdiction
PK Year_Record NUMERIC(4,0)
PK State_Code NUMERIC(2,0)
PK Route_ID VARCHAR2(32)
PK Begin_Point NUMERIC(8,3)
PK End_Point NUMERIC(8,3)
Section_Length NUMERIC(8,3)
Ownership NUMERIC(1,0)
Toll_ID VARCHAR2(20)
Toll_Charged NUMERIC(1,0)
Toll_Type NUMERIC(1,0)
Shape ST_GEOMETRY
Sections_StateControl
PK Year_Record NUMERIC(4,0)
PK State_Code NUMERIC(2,0)
PK Route_ID VARCHAR2(32)
PK Begin_Point NUMERIC(8,3)
PK End_Point NUMERIC(8,3)
State_Control_Field VARCHAR2(100)
Shape ST_GEOMETRY
Sections_Lane
PK Year_Record NUMERIC(4,0)
PK State_Code NUMERIC(2,0)
PK Route_ID VARCHAR2(32)
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PK End_Point NUMERIC(8,3)
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Is_Structure NUMERIC(1,0)
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HOV_Lanes NUMERIC(1,0)
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Sections_Traffic
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AADT_Combination NUMERIC(8,0)
Pct_Peak_Combination NUMERIC(3,1)
K_Factor NUMERIC(2,0)
Dir_Factor NUMERIC(3,0)
Future_AADT NUMERIC(8,0)
Future_AADT_Year NUMERIC(4,0)
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Sections_Pavement
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PK State_Code NUMERIC(2,0)
PK Route_ID VARCHAR2(32)
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PK End_Point NUMERIC(8,3)
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IRI NUMERIC(6,2)
IRI_Date DATE
PSR NUMERIC(3,1)
Climate_Zone NUMERIC(1,0)
Surface_Type NUMERIC(1,0)
Rutting NUMERIC(4,1)
Faulting NUMERIC(4,1)
Cracking_Fatigue NUMERIC(3,0)
Cracking_Transverse NUMERIC(4,1)
Year_Last_Improv NUMERIC(4,0)
Year_Last_Construction NUMERIC(4,0)
Last_Overlay_Thickness NUMERIC(4,1)
Thickness_Rigid NUMERIC(4,1)
Thickness_Flexible NUMERIC(4,1)
Base_Type NUMERIC(1,0)
Base_Thickness NUMERIC(6,2)
Soil_Type NUMERIC(1,0)
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Sections_Geometric
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Shoulder_Width_L NUMERIC(3,1)
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Widening_Obstacle CHAR(8)
Widening_Potential NUMERIC(1,0)
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Curves_B NUMERIC(8,3)
Curves_C NUMERIC(8,3)
Curves_D NUMERIC(8,3)
Curves_E NUMERIC(8,3)
Curves_F NUMERIC(8,3)
Horiz_Align NUMERIC(1,0)
Terrain_Type NUMERIC(1,0)
Vert_Align NUMERIC(1,0)
Grades_A NUMERIC(8,3)
Grades_B NUMERIC(8,3)
Grades_C NUMERIC(8,3)
Grades_D NUMERIC(8,3)
Grades_E NUMERIC(8,3)
Grades_F NUMERIC(8,3)
Pct_Pass_Sight NUMERIC(3,0)
Speed_Limit NUMERIC(3,0)
Design_Speed NUMERIC(3,0)
Peak_Lanes NUMERIC(2,0)
Counter_Peak_Lanes NUMERIC(2,0)
Turn_Lanes_R NUMERIC(1,0)
Turn_Lanes_L NUMERIC(1,0)
Lane_Width NUMERIC(4,1)
Pct_Green_Time NUMERIC(3,0)
Type_Signal NUMERIC(2,0)
Number_Signals NUMERIC(2,0)
Stop_Signals NUMERIC(2,0)
At_Grade_Other NUMERIC(2,0)
Peak_Capacity NUMERIC(6,0)
VSF NUMERIC(5,2)
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Sections_Signage
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PK End_Point NUMERIC(8,3)
PK Route_Sequence NUMERIC(1,0)
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Route_Number NUMERIC(5,0)
Route_Suffix CHAR(2)
Route_Signing NUMERIC(1,0)
Route_Qualifier NUMERIC(1,0)
Alternative_Route_Name VARCHAR2(32)
Shape ST_GEOMETRY
References Catalog
References_Truck
PK Year_Record NUMERIC(4,0)
PK State_Code NUMERIC(2,0)
PK Route_ID VARCHAR2(32)
PK Begin_Point NUMERIC(8,3)
PK End_Point NUMERIC(8,3)
Section_Length NUMERIC(8,3)
Date_Approved DATE
Shape ST_GEOMETRY
References_NHS
PK Year_Record NUMERIC(4,0)
PK State_Code NUMERIC(2,0)
PK Route_ID VARCHAR2(32)
PK Begin_Point NUMERIC(8,3)
PK End_Point NUMERIC(8,3)
Section_Length NUMERIC(8,3)
Date_Approved DATE
NHS NUMERIC(1,0)
Future_Facility NUMERIC(1,0)
Strahnet_Type NUMERIC(1,0)
Military_Base VARCHAR2(20)
Shape ST_GEOMETRY

1.3. Document Overview

The remainder of this document describes the catalogs and tables used for the submittal, storage, and analysis of HPMS data. At the beginning of each section is a tabular description of the data items (Field Name) contained in the table along with the Field Number, Constraints, Data Type, and Description. Cells within the Constraint column will be blank, contain the text "PK" which stands for "Primary Key", or contain the text "UK" which stands for "Unique Key" and indicates the data fields used for linking data in the table with data in other tables. The Data Type column contains the format for each data item e.g. Numeric(2); Decimal(6,3); Character(32) etc. Below the tabular description of the data are some or all of the following attributes: Extent, Metadata, Valid Values, Aggregation Rule, Collection Cycle, and Collection Requirements.

- **Extent** - describes where or for what part of the State's public roads the data in the table are required.
- **Metadata** – describes any metadata collected for the table and contained in the Metadata Catalog.
- **Valid Values** – describes the nature and type of the data contained in the table.
- **Aggregation Rule** – describes how the HPMS database and software determine the value for a Data Item in the Sections Catalog when combining two or more sections with differing values.
- **Collection Cycle** – describes the frequency of data collection, typically: as required; annually; or biennially.
- **Collection Requirements** – describes any specific procedures, equipment, or process to be followed in the collection and reporting of the data.

Following the tabular attributes are the Field Details, which list the above attributes, where applicable, for each data item along with a short description. The final portion of each section contains a Record Example that shows how the data are stored in each table along with an example of how the data can be imported into the table from a Comma Separated Value (CSV) format file.

1.4. Underlying HPMS Data Assumptions

There are some basic data assumptions that apply to HPMS, the underlying database, software, and analysis:

- Unless otherwise noted in the *HPMS Reassessment 2010+ Final Report*, all changes will take effect beginning with the submittal of 2009 data, submitted to FHWA in June 2010.
- All data in a State's submittal will be consistent with regard to the measurement system i.e. English and Metric. Measurement units within this and other HPMS documents are specified for each data item in both English and Metric units.
- Unless otherwise noted, universe and sample data submitted and stored in the Sections tables are only required for Federal-Aid Highways, which are comprised of the entire NHS and all roads functionally classified through Rural Major Collector and Urban Minor Collector.
- Only current year data will be reported in HPMS unless otherwise noted. Factoring or estimation of data is only permissible where specified in the individual Data Item attributes.
- Metadata will only be used in HPMS to understand and/or explain the variability of certain data items.
- Data in the Estimates Catalog is collected for national-level analysis only and will not be used in reporting HPMS data, nor will it be provided when responding to data requests. The sole purpose of these data are to develop a more complete estimation of current State and Local pavement conditions and construction practices beyond the data currently being collected and reported in the Sections Catalog.

- The only data items required for ramps, in addition to the location and length data, are AADT, F_System, and Through_Lanes. All are clearly marked as required for ramps in the Sections Catalog. All other data items are optional for ramps, regardless of whether they are required or optional for other types of facilities.

2. ACRONYMS AND ABBREVIATIONS

AADT:	Annual Average Daily Traffic
AASHTO:	American Association of State Highway Transportation Officials
AC:	Asphalt "Bituminous" Concrete
AP:	Analytical Process
ARS:	Average Rectified Slope
ASTM:	American Society for Testing and Materials
ATR:	Automatic Traffic Recorder
AWT:	Average Weekday Traffic
BTS:	Bureau of Transportation Statistics
CAAA:	Clean Air Act Amendments
CD:	Collector-Distributor
CFR:	Code of Federal Regulations
CO:	Carbon Monoxide
Col:	Collector
CRCP:	Contnuously Reinforced Concrete Pavement
CSV:	Comma Separated Value
C.V.:	Coefficient of Variation
DLG:	Digital Line Graphs
DOT:	Department of Transportation
DVKT:	Daily Vehicle-Kilometers of Travel
DVMT:	Daily Vehicle-Miles of Travel
EPA:	Environmental Protection Agency
ESAL:	Equivalent Single Axle Load
FA:	Federal-Aid
FAP:	Federal-aid Primary
FHWA:	Federal Highway Administration
FIPS:	Federal Information Processing Standards
GIS:	Geographic Information System
GPRA:	Government Performance & Results Act
HCM:	Highway Capacity Manual
HERS:	Highway Economic Requirements System
HOT:	High Occupancy Toll
HOV:	High Occupancy Vehicle
HPMS:	Highway Performance Monitoring System
ID:	Section Identification
IM:	Interstate Maintenance
Int:	Interstate
IRI:	International Roughness Index
ITS:	Intelligent Transportation System
JPCP:	Jointed Plain Concrete Pavement
JPEG:	Joint Photographic Experts Group
JRCP:	Jointed Reinforced Concrete Pavement
KMPT:	Kilometer point
Loc:	Local
LRS:	Linear Referencing System
LTPP:	Long Term Pavement Performance
MA:	Minor Arterial
MaC:	Major Collector
MiC:	Minor Collector
MPH:	Miles per Hour
MPO:	Metropolitan Planning Organization
MPT:	Mile point
MRI:	Mean Roughness Index
NAAQS:	National Ambient Air Quality Standards
NCHRP:	National Cooperative Highway Research Program
NHPN:	National Highway Planning Network
NHS:	National Highway System
NHTSA:	National Highway Traffic Safety Administration
NIST:	National Institute of Standards and Technology
NN:	National Freight Network
OFE:	Other Freeways and Expressways
OPA:	Other Principal Arterial
PAS:	Principal Arterial System
PAS/NHS:	Principal Arterial System/National Highway System
PC:	Personal Computer
PCC:	Portland Cement Concrete
PK:	Primary Key
PMS:	Pavement Management System
PSI:	Present Serviceability Index
PSR:	Present Serviceability Rating
ROW:	Right-of-Way
RTRRM:	Response Type Road Roughness Meter
R/U:	Rural/Urban
SAFETEA-LU	Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users
SHA:	State Highway Agency
SHRP:	Strategic Highway Research Program
SI:	International System
SN or D:	Structural Number (SN) of Flexible Pavement or Thickness (D) of rigid Pavement
SPR:	Statewide Planning and Research
STAA:	Surface Transportation Assistance Act
STP:	Surface Transportation Program
STRAHNET:	Strategic Highway Corridor Network
TEA-21:	Transportation Equity Act for the 21st Century

THS:	Territorial Highway System
TMG:	Traffic Monitoring Guide
TMS:	Traffic Monitoring System
UK:	Unique Key
U.S.:	United States
U.S.C.:	United States Code
USGS:	United States Geological Survey
VDT:	Vehicle Distance Traveled
VKT:	Vehicle Kilometers of Travel
VMT:	Vehicle-Miles of Travel
V/SF:	Volume/Service Flow Ratio
WDS:	Weighted Design Speed
4D:	Four Dimensional
90-10:	90-Percent Confidence Level with 10-Percent Allowable Error

3. DEFINITIONS

This chapter contains definitions to be used in preparing HPMS data for FHWA. Specific details addressing summary, universe, and sample data, and LRS (linear referencing system) data are later in this document and in the forthcoming *HPMS Field Manual*. This chapter along with the subsequent chapters provides necessary definitions, guidelines, coding instructions, reporting formats, and update specifications necessary to facilitate the reporting of current, consistent, and uniform data on a nationwide basis.

Aggregation Business Rule: It describes how the HPMS database and software will aggregate data as the sample view is created. Typically rules include: weighted average, predominance, proportional, or sum.

Certification of Public Road Mileage: An annual document furnished by each state to FHWA certifying the total public road length in the State as of December 31st. This document is to be signed by the Governor of the State or by his/her designee and provided to FHWA by June 1st of the year following (23 CFR 460). See the definition of "Public Road".

Collection Cycle: The period for which the data are collected; typically annually or every 2- or 3-years.

Collection Requirements: Description of data collection requirements to ensure consistency. For example, for IRI, we will be requiring States to include bridges. This goes beyond a reporting requirement in that we expect every State to follow these procedures when collecting the data.

Combination Truck: Any multi-unit vehicle described by vehicle types 8-13.

Comment File: A text file that accompanies the HPMS data submittal to FHWA. It explains data issues, problems, deficiencies, unusual conditions, and any significant changes from the previous HPMS submittal. It should be provided as an electronic file attached to the HPMS submittal.

Confidence Level/Precision Level: The degree of accuracy resulting from the use of a statistical sample. For example, if a sample is designed at the 90-10 confidence (precision) level, the resultant sample estimate will be within ±10 percent of the true value, 90 percent of the time.

(Data) Description: Short description of the data and where used. The bulk of the *HPMS Field Manual* work will revolve around expanding on this text.

D-Factor: The proportion of traffic moving in the peak direction of travel during peak hours is denoted as D-factor. The D-factor is an important factor in highway capacity analysis, especially for two-lane rural highways.

Divided Highway: A multi-lane facility with a curbed or positive barrier median or a median that is at least 1.2 meters (4 feet) or wider.

Valid values: Describes the actual data to be coded; includes the range of expected values and possible codes.

English Units: The term "English" refers to the United States legislative interpretation of the units as defined in a document prepared by the National Institute of Standards and Technology (NIST), U.S. Department of Commerce, Special Publication 330. Commonly used English units in HPMS are miles, feet, and inches.

Expressway: A divided highway facility with partial control of access and two-or-more lanes for the exclusive use of through traffic in each direction; includes grade separations at most major intersections.

Extent: Where the data are required: functional system, NHS, Sample, paved etc.

Federal-Aid Highways: All NHS routes and other roads functionally classified as Interstate, Other Freeways & Expressways, Other Principal Arterials, Minor Arterials, Major Collectors, and Urban Minor Collectors.

FHWA-Approved Adjusted Census Urban Boundary: Designated boundaries of a Census urban place or urbanized area as adjusted by responsible State and local officials in cooperation with each other, subject to the approval by FHWA (23 U.S.C. 101). Urban and rural data in HPMS must be reported in accordance with FHWA-approved adjusted boundaries.

Freeway: A divided highway facility with full control of access and two or more lanes for the exclusive use of through traffic in each direction.

Functional Systems: Functional systems result from the grouping of highways by the character of service they provide. The functional systems designated by the States in accordance with 23 CFR 470 are used in the HPMS. Guidance criteria and procedures are provided in the FHWA publication *Highway Functional Classification: Concepts, Criteria, and Procedures*, March 1989, as amended. In addition, interim guidance has been issued by FHWA, spring 2008.

Geographic Information System (GIS): A system for the management, display, and analysis of spatial information.

Geospatial Data: The HPMS geospatial data provide a linear referencing system for the universe and sample data on selected highway functional systems. The represented functional systems include Interstate, Other Freeways & Expressways, Other Principal Arterials, Minor Arterials, Major Collectors, Urban Minor Collectors, and all National Highway System (NHS) routes and connectors. This permits the analyses of HPMS data in a GIS environment.

Highway: The term highway includes roads, streets, and parkways and all their appurtenances (23 U.S.C. 101).

K-Factor: The proportion of annual average daily traffic occurring in the analysis period. For rural highways, the proportion has often been assumed to occur at the 30th highest hour, which is often used as the basis for estimates of design-hour volume. For urban roadways, a design hour for the repetitive weekday peak periods is common.

Linear Referencing System (LRS): A set of procedures for determining and retaining a record of specific points along a highway. Typical methods used are kilometerpoint (milepoint), kilometerpost (milepost), reference point, and link-node.

LRS Data: Provides a linear referencing system for the universe and sample data on selected highway functional systems.

Maintenance Area: Any geographic region of the Unites States previously designated non-attainment pursuant to the CAA Amendments of 1990 and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan under Section 175A of the CAA, as amended. HPMS data are used for travel tracking for air quality assurance purposes in non-attainment and maintenance areas as required by EPA under the 1990 CAAA (Section 187) and the Transportation Conformity Rule, 40 CFR parts 51 and 93. More specifically, these data are used primarily for establishing regional transportation-related emissions for transportation conformity purposes. Estimated travel based on these data is used for calibration and validation of base-year network travel models when required for non-attainment or maintenance areas.

Metadata: Describes how data are collected or converted for reporting; explains variations in data that do not warrant the establishment of a collection requirement e.g. type of equipment used, sampling frequency etc.

Metric Units: The term "metric" refers to the modernized metric system known as the International System (SI). Further information is available under NIST's Special Publication 811, titled *Guide for the Use of the International System of Units: the Modernized Metric System* and *the American Society for Testing and Materials (ASTM) Standard E380-89a*. Commonly used metric units in the HPMS are kilometers, meters, and millimeters.

Metropolitan Planning Organization (MPO): The term MPO is used in HPMS as defined in 23 U.S.C. 134.

National Ambient Air Quality Standards (NAAQS) Non-attainment Area: Any geographic region of the United States which has been designated under Section 107 of the Clean Air Act for any pollutant for which a national ambient air quality standard exists. HPMS data are used for travel tracking for air quality assurance purposes in non-attainment and maintenance areas as required by EPA under the 1990 CAAA (Section 187) and the Transportation Conformity Rule, 40 CFR parts 51 and 93. More specifically, these data are used primarily for establishing regional transportation-related emissions for transportation conformity purposes. Estimated travel based on these data is used for calibration and validation of base-year network travel models when required for non-attainment or maintenance areas.

National Highway System (NHS): The National Highway System is a network of nationally significant highways approved by Congress in the National Highway System Designation Act of 1995. It includes the Interstate System and over 116,000 miles of other roads and connectors to major intermodal terminals. All NHS routes and connectors must be identified in the HPMS.

National Network: These are the routes designated for use by dimensioned commercial vehicles under the Surface Transportation Assistance Act (STAA) of 1982 as identified in 23 CFR 658, Appendix A. Nationally designated truck routes include the Interstate System (a few sections are exempted by Federal law in Minnesota, Virginia, and District of Columbia); non-Interstate routes specifically listed in 23 CFR, Appendix A, as amended, and the other non-Interstate existing Federal-Aid Primary (FAP) routes as defined prior to June 1, 1991, that STAA-dimensioned commercial vehicles may legally operate on.

Some States have allowed STAA-dimensioned commercial vehicles to operate on other State routes. These and other non-national truck network roads used between the STAA national network and terminals and facilities for food, fuel, repairs, and rest under the reasonable access rule are not nationally designated truck routes. These routes are not to be included.

PK: Primary Key – It indicates the data fields used for linking data in a table with data in other tables.

Public Road: A public road is any road or street owned and maintained by a public authority and open to public travel. [23 U.S.C. 101(a)] Under this definition, a ferryboat route is not a public road.

- The term "maintenance" means the preservation of the entire highway, including surfaces, shoulders, roadsides, structures, and such traffic-control devices as are necessary for safe and efficient utilization of the highway. [23 U.S.C. 101(a)]
- To be open to public travel, a road section must be available, except during scheduled periods, extreme weather or emergency conditions, passable by four-wheel standard passenger cars, and open to the general public for use without restrictive gates, prohibitive signs, or regulation other than restrictions based on size, weight or class of registration. Toll plazas of public toll roads are not considered restrictive gates. [23 CFR 460.2(c)]
- A public authority is defined as a Federal, State, county, town or township, Indian tribe, municipal or other local government or instrumentality with authority to finance, build, operate, or maintain toll or toll-free facilities. [23 U.S.C. 101(a)]

Roadway: The portion of a highway intended for vehicular use.

Rural Areas: All areas of a State outside of the FHWA-approved adjusted Census boundaries of small urban and urbanized areas.

Single-Unit Truck: Any single-unit vehicle described by vehicle types 4-7.

Small Urban Areas: Small urban areas are defined by Census as places of 5,000 to 49,999 urban population (except in the case of cities in Maine and New Hampshire) outside of urbanized areas. As a minimum, a small urban area includes any place containing an urban population of at least 5,000 as designated by Census. Designated boundaries of an urban place (or urban cluster) can be adjusted by responsible State officials subject to approval by FHWA (23 U.S.C. 101). Urban and rural data in HPMS must be reported in accordance with FHWA-approved adjusted boundaries. Area revisions as needed are expected to be submitted especially shortly after the latest Decennial (or special) Census information becomes available.

Sample Data: These data consist of additional inventory, condition, use, pavement, operational, and improvement data that complement the universe data for those sections of roadway that have been selected as samples. When expanded through use of an appropriate expansion factor, the data represents the entire universe from which the sample was drawn, permitting evaluation of highway system performance. The sample sections form nominally "fixed" panels of road segments that are monitored on an established cyclical basis. Samples can be added or deleted from the sample panels as the need arises.

Panels of roadway sections are established using a statistically designed sampling plan based on the random selection of road segments at predetermined precision levels. The sample is stratified by area, by functional system, and by traffic volume group. Sample selection is done randomly within each stratum (a predetermined AADT volume group) for each arterial and major collector functional highway system in rural, and for each arterial and collector functional system in small urban and urbanized areas of the State.

Each urbanized area needs to be sampled individually. Rural and small urban areas (populations of 5,000 to 49,999) are sampled collectively statewide.

Sample Sections: Sections selected at random from the universe of arterial and collector systems (excluding rural minor collector) for which additional physical and operational data elements are reported along with the universe data.

State (Codes): The term "State" refers to any one of the 50 States, the District of Columbia, or the Commonwealth of Puerto Rico. The Federal Information Processing Standard Codes for States (FIPS PUB 5-2) are included in Appendix A.

Strategic Highway Network (STRAHNET): The STRAHNET includes highways which are important to the United States strategic defense policy and which provide defense access, continuity, and emergency capabilities for the movement of personnel, materials, and equipment in both peacetime and war time.

Structures: A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet (6.1 meters) between under copings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening. Structures can include tunnels.

Summary Data: These data consist of annual summary reports for certain data not included in the HPMS universe and sample data set for the rural minor collector and local functional systems. Summary data must be coded manually onto the several summary screens contained in the HPMS submittal software. These additional data are derived from State and local sources such as statewide highway databases,

management systems, Intelligent Transportation Systems (ITS) and traffic monitoring systems, and data made available from local governments and MPOs.

System Length: The total length of public roads as of December 31st of a data year that is to be reported via HPMS (see definition of public road). System length includes all public roads owned by Federal, State, and local governments, or instrumentality thereof, within the boundaries of the reporting State. Planned, un-built facilities on the NHS are also reported in the HPMS system length.

UK: Unique Key – It is used to uniquely identify each section record in the table. There can be one and only one row with each unique key value.

Universe Data: Data representing total system length including National Highway System length not yet built or open to traffic. These data consist of a complete inventory of length (kilometers or miles) by functional system, jurisdiction, geographic location, (rural, small urban and urbanized areas) and other selected characteristics. Universe data fully reflect all open-to-traffic public roads in the State and contain basic information for planned, un-built future NHS. Universe data can be reported in **either** of the following ways:

- Section Data: Data reported for a continuous length of roadway that is homogeneous with respect to the physical, operational, administrative, and jurisdictional characteristics being reported. All Federal-Aid Highways must be reported in section data form.

- Grouped Data: The Summaries_County table will accepted individual or grouped highway sections, not necessarily contiguous, with length aggregated with respect to the homogeneous administrative, physical, and jurisdictional characteristics being reported. Grouped data can only be reported for the non-Federal-Aid Highway sections.

Urban Areas: All urban places (or clusters) of 5,000 or more population and Urbanized areas. These are the small urban and urbanized areas within the State.

Urbanized Areas and Codes: Areas with a population of 50,000 or more, as designated by the Census. An FHWA-approved adjusted urbanized area includes the Census urbanized area plus transportation centers, shopping centers, major places of employment, satellite communities, and other major trip generators near the edge of the urbanized area, including those expected to be in place in the near future. Urbanized area codes are included in Appendix C. For multi-State urbanized areas, each State must report HPMS information for the portion of the FHWA-approved adjusted urbanized area within its State boundary. Area revisions as needed should be submitted especially shortly after the latest Decennial (or special) Census information becomes available. New codes for new or modified areas will be issued based on Census changes.

U.S. Territories: The U.S. Territories include American Samoa, Guam, the Commonwealth of the Northern Marianas, and the Virgin Islands of the United States. The Federal Information Processing Standard Codes (FIPS PUB 5-2) are included in Appendix A.

Vehicle Distance Traveled: This term refers to vehicle-miles/kilometers traveled.

Weighted Average: An average of a group of positive values where each is assigned a weight. For example, the user desires to find the weighted average of group of IRI values collected for a group of sections.

Value:	100, 109, 130, 140
Length:	1.233, 1.566, 3.555, 7.100

To find the weighted average: Compute the average using the length of each section as the weight. Get the sum of the products of each value times its section length. Divide the sum of the products by the total length of the group of sections. The weighted average in this case is 130.

4. SHAPES CATALOG

These tables store geographic information used to visually display and analyze HPMS data. The data in these tables are derived from State and local geospatial data and are provided as geospatial vector data or *shapefile*[1]. The spatial boundaries and associated data in many of these tables will not change from year to year, but are expected to be updated as needed to reflect any changes made over the course of the year. Furthermore, some of these tables will be maintained by FHWA from data provided by States and other Federal Agencies. These tables will be available to States for their use through the HPMS software.

[1] "A shapefile stores non-topological geometry and attribute information for the spatial features in a data set. The geometry for a feature is stored as a shape comprising a set of vector coordinates. Shapefiles can support point, line, and area features. Area features are represented as closed loop, double-digitized polygons. Attributes are held in a dBASE® format file. Each attribute record has a one-to-one relationship with the associated shape record." Environmental Systems Research Institute, Inc., (ESRI) Shapefile Technical Description: An ESRI White Paper—July 1998

4.1. Shapes_Route

This table stores the State's linear referenced network. HPMS data are linked to the network through the Route_ID.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4		Shape	Geometry	Line feature

Extent: All Federal-Aid Highways.

Collection cycle: Annual.

Collection requirements: Supplied by the States as a shapefile.

Valid values: Shapefile containing Year_Record, State_Code, and Route_ID values for each line feature. Route_ID must be **unique** within the State.

Field Details

4.1.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

4.1.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

4.1.3. Route_ID

Description: The ID that uniquely identifies the route.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must be unique within the State.

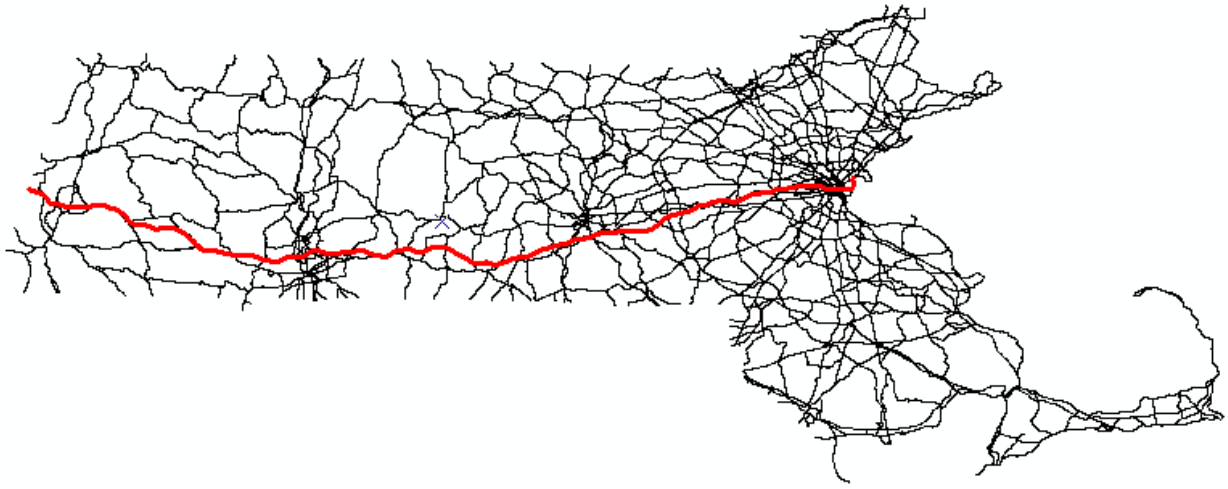
4.1.4. Shape

Description: The geometric representation of the route.

Valid values: This field is extracted from the State provided shapefile.
Coordinates for geometries are **4D** (x,y,z,m).
The shapefile is expected to contain lines with valid X, Y, Z, and M points.
Z is optional, however. HPMS will set Z to 0 if it is not supplied in the shapefile.

Record Example

The following line graphically represents the roads of Massachusetts. The red line represents one single entry in the Shapes_Route table.



The above route would be stored in the Shapes_Route table as follow:

Year_Record: `2010`
State_Code: `25`
Route_ID: `I90 EB`
Shape: `MULTILINESTRING((X Y Z M, X Y Z M),(X Y Z M, X Y Z M) …)`

4.2. FHWA Provided Shapes

The following tables are available in HPMS and can be used for display, analysis, and query purposes. These tables are maintained by FHWA.

4.2.1. Shapes_Region

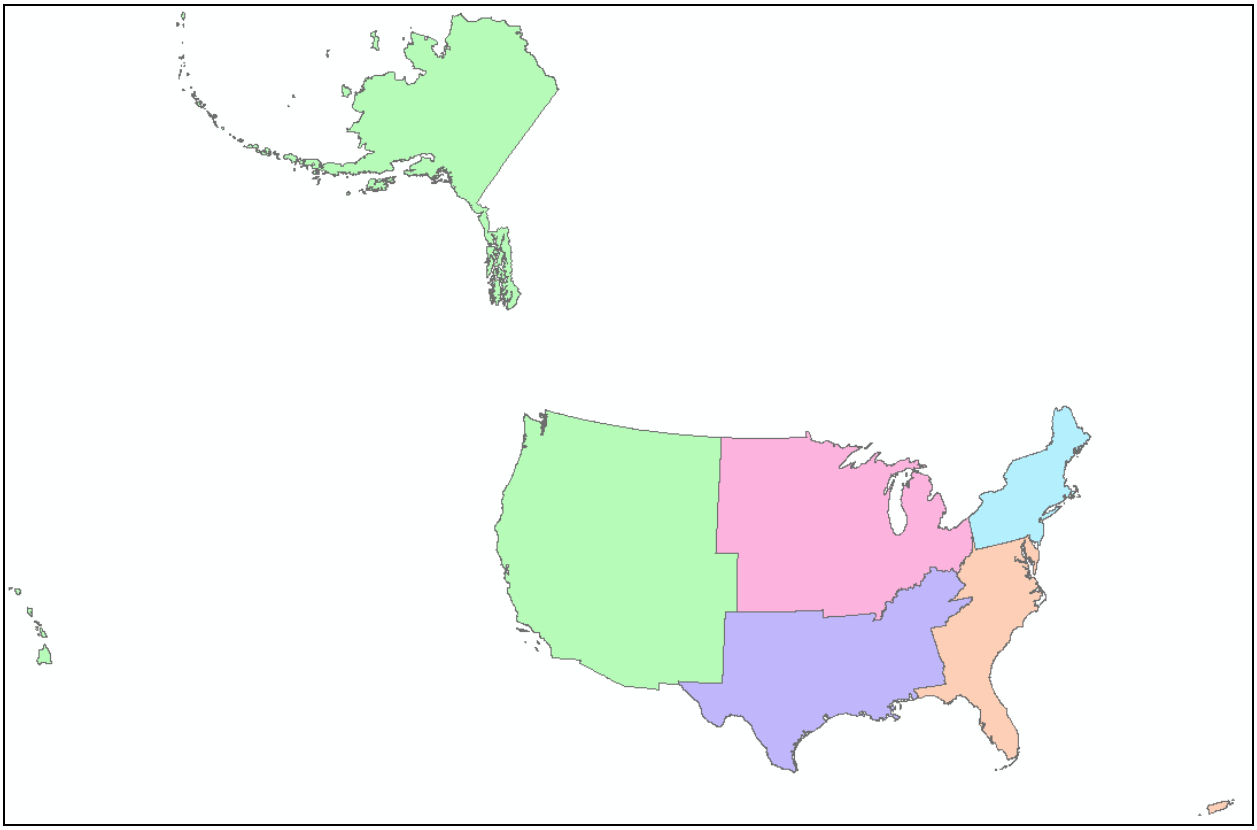
This table stores polygons representing US regions.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Region_Code	Numeric(1)	Region code
2		Region_Abbr	Character(2)	Region abbreviation
3		Region_Name	Character(20)	Region name
4		Shape	Geometry	Polygon feature

Record Example

The region that contains Alaska is the West region and it is stored in the Shapes_Region table as follow:

Region_Code: `5`
Region_Abbr: `WE`
Region_Name: `West`
Shape: `MULTIPOLYGON(((X Y, X Y, X Y …)`



4.2.2. Shapes_State

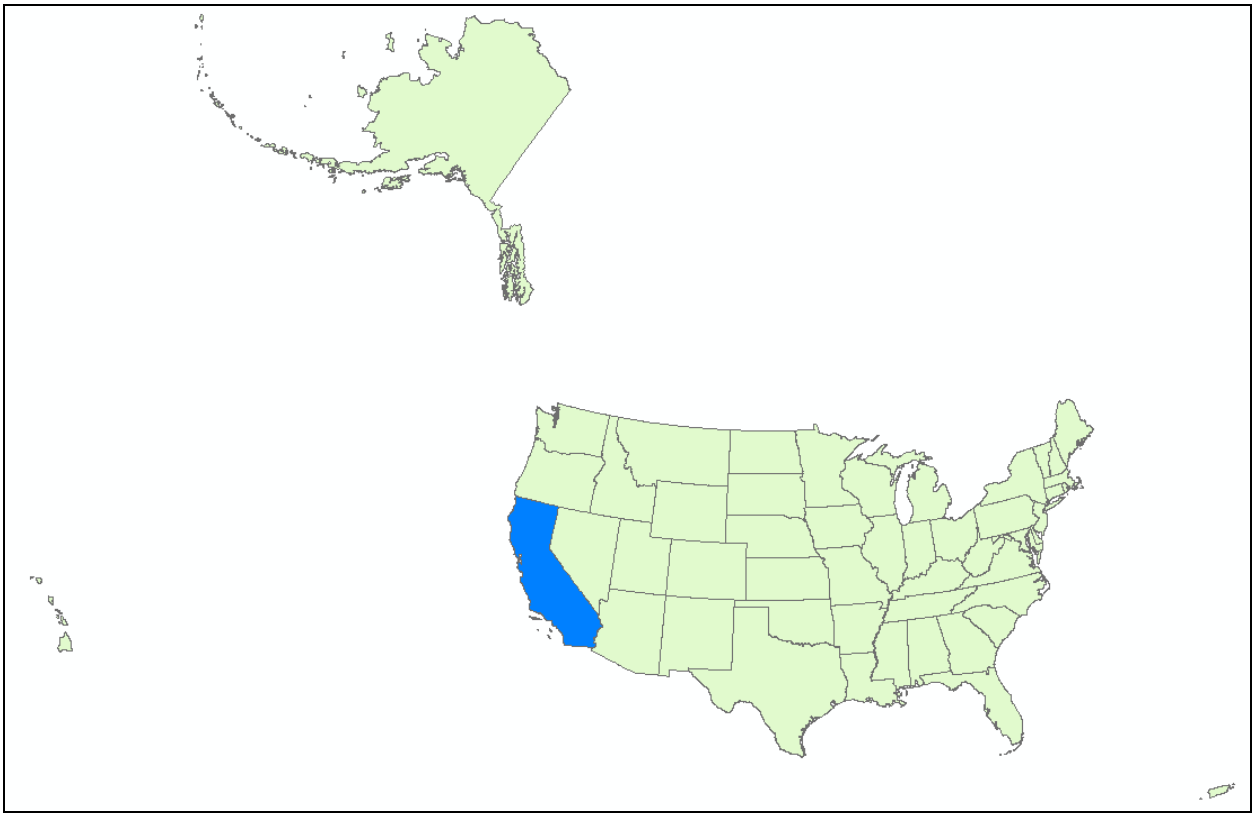
This table stores polygons representing each of the US States.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	State_Code	Numeric(2)	State FIPS code
2		State_Abbr	Character(2)	State abbreviation
3		State_Name	Character(30)	State name
4		Shape	Geometry	Polygon feature

Record Example

California is stored in the Shapes_State table as follow:

State_Code: `6`
State_Abbr: `CA`
State_Name: `California`
Shape: `MULTIPOLYGON(((X Y, X Y, X Y …)`



4.2.3. Shapes_County

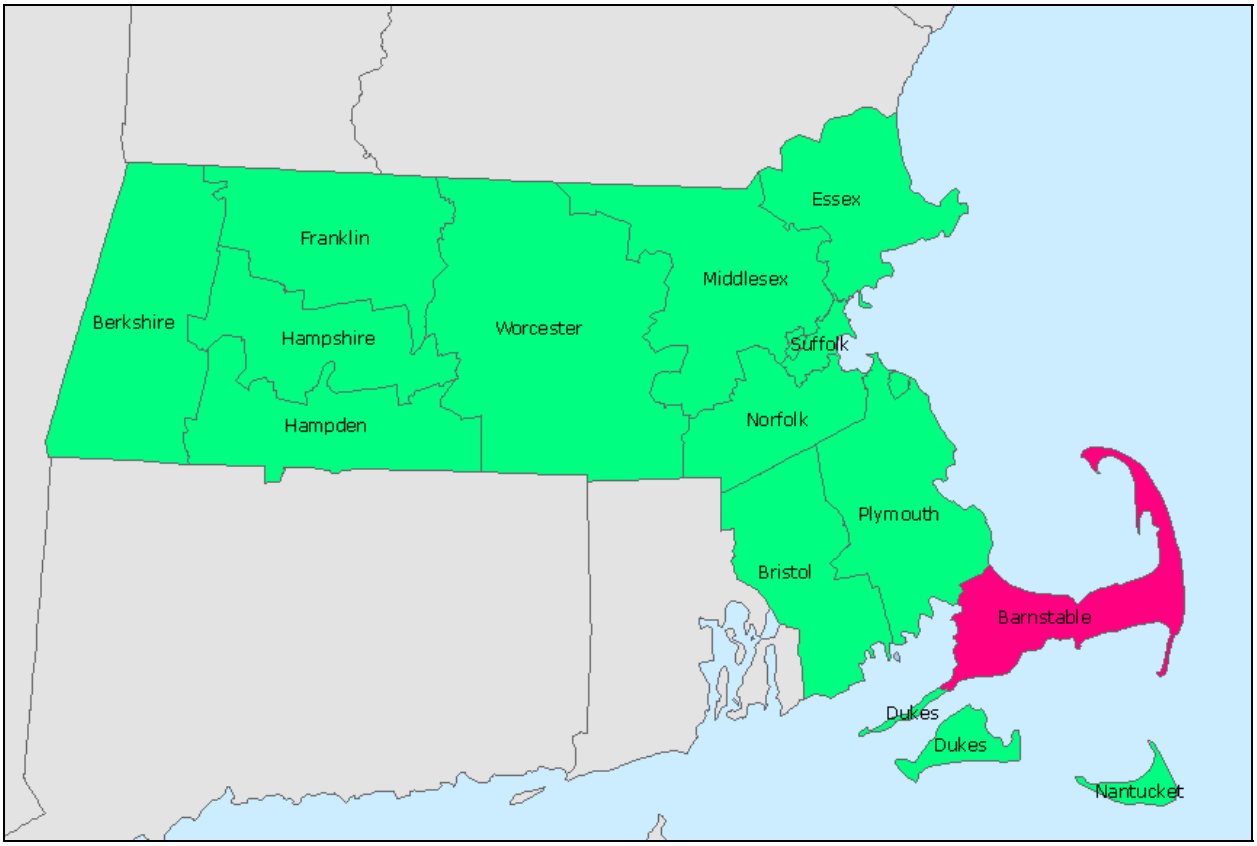
This table stores polygons representing counties for each State.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	State_Code	Numeric(2)	State FIPS code
2	PK	County_Code	Numeric(3)	County FIPS code
3		County_Name	Character(30)	County name
4		Shape	Geometry	Polygon feature

Record Example

Barnstable County in Massachusetts is stored in the Shapes_County table as follow:

State_Code: `25`
County_Code: `1`
County_Name: `Barnstable`
Shape: `MULTIPOLYGON(((X Y, X Y, X Y …)`



4.2.4. Shapes_Urban

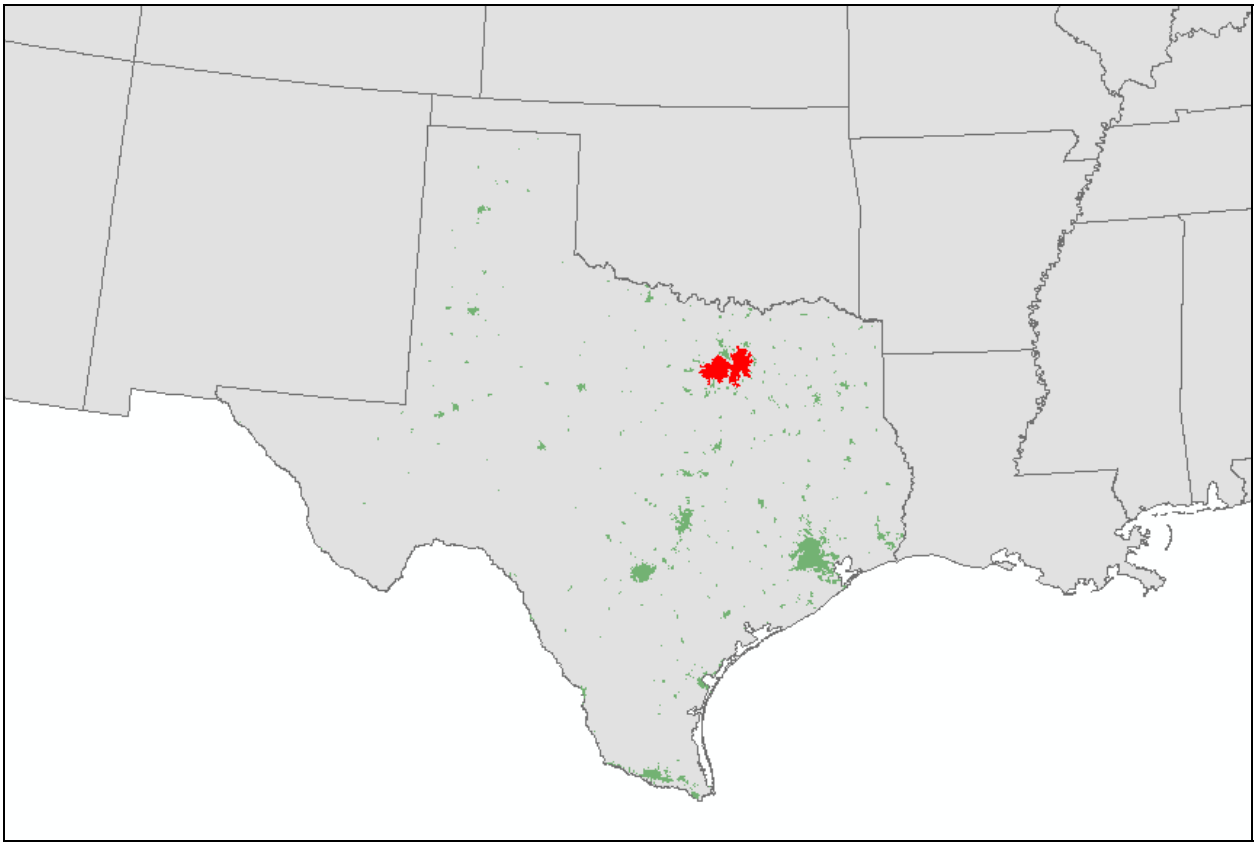
This table stores polygons representing adjusted urban areas for each State. The polygons stored in this table are provided annually to FHWA by the States through a separate submittal outside of HPMS.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Urban_Code	Numeric(5)	Census urban code
2		Urban_Name	Character(30)	Urban name
3		Census_Pop	Numeric(8)	Census population
4		Census_Land	Numeric(4)	Census land area (in square miles)
5		Shape	Geometry	Polygon feature

Record Example

Dallas – Fort Worth urbanized area in Texas is stored in the Shapes_Urban table as follow:

Urban_Code: `22042`
Urban_Name: `Dallas--Fort Worth--Arlington, TX`
Census_Pop: `3746`
Census_Land: `1712`
Shape: `MULTIPOLYGON(((X Y, X Y, X Y …)`



4.2.5. Shapes_NAAQS

This table stores polygons representing non-attainment and maintenance areas for each State.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	NAAQS_Code	Numeric(5)	NAAQS/urban code
2	PK	NAAQS_Name	Character(30)	NAAQS/Urban name
3	PK	Pollutant_Type	Numeric(1)	Census population (in thousands)
4		Shape	Geometry	Polygon feature

4.2.6. Shapes_Soil

This table stores polygons representing soil types for each State.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Soil_Type	Numeric(5)	Soil type code
2		Soil_Name	Character(30)	Soil type description
3		Shape	Geometry	Polygon feature

4.2.7. Shapes_Climate

This table stores polygons representing climate zones for each State.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Climate_Zone	Numeric(1)	Climate zone code
2		Climate_Name	Character(30)	Climate zone description
3		Shape	Geometry	Polygon feature

5. SUMMARIES CATALOG

These tables store annual summary reports for certain data not included in the Sections Catalog (universe and sample data) for the rural Minor Collector and Local functional systems. These additional data are derived from State and local sources such as statewide highway databases, management systems, Intelligent Transportation Systems (ITS) and traffic monitoring systems, and data made available from local governments and MPOs.

Summary data can be coded manually onto the several summary screens contained in the HPMS web application, or can be imported as a file in Comma Separated Value (CSV) format.

5.1. Summaries_Vehicle

This table stores Travel Activity summarized by Functional System Group (FS_Group) and Vehicle Type.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Calendar year for the data
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	FS_Group	Numeric(1)	Functional system group
4		Motorcycles	Decimal(5,2)	Percent of motorcycles
5		Passenger_Cars	Decimal(5,2)	Percent of passenger cars
6		Light_Trucks	Decimal(5,2)	Percent of light trucks
7		Buses	Decimal(5,2)	Percent of buses
8		SU_Trucks	Decimal(5,2)	Percent of single-unit trucks
9		CU_Trucks	Decimal(5,2)	Percent of combination-unit trucks

Extent: All public roads
Metadata: See Traffic metadata.
Collection cycle: Annual.
Collection requirements: Percentages for each FS_Group reported to the nearest hundredth of a percent (i.e. 45.33).

Field Details

5.1.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

5.1.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

5.1.3. FS_Group

Description: Functional system group for which travel by vehicle type is summarized.

Valid values:

Code	Description
1	Rural Interstate
2	Rural Other Arterial (Includes Other Freeways & Expressways, Other Principal Arterials, and Minor Arterials)
3	Rural Other (Includes Major Collectors, Minor Collectors, and Locals)
4	Urban Interstate
5	Urban Other Arterial (Includes Other Freeways & Expressways, Other Principal Arterials, and Minor Arterials)
6	Urban Other (Includes Major Collectors, Minor Collectors, and Locals)

5.1.4. Motorcycles

Description: Percent of total travel related to motorcycles for each FS_Group.

Valid values: Code percentage 0.00 to 100.00.

5.1.5. Passenger_Cars

Description: Percent of total travel related to passenger cars for each FS_Group.

Valid values: Code percentage 0.00 to 100.00.

5.1.6. Light_Trucks

Description: Percent of total travel related to light trucks for each FS_Group.

Valid values: Code percentage 0.00 to 100.00.

5.1.7. Buses

Description: Percent of total travel related to buses for each FS_Group.

Valid values: Code percentage 0.00 to 100.00.

5.1.8. SU_Trucks

Description: Percent of total travel related to single-unit trucks for each FS_Group.

Valid values: Code percentage 0.00 to 100.00.

5.1.9. CU_Trucks

Description: Percent of total travel related to combination-unit trucks for each FS_Group.

Valid values: Code percentage 0.00 to 100.00.

Record Example

Data is stored in the Summaries_Vehicle table as follow:

Year_Record: `2010`
State_Code: `25`
FS_Group: `1`
Motorcycles: `0.08`
Passenger_Cars: `73.81`
Light_Trucks: `13.82`
Buses: `0.73`
SU_Trucks: `2.78`
CU_Trucks: `8.78`

Data can be imported into Summaries_Vehicle table from a CSV file in the format:

```
2010,25,1,0.08,73.81,13.82,0.73,2.78,8.78
```

5.2. Summaries_Urban

This table stores the following data on non-Federal-Aid (Local functional class) roads for each adjusted urbanized area: highway length, travel, and demographics.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Calendar year for the data
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Urban_Code	Numeric(5)	Census Urban code
4		Local_Length	Numeric(8)	Local highway length
5		Local_Travel	Numeric(8)	Local travel
6		State_Portion_Pop	Numeric(8)	Population for State portion (thousands)
7		State_Portion_Land	Numeric(8)	Land area for State portion

Extent: All non-Federal-Aid urbanized area public roads functionally classified as Local.
Collection requirements: Data collected for each Urban_Code within the State.

Field Details

5.2.1. Year_Record

Description: The calendar year for which the data apply.
Valid values: The four digits of the year the data represents.

5.2.2. State_Code

Description: The State FIPS code.
Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

5.2.3. Urban_Code

Description: Census urban area code. Used to query HPMS information by Urban Area.
Valid values: Up to five digits for the Census urban code. See Urban Area Codes for a complete list.

5.2.4. Local_Length

Description: Total length of local roads within urbanized area boundary.
Valid values: Length to the nearest mile/kilometer.

5.2.5. Local_Travel

Description: Total daily vehicle-miles/kilometers of travel on local roads within urbanized area boundary.
Metadata: See Traffic metadata.
Valid values: Vehicle-miles/kilometers of travel to the nearest thousand.

5.2.6. State_Portion_Pop

Description: Estimate of current population for urbanized area portion within the State.

Valid values: Estimate of current population to the nearest thousand.

5.2.7. State_Portion_Land

Description: Estimate of current land area for urban area portion within the State.

Valid values: Estimate of current land area to the nearest square mile/kilometer.

Record Example

Data is stored in the Summaries_Urban table as follow:

Year_Record:	2010
State_Code:	48
Urban_Code:	22042
Local_Length:	13047
Local_Travel:	4951
State_Portion_Pop:	3746
State_Portion_Land:	1712

Data can be imported into Summaries_Urban table from a CSV file in the format:

```
2010,48,22042,13047,4951,3746,1712
```

5.3. Summaries_County

This table stores length data on non-Federal-Aid Highways functionally classified as Rural Minor Collector and Rural/Urban Local, summarized by county.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Calendar year for the data
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	County_Code	Numeric(3)	County FIPS code
4	PK	F_System	Numeric(1)	FHWA approved Functional System
5	PK	RU_Code	Numeric(1)	Rural/Urban code
6	PK	Ownership	Numeric(2)	Ownership code
7		Non_FA_Length	Decimal(8,3)	Non-Federal-Aid road length within county

Extent: Non-Federal-Aid Highways functionally classified as Rural Minor Collector and Rural/Urban Local.

Collection cycle: Annual.

Collection requirements: Data collected for each F_System within the county.

Field Details

5.3.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

5.3.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

5.3.3. County_Code

Description: Census defined County FIPS codes.

Valid values: Up to three digits for the Census county code. See County Codes for a complete list.

5.3.4. F_System

Description: The FHWA approved Functional System.

Valid values: Report only for roads functionally classified as rural and urban Local (7) and urban Minor Collector (6).

Code	Description
1	Interstate
2	Principal Arterial – Other Freeways and Expressways
3	Principal Arterial – Other
4	Minor Arterial
5	Major Collector
6	Minor Collector (urban only)
7	Local

5.3.5. RU_Code

Description: Rural or Urban designation based on Census urban boundary and population.

Valid values:

Code	Description
1	Rural
2	Small Urban Area (Population 5,000 to 49,999)
3	Small Urbanized Area (Population 50,000 to 199,999)
4	Large Urbanized Area (Population 200,000 or more)

5.3.6. Ownership

Description: Used to describe the public/private owner with jurisdictional responsibility for the section. It is used in Highway Statistics and to calculate Certified Length.

Valid values:

Code	Description	Code	Description
1	State Highway Agency	60	Other Federal Agency
2	County Highway Agency	62	Bureau of Indian Affairs
3	Town or Township Highway Agency	63	Bureau of Fish and Wildlife
4	City or Municipal Highway Agency	64	U.S. Forest Service
11	State Park, Forest, or Reservation Agency	66	National Park Service
12	Local Park, Forest, or Reservation Agency	67	Tennessee Valley Authority
21	Other State Agency	68	Bureau of Land Management
25	Other Local Agency	69	Bureau of Reclamation
26	Private (other than Railroad)	70	Corps of Engineers
27	Railroad	72	Air Force
31	State Toll Road	73	Navy/Marines
32	Local Toll Authority	74	Army
40	Other Public Instrumentality (i.e., Airport)	80	Other
50	Indian Tribe Nation		

5.3.7. Non_FA_Length

Description: Total length of Non-Federal-Aid road within the county.

Valid values: Total length to the nearest thousands of a mile/kilometer.

Record Example

Data is stored in the Summaries_County table as follow:

Year_Record: 2010
State_Code: 25
County_Code: 1
F_System: 1
RU_Code: 2
Ownership: 1
Non_FA_Length: 3746

Data can be imported into Summaries_County table from a CSV file in the format:

```
2010,25,1,1,1,1,3746
```

5.4. Summaries_Statewide

This table stores demographic, highway length and VMT estimates on all Small Urban and Rural Non-Federal-Aid Highways functionally classified as Rural Minor Collector or Local summarized by State.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Calendar year for the data
2	PK	State_Code	Numeric(2)	State FIPS code
3		Travel_Rural_MiC	Numeric(8)	Travel for Rural Minor Collectors
4		Travel_Rural_Local	Numeric(8)	Travel for Rural Locals
5		Travel_SmallUrb_Local	Numeric(8)	Travel for Small Urban Locals
6		Rural_Pop	Numeric(8)	Rural Population
7		Rural_Land	Numeric(8)	Rural Land Area
8		Small_Urban_Pop	Numeric(8)	Small Urban Population
9		Small_Urban_Land	Numeric(8)	Small Urban Land Area
10		Paved_Rural_MiC	Numeric(8)	Paved Rural Minor Collectors
11		Paved_Rural_Local	Numeric(8)	Paved Rural Locals
12		Paved_Urban_Local	Numeric(8)	Paved Urban Locals
13		Unpaved_Rural_MiC	Numeric(8)	Unpaved Rural Minor Collectors
14		Unpaved_Rural_Local	Numeric(8)	Unpaved Rural Locals
15		Unpaved_Urban_Local	Numeric(8)	Unpaved Urban Locals

Extent: All non-Federal-Aid Highways functionally classified as Rural Minor Collector or Rural/Urban Local.
Metadata: See traffic metadata
Collection cycle: Annual.
Collection requirements: Data collected for each State.

Field Details

5.4.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

5.4.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

5.4.3. Travel_Rural_MiC

Description: Total travel for all Rural Minor Collectors, reported as daily vehicle travel (in thousands).

Valid values: Report total daily vehicle-miles/kilometers of travel to the nearest 1,000.

5.4.4. Travel_Rural_Local

Description: Total travel for all Rural Locals, reported as daily vehicle travel (in thousands).

Valid values: Report total daily vehicle-miles/kilometers of travel to the nearest 1,000.

5.4.5. Travel_SmallUrb_Local

Description: Total travel for all Small Urban Locals, reported as daily vehicle travel (in thousands).

Valid values: Report total daily vehicle-miles/kilometers of travel to the nearest 1,000.

5.4.6. Rural_Population

Description: Estimate of rural population based on FHWA approved adjusted urban/urbanized area boundaries.

Valid values: Estimate of rural population to the nearest 1,000.

5.4.7. Rural_Land_Area

Description: Estimate of rural land area based on FHWA approved adjusted urban/urbanized area boundaries.

Valid values: Estimate of rural land area to the nearest square mile/kilometer.

5.4.8. Small_Urban_Pop

Description: Estimate of small urban population

Valid values: Estimate of small urban area population to the nearest 1,000.

5.4.9. Small_Urban_Land

Description: Estimate of small urban land area

Valid values: Estimate of small urban land area to the nearest square mile/kilometer.

5.4.10. Paved_Rural_MiC

Description: Total miles of paved Rural Minor Collectors

Valid values: Report total miles of paved roads to the nearest mile/kilometer.

5.4.11. Paved_Rural_Local

Description: Total miles of paved Rural Locals

Valid values: Report total miles of paved roads to the nearest mile/kilometer.

5.4.12. Paved_Urban_Local

Description: Total miles of paved Small Urban Locals

Valid values: Report total miles of paved roads to the nearest mile/kilometer.

5.4.13. Unpaved_Rural_MiC

Description: Total miles of unpaved Rural Minor Collectors

Valid values: Report total miles of unpaved roads to the nearest mile/kilometer.

5.4.14. Unpaved_Rural_Local

Description: Total miles of unpaved rural

Valid values: Report total miles of unpaved roads to the nearest mile/kilometer.

5.4.15. Unpaved_Urban_Local

Description: Total miles of unpaved Urban Locals

Valid values: Report total miles of unpaved roads to the nearest mile/kilometer.

Record Example

Data is stored in the Summaries_Statewide table as follow:

Year_Record:	2010
State_Code:	25
Travel_Rural_MiC:	426
Travel_Rural_Local:	1874
Travel_SmallUrb_Local:	716
Rural_Pop:	564
Rural_Land:	3988
Small_Urban_Pop:	159
Small_Urban_Land:	179
Paved_Rural_MiC:	734
Paved_Rural_Local:	3138
Paved_Urban_Local:	16897
Paved_Rural_MiC:	41
Paved_Rural_Local:	2215
Paved_Urban_Local:	1653

Data can be imported into Summaries_Statewide table from a CSV file in the format:

```
2010,25,426,1874,716,564,3988,159,179,734,3138,16897,41,2215,1653
```

5.5. Summaries_NAAQS

This table stores length and travel for all non-Federal-Aid Highways (non-NHS functionally classified as Rural Minor Collectors and Rural/Urban Locals) summarized by Non-Attainment and Maintenance Areas, and pollutant types.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Calendar year for the data
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Urban_Code	Numeric(5)	Urban Code
4	PK	Pollutant_Type	Numeric(1)	Pollutant type
5		Non_FA_Length	Numeric(8)	Non-Federal-Aid Length
6		Non_FA_Travel	Numeric(8)	Non-Federal-Aid Travel

Extent: All Federal-Aid Highways

Collection cycle: Annual.

Collection requirements: Data collected for each Pollutant_Type within the applicable Urban code within the State.

Field Details

5.5.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

5.5.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

5.5.3. Urban_Code

Description: The HPMS Urban code that corresponds with the EPA defined non-attainment or maintenance area. Additional information can be found in the EPA Green Book.

Valid values: Up to five digits for the Urban code. See Urban Codes for a complete list. Code 99999 for rural sections and 99998 for small urban sections (population < 50,000). If more than one rural or small urban, consult with FHWA for additional codes.

5.5.4. Pollutant_Type

Description: EPA “criteria pollutants” that are used as indicators of air quality.

Valid values:

Code	Description
1	1-Hour Ozone
2	8-Hour Ozone
3	Carbon Monoxide
4	Nitrogen Dioxide
5	Sulfur Dioxide
6	Particulate Matter PM0.0
7	Particulate Matter PM-2.5
8	Lead

5.5.5. Non_FA_Length

Description: Total length in miles for all Rural Minor Collectors, Rural Locals, and Urban Locals within the EPA defined non-attainment boundary.

Valid values: Report total miles to the nearest mile.

5.5.6. Non_FA_Travel

Description: Total travel for all Rural Minor Collectors, Rural Locals, and Urban Locals within the EPA defined non-attainment boundary, reported as daily vehicle travel (in thousands).

Valid values: Report total daily vehicle-miles of travel to the nearest 1,000.

Record Example

Data is stored in the Summaries_NAAQS table as follow:

Year_Record: 2010
State_Code: 25
NAAQS_Code: 9271
Pollutant_Type: 3
Non_FA_Length: 16897
Non_FA_Travel: 716

Data can be imported into Summaries_NAAQS table from a CSV file in the format:

```
2010,25,9271,3,16897,716
```

6. ESTIMATES CATALOG

The table in this catalog stores estimated values for Data Items reported in the Sections_Pavement table in the Sections Catalog, as well as three additional Data Items not reported in the Sections_Pavement table. The data in this catalog are only for national-level analysis and not for reporting purposes, and represent the State's best estimate of current conditions or construction practices.

6.1. Estimates_Pavement

This table stores statewide estimates to be used as defaults in FHWA pavement deterioration models.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Calendar year for the data
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Estimate_Code	Numeric(1)	Estimate Code
4	PK	F_System	Numeric(1)	Functional System
5	PK	Is_Urban	Numeric(1)	Rural or Urban
6		Off_State	Decimal(5,1)	Off State System
7		On_State	Decimal(5,1)	On State System

Extent: All Federal-Aid Highways; optional for all other sections
Metadata: None.
Collection cycle: Annual.
Collection requirements: None.

Field Details

6.1.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

6.1.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

6.1.3. Estimate_Code

Description: Code used for each of the eight types of pavement metadata. Used in various models.

Valid values:

Code	Description
1	LAST_OVERLAY_THICKNESS
2	THICKNESS_RIGID
3	THICKNESS_FLEXIBLE
4	BASE_TYPE
5	BASE_THICKNESS
6	BINDER_TYPE
7	DOWEL_BAR
8	JOINT_SPACING

6.1.4. F_System

Description: The FHWA approved Functional System.

Valid values:

Code	Description
1	Interstate
2	Principal Arterial – Other Freeways and Expressways
3	Principal Arterial – Other
4	Minor Arterial
5	Major Collector
6	Minor Collector
7	Local

6.1.5. Is_Urban

Description: Rural or Urban designation based on Census urban boundary and population.

Valid values:

Code	Description
0	Rural
1	Urban (Population ≥ 5,000)

6.1.6. Off_State

Description: Estimate values or codes for missing pavement sample data off the State highway system.

Valid values: For *LAST_OVERLAY_THICKNESS*, *THICKNESS_RIGID*, and *THICKNESS_FLEXIBLE*:

Code the typical design or construction thickness to the nearest 0.5 inch or nearest 10 millimeters.

For *BASE_THICKNESS*:

Code the typical design or construction thickness to the nearest whole inch or 25 millimeters.

For *BASE_TYPE*, use one of the following codes to indicate the typical base material:

Code	Description	Code	Description
1	Crushed Gravel	5	High Stabilized
2	Crushed Stone	6	Weakly Stabilized
3	Granular	7	Drainable Material
4	Asphalt Stabilized		

For *BINDER_TYPE*, use a code from one of the two tables below to indicate the estimated binder type:

Viscosity Graded Binders	
Code	**Description**
1	Less than AC-2.5
2	AC-2.5 to AC-4
3	AC-5 to AC-9
4	AC-10 to AC-19
5	AC-20 to AC-29
6	AC-30 to AC-39
7	AC-40 to AC-49
8	AC-50 or more

Codes for Super Pave Binders									
		Low Temperature Grade							
		Less than -4	-4 to -9	-10 to -15	-16 to -21	-22 to -27	-28 to -33	-34 to -39	-40 to -45	-46 or more
High Temp Grade	Less than 40	10	20	30	40	50	60	70	80	90
	40 to 45	11	21	31	41	51	61	71	81	91
	46 to 51	12	22	32	42	52	62	72	82	92
	52 to 57	13	23	33	43	53	63	73	83	93
	58 to 63	14	24	34	44	54	64	74	84	94
	63 to 69	15	25	35	45	55	65	75	85	95
	70 to 75	16	26	36	46	56	66	76	86	96
	76 to 81	17	27	37	47	57	67	77	87	97
	82 to 87	18	28	38	48	58	68	78	88	98
	88 or more	19	29	39	49	59	69	79	89	99

For *DOWEL_BAR*, use one of the following codes to indicate typical use of dowel bars:

Code	Description
0	No – dowel bars not typically used
1	Yes – dowel bars are typically used

For *JOINT_SPACING*:

Code the typical joint spacing to the nearest whole foot or 0.25 meter.

6.1.7. On_State

Description: Estimate values or codes for missing pavement sample data on the State highway system.

Valid values: For *LAST_OVERLAY_THICKNESS*, *THICKNESS_RIGID*, and *THICKNESS_FLEXIBLE*:

Code the typical design or construction thickness to the nearest 0.5 inch or nearest 10 millimeters.

For *BASE_THICKNESS*:

Code the typical design or construction thickness to the nearest whole inch or 25 millimeters.

For *BASE_TYPE*, use one of the following codes to indicate the typical base material:

Code	Description	Code	Description
1	Crushed Gravel	5	High Stabilized
2	Crushed Stone	6	Weakly Stabilized
3	Granular	7	Drainable Material
4	Asphalt Stabilized		

For *BINDER_TYPE*, use a code from one of the two tables below to indicate the estimated binder type:

Viscosity Graded Binders	
Code	**Description**
1	Less than AC-2.5
2	AC-2.5 to AC-4
3	AC-5 to AC-9
4	AC-10 to AC-19
5	AC-20 to AC-29
6	AC-30 to AC-39
7	AC-40 to AC-49
8	AC-50 or more

Codes for Super Pave Binders										
		Low Temperature Grade								
		Less than -4	**-4 to -9**	**-10 to -15**	**-16 to -21**	**-22 to -27**	**-28 to -33**	**-34 to -39**	**-40 to -45**	**-46 or more**
High Temp Grade	**Less than 40**	10	20	30	40	50	60	70	80	90
	40 to 45	11	21	31	41	51	61	71	81	91
	46 to 51	12	22	32	42	52	62	72	82	92
	52 to 57	13	23	33	43	53	63	73	83	93
	58 to 63	14	24	34	44	54	64	74	84	94
	63 to 69	15	25	35	45	55	65	75	85	95
	70 to 75	16	26	36	46	56	66	76	86	96
	76 to 81	17	27	37	47	57	67	77	87	97
	82 to 87	18	28	38	48	58	68	78	88	98
	88 or more	19	29	39	49	59	69	79	89	99

For *DOWEL_BAR*, use one of the following codes to indicate typical use of dowel bars:

Code	Description
0	No – dowel bars not typically used
1	Yes – dowel bars are typically used

For *JOINT_SPACING*:

Code the typical joint spacing to the nearest whole foot.

Record Example

Data is stored in the Estimates_Pavement table as follow:

Year_Record: 2010
State_Code: 25
Estimate_Code: 1
F_System: 1
RU_Code: 1
Off_State: 2.5
On_State: 3.5

Data can be imported into Estimates_Pavement table from a CSV file in the format:
`2010,25,1,1,1,2.5,3.5`

7. METADATA CATALOG

These tables store data that describes tables and Data Items in the State's HPMS dataset. Metadata within HPMS are used to describe data collection procedures and post-processing that may impact the consistency or quality of the data. Metadata applies to an entire Data Item or group of Data Items, and not any single Data Item entry. Some Metadata will be published annually in *Highway Statistics* and provided to data users as requested. FHWA has no intention of using Metadata to modify or alter a State's HPMS data.

7.1. Metadata_Traffic

This table stores data that captures and explains variability in the collection and reporting of traffic data in HPMS.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Calendar year for the data
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Traffic_Code	Numeric(2)	Traffic code
4	PK	F_System	Numeric(1)	Functional System
5	PK	Is_Urban	Numeric(1)	Rural or Urban
6		Off_State	Numeric(5)	Off State System
7		On_State	Numeric(5)	On State System

Extent: All Federal-Aid Highways; optional for other sections.
Collection cycle: Annual.
Collection requirements: None.

Field Details

7.1.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

7.1.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

7.1.3. Traffic_Code

Description: Code used for each of the eighteen types of traffic metadata. Used in various models.

Valid values:

Code	Description	Code	Description
1	AADT_PCT_ACTUAL	10	CLASS_NUMBER_24
2	AADT_NUMBER_48	11	CLASS_CURRENT_YR
3	AADT_NUMBER_24	12	CLASS_ADJ_SEASON
4	AADT_ADJ_SEASON	13	CLASS_ADJ_WEEK
5	AADT_ADJ_WEEK	14	CLASS_ADJ_GROWTH
6	AADT_ADJ_AXLE	15	TRAVEL_SOURCE
7	AADT_ADJ_GROWTH	16	TRAVEL_VOLUME_TYPE
8	CLASS_PCT_ACTUAL	17	TRAVEL_CLASS_TYPE
9	CLASS_NUMBER_48	18	TRAVEL_QA

7.1.4. F_System

Description: The FHWA approved Functional System.

Valid values:

Code	Description
1	Interstate
2	Principal Arterial – Other Freeways and Expressways
3	Principal Arterial – Other
4	Minor Arterial
5	Major Collector
6	Minor Collector
7	Local

7.1.5. Is_Urban

Description: Rural or Urban designation based on Census urban boundary and population.

Valid values:

Code	Description
0	Rural
1	Urban (Population ≥ 5,000)

7.1.6. Off_State

Description: Estimate values and codes for missing traffic data off the State highway system.

Valid values: For *AADT_PCT_ACTUAL*:

Code percent total AADTs reported that are based on actual counts for the reported data year or factored prior year AADTs to the nearest whole percent, expect range 1 to 100.

For *AADT_NUMBER_48*:

Code the number of locations that were counted for a minimum of 48 hours. Please include permanent and portable counters meeting the 48 hours minimum.

For *AADT_NUMBER_24*

Code the number of locations that were counted for 24 hours (or less than 48 hours). Please include permanent and portable counters meeting this criteria.

For *AADT_ADJ_SEASONAL*, *AADT_ADJ_WEEK*, *AADT_ADJ_AXLE*, and *AADT_ADJ_GROWTH* use one of the following codes:

Code	Description
0	No adjustment
1	With adjustment

For *CLASS_PCT_ACTUAL*:

Code percent of class AADTs reported that are based on actual counts for the reported data year or factored prior year class AADTs to the nearest whole percent, expect range 1 to 100.

For *CLASS_NUMBER_48*:

Code the number of classification count locations that were counted for a minimum of 48 hours. Please include permanent and portable classification

counters meeting the 48 hours minimum.

For *CLASS_NUMBER_24*:

Code the number of classification count locations that were counted for 24 hours (or less than 48 hours). Please include permanent and portable classification counters meeting this criteria.

For *CLASS_ADJ_SEASONAL*, *CLASS_ADJ_WEEK*, , and *CLASS_ADJ_GROWTH* use one of the following codes:

Code	Description
0	No adjustment
1	With adjustment

For *TRAVEL_SOURCE*:

Please indicate the source of travel data reported in the summary forms using one of the following codes:

Code	Description
1	State traffic database only
2	State traffic database and local governments (MPO, Cities, and Counties)
3	Other

For *TRAVEL_VOLUME_TYPE*:

Please indicate the use of short-term volume counts (less than 48 hours) by data type using one of the following codes:

Code	Description
0	Short-term counts not included in summary data
1	Continuous permanent class counts only
2	Short term and continuous counts included

For *TRAVEL_CLASS_TYPE*:

Please indicate the use of short-term classification counts (less than 48 hours) by data type using one of the following codes:

Code	Description
0	Short-term counts not included in summary data
1	Continuous permanent class counts only
2	Short term and continuous counts included

For *TRAVEL_QA*:

Please indicate if a quality assurance program exists for any traffic data using one of the following codes:

Code	Description
0	No existing traffic data quality assurance program
1	State traffic data only
2	State and Local traffic data
3	Local traffic data only

7.1.7. On_State

Description: Estimate values and codes for missing traffic data on State highway system.

Valid values: For *AADT_PCT_ACTUAL*:

Code percent total AADTs reported that are based on actual counts for the reported data year or factored prior year AADTs to the nearest whole percent, expect range 1 to 100.

For *AADT_NUMBER_48*:

Code the number of locations that were counted for a minimum of 48 hours. Please include permanent and portable counters meeting the 48 hours minimum.

For *AADT_NUMBER_24*

Code the number of locations that were counted for 24 hours (or less than 48 hours). Please include permanent and portable counters meeting this criteria.

For *AADT_ADJ_SEASONAL*, *AADT_ADJ_WEEK*, *AADT_ADJ_AXLE*, and *AADT_ADJ_GROWTH* use one of the following codes:

Code	Description
0	No adjustment
1	With adjustment

For *CLASS_PCT_ACTUAL*:

Code percent of class AADTs reported that are based on actual counts for the reported data year or factored prior year class AADTs to the nearest whole percent, expect range 1 to 100.

For *CLASS_NUMBER_48*:

Code the number of classification count locations that were counted for a minimum of 48 hours. Please include permanent and portable classification counters meeting the 48 hours minimum.

For *CLASS_NUMBER_24*:

Code the number of classification count locations that were counted for 24 hours (or less than 48 hours). Please include permanent and portable classification counters meeting this criteria.

For *CLASS_ADJ_SEASONAL*, *CLASS_ADJ_WEEK*, *CLASS_ADJ_AXLE*, and *CLASS_ADJ_GROWTH* use one of the following codes:

Code	Description
0	No adjustment
1	With adjustment

For *TRAVEL_SOURCE*:

Please indicate the source of travel data reported in the summary forms using one of the following codes:

Code	Description
1	State traffic database only
2	State traffic database and local governments (MPO, Cities, and Counties)
3	Other

For *TRAVEL_VOLUME_TYPE*:

Please indicate the use of short-term volume counts (less than 48 hours) by data type using one of the following codes:

Code	Description
0	Short-term counts not included in summary data
1	Continuous permanent class counts only
2	Short term and continuous counts included

For *TRAVEL_CLASS_TYPE*:

Please indicate the use of short-term classification counts (less than 48 hours) by data type using one of the following codes:

Code	Description
0	Short-term counts not included in summary data
1	Continuous permanent class counts only
2	Short term and continuous counts included

For *TRAVEL_QA*:

Please indicate if a quality assurance program exists for any traffic data using one of the following codes:

Code	Description
0	No existing traffic data quality assurance program
1	State traffic data only
2	State and Local traffic data
3	Local traffic data only

Record Example

Data is stored in the Metadata_Traffic table as follow:

Year_Record: 2010
State_Code: 25
Traffic_Code: 1
F_System: 1
RU_Code: 1
Off_State: 40
On_State: 60

Data can be imported into Metadata_Traffic table from a CSV file in the format:
`2010,25,1,1,1,40,60`

7.2. Metadata_Pavement

This table stores data that captures and explains variability in the collection and reporting of pavement data in HPMS.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Calendar year for the data
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Pavement_Code	Numeric(2)	Pavement Code
4	PK	F_System	Numeric(1)	Functional System
5	PK	Is_Urban	Numeric(1)	Rural or Urban
6		Off_State	Decimal(6,3)	Off State System
7		On_State	Decimal(6,3)	On State System

Extent: All Federal-Aid Highways.
Collection cycle: Annual.
Collection requirements: None.

Field Details

7.2.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

7.2.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

7.2.3. Pavement_Code

Description: Code used for each of the fourteen types of pavement metadata. Used in various models.

Valid values:

Code	Description	Code	Description
1	IRI_EQUIP_TYPE	8	FAULTING_METHOD
2	IRI_INTERVAL	9	FAULTING_EQUIP_TYPE
3	RUTTING_METHOD	10	CRACKING_FAT_EQUIP
4	RUTTING_EQUIP_TYPE	11	CRACKING_FAT_CRACK_TYPE
5	RUTTING_NUM_SENSORS	12	CRACKING_TRAN_EQUIP
6	RUTTING_INTERVAL	13	CRACKING_TRAN_CRACK_TYPE
7	FAULTING_INTERVAL	14	CRACKING_METHOD

7.2.4. F_System

Description: The FHWA approved Functional System.

Valid values:

Code	Description
1	Interstate
2	Principal Arterial – Other Freeways and Expressways
3	Principal Arterial – Other
4	Minor Arterial
5	Major Collector
6	Minor Collector
7	Local

7.2.5. Is_Urban

Description: Rural or Urban designation based on Census urban boundary and population.

Valid values:

Code	Description
0	Rural
1	Urban (Population ≥ 5,000)

7.2.6. Off_State

Description: Estimate values and codes for missing pavement data off the State highway system.

Valid values: For *IRI_EQUIP_TYPE*:

Use one of the following codes to indicate the type of equipment used predominately for measuring the international roughness index (IRI):

Code	Description
0	Sonar
1	Combination sonar and laser
2	Laser
3	Scanning laser
4	Other

For *IRI_INTERVAL*:

Code IRI reporting interval to the nearest inch or 25 millimeters.

For *RUTTING_METHOD*:

Use one of the following codes to indicate if a manual or automated method was used to collect most of the rutting data:

Code	Description
0	Manual
1	Automatic

For *RUTTING_EQUIP_TYPE*:

Use one of the following codes to indicate the type of equipment used predominately for collection of rutting data:

Code	Description
0	Sonar
1	Combination sonar and laser
2	Laser
3	Scanning laser
4	Other

For *RUTTING_NUM_SENSORS*:

Use one of the following codes to indicate the number of sensors for the equipment used predominately for collection of rutting data:

Code	Description
0	Three (3) sensors
1	Five (5) sensors
2	Greater than five (>5) sensors
3	Scanning laser
4	Other

For *RUTTING_INTERVAL*:

Code rutting reporting interval to the nearest inch or 25 millimeters.

For *FAULTING_METHOD*:

Use one of the following codes to indicate if a manual or automated method was used to collect most of the faulting data:

Code	Description
0	Manual
1	Automatic

For *FAULTING_EQUIP_TYPE*:

Use one of the following codes to indicate the type of equipment used predominately for measuring the faulting data:

Code	Description
0	Manual
1	Laser
2	Scanning laser
3	Other

For *FAULTING_INTERVAL*:

Code faulting reporting interval to the nearest inch or 25 millimeters.

For *CRACKING_FAT_EQUIP*:

Use one of the following codes to indicate the type of equipment used predominately for measuring the cracking fatigue data:

Code	Description
1	Windshield survey
2	Visual distress survey (side of road)
3	Video with manual survey in office
4	Video with automated survey
5	Automated crack identification
6	Other

For *CRACKING_FAT_CRACK_TYPE*:

Use one of the following codes to indicate the type of cracks and pavement surface features included in the cracking fatigue data:

Code	Description
1	Wheel path
2	Patching
3	Failures
4	All of the above
5	Other

For *CRACKING_TRAN_EQUIP*:

Use one of the following codes to indicate the type of equipment used predominately for measuring the cracking transverse data:

Code	Description
1	Windshield survey
2	Visual distress survey (side of road)
3	Video with manual survey in office
4	Video with automated survey
5	Automated crack identification
6	Other

For *CRACKING_TRAN_CRACK_TYPE*:

Use one of the following codes to indicate the type of cracks included in the cracking transverse data:

Code	Description
1	Transverse
2	Reflective

For *CRACKING_METHOD*:

Use one of the following codes to indicate the protocol used to identify pavement distresses:

Code	Description
1	Long-Term Pavement Performance (LTPP)
2	American Association of State Highway and Transportation Officials (AASHTO)
3	Modified LTPP
4	Modified AASHTO
5	State developed protocol
6	Other

7.2.7. On_State

Description: Estimate values and codes for missing pavement data on State highway system.

Valid values: For *IRI_EQUIP_TYPE*:

Use one of the following codes to indicate the type of equipment used predominately for measuring the international roughness index (IRI):

Code	Description
0	Sonar
1	Combination sonar and laser
2	Laser
3	Scanning laser
4	Other

For *IRI_INTERVAL*:

Code IRI reporting interval to the nearest inch or 25 millimeters.

For *RUTTING_METHOD*:

Use one of the following codes to indicate if a manual or automated method was used to collect most of the rutting data:

Code	Description
0	Manual
1	Automatic

For *RUTTING_EQUIP_TYPE*:

Use one of the following codes to indicate the type of equipment used predominately for collection of rutting data:

Code	Description
0	Sonar
1	Combination sonar and laser
2	Laser
3	Scanning laser
4	Other

For *RUTTING_NUM_SENSORS*:

Use one of the following codes to indicate the number of sensors for the equipment used predominately for collection of rutting data:

Code	Description
0	Three (3) sensors
1	Five (5) sensors
2	Greater than five (>5) sensors
3	Scanning laser
4	Other

For *RUTTING_INTERVAL*:

Code rutting reporting interval to the nearest inch or 25 millimeters.

For *FAULTING_METHOD*:

Use one of the following codes to indicate if a manual or automated method was used to collect most of the faulting data:

Code	Description
0	Manual
1	Automatic

For *FAULTING_EQUIP_TYPE*:

Use one of the following codes to indicate the type of equipment used predominately for measuring the faulting data:

Code	Description
0	Manual
1	Laser
2	Scanning laser
3	Other

For *FAULTING_INTERVAL*:

Code faulting reporting interval to the nearest inch or 25 millimeters.

For *CRACKING_FAT_EQUIP*:

Use one of the following codes to indicate the type of equipment used predominately for measuring the cracking fatigue data:

Code	Description
1	Windshield survey
2	Visual distress survey (side of road)
3	Video with manual survey in office
4	Video with automated survey
5	Automated crack identification
6	Other

For CRACKING_FAT_CRACK_TYPE:

Use one of the following codes to indicate the type of cracks and pavement surface features included in the cracking fatigue data:

Code	Description
1	Wheel path
2	Patching
3	Failures
4	All of the above
5	Other

For CRACKING_TRAN_EQUIP:

Use one of the following codes to indicate the type of equipment used predominately for measuring the cracking transverse data:

Code	Description
1	Windshield survey
2	Visual distress survey (side of road)
3	Video with manual survey in office
4	Video with automated survey
5	Automated crack identification
6	Other

For *CRACKING_TRAN_CRACK_TYPE*:

Use one of the following codes to indicate the type of cracks included in the cracking transverse data:

Code	Description
1	Transverse
2	Reflective

For *CRACKING_METHOD*:

Use one of the following codes to indicate the protocol used to identify pavement distresses:

Code	Description
1	Long-Term Pavement Performance (LTPP)
2	American Association of State Highway and Transportation Officials (AASHTO)
3	Modified LTPP
4	Modified AASHTO
5	State developed protocol
6	Other

Record Example

Data is stored in the Metadata_Pavement table as follow:

Year_Record: 2010
State_Code: 25
Pavement_Code: 2
F_System: 1
Is_Urban: 1
Off_State: 0.000
On_State: 0.815

Data can be imported into Metadata_Pavement table from a CSV file in the format:
2010,25,2,1,1,0.000,0.815

7.3. Metadata_Ramp

This table stores data that captures and explains variability in the collection and reporting of ramp data in HPMS.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Calendar year for the data
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Ramp_Code	Numeric(2)	Ramp Code
4	PK	F_System	Numeric(1)	Functional System
5	PK	Is_Urban	Numeric(1)	Rural or Urban
6		Off_State	Numeric(5)	Off State System
7		On_State	Numeric(5)	On State System

Extent: All turning movement ramps associated with grade separated interchanges on Federal-Aid Highways; optional for all other systems.

Collection cycle: Annual.

Collection requirements: None.

Field Details

7.3.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

7.3.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

7.3.3. Ramp_Code

Description: Code used for the two types of ramp metadata. Used in various models.

Valid values:

Code	Description
1	RAMP_TERMINI_DESC
2	RAMP_TRAF_EST_METHOD

7.3.4. F_System

Description: The FHWA approved Functional System.

Valid values:

Code	Description
1	Interstate
2	Principal Arterial – Other Freeways and Expressways
3	Principal Arterial – Other
4	Minor Arterial
5	Major Collector
6	Minor Collector
7	Local

7.3.5. Is_Urban

Description: Rural or Urban designation based on Census urban boundary and population.

Valid values:

Code	Description
0	Rural
1	Urban (Population ≥ 5,000)

7.3.6. Off_State

Description: Codes that describe the collection and estimation of ramp travel and length on non State owned highways.

Valid values: For *RAMP_TERMINI_DESC*:

Use one of the following codes to indicate the ramp termini.

Code	Description
1	Gore to Gore
2	Taper to Taper
3	Other

For *RAMP_TRAF_EST_METHOD*:

Use one of the following codes to indicate method that best describes the predominant method of collecting and estimating ramp traffic volumes.

Code	Description
1	Manual counts
2	Portable counts
3	Permanent count equipment
4	ITS equipment
5	Ramp metering equipment
6	Ramp balancing
7	Turning or ramp movement estimation software
8	Estimation based on fixed percent of mainline volumes
9	Other estimation method not described above

7.3.7. On_State

Description: Codes that describe the collection and estimation of ramp travel and length on State owned highways.

Valid values: For *RAMP_TERMINI_DESC*:

Use one of the following codes to indicate the ramp termini.

Code	Description
1	Gore to Gore
2	Taper to Taper
3	Other

For *RAMP_TRAF_EST_METHOD*:

Use one of the following codes to indicate method that best describes the predominant method of collecting and estimating ramp traffic volumes.

Code	Description
1	Manual counts
2	Portable counts
3	Permanent count equipment
4	ITS equipment
5	Ramp metering equipment
6	Ramp balancing
7	Turning or ramp movement estimation software
8	Estimation based on fixed percent of mainline volumes
9	Other estimation method not described above

Record Example

Data is stored in the Metadata_Ramp table as follow:

Year_Record: 2010
State_Code: 25
Ramp_Code: 2
F_System: 1
RU_Code: 1
Off_State: 8
On_State: 5

Data can be imported into Metadata_Ramp table from a CSV file in the format:

```
2010,25,2,1,1,8,5
```

8. SECTIONS CATALOG

These tables store annual universe and sample HPMS data that are spatially linked to the Road_Route network provided by the State. In general, these data are required for Federal-Aid Highways and are optional for non-Federal-Aid Highways. Data Items required for sample sections, or "sample data" are identified as such in the individual Data Item descriptions. The locations of sample sections are contained in the Sections_Sample table. All data not identified as sample data are by default universe data and are required for all Federal-Aid Highways unless otherwise noted in the Data Item description.

Section data can be coded manually onto the several summary screens contained in the HPMS web application, or can be imported from a file in Comma Separated Value (CSV) format.

States are required to only submit the following data items for ramps:

- Sections_FSystem table:
  - Year_Record
  - State_Code
  - Route_ID
  - Begin_Point
  - End_Point
  - Section_Length
- Sections_Lane
  - Year_Record
  - State_Code
  - Route_ID
  - Begin_Point
  - End_Point
  - Facility_Type
  - Through_Lanes
- Sections_Traffic
  - Year_Record
  - State_Code
  - Route_ID
  - Begin_Point
  - End_Point
  - Section_Length
  - AADT

All other data for ramps are optional.

The reporting of Non-Mainline facilities, and all data associated with these facilities is optional.

8.1. Sections_FSystem

This table stores all mileage for the Federal-Aid Highways by functional system. This is the official length for these systems.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7		F_System	Numeric(1)	Functional system code

Extent: All Federal-Aid Highways and ramps on grade separated interchanges; optional for other sections.

Collection cycle: Annual.

Collection requirements: The functional classification of highways contained in this table should reflect the FHWA approved functional classifications. Proposed and pending Functional Classification changes, not yet been approved by FHWA, are not to be included.

Field Details

8.1.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

8.1.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

8.1.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

8.1.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.1.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.1.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

8.1.7. F_System

Description: The FHWA approved Functional System.

Valid values:

Code	Description
1	Interstate
2	Principal Arterial – Other Freeways and Expressways
3	Principal Arterial – Other
4	Minor Arterial
5	Major Collector
6	Minor Collector
7	Local

Record Example

Data is stored in the Sections_FSystem table as follow:

Year_Record: 2010
State_Code: 25
Route_ID: I90 EB
Begin_Point: 0.000
End_Poin: 1.500
Section_Length: 1.500
F_System: 1

Data can be imported into Sections_FSystem table from a CSV file in the format:

```
2010,25,"I90 EB",0,1.5,1.5,1
```

8.2. Sections_Urban

This table stores the length for all NHS and Federal-Aid Highways by urbanized area. This table is also used as an input to create the HPMS sample panel.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7		Urban_Code	Numeric(5)	Census Urban code

Extent: All NHS and Federal-Aid Highways; optional for other sections.
Collection cycle: Annual.
Collection requirements: None

Field Details

8.2.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

8.2.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

8.2.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

8.2.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.2.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.2.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

8.2.7. Urban_Code

Description: Census urban area code. Used to query HPMS information by Urban Area.

Valid values: Up to five digits for the Census urban code. See Urban Area Codes for a complete list. Code 99999 for rural sections and 99998 for small urban sections (population < 50,000).

Record Example

Data is stored in the Sections_Urban table as follow:

Year_Record:	2010
State_Code:	25
Route_ID:	I90 EB
Begin_Point:	0.000
End_Point:	1.500
Section_Length:	1.500
Urban_Code:	48745

Data can be imported into Sections_Urban table from a CSV file in the format:

```
2010,25,"I90 EB",0,1.5,1.5,48745
```

8.3. Sections_Lane

This table stores section level data for all Federal-Aid Highways about the total number of through lanes; used for apportionment and general lane-mile calculations, HOV and Access Control. This table is also used as an input to create the HPMS sample panel.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7		Facility_Type	Numeric(1)	Facility Type
8		Is_Structure	Numeric(1)	Identifies if section is on a structure
9		Through_Lanes	Numeric(2)	Total number of through lanes
10		HOV_Type	Numeric(1)	Type of HOV lanes present
11		HOV_Lanes	Numeric(1)	Number of HOV lanes
12		Access_Control	Numeric(1)	Degree of access control

Extent: All Federal-Aid Highways; optional for other sections.
Collection cycle: Annual.
Collection requirements: None.

Field Details

8.3.1. Year_Record

Description: The calendar year for which the data apply.
Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = “4” in the Sections_Lane table.
Valid values: The four digits of the year the data represents.

8.3.2. State_Code

Description: The State FIPS code.
Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = “4” in the Sections_Lane table.
Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

8.3.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.
Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = “4” in the Sections_Lane table.
Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

8.3.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = "4" in the Sections_Lane table.

Valid values: Enter a decimal value.

8.3.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = "4" in the Sections_Lane table.

Valid values: Enter a decimal value.

8.3.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = "4" in this table.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

8.3.7. Facility_Type

Description: This item is used to determine the operational characteristics of the roadway. It is used in investment requirements modeling to calculate capacity and estimate roadway deficiencies and improvement needs, in the cost allocation pavement model, and in the national highway database.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps associated with grade separated interchanges.

Valid values: Use one of the following codes as applicable regardless of whether the section is on a structure.

Code	Description
1	One-Way Roadway
2	Two-Way Roadway
3	Couplet
4	Ramp
5	Non-Mainline

For purposes of this data item, the following definitions are provided:

One-Way: A roadway with traffic moving in only one direction during non-peak period hours. When part of a one-way couplet, report only the side in the inventory direction, otherwise code as "Couplet".

Two-Way: A roadway or structure with traffic moving in both directions during non-peak period hours.

Couplet: Side of the "couplet" in the non-inventory direction.

Ramp: Non-mainline turning movement facility associated with a grade separated interchange.

Non-Mainline: All other non-mainline facilities.

8.3.8. Is_Structure

Description: Identifies whether a section is completely on a structure, tunnel, or causeway.

Valid values:

Code	Description
0	Section is NOT completely on a structure
1	Entire section is a structure, tunnel, or causeway

8.3.9. Through_Lanes

Description: The number of lanes of the entire facility. It is extensively used for apportionment, administrative, legislative, analytical, and national highway database purposes.

Extent: All HPMS sections on Federal-Aid Highways; all NHS sections regardless of functional system; and all ramps. Optional for other sections.

Valid values: Code the number of through lanes according to the striping, if present, on multilane facilities, or according to traffic use or State/local design guidelines if no striping or only centerline striping is present. Enter the prevailing number of through lanes in both directions carrying through traffic in the off-peak period. Exclude what are defined as auxiliary lanes, such as collector-distributor lanes, weaving lanes, frontage road lanes, parking and turning lanes, acceleration/deceleration lanes, toll collection lanes and truck climbing lanes.

8.3.10. HOV_Type

Description: Type of HOV operations on a roadway section. If more than one type of HOV lane is present for the section, code the lower of the two HOV_Type codes e.g. if codes “2” and “3” are applicable for a section then code the section as HOV_Type = 2.

Valid values:

Code	Description
0	Section does NOT have HOV lanes
1	Section has 24 hour exclusive HOV lanes (HOV use only; no other use permitted)
2	Normal through lanes used for exclusive HOV during specified time periods
3	Shoulder/Parking lanes used for exclusive HOV during specified time periods

8.3.11. HOV_Lanes

Description: Maximum number of HOV lanes in both directions for the entire facility.

Extent: For all HPMS sections where HOV_Type > “0”

Valid values: Code the number of HOV lanes

8.3.12. Access_Control

Description: The measure of the degree of access control on sample roadway sections. It is used in investment requirements modeling to calculate capacity and estimate type of design, in truck size and weight studies, and for national highway data base purposes.

Extent: Required for all Principal Arterials and sample sections; optional for other sections.

Aggregation rules: Predominance

Valid values:

Code	Description
0	Data is not reported on this section
1	Full Access Control
2	Partial Access Control
3	No Access Control

Record Example

Data is stored in the Sections_Lane table as follow:

Year_Record: 2010
State_Code: 25
Route_ID: I90 EB
Begin_Point: 0.000
End_Point: 1.500
Section_Length: 1.500
Facility_Type: 2
Is_Structure: 0
Through_Lanes: 3
HOV_Type: 0
Access_Control: 1

Data can be imported into Sections_Lane table from a CSV file in the format:

```
2010,25,"I90 EB",0,1.5,1.5,2,0,3,0,1
```

8.4. Sections_Traffic

This table stores information about the movement of vehicles throughout the highway system. A primary purpose of this data is to establish Vehicle Distance Traveled (VDT) for various cuts throughout the entire database. It is also a principle component and the basis for establishing the Sample Panel.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7		AADT	Numeric(8)	Annual average traffic volume
8		AADT_Single_Unit	Numeric(8)	Volume single-unit trucks
9		Pct_Peak_Single	Decimal(3,1)	Percent single-unit trucks in peak
10		AADT_Combination	Numeric(8)	Volume combination-unit trucks
11		Pct_Peak_Combination	Decimal(3,1)	Percent combination-unit trucks
12		K_Factor	Numeric(2)	Percent of travel in peak
13		Dir_Factor	Numeric(3)	Directional travel in peak
14		Future_AADT	Numeric(8)	Estimated future AADT
15		Future_AADT_Year	Numeric(4)	Year of estimated future AADT

Extent: All Federal-Aid Highways; optional for other sections.

Collection cycle: Annual.

Collection requirements: None; collection requirements identified for each Data Item.

Field Details

8.4.1. Year_Record

Description: The calendar year for which the data apply.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = “4” in the Sections_Lane table.

Valid values: The four digits of the year the data represents.

8.4.2. State_Code

Description: The State FIPS code.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = “4” in the Sections_Lane table.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

8.4.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = “4” in the Sections_Lane table.

Valid values: Up to 32 alpha-numeric digits that identify the route.

This ID must match a record in the SHAPES_ROUTE table.

8.4.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = "4" in the Sections_Lane table.

Valid values: Enter a decimal value.

8.4.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = "4" in the Sections_Lane table.

Valid values: Enter a decimal value.

8.4.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = "4" in the Sections_Lane table.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

8.4.7. AADT

Description: Annual Average Daily Traffic. This item provides basic existing traffic inventory information for selected sections. It is extensively used for apportionment, administrative, legislative, analytical, and national highway database purposes.

Extent: In addition to all Federal-Aid Highways, this data item is also required for ramps e.g. any section with a Facility_Type code = "4" in the Sections_Lane table.

Collection requirements: Update reported AADT values annually. All counts must reflect application of day of week, seasonal, and axle correction factors, as necessary. Growth factors must be applied if the AADT is not derived from current year counts. Specific guidance for the frequency and size of traffic data collection programs, factor development, age of data, and other applications is contained in Appendix F and the Traffic Monitoring Guide.

Aggregation rule: Weighted average.

Valid values: This is either a count AADT or factored AADT value to represent the current data year. For two-way facilities, provide the AADT for both directions; provide the directional AADT if part of a one-way couplet or for one-way streets. Since many applications, including travel estimates, are based on section AADTs, States should provide AADT values that are count-based (actual counts adjusted to represent AADT) rather than estimated values. Each section must have an AADT for the data year

8.4.8. AADT_Single_Unit

Description: This item provides information on truck use on the NHS and all sample sections. It is used in investment requirements modeling to estimate pavement deterioration and operating speeds, in the cost allocation pavement model, and in the truck size and weight analysis process.

Extent: All NHS sections and all Samples. Reporting for other sections is optional.

Collection requirements: This value should be representative of all single-unit truck activity over all days of the week and seasons of the year in terms of annual average daily traffic. Section specific measured values are requested. If not available, use values derived from classification station data on the same route or on a similar route with similar traffic in the same area.

Aggregation rule: Weighted average.

Valid values: Code single-unit truck traffic. Code “0” only on facilities where trucks are not allowed

8.4.9. Pct_Peak_Single

Description: This item provides information on truck use on a sample section. It is used in investment requirements modeling to calculate capacity and design volumes.

Extent: All Samples.

Collection requirements: Some routes, such as urban commuter or recreational routes, may exhibit significant differences in truck percentages between peak period and average daily operation; these differences may have a significant impact on route capacity. In cases where the State determines that differing peak period operations have a significant bearing on route capacity, code a separate peak usage value for the section, even if it is an estimated value.

Aggregation rule: Weighted average.

Valid values: Code this item with the percent from AADT_SINGLE_UNIT unless the State has determined that the percent of trucks in the peak period is different from the average daily percent trucks. Code to the nearest tenth of a percent and code "0" on facilities where trucks are not allowed.

8.4.10. AADT_Combination

Description: This item provides information on truck use on the NHS and all sample sections. It is used in investment requirements modeling to estimate pavement deterioration and operating speeds, in the cost allocation pavement model, and in the truck size and weight analysis process.

Extent: All NHS sections and all Samples.

Collection requirements: This value should be representative of all combination-unit truck activity over all days of the week and seasons of the year in terms of annual average daily traffic. Single-unit trucks include vehicle classes 8 through 13 (four-or-less axle, single-trailer trucks through seven-or-more axle, multi-trailer trucks). Section specific measured values are requested. If not available, use values derived from classification station data on the same route or on a similar route with similar traffic in the same area.

Aggregation rule: Weighted average.

Valid values: Code combination-unit truck traffic. Code "0" only on facilities where trucks are not allowed

8.4.11. Pct_Peak_Combination

Description: This item provides information on truck use on a sample section. It is used in investment requirements modeling to calculate capacity and design volumes.

Extent: All Samples

Collection requirements: Some routes, such as urban commuter or recreational routes, may exhibit significant differences in truck percentages between peak period and average daily operation; these differences may have a significant impact on route capacity. In cases where the State determines that differing peak period operations have a significant bearing on route capacity, code a separate peak usage value for the section, even if it is an estimated value.

Aggregation rule: Weighted average

Valid values: Code this item with the percent from AADT_COMBINATION unless the State has determined that the percent of trucks in the peak period is different from the average daily percent trucks. Code to the nearest tenth of a percent and code "0" only on facilities where trucks are not allowed.

8.4.12. K_Factor

Description: This item provides the design hour volume as a percent of AADT for a sample section. It is used in investment requirements modeling to calculate capacity and estimate needed capacity improvements, in the cost allocation pavement model, and for other analysis purposes, including delay estimation.

Extent: All Samples

Collection Requirements: The K-Factor is the design hour volume (30^{th} highest hour) as a percentage of the annual average daily traffic. Section specific values are requested. If not available, use values derived from continuous count station data on the same route or on a similar route with similar traffic in the same area. Avoid using a single statewide value or statewide values by functional system. The K-Factor normally ranges from 6 to 18 percent.

Aggregation rule: Weighted average

Valid values: Code the K-Factor for the section to the nearest percent. Code "0" for unreported data.

8.4.13. Dir_Factor

Description: This item provides the percent of design hour volume flowing in the peak direction on a sample section. It is used in investment requirements modeling to calculate capacity and estimate needed capacity improvements, in congestion, delay, and other analyses, and in the cost allocation pavement model.

Extent: All Samples

Collection Requirements: Section specific values are requested. If not available, use values derived from continuous count station data on the same route or on a similar route with similar traffic in the same area. Avoid using a single statewide value or statewide values by functional system. The Dir-Factor normally ranges from 50 to 70 percent.

Aggregation rule: Weighted average

Valid values: Enter the percentage of the design hour volume (30^{th} highest hour) flowing in the peak direction. Code "100" for one-way facilities. Code "0" for unreported data.

8.4.14. Future_AADT

Description: This item provides forecast AADT information for a sample section. It is used in investment requirements modeling to estimate deficiencies and future improvement needs, in the cost allocation pavement model and in other analytical studies data.

Extent: All Samples

Collection Requirements: The intent is to include a 20-year forecast in the HPMS but the estimate may be for some other period of time within an 18 to 25 year time span. This item may be updated at any time but must be updated when the forecast falls below 18 years. Future AADT should come from a technically supportable State procedure or data from MPOs or other local sources. HPMS forecasts for urbanized areas should be consistent with those developed by the MPO at the functional system and urbanized area level.

Aggregation rule: Weighted average

Valid values: Code the forecasted two-way AADT for the year coded in FUTURE_AADT_YEAR. Code "0" for unreported.

8.4.15. Future_AADT_Year

Description: This item provides the year for which the AADT has been forecast. It is used to normalize the forecast AADT to a consistent 20-year horizon.

Extent: All Samples

Aggregation rule: Predominance.

Valid values: Enter the four-digit year for which FUTURE_AADT has been forecasted. This cannot be for less than 18 years nor more than 25 years from the data year. Code "0" for unreported.

Record Example

Data is stored in the Sections_Traffic table as follow:

Year_Record:	2010
State_Code:	25
Route_ID:	I90 EB
Begin_Point:	0.000
End_Point:	1.500
Section_Length:	1.500
AADT:	2000
AADT_Single_Unit:	1500
Pct_Peak_Single:	60.2
AADT_Combination:	500
Pct_Peak_Combination:	10.4
K_Factor:	6
Dir_Factor:	0
Future_AADT:	3000
Future_AADT_Year:	2030

Data can be imported into Sections_Traffic table from a CSV file in the format:
`2010,25,"I90 EB",0,1.5,1.5,2000,1500,60.2,500,10.4,6,0,3000,2030`

8.5. Sections_Signage

This table stores route naming and signing convention. It allows for query by specific route and provides for cartographic symbols.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6	PK	Route_Sequence	Numeric(1)	The primary route number
7		Section_Length	Decimal(8,3)	Section length
8		Route_Prefix	Character(2)	Any applicable route prefix
9		Route_Number	Numeric(5)	Route number
10		Route_Suffix	Character(2)	Any applicable route suffix
11		Route_Signing	Numeric(1)	Type of route sign present
12		Route_Qualifier	Numeric(1)	Description of type of route
13		Alternative_Route_Name	Character(50)	Altenative name where applicable

Extent: All NHS and Arterials (i.e., Interstate, Other Freeways & Expressways, Other Principal Arterials, and Minor Arterials); optional for other sections.
Collection cycle: Annual.

Field Details

8.5.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

8.5.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

8.5.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

8.5.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.5.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.5.6. Route_Sequence

Description: Used to indicate the primary route when two-or-more concurrent routes exist for the same section

Valid values: Code "1" for the primary route, code "2" for the secondary route, etc.

8.5.7. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

8.5.8. Route_Prefix

Description: An optional field for capturing route prefixes.

Valid values: Leave blank for unknown or no prefix. May include State specific prefixes such as "H" for Interstate H-1 in Hawaii or State specific Route_Qualifiers such as "S" for spur routes or "B" for business routes.

8.5.9. Route_Number

Description: Represents the numeric portion of the signed route number.

Valid values: Code the appropriate route number without leading zeros, e.g. Interstate 81 coded as "81".

8.5.10. Route_Suffix

Description: An optional field for capturing route prefixes. Include coding for Interstate routes with parallel or diverging branches having cardinal direction letters in the official route number.

Valid values: Leave blank for unknown or no suffix. Examples include coded values of "E" and "W" for Interstates I-35E and I-35W, respectively.

8.5.11. Route_Signing

Description: Indicates the type of route signing.

Valid values:

Code	Description	Code	Description
0	Data not reported	6	County
1	Not Signed	7	Township
2	Interstate	8	Municipal
3	U.S.	9	Parkway Marker or Forest Route Marker
4	State	10	None of the Above
5	Off-Interstate Business Marker		

8.5.12. Route_Qualifier

Description: This item, along with other ROUTE data items are used to track HPMS information by specific route.

Valid values: Code the value which best represents the manner in which the highway segment is signed on the route marker described in ROUTE_SIGNING. Where more than one code is applicable, use the lower code.

Code	Description	Code	Description
0	Data not reported	6	Loop
1	No Qualifier or Not Signed	7	Proposed
2	Alternate	8	Temporary
3	Business Route	9	Truck Route
4	Bypass	10	None of the Above
5	Spur		

8.5.13. Alternative_Route_Name

Description: A familiar or non-numeric designation for the route, e.g. “Pacific Coast Highway” in California, or the “Garden State Parkway” in New Jersey.

Valid values: Optional

Record Example

Data is stored in the Sections_Signage table as follow:

Year_Record: 2010
State_Code: 34
Route_ID: 00000295__
Begin_Point: 0.000
End_Point: 1.500
Route_Sequence: 1
Section_Length: 1.500
Route_Prefix:
Route_Number: 295
Route_Suffix:
Route_Signing: 1
Route_Qualifier: 1
Alternative_Route_Name: Garden State Parkway

Data can be imported into Sections_Signage table from a CSV file in the format:

```
2010,34,”00000295__”,0,1.5,1,1.5,””,295,””,1,1,”Garden State Parkway”
```

8.6. Sections_Jurisdiction

This table stores information that establishes the ownership and authority of highway sections.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7		Ownership	Numeric(2)	Public or private owner of road
8	UK	Toll_ID	Character(20)	FHWA assigned toll identifier
9		Toll_Charged	Numeric(1)	Indicates direction tolls are collected
10		Toll_Type	Numeric(1)	Indicates HOT or other special tolls

Extent: All Federal-Aid Highways; optional for other sections.

Collection cycle: Annual.

Field Details

8.6.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

8.6.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

8.6.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

8.6.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.6.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.6.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

8.6.7. Ownership

Description: This item identifies the road owner and is used in cost allocation studies, to track historic data, in the national highway database, and for apportionment. The purpose of this item is to identify the owner of public roads; do not include privately owned roads in HPMS.

Valid values: Code the level of government that best represents the highway owner irrespective of whether agreements exist for maintenance or other purposes. For purposes of this data item, "State" means owned by one of the 50 States, the District of Columbia, or the Commonwealth of Puerto Rico including quasi-official State commissions or organizations; County, local, municipal, town, or township" means owned by one of the officially recognized governments established under State authority.

Code	Description	Code	Description
1	State Highway Agency	60	Other Federal Agency
2	County Highway Agency	62	Bureau of Indian Affairs
3	Town or Township Highway Agency	63	Bureau of Fish and Wildlife
4	City or Municipal Highway Agency	64	U.S. Forest Service
11	State Park, Forest, or Reservation Agency	66	National Park Service
12	Local Park, Forest, or Reservation Agency	67	Tennessee Valley Authority
21	Other State Agency	68	Bureau of Land Management
25	Other Local Agency	69	Bureau of Reclamation
26	Private (other than Railroad)	70	Corps of Engineers
27	Railroad	72	Air Force
31	State Toll Road	73	Navy/Marines
32	Local Toll Authority	74	Army
40	Other Public Instrumentality (i.e., Airport)	80	Other
50	Indian Tribe Nation		

8.6.8. Toll_ID

Description: A unique identifier for a facility regulated by a toll authority. Identifier generated by FHWA and used to link HPMS data with the *Toll Facilities in the United States Report*. Details pending.

Valid values: Code the appropriate toll identifier for all toll sections.

8.6.9. Toll_Charged

Description: Used to indicate sections where a toll is charged.

Valid values:

Code	Description
0	No toll fee charged
1	Toll paid in one direction only
2	Toll paid in both directions

8.6.10. Toll_Type

Description: This item identifies special lanes where tolls are charged, such as High Occupancy Toll (HOT) roadway sections.

Valid values:

Code	Description
0	No Special Toll Lanes
1	This section has HOT lanes
2	This section has special toll lanes where a fee is charged; not HOT lanes

Record Example

Data is stored in the Sections_Jurisdiction table as follow:

Year_Record: 2010
State_Code: 34
Route_ID: 00000295__
Begin_Point: 0.000
End_Point: 1.500
Section_Length: 1.500
Ownership: 31
Toll_ID: 295
Toll_Charged: 2
Toll_Type: 1

Data can be imported into Sections_Jurisdiction table from a CSV file in the format:

```
2010,34,"00000295__",0,1.5,1.5,31,"295",2,1
```

8.7. Sections_Sample

This table will determine the section lengths and location of the sample panel. It will be determined through a geospatial intersection of the Sections_FSystem, Sections_Lane, and Sections_Traffic tables and populated with data for this intersection. This will be a Software process that relies on data from the other tables.

Field Number	Constraint	Field Name	Data Type	Description
1	PK, UK	Year_Record	Numeric(4)	Year for which the data apply
2	PK, UK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7	UK	Sample_ID	Character(12)	State or County unique identifier
8		Volume_Group	Numeric(1)	Traffic volume group
9		Exp_Factor	Decimal(8,3)	Expansion factor for sample data
10		NHS_Exp_Factor	Decimal(8,3)	NHS expansion factor

Extent: All Federal-Aid Highways; optional for other sections.

Collection cycle: Annual.

Field Details

8.7.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

8.7.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

8.7.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

8.7.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.7.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.7.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

8.7.7. Sample_ID

Description: The sample identifier is a statewide or countywide unique 12-character alphanumeric code that cannot change once it has been assigned. It is used to track sample sections over time, and must never change for any reason.

Extent: All Samples.

Valid values: For existing sections, carry over the sample identifier from year to year. For a new sample section, assign a new, unique sample identifier. When an existing sample is split, assign the existing sample identifier to the section retained as the HPMS sample.

8.7.8. Volume_Group

Description: This item is used to identify the AADT volume group for a section when an actual AADT is not reported.

Valid values: Code a sample volume group number (valid codes 1 through 12) for the section when an AADT is not coded; when an AADT is coded, the HPMS software will assign the volume group number if the State is using the FHWA volume group ranges. An AADT or the volume group must be coded for applicable universe and sample sections for all except the rural minor collector and the local functional systems. Code "0" for all other sections.

Code	Description
1	Under 500
2	500 – 1,999
3	2,000 – 4,999
4	5,000 – 9,999
5	10,000 – 19,999
6	20,000 – 34,999
7	35,000 – 54,999
8	55,000 – 84,999
9	85,000 – 124,999
10	125,000 – 174,999
11	175,000 – 249,999
12	250,000 and more

8.7.9. Exp_Factor

Description: Expansion factors are used to expand sampled data to represent the universe from which the sample is drawn. This value item is calculated and coded to the sample section by the HPMS software using the volume group information in VOLUME_GROUP. By definition, the expansion factor is the ratio of the total length in a volume group to the total sampled volume group length:

$$\text{Exp\_Factor} = \frac{\text{Total length in the Volume Group}}{\text{Sampled length in the Volume Group}}$$

Extent: All Samples.

Valid values: If the expansion factor for a volume group exceeds 100.000, select additional sample sections from the universe volume group until the expansion factor is reduced to a maximum of 100.000. If there are fewer than three samples in a volume group and additional universe sections are available, select additional samples from the universe volume group.

8.7.10. NHS_Exp_Factor

Description: Software calculated expansion factor used to expand sampled data to represent the entire NHS in lieu of a separate sample for NHS. Since the NHS is not explicitly sampled, this data item is only used for general estimates of overall NHS condition, use, and performance.

Valid values: All NHS sections.

Record Example

Data is stored in the Sections_Sample table as follow:

Year_Record: 2010
State_Code: 34
Route_ID: 00000295__
Begin_Point: 0.000
End_Point: 1.500
Section_Length: 1.500
Sample_ID: ABC
Volume_Group: 1
Exp_Factor: 0.234
NHS_Exp_Factor: 0.123

Data can be imported into Sections_Sample table from a CSV file in the format:

```
2010,34,"00000295__",0,1.5,1.5,"ABC",1,0.234,0.123
```

8.8. Sections_Geometric

This table stores data used for the capacity calculation, some of which are also published. These data are required on samples and optional elsewhere.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7		Lane_Width	Decimal(4,1)	Lane width
8		Median_Type	Numeric(1)	Median type
9		Median_Width	Decimal(4,1)	Median width
10		Shoulder_Type	Numeric(1)	Shoulder type
11		Shoulder_Width_R	Decimal(3,1)	Right shoulder width
12		Shoulder_Width_L	Decimal(3,1)	Left shoulder width
13		Peak_Parking	Numeric(1)	Type of peak parking
14		Widening_Obstacle	Character(7)	Widening obstacle(s)
15		Widening_Potential	Numeric(1)	# of potential lanes
16		Curves_A	Decimal(8,3)	Length of class A horizontal curves
17		Curves_B	Decimal(8,3)	Length of class B horizontal curves
18		Curves_C	Decimal(8,3)	Length of class C horizontal curves
19		Curves_D	Decimal(8,3)	Length of class D horizontal curves
20		Curves_E	Decimal(8,3)	Length of class E horizontal curves
21		Curves_F	Decimal(8,3)	Length of class F horizontal curves
22		Horiz_Align	Numeric(1)	Horizontal alignment adequacy
23		Terrain_Type	Numeric(1)	Terrain type
24		Vert_Align	Numeric(1)	Vertical alignment adequacy
25		Grades_A	Decimal(8,3)	Length of class A vertical curves
26		Grades_B	Decimal(8,3)	Length of class B vertical curves
27		Grades_C	Decimal(8,3)	Length of class C vertical curves
28		Grades_D	Decimal(8,3)	Length of class D vertical curves
29		Grades_E	Decimal(8,3)	Length of class E vertical curves
30		Grades_F	Decimal(8,3)	Length of class F vertical curves
31		Pct_Pass_Sight	Numeric(3)	Percent of section w/o restrictions
32		Speed_Limit	Numeric(3)	Posted speed limit
33		Design_Speed	Numeric(3)	Design speed
34		Peak_Lanes	Numeric(2)	# of peak lanes
35		Counter_Peak_Lanes	Numeric(2)	# of counter-peak lanes
36		Turn_Lanes_R	Numeric(1)	Type of right turn lanes
37		Turn_Lanes_L	Numeric(1)	Type of left turn lanes
38		Type_Signal	Numeric(2)	Type of signals
39		Pct_Green_Time	Numeric(3)	Percent green time
40		Number_Signals	Numeric(2)	# of signalized intersections
41		Stop_Signs	Numeric(2)	# of intersections w/ stop signs
42		At_Grade_Other	Numeric(2)	# of other intersections
43		Peak_Capacity	Numeric(6)	Peak capacity
44		VSF	Decimal(5,2)	Volume to service flow ratio

Extent: All Samples on Federal-Aid Highways; optional for other sections.
Collection cycle: Annual.

Field Details

8.8.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

8.8.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

8.8.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

8.8.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.8.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.8.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

8.8.7. Lane_Width

Description: This item is a measure of existing lane width on sample roadway sections. It is used in investment requirements modeling to calculate capacity, estimate needed improvements, and compute a safety index, for cost allocation pavement models, and for other policy analysis and national highway data base purposes.

Valid values: Enter the prevailing through lane width to the nearest tenth of a meter (999.9) or whole foot (99). Code according to the reporting units chosen (Metric or English). Code "0" for unreported data.

8.8.8. Median_Type

Description: This item is a characterization of the type of median on sample roadway sections. It is used in investment requirements modeling to calculate capacity and estimate type of design and for national highway data base purposes.

Valid values: A positive barrier normally consists of a guardrail or concrete barrier, but could consist of thick, impenetrable vegetation. Turning lanes or bays are not considered medians unless the turning lanes/bays are cut into an existing median at intersections, entrance drives, etc; a continuous turning lane is not a median. The following definitions are summarizations from the definitions provided in the AASHTO *Policy on Geometric Design of Highways and Streets* (Green Book). States to code at a minimum 0 through 4; codes 5 through 7 are optional, and should be coded if available.

Median: The portion of a divided highway separating the traveled way for traffic in opposing directions. The principal functions of a median are to separate opposing traffic, provide recovery are for out-of-control vehicles, provide stopping area in case of emergencies, allow space for speed changes and storage of left-turning and U-turning vehicles, minimize headlight glare, and provide width for future lanes. Medians may be depressed, raised, or flush with the pavement.

None: No median, or unprotected less than 4’ or 1.2m wide.

Unprotected: unprotected with a width of 4’ or 1.2m or more.

Curbed: Barrier or mountable curbs with a minimum height of 4” or 0.1m.

Flexible: longitudinal barrier that undergoes considerable dynamic deflection upon impact. Typically cable and beam construction; beams may be either wood or metal.

Semi-rigid: longitudinal barrier that allows some deflection upon impact.

Rigid: does not deflect substantially upon impact

Code	Description
0	Not reported
1	None
2	Unprotected
3	Curbed
4	Positive barrier – unspecified
5	Positive barrier – flexible
6	Positive barrier – semi-rigid
7	Positive barrier - rigid

8.8.9. Median_Width

Description: This item is a measure of existing median width on sample roadway sections. It is used in investment requirements modeling to calculate capacity and estimate type of design and for national highway data base purposes.

Valid values: Enter the predominant median width including left shoulders, if any, measured between the inside edges of the through lanes. Enter “0” where MEDIAN_TYPE is coded as “0” or “1”. Enter "99" where the median width is 30 meters or 100 feet or greater. Ignore turning bays cut into the median.

8.8.10. Shoulder_Type

Description: This item provides information on the type of existing shoulders on sample roadway sections. It is used in investment requirements modeling to estimate needed improvements.

Valid values: Enter the code for the type of shoulder on the section. If the shoulder type changes back and forth along the length of the section, code the predominant type. If left and right shoulder types differ on a divided facility, code the right shoulder type as the predominant type…

Code	Description
0	Not reported
1	None
2	Surfaced shoulder exists - bituminous concrete (AC)
3	Surfaced shoulder exists - Portland Cement Concrete surface (PCC)
4	Stabilized shoulder exists (stabilized gravel or other granular material with or without admixture)
5	Combination shoulder exists (shoulder width has two or more surface types; e.g., part of the shoulder width is surfaced and a part of the width is earth)
6	Earth shoulder exists
7	Barrier curb exists; no shoulder in front of curb

8.8.11. Shoulder_Width_R

Description: This item measures the existing shoulder width on sample roadway sections. It is used in investment requirements modeling to calculate capacity and estimate needed improvements.

Valid values: Enter the width of the right shoulder to the nearest tenth of a meter or whole foot. Code "0" if no right shoulder exists. Do not include parking or bicycle lanes in the shoulder width measurement; code the predominant width where it changes back and forth along a roadway section; ensure that the total width of combination shoulders is reported. Include rumble strips and gutter pans in shoulder width.

8.8.12. Shoulder_Width_L

Description: This item measures the existing shoulder width on sample roadway sections. It is used in investment requirements modeling to calculate capacity and estimate needed improvements.

Valid values: On divided highways, enter the width of the left (median) shoulder to the nearest tenth of a meter or whole foot. Code "0 where no left shoulder exists or if the section is undivided. Do not include parking or bicycle lanes in the shoulder width measurement; code the predominant width where it changes back and forth along a roadway section; ensure that the total width of combination shoulders is reported. Include rumble strips and gutter pans in shoulder width.

8.8.13. Peak_Parking

Description: This item provides specific information about the presence of peak parking on urban sample roadway sections. It is used in investment requirements modeling to calculate capacity on sections with signals.

Valid values: Enter the code that best reflects the type of peak parking that exists on the section. Code to reflect permitted use; code permitted parking even if the section is not formally signed or striped for parking. If parking is actually beyond the shoulder or the pavement edge where there is no shoulder, use code "3" for no parking. If parking lanes are legally used for through traffic or turning lanes during the peak-hour, code the appropriate in-use condition.

Code	Description
0	Not applicable; Section is Rural
1	Parking allowed on one side
2	Parking allowed on both sides
3	No parking allowed or none available

8.8.14. Widening_Obstacle

Description: Obstacles to widening, code all that apply (multiple answer)

Valid values: This is a character field that takes any combination of the codes listed. For example: if there is a Historic and Dense development obstacles, code “AE” or “EA”. The order of the codes is not important; the same code cannot be used twice. Code “X” can not be used with other codes.

Code	Description
X	No obstacles
A	Dense development
B	Major transportation facilities
C	Other public facilities
D	Terrain restrictions
E	Historic and archeological sites
F	Environmentally sensitive areas
G	Parkland

Leave this item blank for unreported data.

8.8.15. Widening_Potential

Description: This item provides a measure of whether it is feasible to widen an existing sample section. It is used in investment requirements modeling to estimate needed capacity improvements.

Valid values: Enter the number of lanes to which it is feasible to widen the existing road. Code “0” if it is not feasible to add lanes or if data is not reported; code “9” if it is possible to add nine or more lanes.

8.8.16. Curves_A

Description: This item provides specific information regarding the length of horizontal curves by degree of curvature for sample sections. It is used in investment requirements modeling to calculate horizontal alignment adequacy and estimate running speed and operating costs. Class A curves have a radius of greater than 506 meters and a curvature of 0.0 – 3.4 degrees.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other

sections.

Valid values: Report the sum of the curves within this class. Code "0" for unreported data.

8.8.17. Curves_B

Description: This item provides specific information regarding the length of horizontal curves by degree of curvature for sample sections. It is used in investment requirements modeling to calculate horizontal alignment adequacy and estimate running speed and operating costs. Class B curves have a radius of 321 - 505 meters and a curvature of 3.5 – 5.4 degrees.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Report the sum of the curves within this class. Code "0" for unreported data.

8.8.18. Curves_C

Description: This item provides specific information regarding the length of horizontal curves by degree of curvature for sample sections. It is used in investment requirements modeling to calculate horizontal alignment adequacy and estimate running speed and operating costs. Class C curves have a radius of 206 - 320 meters and a curvature of 5.5 – 8.4 degrees.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Report the sum of the curves within this class. Code "0" for unreported data.

8.8.19. Curves_D

Description: This item provides specific information regarding the length of horizontal curves by degree of curvature for sample sections. It is used in investment requirements modeling to calculate horizontal alignment adequacy and estimate running speed and operating costs. Class D curves have a radius of 126 - 205 meters and a curvature of 8.5 – 13.9 degrees.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Report the sum of the curves within this class. Code "0" for unreported data.

8.8.20. Curves_E

Description: This item provides specific information regarding the length of horizontal curves by degree of curvature for sample sections. It is used in investment requirements modeling to calculate horizontal alignment adequacy and estimate running speed and operating costs. Class E curves have a radius of 61 - 125 meters and a curvature of 14.0 – 27.9 degrees.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Report the sum of the curves within this class. Code "0" for unreported data.

8.8.21. Curves_F

Description: This item provides specific information regarding the length of horizontal curves by degree of curvature for sample sections. It is used in investment requirements modeling to calculate horizontal alignment adequacy and estimate running speed and operating costs. Class F curves have a radius of less than 61 meters and a curvature of

greater than 28 degrees.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Report the sum of the curves within this class. Code "0" for unreported data.

8.8.22. Horiz_Align

Description: This item provides information about the adequacy of horizontal alignment when curve data are not re-ported. It is used in investment requirements modeling to estimate horizontal alignment deficiencies and in the truck size and weight analyses. If curve data are present, the software will calculate for Rural Principal and Minor Arterials; State must code for Rural Major Collectors.

Extent: All paved samples on Rural Major Collectors; optional on other sections.

Valid values: Code for all paved sample sections unless Curves by Class are coded for the section. If curves by class are coded, horizontal alignment adequacy will be calculated for paved sections from the curve data. Use the following codes:

Code	Description
0	Curve data not reported or this item is not required for the section
1	All curves meet appropriate design standards for the type of roadway. Reduction of curvature would be unnecessary even if reconstruction were required to meet other deficiencies (i.e., capacity, vertical alignment, etc.).
2	Although some curves are below appropriate design standards for new construction, all curves can be safely and comfortably negotiated at the prevailing speed limit on the section. The speed limit was not established by the design speed of curves.
3	Infrequent curves with design speeds less than the prevailing speed limit on the section. Infrequent curves may have reduced speed limits for safety purposes.
4	Several curves uncomfortable or unsafe when traveled at the prevailing speed limit on the section, or the speed limit on the section is severely restricted due to the design speed of curves.

8.8.23. Terrain_Type

Description: This item provides information on the type of terrain through which the sampled roadway passes. It is used in investment requirements modeling to calculate capacity and estimate needed capacity improvements and in the truck size and weight analysis process.

Valid values: For all rural sample sections, enter the code that best characterizes the terrain classification for the sampled roadway. In coding this item, consider the terrain of an extended length of the roadway upon which the sample is located rather than the grade on the specific sample section by itself… Code according to the following table:

Code	Description
0	Not Applicable; this is an Urban Section.
1	**Level:** Any combination of grades and horizontal or vertical alignment that permits heavy vehicles to maintain the same speed as passenger cars; this generally includes short grades of no more than 2 percent.
2	**Rolling:** Any combination of grades and horizontal or vertical alignment that causes heavy vehicles to reduce their speeds substantially below those of passenger cars but that does not cause heavy vehicles to operate at crawl speeds for any significant length of time.
3	**Mountainous:** Any combination of grades and horizontal or vertical alignment that causes heavy vehicles to operate at crawl speeds for significant distances or at frequent intervals.

8.8.24. Vert_Align

Description: This item provides information about the adequacy of vertical alignment when grade data are not re-ported. It is used in investment requirements modeling to estimate vertical alignment deficiencies.

Extent: All paved samples on Rural Major Collectors: optional for other sections.

Valid values: Code for all paved sample sections unless Grades by Class are coded for the section. If grades by class are coded, vertical alignment adequacy will be calculated for all paved sections from the grade data. Use the following codes:

Code	Description
0	Grade data are reported or this item is not required for the section.
1	All grades (rate and length) and vertical curves meet minimum design standards appropriate for the terrain. Reduction in rate or length of grade would be unnecessary even if reconstruction were required to meet other deficiencies (i.e., capacity, horizontal alignment, etc.).
2	Although some grades (rate and/or length) and vertical curves are below appropriate design standards for new construction, all grades and vertical curves provide sufficient sight distance for safe travel and do not substantially affect the speed of trucks.
3	Infrequent grades and vertical curves that impair sight distance or affect the speed of trucks (when truck climbing lanes are not provided).
4	Frequent grades and vertical curves that impair sight distance or severely affect the speed of trucks; truck climbing lanes are not provided.

8.8.25. Grades_A

Description: This data item provides specific information regarding the length of vertical grades for sample sections. It is used in investment requirements modeling to calculate vertical alignment adequacy and estimate running speed and operating costs and in the truck size and weight analysis process. Class A grades have a gradient of 0.0 – 0.4 percent.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Code for paved Rural Arterials and Urban Principal Arterials. May be coded for other functional systems if the data are available; code “0” when grade data are not reported.

8.8.26. Grades_B

Description: This data item provides specific information regarding the length of vertical grades for sample sections. It is used in investment requirements modeling to calculate vertical alignment adequacy and estimate running speed and operating costs and in the truck size and weight analysis process. Class B grades have a gradient of 0.5 – 2.4 percent.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Code for paved Rural Arterials and Urban Principal Arterials. May be coded for other functional systems if the data are available; code “0” when grade data are not reported.

8.8.27. Grades_C

Description: This data item provides specific information regarding the length of vertical grades for sample sections. It is used in investment requirements modeling to calculate vertical alignment adequacy and estimate running speed and operating costs and in the truck size and weight analysis process. Class C grades have a gradient of 2.5 – 4.4 percent.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Code for paved Rural Arterials and Urban Principal Arterials. May be coded for other functional systems if the data are available; code “0” when grade data are not reported.

8.8.28. Grades_D

Description: This data item provides specific information regarding the length of vertical grades for sample sections. It is used in investment requirements modeling to calculate vertical alignment adequacy and estimate running speed and operating costs and in the truck size and weight analysis process. Class D grades have a gradient of 4.5 – 6.4 percent.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Code for paved Rural Arterials and Urban Principal Arterials. May be coded for other functional systems if the data are available; code "0" when grade data are not reported.

8.8.29. Grades_E

Description: This data item provides specific information regarding the length of vertical grades for sample sections. It is used in investment requirements modeling to calculate vertical alignment adequacy and estimate running speed and operating costs and in the truck size and weight analysis process. Class E grades have a gradient of 6.5 – 8.4 percent.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Code for paved rural arterials and urban principal arterials. May be coded for other functional systems if the data are available; code "0" when grade data are not reported.

8.8.30. Grades_F

Description: This data item provides specific information regarding the length of vertical grades for sample sections. It is used in investment requirements modeling to calculate vertical alignment adequacy and estimate running speed and operating costs and in the truck size and weight analysis process. Class F grades have a gradient of 8.5 percent or more.

Extent: All paved samples on Rural Arterials and Urban Principal Arterials: optional for other sections.

Valid values: Code for paved Rural Arterials and Urban Principal Arterials. May be coded for other functional systems if the data are available; code "0" when grade data are not reported.

8.8.31. Pct_Pass_Sight

Description: This item provides specific information on the percent of the sample section meeting the sight distance requirement for passing. It is used in investment requirements modeling to calculate capacity and estimate running speed and for truck size and weight analysis purposes.

Valid values: Code this numeric item for all Rural, paved two-lane sample sections. Enter the percent of the section length that is striped for passing. Where there is a discernable directional difference, code for the more restrictive direction. Code "0" for non-applicable sections and "0" for very curved or very hilly sections without passing zones.

8.8.32. Speed_Limit

Description: This item provides information on the posted speed limit on sample sections. It is used in investment requirements modeling to estimate running speed and for other analysis purposes, including delay estimation.

Valid values: Enter the daytime speed limit for automobiles posted or legally mandated on the greater part of the section. If there is no legally mandated maximum daytime speed limit for automobiles, code "999". Code "0" for unreported data.

8.8.33. Design_Speed

Description: This item is a calculated value that provides a design speed weighted by the length of individual horizontal curves and tangents in a sample section. It is used in investment requirements modeling to calculate capacity and estimate needed capacity improvements.

Valid values: This item is calculated by the HPMS software from curve data; when curve data are not provided, a default value based upon functional system and facility type is used as shown in the following table.

Facility Type	Functional System by Rural & Urban									
	Rural					Urban				
	1	2	3	4	5	1	2	3	4	5/6
Multilane Divided	70	70	70	70	65	70	70	70	60	55
Multilane Undivided	70	70	70	70	60	70	70	70	55	45

8.8.34. Peak_Lanes

Description: This data item is used to provide information on the number of lanes used in the peak hour direction of flow on a sample section. It is used in investment requirements modeling to calculate capacity, and in congestion analyses, including estimates of delay.

Valid values: Code the number of through lanes used in the peak period in the peak direction. Include reversible lanes, parking lanes, or shoulders that legally are used for through traffic whether for SOV or HOV operation. For rural 2- or 3-lane sections, code the number of through lanes in both directions in the peak period. Code “0” for unreported data.

8.8.35. Counter_Peak_Lanes

Description: Number of lanes in the peak hour in the counter-peak direction of flow on a sample section. It is used in investment requirements modeling to calculate capacity, and in congestion analyses, including estimates of delay.

Valid values: Code the number of through lanes used in the peak period in the counter-peak direction. Code “0” for unreported data.

8.8.36. Turn_Lanes_R

Description: This data item provides information on the presence of right turn lanes at a typical intersection on the sample section. It is used in investment requirements modeling to calculate capacity and in congestion analyses, including estimates of delay.

Valid values: Enter the code from the following tables that best describes the peak-period turning lane operation on the inventory section. Where peak capacity for a section is governed by a particular intersection that is on the section, code the turning lane operation at that location; otherwise code for a typical intersection. Code turning lanes and the percent green time for the same intersection. Include turning lanes that are located at entrances to shopping centers, industrial parks, and other large traffic generating enterprises as well as public cross streets.

Code	Description
0	Not applicable; this is a rural section.
1	No intersections exist on the section.
2	Turns permitted; multiple exclusive right turning lanes exist. Through movements are prohibited in these lanes. Multiple turning lanes allow for simultaneous turns from all turning lanes.
3	Turns permitted; a continuous exclusive right turning lane exists from intersection to intersection. Through movements are prohibited in this lane.
4	Turns permitted; a single exclusive right turning lane exists.
5	Turns permitted; no exclusive right turning lanes exist.
6	No right turns are permitted during the peak period.

8.8.37. Turn_Lanes_L

Description: This data item provides information on the presence of left turn lanes at a typical intersection on the sample section. It is used in investment requirements modeling to calculate capacity and in congestion analyses, including estimates of delay.

Valid values: Enter the code from the following tables that best describes the peak-period turning lane operation on the inventory section. Where peak capacity for a section is governed by a particular intersection that is on the section, code the turning lane operation at that location; otherwise code for a typical intersection. Code turning lanes and the percent green time for the same intersection. Include turning lanes that are located at entrances to shopping centers, industrial parks, and other large traffic generating enterprises as well as public cross streets.

Code	Description
0	Not applicable; this is a rural section.
1	No intersections exist on the section.
2	Turns permitted; multiple exclusive right turning lanes exist. Through movements are prohibited in these lanes. Multiple turning lanes allow for simultaneous turns from all turning lanes.
3	Turns permitted; a continuous exclusive right turning lane exists from intersection to intersection. Through movements are prohibited in this lane.
4	Turns permitted; a single exclusive right turning lane exists.
5	Turns permitted; no exclusive right turning lanes exist.
6	No right turns are permitted during the peak period.

8.8.38. Type_Signal

Description: This item describes the predominant type of signal system on a sample section. It is used in the investment requirements modeling process to calculate capacity and estimate delay.

Valid values: Enter the code that best describes the predominant type of signal system for the direction of travel on the inventory section. Signal information may be coded for rural sections on an optional basis.

Code	Description
0	Not applicable; this is a rural section.
1	Uncoordinated Fixed Time (may include pre-programmed changes for peak or other time periods).
2	Uncoordinated Traffic Actuated.
3	Coordinated Progressive (coordinated signals through several intersections).
4	Coordinated Real-time Adaptive
5	No signal systems exist.

8.8.39. Pct_Green_Time

Description: This item provides information on the typical through lane percent green time in effect at intersections on a sample section. It is used in investment requirements modeling to calculate capacity and in congestion analyses, including estimates of delay.

Valid values: Enter the percent green time in effect during the peak period for through traffic at signalized intersections for the direction of travel on the inventory section; percent green time may be coded for rural sections on an optional basis. Where peak capacity for a section is governed by a particular intersection that is on the section, code the percent green time at that location; otherwise code for a typical intersection. Code the percent green time for the same intersection where the left and right turn data items are coded; code “0” if no signalized intersections exist or if the section is rural.

8.8.40. Number_Signals

Description: This item provides a count of the signalized at-grade intersections within the sample section. It is used in investment requirements modeling to calculate capacity and estimate delay.

Valid values: Enter the number of at-grade intersections with a signal controlling traffic on the inventory route. A signal that cycles through red, yellow, and green for all or a portion of the day should be counted as a signalized intersection. If none, enter “0”. Include at-grade intersections at entrances to shopping centers, industrial parks, and other large traffic generating enterprises.

8.8.41. Stop_Signs

Description: This item provides a count of the intersections within the sample section with stop signs. It is used in investment requirements modeling to calculate capacity and estimate delay.

Valid values: Enter the number of at-grade intersections with a stop sign controlling traffic on the inventory route. A continuously operating, flashing red signal should be counted as a stop sign control. If none, enter "0". Include at-grade intersections at entrances to shopping centers, industrial parks, and other large traffic generating enterprises.

8.8.42. At_Grade_Other

Description: This item provides a count of the intersections within the sample section without stop signs or controls. It is used in investment requirements modeling to calculate capacity and estimate delay.

Valid values: Enter the number of at-grade intersections where traffic on the inventory route not controlled by either a signal or a stop sign; or is controlled by other types of signing; or has no controls. A continuously operating, flashing yellow signal should be considered as "other or no control." If none, enter "0". Include at-grade intersections at entrances to shopping centers, industrial parks, and other large traffic generating enterprises.

8.8.43. Peak_Capacity

Description: This item provides existing peak hour capacity for a sample section. It is used in investment requirements modeling to calculate capacity, in the cost allocation pavement model, and in congestion, delay, and other analyses. The software will calculate; States have the option to override.

Valid values: All urban capacity is for the peak direction as is rural capacity for freeways and other multi-lane facilities. If a rural facility has 2 or 3 lanes with one-way operation, it is considered to be a multi-lane facility for determining capacity. The capacity for rural facilities with 2 or 3 lanes and two-way operation is for both directions. The state may override the calculated capacity if it determines that the capacity is too low or too high because of operational conditions that are not appropriately reflected in the HPMS data items used in the calculation.

8.8.44. VSF

Description: This item is a computed value reflecting peak hour congestion (volume/service flow ratio) for a sample section. It is used in investment requirements modeling to estimate needed capacity improvements, in the national highway data-base, and for congestion, delay, and other data analyses.

Valid values: This value is generated by the HPMS software from HPMS data; States are not able to override.

Record Example

Data is stored in the Sections_Geometric table as follow:

Year_Record	2010
State_Code	34
Route_ID	00000295__
Begin_Point	0.000
End_Point	1.500
Section_Length	1.500
Lane_Width	12.5
Median_Type	4
Median_Width	4.1
Shoulder_Type	3
Shoulder_Width_R	10.5
Shoulder_Width_L	4.5
Peak_Parking	3
Widening_Obstacle	FD
Widening_Potential	3
Curves_A	0.0
Curves_B	0.0
Curves_C	0.0
Curves_D	0.0
Curves_E	0.0
Curves_F	0.0
Horiz_Align	1
Terrain_Type	1
Vert_Align	1
Grades_A	0.0
Grades_B	0.0
Grades_C	0.0
Grades_D	0.0
Grades_E	0.0
Grades_F	0.0
Pct_Pass_Sight	70
Speed_Limit	65
Design_Speed	70
Peak_Lanes	0
Counter_Peak_Lanes	0
Turn_Lanes_R	0
Turn_Lanes_L	0
Type_Signal	0
Pct_Green_Time	0
Number_Signals	0
Stop_Signs	0

At_Grade_Other	0
Peak_Capacity	25000
VSF	1.0

Data can be imported into Sections_Geometric table from a CSV file in the format:

```
2010,34,"00000295__",0,1.5,1.5,12.5,4, 4.1, 3,"FD", 3.0,
0.0,0.0,0.0,0.0,0.0,0.0,1,1,1,0.0,0.0,0.0,0.0,0.0,0.0,70,65,70,0,0,0,0,0,0,0,
0,0,25000,1.0
```

8.9. Sections_Pavement

This table stores information about pavement conditions and performance of the Highway System. It provides information to create performance measures. It is also a primary source for the Pavement Deterioration Model.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7		IRI	Decimal(6,2)	International Roughness Index
8		IRI_Date	Date	Month & year IRI data collected
9		PSR	Decimal(3,1)	Present Serviceability Rating
10		Climate_Zone	Numeric(1)	LTPP climate zone
11		Surface_Type	Numeric(1)	Surface type
12		Rutting	Decimal(4,1)	Rutting
13		Faulting	Decimal(4,1)	Faulting
14		Cracking_Fatigue	Numeric(3)	Area of fatigue cracking
15		Cracking_Transverse	Decimal(4,1)	Length of transverse cracking
16		Year_Last_Improv	Numeric(4)	Year of last improvement
17		Year_Last_Construction	Numeric(4)	Year of last construction
18		Last_Overlay_Thickness	Decimal(4,1)	Last overlay thickness
19		Thickness_Rigid	Decimal(4,1)	Thickness of rigid pavement
20		Thickness_Flexible	Decimal(4,1)	Thickness of flexible pavement
21		Base_Type	Numeric(1)	Base type
22		Base_Thickness	Decimal(6,2)	Base thickness
23		Soil_Type	Numeric(1)	Soil type

Extent: All Federal-Aid Highways; optional for other sections.

Collection cycle: Annual unless otherwise stated by item.

Field Details

8.9.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

8.9.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

8.9.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.

This ID must match a record in the SHAPES_ROUTE table.

8.9.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.9.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.9.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

8.9.7. IRI

Description: Used as in indicator of pavement roughness; expressed in terms of the cumulative vertical displacement over a given length of highway, usual measured in inches/mile or m/km. HPMS suggests AASHTO R43M/R43-07 as a best practice and will be included in the *HPMS Field Manual*. Used in the biennial *Condition and Performance (C&P) Report*, FHWA performance measures, various models, and published in Highway Statistics.

Extent: Required for all NHS and PAS universe sections and rural Minor Arterial sample sections. Collect and report annually for the NHS as opposed to the current 2-year reporting cycle. Note that reporting for required sections off of the NHS can remain on the 2-year maximum cycle.

Metadata:
- Type of equipment used.
- Reporting interval.

Metadata will be used for information purposes only. State should note any deviation(s) from the *HPMS Field Manual* in their submittal comments regarding the collection and reporting of IRI data.

Collection requirements: **Mean Roughness Index (MRI)** – The average of the right and left quarter-car IRI for a given highway section. This is not to be confused with the half-car IRI, which is the summation of the average of the two wheel paths for a given section.

Direction and lane – States to consistently measure and report the MRI for the same direction and lane annually or semiannually for NHS and non-NHS samples, respectively. Typically, this is the outermost (right) lane. The practice of measuring the "worst" lane is discouraged.

Structures and railroad grade crossings to be included.

Aggregation rules: Weighted average.

Valid values: MRI reported as an integer to the nearest in/mi or 0.01 m/km. Code "0" for unreported data.

8.9.8. IRI_Date

Description: Month and year that the IRI data was collected.

Extent: Required for all NHS and PAS universe sections and rural Minor Arterial sample sections. Collect and report annually for the NHS as opposed to the current 2-year reporting cycle. Note that reporting for required sections off of the NHS can remain on the 2-year maximum cycle.

Aggregation rules: Predominance.

Valid values: Month and year reported as MM/YYYY.

8.9.9. PSR

Description: Present Serviceability Rating (PSR) provides information on pavement condition on selected roadway sections. It is used in investment requirements modeling to estimate pavement deterioration, section deficiencies, and needed improvements, in the cost allocation pavement model, and for national highway database purposes.

Extent: Required for urban Minor Arterial, all Major Collector, and urban Minor Collector sample sections. If IRI is reported for a section, then PSR for that section is not required to be reported. **A sample section must have either PSR or IRI reported**.

Aggregation rules: Weighted average.

Valid values: Code a PSR or equivalent value, to the nearest tenth (x.x), for all paved sample sections where IRI is not reported. Code "0.0" for unpaved facilities and for sections for which PSR data are not provided.

Present Serviceability Rating (Use full range of values)	
PSR	**Description**
4.0 – 5.0	Only new (or nearly new) superior pavements are likely to be smooth enough and distress free (sufficiently free of cracks and patches) to qualify for this category. Most pavements constructed or resurfaced during the data year would normally be rated in this category.
3.0 – 4.0	Pavements in this category, although not quite as smooth as those described above, give a first class ride and exhibit few, if any, visible signs of surface deterioration. Flexible pavements may be beginning to show evidence of rutting and fine random cracks. Rigid pavements may be beginning to show evidence of slight surface deterioration, such as minor cracks and spalling.
2.0 – 3.0	The riding qualities of pavements in this category are noticeably inferior to those of new pavements, and may be barely tolerable for high-speed traffic. Surface defects of flexible pavements may include rutting, map cracking, and extensive patching. Rigid pavements in this group may have a few joint failures, faulting and/or cracking, and some pumping.
1.0 – 2.0	Pavements in this category have deteriorated to such an Extent that they affect the speed of free-flow traffic. Flexible pavement may have large potholes and deep cracks. Distress includes raveling, cracking, rutting and occurs over 50 percent of the surface. Rigid pavement distress includes joint spalling, patching, cracking, scaling, and may include pumping and faulting.
0.0 – 1.0	Pavements in this category are in an extremely deteriorated condition. The facility is passable only at reduced speeds, and with considerable ride discomfort. Large potholes and deep cracks exist. Distress occurs over 75 percent or more of the surface.

8.9.10. Climate_Zone

Description: Coded according to the 4 LTPP climate zone descriptions. This will be populated with identified zone via GIS with a State override option.

Extent: All Sample sections.

Aggregation rules: Predominance.

Valid values:

Code	Description

1	Wet-Freeze
2	Wet-Nonfreeze
3	Dry-Freeze
4	Dry-Nonfreeze

8.9.11. Surface_Type

Description: Surface type of the section.

Extent: All sample sections: optional for other sections.

Aggregation rules: Predominance.

Valid values:

Code	Description
0	Not reported
1	Unpaved
2	Conventional Asphalt Concrete (Bituminous): Dense-graded asphalt concrete surface. One or more base/subbase layers may be present (including other AC (Bituminous) layers or a cement-stabilized base) but are not required.
3	Jointed Plain Concrete Pavement (JPCP): Jointed, un-reinforced Portland Cement Concrete (PCC) pavement, including a PCC overlay of this surface type placed on an existing AC (Bituminous) pavement (whitetopping). One or more base/subbase layers may be present but are not required.
4	Jointed Reinforced Concrete Pavement (JRCP): Jointed, reinforced PCC pavement including a PCC overlay of this surface type placed on an existing AC (Bituminous) pavement (whitetopping). One or more base/subbase layers may be present but are not required.
5	Continuously Reinforced Concrete Pavement (CRCP): Continuously reinforced PCC pavement, including a PCC overlay of this surface type placed over a previously existing AC (Bituminous) pavement (whitetopping). One or more base/subbase layers may be present but are not required.
6	AC (Bituminous) Overlay over Existing AC (Bituminous) Pavement: Dense-graded AC (Bituminous) surface layer with or without other HMAC layers placed over a previously existing AC (Bituminous) pavement but not existing composite pavements.
7*	AC (Bituminous) Overlay over Existing Jointed Concrete Pavement: Dense-graded AC (Bituminous) surface layer with or without other AC (Bituminous) layers placed on an intact JPCP or JRCP, including those previously overlaid with AC (Bituminous) (composite pavement).
8*	AC (Bituminous) Overlay over Existing CRCP: Dense-graded AC (Bituminous) surface layer with or without other AC (Bituminous) layers placed on an intact CRCP, including those previously overlaid with AC (Bituminous) (composite pavement).
9*	Unbonded Jointed Concrete Overlay on PCC Pavements: JPCP or JRCP overlay placed over an intact JPCP, JRCP, or CRCP with a separator layer to prevent bonding of the two PCC layers. The overlaid concrete pavement may rest on one or more base/subbase layers or directly on the subgrade.
10*	Unbonded CRCP Overlay on PCC Pavements: CRCP overlay placed over an intact JPCP, JRCP or CRCP with a separator layer to prevent bonding of the two PCC layers. The overlaid concrete pavement may rest on one or more base/subbase layers or directly on the subgrade.
11	Bonded PCC Overlays on PCC Pavements: PCC overlay bonded to an existing JPCP, JRCP or CRCP. The overlaid concrete pavement may rest on one or more base/subbase layers or directly on the subgrade.
12	Other: Surface types not covered by types 1-11 (e.g., surface treatment or chip seal).

- If the existing PCC pavement is fractured (rubblized or crack-and-seated) prior to overlaying, treat the broken PCC as a base and select the surface type that best describes the new surface. For example, AC (Bituminous) surface placed over rubblized PCC is Type 2 with fractured PCC as the base type.

8.9.12. Rutting

Description: Rutting is defined as an average for the entire HPMS sample section. Used in various models.

Extent: Required for all paved AC and composite pavement sample sections.

Metadata:
- Collection methodology used

- Type of equipment used
- Number of sensors
- Sampling interval

Collection requirements: HPMS suggests AASHTO PP38-00 or the LTPP protocol be used as a best practice.

Aggregation rules: Weighted average.

Valid values: Reporting should be consistent with IRI inventory direction and lane. Coded in HPMS to the nearest 0.1 inch or nearest millimeter.

8.9.13. Faulting

Description: The average vertical displacement between adjacent jointed concrete panels. Used in various models.

Extent: Required for all paved jointed concrete sample sections.

Metadata:
- Sampling interval
- Methodology used
- Type of equipment used

Collection requirements: HPMS suggests that AASHTO R36-04 or the LTPP protocol be used as a best practice.

Aggregation rules: Weighted average.

Valid values: Report average/mean faulting over the HPMS sample section to the nearest 0.1 inch or nearest whole millimeter. Reporting should be consistent with IRI inventory direction and lane.

8.9.14. Cracking_Fatigue

Description: Estimate of total area with fatigue type cracking for AC pavements and total percent of slabs with cracking for PCC pavements. HPMS suggests AASHTO PP44-01 or the LTPP distress identification manual as a best practice for use in identifying and reporting cracks at any and all severity levels (sealed and unsealed). Used in various models.

Extent: Required for all AC and PCC paved sample sections.

Metadata:
- Type of equipment used
- Type(s) of cracking identified
- Methodology used

Aggregation rules: Weighted average.

Valid values: For HPMS reporting, the percent of the total AC section area and percent of PCC slabs cracked to the nearest 5% is to be coded. Reporting should be consistent with IRI inventory direction and lane.

8.9.15. Cracking_Transverse

Description: Estimate of total ft/mi or m/km of transverse cracking. HPMS suggests AASHTO PP44-01 or the LTPP distress identification manual as a best practice for use in identifying and reporting cracks at any and all severity levels (sealed and unsealed). Used in various models.

Extent: Required for all AC (transverse cracking) and composite (reflection cracking) paved sample sections.

Metadata:
- Type of equipment used
- Type(s) of cracking identified
- Methodology used

Aggregation rules: Weighted average.

Valid values: For HPMS reporting, the total ft/mi (m/km) section of AC and composite pavement cracking to the nearest foot/meter is to be coded. Reporting should be consistent with IRI inventory direction and lane.

8.9.16. Year_Last_Improv

Description: This item is used to identify the year in which the sample section roadway surface was improved. Update as needed for all paved sample sections receiving a resurfacing treatment of at least 0.5 inches or nearest 10 millimeters of compacted pavement material. Used in various models.

Extent: All paved Sample sections.

Aggregation rules: Weighted average.

Valid values: Code the year in YYYY format.

8.9.17. Year_Last_Construction

Description: Update as needed for all paved sample sections. Used in various models.

Extent: All paved Sample sections.

Aggregation rules: Weighted average.

Valid values: Code the year the section was constructed (or reconstructed) in YYYY format.

8.9.18. Last_Overlay_Thickness

Description: Required for all paved sample sections. Coded in HPMS to the nearest 0.5 inch or nearest 10 millimeters for all paved sample sections. Used in various models.

Extent: All paved Sample sections.

Aggregation rules: Weighted average.

Valid values: State to supply the actual measured value for each sample section. Default values to be provided in the Estimates_Pavement table.

8.9.19. Thickness_Rigid

Description: Coded in HPMS to the nearest 0.5 inch or nearest 10 millimeters for all concrete and composite sample sections. Used in various models.

Extent: All paved Sample sections.

Aggregation rules: Weighted average.

Valid values: State to supply the actual measured value for each sample section. Default values to be provided in the Estimates_Pavement table.

8.9.20. Thickness_Flexible

Description: Coded in HPMS to the nearest 0.5 inch or nearest 10 millimeters for all AC and composite sample sections. Used in various models.

Extent: All paved Sample sections.

Aggregation rules: Weighted average.

Valid values: State to supply the actual measured value for each sample section. Default values to be provided in the Estimates_Pavement table.

8.9.21. Base_Type

Description: Coded in HPMS for all paved sample sections based on the following. Used in various models.

Extent: All paved Sample sections.

Aggregation rules: Weighted average.

Valid values: State to supply the appropriate code for each sample section. Default values to be provided in the Estimates_Pavement table.

Code	Description
0	Data not reported
1	No base
2	Aggregate
3	Asphalt or cement stabilized
4	Asphalt or cement stabilized with granular subbase
5	Hot mix AC (Bituminous)
6	Lean concrete
7	Stabilized open-graded permeable
8	Fractured PCC

8.9.22. Base_Thickness

Description: Coded in HPMS for all paved sample sections to the nearest whole inch or 25 millimeters. State design default value or override with more specific value. Used in various models.

Extent: All paved Sample sections.

Aggregation rules: Weighted average.

Valid values: State to supply the actual measured value for each sample section. Default values to be provided in the Estimates_Pavement table.

8.9.23. Soil_Type

Description: Coded in HPMS for all paved sample sections based on AASHTO soil type classes. Default values will be determined by FHWA unless overridden by State. Used in various models.

Extent: All paved Sample sections.

Aggregation rules: Predominance.

Valid values: State may override the software coded values using the following codes:

Code	Description
0	Data not reported
1	Granular (35% or less passing the 0.075 mm sieve) (AASHTO Soil Class A0 through A-3)
2	Fine (Silt-Clay) Materials (>35% passing the 0.075 mm sieve) (AASHTO Soil Class A-4 through A-7)

Record Example

Data is stored in the Sections_Pavement table as follow:

Year_Record	2010
State_Code	34
Route_ID	00000295__
Begin_Point	0.000
End_Point	1.500
Section_Length	1.500
IRI	120
IRI_Date	2003
PSR	0.0
Climate_Zone	1
Surface_Type	2
Rutting	3.2
Faulting	3.2
Cracking_Fatigue	100
Cracking_Transverse	45.2
Year_Last_Improv	2003
Year_Last_Construction	2003
Last_Overlay_Thickness	12.3
Thickness_Rigid	1.3
Thickness_Flexible	1.3
Base_Type	5
Base_Thickness	12.0
Soil_Type	4

Data can be imported into Sections_Pavement table from a CSV file in the format:

```
2010,34,"00000295__",0,1.5,1.5,120,2003,0.0,1,2,3.2,3.2,100,45.2,2003,2003,12
.3,1.3,1.3,5,12.0,4
```

8.10.Sections_StateControl

This is an optional table that States can use to store notes and comments for each individual road section.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7		State_Control_Field	Character(100)	State use field

Extent: All Federal-Aid Highways; optional for other sections.

Field Details

8.10.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

8.10.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

8.10.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

8.10.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.10.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

8.10.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public

Mileage.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

8.10.7. State_Control_Field

Description: Free text available for State DOT use.

Extent: FHWA does not require this data.

Record Example

Data is stored in the Sections_StateControl table as follow:

Year_Record: 2010
State_Code: 34
Route_ID: 00000295__
Begin_Point: 0.000
End_Point: 1.500
Section_Length: 1.500
State_Control_Field: State use field

Data can be imported into Sections_Geometric table from a CSV file in the format:

```
2010,34,"00000295__",0,1.5,1.5,"State use field"
```

9. REFERENCES CATALOG

The tables stored in this catalog contain the current, FHWA approved, National Highway System (NHS), National Freight Network (NN), and Strategic Highway Network (STRAHNET). Following the procedures outlined in the appropriate sections of 23 CFR and FHWA regulations, States will submit additions, deletions, and changes to these networks to FHWA for approval. Once approved, the appropriate sections of the network(s) will be coded by FHWA with the approval date, at which time the change will become official. These tables will be available to States throughout the year for reference or to download, and will be provided to each State at the end of the calendar year, which will serve as the "official" network for that calendar year.

9.1. References_NHS

This table stores information that identifies highway sections that comprise the NHS, NHS Connectors, and STRAHNET.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7		Data_Approved	Date	Data change becomes official
8		NHS	Numeric(1)	National Highway System
9		Future_Facility	Numeric(1)	Future or unbuilt NHS sections
10		STRAHNET_Type	Numeric(1)	STRAHNET sections
11		Military_Base	Character(30)	Name of military base

Field Details

9.1.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

9.1.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

9.1.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

9.1.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

9.1.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

9.1.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

9.1.7. Date_Approved

Description: The date that the NHS/STRAHNET section was officially approved.

Valid values: Enter the date in the format MMDDYYYY

9.1.8. NHS

Description: This item is used by FHWA to track changes to the approved NHS, including intermodal connectors. This field will be used to establish the official representation of the National Highway System. It is also used in providing the non Interstate NHS apportionment inputs. The Office of Highway Policy Information will maintain this data item based on official requests for changes to the NHS per the Office of Planning.

Valid values: Code this item for all sections to indicate whether the section is on the NHS or is an NHS connector to an intermodal facility. Enter one of the following codes:

Code	Description
0	Default- Not on the NHS
1	Non Connector NHS
2	Major Airport
3	Major Port Facility
4	Major Amtrak Station
5	Major Rail/Truck Terminal
6	Major Inter City Bus Terminal
7	Major Public Transportation or Multi-Modal Passenger Terminal
8	Major Pipeline Terminal
9	Major Ferry Terminal

9.1.9. Future_Facility

Description: This item is used to track changes to the approved NHS, including intermodal connectors. The Office of Highway Policy Information will maintain this data item based on official proposed additions to the NHS per the Office of Planning.

Valid values:

Code	Description
0	This section is built or not on the NHS
1	This is an un-built NHS section
2	This section is an existing temporary STRAHNET facility that is not currently on the NHS

9.1.10. STRAHNET_Type

Description: This data items is maintained by the Office of Highway Policy Information, and is used to indicate the type of STRAHNET facility.

Valid values:

Code	Description
0	Not on STRAHNET
1	Regular STRAHNET
2	Connector

9.1.11. Military_Base

Description: This is the official Department of Defense name for the military installation or facility being served by the STRAHNET connector.

Valid values: Enter the installation or facility name as “Fort A.P. Hill” or “Tobyhanna Army Depot” for example. Leave blank if unknown or not applicable.

Record Example

Data is stored in the References_NHS_STRAHNET table as follow:

Year_Record:	2010
State_Code:	34
Route_ID:	00000295__
Begin_Point:	0.000
End_Point:	1.500
Section_Length:	1.500
Date_Approved:	12022009
NHS:	1
Future_Facility:	0
STRAHNET_Type:	0
Military_Base:	

Data can be imported into References_NHS_STRAHNET table from a CSV file in the format:

```
2010,34,”00000295__”,0,1.5,1.5,12022009,1,0,0,,
```

9.2. References_Truck

This table stores information that identifies highway sections that comprise the National "Truck" Network as defined by 23 CFR 658.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Route_ID	Character(32)	ID for the linear feature
4	PK	Begin_Point	Decimal(8,3)	Begin point
5	PK	End_Point	Decimal(8,3)	End point
6		Section_Length	Decimal(8,3)	Section length
7		Date_Approved	Date	Date change becomes official

Field Details

9.2.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

9.2.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

9.2.3. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

9.2.4. Begin_Point

Description: Beginning of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

9.2.5. End_Point

Description: End of a section. The Route_ID, Begin_Point, and End_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

9.2.6. Section_Length

Description: Measured length of section consistent with the reporting of State's Certified Public Mileage.

Valid values: Enter the measured section length to the nearest thousandths of a mile/kilometer.

9.2.7. Date_Approved

Description: The date that the National "Truck" Network section was officially approved.

Valid values: Enter the date in the format MMDDYYYY

Record Example

Data is stored in the References_Trucks table as follow:

Year_Record:	2010
State_Code:	34
Route_ID:	00000295__
Begin_Point:	0.000
End_Point:	1.500
Section_Length:	1.500
Date_Approved:	12022009

Data can be imported into References_Trucks table from a CSV file in the format:

```
2010,34,"00000295__",0,1.5,1.5,12022009
```

10. POINTS CATALOG

The table in this catalog contains the location, type, and image of each interchange. This table will be initially populated by FHWA, unless a State indicates that they already have these data. These data will be used for the estimation of national interchange needs and the reporting of the extent of interchanges by State and functional class.

10.1.Points_Interchange

This table stores basic data for grade separated interchanges, and will be populated by FHWA for States that do not currently have these data.

Field Number	Constraint	Field Name	Data Type	Description
1	PK	Year_Record	Numeric(4)	Year for which the data apply
2	PK	State_Code	Numeric(2)	State FIPS code
3	PK	Interchange_ID	Character(10)	FHWA or State assigned ID
4		Interchange_Type	Numeric(1)	Interchange type code
5		Route_ID	Character(32)	Route identifier
6		Route_Point	Decimal(8,3)	Route point
7		Exhibit	Image	Image of Interchange

Field Details

10.1.1. Year_Record

Description: The calendar year for which the data apply.

Valid values: The four digits of the year the data represents.

10.1.2. State_Code

Description: The State FIPS code.

Valid values: Up to two digits for the FIPS code. See State FIPS Codes for a complete list.

10.1.3. Interchange_ID

Description: Unique interchange identifier assigned either by FHWA or the State.

Valid values: Code the FHWA or State assigned identifier as either character or numeric, or both.

10.1.4. Interchange_Type

Description: AASHTO Green Book interchange types; code "9" for hybrids and other types of unique interchanges.

Valid values:

Code	Description
1	Trumpet
2	Three leg directional
3	One quadrant
4	Diamond
5	Partial cloverleaf
6	Full cloverleaf
7	Semi-directional
8	Directional
9	Other

10.1.5. Route_ID

Description: Unique identifier that corresponds to the records in the SHAPES_ROUTE table.

Valid values: Up to 32 alpha-numeric digits that identify the route.
This ID must match a record in the SHAPES_ROUTE table.

10.1.6. Route_Point

Description: Location of a point. The Route_ID and Route_Point utilize the Linear Reference Method (LRM) that is native to the State DOT.

Valid values: Enter a decimal value.

10.1.7. Exhibit

Description: Optional image file of interchange.

Valid values: JPEG (and possibly other types) of image file. Plan views of interchanges, video images, and other appropriate images of the interchange can be included. Raster images can not be utilized at this time.

,

Record Example

Data is stored in the Points_Interchange table as follow:

Year_Record:	2010
State_Code:	34
Interchange_ID:	NJ2951
Interchange_Type:	3
Route_ID:	00000295__
Route_Point:	4.6
Exhibit:	Example.jpg

Data can be imported into Points_Interchange table from a CSV file in the format:

```
2010,34,NJ2951,3,"00000295__",4.6,Example.jpg
```

APPENDIX A – STATE FIPS CODES

Code	Description	Code	Description
1	Alabama	32	Nevada
2	Alaska	33	New Hampshire
4	Arizona	34	New Jersey
5	Arkansas	35	New Mexico
6	California	36	New York
8	Colorado	37	North Carolina
9	Connecticut	38	North Dakota
10	Delaware	39	Ohio
11	District of Columbia	40	Oklahoma
12	Florida	41	Oregon
13	Georgia	42	Pennsylvania
15	Hawaii	44	Rhode Island
16	Idaho	45	South Carolina
17	Illinois	46	South Dakota
18	Indiana	47	Tennessee
19	Iowa	48	Texas
20	Kansas	49	Utah
21	Kentucky	50	Vermont
22	Louisiana	51	Virginia
23	Maine	53	Washington
24	Maryland	54	West Virginia
25	Massachusetts	55	Wisconsin
26	Michigan	56	Wyoming
27	Minnesota	60	American Samoa
28	Mississippi	66	Guam
29	Missouri	69	Northern Mariana Islands
30	Montana	72	Puerto Rico
31	Nebraska	78	Virgin Islands of the U.S.

APPENDIX B – COUNTY FIPS CODES

Alabama

Alaska

Arizona

Arkansas

Georgia

Indiana

Iowa

Kansas

Kentucky

Louisiana

Maine

Mississippi

Missouri

Montana

Nebraska

North Carolina

North Dakota

Ohio

Oklahoma

Oregon

Pennsylvania

Tennessee

Texas

Utah

Vermont

Virginia

Washington

West Virginia

Wisconsin

APPENDIX C – URBAN AREA CODES

A

Aberdeen--Havre de Grace--Bel Air, MD 199
Abilene, TX 280
Aguadilla--Isabela--San Sebastian, PR 631
Akron, OH 766
Albany, GA 901
Albany, NY 928
Albuquerque, NM 1171
Alexandria, LA 1279
Allentown--Bethlehem, PA--NJ 1495
Alton, IL 1765
Altoona, PA 1792
Amarillo, TX 1927
Ames, IA 2062
Anchorage, AK 2305
Anderson, IN 2386
Anderson, SC 2413
Ann Arbor, MI 2602
Anniston, AL 2629
Antioch, CA 2683
Appleton, WI 2764
Arecibo, PR 3034
Arecibo, PR (Sp) 3034
Asheville, NC 3358
Atascadero--El Paso de Robles (Paso Robles), CA 3574
Athens-Clarke County, GA 3763
Atlanta, GA 3817
Atlantic City, NJ 3898
Auburn, AL 4033
Augusta-Richmond County, GA--SC 4222
Austin, TX 4384
Avondale, AZ 4546

B

Bakersfield, CA 4681
Baltimore, MD 4843
Bangor, ME 4951
Barnstable Town, MA 5167
Baton Rouge, LA 5680
Battle Creek, MI 5707
Bay City, MI 5869
Beaumont, TX 6058
Bellingham, WA 6652
Beloit, WI--IL 6760
Bend, OR 6868
Benton Harbor--St. Joseph, MI 7138
Billings, MT 7705
Binghamton, NY--PA 7732
Birmingham, AL 7786
Bismarck, ND 7921
Blacksburg, VA 8002
Bloomington, IN 8380
Bloomington--Normal, IL 8407
Boise City, ID 8785
Bonita Springs--Naples, FL 8974
Boston, MA--NH--RI 9271
Boulder, CO 9298
Bowling Green, KY 9379
Bremerton, WA 9946
Bridgeport--Stamford, CT--NY 10162
Bristol, TN--Bristol, VA 10351
Brooksville, FL 10729
Brownsville, TX 10972
Brunswick, GA 11026
Buffalo, NY 11350
Burlington, NC 11728
Burlington, VT 11755

C

Camarillo, CA 12754
Canton, OH 13375
Cape Coral, FL 13510
Carson City, NV 14158
Casper, WY 14482
Cedar Rapids, IA 14752
Champaign, IL 15211
Charleston, WV 15481
Charleston--North Charleston, SC 15508
Charlotte, NC--SC 15670
Charlottesville, VA 15724
Chattanooga, TN--GA 15832
Cheyenne, WY 16237
Chicago, IL--IN 16264
Chico, CA 16318
Cincinnati, OH--KY--IN 16885
Clarksville, TN--KY 17317
Cleveland, OH 17668
Cleveland, TN 17722
Coeur d'Alene, ID 18451
College Station--Bryan, TX 18748
Colorado Springs, CO 18856
Columbia, MO 18937
Columbia, SC 18964
Columbus, GA--AL 19099
Columbus, IN 19126
Columbus, OH 19234
Concord, CA 19504
Concord, NC 19558
Corpus Christi, TX 20287
Corvallis, OR 20422

D

Dallas--Fort Worth--Arlington, TX 22042
Dalton, GA 22069
Danbury, CT--NY 22096
Danville, IL 22204
Danville, VA 22258
Davenport, IA--IL 22366
Davis, CA 22420
Dayton, OH 22528
Daytona Beach--Port Orange, FL 22636
Decatur, AL 22690
Decatur, IL 22717
DeKalb, IL 22960
Deltona, FL 23311
Denton--Lewisville, TX 23500
Denver--Aurora, CO 23527
Des Moines, IA 23743
Detroit, MI 23824
Dothan, AL 24472