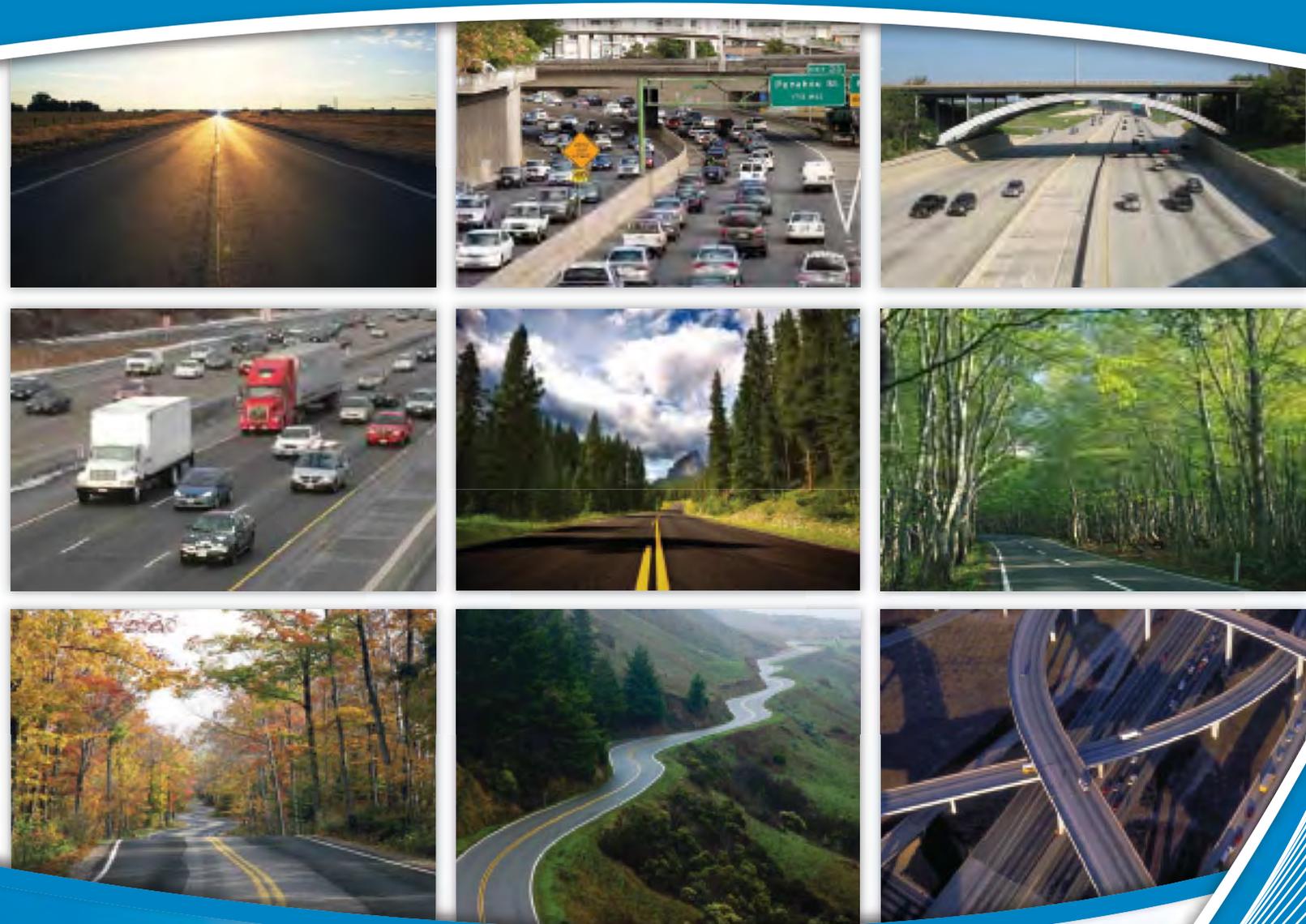


Highway Performance Monitoring System Software Guide for Version 8.0



U.S. Department of Transportation
Federal Highway Administration

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Chapter 1—Introduction

This document serves as a guide to using HPMS 8.0, the software used for input, analysis and processing of Highway Performance Monitoring System (HPMS) data. It assumes that access to HPMS 8.0 has been granted through the User Profile Access Control System (UPACS). Please contact a FHWA Division Office for information about obtaining a UPACS account.

Please note that although UPACS operates 24 hours a day and seven days a week, maintenance windows impact the HPMS system. The HPMS system is therefore available from 7am to 11pm Monday through Saturday and 1pm through 11pm on Sunday. All times are Eastern Standard Time (EST).

This manual is a companion to the HPMS Field Manual which can be found on the Federal Highway Administration website (<http://www.fhwa.dot.gov/policy/ohpi/hpms/fieldmanual/>). All data collection and database definitions are contained in the Field Manual as opposed to this Software Guide.

HPMS 8.0 is divided into three distinct areas according levels of review and ownership of the data.

Level 1: The **Submit** (State) area is a staging environment to allow States to prepare data for submittal into the National HPMS Database.

Level 2: The **Review** environment allows FHWA staff to analyze the submitted data to ensure consistency with HPMS requirements.

Level 3: The **National** area is the official interface for public viewing of finalized HPMS data.

Key to Symbols and Text Notices in this Guide

There are three types of text boxes in this guide -

A white box will provide information about a screen.

A shaded box will indicate an instruction to the user.

Purple italic print in a dashed box will indicate notes or warnings to the user.

The guide also includes a few symbols to help users jump to important content or actions on the illustrations of application screens.



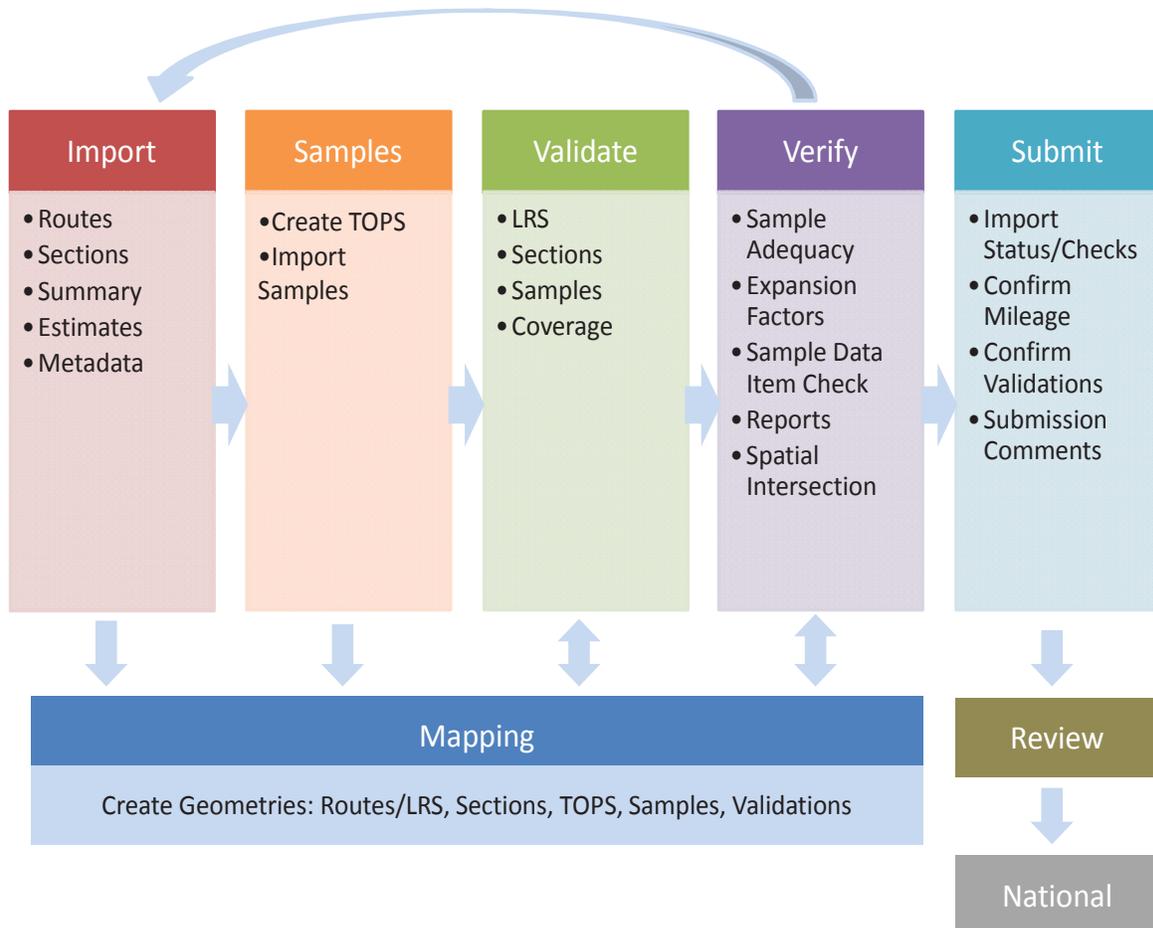
Star symbols indicate actions that should be taken by the user to complete processes.



Software features within process screens that are of particular interest are highlighted with large red circles or ovals

Chapter 2—HPMS Workflow

The HPMS v.8 workflow is illustrated in the diagram below. Workflow is from left to right beginning with Import* and ending with Submit. For each stage, there is a companion but independent mapping component that is derived from the Create Geometries tool. Frequently the HPMS submission process is iterative, with Validations or Import errors triggering revisions to data items and then new imports. The cyclical nature of the process is depicted with the arrow at the top of the diagram from the Verify stage, but each stage and/or data item required for the submission process could loop back to Import in order to complete the submittal. Note that this diagram is conceptual and does not mimic the menus in the software. As a result, State data types such as routes and sections appear alongside system outputs such as TOPS**.



* The National HPMS Database Import process consists of two parts, Upload and Insert. The Upload step involves the transmission of data from the user (State) cpu to the FHWA HPMS server. This step is followed by the Insert process whereby data on the HPMS server are incorporated into the National HPMS database.

** TOPS (Table of Potential Samples), is the HPMS sampling frame and is composed of five elements; Functional System, Facility Type, Urban Code, AADT, and Through Lanes. See Chapter 6 of the Field Manual for more information.

Chapter 3—HPMS Application Layout

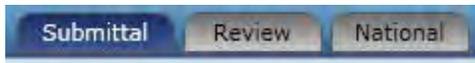
Each HPMS 8.0 screen is generally partitioned according to the following layout. The application itself is dynamic such that depending on where you are in the application, options may change. For example, while the Application Menu will provide an option for data import in the Submittal Area, the Review Area Application Menu will provide options to View Review Reports.

HPMS Entry Screen



- 1 **Database Area**- Displays three buttons to navigate between Submittal (State), Review and National datasets.
- 2 **Exit**- Exit HPMS application. After selecting Exit, the user is prompted to confirm exit in case this function was hit unintentionally.
- 3 **Filter**- Users must select the appropriate Year (and State for those with national access) before importing, exporting, viewing or editing data.
- 4 **Application Menu**- Allows users to select a specific table in the database or perform a specific task in the application. Selecting an item on this menu will typically navigate to a different screen.
- 5 **Screen Indicator**- Displays the name of the active Application Menu item.

Database Area



Select an Area by clicking Submittal, Review or National. Only one location may be selected at a time.

Submittal- State DOT users and their approved agents have permission to access the Submittal Area of the National HPMS Database. They will have access only to their State based on their UPACS account information. The Submittal Area provides tools and processes to assist State DOTs in preparing the annual HPMS submittal.

Review - Access to the Review Area is granted to State DOTs and FHWA staff to evaluate data quality issues once the data has been submitted by the State.

National – The official record for the annual HPMS data submission. The National Area enables users to view products and data that have been approved for release to the public.

State and Year Filter

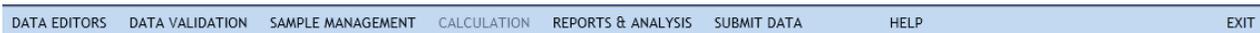


1. Click on the Year and State Label
2. Change Year/State Screen is displayed
3. Enter a 4 digit Year in the Text box for Year and use the drop down list to select a State.
4. Click OK to change the Year
5. Changes made will appear in the Year/State Label

The filter area is used to set the application workspace to the data year and State of choice. Follow these steps to change the Year and State parameters: HPMS users normally work with a specific Year and State. The Filter allows a user to select and change the filter. There are some reports and queries that will allow multi-year and multi-state selection. With these exceptions, work within HPMS 8.0 will always relate to the options selected via this filter.

Note: State Users will be restricted to their own State in the Submittal Area.

Application Menu



The application menu provides the functionality of the software, from importing to reporting. The Application Menu is located in a light blue bar across the top of the window. Menu items are unique for each Database Area. The menu shown above is for the Submittal Area. The Application Menu is discussed in more detail in Chapter 4.

Map Display & Tabular Grid

During the submittal and review processes users typically will view data via a map display and accompanying tabular grid. The following image illustrates the general layout of the map with an accompanying grid below. Subsequent images provide detail about each component of the map and table portions of the application display.

Screen Layout

			Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value Text	Value Date	Comme
			F_SYSTEM	100	0	0.180	0.190	3.000			
			F_SYSTEM	100	0.200	0.950	0.750	3.000			
			F_SYSTEM	100	0.950	1.150	0.200	3.000			
			F_SYSTEM	100	1.150	1.760	0.610	3.000			
			F_SYSTEM	100	1.760	1.960	0.200	3.000			
			F_SYSTEM	100	1.960	2.240	0.280	3.000			

Grid Features

Click, hold and drag any header to reposition columns of data.

			Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value Text	Value Date	Comme
			F_SYSTEM	100	0	0.180	0.190	3.000			
			F_SYSTEM	100	0.200	0.950	0.750	3.000			
			F_SYSTEM	100	0.950	1.150	0.200	3.000			
			F_SYSTEM	100	1.150	1.760	0.610	3.000			
			F_SYSTEM	100	1.760	1.960	0.200	3.000			
			F_SYSTEM	100	1.960	2.240	0.280	3.000			

Navigation and Map Layers

Users may also Pan and Zoom from the mouse controls

Pan: Click on Cardinal Points to pan map.

Toggle On/Off Layers Control

Obtain information about Map Data Layers: Click this button and then click on the desired section.

Toggle On/Off Map Legend

Map Scale

Collapse/Expand Layer and Scale Tools

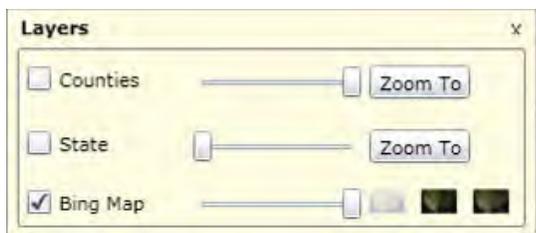
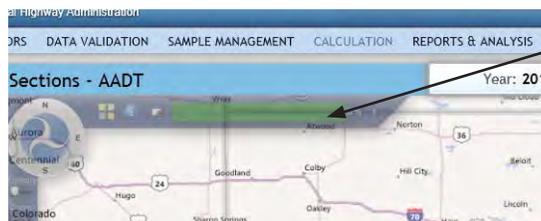
Adjust the Opacity of the Navigation Tools: Regardless of position of slider, the Navigation Tools will always illuminate when the cursor is placed on the tool bar.

Zoom: Click on Plus or Minus symbol or slide bar.

Zoom to Full Extent: This may take some time to fully execute.

Collapse/Expand Zoom and Opacity Tools

Map Legend: The map legend can be turned on or off using the Legend Icon on the Navigation grid, or the X in the Legend's top corner. The Legend can also be moved by clicking with the mouse cursor and dragging to another location on the screen.



Use these buttons to select map, aerial or aerial with labels background images.

Layers Control: Checking the boxes next to available map layers will turn them on. The Opacity of each layer can be adjusted with the slider bar. Zoom buttons allow a quick zoom to the State or county level.

Applying Filters to Grid

Specific data sets may be examined through the use of the query feature in the grid table. Fields that may be filtered are indicated with a funnel icon in the field header on the data grid. The graphics below illustrate the filter process.

To query data records, click the funnel icon on the field to be filtered.

				Data Item	Route ID	Begin Point	End Point	Section Length
				F_SYSTEM	100	0	0.180	0.0
				F_SYSTEM	100	0.200	0.950	0.0
				F_SYSTEM	100	0.950	1.150	0.0

A dialog box will appear after clicking on the funnel icon.

Type in query parameters in the spaces provided being sure to use the drop down menu to select the appropriate filter string— Is equal to, Contains, etc.

Select All

Show rows with value that

Is equal to

And

Is equal to

Filter Clear Filter

Route ID	Begin Point	End Point	S
100	0	0.180	
100	0.200	0.950	

Enter query text here.

Grid Filters Continued

After entering query parameters, click Filter.

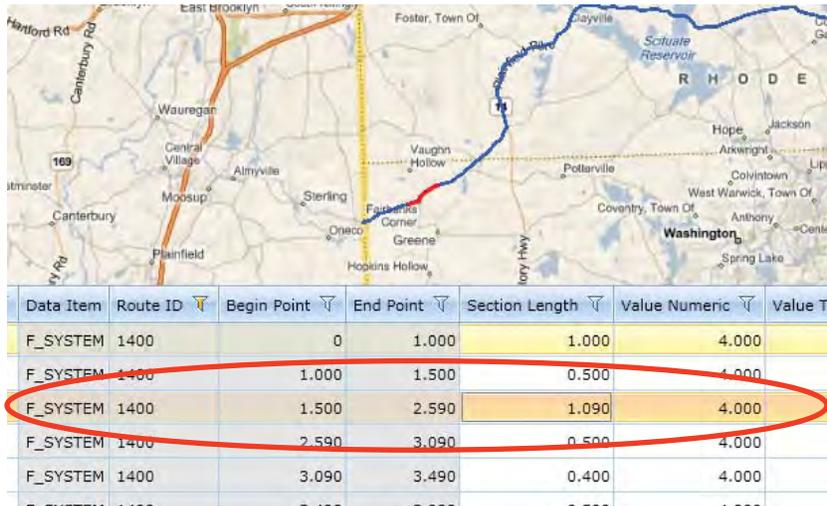
Route ID	Begin Point	End Point
100	0	0.180

The Records Are Displayed in the Grid and the sections are displayed where there is a spatial link.

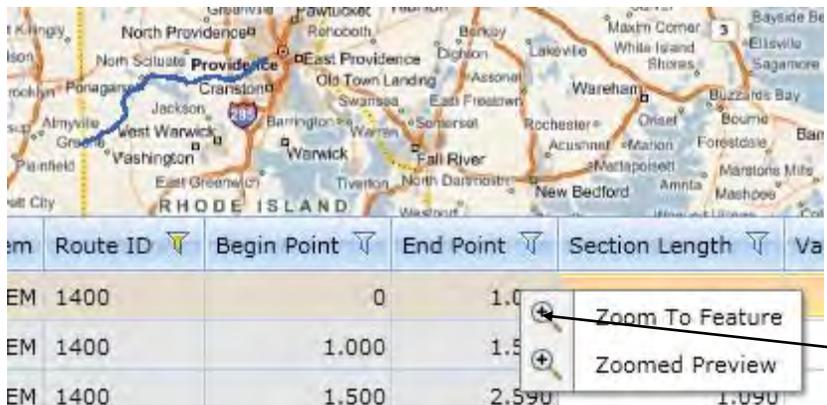
Data Item	Route ID	Begin Point	End Point	Section Length
F_SYSTEM	1400	0	1.000	1.000
F_SYSTEM	1400	1.000	1.500	0.500
F_SYSTEM	1400	1.500	2.590	1.090
F_SYSTEM	1400	2.590	3.090	0.500
F_SYSTEM	1400	3.090	3.490	0.400

Deleting and editing data are covered in another section of this manual.

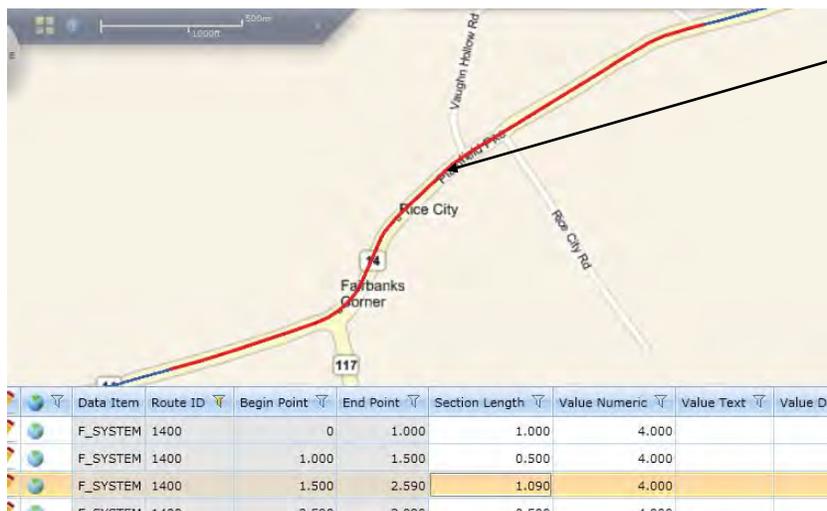
Grid Filters Continued



Double click on a record in the grid to highlight the section. If there is a spatial link, the focus will change to that record.



Right click on a record to provide Zoom options, where Zoom to Feature will display the limits of the feature selected as long as a spatial link has been established.



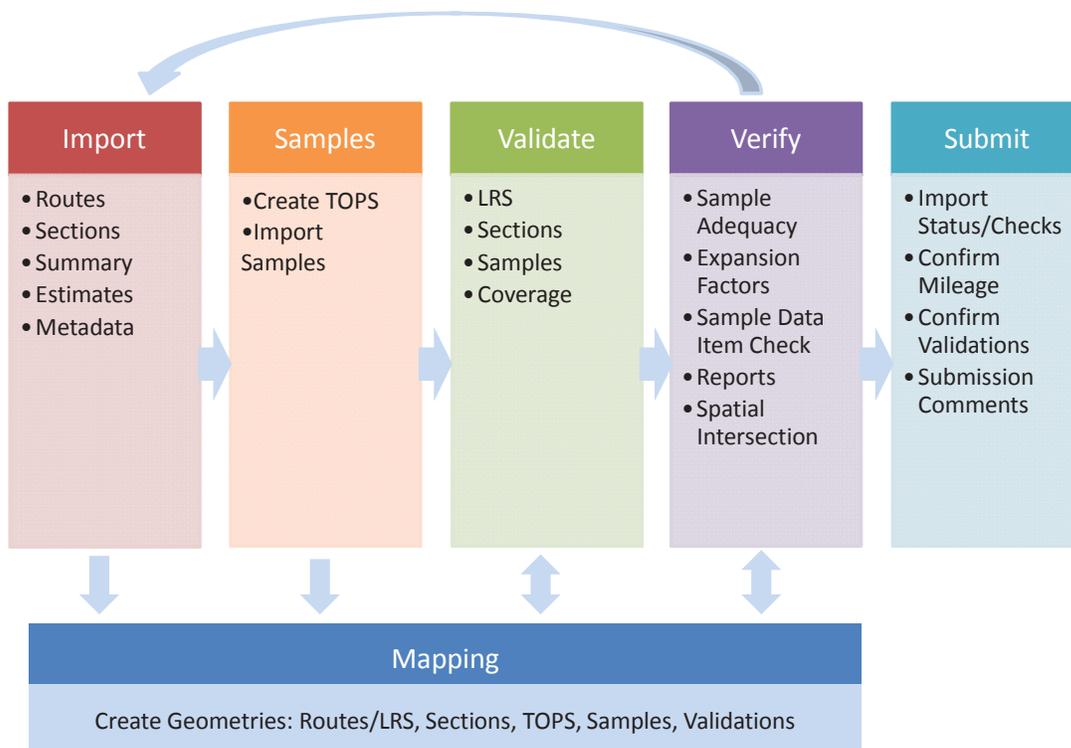
Chapter 4—The Application Menu

DATA EDITORS	DATA VALIDATION	SAMPLE MANAGEMENT	CALCULATION	REPORTS & ANALYSIS	SUBMIT DATA	HELP	EXIT
--------------	-----------------	-------------------	-------------	--------------------	-------------	------	------

The application menu show above provides key functionality for users during submission of HPMS data. A summary of key process steps functions and their related HPMS v.8 application menu are listed below.

Process Step	Menu
Import	Data Editors
Export	Data Editors
Validate	Data Validation
Create TOPS	Sample Management
Sample Adequacy	Sample Management
Run Geometry	Data Editors/Sections, Data Validation, or Sample Management
Report	Reports & Analysis
Delete (Group of Items or “Batch Delete”)	Data Editors
Submit	Submit

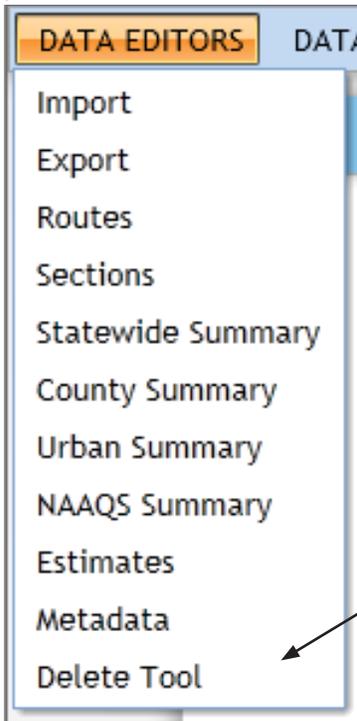
The HPMS application menu is intended for use from left to right (from Data Editors to Submittal) but can also be used in a non linear fashion as data may be entered, reviewed, and edited intermixed with other data loads, validation checks and report views. Use the workflow diagram shown in Chapter 2, as a quick reference for submission steps throughout the process. That diagram is show here with User Guide page numbers for each process in parentheses for quick reference.



Data Editors Menu

Software Functions within the Data Editors Menu

The functions listed under the Data Editors heading provide users with access to import, export, modify and view data in preparation of the annual HPMS submittal. As such, a firm understanding of the tools provided within this portion of the software interface is important for all users of the HPMS software application.

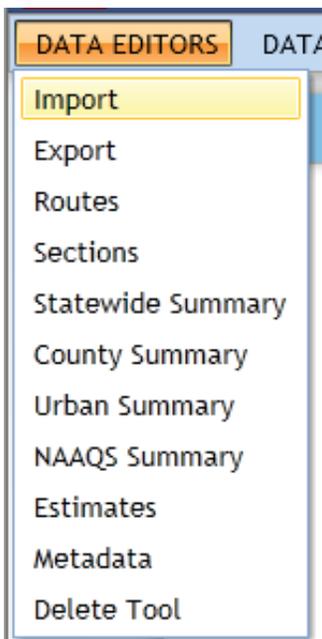


NOTE: Although data may be modified here, it is strongly recommended that any necessary changes be made at the source and not through these reporting tools.

Functionality of the Delete Tool is covered in Chapter 5 - Quick Reference along with the various options users have to delete data that is in the HPMS system.

Importing Data

Overview



All data are imported through the Application Menu —> Data Editors —> Import. See the following pages for suggested order for importing routes, section data and summary files.

The National HPMS Database is populated through a two part import process which is commenced by the user and completed by the software behind the scenes.

Step 1: The user begins the import process by uploading data. The data are then Validated by the HPMS system. (User must be logged in during this step).

Step 2: Uploaded data are incorporated into necessary tables in the National HPMS Database. This insert process takes place in the background. (User does not need to be logged in during this step).

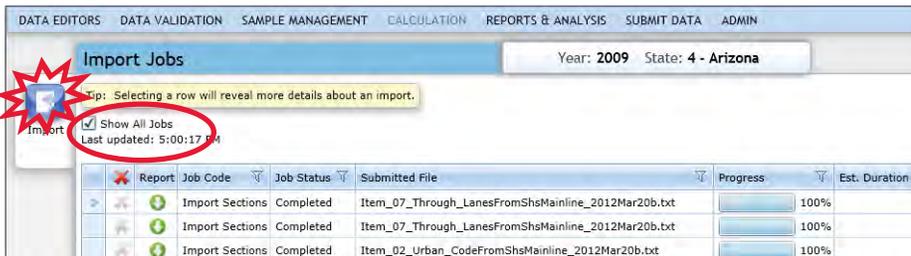
An import status bar provides a visual queue concerning the success of the import process. Upon completion, a link is enabled, providing users access to a report with documentation about errors encountered in the import.

Note that some data items may be available for export as spatial and tabular files.

Steps to Import Data

Step 1—Select Import on the Left Margin

From the Import Log, click Import on the left margin to begin a new import.



The Import Log automatically shows the most recent imports. To see the full list of imports check the Show All Jobs box.

Step 2—Select the Type of Data Being Imported

On the HPMS Data Import screen, select the data type to import by checking on one of the blue dots above available data types. The dot will turn Green when selected.

Click "Next".



IMPORTANT NOTE: The order of import does not matter, but some processes (such as report generation) may produce inaccurate results if they are run before all necessary elements are imported. The suggested import order is Routes, Section Data, Samples and then Summary Files. Note that TOPS must be created for the Sample import process to complete properly. See guidance on TOPS creation on in the Sample Management section of this guide.

This is an example of a shape file import. Details on formats are listed in the Routes section of this chapter.

Step 3—Browse for Files to Load

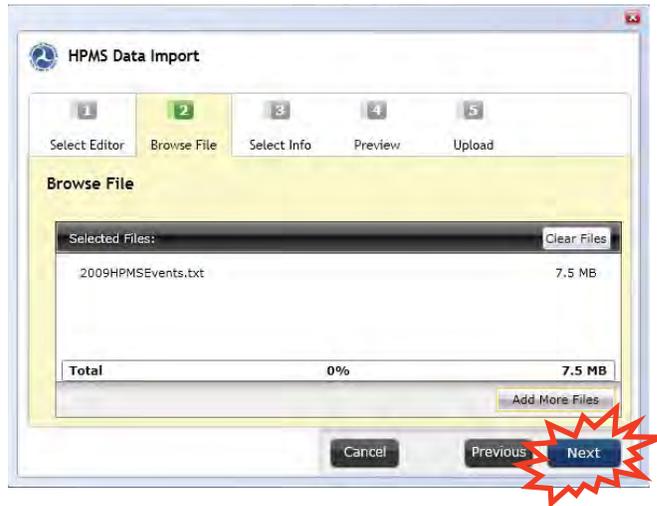
On Step 2 of the HPMS Data Import screen, click on the Browse Button to display a browse window for files to import.



Import Steps Continued

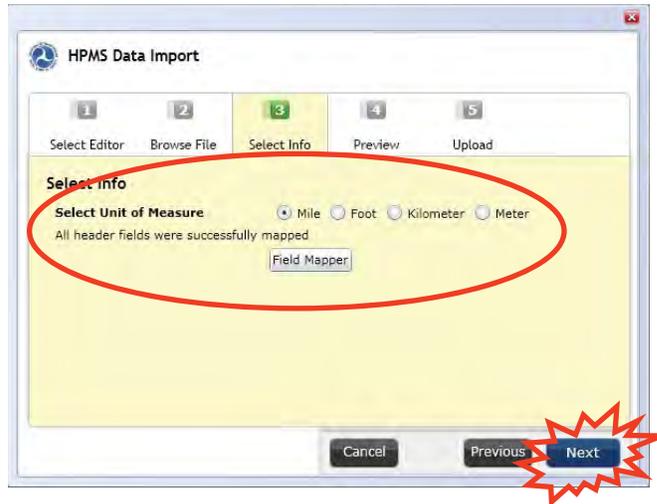
Step 4—Verify File to Import

After selecting that appropriate file from your system, verify that the imported file is correct and click “Next”.



Step 5—Enter Special Information for the Data Type.

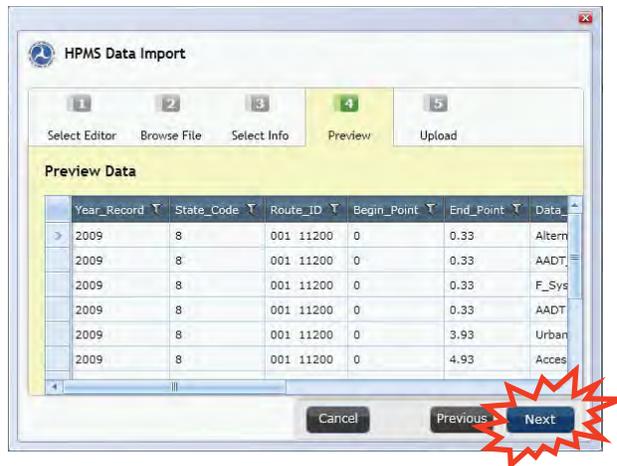
Enter the requested information about the imported data on the following screen and click “Next”.



Step 6—Click the Next Button

Review the preview of imported records and click “Next”.

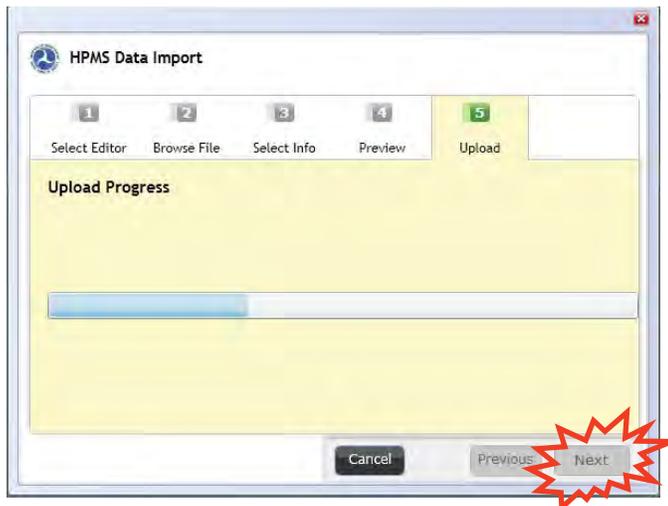
The preview feature may not be available for all data types.



Import Steps Continued

Step 7—After the Upload is Complete, Click the Next Button

When the Upload Progress status bar is complete, click "Next".



Step 8—Review the Import Jobs Log

After the import is complete, the Import Jobs Log will return, showing the status of insert into the database. This part of the import process takes place in the background. The user may navigate away from this screen or the HPMS Application entirely.

Report	Job Code	Job Status	Submitted File	Progress	Est. Duration
Import Routes	Completed	RIHMPSRtes_GCS83	100%		
Import Sections	Completed	test295_rampsFACTYPE.csv	100%		

Click on a row in the import table to display information about the import process.

Review the preview of imported records and click "Next".

Import Results Reports

Once the import procedure completes, a log of the results may be viewed and/or downloaded. The Import Jobs Log displays import jobs that have completed successfully with a Job Status as "Completed", Progress as 100% and a Green Arrow Icon in the Report Column.

Select Data Editors > Import from the Submittal Application Menu.

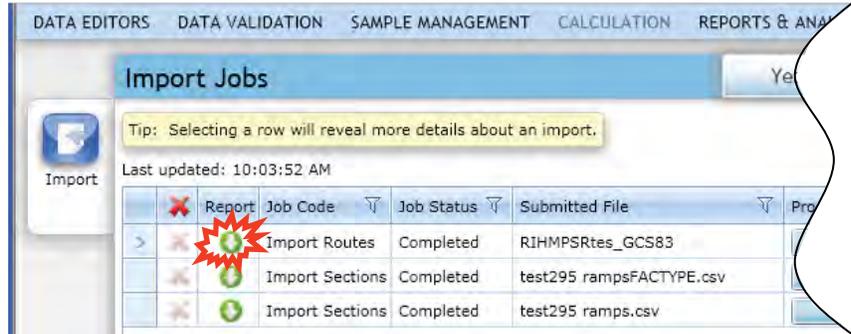


Remember... to import any kind of data, just go to Data Editors —> Import. From here, the user can also review the import logs for any issues.

Import Results—Continued

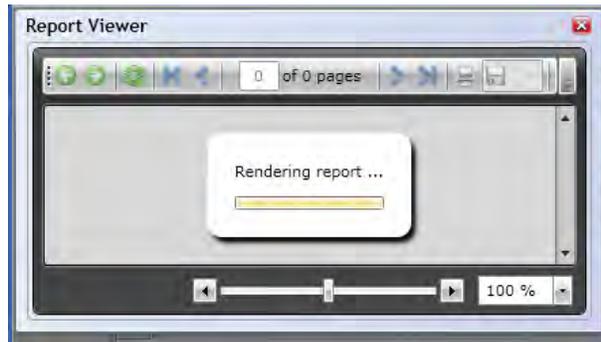
The Green Arrow Renders Reports

Select the Green Arrow icon to render a report of the import with a link to error feedback on the report process.



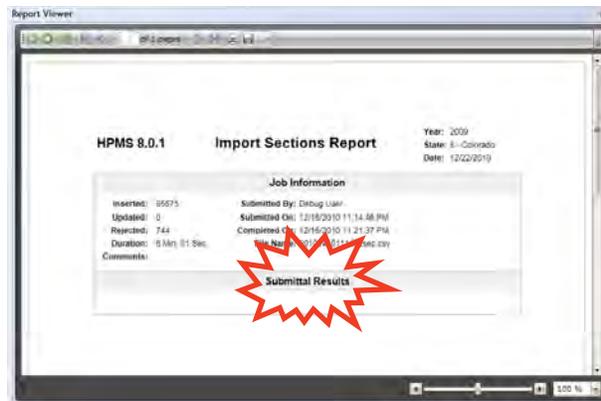
This will display a Report Viewer window. The report will then expand to a summary.

Click "Next".



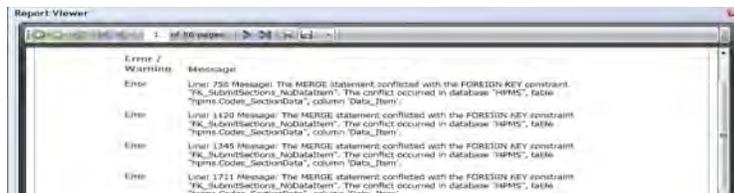
Click "Submittal Results" to show the Error and Warning Messages.

Print and Save options are available.



Import Reports Can Be Expanded to Submittal Results

Note: This sample error report is based on fictitious data.



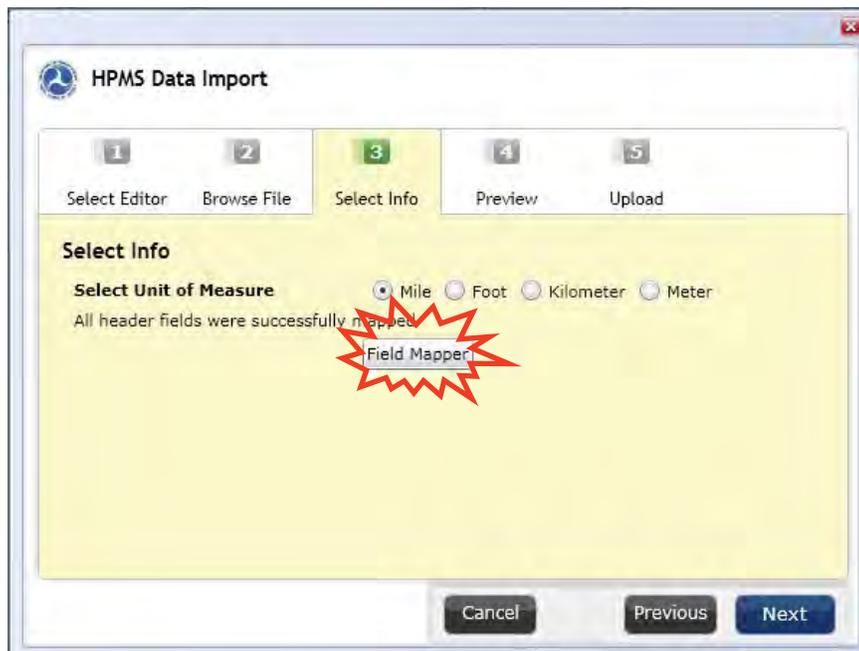
Field Mapping for Import Files

Each imported file may have unique formatting. The order of the columns or the field names may use a different convention.

The field mapper lets the user define (for each type of import—summary, sections, etc.) the fields being imported.

The Import tool requires that files have the exact number of fields required. For section data this is 11 fields. See Chapter 3 of the HPMS Field Manual for details about required fields for HPMS datasets.

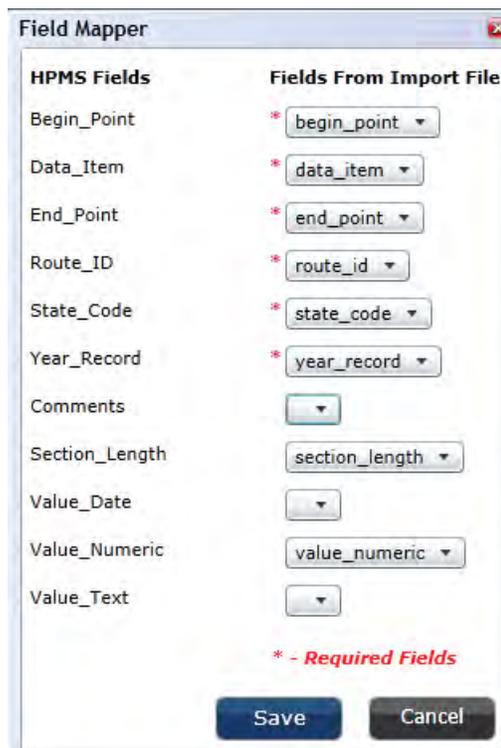
Click the Field Mapper Button to Define Other Specific Import Fields



The following are examples of some of the formats for the File Mapper screen for various file types.

Section Import Example

Most file types use the Field Mapper to ensure that import fields are correctly mapped to the HPMS database. Use the drop down options on the right to map fields if necessary. Fields marked with a red asterisk are required.



Field Mapping Continued

Field Mapper

HPMS Fields	Fields From Import File
State_Code	* state_code
Urban_Code	* urban_code
Year_Record	* year_record
Local_VMT	local_vmt
State_Portion_Land	state_portion_land
State_Portion_Pop	state_portion_pop

*** - Required Fields**

Save Cancel

Urban Summary Example

As with the sections files being imported, the Summary, Estimates, and Metadata files also need to have header rows in order to correctly map field names. Be sure to use the pipe (|) delimiter for the import file in order for the HPMS software to recognize your header row.

Sample File Example

The field mapper will automatically select fields from the input data that closely match the required fields. Quickly review these fields to ensure that the field mapper has made the right selections.

Field Mapper

HPMS Fields	Fields From Import File
Begin_Point	* begin_point
End_Point	* end_point
Route_ID	* route_id
State_Code	* state_code
Year_Record	* year_record
Comments	
Expansion_Factor	
Sample_ID	sample_id
Section_Length	section_length

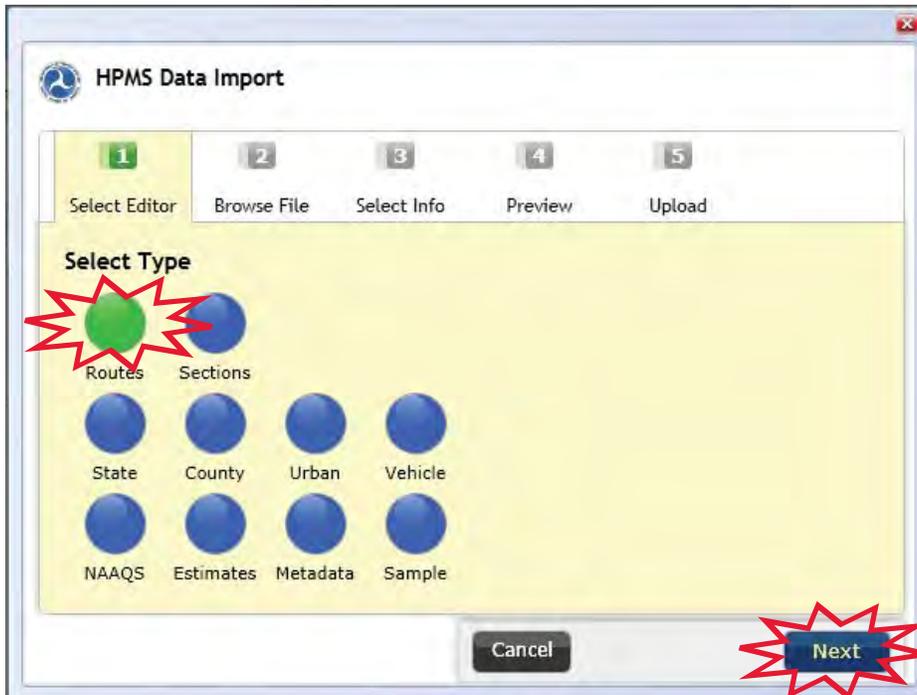
*** - Required Fields**

Save Cancel

Route File Imports

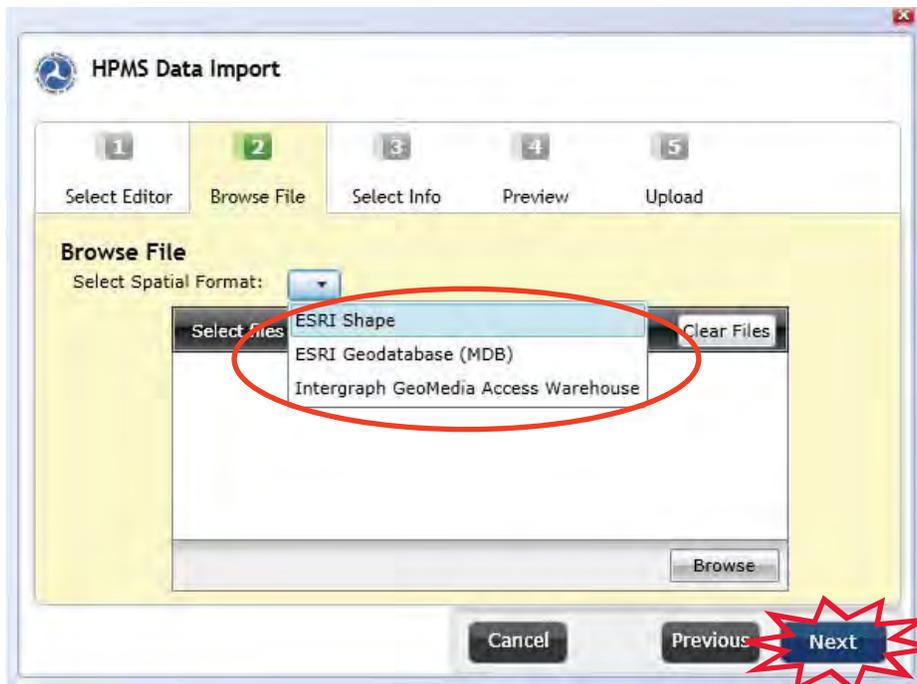
Route imports are a bit different than Section imports. The Import tool is still used in the import process, but menu options are unique to routes during the process.

Step 1 - Select Routes from the Import Dialog



File names in this section are for demonstration purposes only and are not intended to serve as a guide for appropriate file size, naming conventions or other State specific file characteristics.

Step 2 - Select the format used for the route file

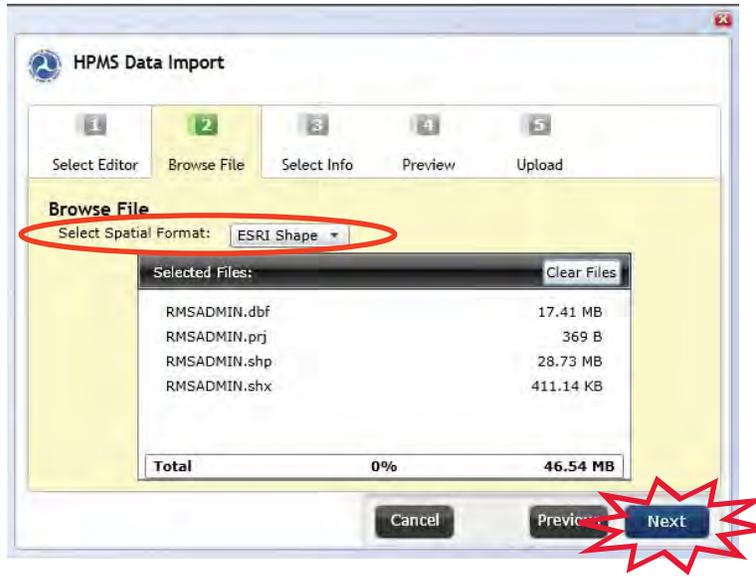


The HPMS v8x Software accepts three types of formats for route files: ESRI Shapefiles, ESRI Geodatabase and Intergraph (as a Geomedia Access Warehouse). Import screens are slightly different for each of these three options.

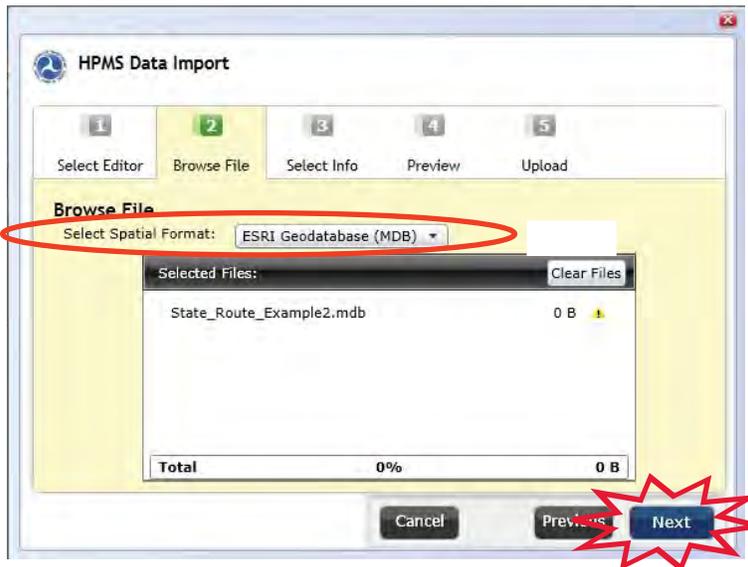
Screens for each of these formats are shown on the following pages.

After each step, Click Next to move on to the next step of the import process.

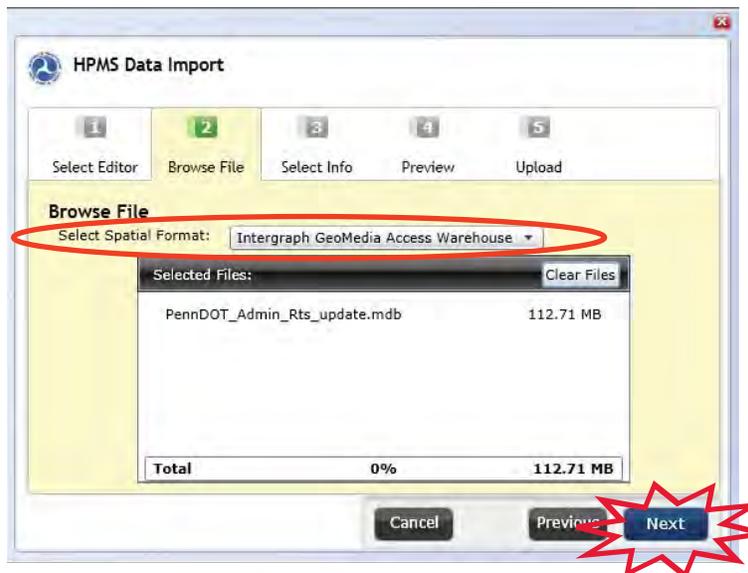
Step 2 - Continued - Select files for import via the browse button



When importing an **ESRI Shapefile**, four component files are required as shown in the example at left.



When importing an **ESRI (Personal) Geodatabase**, one file - stored with the Access database .mdb extension - is required as shown in the example at left.



When importing an **Intergraph GeoMedia Warehouse**, one file - stored as an Access database - is required as shown in the example at left.

Step 3 - Identify the unit of measure and required fields in the input file

HPMS Data Import

1 Select Editor 2 Browse File 3 Select Info 4 Preview 5 Upload

Select Info

Select Unit of Measure Mile Foot Kilometer Meter

Enter Route_ID field name

Enter Begin_Point field name NLF_CNTL_BGN

Enter End_Point field name NLF_CNTL_END

Enter Comment field name

Cancel Previous Next

When importing an **ESRI Shapefile**, the Begin and End Point fields will map automatically, use the drop down lists to select the Route ID and the Comments fields. The Comments field is optional.

The unit of measure should match Section data measures, otherwise LRS errors will occur when running Geometries. Note that the HPMS system converts all measures to Miles for analysis and reporting purposes after import.

HPMS Data Import

1 Select Editor 2 Browse File 3 Select Info 4 Preview 5 Upload

Select Info

Select Unit of Measure Mile Foot Kilometer Meter

Enter Route feature name

Enter Route_ID field name

Enter Comment field name

*Note: All fields are case sensitive.

Cancel Previous Next

When importing an ESRI (**Personal**) **Geodatabase**, all fields must be entered manually. Note that the entries here are CASE SENSITIVE. Again, the Comments field is optional.

Items typed into these dialogue boxes must EXACTLY match the input file.

HPMS Data Import

1 Select Editor 2 Browse File 3 Select Info 4 Preview 5 Upload

Select Info

Select Unit of Measure Mile Foot Kilometer Meter

Enter Route feature name RMSADMIN

Enter Route_ID field name NLFID_TEXT

Enter Begin_Point field name NLF_CNTL_BGN

Enter End_Point field name NLF_CNTL_END

Enter Comment field name

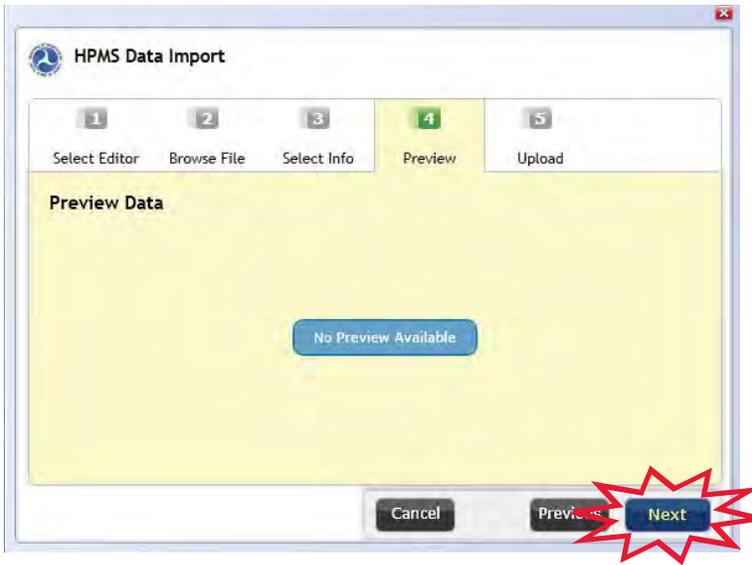
*Note: All fields are case sensitive.

Cancel Previous Next

When importing an **Intergraph Geomedia Warehouse**, all fields must be entered manually. Note that the entries here are CASE SENSITIVE. Again, the Comments field is optional.

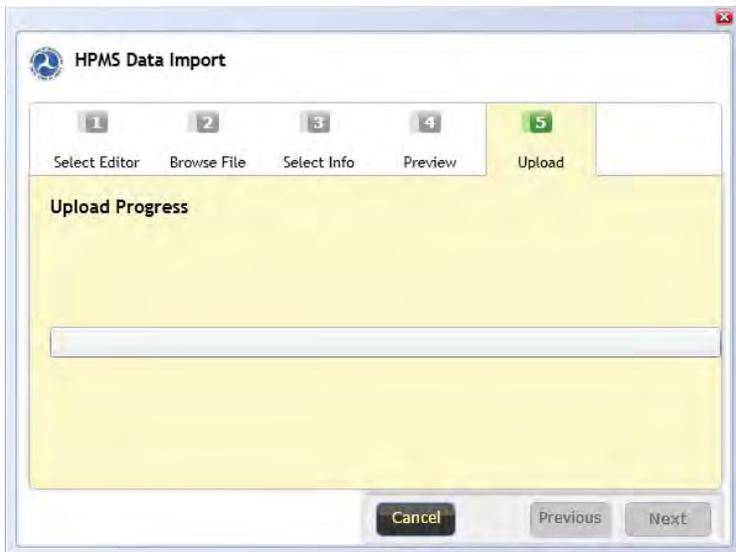
The Route feature name is the table name from the .MDB file that contains the route features. Please contact HPMS staff at FHWA if you have questions about this component of the import process.

Step 4 - Preview



The system does not provide a preview of Route data so just click Next to move on to the next step of the import process.

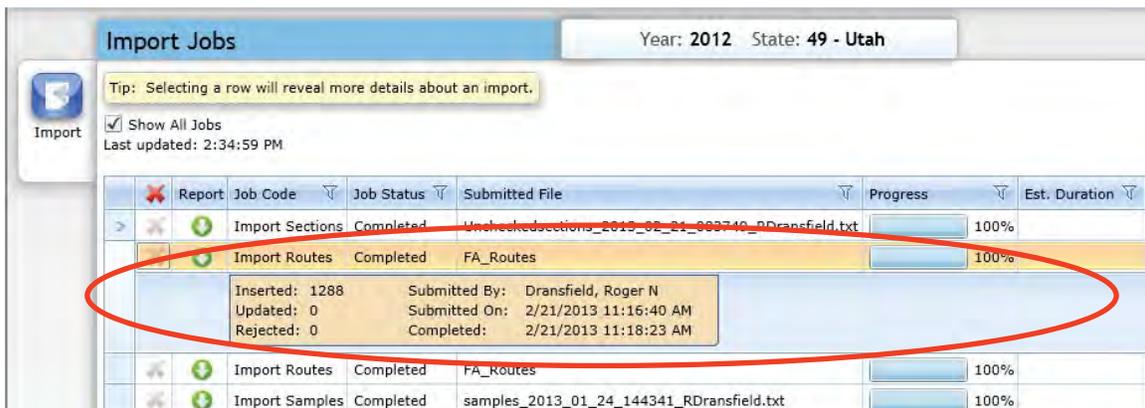
Step 5 - Upload



The final step is the Upload process. This may take some time to run. Once the Upload is complete, click Next. Refer to the Import log screen to monitor the import of Route files and review applicable Import Error Reports.

Import Validations can be viewed in Appendix A of this document.

Step 6 - Review Import Report For Route Files



Exporting Data

All data are exported through the Export function from the Application Menu. The HPMS Application allows users to export data and download data into formats that can be ingested into other applications. Spatial data can be downloaded into shapefile or MDB (ESRI Personal Geodatabase or Intergraph Geomedia MDB*). Tabular data can be downloaded into CSV or Excel*.

** The Intergraph (spatial files) and Excel (tabular files) export tools are currently in development but are not yet available.*

Step 1—Navigate to the Export Screen

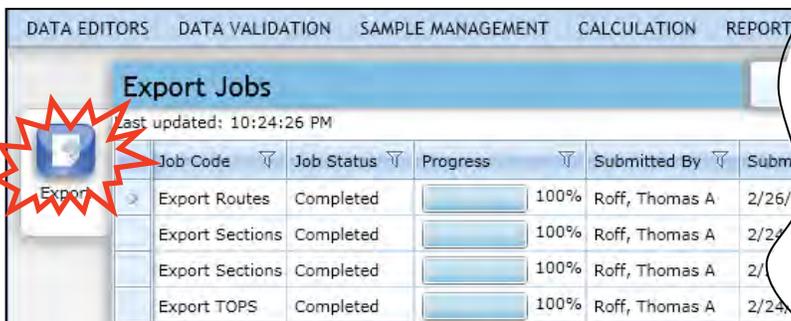
Click on "Export" from the Application Menu -> Data Editor Option.



Step 2—Begin the Export Process by Selecting the Export button

The Export Jobs Log will be displayed.

Click Export from the left Margin.



Step 3—Select the Desired Data Set for Export

The HPMS Data Export Screen will be displayed.

Select the Data Type to be exported from the matrix of data items by clicking on one of the blue dots above one of the listed options. The selected data item will turn green. Click Next.

For views of select Export outputs see Appendix C.



Note that some data items are available for export as spatial and tabular files.

Export Continued

Step 3—Select the Desired Data Set for Export



Most of the Export options available from the HPMS Data Export Screen are self evident. There are several options for Sample exports, however. The distinctions between these are displayed below.

Export Type	Key Components of Output
Sample	<ul style="list-style-type: none"> • Sample ID, • Begin/End Points, • Comments Field, • Expansion Factor Value (populated if Expansion Factors have been run), • Valid/Invalid Flag (populated if Sample Validation has been run)
Sample TOPS	<ul style="list-style-type: none"> • All fields in Sample export above and, • TOPS Volume Group, • The submitted values for the five TOPS data items (AADT, Through Lanes, Urban Code, Facility Type and Functional System) • And a Yes/No value to identify records where Geometry has been created
Sample Details	<ul style="list-style-type: none"> • All fields in the Sample TOPS (EXCEPT Geometry), • Values for each of the HPMS Data Items where submitted with sections data or calculated for the Sample extent based on procedures outlined in the HPMS Field Manual
TOPS (Shape)	<ul style="list-style-type: none"> • Sample ID, • Begin/End Points, • TOPS Volume Group, • Values for each of the HPMS Data Items where submitted with sections data or calculated for the Sample extent based on procedures outlined in the HPMS Field Manual

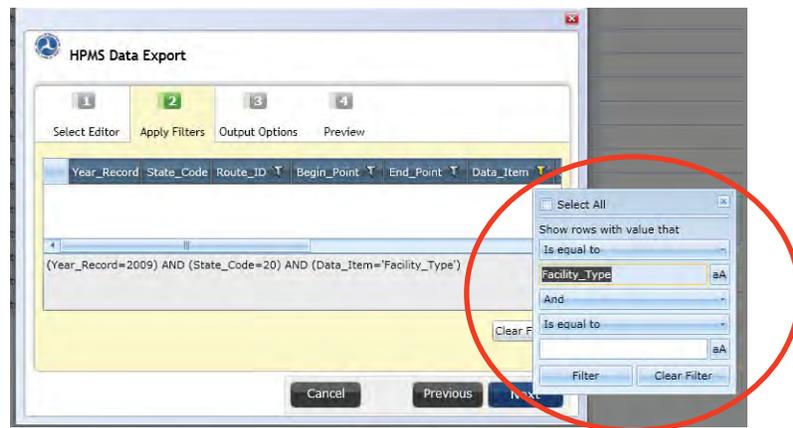
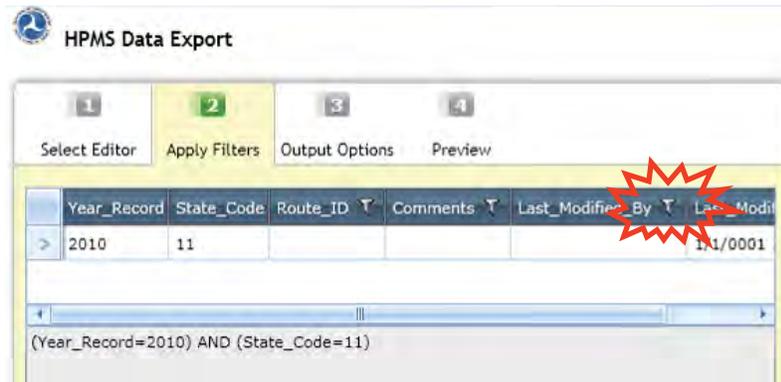
Export Continued

Step 4—Filter the data

Select the filter icon to the right of any data field to filter that the data by that field.

*The State and year filters will already be applied to the data set at this point but other filters can be added as well. **Unless a filter is applied to the Data_Item field for Sections data, the export will include ALL loaded data.** This may be a very large file.*

Filter text should be entered into the resulting dialog box.



Step 5—Select Data Format for Export

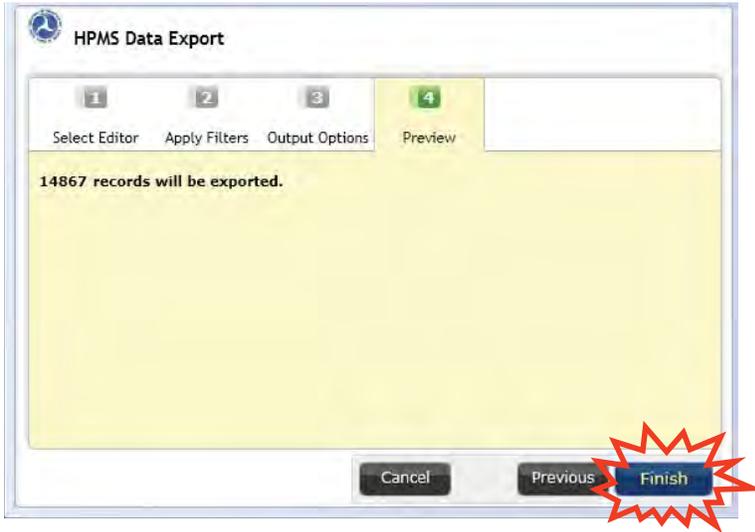
Select a Unit of Measure and format of the Data to be exported and click Next.



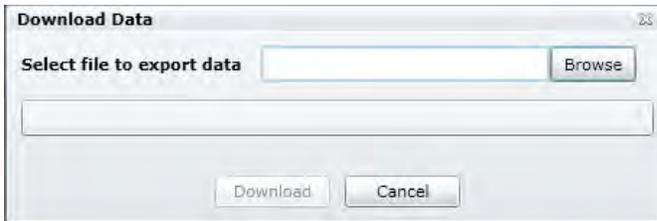
Export Continued

Step 6 - Review Screen/Saving the Data

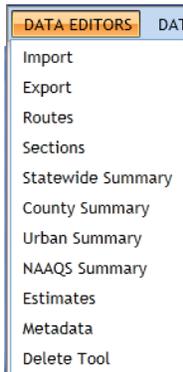
Review information provided on the Preview Screen and click Finish.



Select the desired location to save the data.



As with the Import tool, data export progress and report errors can be viewed in an Export Log. (The Log can be viewed by selecting Export from the Data Editors Menu on the main HPMS application menu.)



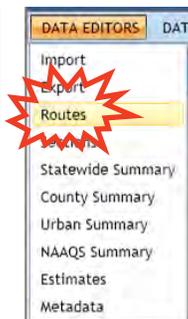
Job Code	Job Status	Progress	Submitted By	Submitted On	Completed On	Download
Export Routes	Files Uploaded	<div style="width: 0%;"></div> 0%	Roff, Thomas A	2/26/2011 10:29:10 PM		
Export Routes	Completed	<div style="width: 100%;"></div> 100%	Roff, Thomas A	2/26/2011 9:37:36 PM	2/26/2011 9:38:01 PM	
Export Sections	Completed	<div style="width: 100%;"></div> 100%	Roff, Thomas A	2/24/2011 11:00:12 PM	2/24/2011 11:00:14 PM	

Example of Export Log view.

Data Viewers—Routes

The Routes menu allows users to view and query Route data.

Select Routes from the Data Editors Menu within the Application Menu to view or query Route data.

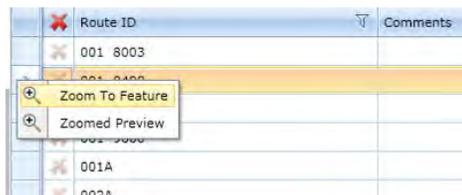


The steps below provide direction on how to examine route information in more detail.

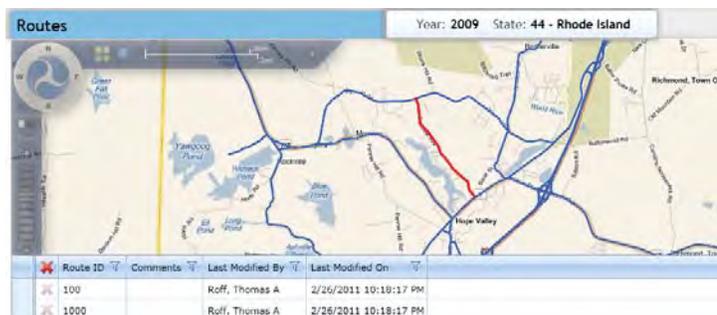
Select a desired Route from the grid window below the map to view a close-up of a specific Route.



Right click on the highlighted record and select Zoom to Feature.



The map display window will be updated to reveal the route selected.



To see a preview of the selected route, select the Zoomed Preview option instead of Zoom to Feature. This is a helpful way to ensure that the route segment selected is the one in question. This is often most useful on crowded urban networks.

The Create Geometries Tool

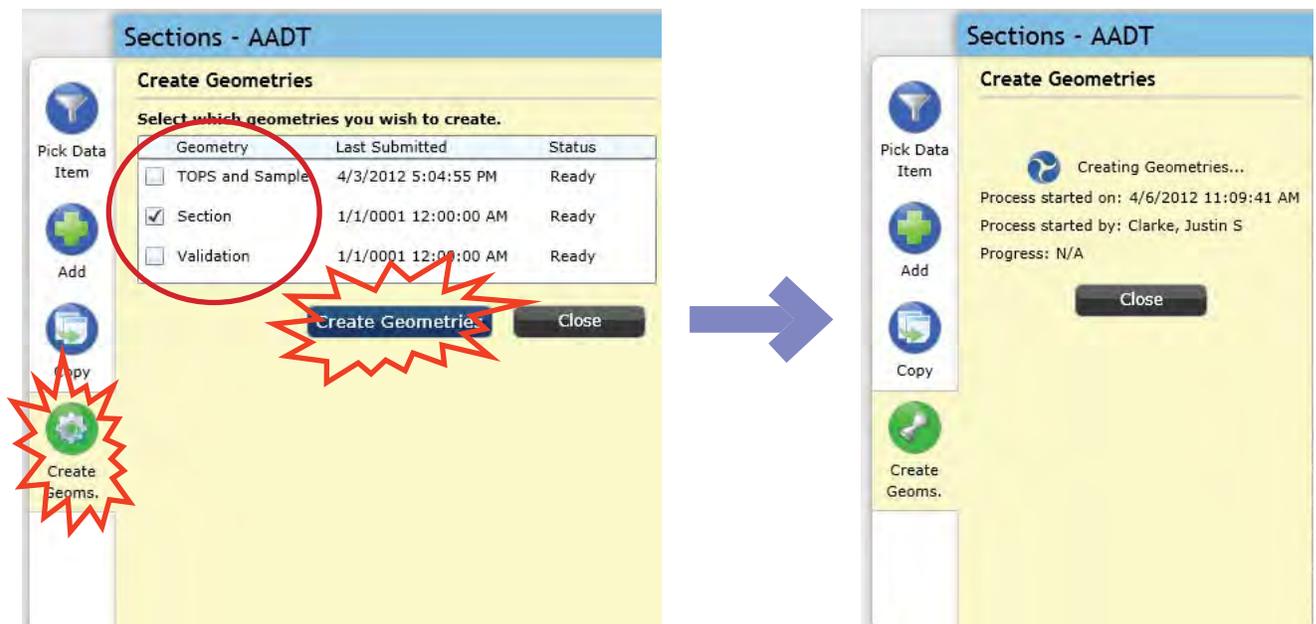
Before Section data can be viewed in the map window of HPMS software screens, the Create Geometries process must be run. This process creates a spatial file from Section, Sample, TOPS and Validation records. Once geometries are created, users can view data in the map window. The process for creating geometries is described below.

The Create Geometries Tool that appears on the Section, Validation and Sample Management Pages provides access to the Geometry process for all of these data types regardless of what screen the user is viewing. Creating Geometries for the fewest items necessary will enhance processing time.

Click the Create Geometries button to open the Create Geometries dialog. The Last Submitted date and Status columns provide information about the last Geometry creation process that was run for the active submission year and State.

Next, select the type of Geometry to run using the check boxes for TOPS and Sample, Section and/or Validation. Any combination of the three options can be run.

Click the Create Geometries Button to run the process.



This process runs in the background, so it is OK to close the dialog box and move away from the screen while the process is running. Bear in mind that many files are quite large and the process may take several hours to complete. It is advised that users load several data items and then run geometries at the end of each work session (day/week) rather than after each data item is data loaded. Beginning the Geometry process in off hours (early/late) will also reduce run time.

Geometries Continued

When the geometry process is complete, data will appear in the map window. Note also that the globe icon will be colored for records that have geometries.

Year: 2010 State: 50

Sample ID	Route ID	Begin Point	End Point	Volume Group	F System
A0051-0.235	A0051	0.235	0.394	2,000 - 4,999	4 - Minor Arter
A0051-0.696	A0051	0.696	0.956	5,000 - 9,999	4 - Minor Arter
A0051-0.956	A0051	0.956	1.282		
B004-0.225	B004	0.225	0.425	5,000 - 9,999	2 - PA - Other

Total Samples: 1202

Use the Filter Tool (with text NO) to find records for which geometries did not create.

Year: 2010 State: 50

Select All No Yes

Show rows with value that is equal to []

And []

Is equal to []

Filter Clear Filter

Sample ID	Route ID	Begin Point	End Point	Volume Group	F System
A0051-0.235	A0051	0.235	0.394	2,000 - 4,999	4 - Minor Arter
A0051-0.696	A0051	0.696	0.956	5,000 - 9,999	4 - Minor Arter
A0051-0.956	A0051	0.956	1.282		
B004-0.225	B004	0.225	0.425	5,000 - 9,999	2 - PA - Other

Total Samples: 1202

There are a number of reasons that geometries might not create but route numbers that don't exist in the LRS or section points that are beyond the bounds of LRS sections are two of the most common.

Click on the filter icon and select Clear Filter to remove the filter.

Click the Create Geometries Button to run the process.

Year: 2010 State: 50

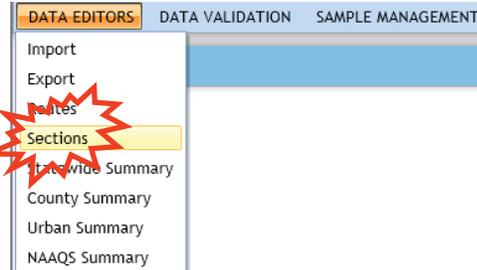
Sample ID	Route ID	Begin Point	End Point	Volume Group	F System
A0051-0.956	A0051	0.956	1.282		
B004-3.334	B004	3.334	3.739		
B004-EA001-0	B004-EA001	0.000	0.061		
I089-0	I089	0.000	0.599		

Total Samples: 375

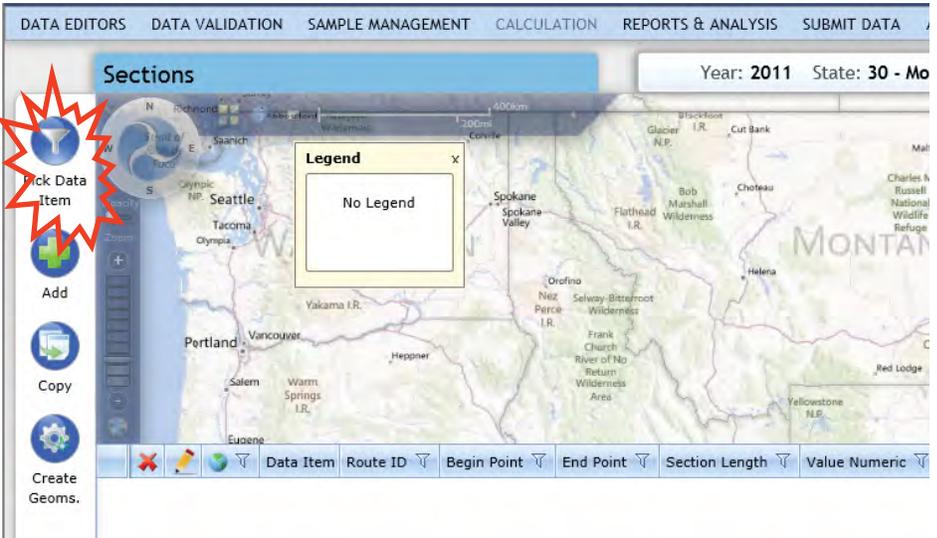
Data Viewers—Sections

Section data can be viewed and queried just as Route Data.

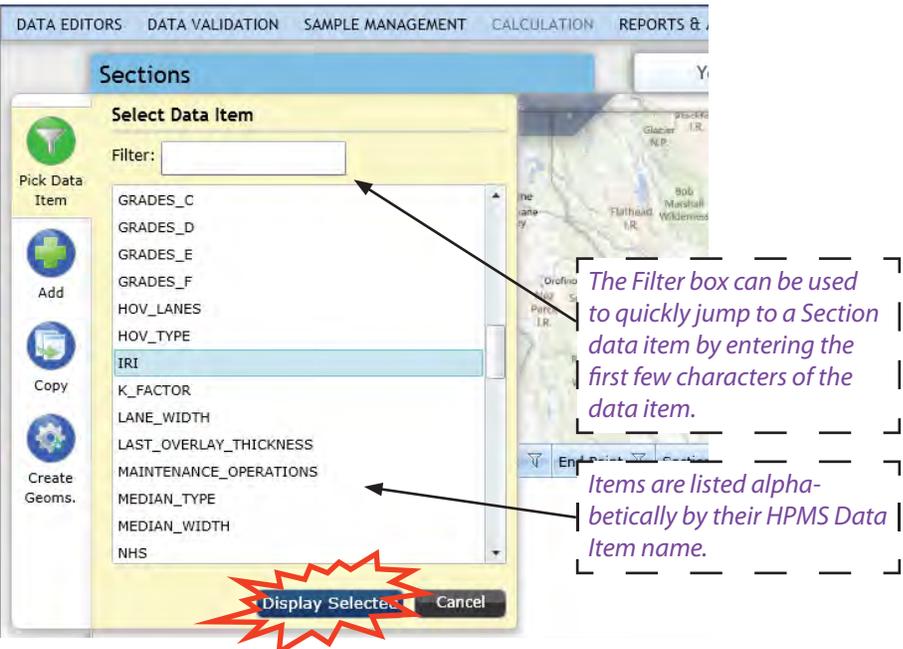
Select Sections from the Data Editors Menu to access section data.



Click on the Filter tool to bring up a list of Section data that can be viewed.



Select an item to view from the list and click Display Selection to generate a map view displaying the section set.

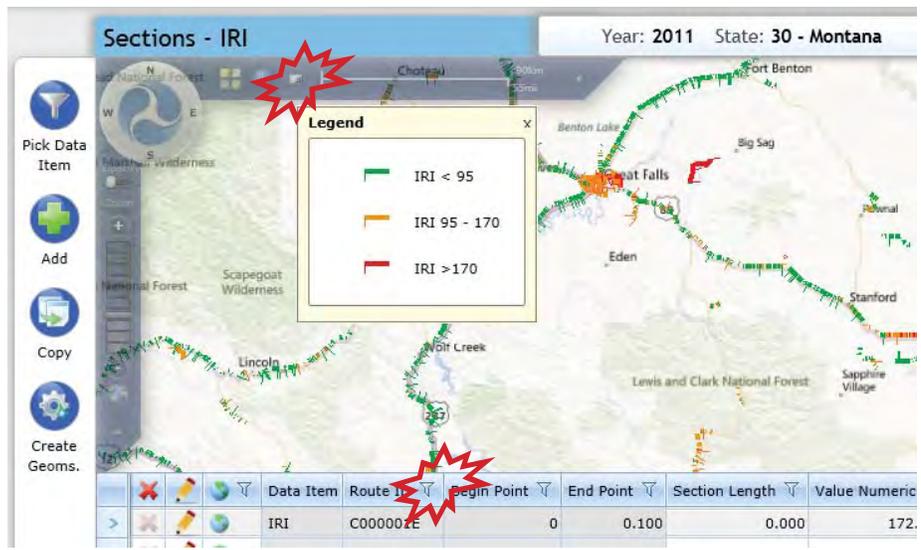


Data Viewers—Sections Continued

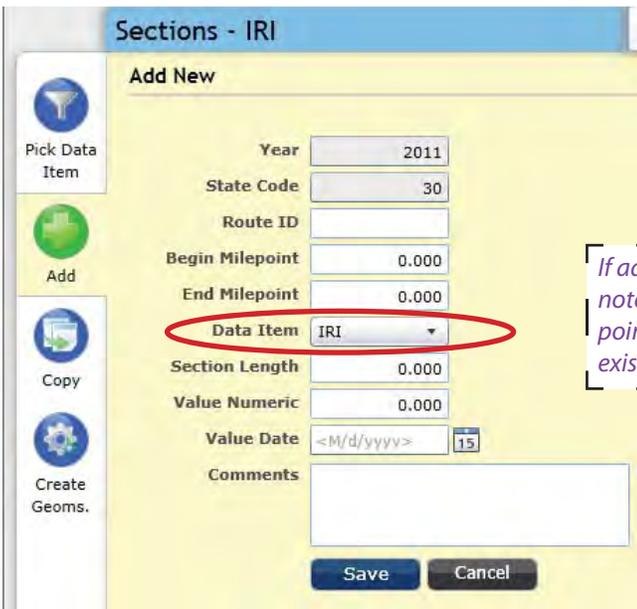
Click on the Map tool bar to turn on (or off) the **Legend**.

Click on any of the **filter icons** adjacent to the field headers to filter records within a data item.

To filter for records that have or have not been spatially mapped, use Yes or No in the filter dialog box after clicking on the filter next to the globe icon in the table header.



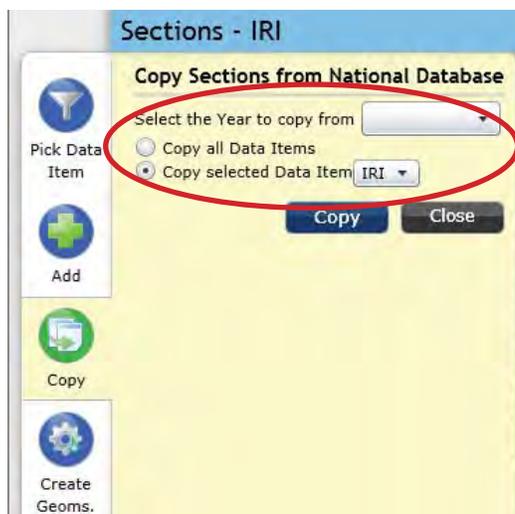
Click on the **Add** tool to manually add records. Select the appropriate data item from the drop down menu before entering any data.



If adding records manually, note that the begin and end points must not overlap existing section data.

Section data can be copied in from a previous year's data set using the **Copy** tool.

Click on the **Copy** tool to copy previous year's data. Be sure to select appropriate year and data item using the drop down radio buttons.



All section data can be copied from a previous year, but this tool is typically used for one Data Item at a time. Note that data is copied from the National HPMS database, so data in Review is not available for Copy.

Summary Features—Statewide Summary

Several Data Summary screens are accessed via the Data Editors Menu options. The first of these, State Summary, provides three tabular views of State data that has been loaded into the HPMS software. Each tab on these screens provides Urban and Rural comparisons. The tabs contain data as follows:

1. Summary—Travel and Demographic Data
2. Pavement Data—Unpaved, Paved mileage for Minor Collector and Local roadways
3. Vehicle Type—Breakdowns of vehicles with data for Interstates, Arterials and Rural roadways

1

Year: 2010 State: 37 - North Carolina

2

Year: 2010 State: 37 - North Carolina

3

Year: 2010 State: 37 - North Carolina

Figures for Travel and Pavement Mileage should be entered in whole numbers (not as a factor of 1,000).

Click the Calculate Total button to complete the Control Total row. The Control Total is a sum of the Minor Collector and Local data in the County Summary file. The Total and Control Total rows must match within one mile.

Use the Edit button to edit and save changes to the data on these screens.

Note that edits to any Summary screen can be partially completed and then finished in another session. This allows users to complete screens as data becomes available and does not require screens to be fully complete for data to be entered into the HPMS system.

Category	Rural	Small Urban
Travel - Local	24,890,000	3,219,000
Travel - Minor Collector	9466000	
Demography - Population (x1000)	3,647	1,058
Demography - Net Land Area	43,345	1,263

	Minor Collector	Local	Local	Total
Paved	6,538.164	44,291.751	25,904.509	76734.424
Un-Paved	19.273	6,223.456	721.631	6964.360
Total	6557.437	50515.207	26626.140	83698.784
Control Total	6557.000	50515.230	26626.140	

Vehicle Type	Rural			Urban		
	Interstate	Other Arterial	Other Rural	Interstate	Other Arterial	Other Urban
Motorcycles	0.36 %	0.53 %	0.72 %	0.39 %	0.58 %	0.71 %
Passenger Cars	65.04 %	68.70 %	69.26 %	71.27 %	75.34 %	75.55 %
Light Trucks	13.41 %	19.05 %	20.80 %	14.69 %	16.73 %	17.35 %
Buses	0.64 %	0.73 %	0.79 %	0.63 %	0.56 %	1.11 %
Single Unit Trucks	3.19 %	4.36 %	4.63 %	3.10 %	3.50 %	3.88 %
Combination Trucks	17.36 %	6.63 %	3.80 %	9.92 %	3.29 %	1.40 %
Total	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %

Summary Features—County Summary

The County Summary screen provides a tabular view of the County roadways grouped by functional classification with RMC L (Rural Minor Collector and Local) System Length.

Highway Performance Monitoring System v8.0

U.S. Department of Transportation
Federal Highway Administration

Year: 2009 State: 37 - North Carolina

County Code	Functional System	Urban Code	Ownership	RMC L System Length	Last Modified By	Last Modified On
1 - Alamance	6 - Minor Collector	Rural	1 - State Highway Agency	78.081	Arnold, Jonathan L	12/15/2010 10:15:05 A
1 - Alamance	7 - Local	Burlington, NC	1 - State Highway Agency	113.742	Arnold, Jonathan L	10/26/2010 12:52:29 F
1 - Alamance	7 - Local	Burlington, NC	4 - City or Municipal Highway Agency	395.920	Arnold, Jonathan L	10/26/2010 12:52:29 F
1 - Alamance	7 - Local	Rural	1 - State Highway Agency	446.866	Arnold, Jonathan L	12/15/2010 10:15:06 A
1 - Alamance	7 - Local	Rural	4 - City or Municipal Highway Agency	4.260	Arnold, Jonathan L	12/15/2010 10:15:06 A
3 - Alexander	6 - Minor Collector	Rural	1 - State Highway Agency	83.746	Arnold, Jonathan L	10/26/2010 12:52:30 F
3 - Alexander	7 - Local	Hickory, NC	1 - State Highway Agency	35.971	Arnold, Jonathan L	10/26/2010 12:52:30 F
3 - Alexander	7 - Local	Rural	1 - State Highway Agency	398.184	Arnold, Jonathan L	10/26/2010 12:52:30 F
3 - Alexander	7 - Local	Rural	4 - City or Municipal Highway Agency	10.940	Arnold, Jonathan L	12/15/2010 10:15:06 A
3 - Alexander	7 - Local	Rural	11 - State Park, Forest, or Resv. Agency	0.900	Arnold, Jonathan L	10/26/2010 12:52:30 F
5 - Alleghany	6 - Minor Collector	Rural	1 - State Highway Agency	6.250	Arnold, Jonathan L	12/15/2010 10:15:06 A
5 - Alleghany	7 - Local	Rural	1 - State Highway Agency	349.388	Arnold, Jonathan L	12/15/2010 10:15:06 A
5 - Alleghany	7 - Local	Rural	4 - City or Municipal Highway Agency	15.530	Arnold, Jonathan L	12/15/2010 10:15:06 A
5 - Alleghany	7 - Local	Rural	66 - National Park Service	2.470	Arnold, Jonathan L	10/26/2010 12:52:30 F
7 - Anson	6 - Minor Collector	Rural	1 - State Highway Agency	115.533	Arnold, Jonathan L	10/26/2010 12:52:30 F
7 - Anson	7 - Local	Small Urban	1 - State Highway Agency	11.848	Arnold, Jonathan L	10/26/2010 12:52:30 F
7 - Anson	7 - Local	Rural	1 - State Highway Agency	530.504	Arnold, Jonathan L	10/26/2010 12:52:30 F
7 - Anson	7 - Local	Rural	4 - City or Municipal Highway Agency	77.070	Arnold, Jonathan L	12/15/2010 10:15:06 A
7 - Anson	7 - Local	Rural	11 - State Park, Forest, or Resv. Agency	0.500	Arnold, Jonathan L	10/26/2010 12:52:30 F
7 - Anson	7 - Local	Rural	63 - Bureau of Fish and Wildlife	15.750	Arnold, Jonathan L	10/26/2010 12:52:30 F
9 - Ashe	6 - Minor Collector	Rural	1 - State Highway Agency	21.969	Arnold, Jonathan L	12/15/2010 10:15:06 A

Total County Summaries: 574 Page 1 of 23

To add data to the County Summary table, click the Add button on the left side of the screen. Use the drop down menus to navigate to a data type to begin the edit process.

Highway Performance Monitoring System v8.0

U.S. Department of Transportation
Federal Highway Administration

Year: 2010 State: 8 - Colorado

Add New

County Code: 1 - Adams

Urban Code: 23527 - Denver-Aurora, CO

F System: 1 - Interstate

Ownership: 1 - State Highway Agency

RMC L System Length: 0.000

Last Modified On: 6/6/2011 1:30:22 PM

Last Modified By: Clarke, Justin S

Save Cancel

County Code	Functional System	Urban Code	Ownership	RMC L System Length	Last Modified By	Last Modified On
1 - Adams	6 - Minor Collector	Rural	1 - State Highway Agency	2.408	Abbott, Kelley J	5/3/2011 4:08
2 - Adams	7 - Local	Small Urban	2 - County Highway Agency	86.390	Abbott, Kelley J	6/3/2011 4:08
4 - Adams	7 - Local	Small Urban	4 - City or Municipal Highway Agency	6.260	Abbott, Kelley J	6/3/2011 4:08
2 - Adams	2 - Interstate	Aurora, CO	2 - County Highway Agency	202.025	Abbott, Kelley J	5/3/2011 4:08
4 - Adams	4 - City or Municipal Highway Agency	Aurora, CO	4 - City or Municipal Highway Agency	818.760	Abbott, Kelley J	5/3/2011 4:08
2 - Adams	2 - County Highway Agency	Small Urban	2 - County Highway Agency	27.700	Abbott, Kelley J	6/3/2011 4:08
4 - Adams	4 - City or Municipal Highway Agency	Small Urban	4 - City or Municipal Highway Agency	115.955	Abbott, Kelley J	5/3/2011 4:08
1 - Adams	1 - State Highway Agency	Small Urban	1 - State Highway Agency	6.661	Abbott, Kelley J	5/3/2011 4:08
2 - Adams	2 - County Highway Agency	Small Urban	2 - County Highway Agency	709.330	Abbott, Kelley J	6/3/2011 4:08
4 - Adams	4 - City or Municipal Highway Agency	Small Urban	4 - City or Municipal Highway Agency	42.010	Abbott, Kelley J	6/3/2011 4:08
2 - Adams	2 - County Highway Agency	Small Urban	2 - County Highway Agency	54.220	Abbott, Kelley J	6/3/2011 4:08
4 - Adams	4 - City or Municipal Highway Agency	Small Urban	4 - City or Municipal Highway Agency	3.030	Abbott, Kelley J	6/3/2011 4:08
2 - Adams	2 - County Highway Agency	Small Urban	2 - County Highway Agency	14.050	Abbott, Kelley J	6/3/2011 4:08
4 - Adams	4 - City or Municipal Highway Agency	Small Urban	4 - City or Municipal Highway Agency	42.080	Abbott, Kelley J	6/3/2011 4:08
2 - Adams	2 - County Highway Agency	Small Urban	2 - County Highway Agency	489.870	Abbott, Kelley J	6/3/2011 4:08
4 - Adams	4 - City or Municipal Highway Agency	Small Urban	4 - City or Municipal Highway Agency	3.985	Abbott, Kelley J	6/3/2011 4:08
26 - Adams	26 - Private (Other than Railroad)	Small Urban	26 - Private (Other than Railroad)	83.340	Abbott, Kelley J	6/3/2011 4:08
66 - Adams	66 - National Park Service	Small Urban	66 - National Park Service	3.770	Abbott, Kelley J	6/3/2011 4:08
1 - Adams	1 - State Highway Agency	Small Urban	1 - State Highway Agency	3.288	Abbott, Kelley J	6/3/2011 4:08

Total County Summaries: 535 Page 0 of 22

* Note that some screen shots in this guide include the Admin menu. This is not available to all users.

Summary Features—Urban Summary

The Urban Summary screen summarizes DVMT (Daily Vehicle Miles of Travel), the proportion of the State population by Urban Area as well as the proportion of State land for each Urban Area. As with the County Summary Data, Urban records can be edited via the Add tool located on the left of the screen.

Urban Summary

Year: 2010 State: 8 - Colorado

Urban Code	Local DVMT	State Portion Pop (x1000)	State Portion Land (Sq. Mile)	Last Modified By	Last Modified On
9298 - Boulder, CO	206000	107	37	Abbott, Kelley J	6/3/2011 4:08:23 PM
18856 - Colorado Springs, CO	1108000	531	380	Abbott, Kelley J	6/3/2011 4:08:23 PM
23527 - Denver--Aurora, CO	5053000	2,293	814	Abbott, Kelley J	6/3/2011 4:08:23 PM
30628 - Fort Collins, CO	502000	242	187	Abbott, Kelley J	6/3/2011 4:08:23 PM
34273 - Grand Junction, CO	198000	112	85	Abbott, Kelley J	6/3/2011 4:08:23 PM
34786 - Greeley, CO	192000	133	91	Abbott, Kelley J	6/3/2011 4:08:23 PM
46126 - Lafayette--Louisville, CO	133000	54	38	Abbott, Kelley J	6/3/2011 4:08:23 PM
51175 - Longmont, CO	122000	76	30	Abbott, Kelley J	6/3/2011 4:08:23 PM
72613 - Pueblo, CO	300000	143	246	Abbott, Kelley J	6/3/2011 4:08:23 PM
99998 - Small Urban	1014000	220	558	Abbott, Kelley J	6/3/2011 4:08:23 PM
99999 - Rural	6049000	1,164	101,230	Abbott, Kelley J	6/3/2011 4:08:23 PM

Total Urban Summaries: 11

Figures for DVMT and Land Area should be entered in whole numbers (not as a factor of 1,000).

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

Submittal

Urban Summary

Year: 2010 State: 8 - Colorado

Add New

Urban Code: 9298 - Boulder, CO

Local DVMT: 0

State Portion Pop: 0

State Portion Land: 0

Last Modified On: 4/2/2012 3:34:42 PM

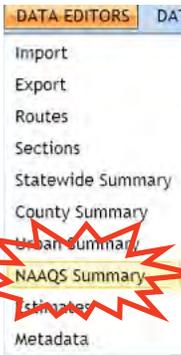
Last Modified By: Clarke, Justin S

Save Cancel

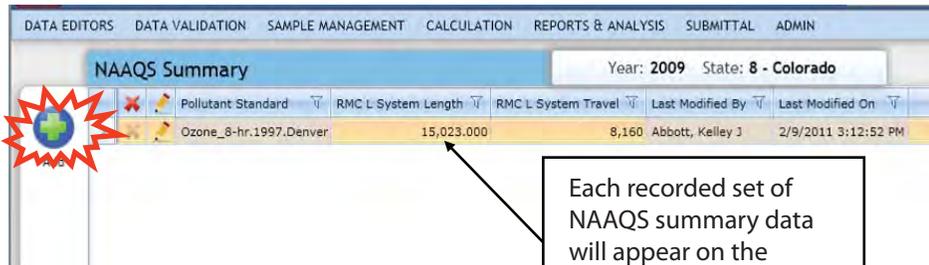
State Portion Pop (x1000)	State Portion Land (Sq. Mile)	Last Modified By	Last Modified On
107	37	Abbott, Kelley J	6/3/2011 4:08:23 PM
531	380	Abbott, Kelley J	6/3/2011 4:08:23 PM
2,293	814	Abbott, Kelley J	6/3/2011 4:08:23 PM
242	187	Abbott, Kelley J	6/3/2011 4:08:23 PM
112	85	Abbott, Kelley J	6/3/2011 4:08:23 PM
133	91	Abbott, Kelley J	6/3/2011 4:08:23 PM
54	38	Abbott, Kelley J	6/3/2011 4:08:23 PM
76	30	Abbott, Kelley J	6/3/2011 4:08:23 PM
143	246	Abbott, Kelley J	6/3/2011 4:08:23 PM
220	558	Abbott, Kelley J	6/3/2011 4:08:23 PM
1,164	101,230	Abbott, Kelley J	6/3/2011 4:08:23 PM

Summary Features—NAAQS Summary

Annual review and update of NAAQS travel and system length is performed in the NAAQS Summary portion of the Data Editors Menu.

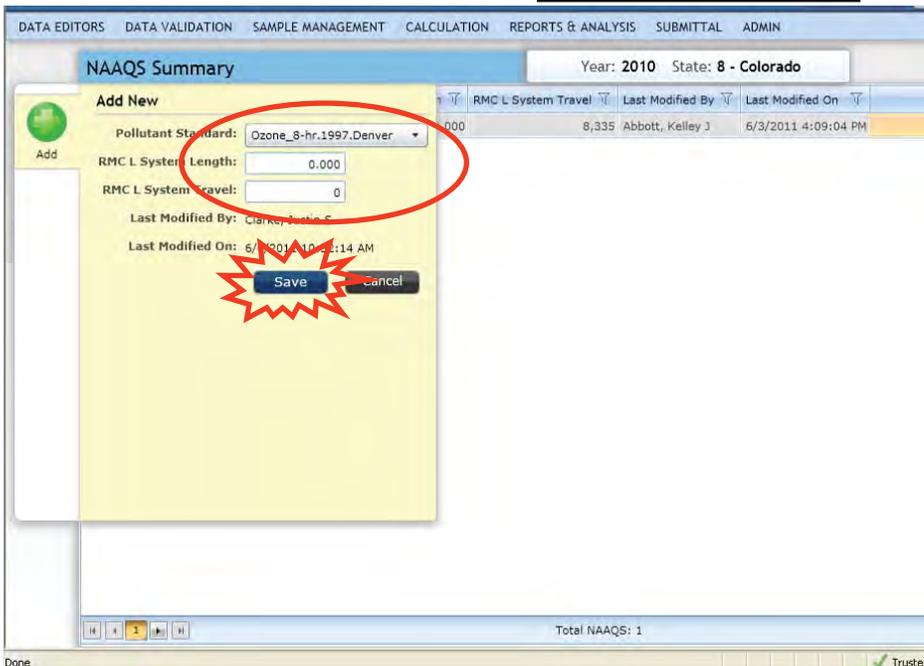


To add new data, select the Add button on the left side of screen.



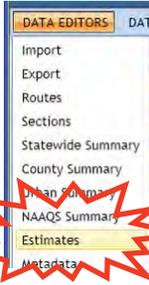
Each recorded set of NAAQS summary data will appear on the summary matrix in the NAAQS Summary screen.

Select a NAAQS area from the Pollution Standard drop down and then enter System Length and System Travel data for the NAAQS area in the blanks below.



Click save to add this data to the National HPMS database.

Estimates - Editing and Copying



The Estimates screen is a way to quickly verify imported estimate data. Revisions can be made via the Add or Edit tools if necessary. The Add and Edit tools on this screen are useful for minor modifications to estimate data. Large scale data revisions should be made through a new Estimate data import. The Copy tool enables users to create a new year of data

Estimate Year: 2010 State: 8 - Colorado

	Estimate Type	Functional System	Is Urban	Is State Owned	Data Item Value	Last Modified By
1 Add	Base Thickness	1 - Interstate	No	Yes	20.0	Clarke, Justin S
2 Edit	Base Thickness	1 - Interstate	Yes	Yes	30.0	Clarke, Justin S
3 Copy	Base Thickness	2 - PA - Other Freeways and Expressways	No	Yes	20.0	Clarke, Justin S
	Base Thickness	2 - PA - Other Freeways and Expressways	Yes	Yes	30.0	Clarke, Justin S
	Base Thickness	3 - PA - Other	No	Yes	20.0	Clarke, Justin S
	Base Thickness	3 - PA - Other	Yes	Yes	30.0	Clarke, Justin S
	Base Thickness	4 - Minor Arterial	No	Yes	20.0	Clarke, Justin S
	Base Thickness	4 - Minor Arterial	Yes	Yes	30.0	Clarke, Justin S
	Base Thickness	5 - Major Collector	No	Yes	20.0	Clarke, Justin S

1 Estimate

Estimate Type: Base Thickness

F System: 1 - Interstate

Is Urban:

Is State Owned:

Value Numeric: 0.0

Last Modified On: 6/10/2011 11:03:36 AM

Last Modified By: Clarke, Justin S

Save Cancel

New records can be added to the existing Estimate table using the Add button. Once the tool is active, drop down menus and check boxes provide users with quick access to specific components of the Estimate data set.

Edits can be made to any field in the table by selecting the Edit tool and then making edits on the Estimates table itself.

Quick edits can be made to individual rows by selecting the pencil symbol to the left of each row.

2 Estimate Year: 2011 State: 13 - Georgia

	Estimate Type	Functional System	Is Urban	Is State Owned	Data Item Value	Last Modified By
Save	Base Thickness	1 - Interstate	No	Yes	10.5	Roff, Thi
Cancel	Base Thickness	1 - Interstate	Yes	Yes	10.5	Roff, Thi
	Base Thickness	2 - PA - Other Freeways and Expressways	Yes	Yes	10.5	Roff, Thi
	Base Thickness	3 - PA - Other	No	Yes	8.0	Roff, Thi
	Base Thickness	3 - PA - Other	Yes	Yes	8.0	Roff, Thi
	Base Thickness	4 - Minor Arterial	No	Yes	8.0	Roff, Thi
	Base Thickness	4 - Minor Arterial	Yes	Yes	8.0	Roff, Thi
	Base Thickness	5 - Major Collector	No	Yes	8.0	Roff, Thi
	Base Thickness	5 - Major Collector	Yes	Yes	8.0	Roff, Thi

3 Estimate

Copy National Data

Copy Previous Year's National Data?

Copy Close

Use the Copy button to copy previous year's data to the current submission year. All data will be copied from the National Database, so data can not be copied from a year that has not been submitted to FHWA (i.e. an incomplete Submission).

The Copy button is also available for Route, Section and Metadata files. To use this feature for those data types, navigate to the Route, Section or Metadata screens from the Data Editors Menu.

Metadata - Import and Edit

The Metadata screen is very similar to the Estimates screen and provides the means to quickly verify imported metadata. As with the Estimates screen, revisions can be made via the Add or Edit tools if necessary.

The screenshot shows the Metadata screen with a table of entries and an 'Add New' dialog box. The table has columns for Metadata Type, Functional System, Is Urban, Is State Owned, and Data Item Value. The dialog box allows adding a new entry with fields for Metadata Type, F System, Is Urban, Is State Owned, and Value Numeric.

Metadata Type	Functional System	Is Urban	Is State Owned	Data Item Value
Cracking Length Equip.	1 - Interstate	No	No	1.0
Cracking Length Equip.	1 - Interstate	No	Yes	1.0
Cracking Length Equip.	1 - Interstate	Yes	No	1.0
Cracking Length Equip.	1 - Interstate	Yes	Yes	1.0
Cracking Length Equip.	2 - PA - Other Freeways and Expressways	No	No	1.0
Cracking Length Equip.	2 - PA - Other Freeways and Expressways	No	Yes	1.0
Cracking Length Equip.	2 - PA - Other Freeways and Expressways	Yes	No	1.0
Cracking Length Equip.	2 - PA - Other Freeways and Expressways	Yes	Yes	1.0
Cracking Length Equip.	2 - PA - Other Freeways and Expressways	No	No	1.0
Cracking Length Equip.	2 - PA - Other Freeways and Expressways	No	Yes	1.0

The 'Add New' dialog box contains the following fields and options:

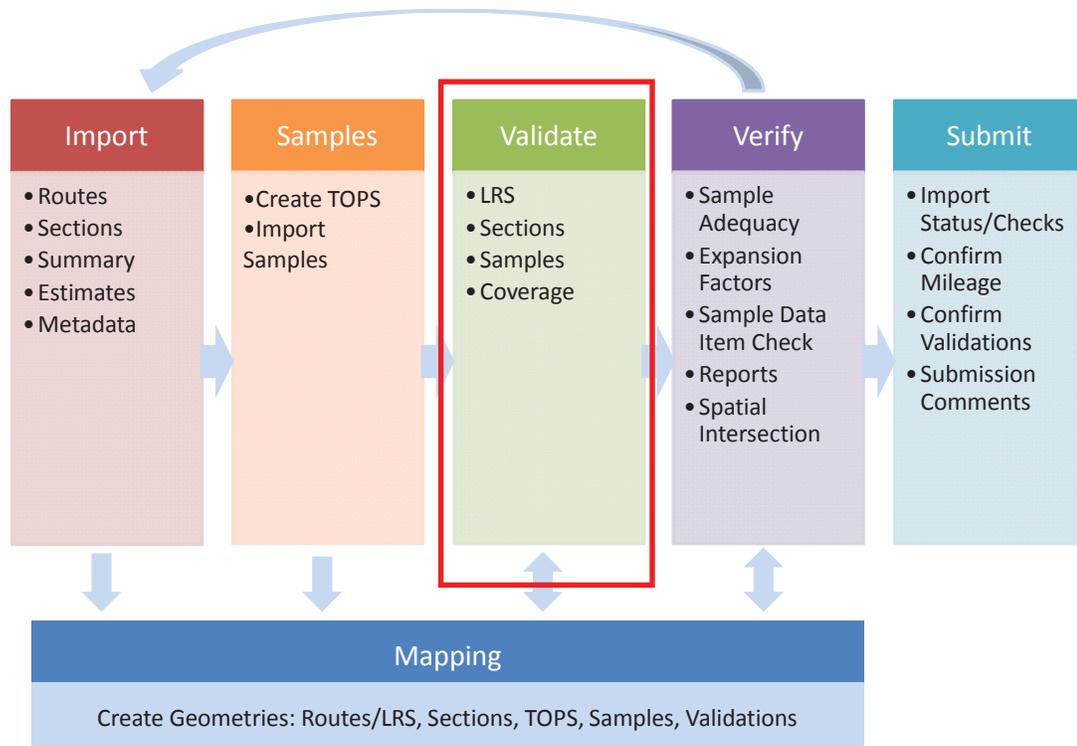
- Metadata Type:** AADT 24
- F System:** 1 - Interstate
- Is Urban:**
- Is State Owned:**
- Value Numeric:** 0.0
- Last Modified On:** 6/10/2011 2:36:01 PM
- Last Modified By:** Clarke, Justin S
- Buttons:** Save, Cancel

The screenshot shows the Metadata screen with a table of entries and a 'Last Modified By' column. The table has columns for Metadata Type, Functional System, Is Urban, Is State Owned, Data Item Value, and Last Modified By.

Metadata Type	Functional System	Is Urban	Is State Owned	Data Item Value	Last Modified By
Cracking Length Equip.	1 - Interstate	No	No	1.0	Shirazi, Aga M
Cracking Length Equip.	1 - Interstate	No	Yes	1.0	Shirazi, Aga M
Cracking Length Equip.	1 - Interstate	Yes	No	1.0	Shirazi, Aga M
Cracking Length Equip.	1 - Interstate	Yes	Yes	1.0	Shirazi, Aga M
Cracking Length Equip.	2 - PA - Other Freeways and Expressways	No	No	1.0	Shirazi, Aga M
Cracking Length Equip.	2 - PA - Other Freeways and Expressways	No	Yes	1.0	Shirazi, Aga M
Cracking Length Equip.	2 - PA - Other Freeways and Expressways	Yes	No	1.0	Shirazi, Aga M
Cracking Length Equip.	2 - PA - Other Freeways and Expressways	Yes	Yes	1.0	Shirazi, Aga M

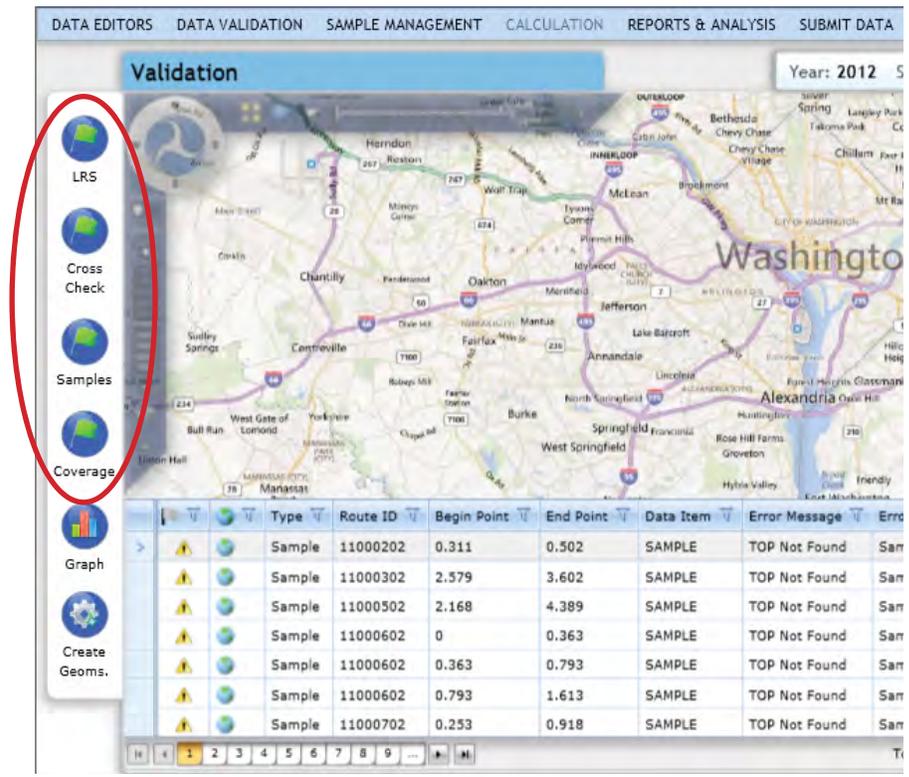
Data Validation Menu

After successfully completing the Import and Sample (Import/TOPS) processes, the next step in the HPMS submission workflow is Validation. There are four user activated validations that can be run from the Validation screen: LRS, Sections, Samples and Coverage.



The four validation functions are run via tool buttons on the left side of the Validation Screen. The validations operate independently, so they can be run in any order. Each validation should be run and the associated result set reviewed prior to submission. Updates and revisions to submitted data may be necessary to address identified validation errors or warnings.

Each validation run will generate a unique set of warning/error records, which are visible in the matrix area below the map view.



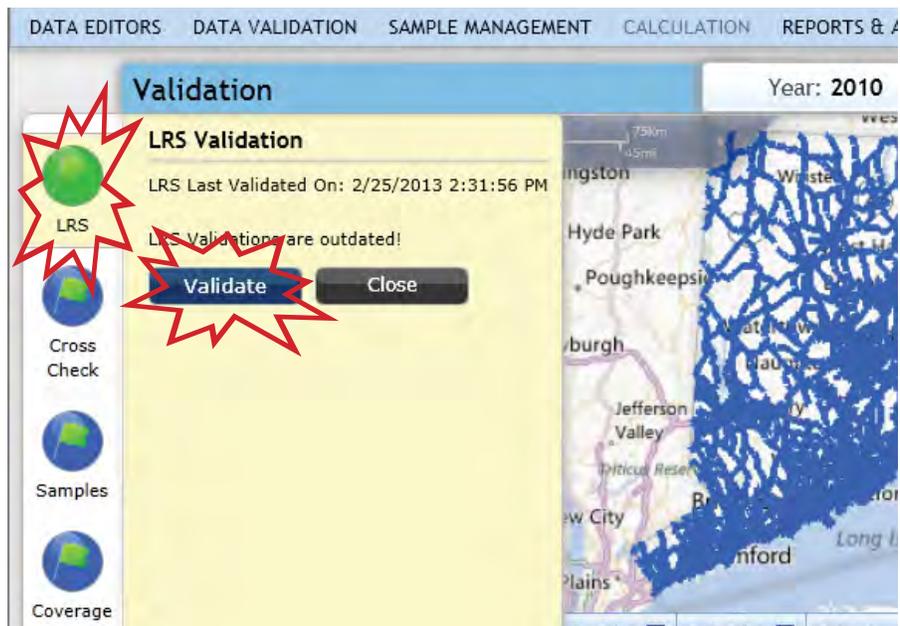
Running Validations

Click on Data Validation in the Application Menu to activate the Validation application window.

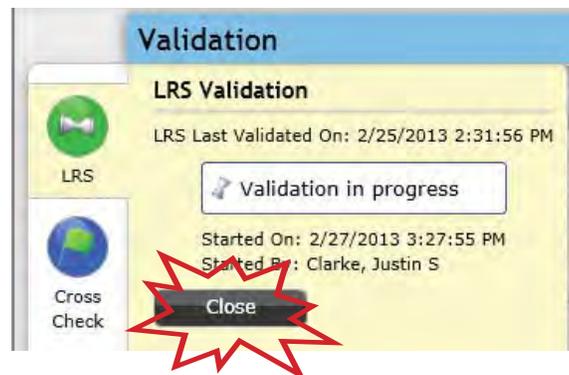
Next click on any Validation button to open the associated Validation status window.

Click Validate to run the validation. After the validation has started, click Close.

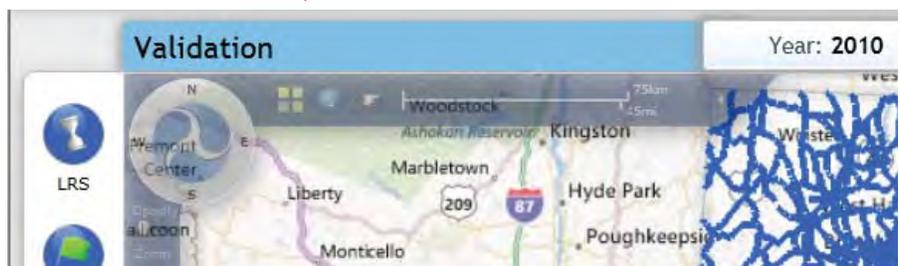
The LRS Validation pop up box displays the last time a validation was run.



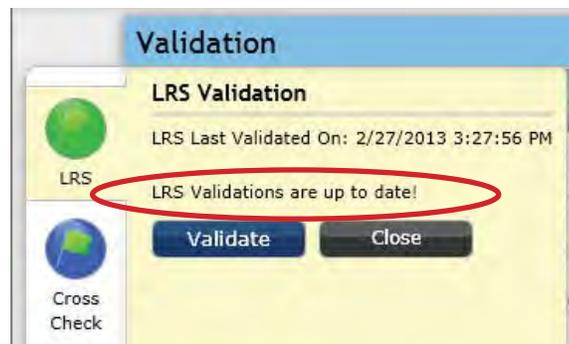
Validations run in the background, so users can close the validation window before the validation run is complete. Users can also exit the system once the process has started, and it will continue to run.



When the hourglass stops spinning, the validation process is complete.

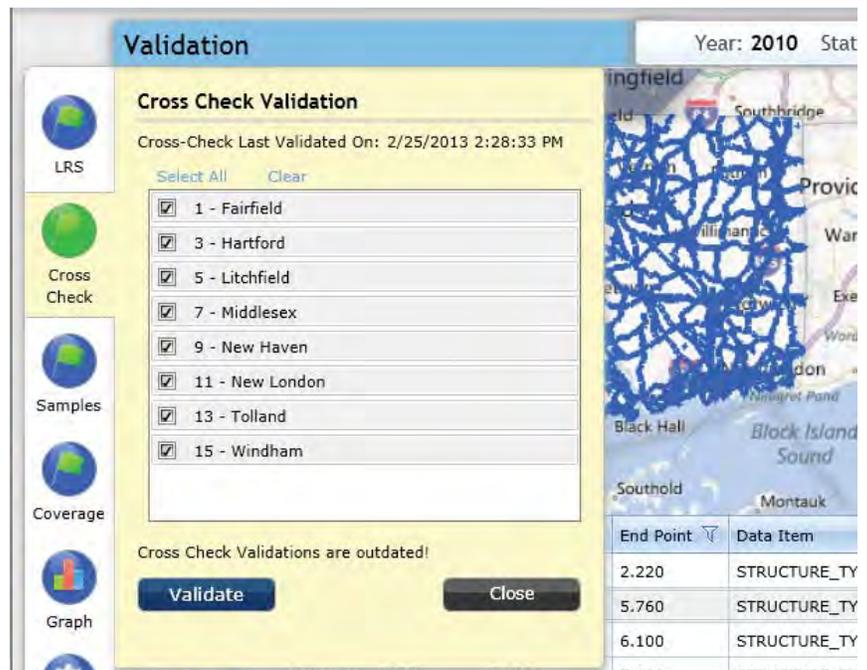


After running Validations, each Validation window will show the most recent run of the associated Validation. If there has been no change to the underlying data since the last run then a message noting that Validations are up to date will appear.



Running Validations Continued

Unlike other Validations which are always run for the whole State, Cross Check Validations can be run at the County level. Use the check boxes in the Cross Check Validation dialog box to select counties to be included in the Cross Check Validation. Select All and Clear can be used to quickly modify the selected list of Counties.



Types of Validations

Each of the four Validation types runs a different process. Some identify errors that needed to be fixed, others produce warnings that flag data for further review. The table below provides more information about each Validation.

Validation	Processes/Data Checks	Output
LRS	<ul style="list-style-type: none"> Identify locations where Data Item records do not match LRS extents Begin/End Points for Data Items exceed Route Begin/End Points Locations where Data Items reference a Route that does not exist in the LRS file 	Errors (Data will not be used by HPMS)
Cross Check	<ul style="list-style-type: none"> Comparison of Data Item values against values from other related Data Items Identify values that are outside of typical data relationship ranges 	Warnings (Data will still be used by HPMS but numerous warnings should be addressed in Submission Comments)
Samples	<ul style="list-style-type: none"> Verification of the spatial location of Samples per HPMS Field Manual rules Locations of Sample Begin/End Points are evaluated against TOPS records and the provided LRS Samples must not cross a TOPS boundary or be located where a valid LRS ID does not exist 	Errors (Data will not be used by HPMS - Samples that fail Validation are marked as Invalid)
Coverage	<ul style="list-style-type: none"> Logical checks to assess where Sample Data Items should be reported related to other Data Items Check to ensure that HPMS Data Items are reported to the requirements provided in the Field Manual 	Errors (Where data is not properly reported or missing)

Viewing Validation Results

After each Validation process is run, results can be viewed in the matrix at the bottom of the screen.

In the view at right, the Error Message field has been repositioned by clicking and dragging the column to a location adjacent to the Route ID field.

To export a CSV file of Validation records, use the Validation button on the Export screen (in the Data Editors menu).

The screenshot shows the 'Validation' window in HPMS. On the left is a vertical toolbar with icons for LRS, Cross Check, Samples, Coverage, Graph, and Create Geoms. The main area features a map of a region with various towns and roads. Below the map is a table titled 'Validation Results Records' with the following data:

Type	Route ID	Error Message
Coverage	A006	AADT_Single_Unit/AADT_Combination Must Ex
Coverage	A006	AADT_Single_Unit/AADT_Combination Must Ex
Coverage	A006	AADT_Single_Unit/AADT_Combination Must Ex
Coverage	A008	AADT_Single_Unit/AADT_Combination Must Ex
Coverage	A015	AADT_Single_Unit/AADT_Combination Must Ex

At the bottom right of the table area, it says 'Total Valid'.

Before Validation results can be viewed on the map within HPMS, their Geometry must be created. Click the Create Geometries tool and then select Validation from the options listed.

For an understanding of the Create Geometries process see the Geometries guidance in the Data Editors Menu section of this Guide.

The screenshot shows the 'Create Geometries' dialog box. It has a title bar 'Validation' and a sub-header 'Create Geometries'. Below the sub-header is the instruction 'Select which geometries you wish to create.' followed by a table:

Geometry	Last Submitted	Status
<input type="checkbox"/> Section	1/1/0001 12:00:00 AM	Ready
<input type="checkbox"/> TOPS and Sample	1/1/0001 12:00:00 AM	Ready
<input checked="" type="checkbox"/> Validation	1/1/0001 12:00:00 AM	Ready

At the bottom of the dialog are two buttons: 'Create Geometries' and 'Close'. A red starburst graphic highlights the 'Create Geoms' icon in the toolbar on the left side of the dialog.

Viewing Validation Results Continued

After running the Geometry process for Validations, the Validations will appear in the map window of the Validation screen. By default, all Validation records will be shown.

By default, all counties will be included in the validation. Use the Clear, Select all, or check boxes to refine your validation if desired.

To view one type of Validation use the filter tools to refine the Validation records.

Type	Route ID	Begin Point	End Point	Data Item
Coverage	A109	1.660	2.220	STRUCTURE
Coverage	A109	2.220	5.760	STRUCTURE

Type	Route ID	Begin Point	End Point	Data Item
Coverage	A109	1.660	2.220	STRUCTURE
Coverage	A109	2.220	5.760	STRUCTURE
Coverage	A109	5.760	6.100	STRUCTURE
Coverage	A109	6.380	7.180	STRUCTURE
Coverage	A109	7.190	10.710	STRUCTURE
Coverage	A109	10.710	12.020	STRUCTURE

Viewing Validation Results Continued

Left click on a record and select Zoom to Feature to view the highlighted record.

The screenshot shows the 'Validation' software interface for the year 2010. On the left is a vertical toolbar with icons for LRS, Cross Check, Samples, Coverage, Graph, and Settings. The main area displays a map of Connecticut with a red line indicating a validation feature. Below the map is a data table with the following columns: Type, Route ID, Begin Point, End Point, and Data Iter. A context menu is open over the table, with 'Zoom To Feature' highlighted by a red starburst.

Type	Route ID	Begin Point	End Point	Data Iter
Cross Check	A437	0.390	0.440	AADT_CC
Cross Check	A437	0.390	0.440	AADT_CC
Cross Check	A916	0.030	0.160	AADT_CC
Cross Check	A916	0.030	0.160	AADT_CC
Cross Check	A437	0.390	0.440	AADT_ST

A sample view of highlighted record is at right. The Zoomed Preview option will preview, but not zoom to the selected feature.

This screenshot shows a zoomed-in view of the map from the previous image, focusing on the intersection of Frontage Rd and Forbes Ave. The red validation feature is clearly visible. The data table below the map shows the same records as before, but with a context menu open over the table, highlighting the 'Zoomed Preview' option.

Type	Route ID	Begin Point	End Point	Data I
Cross Check	A437	0.390	0.440	AADT_
Cross Check	A437	0.390	0.440	AADT_
Cross Check	A916	0.030	0.160	AADT_
Cross Check	A916	0.030	0.160	AADT_

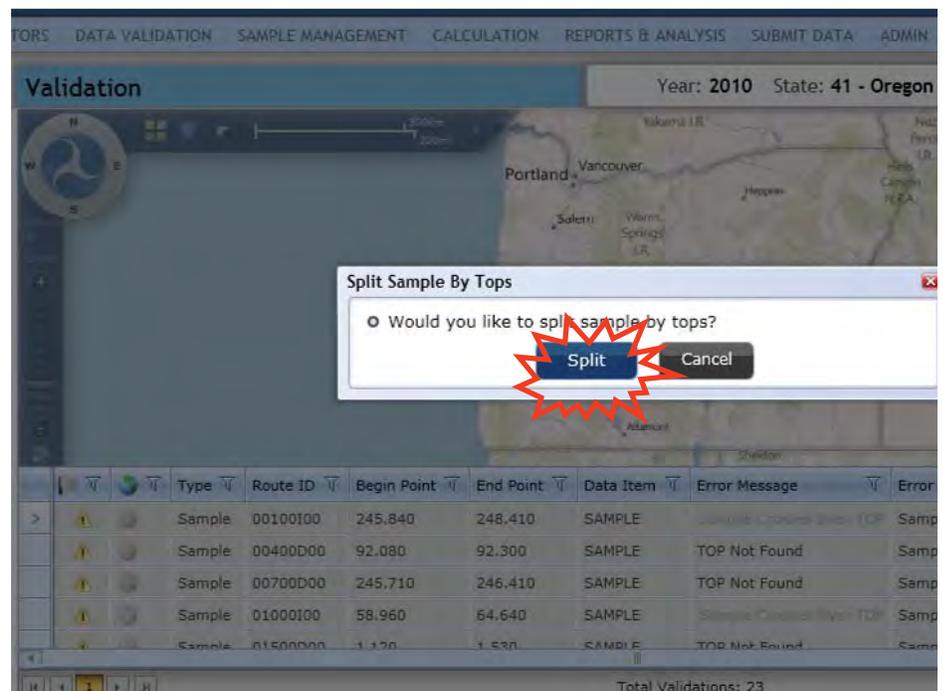
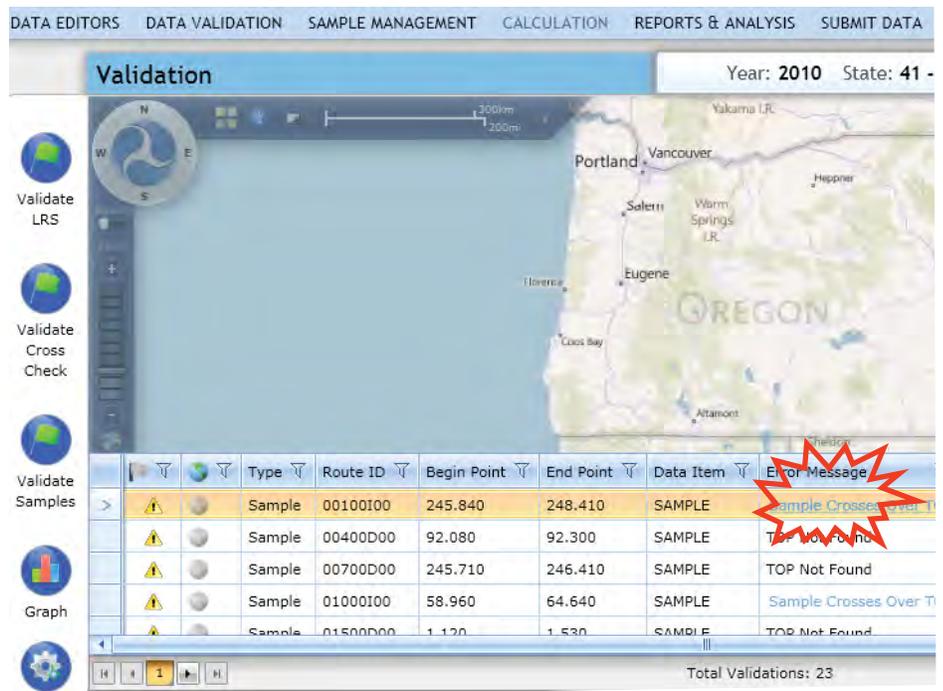
The Sample Splitter Tool

For samples that cross TOPS sections, the HPMS software includes a tool that allows users to split samples to create new samples that conform to TOPS breaks. This Sample Splitter tool is described below.

Click on a record in the Sample Validation matrix that has an error message "Sample Crosses Over TOP".

To split the sample, click Split in the resulting dialog box.

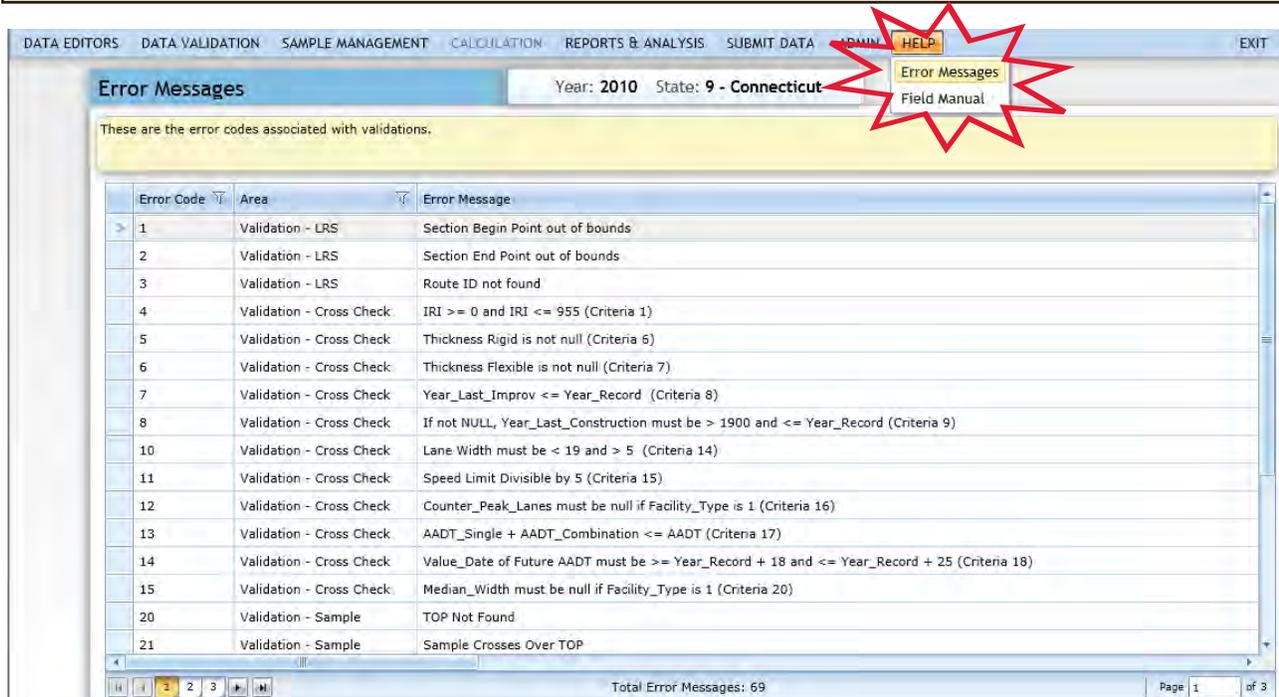
A sample split can not be undone, so be sure to use the splitter tool with caution.



Viewing Validation Rules

The HPMS Validate processes use a number of validation rules when verifying submitted data. The latest list of these validations can be viewed via the application's Admin menu.

Click on the Help menu and then Error Messages to view validation rules used by the HPMS application.

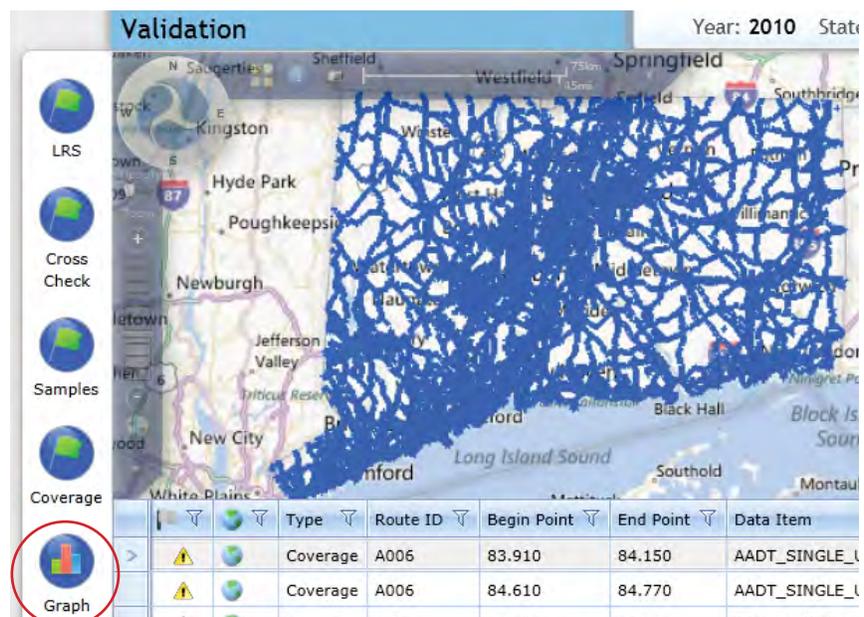


This list is comprised of the user activated Validations (LRS, Cross Check, Sample and Coverage) currently employed in the HPMS Software. Import Validations are run automatically by the HPMS software and can be viewed via reports associated with each Import Job on the Import Screen. More information on validations can be found in Chapter 7 of the [HPMS Field Manual](http://www.fhwa.dot.gov/policy/ohpi/hpms/fieldmanual) (<http://www.fhwa.dot.gov/policy/ohpi/hpms/fieldmanual>). For a complete list of Validations see Appendix A.

The Validation Graph

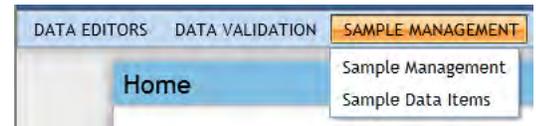
A summary graphic depicting the number and type of Validation Warnings/Errors generated for a State data set can be viewed via the Graph button on the left side of the Validation screen.

This graphic is currently in revision in order to accommodate the new Coverage Validations. Future versions of this Guide will provide more information about this tool.

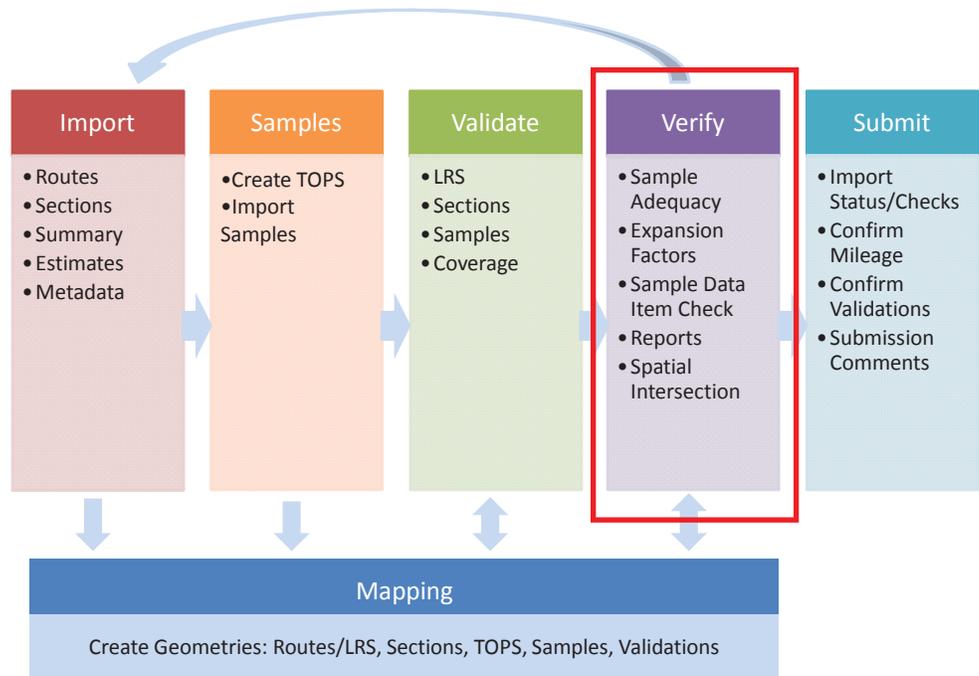


Sample Management Menu

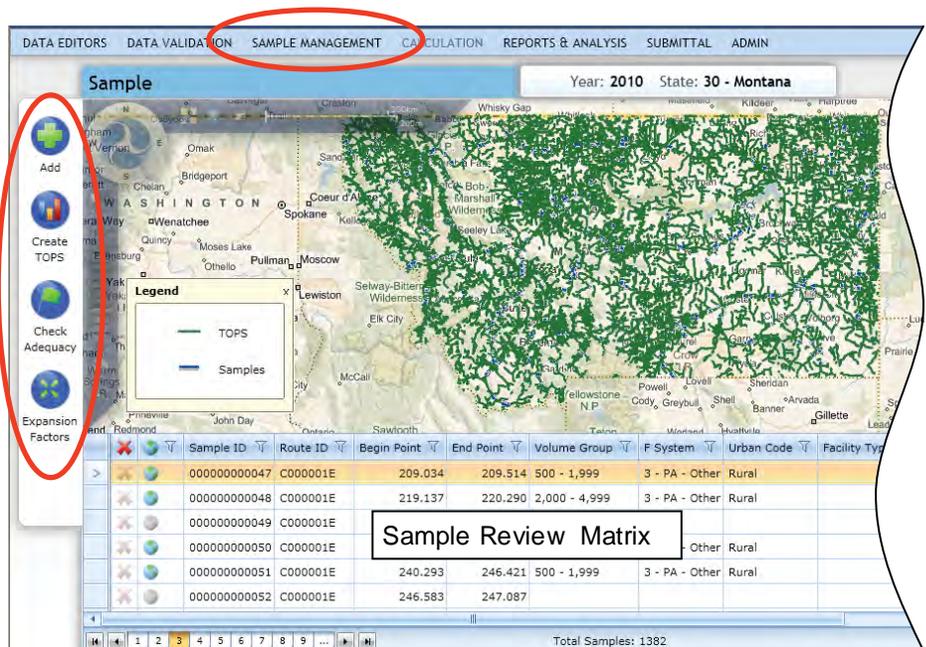
Once Route, Section and Sample data are Imported and Validations have been reviewed, there are several processes that must be completed by States in order to appropriately manage their sample data sets. This review process is performed through the Sample Management Menu and its two components - Sample Management and Sample Data Items. The four tools in the Sample Management area: Add, Create TOPS, Check Adequacy and Expansion Factors, provide users with the means to evaluate and manage sample data. Samples can be reviewed in detail within the Sample Data Items area. The next few pages of this guide discuss the Sample Management Menu in detail. In addition to this guide, it may be helpful to review Chapter 6 of the HPMS Field Manual for details on sample collection and required data elements.



Sample Management tasks fall into the Verify component of the workflow.



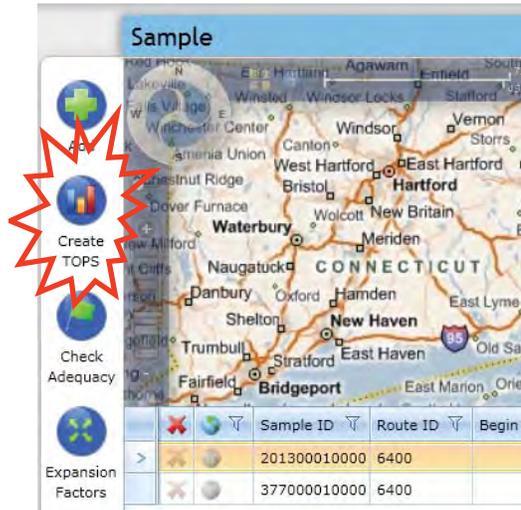
A view of the Sample Management Menu Screen with its four tools on the left margin.



Create TOPS

The Table of Potential Samples, or TOPS is the sampling frame for HPMS and is based on five elements—Functional System, Facility Type, Urban Code, AADT and Through Lanes. State sample submissions are compared to the HPMS TOPS sample frame as part of the HPMS submission process. Typically, States submit their own sample set, but the TOPS sampling frame can serve as a sample set for HPMS submission if States do not have sample data of their own. Regardless of the approach, the HPMS TOPS process must be completed to ensure that the State sample set is consistent with the TOPS and is sufficient for precision targets.

From the Sample Management screen, click Create TOPS to activate the TOPS dialog box.



NOTE: The TOPS process runs automatically upon import of sample data. Although this guide describes a linear process for importing files, many States edit, delete and re-import files throughout the import process. It is therefore recommended that TOPS be run manually before examining sample adequacy to ensure that the sample review in the following steps accurately reflects your most recent data and the associated TOPS file.

Click Create TOPS in the resulting screen. The TOPS button will turn into a spinning hour glass icon when the TOPS process is running.



Users can navigate away from this screen once the Create TOPS button has been pushed as this process will continue to run in the background.

There isn't a display of the TOPS run, but the TOPS can be exported for review from the Export Screen.



If you can't recall when or if TOPS was last created, the TOPS dialog box displays a record of the last TOPS run just above the Create TOPS button.

Adding Samples

If the Sample Adequacy review indicates that samples need to be added to meet HPMS sample requirements, the Add tool can be used to select samples from an available sample set based on the TOPS generated in previous steps.

From the Sample Management screen, click Add to activate the Add Sample dialog box.

Drop down menus for Volume Group, Functional System and Urban Code enable users to select the appropriate groupings for added samples.

The screenshot displays the 'Add Sample' dialog box within the HPMS software. The dialog box is titled 'Sample' and 'Add Sample'. It includes a sidebar with icons for 'Add', 'Create TOPS', 'Check Adequacy', and 'Expansion Factors'. The main area has a message: 'Please select the minimum number of samples to save. You may choose to select a random sample as well.' Below this are three dropdown menus: 'Volume Group: 1 - Under 500', 'F System: 1 - Interstate', and 'Urban Code: 18856 - Colorado Springs, CO'. A table below the dropdowns shows columns for 'Add', 'Sample ID', 'Route ID', 'Begin Point', 'End Point', 'Facility Type', 'Through Lanes', 'AADT', 'Last Modified On', and 'Last Modified By'. At the bottom of the dialog are buttons for 'Random Select', 'Save', and 'Cancel'. Below the main screenshot, three expanded dropdown menus are shown, each with arrows pointing to the corresponding dropdown in the dialog box above. The 'Volume Group' dropdown lists 12 categories from '1 - Under 500' to '12 - 250,000 and more'. The 'F System' dropdown lists 5 categories from '1 - Interstate' to '5 - Major Collector'. The 'Urban Code' dropdown lists 11 categories from '18856 - Colorado Springs, CO' to '99999 - Rural'.

Adding Samples Continued

After using the drop down menus to select a Volume Group, Functional System and Urban Code, users have two options for selecting samples to meet HPMS requirements. For either approach, added samples will be given a system generated Sample ID.

A Add Samples - Manual Select Option

Click on the Add check boxes on the left side of the Add Sample Window to manually add sample records to the selected Volume Group, Functional System and Urban Code. Samples that can be added to the sample set appear in the Add Sample window with an unchecked box in the Add column.

B Add Samples - Random Select Option

Click on the **Random Select** button to add a random selection of sample records to the selected Volume Group, Functional System and Urban Code to match the necessary HPMS sampling requirements.

A running count of existing versus required samples is kept at the bottom of the Add Sample Table.

Click on the Add check boxes on the left side of the Add Sample Window to manually add sample records to the selected Volume Group, Functional System and Urban Code. Samples that can be added to the sample set appear in the Add Sample window with an unchecked box in the Add column.

Expansion Factors

The final step in sample adequacy review is examination of the sample expansion factors. Section 6.5 of the HPMS Field Manual provides guidance and background on sample adequacy requirements.

Select the Expansion Factors button from the Sample Management screen to view sample expansion factors for the imported and/or TOPS sample set. Click the Calculate button to generate an updated list of expansion factors for your data.

As with several other processes, the Expansion Factor window displays a record of the most recent process run.

DATA EDITORS DATA VALIDATION SAMPLE MANAGEMENT CALCULATION REPORTS & ANALYSIS SUBMIT DATA

Sample Year: 2009 State: 8 - Colorado

Expansion Factor

Expansion Factor Last Created On: 7/5/2011 3:28:30 PM

Year_Record	State_Code	Urban_Name	F_System	Volume_Group	Expansion_Factor	Sample_Length	Universe_Length
> 2009	8	Boulder, CO		5	10.156		0.782
2009	8	Boulder, CO		6	1.216		2.732
2009	8	Boulder, CO		7	1.86		10.052
2009	8	Boulder, CO		8	1.352		1.159
2009	8	Boulder, CO		4	1.592		3.227

Calculate Close

Sample Data Item Area

The Sample Data Item Area contains two tools to help with the review of Samples - the Sample Data Items Matrix and the Missing Data Items Breakdown Summary. Use these tools to identify Samples that are missing data, generate maps for field review of Samples and to summarize the set of data items covered by the submitted Sample set. The images below illustrate the features of the default screen in this area of the software.



The Overall Summary lists the total number of samples imported into the software and identifies those samples that are missing data.

Records can be sorted or filtered on any Header column.

Data Items

Data Item: Clear

System	Missing Data Items
Access_Control	
Alternative_Route_Name	
At_Grade_Other	27
Base_Thickness	
Base_Type	
Climate_Zone	
Cracking_Length	
Cracking_Percent	
Curves_A	
Curves_B	
Curves_C	
Curves_D	
Curves_E	
Curves_F	
Faulting	
Grades_A	
Grades_B	
Grades_C	
99999	33
	27

Use the drop down list to quickly generate a list of samples missing a specific Data Item. If left empty, the screen below will show the total number of data items missing from each sample.

Sample Data Items Year: 2010 State: 20 - Kansas

Overall Summary: Total Samples: 1878 Samples With No Missing Data Items: 0 Samples with Missing Data Items: 1878

Filter by Samples with Missing Data Item:

Sample ID	Route ID	Begin Point	End Point	F System	Urban Code	Volume Group	Missing Data Items
> 201300010000	001K0022400-EB	0	1.039	5	99999	2	27
377000010000	001U0005400-EB	6.034	6.161	3	99998	4	30
117400010000	001U0005400-EB	7.666	9.046	3	99999	4	32
114100010000	001U0005400-EB	19.110	22.182	3	99999	3	29
548000010000	001U0005900-NB	3.896	10.134	4	99999	2	26
548500010000	001U0005900-NB	12.406	12.555	4	99999	2	29
549000010000	001U0005900-NB	15.134	20.020	4	99999	2	25
202300020000	002K0003100-NB	1.003	3.011	5	99999	1	26
278300020000	002K0003100-NB	3.964	8.174	5	99999	1	30
126300020000	002K0003100-NB	20.275	20.682	5	99999	3	31
119300020000	002K0003100-NB	41.628	44.128	4	99999	2	29
850200020000	002R0001100X0	3.080	7.110	5	99999	1	50
850400020000	002R0116000X0	0	0.970	5	99999	2	49
550000020000	002U0005900-NB	0.154	3.041	4	99999	2	27
117600020000	002U0005900-NB	21.468	21.752	3	99999	4	33
238500020000	002U0016900-NB	19.897	27.447	3	99999	3	27

Total: 1878 Page 1 of 76

Sample Data Item Area Continued

To view more information about an individual record in a **Sample Detail** report, click on the magnifying glass on the right side of that record's row in the table.

Sample Data Items

Year: 2010 State: 20 - Kansas

Overall Summary: Total Samples: 1878 Samples With No Missing Data Items: 0 Samples with Missing Data Items: 1878

Filter by Samples with Missing Data Item: []

Sample ID	Route ID	Begin Point	End Point	F System	Urban Code	Volume Group	Missing Data Items
201300010000	001K0022400-EB	0	1.039	5	99999	2	27
377000010000	001U0005400-EB	6.034	6.161	3	99998	4	30
117400010000	001U0005400-EB	7.666	9.046	3	99999	4	32
114100010000	001U0005400-EB	19.110	22.182	3	99999	3	29
548000010000	001U0005900-NB	3.896	10.134	4	99999	2	26
548500010000	001U0005900-NB	12.406	12.555	4	99999	2	29
549000010000	001U0005900-NB	15.134	20.020	4	99999	2	25
202300020000	00230002100-NB	1.003	3.011	5	00000	1	26

The Sample Detail report consists of three components - the Sample Details summary, Map tab and Data Item (detail) tab. Shown below are the Sample Details summary and Map tab. The Data Items tab is shown on the next page. Note that the Map is automatically zoomed to the selected sample.

Sample Data Items

1 Sample Details

State Code 13

Sample ID 000400100400

Route ID 0011000400

Begin Point 0.420

End Point 2.460

Comments

F System 3 - PA - Other

Facility Type 2

Urban Code 99999

Through Lanes 2

AADT 2280

Volume Group 3

Expansion Factor

2

Map Data Items

Print OK

Items that are not complete will appear in red text in the Sample Details screens.

The tab (with Detail summary) can be printed. Note that the print will be Landscape.

Sample Data Item Area Continued

The Data Items tab, as shown below, provides a list of all Data Items that are required by HPMS and identifies those that are missing from the sample file. Note that the list of Data Items is the same for each Sample. The data provided on that Sample, however, defines the appropriate set of required Data Items based on the HPMS Field Manual requirements and associated Coverage Validations. For example, a Sample with a rigid pavement type will be required to have Faulting values reported on that Sample.

Sample Data Items

3

Map | Data Items

Traffic	Pavement	Geometric	
AAADT Combination 775	IRI 81	Access Control 3	Alternative Route Name
AAADT Single Unit 674	IRI (Year) 2009	At Grade Other 4	Counter Peak Lanes
Pct Peak Single 5.7	IRI (Month) 10	Curves A 2.04	Median Type
Pct Peak Combination 6.1	PSR	Curves B	Median Width
K Factor	Surface Type	Curves C	Number Signals 0
Dir Factor 57	Rutting	Curves D	Pct Green Time
Future AADT 3594	Faulting	Curves E	Pct Pass Sight 50
Future AADT (Year)	Cracking Length	Curves F	Shoulder Type 5
	Cracking Percent	Grades A 1.48	Shoulder Width L
Jurisdiction	Year Last Constr.	Grades B 0.56	Shoulder Width R 8
Ownership 1	Year Last Improv	Grades C	Signal Type 5
Ownership (S)	Thickness Flexible	Grades D	Stop Signs 0
Route Number 1	Thickness Rigid	Grades E	Speed Limit 55
Route Number (T)	Base Thickness	Grades F	Structure Type 1
Route Qualifier 9	Last Overlay Thickness	HOV Lanes	Terrain Type 1
Route Signing 3	Base Type	HOV Type	Turn Lanes L
Toll Charged	Soil Type	Lane Width 12	Turn Lanes R
Toll Charged (ID)		Peak Parking	Widening Obstacle
Toll Type		Peak Lanes 2	Widening Potential
Climate Zone			
County Code 1			

Print | OK

Items that are not complete will appear in red text in the Sample Details screens (but only after the Coverage Validations have been run, see Page 39).

Sample Data Item Area Continued

Click on the Show Summary tool to view a full listing of the number of Samples reported for each of the Data Items that are part of the annual HPMS Sample submission.

The image shows two screenshots of the HPMS software interface. The left screenshot shows the 'Sample Data Items' window with a table of sample data. A red starburst icon highlights the 'Show Summary' button. A blue arrow points to the right screenshot, which shows the 'Missing Data Items Breakdown Summary' dialog box overlaid on the main window. The dialog box contains a table listing various data items and their corresponding number of samples.

Sample Data Items (Left Screenshot)

Overall Summary: Total Samples: 1

Sample ID	Route ID
> 201300010000	001K0022400-EB
377000010000	001U0005400-EB
117400010000	001U0005400-EB
114100010000	001U0005400-EB
548000010000	001U0005900-NB
548500010000	001U0005900-NB
549000010000	001U0005900-NB
202300020000	002K0003100-NB
278300020000	002K0003100-NB
126300020000	002K0003100-NB
119300020000	002K0003100-NB
850200020000	002R0001100X0
850400020000	002R0116000X0
550000020000	002U0005900-NB
117600020000	002U0005900-NB
238500020000	002U0016900-NB

Missing Data Items Breakdown Summary (Right Screenshot)

Missing Data Item	# of Samples
Access_Control	67
Alternative_Route_Name	1878
At_Grade_Other	10
Base_Thickness	1093
Base_Type	1093
Climate_Zone	1878
Cracking_Length	987
Cracking_Percent	988
Curves_A	1118
Curves_B	1848
Curves_C	1868
Curves_D	1870
Curves_E	1868
Curves_F	1878
Faulting	1640
Grades_A	1174
Grades_B	1164
Grades_C	1595
Grades_D	1831
Grades_E	1876

Reports & Analysis

There are three options for users in the Reports & Analysis menu: Reports, Spatial Intersector and Sample Drill. The Reports and Spatial Intersector tools are described in this Guide. The Sample Drill function will be described in a future version of this Guide.

The Reports function enables users to generate summaries of submitted HPMS data while the Spatial Intersector tool can be used to create queries of multiple data items for analysis. There are a number of reports available either in static form or through interactive dialogs. The text below describes available reports in the Submit Module. Each report can be downloaded or printed for further analysis.



Available Report Types

Here is an overview of the HPMS reports available in the Submit Module. More detail is available in Appendix B.

Overview: Lists the submitted data items (Sections, Routes, Summaries) by number of records submitted. A detailed list of records submitted for each Data Item is available via the Interactive Reports tool.

Validation Summary: Summary of the number of occurrences of errors associated with uploaded data. This report is also available via the Interactive Reports tool where users can generate sub-reports by error type.

Extent and Travel (also on the NHS, Interstate, Extent and Travel Changes and Changes Summary): This group of reports produces a table of miles, lane miles and travel by Functional System. The base report (Extent and Travel) also groups records by Urban Area. The Changes report compares the current submittal with data from the previous year, the Summary report groups data by Urban and Rural classifications, the Interstate report lists mileage and travel for all reported Interstates and the NHS version reports mileage only for routes that are part of the NHS (National Highway System).

Several reports, including the Extent and Travel Report selected at right, incorporate summary data. Be sure to have summary data imported before running any of the Extent and Travel reports.

Ownership: A listing of mileage for each of the Ownership categories in the Field Manual - grouped by Functional System.

Consistency: This report compares the total mileage for several key Data Items with the HPMS Control Total (F_System, Facility_Type and Urban_Code) for upper level systems. Data is reported by Functional System for Section data only.

IRI on the NHS (and Federal Aid Highways): These two reports present IRI (International Roughness Index) Data grouped by Functional System and Good, Fair and Poor Rating for the respective subset of a State's roadway network.

Generating Reports

Select Reports from the Reports & Analysis Menu.



Generating Reports Continued

Software Generated Static Reports

There are two types of reports in the HPMS software, Static and Interactive. Both Static and Interactive reports are generated from the Reports & Analysis Menu. The features of the Report screen are described in the image below.

The list of available static reports varies depending on the HPMS software module: Submit, Review and National. The list here is for Submit. More reports are available in the Review and National Modules. See Appendix for more detail.

Report Name	Report Status	Submitted By	Submitted On	Last Modified On	Create	Cancel	Download	Preview PDF
Consistency	0 - Not Created				<input type="checkbox"/>			
Extent and Travel Report	0 - Not Created				<input type="checkbox"/>			
Extent and Travel Report (Urban/Rural Summary)	0 - Not Created				<input type="checkbox"/>			
Extent and Travel on the NHS	0 - Not Created				<input type="checkbox"/>			
Extent and Travel on the Interstates	0 - Not Created				<input type="checkbox"/>			
IRI on the Federal Aid Highways	5 - Report Created	Carpenter, Edward	12/11/2012 4:12:51 PM	12/11/2012 4:14:27 PM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IRI on the NHS	5 - Report Created	Carpenter, Edward	12/11/2012 4:12:51 PM	12/11/2012 4:14:30 PM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Overview	0 - Not Created				<input type="checkbox"/>			
Ownership	0 - Not Created				<input type="checkbox"/>			
Sample Adequacy	0 - Not Created				<input type="checkbox"/>			
Validation Summary	0 - Not Created				<input type="checkbox"/>			

After reports are run, they are stored in the HPMS system for future use. Date and time data is updated each time a report is run. Reports that have already been run can be downloaded and previewed without going through the Create process.

- Static Report Interface** - Users can run, preview and download reports from this area.
- Interactive Report Link** - Clicking this link will take users to a screen where two interactive reports can be generated. These reports are described in the following pages.
- Available Reports** - The image above depicts the reports available from the Submit module. Four additional reports, the National Extent and Travel Report and three standard tables from the FHWA Highway Statistics series - HM-20, HM-60 and VM-2 are available in the Review and National modules.
- Report Selection Buttons** - Reports are created, canceled, downloaded and previewed via check boxes to the right of the screen. To run a report, check the box in the row that corresponds to the desired report. Processing status will appear in the middle columns of the screen. After the report is created, it can be viewed or downloaded via corresponding check boxes in the adjacent columns.
- Action Buttons** - After selecting reports to run or download via the check boxes in the Static Report Interface, users must click one of these buttons to complete the request. If necessary, reports can be canceled once the processing request has been made.

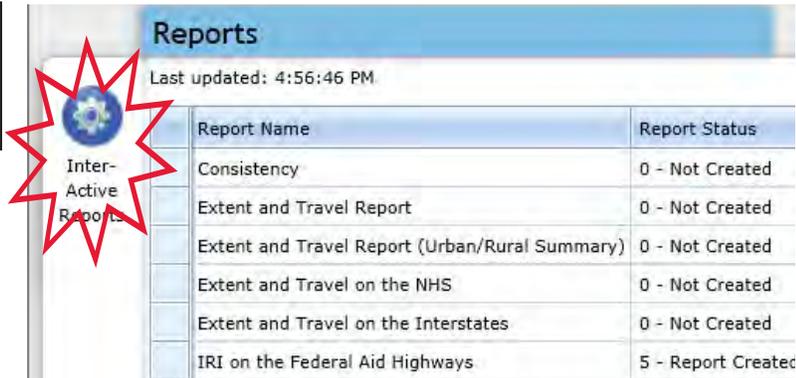
General Note on Report Output where Two Years of Data is Reported: Many Reports in the HPMS system (submittal year 2011 and higher) provide year to year comparisons of submitted HPMS data. In the Submit and Review Modules, data for the previous year is taken from the National module for comparison.

Generating Reports Continued

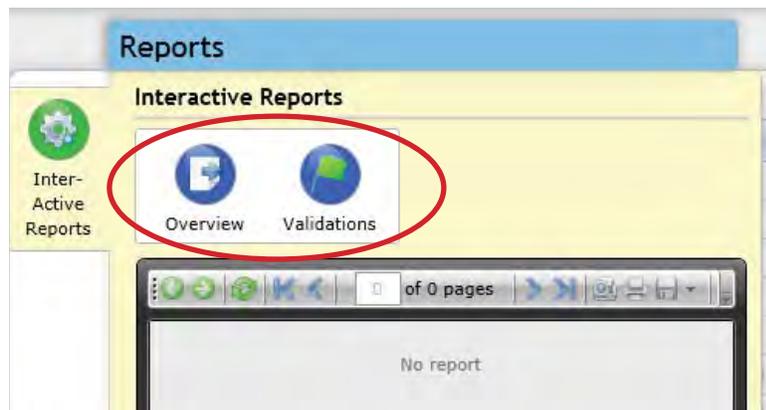
Generating Interactive Reports

As the name suggests, interactive reports allow users to define the components of the report (to an extent). The two interactive reports in the HPMS software are for Overview and Validations. The Overview report lists the number of records that were submitted for each Data Item. The Validations report lists the detailed records for each validation error or warning from the Validations processes. Validations must first be run before this report will be populated.

To create interactive reports for viewing or printing, select Interactive Reports from the Reports Screen.



Two interactive report options will be displayed. Select the Overview or Validations buttons to generate the associated report.



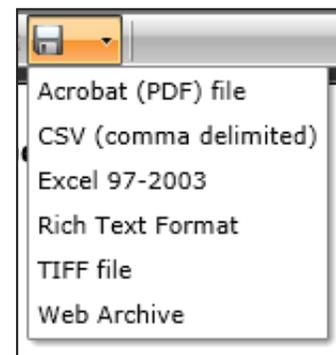
The Overview report is provided both in Interactive and Static formats. The Static version provides a summary of the data submitted by data type (e.g., Sections, Summary, Routes, etc.) while the Interactive version provides details for each HPMS Data Item (e.g. number of records for Functional System, number of records for Facility Type, etc.).

The Validation report is also provided in Interactive and Static formats. The Interactive version allows users to get the records that are affected by each Validation as opposed to the Static version which provides the just the sum of all records for each Validation.

Features of the Interactive Report Screen



- 1 Select one of the available report types to generate a report in the report window below.
- 2 These back and forward buttons are used when navigating between reports and sub reports. For example, clicking the back button will take the user back to the full report if a link to a sub report has been clicked.
- 3 This button can be used to refresh the report currently selected.
- 4 Users can enter a page number or use the forward and back arrows to navigate through pages within the reports.
- 5 The Print Preview and Print buttons can be used to print directly from the report view screen.
- 6 Reports can be saved into several formats for further review and analysis.



- 7 Text in the report window may have links to other reports or sub reports. Click these links to generate related reports.
- 8 Use the slider bar or preset zoom levels to enlarge or shrink reports for better reading or format review.

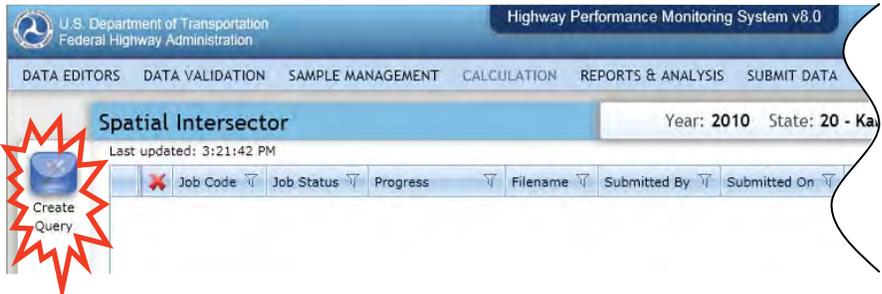
Spatial Intersector Tool

The Spatial Intersector tool in the Reports & Analysis menu provides users with the ability to query submitted data and combine various data items for tailored analysis. Output from the Intersector tool is in the form of a (zipped) pipe delimited .csv file.

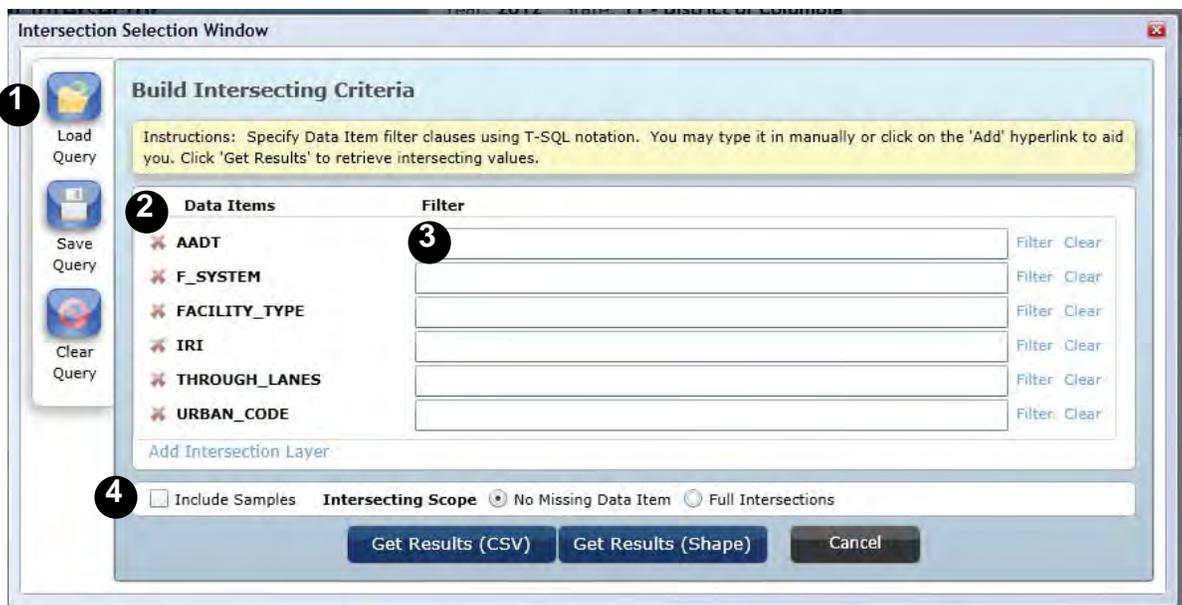
Select Spatial Intersector from the Reports & Analysis menu to begin using the tool.



Click on the Create Query button to launch the Intersector dialog box.

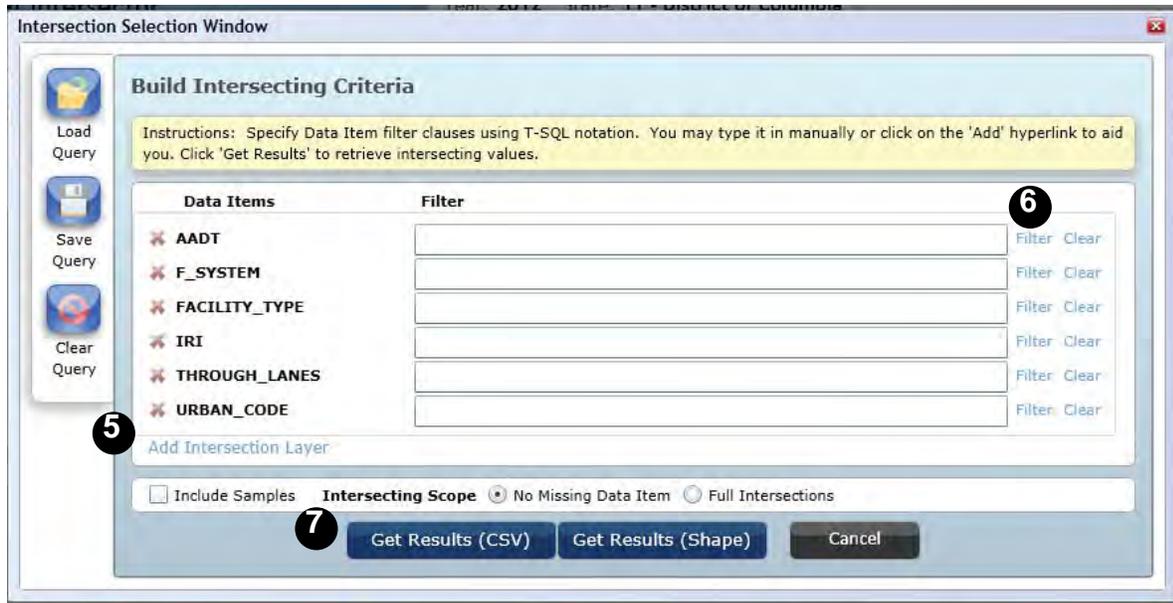


Features of the Spatial Intersector Dialog Box

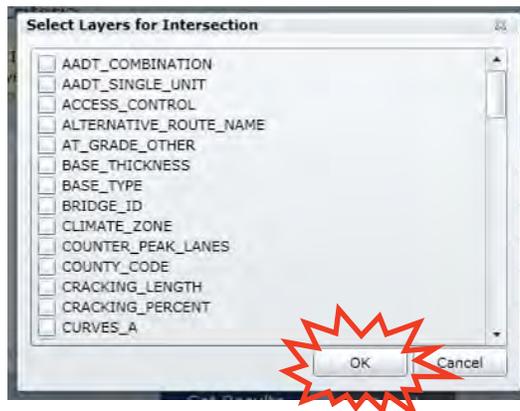


- 1 Existing SQL queries can be loaded into the application, and can be saved once generated. Use the Clear Query button to clear an existing query or refresh the query screen.
- 2 Use the 'X' marks next to the default list of data items to remove them from the query.
- 3 Add query text for data items in the boxes to the right of data items. The Intersector Query tool uses T-SQL notation.
- 4 Click here to include a field identifying which records were included in the submitted Sample set. Designation is via a boolean value (1/0). In addition, for those records that are Samples, the associated Expansion Factor will be included.

Spatial Intersector Tool Continued

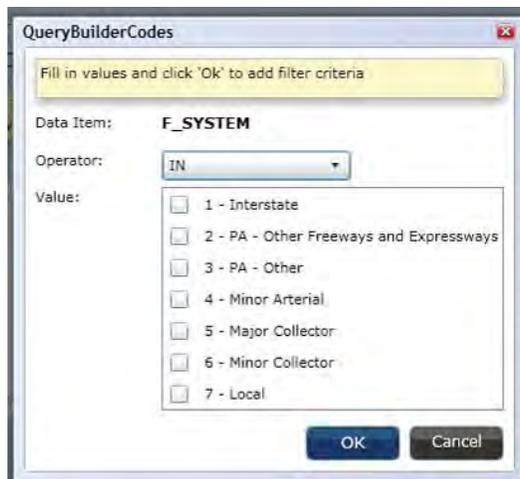


5 Data items can be added to the query by clicking on the Add Intersection Layer link. In the resulting dialog box, select data items by clicking in the boxes to the left of the data items and click OK.



There is no limit within the application on the number of layers that can be intersected at the same time. However, it is advised that users keep the number of layers to a minimum in order to ensure reasonable processing times.

6 Users can quickly add text to the Intersection dialog box by clicking on the Filter link. The resulting dialog box provides a drop down menu and check boxes for data items unique to each data item.



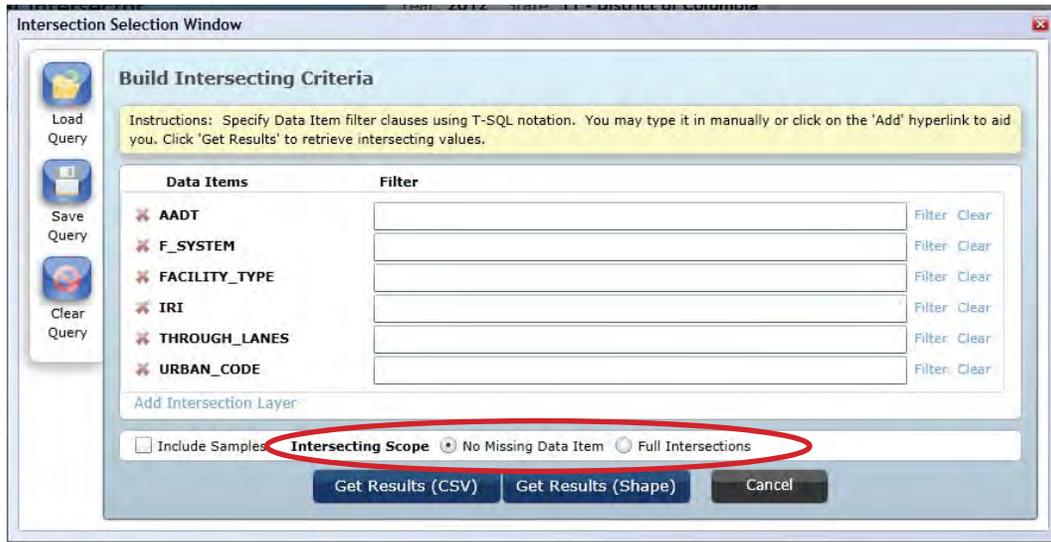
Clicking 'Clear' in the Intersector Dialog will clear an existing filter string.

7 Click either the CSV or Shape Results button to generate the corresponding output file. Note that Geometries must be run in order to obtain a Shape output.

Spatial Intersector Tool Continued

Specifying the Intersection Type

The intersector tool includes options to allow users to specify the type of intersection to run on the Data Items included in the Spatial query. The three “Intersecting Scope” options are described below and are available via the radio buttons on the bottom of the Intersection Criteria window.

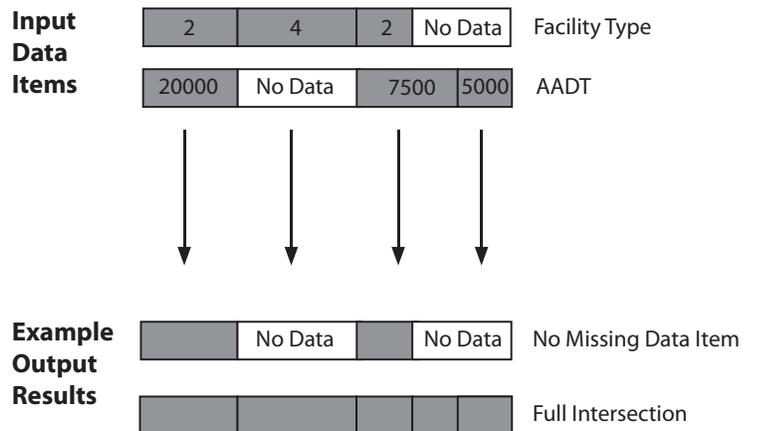
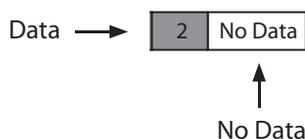


No Missing Data Item – This includes all of the sections that were selected as part of the intersection (this is the previous format for the tool). If there is data missing on a given piece of roadway for one of the included items then all data items will be left out of the result set for that section of road.

Full Intersection – All road sections will be included. If there is a gap in one data item but not another, null values will be filled in for the data section that has the gap.

Illustrative Diagram

In the example intersection with sample sections for two data items, shaded areas contain data, those without shading do not contain data. Note also that new section breaks are created when input section data contains different break points.



Spatial Intersector Tool Continued

After clicking on the Get Results button, the query will run and generate a log record on the main Spatial Intersector screen. As with the Import and Export logs, Intersection log entries can be cleaned by selecting the red 'X' to the left of the record. All queries can be deleted by selecting the 'X' in the header bar of the query log.

Click the green arrow under Download to download the data in a zipped, pipe delimited .csv file.



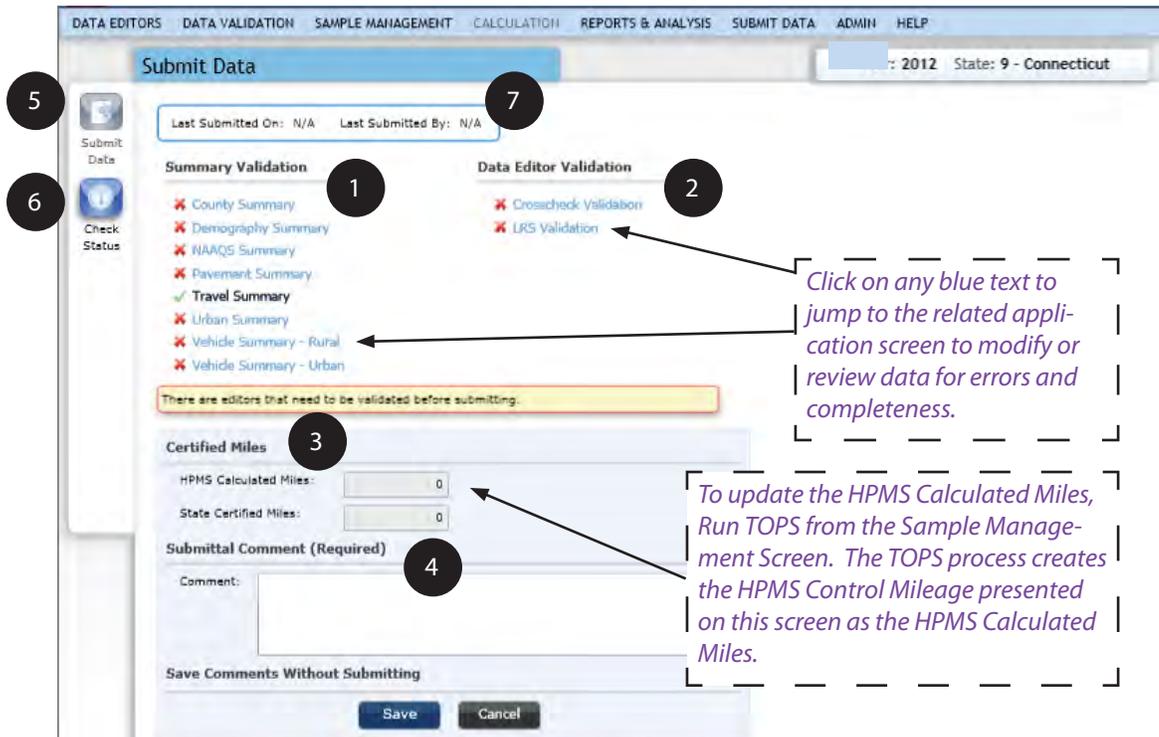
An example of an intersection created with the No Missing Data Item option of Urban Code and F_System is show below. The Intersector tool will generate a file with one record for each section. Note that because this option is an intersection and not a union, records will only be created for areas where all of the selected items are present.

Year_Record	State_Code	Route_ID	Begin_Point	End_Point	F_SYSTEM	URBAN_CODE
2010		9E084 009	0	0.26	1	22096
2010		9E084 018	0	0.19	1	22096
2010		9E084 029	0.62	0.63	1	22096
2010		9E084 240	0	0.12	1	22096
2010		9E084 013	0	0.15	1	22096
2010		9E084 021	0	0.27	1	22096
2010		9E084 801	0	0.4	1	22096
2010		9E084 236	0	0.06	1	22096
2010		9E084 243	0	0.88	1	22096
2010		9E084 010	0	0.13	1	22096
2010		9E084 019	0	0.2	1	22096
2010		9E084 031	0.22	0.57	1	22096
2010		9E084 241	0	0.26	1	22096
2010		9E084 014	0	0.13	1	22096

Submittal

The last stage in the annual HPMS submittal process is the review and verification of submitted files via the Submit Data screen. The components of the screen are described below.

Select the Submit Data function on the application menu to open the submittal review screen.



- 1 Summary Validation: data that is ready for submittal will appear with a green check. Items needing further attention will be marked with a red 'X'.
- 2 Data Editor Validation: LRS and Cross Check Validation results are displayed in this list. Green checks indicate that validation is successful, an exclamation mark/warning sign indicates that there are active warnings but that validation is free of errors, a red 'X' indicates that validation has not run or has errors needing attention.
- 3 Certified Miles: The HPMS Calculated Mileage should equal the number of miles for the State Certified Mileage submitted separately to FHWA. FHWA staff will enter the State Certified Mileage on this screen based on the Certified Mileage submission from the States. **In order to submit successfully, these two numbers must match within one mile.**
- 4 Submittal Comment: Comments are required but can be emailed separately. Comments should address items that are irregular, or major changes from the previous year's submittal. If emailing comments, write "Comments sent to staff via e-mail." in the comment box on this screen.
- 5 Submit Data Button: When all validations are free from red 'X' marks, the certified mileage has been entered and comments added, the Submit Data button will be activated (it will turn blue). Click the button to submit your data and e-mail FHWA staff any comments.
- 6 After submitting data, click the Check Status button to view submission progress.
- 7 For Reference, record of the most recent submission is logged in this box at the top of the Submission Screen.

Submittal Continued

Click the Submit Data button. Several windows will subsequently open. These boxes will confirm that the submission should continue and provide opportunity to monitor the submission status.

To activate the Submit Data button, HPMS submissions must meet all of the following conditions on the Submit Data Screen:

1. All validations either have a green check or caution sign. Red 'X' marks will prevent activation of the Submit Data button.
2. Certified Mileage must match HPMS calculated mileage within one mile.
3. Comments must be entered. Enter as much detail about the constraints and deficiencies of the associated submission as possible. Comments can be pasted from a text or word processing file.

See Appendix B - The Extent and Travel Report - for details on how the HPMS Calculated Miles figure is derived.

Read and Click through the Submit Process dialog boxes.

Each submission updates the data in the HPMS Review Module. Be sure to let FHWA HPMS staff know each time a submission is run.

The Submit Process runs in the background so users don't need to be logged in once the complete process has started. Details of the process can be viewed using the button on the right of this screen.

Submittal Continued

The Submit Process Dialog shows the status of submission throughout the process.

While the Submission process is running, the HPMS system is locked for the associated State and Year. No other actions or processes can be run while the Submission is running. Users can manipulate data for the same State but a different year, however.

Submit Process is Running

Submit Process is Running.

The HPMS system will now verify your data and move it to the Review module. This process may take several hours depending on system activity levels.

NOTE: HPMS functionalities will be unavailable until the verification process is complete. Processing will continue in the background. Users may log off of the system.

Step	Name	Started	Completed
1	Deleting Review Data	2/25/2013 2:52:23 PM	Not Yet
2	Running LRS and Cross Validation	Not Yet	Not Yet
3	Running Coverage Validation	Not Yet	Not Yet
4	Creating TOPS	Not Yet	Not Yet
5	Breaking TOPS	Not Yet	Not Yet
6	Running Sample Validation	Not Yet	Not Yet
7	Calculating Expansion Factors	Not Yet	Not Yet
8	Creating Full Intersections	Not Yet	Not Yet
9	Creating Section Geometries	Not Yet	Not Yet
10	Creating TOPS and Sample Geometries	Not Yet	Not Yet
11	Creating Validation Results Geometries	Not Yet	Not Yet
12	Submitting Routes	Not Yet	Not Yet
13	Submitting Sections	Not Yet	Not Yet

Close this Window Refresh and View Verification Process Detail

When the Submit process is complete, users will get a notice dialog when logging into the HPMS system.

Submit Process is Completed

Submit Process is Completed. Thank You !

Close this Window Refresh and View Verification Process Detail

The example at right displays a full set of completed steps in the Submit process.

Submit Process is Completed

Submit Process is Completed. Thank You !

Step	Name	Started	Completed
6	Running Sample Validation	2/25/2013 3:02:32 PM	2/25/2013 3:02:34 PM
7	Calculating Expansion Factors	2/25/2013 3:02:34 PM	2/25/2013 3:02:36 PM
8	Creating Full Intersections	2/25/2013 3:02:36 PM	2/25/2013 3:05:00 PM
9	Creating Section Geometries	2/25/2013 3:05:00 PM	2/25/2013 3:12:37 PM
10	Creating TOPS and Sample Geometries	2/25/2013 3:12:37 PM	2/25/2013 3:13:16 PM
11	Creating Validation Results Geometries	2/25/2013 3:13:16 PM	2/25/2013 3:14:51 PM
12	Submitting Routes	2/25/2013 3:14:51 PM	2/25/2013 3:14:56 PM
13	Submitting Sections	2/25/2013 3:14:56 PM	2/25/2013 3:16:10 PM
14	Submitting Samples and TOPs	2/25/2013 3:16:10 PM	2/25/2013 3:16:20 PM
15	Submitting Summaries and Validations	2/25/2013 3:16:20 PM	2/25/2013 3:16:40 PM
16	Submitting Full Intersections	2/25/2013 3:16:40 PM	2/25/2013 3:17:09 PM
17	Spooling Report Jobs	2/25/2013 3:17:09 PM	NA

Close this Window Refresh and View Verification Process Detail

Submittal Continued

After a submission is complete, the Submit Data button will be grayed out, and the State will be locked from resubmitting. To remove the lock (for a re-submittal) contact FHWA HPMS staff.

The screenshot displays the 'Submit Data' interface with the following elements:

- Navigation Bar:** DATA EDITORS, DATA VALIDATION, SAMPLE MANAGEMENT, CALCULATION, REPORTS & ANALYSIS, SUBMIT DATA.
- Submit Data Section:** Last Submitted On: 11/8/2011 10:47:28 AM, Last Submitted By: Roff, Thomas A.
- Summary Validation:**
 - ✓ County Summary
 - ✓ Demography Summary
 - ✓ NAAQS Summary
 - ✓ Pavement Summary
 - ✓ Travel Summary
 - ✗ Urban Summary
 - ✓ Vehicle Summary - Rural
 - ✓ Vehicle Summary - Urban
- Data Editor Validation:**
 - ✗ Crosscheck Validation
 - ✗ LRS Validation
- Message:** There are editors that need to be validated before submitting.
- Certified Miles:**
 - HPMS Calculated Miles: 21390.720
 - State Certified Miles: 21391.000
- Submittal Comment (Required):** Comment: ETR
- Buttons:** Save, Cancel

A red circle highlights the 'Submit Data' button (disabled) and the 'Unlock' button (active) in the left sidebar.

Chapter 5—Quick Reference

Deleting Data

For various reasons, users may want to delete data that has been uploaded into the HPMS system. This can be done for entire data sets, for data with particular attributes or piecemeal for individual records. In addition, the import and export logs can be cleaned by deleting the record of import and export jobs without affecting associated data.

Deleting Entire Data Sets

The Delete Tool is the most efficient option for deleting data sets that have been uploaded into the HPMS system. Currently this tool is available via the Admin menu. The tool enables users to delete entire data sets with a few clicks.

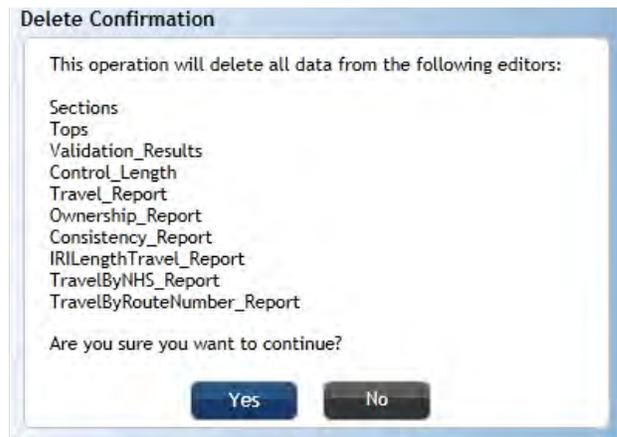
After selecting the tool from the Data Editors menu, the Delete screen will appear. Check the box next to one or more data elements and click Delete.

To deselect an item from the list after checking it, Click on the item's check box again or use the Clear option on the top of the list to clear all items.



Note that the Sections option in the Delete Tool will delete all Section files. To delete just one data item from imported section files, follow the Delete Route and Section Data instructions on the following pages.

The application will prompt the user with a confirmation before deleting any files. Deleting files should be done with caution as files can not be restored once deleted. Also, note that several related processes and reports may be affected by a deletion.



Deleting Route and Section Data

Route and Section data can also be deleted from the HPMS system via the respective route and section screens on the Data Editors tab of the Application Menu. This approach to delete records is more interactive than the Delete Tool and provides the user with more control on the number of records deleted.

Deleting Routes

Delete All Routes

First, open the Routes view by clicking on Route in the Data Editors menu.

Next, Click on the 'X' at the top of the Routes Matrix to remove all routes from the HPMS system.

All records will be deleted if the 'X' at the top of the column is selected—regardless of any selected records in the Routes Matrix.

Delete Individual Routes

Click on the 'X' to the left of a record in the Routes Matrix to remove individual route records from the HPMS system.

Deleting Routes Continued

Delete A Subset of Routes With a Filter

Click on the filter icon at the top of a column in the Routes Matrix.

Route ID	Comments	Last Modified By	Last Modified On
I089-NR007B		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR007A		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR006B		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR006A		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR005B		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR005A		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR004D		Beauregard, Rachel K	6/23/2011 4:24:06 PM

Total Routes: 1196

Enter filter parameters in the filter dialog box and click the Filter button.

Select All

Show rows with value that

Contains

I089

And

Is equal to

Filter Clear Filter

Use the drop down list above the filter parameters entry box to select the appropriate qualifier for your filter.

After the filter has run, the entire filtered record set can be deleted by clicking on the red 'X' above the data in the Routes Matrix.

Route ID	Comments	Last Modified By	Last Modified On
I089-NR012A		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR011F		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR011C		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR011A		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR010H		Beauregard, Rachel K	6/23/2011 4:24:06 PM
I089-NR010C		Beauregard, Rachel K	6/23/2011 4:24:06 PM

Total Routes: 100

You can quickly gauge the success of the filter by noting the number of pages of records for your route data. In this example, the records list was reduced from nine+ pages to four.

For all of the interactive delete options, the user will be prompted to confirm the deletion of data before any delete is completed.

Delete Confirmation

Sections record with the following key-fields will be deleted:

Year Record: 2009
 State Code: 16
 Route ID: 007015000018
 Begin Point: 0
 End Point: 0.018
 Data Item: F_SYSTEM

Are you sure you want to delete this record?

Delete Confirmation

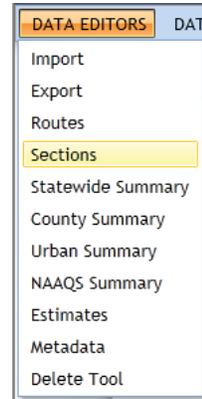
16795 records will be deleted.

Are you sure you want to continue?

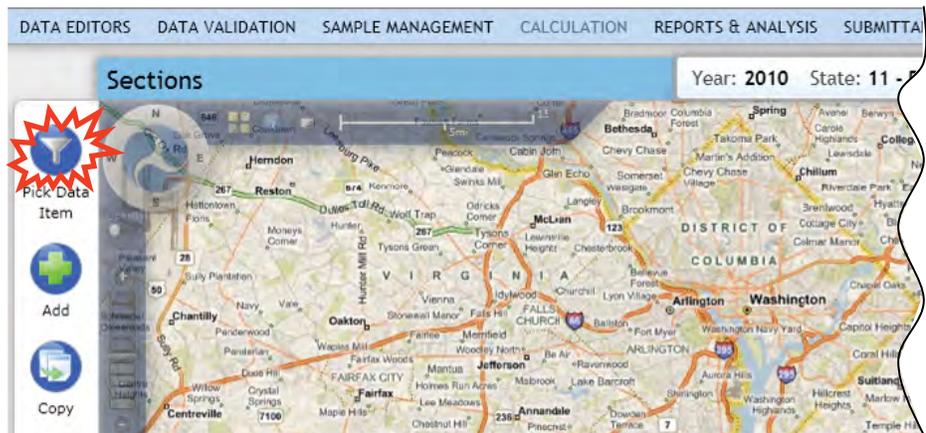
Yes No

Deleting Section Data

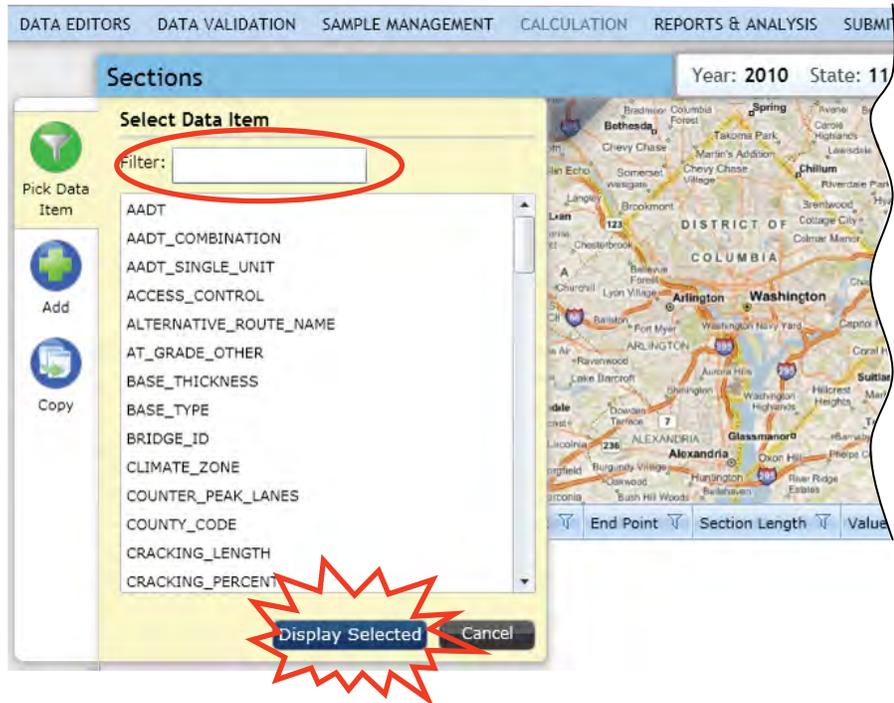
Deleting section data is done through a procedure very much like that for route data. The major distinction between the two processes, is that Section data must first be selected through the 'Select Data Item' filter in the Sections screen (accessible via the Data Editors menu).



Click on the Pick Data Item button in the Sections screen to select an item from submitted Section data.



Select the desired Section data set from the Select Data Item window and click Display Selected. Use the Filter box to quickly navigate to your desired Section data item.



Deleting Section Data—Continued

Section Data can be deleted just as Route data - entirely for each section, in a subset grouping based on a filter, or record by record.

Delete One Data Item

To delete an entire Section data set, click on the 'X' on the top of the Section Matrix.

Data Item	Route ID	Begin Point	End Point	Section Length	Val
AADT	10	0	0.040	0.993	
AADT	100	0	0.070	0.579	
AADT	1000	0	0.100	1.180	
AADT	1001	0	0.070	1.180	
AADT	10018	0	0.040	0.964	

Total Sections - AADT: 608

Delete Individual Section Items

To delete one row/record of data, click on the 'X' to the left of a given row in the table from the appropriate Sections Data Item screen.

Data Item	Route ID	Begin Point	End Point	Section Length	Val
AADT	10	0	0.040	0.993	
AADT	100	0	0.070	0.579	
AADT	1000	0	0.100	1.180	
AADT	1001	0	0.070	1.180	
AADT	10018	0	0.040	0.964	

Total Sections - AADT: 60

Deleting Section Data - Continued

Delete A Subset of Records With a Filter

Click on the filter icon at the top of a column in the Sections Matrix.

		Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value
		AA DT	10	0	0.040	0.993	10068.000	
		AA DT	100	0	0.070	0.579	5300.000	
		AA DT	1000	0	0.100	1.180	27478.000	
		AA DT	1001	0	0.070	1.180	27478.000	
		AA DT	10018	0	0.040	0.964	4000.000	

Total Sections - AADT: 6082

Enter filter parameters in the filter dialog box and click the Filter button.

Select All

Show rows with value that

Is greater than

10000

And

Is equal to

Filter Clear Filter

The funnel icon will be shaded when there is a filter applied to a data field.

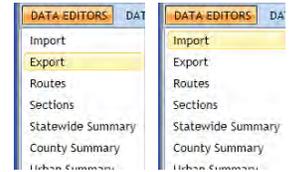
After the filter has run, the entire filtered record set can be deleted by clicking on the red 'X' above the data in the Routes Matrix.

		Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value
		AA DT	10	0	0.040	0.993	10068.000	
		AA DT	1000	0	0.100	1.180	27478.000	
		AA DT	1001	0	0.070	1.180	27478.000	
		AA DT	1002	0	0.080	1.180	27478.000	
		AA DT	1003	0	0.070	1.180	27478.000	

Total Sections - AADT: 3119

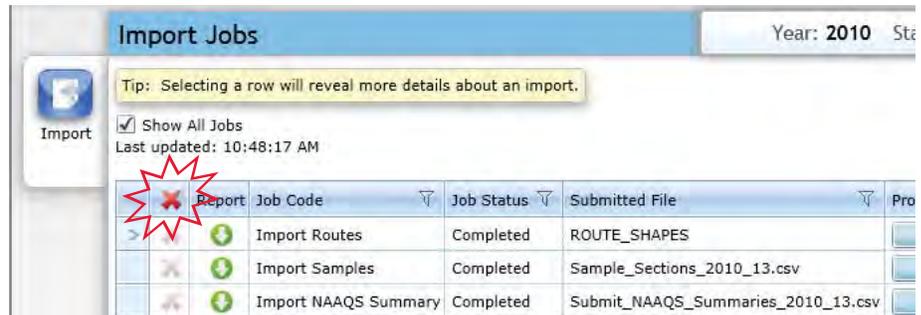
Deleting Import or Export Jobs

A record of import and export jobs is kept in the HPMS application to help users keep track of files that have been loaded into or extracted from the system. The log record is visible from the Import or Export screens of the Data Editors tab on the Application Menu. The logs can be managed through deleting records individually or collectively. Use procedures depicted below to delete Import/Export log files.



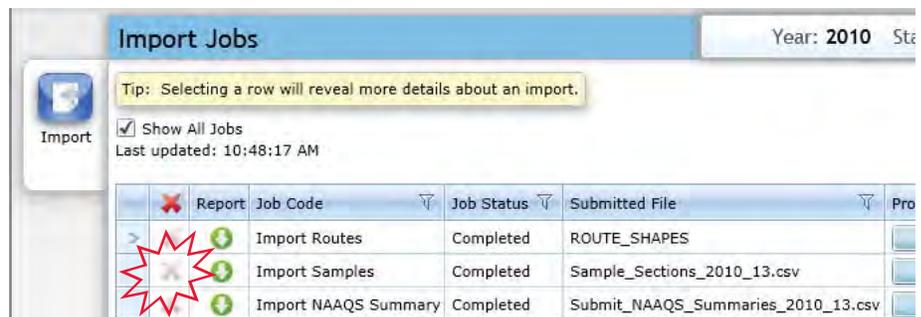
Delete All Log Records

Click on the 'X' at the top of the jobs log table to remove all jobs from the log.

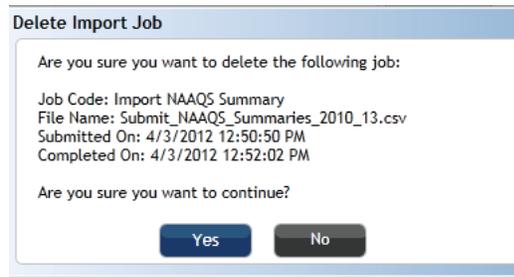


Delete Individual Import /Export Logs Records

Click on the 'X' next to a job in the jobs log to remove that job from the log.



Warning message dialog boxes like the one shown at right appear once a delete process has been initiated. They help to ensure that erroneous mouse clicks don't remove job logs inadvertently.



Import and Export Log delete processes can not be undone.

Exiting the System

Closing the HPMS browser window will disconnect the user from the HPMS application. If a connection to the UPACS system is still desired, e.g. when switching between Test and Production versions of the application, use the Exit command on the right side of the main application menu. Users will be prompted to confirm their exit before leaving the application.



The Help Menu

The HPMS Help Menu contains links to valuable reference documents. Currently, there are two options in this Menu, links to the HPMS Field Manual the Error Messages Screen. Ultimately this Menu will include a link to this Software Guide and other technical documents about HPMS processes, and methodology.

Accessing the HPMS Field Manual



The Help Menu Continued

Viewing Error Messages

As discussed in the Validations section of this document, the list of current software validations is available via the Help menu. Any updates to this list will be posted periodically with notice to users as appropriate.

Please see Appendix A for the complete list of Validations currently used in the software.

The screenshot shows the HPMS software interface with the 'Error Messages' window open. The window title is 'Error Messages' and it displays a list of validation error codes and descriptions. A red starburst graphic highlights the 'HELP' menu item in the top navigation bar, which has opened a dropdown menu with 'Error Messages' selected.

Area	Error Message	Error Description
Validation - Cross Check	IRI \geq 0 and IRI \leq 955 (Criteria 1)	IRI \geq 0 and IRI \leq 955
Validation - Cross Check	Thickness Rigid is not null (Criteria 6)	For sections with surface types of 2 or 6, Thickness Rigid must be greater than 0
Validation - Cross Check	Thickness Flexible is not null (Criteria 7)	For sections with surface types of 3, 4, 5, 9 or 10, Thickness Flexible must be greater than 0
Validation - Cross Check	Year_Last_Improve \leq Year_Last_Construction (Criteria 8)	If Year_Last_Improve does exist, it has to be greater than or equal to Year_Last_Construction
Validation - Cross Check	If not NULL, Year_Last_Construction must be $>$ 1900 and \leq Year_Record (Criteria 9)	If not NULL, Year_Last_Construction must be $>$ 1900 and \leq Year_Record
Validation - Cross Check	Section Length of Year Last Improv must equal to Sum of Last Overlay Thickness (Criteria 10)	Section Length of Year Last Improv must equal to Sum of Last Overlay Thickness
Validation - Cross Check	Lane Width must be $<$ 19 and $>$ 5 (Criteria 14)	Lane Width must be $<$ 19 and $>$ 5
Validation - Cross Check	Speed Limit Divisible by 5 (Criteria 15)	Speed Limit Divisible by 5
Validation - Cross Check	Counter_Peak_Lanes must be null if Facility_Type is 1 (Criteria 16)	Counter_Peak_Lanes must be null if Facility_Type is 1
Validation - Cross Check	AADT_Single + AADT_Combination \leq AADT (Criteria 17)	AADT_Single + AADT_Combination must be less than or equal to AADT
Validation - Cross Check	Value_Date of Future AADT must be \geq Year_Record + 18 and \leq Year_Record + 25 (Criteria 18)	Value_Date of Future AADT must be \geq Year_Record + 18 and \leq Year_Record + 25
Validation - Cross Check	Median_Width must be null if Facility_Type is 1 (Criteria 20)	Median_Width must be null if Facility_Type is 1
Validation - Cross Check	Same BP and EP	Same Begin_Point and End_Point
Validation - Cross Check	DIR Factor = 100 Where Facility Type = 1 (Criteria 39)	DIR_Factor must be 100 where Facility Type = 1
Validation - Cross Check	DIR Factor $<$ 81 Where Facility Type = 2 (Criteria 40)	DIR_Factor must be less than 81 where Facility Type = 2
Validation - Cross Check	Future AADT \leq 3*AADT (Criteria 41)	Future AADT should not be greater than 3*AADT
Validation - Cross Check	AADT * PCT Peak Single $<$ AADT_Single_Unit (Criteria 42)	AADT * PCT_Peak_Single should be less than AADT_Single_Unit

Total Error Messages: 25 Page 1 of 2

The Job Monitor

The Job Monitor provides users with a view of activity in the HPMS v8 software. Jobs are listed sequentially according to their submission time with the oldest jobs at the top of the list. Jobs are processed according to a number of queues, however, so job completion may appear to be out of order. See below for a list of the job queues currently employed by the HPMS software.

The Job Monitor is accessible via the Admin Menu.

Use the red X to cancel jobs from this screen. Note that users can only cancel jobs that they have issued.

Job ID	Year	State	Job Code	Job Status	Progress	Submitted By	Submitted On	Last Modified On
4814	2011	48	Export Intersections (National)	Job Started	50%	Vaughn, Ronald Jr	4/12/2013 11:41:34 AM	4/12/2013 11:46:40 AM
4816	2012	18	Import Sections	Job Started	24%	McMahan, Mark T	4/12/2013 11:49:33 AM	4/12/2013 11:49:46 AM

HPMS Software Queues

- 1. Import Routes and Geometry**
(Routes, Urban Area Geometry*)
- 2. Other Imports**
(Import Sections, Summaries, Estimates, Metadata)
- 3. Sample and TOPS Processes**
(Import Samples, Create TOPS, Expansion Factor Creation)
- 4. Validations**
(LRS Validation, Cross Check Validation, Sample Validation, Coverage Validation,
- 5. Geometry Creation**
(Sections, TOPS/Samples, Validations)
- 6. Copy and Delete**
(Copy Section Data from National, Copy Routes from National, Delete Data)
- 7. Submit**
Submit Data, (Archive Data - FHWA Use)
- 8. Export Geometry**
(Routes, Section Geometry, TOPS/Samples Geometry, Validation Geometry, Urban Area Geometry)
- 9. Tabular Data Exports**
(Sections, Samples/Sample Details, Summaries, Estimates, Metadata, Validations, Urban Areas)
- 10. FHWA Extraction and Query Processes**
- 11. Reports**
(All Reports)
- 12. Calculations**
(Calculations are currently not activated)

The 12 Queues operate independently, not in sequential order. Numbers listed here do not indicate hierarchy and are for reference purposes only.

*Urban Area Geometry will be fully accommodate in HPMS software in 2015.

HPMS v8 User Guide Appendices

Appendix A - Validations

Route Import Validations (Errors)

Message	Type	Description
Wrong Type of Geometry	Error - Data Rejected	Only Line files are accepted in HPMS
Illegal Route (Parts Not Connected)	Error - Data Rejected	Aggregated geometry in GeoMedia format that is not perfectly connected is not accepted
Illegal Route (Wrong BP or EP)	Error - Data Rejected	Geometry in GeoMedia format that is missing either the Begin Point or the End Point is not accepted
Route is Empty	Error - Data Rejected	All records in the submitted file must have a Route ID
Duplicate Route ID	Error - Data Rejected	Each record must have a unique Route ID
Invalid M at Part X, Point Y	Error - Data Rejected	The M (measurement) value is missing, too big or too small (measures with this error are typically VERY small or large with values to many exponential factors)
M Not in Order in Part X, Point Y	Error - Data Rejected	M values are not in order at the specified location
M Order in Part X Changes	Error - Data Rejected	Measurements should follow the same sequential order in each part
Route X has a zero-area Ring at Part X	Error - Data Rejected	Typically this occurs when a false area is created by a Route that overlaps itself. These overlaps are often at a VERY small scale.

Route Import Validations (Warnings)

Message	Type	Description
Self -Intersect at Part	Warning	Within a Route Part, a loop may be created, possibly due to digitizing errors.
Route X Has a Non-Zero Ring at Part Y	Warning	An interchange or cul-de-sac may occur on a route leading to an area that has a positive area.
Duplicate Points removed	Warning	Points that exactly overlap each other are removed
Point Order in a Part is Reversed	Warning	If a measurement order is not ascending, but consistently in a descending order, points will be reversed - Measures are not affected.
OGC Invalid	Warning	Geometry is invalid in terms of Open Geospatial Consortium definitions. The FHWA HPMS SQL Server is using OGC format to save geometry. When a route is OGC invalid, HPMS uses the native database function to make it valid in order to save it. When the HPMS system makes this record valid, its measurements will be modified. Please check for OGC Invalid issues before submission if possible. Many OGC validation errors are due to overlaps at the intersection of Route Parts.
Parts are reordered	Warning	When a route has more than one part and M is not in ascending order from part to part, parts will be reordered.

Users should review any record that gets flagged with one or more of the Route Import validation rules above. Special attention should be paid to records where the imported Route has been modified during import. The modification of these routes may impact the dynamic segmentation of data during the Geometry process and lead to LRS Validation errors.

Appendix A - Validations

Import Validations

Data Item #	Data Item Name	Validation
1	F_System	(1,2,3,4,5,6,7)
2	Urban_Code	Valid Five Digit Code from Census
3	Facility_Type	(1,2,4,5,6,7)
4	Structure_Type	(1,2,3)
5	Access_Control	(1,2,3)
6	Ownership	(1,2,3,4,11,12,21,25,26,27,31,32,40,50,60,62,63,64,66,67,68,69,70,72,73,74,80)
7	Through_Lanes	> 0
8	HOV_Type	(1,2,3)
9	HOV_Lanes	> 0
10	Peak_Lanes	> 0
11	Counter_Peak_Lanes	> 0
12	Turn_Lanes_R	(1,2,3,4,5,6)
13	Turn_Lanes_L	(1,2,3,4,5,6)
14	Speed_Limit	> 0
15	Toll_Charged	(1,2,3)
16	Toll_Type	(1,2)
17	Route_Number	> 0
18	Route_Signing	(1,2,3,4,5,6,7,8,9,10)
19	Route_Qualifier	(1,2,3,4,5,6,7,8,9,10)
20	Alternative_Route_Name	
21	AADT	> 0
22	AADT_Single_Unit	>= 0
23	Pct_Peak_Single	>= 0 and <= 100
24	AADT_Combination	>= 0
25	Pct_Peak_Combination	>= 0 and <= 100
26	K_Factor	> 0
27	Dir_Factor	> 0 and <= 100
28	Future_AADT	> 0
29	Signal_Type	(1,2,3,4,5)
30	Pct_Green_Time	> 0 and <= 100
31	Number_Signals	>= 0
32	Stop_Signs	>= 0
33	At_Grade_Other	>= 0
34	Lane_Width	>5 and <31
35	Median_Type	(1,2,3,4,5,6,7)
36	Median_Width	>0 and <100
37	Shoulder_Type	(1,2,3,4,5,6,7)
38	Shoulder_Width_R	> 0

Appendix A: Validations Continued

Import Validations Continued

Data Item #	Data Item Name	Validation
39	Shoulder_Width_L	> 0
40	Peak_Parking	(1,2,3)
41	Widening_Obstacle	(X) or (A,B,C,D,E,F,G)
42	Widening_Potential	>= 0 and <=9
43	Curves_A-F	> 0
44	Terrain_Type	(1,2,3)
45	Grades A-F	> 0
46	Pct_Pass_Sight	>=0 and <= 100
47	IRI	> 0
47	IRI	Value_Date<=Year Record
48	PSR	>0.0 and <=5.0
49	Surface_Type	(1,2,3,4,5,6,7,8,9,10,11)
50	Rutting	>=0
51	Faulting	>=0
52	Cracking_Percent	>= 0 and <= 100
53	Cracking_Length	>= 0
54	Year_Last_Improv	>= 1753 and <= Year Record
55	Year_Last_Construction	>= 1753 and <= Year Record
56	Last_Overlay_Thickness	> 0
57	Thickness_Rigid	>0
58	Thickness_Flexible	> 0
59	Base_Type	(1,2,3,5,6,7,8)
60	Base_Thickness	> 0
61	Climate_Zone	(1,2,3,4)
62	Soil_Type	(1,2)
63	County_Code	Valid Three Digit FIPS Code
64	NHS	(1,2,3,4,5,6,7,8,9)
65	STRAHNET_Type	(1,2)
66	Truck	(1,2)
67	Future_Facility	1
68	Maintenance_Operations	(1,2,3,4,11,12,21,25,26,27,31,32,40,50,60,62,63,64,66,67,68,69,70,72,73,74,80)
69	Capacity	>0
N/A	All Data Items	Begin Point (BP) Must be < End Point (EP)

Appendix A: Validations Continued

Coverage Validations

Data Item	Must Exist Where
1 F_System	Facility_Type in (1,2,4)
2 Urban_Code	(F_System in (1,2,3,4,5,6) or NHS)and Facility_Type (1,2,4)
3 Facility_Type	F_System in (1,2,3,4,5) or (F_System =6 and Urban_Code <> 99999)or NHS
4 Structure_Type	
5 Access_Control	(F_System in (1,2,3) or Sample or NHS) AND Facility_Type IN (1,2)
6 Ownership	Facility Type in (1,2) AND (F_System in (1,2,3,4,5) or (F_System = 6 and Urban Code <99999) or NHS)
7 Through_Lanes	Facility Type in (1,2,4) AND (F_System in (1,2,3,4,5) or (F_System = 6 and Urban Code <99999) or NHS)
8 HOV_Type	HOV Lanes is not Null
9 HOV_Lanes	HOV Type is not Null
10 Peak_Lanes	Sample
11 Counter_Peak_Lanes	Sample and Facility_Type = 2 AND (Urban_Code < 99999 OR Through_Lanes>=4)
12 Turn_Lanes_R	Sample and Urban_Code < 99999 and Access_Control >1
13 Turn_Lanes_L	Sample and Urban_Code < 99999 and Access_Control >1
14 Speed_Limit	Sample
15 Toll_Charged	Toll_Type is not Null
16 Toll_Type	Toll_Charged is not Null
17 Route_Number	(F_System in (1,2,3,4) or NHS) and Facility_Type (1,2) AND Route_Signing in (2,3,4,5,6,7,8,9)
18 Route_Signing	(F_System in (1,2,3,4) or NHS) and Facility_Type (1,2)
19 Route_Qualifier	(F_System in (1,2,3,4, or NHS) and Facility_Type (1,2)
20 Alternative_Route_Name	
21 AADT	Facility Type in (1,2,4) AND (F_System in (1,2,3,4,5) or (F_System = 6 and Urban Code <99999) or NHS)
22 AADT_Single_Unit	(F_System in (1) or NHS) and Facility_Type (1,2) or Sample
23 Pct_Peak_Single	Sample
24 AADT_Combination	(F_System in (1) or NHS) and Facility_Type (1,2) or Sample
25 Pct_Peak_Combination	Sample
26 K_Factor	Sample
27 Dir_Factor	Sample
28 Future_AADT	Sample
29 Signal_Type	Sample AND Urban Code <> 99999 and Access_Control >1
30 Pct_Green_Time	Sample and Number_Signals >=1 AND Urban Code <99999
31 Number_Signals	(Sample Where Pct_Green_Time is not Null) or (Sample and Signal_Type IN (1,2,3,4))
32 Stop_Signs	Sample
33 At_Grade_Other	Sample
34 Lane_Width	Sample
35 Median_Type	Sample
36 Median_Width	Sample and Median_Type in (2,3,4,5,6,7)
37 Shoulder_Type	Sample

Appendix A: Validations Continued

Coverage Validations Continued

Data Item	Must Exist Where
38 Shoulder_Width_R	Sample and Shoulder_Type in (2,3,4,5,6)
39 Shoulder_Width_L	Sample and Shoulder_Type in (2,3,4,5,6) and Median_Type in (2,3,4,5,6,7)
40 Peak_Parking	Sample and Urban_Code < 99999
41 Widening_Obstacle	Sample
42 Widening_Potential	Sample
43 Curves A-F	Curves BP/EP on F_System in (1,2,3) or F_System = 4 and Urban_Code = 99999 and Surface_Type > 1 Must Align with Sample BP/EP
44 Terrain_Type	Sample and Urban_Code = 99999
45 Grades A-F	Grades BP/EP on F_System in (1,2,3) or F_System = 4 and Urban_Code = 99999 and Surface_Type > 1 Must Align with Sample BP/EP
46 Pct_Pass_Sight	Sample and Urban_Code = 99999 and Through_Lanes =2
47 IRI	Facility_Type (1,2) and (F_System in (1,2,3) or NHS or (Sample and F_System = 4 and Urban_Code = 99999))
48 PSR	IRI is NULL and Sample and ((F_System in (4,5,6) and Urban_Code < 99999 and Facility_Type in (1,2,3)) or (F_System in (5) and Facility_Type in (1,2,3) and Urban_Code = 99999)))
49 Surface_Type	Sample
50 Rutting	Surface_Type in (2,6,7,8) and Sample
51 Faulting	Surface_Type in (3,4,9,10) and Sample
52 Cracking_Percent	Surface_Type in (2,3,4,5,6,7,8,9,10) and Sample
53 Cracking_Length	Surface_Type in (2,6,7,8) and Sample
54 Year_Last_Improv	(Surface_Type in (2,3,4,5,6,7,8,9,10) and Sample) OR (Year_Last_Construction < Year Record - 20)
55 Year_Last_Construction	Surface_Type in (2,3,4,5,6,7,8,9,10) and Sample
56 Last_Overlay_Thickness	Sample and Year_Last_Improv exists
57 Thickness_Rigid	Surface_Type (3,4,5,7,8,9,10) and Sample
58 Thickness_Flexible	Surface_Type (2,6,7,8) and Sample
59 Base_Type	Sample and Surface_Type >1
60 Base_Thickness	Surface_Type >1 and Sample
61 Climate_Zone	
62 Soil_Type	
63 County_Code	Facility Type in (1,2) AND (F_System in (1,2,3,4,5) or (F_System = 6 and Urban Code <99999) or NHS)
64 NHS	(F_System = 1 AND Facility_Type <4) OR Future Facility =1
65 STRAHNET_Type	
66 Truck	
67 Future_Facility	
68 Maintenance_Operations	Toll Charged and Facility_Type (1,2) and (F_System in (1,2,3,4,5) or NHS or (F_System =6 and Urban_Code < 99999))
69 Capacity	
72 Sum of Curves	Length Must Equal to the Sample Length on (Sample and (F_System (1,2,3) or (F_System = 4 and Urban_Code = 99999)))
73 Sum of Grades	Length Must Equal to the Sample Length on (Sample and (F_System (1,2,3) or (F_System = 4 and Urban_Code = 99999)))

Appendix A: Validations Continued

Cross, LRS and Sample Validations

Type	Data Item (and Value)	Validation
Cross	AADT Combination	AADT_Combination < AADT/2.5
Cross	AADT_Single_Unit	AADT_Single_Unit < AADT/2.5
Cross	Counter Peak Lanes	NULL if FACILITY_TYPE is 1
Cross	Cracking_Percent	Cracking Percent should be <50
Cross	DIR_Factor	DIR_Factor must be 100 where Facility_Type = 1
Cross	DIR_Factor	DIR_Factor must be < 81 AND > 50 where Facility_Type = 2
Cross	Faulting	<=1
Cross	Future AADT	Year_Record + 25 >= Value_Date >= Year_Record + 18
Cross	Future_AADT	AADT < FAADT < 3*AADT
Cross	IRI	Where (NHS = (1,2,3,4,5,6,7,8,9), Value_Date = Year Record), Where (NHS is Null, Value_Date Must not be less than (Year Record -2)
Cross	IRI	>= 30 and <= 400
Cross	K_Factor	K_Factor must be > 4.5 and <20
Cross	Lane Width	> 5 and <19
Cross	Median Type in (2,3,4,5,6,7)	Median Width > 0
Cross	Median Width	NULL if (FACILITY_TYPE is 1 or 4) or Median_Type Code <2
Cross	PCT_Peak_Combination	AADT*PCT_Peak_Combination/100 <=AADT_Combination
Cross	PCT_Peak_Single	AADT*PCT_Peak_Single/100 <=AADT_Single_Unit
Cross	Rutting	Rutting should be < 1
Cross	Should_Width_R	Warning if Shoulder_Width_R < 2
Cross	Single Unit / Combination	SU AADT + CU AADT < AADT
Cross	Speed Limit	Divisible by 5
Cross	Surface Type in (7,8)	Neither Flexible or Rigid is Null
Cross	Surface_Type in (2,6)	Thickness Rigid is Null
Cross	Surface_Type in (3,4,5,9,10)	Thickness Flexible is Null
Cross	Widening_Obstacle	Widening_Obstacle must contain A-G where Widening_Potential <9
Cross	Year_Last_Construction	<= Year_Record or NULL
LRS	Route ID Not Found	Route Must Exist where (F_System in (1,2,3,4,5) or (F_System =6 and Urban_Code <> 99999) or NHS)
LRS/Cross	Section Begin_Point/End_Point Out of Bounds	BP/EP Must be Within Route Measurement Bounds within Error of 0.05 mile where (F_System in (1,2,3,4,5) or (F_System =6 and Urban_Code <> 99999) or NHS)
Sample	Sample Crosses Over TOPS	The extent of a given Sample Panel Section extends beyond the extent of the associated TOPS section. Samples should match the length of TOPS sections or be shorter, but can not be longer.
Sample	Sample on Ramp and lower functional systems is Invalid	Only allow Sample where Facility_Type IN 1,2,3 and (F_System = 1-5 or F_System = 6 and Urban Code <99999)
Sample	TOPS Not Found	No TOPS record was created for a given section of the network. One or more of the five TOPS data items is likely missing from this section.

Note: Cross, LRS and Sample validations indicate valid values. A user will receive an error message if submitted data falls outside of this prescribed range. E.g. a value for IRI of 980.

Appendix B: Report Types

Software Generated Static Reports

There are two types of reports in the HPMS software, Static and Interactive. Both Static and Interactive reports are generated from the Reports & Analysis Menu. This Appendix provides detail on both report types, with images and documentation for reference.

The two Interactive Reports in the HPMS 8.x software are Overview and Validations. Although both of these reports are also available via the Static Reports tool, the Interactive versions contain internal links to sub-reports and a slightly different interface. These reports are always generated on the fly and are not stored in a jobs log as with the Static reports.

Link to Interactive Report Interface

These Static Reports are available in Submit, Review and National Modules.

Report Name	Report Status	Submitted By	Submitted On	Last Modified On	Create	Cancel	Download
Consistency	0 - Not Created				<input type="checkbox"/>		
Extent and Travel Report	0 - Not Created				<input type="checkbox"/>		
Extent and Travel Report (Urban/Rural Summary)	0 - Not Created				<input type="checkbox"/>		
Extent and Travel on the NHS	0 - Not Created				<input type="checkbox"/>		
Extent and Travel on the Interstates	0 - Not Created				<input type="checkbox"/>		
IRI on the Federal Aid Highways	\$ - Report Created		10/25/2012 1:42:56 PM	10/25/2012 1:42:56 PM	<input type="checkbox"/>		<input type="checkbox"/>
IRI on the NHS	\$ - Report Created		10/25/2012 1:43:05 PM	10/25/2012 1:43:05 PM	<input type="checkbox"/>		<input type="checkbox"/>
Overview	0 - Not Created				<input type="checkbox"/>		
Ownership	0 - Not Created				<input type="checkbox"/>		
Sample Adequacy	0 - Not Created				<input type="checkbox"/>		
Validation Summary	0 - Not Created				<input type="checkbox"/>		
Extent and Travel Report (Nationwide)	\$ - Report Created	Roff, Thomas A	12/4/2012 9:01:52 AM	12/4/2012 9:24:38 AM	<input type="checkbox"/>		<input type="checkbox"/>
HM-20 (Public Road Length by Functional System)	\$ - Report Created	Angulo, Paolo A	12/12/2012 1:50:07 PM	12/12/2012 1:51:29 PM	<input type="checkbox"/>		<input type="checkbox"/>
HM-60 (Estimated Public Road Lane - Miles by Functional System)	\$ - Report Created	Gillmann, Ralph A	11/27/2012 1:34:31 PM	11/27/2012 2:27:46 PM	<input type="checkbox"/>		<input type="checkbox"/>
VM-2 (Vehicle -Miles of Travel by Functional System)	\$ - Report Created	Zhang, Patrick P	12/5/2012 3:43:01 PM	12/5/2012 4:04:52 PM	<input type="checkbox"/>		<input type="checkbox"/>

Static Report Interface

These Static Reports are available in Review and National Modules only.

Create Selected Reports Cancel Selected Reports Download Selected Reports

Appendix B: Report Types Continued

Overview Summary Report (Interactive)

The Overview Summary Report provides a view of the records uploaded into the HPMS system for each of the Data Menu items. The Interactive version (shown below) contains a link to a count detail for each Section Data Item.

Click the "By Data Item" link to jump to a sub report with a count of records uploaded for each of the HPMS data items.

The screenshot shows the HPMS 8.0.1 Overview Summary Report interface. The main window displays a table with the following data:

Entity	Count
Sections:	236,268
Route Shapes:	9,201
Statewide Summaries:	1
County Summaries:	955
Urban Summaries:	15
Naaqs Summaries:	2
Estimates:	45
Metadata:	452

A red starburst highlights the "By Data Item" link next to the "Sections" row. An arrow points from this link to a secondary window titled "Section Breakdown Summary", which displays a detailed table of data items and their counts:

Data Item	Count
AADT	20,720
AADT_COMBINATION	6,579
AADT_SINGLE_UNIT	6,579
ACCESS_CONTROL	2,621
AT_GRADE_OTHER	2,560
COUNTER_PEAK_LANES	2,408
COUNTY_CODE	9,932
CRACKING_LENGTH	10,396
CRACKING_PERCENT	10,340
CURVES_A	1,246
CURVES_B	143

Appendix B: Report Types Continued

Validation Summary Report (Interactive)

The Validation Summary Report is the second of two reports available in both static and interactive formats. The report lists validation errors with uploaded data, grouped by validation category (LRS, Cross Check or Sample) and error type. These validation errors are the same as those displayed on the validation screens in the Data Validation menu. Links in the Records column of the Interactive version can be used to view a detailed validation report by topic area. See the Help Menu for a list of the Validations that appear in this report.

Click the linked record count in the Records column to jump to a report listing each record (Route ID, etc) with a specified error.

HPMS 8.0.1 Validation Summary Report

Stage: Submit
Year: 2010
State: 13 - Georgia
Date: 5/4/2012

Validation Category: LRS Validation

Error Message	Records
Route ID not found	2281
Section Begin Point out of bounds	19
Section End Point out of bounds	2783

Validation Category: Cross Check Validation

Error Message	Records
Lane Width must be < 19 and > 5 (Criteria 14)	19

HPMS 8.0.1 Validation Details Report

Year: 2010
State: 13 - Georgia
Date: 5/4/2012

Validation Category: LRS Validation
Total Count: 2281 records
Error Message: Route ID not found
Description: Section references a Route ID that does not exist.

Data Item	Route ID	Begin Point	End Point
AADT	0151100000	5.190	8.450
AADT	0513176507	0.000	0.380
AADT	0516021016	0.000	0.210
AADT	0516021017	0.000	0.150
AADT	0516078103	0.000	0.200

Appendix B: Report Types Continued

Extent and Travel Report

This report represents the output of three similar but distinct spatial intersections of submitted Section and Summary data.

Collectively, the following data elements are included in this report: F_System, Facility_Type, Urban_Code, Through_Lanes and AADT. Note that totals from the lower functional systems (Minor Collectors and Locals) are derived from a mix of Summary and Section data. The output of this report is a useful tool in the review of submitted length, lane length and travel data. There are several versions of this report. The formulas are similar for each version, although the universe of data (e.g. Total Mileage vs. National Highway System Mileage) is unique.

The example to the right depicts the components of the 'Miles' portion of the report as described below. Note that the illustration is truncated and only shows a few of the urban/rural classifications for the selected State. Subsequent pages depict the various iterations of the Extent and Travel Report in the HPMS V. 8.x software.

For each column of the report table: Miles, Through Lanes and Vehicle Miles, several HPMS Data Items are intersected within the HPMS system. Data in this report includes records where Facility Type is equal to 1 or 2. Sections coded as Ramps, Non-Mainline and Non-Inventory Direction (codes 4-6) are excluded. (Note, use of Facility Type 3 has been discontinued).

Miles

- Establishes the length ("HPMS Calculated Miles") which should be compared to the Certified Mileage. The comparison of these two mileage figures can be viewed on the Submit Data screen.
- For records with Functional System equal to 1 through 5, length is calculated by running a spatial intersection of F_System, Facility_Type, and Urban_Code for Facility_Type, and then summing the difference of (End_Point - Begin_Point) and grouping by F_System.
- Where Functional System is equal to 6-Minor Collector and 7-Local, the table represents the combination of County Summary and Section data. Mileage for Urban Minor Collectors (F_System =6 and Urban Code < 99999) is summed as described above for Functional Systems 1 through 5. The mileage for Rural Minor Collector (F_System = 6 and Urban_Code = 99999) and all Local roadways (F_System = 7) is a sum of the length for those Functional Systems as reported in the County Summary table.

Lane Miles

- For records with Functional System equal to 1 through 5, length is calculated by running a spatial intersection of F_System, Facility_Type, and Urban_Code for Facility_Type, and then summing: ((End Point – Begin Point)*Through Lanes), for each reported HPMS Section, and grouping by Functional System.
- As with the Miles calculations, figures for Functional System equal to 6-Minor Collector and 7-Local are a combination of County Summary and Section data. Lane Miles for Urban Minor Collectors is summed as described above for Functional Systems 1 through 5. The mileage for Rural Minor Collector and all Local roadways is the sum of system length in the County Summary Table multiplied by two (so the total may not agree with lane miles in State records).

Vehicle Miles (VMT)

- This column represents the total Daily Vehicle Miles Traveled (DVMT) for each of the seven roadway functional classes. The DVMT is defined as the Annualized Average Daily Travel (AADT) * Segment Length
- DVMT is calculated by running a spatial intersection of F_System, Facility_Type, Urban_Code, and AADT for Facility_Type and then summing the (End_Point – Begin_Point)*AADT and Grouping by F_System.
- For Functional System equal to 6- Minor Collector and 7-Local, the report represents the State Summary travel figures for Local and Minor Collector roadway types. Where Urban Area data is reported for Rural Minor Collector and Local roadways, the travel figures are taken from the Urban Summary table.

Appendix B: Report Types Continued

Extent and Travel Report Continued

HPMS 8.0.1 Extent and Travel Report

Stage: Review
 Year: 2010
 State: 41 - Oregon
 Date: 12/20/2011

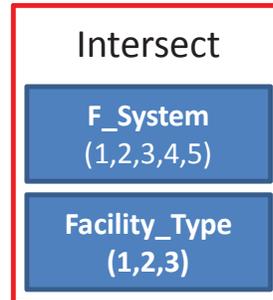
All Areas	Miles
1 - Interstate	729.810
2 - PA - Other Freeways and Expressways	58.870
3 - PA - Other	3,583.470
4 - Minor Arterial	3,498.480
5 - Major Collector	10,278.170
6 - Minor Collector	7,413.250
7 - Local	53,588.830
Total	59,150.880

6868 - Bend, OR	Miles
1 - Interstate	0.000
2 - PA - Other Freeways and Expressways	0.000
3 - PA - Other	27.620
4 - Minor Arterial	57.490
5 - Major Collector	52.460
6 - Minor Collector	0.000
7 - Local	303.350
Total	440.920

99998 - Small Urban	Miles
1 - Interstate	55.420
2 - PA - Other Freeways and Expressways	0.000
3 - PA - Other	293.440
4 - Minor Arterial	293.550
5 - Major Collector	631.590
6 - Minor Collector	0.000
7 - Local	2,399.060
Total	3,673.060

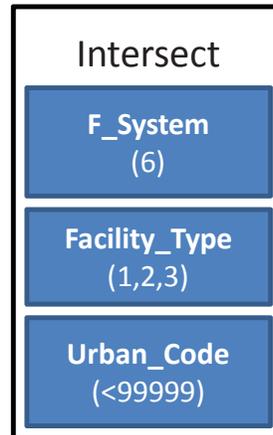
99999 - Rural	Miles
1 - Interstate	553.070
2 - PA - Other Freeways and Expressways	0.000
3 - PA - Other	2,817.850
4 - Minor Arterial	2,366.880
5 - Major Collector	8,385.050
6 - Minor Collector	7,413.250
7 - Local	24,716.130
Total	46,252.230

Sum section lengths:



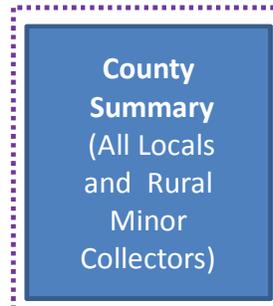
+

Sum section lengths:



+

Sum mileage:



Appendix B: Report Types Continued

Extent and Travel Report Continued

The image below depicts the first page of the Extent and Travel Report for 2010/Review showing columns for Miles Lane Miles and Vehicle Miles. The format of this report is the same as what appears in the Submit module. Note that the report provides a two year comparison for Miles, Lane Miles and Vehicle Miles. Data is grouped for the entire State and then broken out by urban/rural designation. The active year in the HPMS application will always be compared with the previous year's data from the National database. If data was not submitted for a prior year, then no comparison will be available.

HPMS 8.0.1	Extent and Travel Report									Stage:
	Urbanized Area Summary									Review
										Year:
									2010	State:
									2009	8 - Colorado
									% Change	Date:
									2010	05/04/2012
									2009	
									% Change	
All Areas										
1 - Interstate	952.71	952.67	0.00%	4,119.46	4,119.61	0.00%	31,885,353.40	31,632,446.00	0.80%	
2 - PA - Other Freeways and Expressways	313.97	313.99	-0.01%	1,320.78	1,320.86	-0.01%	12,367,712.00	11,787,952.30	4.92%	
3 - PA - Other	3,512.59	3,511.44	0.03%	9,764.33	9,757.23	0.07%	35,829,191.36	34,986,927.02	2.41%	
4 - Minor Arterial	5,412.06	5,410.51	0.03%	11,909.30	11,897.79	0.10%	21,246,105.40	21,481,448.08	-1.10%	
5 - Major Collector	7,298.34	7,301.40	-0.04%	14,900.18	14,904.82	-0.03%	12,397,178.36	12,110,711.58	2.37%	
6 - Minor Collector	8,972.03	8,967.82	0.05%	17,944.07	17,935.64	0.05%	2,016,000.00	1,994,000.00	1.10%	
7 - Local	61,891.12	61,801.18	0.15%	123,782.24	123,602.36	0.15%	12,861,000.00	12,665,000.00	1.55%	
Total	88,352.8	88,259.0	0.11%	183,740.4	183,538.3	0.11%	128,602,540.5	126,658,485.0	1.53%	
9298 - Boulder, CO										
1 - Interstate	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	
2 - PA - Other Freeways and Expressways	15.10	15.10	0.03%	60.73	60.74	-0.01%	664,454.30	594,789.90	11.71%	
3 - PA - Other	27.71	27.71	-0.01%	101.88	101.89	0.00%	567,831.80	546,341.90	3.93%	
4 - Minor Arterial	37.72	37.72	0.00%	96.88	96.88	0.00%	451,979.70	445,475.50	1.46%	
5 - Major Collector	38.90	38.96	-0.18%	78.50	78.64	-0.18%	168,871.20	171,037.90	-1.27%	
6 - Minor Collector	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	
7 - Local	302.21	301.45	0.25%	604.41	602.89	0.25%	206,000.00	195,000.00	5.64%	
Total	421.6	420.9	0.16%	942.4	941.0	0.15%	2,059,137.0	1,952,645.2	5.45%	
18856 - Colorado Springs, CO										
1 - Interstate	35.44	35.46	-0.06%	165.90	166.02	-0.07%	2,752,012.00	2,469,633.60	11.43%	
2 - PA - Other Freeways and Expressways	47.34	47.34	0.00%	212.96	212.97	0.00%	1,678,818.00	1,519,265.40	10.50%	
3 - PA - Other	173.83	173.81	0.01%	637.50	637.74	-0.04%	3,177,733.80	3,224,567.90	-1.45%	
4 - Minor Arterial	273.81	273.81	0.00%	693.02	693.04	0.00%	1,863,602.80	1,887,434.80	-1.26%	
5 - Major Collector	148.35	148.14	0.14%	315.19	314.77	0.13%	498,507.98	492,713.42	1.18%	
6 - Minor Collector	0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%	
7 - Local	1,850.54	1,844.68	0.32%	3,701.08	3,689.36	0.32%	1,108,000.00	1,066,000.00	3.94%	
Total	2,529.3	2,523.2	0.24%	5,725.6	5,713.9	0.21%	11,078,674.6	10,659,615.1	3.93%	

Appendix B: Report Types Continued

Extent and Travel Report (Urban/Rural Summary)

This version of the Extent and Travel Report provides a grouping of data by urban designation: Small Urban, Urban and Rural as well as a two year comparison much like the Extent and Travel Changes report.

HPMS 8.0.1		Extent and Travel Report Statewide Summary						Stage: Submit					
								Year: 2011			State: 40 - Oklahoma		
								Date: 05/01/2012					
		Miles			Lane Miles			Vehicle Miles					
		2011	2010	% Change	2011	2010	% Change	2011	2010	% Change			
All Areas													
1 - Interstate		932.65	932.65	0.00%	3,955.54	3,939.48	0.41%	27,309,365.00	27,472,188.00	-0.59%			
2 - PA - Other Freeways and Expressways		188.13	185.64	1.34%	881.06	861.24	2.30%	7,709,204.10	7,730,404.10	-0.27%			
3 - PA - Other		3,388.02	3,388.31	-0.01%	10,675.37	10,658.39	0.16%	29,331,456.71	29,727,049.27	-1.33%			
4 - Minor Arterial		4,843.84	4,844.42	-0.01%	11,302.62	11,295.08	0.07%	23,271,951.01	23,460,721.02	-0.80%			
5 - Major Collector		22,318.05	22,315.71	0.01%	45,139.00	45,129.54	0.02%	18,977,562.02	19,072,370.03	-0.50%			
6 - Minor Collector		2,990.71	2,989.52	0.04%	5,981.42	5,979.04	0.04%	495,984.00	496,000.00	0.00%			
7 - Local		78,145.40	78,216.76	-0.09%	156,290.80	156,433.52	-0.09%	22,894,474.00	22,852,000.00	0.19%			
Total		112,806.8	112,873.0	-0.06%	234,225.8	234,296.3	-0.03%	129,989,996.8	130,810,732.4	-0.63%			
99998 - Small Urban													
1 - Interstate		80.07	80.07	0.00%	320.28	320.28	0.00%	1,863,071.00	1,863,071.00	0.00%			
2 - PA - Other Freeways and Expressways		43.57	43.57	0.00%	174.28	174.28	0.00%	770,576.00	855,127.00	-9.89%			
3 - PA - Other		547.74	547.76	0.00%	1,878.44	1,878.36	0.00%	5,333,445.10	5,381,479.00	-0.89%			
4 - Minor Arterial		1,051.17	1,062.78	-1.09%	2,323.74	2,346.98	-0.99%	3,733,219.41	3,770,851.36	-1.00%			
5 - Major Collector		485.21	488.40	-0.65%	993.58	1,000.34	-0.68%	989,184.94	994,627.32	-0.55%			
6 - Minor Collector		0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%			
7 - Local		4,939.42	4,890.80	0.99%	9,878.84	9,781.60	0.99%	3,886,922.00	3,841,000.00	1.20%			
Total		7,147.2	7,113.4	0.48%	15,569.2	15,501.8	0.43%	16,576,418.5	16,706,155.7	-0.78%			
99999 - Rural													
1 - Interstate		683.52	683.52	0.00%	2,748.94	2,735.14	0.50%	14,014,257.00	14,089,911.00	-0.54%			
2 - PA - Other Freeways and Expressways		0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%			
3 - PA - Other		2,328.22	2,326.04	0.09%	6,903.78	6,881.12	0.33%	13,604,656.70	13,902,264.60	-2.14%			
4 - Minor Arterial		2,702.91	2,703.28	-0.01%	5,986.24	5,979.72	0.11%	7,935,195.40	8,129,163.10	-2.39%			
5 - Major Collector		21,262.45	21,259.04	0.02%	42,852.36	42,839.10	0.03%	15,453,769.74	15,532,752.24	-0.51%			
6 - Minor Collector		2,990.71	2,989.52	0.04%	5,981.42	5,979.04	0.04%	495,984.00	496,000.00	0.00%			
7 - Local		66,704.09	66,822.49	-0.18%	133,648.18	133,644.98	-0.18%	7,509,662.00	7,501,000.00	0.12%			
Total		96,671.9	96,783.9	-0.12%	197,880.9	198,059.1	-0.09%	59,013,524.8	59,651,090.9	-1.07%			
All Urbanized													
1 - Interstate		169.06	169.06	0.00%	886.32	884.06	0.26%	11,432,037.00	11,519,206.00	-0.76%			
2 - PA - Other Freeways and Expressways		144.56	142.07	1.75%	706.78	686.96	2.89%	6,938,628.10	6,875,277.10	0.92%			
3 - PA - Other		512.06	514.51	-0.48%	1,893.15	1,898.91	-0.30%	10,393,354.91	10,443,305.67	-0.48%			
4 - Minor Arterial		1,089.76	1,078.36	1.06%	2,992.64	2,968.38	0.82%	11,603,536.20	11,560,706.56	0.37%			
5 - Major Collector		570.39	568.27	0.37%	1,293.06	1,290.10	0.23%	2,534,607.34	2,544,990.47	-0.41%			
6 - Minor Collector		0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%			
7 - Local		6,501.89	6,503.47	-0.02%	13,003.78	13,006.94	-0.02%	11,497,890.00	11,510,000.00	-0.11%			
Total		8,987.7	8,975.7	0.13%	20,775.7	20,735.4	0.19%	54,400,053.6	54,453,485.8	-0.10%			
All Urban													
1 - Interstate		249.13	249.13	0.00%	1,206.60	1,204.34	0.19%	13,295,108.00	13,382,277.00	-0.65%			
2 - PA - Other Freeways and Expressways		188.13	185.64	1.34%	881.06	861.24	2.30%	7,709,204.10	7,730,404.10	-0.27%			
3 - PA - Other		1,059.80	1,062.27	-0.23%	3,771.59	3,777.27	-0.15%	15,726,800.01	15,824,784.67	-0.62%			
4 - Minor Arterial		2,140.93	2,141.14	-0.01%	5,316.38	5,315.36	0.02%	15,336,755.61	15,331,557.92	0.03%			
5 - Major Collector		1,055.60	1,056.67	-0.10%	2,286.64	2,290.44	-0.17%	3,523,792.28	3,539,617.79	-0.45%			
6 - Minor Collector		0.00	0.00	0.00%	0.00	0.00	0.00%	0.00	0.00	0.00%			
7 - Local		11,441.31	11,394.27	0.41%	22,882.62	22,788.54	0.41%	15,384,812.00	15,351,000.00	0.22%			
Total		16,134.9	16,089.1	0.28%	36,344.9	36,237.2	0.30%	70,976,472.0	71,159,641.5	-0.26%			

Appendix B: Report Types Continued

Interstate Extent and Travel by Route Number

This table shows the Interstate Mileage, Lane-Mileage and DVMT for the Interstate System grouped by Route Number. The Totals should agree with the Interstate rows on the Extent and Travel Report.

Miles

- Length is calculated by running a spatial intersection of F_System, Facility_Type, Urban_Code and Route_Number for Facility_Type equal to 1-One-Way or 2-Two-Way and F_System = 1.
- The Length is determined by summing the End_Point – Begin_Point and Grouping by Route_Number.

Lane Miles

- Lane-Length is calculated by running a spatial intersection of F_System, Facility_Type, Urban_Code, Through_Lanes and Route_Number for Facility_Type equal to 1-One-Way or 2-Two-Way and F_System = 1.
- The Lane-Length is determined by summing the (End_Point – Begin_Point)*Through_Lanes and grouping by Route_Number.

Vehicle Miles (DVMT)

- Length is calculated by running a spatial intersection of F_System, Facility_Type, Urban_Code, and Route_Number for Facility_Type equal to 1-One-Way or 2-Two-Way and F_System = 1.
- The total DVMT is determined by summing the (End_Point – Begin_Point)*AADT and Grouping by Route_Number.

HPMS 8.0.1		Interstate Extent and Travel by Route Number		Stage: Submit
				Year: 2011
				State: 12 - Florida
				Date: 03/28/2012
Route Number	Miles	Lane Miles	Vehicle Miles	
4	131.90	804.39	13,630,400.04	
10	362.06	1,489.16	8,984,849.20	
75	470.76	2,476.04	25,212,699.46	
95	382.01	2,310.26	33,707,622.40	
110	6.34	34.55	218,764.50	
175	1.29	5.53	24,834.60	
195	4.42	25.13	470,901.55	
275	60.29	332.15	5,732,930.10	
295	60.86	307.38	4,639,817.92	
375	1.22	5.50	28,934.10	
395	1.29	5.17	168,292.00	
595	12.86	83.86	1,995,458.00	
Total	1,495.30	7,879.10	94,815,503.86	

Appendix B: Report Types Continued

Extent and Travel on the NHS

This table is similar to the other Extent and Travel Reports but adds the National Highway System (NHS) as a filter for included roadways. The resulting table is grouped by Functional System and NHS code. **Note that totals for Mileage, Lane Miles and DVMT are listed on the last page of the report.**

Miles

- Included roadways are calculated by running a spatial intersection of F_System, Facility_Type, Urban_Code and NHS for Facility_Type equal to 1-One-Way or 2-Two-Way.
- The Length is determined by summing the (End_Point – Begin_Point) and Grouping by F_System.

Lane Miles

- Lane-Length is calculated by running a spatial intersection of F_System, Facility_Type, Urban_Code, Through_Lanes and NHS for Facility_Type equal to 1-One-Way or 2-Two-Way.
- The Lane-Length is determined by summing the (End_Point – Begin_Point)* Through_Lanes and Grouping by F_System.

Vehicle Miles

- Length is calculated by running a spatial intersection as described above for Miles.
- The total DVMT is determined by summing the (End_Point – Begin_Point)* AADT and Grouping by F_System.

HPMS 8.0.1 Extent and Travel on the NHS		Stage: Review
		Year: 2011
		State: 37 - North Carolina
		Date: 10/09/2012
NHS: 1 - Non Connector NHS		
F System	Miles	Lane Miles
1 - Interstate	1,172.50	5,599.40
2 - PA - Other Freeways and Expressways	397.94	1,681.30
3 - PA - Other	2,064.16	7,326.15
4 - Minor Arterial	175.84	519.66
5 - Major Collector	90.68	195.32
6 - Minor Collector	0.00	0.00
7 - Local	7.74	28.96
Sub-Totals	3,908.85	15,350.79
NHS: 9 - Ferry Terminal		
F System	Miles	Lane Miles
1 - Interstate	0.00	0.00
2 - PA - Other Freeways and Expressways	0.00	0.00
3 - PA - Other	31.99	91.13
4 - Minor Arterial	3.78	8.12
5 - Major Collector	98.74	197.49
6 - Minor Collector	0.00	0.00
7 - Local	0.00	0.00
Sub-Totals	134.51	296.74
Total Miles		Total Lane Miles
4,082.04		15,768.41
Total Vehicle Miles		106,271,197.76

The NHS ETR is multiple pages long. This example is truncated to show the Miles, Lane Miles and Vehicle Miles totals and therefore depicts data for just two of nine NHS codes.

Appendix B: Report Types Continued

Consistency

The output for this report is a comparison of key full extent Data Items. The Control Length column should agree with the State’s Certified Miles for upper level Functional Systems. The Miles of AADT, Lanes and Ownership indicate the number of miles that are covered by each respective data item. **This report is a key reference for review of State HPMS submittals.** Once complete, a submittal should yield equal values across each row. Note that the report only includes Section lengths so most miles reported on lower Functional Systems in Summary tables are not represented. As a result, mileage for lower Functional Systems typically only represents those roadways where data is coded for NHS or related purposes. The intersections that support this report will omit data where it is missing on any of the intersected data items, so if AADT is not reported for the full extent of a Functional System, the Length for AADT will be short on the corresponding Functional System when compared with the length on the same Functional System for other Data Items in the report. Finally, this report only represents system length for select Data Items, it does not reflect the coded numeric values on those Sections.

Length calculations for all data items are the same. After each intersection described below is performed, the Length is determined by summing (End_Point - Begin_Point) and grouping by F_System.

Length of AADT (Miles)

- Length is calculated after running a spatial intersection of F_System, Facility_Type, Urban_Code and AADT for Facility_Type equal to 1-One-Way, 2-Two-Way, or 3-Couplet.

Length of Through Lanes (Miles)

- Length is calculated after running a spatial intersection of F_System, Facility_Type, Urban_Code and Through_Lanes for Facility_Type equal to 1-One-Way, 2-Two-Way, or 3-Couplet.

Length of Ownership (Miles)

- Length is calculated after running a spatial intersection of F_System, Facility_Type, Urban_Code and Ownership for Facility_Type equal to 1-One-Way, 2-Two-Way, or 3-Couplet.

Length Control (Miles)

- This is the same calculation that is used for the Extent and Travel Report for Functional Systems 1-5.
- Length is derived from a spatial intersection of F_System, Facility_Type, and Urban_Code for Facility_Type equal to 1-One-Way, 2-Two-Way, or 3-Couplet.

HPMS 8.0.1		Consistency Report			Stage: Submit
					Year: 2010
					State: 37 - North Carolina
F System	Length	Length	Length	Length	
	AADT (Miles)	Through Lanes (Miles)	Ownership (Miles)	Control (Miles)	
1 - Interstate	1,171.400	1,171.996	1,171.996	1,171.996	
2 - PA - Other Freeways and Expressways	480.742	480.742	480.742	480.742	
3 - PA - Other	3,685.628	3,685.748	3,685.748	3,685.748	
4 - Minor Arterial	5,846.634	5,846.634	5,846.634	5,846.634	
5 - Major Collector	10,757.502	10,757.518	10,757.518	10,757.518	
6 - Minor Collector	6,568.288	6,569.285	6,569.285	6,569.285	
7 - Local	43.055	43.055	43.055	43.055	

Length figures for Rural Minor Collectors and Local roadways reported in the County Summary file are not included in this report.

Appendix B: Report Types Continued

Ownership

Ownership totals are shown by Functional System for each ownership category coded in the State submittal, as well as the total sum for submitted data statewide. The "All" sub-table reflects the State Total. Subsequent sub-tables reflect individual ownership categories. The length of this report varies greatly depending on the number of Ownership categories reported in a State submittal. The example shown here depicts just two of the many Ownership categories available for coding per the HPMS Field Manual.

HPMS 8.0.1		Ownership Report		Stage: Review
				Year: 2010
				State: 9 - Connecticut
				Date: 03/20/2012
All		Miles		
1 - Interstate				346.170
2 - PA - Other Freeways and Expressways				278.870
3 - PA - Other				807.310
4 - Minor Arterial				1,916.340
5 - Major Collector				2,769.240
6 - Minor Collector				432.970
7 - Local				14,839.820
Total				21,390.720
State Highway Agency		Miles		
1 - Interstate				346.170
2 - PA - Other Freeways and Expressways				278.870
3 - PA - Other				758.160
4 - Minor Arterial				1,166.510
5 - Major Collector				1,122.780
6 - Minor Collector				22.450
7 - Local				24.150
Total				3,719.090

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Appendix B: Report Types Continued

IRI on NHS

There are two reports that deal specifically with IRI (International Roughness Index) data. The first of these reports depicts the Mileage and DVMT for the National Highway System grouped by Functional System and aggregated by reported IRI values where IRI is less than 95 (Good), greater than 94 but less than 171 (Fair) and greater than 170 (Poor). The totals in this report should be consistent with the Extent and Travel on the NHS report.

Length - in Miles

- Length includes all control sections that have a FACILITY_TYPE of 1 or 2 and are covered by IRI and NHS
- Length is determined from (End_Point - Begin Point) and summed where;
- IRI is less than 95 (as Good), IRI ranges from 95 to 170 (as Fair) and IRI is greater than 170 (as Poor), and group by F_SYSTEM

Travel - in Vehicle Miles

- For all control sections that have a FACILITY_TYPE of 1 or 2 and are covered by IRI and any NHS,
- Sum VMT of those with an IRI less than 95 (as Good), with an IRI from 95 to 170 (as Fair) and those with an IRI great than 170 (as Poor), and group by F_SYSTEM

HPMS 8.0.1		IRI on NHS			Stage: Review	
					Year: 2010	
					State: 20 - Kansas	
					Date: 05/07/2012	
Length - In Miles						
F System	< 95	95 - 170	> 170	Total		
1 - Interstate	679.0	191.4	2.1	872.5		
2 - PA - Other Freeways and Expressways	121.8	34.6	0.9	157.2		
3 - PA - Other	2,320.1	395.1	20.3	2,735.4		
4 - Minor Arterial	4.3	4.3	3.4	12.0		
5 - Major Collector	0.0	0.1	1.9	2.0		
6 - Minor Collector	0.0	0.0	0.0	0.0		
7 - Local	0.0	0.0	0.0	0.0		
Sub-Totals	3,125.1 (82.7%)	625.5 (16.6%)	28.6 (0.8%)	3,779.1		
Travel - In Vehicle Miles						
F System	< 95	95 - 170	> 170	Total		
1 - Interstate	12,312,973.1	6,244,270.0	60,042.5	18,617,285.6		
2 - PA - Other Freeways and Expressways	3,388,118.5	889,040.8	8,495.9	4,285,655.2		
3 - PA - Other	9,973,551.5	2,062,665.0	143,778.0	12,179,994.6		
4 - Minor Arterial	11,554.3	15,361.2	33,246.4	60,161.9		
5 - Major Collector	0.0	60.0	4,938.3	4,998.3		
6 - Minor Collector	0.0	0.0	0.0	0.0		
7 - Local	0.0	0.0	0.0	0.0		
Sub-Totals	25,686,197.3 (73.1%)	9,211,397.1 (26.2%)	250,501.1 (0.7%)	35,148,095.4		

Appendix B: Report Types Continued

IRI on Federal Aid Highways

As with the IRI on NHS report, this report provides length and travel information in two tables with records grouped by Functional System and IRI rating. Here the Functional System value of 1-3 replaces the NHS component of the data input/intersection.

Length

- For all sections that have a FACILITY_TYPE of 1, 2 or 3 and a F_SYSTEM of 1, 2 or 3, and are covered by IRI,
- Sum the length of sections as (End_Point - Begin_Point) and group by Functional System.
- Group records within Functional System by IRI value; IRI less than 95 (as Good), IRI from 95 to 170 (as Fair) and IRI greater than 170 (as Poor)

Travel/Vehicle Miles

- For all sections that have a FACILITY_TYPE of 1, 2 or 3 and a F_SYSTEM of 1, 2 or 3, and are covered by IRI,
- Sum DVMT (Length*AADT) of those with an IRI less than 95 (as Good), with an IRI from 95 to 170 (as Fair) and those with an IRI great than 170 (as Poor), and group by F_SYSTEM

HPMS 8.0.1	IRI on Federal Aid Highways				Stage: Review
					Year: 2010
					State: 20 - Kansas
					Date: 05/07/2012
Length- In Miles					
F System	< 95	95 - 170	> 170	Total	
1 - Interstate	679.0	191.4	2.1	872.5	
2 - PA - Other Freeways and Expressways	136.6	47.8	2.8	187.2	
3 - PA - Other	2,868.9	809.2	187.8	3,865.9	
Sub-Totals	3,684.5 (74.8%)	1,048.5 (21.3%)	192.7 (3.9%)	4,925.6	
Travel - In Vehicle Miles					
F System	< 95	95 - 170	> 170	Total	
1 - Interstate	12,312,973.1	6,244,270.0	60,042.5	18,617,285.6	
2 - PA - Other Freeways and Expressways	3,685,841.2	1,128,131.9	22,079.8	4,836,053.0	
3 - PA - Other	12,540,350.5	7,034,219.0	2,348,286.7	21,922,856.2	
Sub-Totals	28,539,164.7 (62.9%)	14,406,621.0 (31.7%)	2,430,409.1 (5.4%)	45,376,194.8	

Appendix B: Report Types Continued

National Level Reports Overview

With the exception of the National Extent and Travel Report, National reports match the format and content of the annual FHWA Highway Statistics Series. The HM-20, HM-60 and VM-2 reports are also available online at this address: <http://www.fhwa.dot.gov/policyinformation/statistics.cfm>. Brief descriptions of these reports are below. Sample exports of the reports appear on the following pages.

HM-20 - State Length by Functional System (Rural and Urban)

- The section lengths of Function Systems 1-5 are sum of all sections that have a Facility Type of 1-3
- The section length of Function System 6 are sum of all sections that have a Facility Type of 1-3 and an Urban Code less than 99999 (using length entered in the County Summary table)
- The length of Functional System 6 where Urban Code = 99999 and all Function System 7 is what is entered in the County Summary table

HM-60 - Estimated State Lane Miles by Functional System (Rural and Urban)

- The section lane-lengths of Function Systems 1-5 are the sum of all sections that have a Facility Type of 1-3 multiplied by Through Lanes
- The section lane-length of Function System 6 are sum of all sections that have a Facility Type of 1-3 and an Urban Code less than 99999 multiplied by Through Lanes using the length entered in the County Summary table multiplied by 2 (Through Lanes is assumed as 2)
- The section lane-length of Function System 7 is what entered in County Summary table multiplied by 2 (Through Lanes is assumed as 2)

VM-2 - State Vehicle Miles of Travel by Functional System (Rural and Urban)

- The vehicle-lengths of Function Systems 1-5 are sum of all sections that have a facility of 1-3 multiplied by AADT
- The vehicle-length of Function System 6 are sum of all sections that have a Facility Type of 1-3 and an urban code less than 99999 multiplied by AADT
- Rural Minor Collector VMT is from State Summary
- The vehicle-length of Function System 7 are sum of Local VMT in the Urban Summary table
- Small Urban VMT is from State Summary
- Rural Local VMT is from State Summary
- Multiply 365 to above results to represent Annual Vehicle Miles

National Extent and Travel Report (National ETR)

- This report displays the HPMS calculated mileage, lane mileage and travel totals for each State. These total figures match each State's respective ETR totals and are calculated in the same manner as the State level ETR report.
- Figures are presented for two years with a percent change column.

Appendix B: Report Types Continued

National Level Reports: HM-20

Public Road Length (HM-20)
Miles by Functional System

HPMS 8.0.1

Stage: Review
Year: 2011
Date: 02/01/2013

State	URBAN										RURAL										Total
	Interstate	Other Freeways and Expressway	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local	Total	Interstate	Other Freeways and Expressway	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local	Total					
Alabama	536.77	74.07	2,102.00	4,042.45	12,462.18	6,697.78	50,501.55	76,417	369.01	55.45	1,093.86	2,061.46	3,010.83	0.70	18,662.78	25,254	101,671				
Alaska	1,005.41	0.00	816.78	4,267.67	1,629.48	1,031.85	9,076.89	13,987	78.53	0.00	122.95	209.07	0.00	620.46	1,656.57	2,688	16,675				
Arizona	980.48	25.22	1,267.11	3,281.11	4,412.66	2,031.80	31,548.26	41,732	1,149.69	1,783.39	4,354.83	1,788.34	1,650.92	2.05	18,253.82	23,498	65,092				
Arkansas	441.46	0.00	2,066.22	2,993.84	12,527.11	6,973.33	61,932.62	87,059	214.09	86.76	688.70	1,403.10	1,305.34	59.34	9,235.25	13,013	100,082				
California	1,278.67	0.00	3,528.14	6,674.73	12,807.53	8,130.75	49,457.62	81,877	1,173.99	1,338.99	6,549.99	10,755.88	11,360.53	0.00	58,944.76	90,324	172,202				
Colorado	684.55	40.60	2,310.91	3,721.00	5,802.13	8,962.86	47,661.35	68,883	1,066.95	1,248.88	1,182.85	1,664.86	1,793.57	0.00	14,300.38	19,531	88,415				
Connecticut	43.28	39.14	126.61	256.70	940.62	398.93	2,410.34	3,361	302.89	239.74	680.70	1,661.08	1,830.82	36.31	10,441.73	15,193	21,445				
Delaware	0.00	0.00	160.78	114.57	451.61	223.58	2,410.34	3,361	12.77	16.85	104.11	164.13	156.45	0.00	1,046.34	1,501	1,501				
District of Columbia	748.45	180.58	2,674.06	2,408.14	4,176.80	3,295.91	26,803.70	40,288	531.62	147.37	3,614.87	4,112.05	7,050.03	0.00	65,381.04	81,471	121,759				
Florida	716.31	0.00	2,674.01	5,206.65	12,816.72	7,488.63	4,645.67	83,548	48,558	33,665	232.98	1,211.68	386.31	0.00	30,297.04	39,998	123,546				
Georgia	6.35	0.00	107.17	293.78	319.76	122.38	2,050	2,050	48,558	33,665	232.98	1,211.68	386.31	0.00	1,532.13	2,355	4,405				
Hawaii	521.58	0.00	1,742.18	1,392.61	5,786.77	4,014.64	29,541.91	43,000	48,558	33,665	232.98	1,211.68	386.31	0.00	6,511.61	5,553	48,553				
Illinois	1,356.23	0.00	2,353.68	4,670.78	13,751.60	3,361.39	6,578.37	98,226	16,011	98.94	3,140.10	4,512.01	4,813.66	0.27	27,882.15	41,273	139,498				
Indiana	712.28	0.00	1,588.56	2,070.67	10,204.22	9,016.79	70,171	102,986	1,149.69	1,697.3	1,860.80	3,002.83	3,226.11	0.00	18,176.03	26,895	97,066				
Iowa	628.41	0.00	3,456.81	3,911.40	14,385.25	16,159.15	4,444.67	102,986	1,149.69	1,697.3	1,860.80	3,002.83	3,226.11	0.00	7,796.04	11,401	114,387				
Kansas	656.02	0.00	3,075.31	4,280.52	22,898.82	9,230.00	12,753.2	17,888	186.72	186.72	801.27	1,362.78	1,462.55	0.00	8,949.18	12,980	140,513				
Kentucky	596.78	587.00	1,865.02	1,848.11	8,486.11	9,489.12	46,246.53	66,538	33,944	66.71	847.32	934.27	1,106.33	0.00	9,473.50	12,632	79,220				
Louisiana	532.80	0.00	1,018.75	1,759.06	4,919.99	3,153.10	32,064.08	44,466	1,149.69	1,697.3	1,860.80	3,002.83	3,226.11	0.00	12,031.06	17,169	61,635				
Maine	299.15	0.00	787.63	1,016.88	3,213.77	2,179.72	12,395.55	19,857	297.36	305.75	1,086.48	1,434.45	1,753.65	0.00	13,120.45	17,998	32,321				
Maryland	183.57	19.98	146.31	389.41	1,167.52	775.34	5,411.49	7,988	284.40	157.86	1,845.56	1,434.45	2,907.84	0.00	19,003.98	28,315	36,303				
Massachusetts	608.92	376.33	2,195.88	5,011.35	16,700.56	4,294.1	8,924.34	865,996	85,222	329.02	2,311.64	1,434.45	2,907.84	0.00	23,942.65	35,490	122,086				
Michigan	629.91	8.40	3,585.94	6,605.98	12,017.69	12,017.69	8,924.34	64,107	284.40	157.86	1,845.56	1,434.45	2,907.84	0.00	14,810.54	20,817	138,702				
Minnesota	501.69	6.65	1,925.13	3,667.76	11,823.51	2,298.79	3,885.94	61,077	62,855	91.70	1,093.75	990.27	1,432.40	0.00	7,354.54	11,011	75,119				
Mississippi	723.62	966.86	2,159.26	3,993.73	16,447.16	6,496.36	3,885.94	107,827	482.61	464.70	2,834.68	3,227.14	3,298.2	0.00	17,454.81	23,839	131,667				
Missouri	1,129.38	0.00	2,623.39	2,978.56	8,816.72	8,816.72	49,103.47	71,698	62,855	91.70	1,093.75	990.27	1,432.40	0.00	2,353.21	3,182	74,880				
Montana	417.50	350.66	2,362.00	4,133.01	11,508.08	8,785.17	87,170	87,170	21,361	69.06	349.31	775.21	486.55	0.00	4,605.65	6,430	93,600				
Nebaska	449.21	0.26	1,514.99	767.51	3,366.09	2,525.81	11,362.48	28,622	21,361	69.06	349.31	775.21	486.55	0.00	5,819.85	8,217	36,839				
Nevada	149.25	21.47	336.09	462.56	1,092.22	1,146.72	7,938.62	11,147	1,093.75	990.27	1,432.40	497.07	503.16	0.00	3,581.00	4,929	16,076				
New Hampshire	65.00	0.00	253.92	182.99	942.50	424.50	2,292.75	7,296	1,093.75	990.27	1,432.40	497.07	503.16	0.00	23,202.51	31,917	39,213				
New Jersey	847.59	0.00	1,857.99	1,578.82	9,455.10	3,137.61	48,543	60,480	152.32	0.00	693.79	640.41	0.00	2,565	4,924.33	7,904	68,384				
New Mexico	846.80	128.68	1,410.37	3,745.56	5,768.49	9,592.76	44,665.49	66,157	1,149.69	1,697.3	1,860.80	3,002.83	3,226.11	0.00	32,862.10	48,435	114,592				
North Carolina	541.76	3.20	1,864.30	2,654.71	5,768.49	6,544.80	30,595.92	70,197	2,234	472.53	1,848.84	3,227.14	2,728.20	0.03	26,713.36	35,673	105,866				
North Dakota	519.23	0.00	2,934.03	2,515.35	11,580.63	6,544.80	30,595.92	84,932	3,175	0.00	1,652.78	320.46	314.76	0.00	2,665.94	1,919	86,951				
Ohio	723.27	0.00	1,978.88	2,672.83	11,381.88	6,615.11	24,878.84	78,209	249.13	188.13	1,039.80	2,140.53	1,675.47	0.00	32,689.91	45,038	123,427				
Oklahoma	683.52	0.00	2,328.72	2,702.91	21,282.45	2,990.74	7,414.13	96,673	1,149.69	1,697.3	1,860.80	3,002.83	3,226.11	0.00	11,441.31	16,135	122,806				
Oregon	553.07	0.00	2,793.74	2,564.74	6,386.87	7,258.60	51,517.73	73,620	1,149.69	1,697.3	1,860.80	3,002.83	3,226.11	0.00	8,685.28	12,911	59,146				
Pennsylvania	1,119.70	327.85	1,580.02	4,541.49	7,243.04	7,243.04	48,543	1,149.69	1,149.69	1,149.69	1,149.69	1,149.69	1,149.69	0.00	32,753.58	46,151	119,771				
Rhode Island	214.7	0.00	47.91	65.85	144.86	126.52	814.72	462.37	1,149.69	1,697.3	1,860.80	3,002.83	3,226.11	0.00	3,789.96	5,260	6,485				
South Carolina	580.50	0.00	1,289.43	3,287.50	10,477.99	2,153.39	31,834.63	49,623	1,149.69	1,697.3	1,860.80	3,002.83	3,226.11	0.00	10,995.94	16,374	65,997				
South Dakota	602.37	0.00	2,531.92	3,342.03	12,445.81	6,284.32	44,289.28	79,492	1,149.69	1,697.3	1,860.80	3,002.83	3,226.11	0.00	2,073.58	2,968	82,459				
Tennessee	687.50	0.00	1,894.70	3,188.36	5,132.13	10,516.25	68,570	69,975	416.99	155.26	1,441.76	2,489.42	2,333.20	0.00	18,578.25	25,517	95,492				
Texas	2,049.51	0.00	7,435.65	10,158.04	34,879.56	17,657.55	141,921	213,725	1,149.69	1,697.3	1,860.80	3,002.83	3,226.11	0.00	69,720.76	99,185	312,911				
Texas	723.95	0.00	1,031.79	1,429.74	3,668.49	3,893.99	24,015.03	34,463	212.94	197.1	395.75	876.57	898.91	28.81	8,739.08	11,172	45,635				
Utah	279.95	0.00	319.47	728.29	2,007.79	886.39	8,602.60	12,824	40.33	17.62	102.99	152.34	215.52	0.00	936.60	1,465	14,290				
Vermont	656.63	2.45	1,408.47	3,409.47	9,428.69	2,450.48	33,035.05	50,391	296.93	380.29	3,601.14	2,312.57	2,520.25	0.00	17,155.41	24,070	74,461				
Virginia	467.33	722.92	1,257.38	1,911.33	6,430.41	6,453.10	40,816.93	60,059	196.53	280.29	1,351.81	2,682.38	2,431.84	0.00	16,540.15	23,683	83,743				
Washington	368.04	0.00	1,083.70	1,399.47	5,651.76	6,327.55	22,615.16	33,275	286.55	10.30	335.01	743.95	373.64	0.00	3,361.42	5,371	38,646				
West Virginia	477.75	213.56	2,961.85	4,819.13	12,276.14	8,621.56	63,167.21	92,537	101.73	348.73	1,878.85	2,521.13	2,507.15	0.00	14,960.22	22,481	115,018				
Wisconsin	812.42	0.00	1,992.00	1,252.76	2,746.11	6,926.37	11,738.74	25,468	101.73	2.88	220.16	195.52	474.23	9.20	1,781.48	2,785	28,253				
US Total:	30,256	4,224	91,266	135,665	420,136	263,053	2,037,783	2,982,383	16,704	11,495	65,012	107,263	114,456	3,304	777,142	1,095,376	4,077,759				
Grand Total:	30,256	4,224	91,266	135,665	420,136	263,053	2,037,783	2,982,383	16,704	11,495	65,012	107,263	114,456	3,304	777,142	1,095,376	4,077,759				

Appendix B: Report Types Continued

National Level Reports: HM-60

Functional System Lane-Length (HM-60)
Lane-Miles

Review Stage: 2011
Year: 2011
Date: 11/27/2012

HPMS 8.0.1

State	RURAL							URBAN							Total		
	Interstate	Other Freeways and Expressway	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local	Total	Interstate	Other Freeways and Expressway	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector		Local	Total
Alabama	2,241.65	34,020	6,312.28	8,561.52	25,046.37	13,395.56	101,003.10	156,901	1,853.10	265.42	4,042.15	5,224.12	6,295.65	1.41	37,325.55	55,005	211,906
Alaska	2,063.81	0.00	1,652.47	860.98	3,253.86	2,063.69	18,153.79	28,049	305.12	0.00	451.84	484.00	0.00	1,230.96	3,313.14	5,785	33,834
Arizona	4,030.21	90.10	3,502.11	2,875.48	9,037.81	4,063.59	63,096.52	86,976	1,416.22	3,732.1	6,428.02	5,620.00	3,688.95	4.10	36,511.64	54,787	141,483
Arkansas	1,765.84	53,883	5,319.07	6,246.89	25,035.31	13,946.66	123,865.24	176,713	991.05	3,732.1	2,280.29	3,087.41	2,843.06	115.88	18,470.50	28,170	204,883
California	5,846.18	16,258	9,514.53	13,711.78	25,071.89	16,261.49	98,915.25	169,321	8,862.60	8,572.84	24,655.76	19,143.44	23,513.48	0.00	17,889.52	212,618	381,939
Colorado	2,784.97	2,136	5,677.36	7,567.31	17,102.31	17,102.31	140,036	189,272	1,653.42	981.83	4,416.15	4,295.68	3,883.11	0.00	28,618.77	43,889	183,925
Connecticut	2,136	15,591	2,651.00	519.30	1,883.32	797.85	8,828	12,000	1,653.42	981.83	1,813.30	3,758.01	3,806.41	72.62	20,883.46	32,969	45,697
Delaware	0.00	0.00	0.00	0.00	0.00	0.00	4,820.8	7,018	81.88	75.33	426.06	434.93	309.43	0.00	2,095.67	3,420	3,420
District of Columbia	3,440.65	71,508	7,523.49	5,063.71	8,426.56	6,591.82	85,369	125,352	4,471.33	7,756.74	15,835.65	13,836.44	16,710.13	0.00	130,765.07	184,339	269,708
Florida	3,501.09	0.00	8,534.24	10,968.10	25,695.23	14,977.26	109,291.24	172,967	4,471.33	7,756.74	6,923.87	10,894.72	6,095.52	0.00	60,594.08	88,591	261,558
Georgia	2,085.14	25.40	0.00	220.16	594.34	639.97	24,766.35	41.25	309.07	152.34	757.26	363.69	8,445.00	0.00	3,064.25	5,489	9,615
Illinois	5,481.08	0.00	4,019.48	2,875.45	11,631.25	8,029.22	59,083.82	87,724	0.00	0.00	1,240.20	1,388.68	1,413.38	0.00	7,303.22	11,761	99,485
Indiana	2,869.10	0.00	5,301.25	9,457.90	27,537.63	6,722.78	145,463.76	199,964	4,385.01	413.88	10,457.65	11,815.42	10,442.80	0.00	55,764.30	93,239	293,203
Iowa	2,514.05	0.00	8,943.26	7,907.20	8,051.10	32,318.30	128,889.33	209,378	2,276.28	0.00	5,899.12	6,967.75	6,796.54	0.00	36,352.06	58,965	202,501
Kansas	2,647.67	0.00	7,140.25	8,663.43	4,099.62	18,460.00	18,460.00	257,527	2,276.28	0.00	2,859.59	3,804.65	2,235.10	5.20	15,592.07	25,219	234,596
Kentucky	2,744.16	2,175.70	5,004.65	3,757.17	9,941.39	18,978.25	92,459.37	137,179	3,979.13	2,644.00	3,050.24	2,229.65	2,229.65	0.00	18,947.00	27,952	165,130
Louisiana	2,201.08	0.00	3,299.52	3,923.20	3,777.03	6,306.20	66,123.66	91,835	1,651.28	239.94	3,979.13	4,511.44	4,228.74	0.00	24,063.23	38,674	130,509
Maine	1,275.46	0.00	1,632.79	2,063.20	6,430.46	4,366.20	33,324.4	40,493	3,979.13	71.08	3,979.13	4,511.44	4,228.74	0.00	4,022.12	6,391	46,883
Maryland	899.34	0.00	1,508.94	1,720.02	3,216.92	3,540.33	19,050.94	29,855	3,979.13	1,399.85	4,628.84	7,307.67	5,795.69	0.00	26,240.89	41,028	70,883
Massachusetts	417.50	76.56	324.49	7,099.04	2,190.08	2,933.44	15,877.23	22,689	3,979.13	334.80	1,324.53	1,847.79	1,002.81	0.00	9,211.29	14,188	190,364
Michigan	2,888.39	1,511.63	4,691.76	10,275.37	3,335.29	8,588.22	10,822.99	16,288	2,704.70	1,399.85	4,628.84	7,307.67	5,795.69	0.00	38,011.95	60,418	76,707
Minnesota	2,531.35	23.02	8,999.21	13,283.31	3,841.16	24,035.37	61,658	239,005	1,500.31	712.50	3,565.50	6,706.02	4,950.41	0.00	47,885.31	80,822	256,730
Mississippi	1,939.72	2.60	6,540.81	7,517.00	8,777.02	4,592.57	82,771.88	132,208	182.95	2,287.48	2,287.48	2,287.48	2,287.48	0.00	14,709.08	24,285	156,492
Missouri	2,897.37	3,856.29	5,164.27	8,022.45	32,927.36	12,992.77	129,927.36	219,940	1,988.51	0.00	1,988.51	4,779.68	4,938.00	0.00	34,909.62	52,899	272,839
Montana	4,516.75	1,735.24	1,399.68	8,880.40	8,363.37	17,570.33	119,181.6	176,177	3,979.13	3,979.13	3,979.13	3,979.13	3,979.13	0.00	4,706.41	6,784	152,799
Nebraska	1,845.62	1.32	3,467.73	6,121.87	2,001.45	5,051.63	19,050.94	29,855	3,979.13	3,979.13	3,979.13	3,979.13	3,979.13	0.00	9,211.29	14,188	190,364
Nevada	622.00	85.88	689.50	6,699.04	2,190.08	2,933.44	15,877.23	22,689	3,979.13	334.80	1,324.53	1,847.79	1,002.81	0.00	11,639.70	20,020	78,726
New Hampshire	329.23	0.00	689.04	6,699.04	2,190.08	2,933.44	15,877.23	22,689	3,979.13	334.80	1,324.53	1,847.79	1,002.81	0.00	11,639.70	20,020	78,726
New Jersey	353.92	0.00	5,732.65	4,035.09	6,975.21	8,490.91	10,621.07	15,049	3,979.13	2,180.93	5,240.59	7,725.42	5,613.03	0.00	46,408.02	70,173	85,222
New Mexico	3,429.23	0.00	2,824.64	7,294.14	11,583.17	19,185.52	132,324	174,914	728.80	0.00	2,666.37	1,579.34	0.00	3,088.58	9,848.67	17,913	142,837
New York	3,654.29	538.11	6,180.17	5,944.80	16,340.03	13,089.61	101,366.37	144,868	4,410.10	3,801.20	8,584.44	13,662.89	11,311.15	0.00	65,724.70	107,494	242,618
North Carolina	2,076.92	0.00	6,735.05	3,030.12	23,170.21	0.00	171,764	219,84	3,979.13	0.00	3,979.13	7,017.67	5,822.64	0.00	53,426.72	79,329	224,197
North Dakota	3,500.09	0.00	5,948.11	3,473.63	23,018.04	13,202.02	10,751.89	160,728	2,038.75	7,953.94	10,768.64	11,047.19	0.00	65,379.82	101,951	262,678	
Ohio	2,406.94	0.00	6,903.78	5,986.24	42,832.36	5,986.24	19,883	1,206.60	881.06	3,771.59	5,316.38	2,886.64	0.00	22,882.62	36,345	234,228	
Oklahoma	2,259.27	0.00	6,312.24	4,858.26	16,994.31	14,826.82	4,740	94,502	866.81	2,499.8	2,411.80	2,640.44	3,840.12	0.00	17,770.56	27,780	122,281
Oregon	4,529.79	1,319.93	3,711.11	9,367.74	14,556.46	14,517.20	103,089.47	151,102	2,149.99	8,402.21	8,721.35	10,805.60	0.00	65,510.76	98,881	249,982	
Pennsylvania	85.89	0.00	107.82	136.84	2,977.00	2,530.00	3,251.8	306.53	351.79	959.76	729.43	4,076.10	1,226.48	0.00	5,579.93	11,154	13,672
Rhode Island	2,375.92	0.00	3,859.96	7,265.80	21,057.08	4,206.76	666.7	102,535	3,979.13	3,979.13	3,979.13	3,979.13	3,979.13	0.00	21,987.88	36,945	139,480
South Carolina	2,413.13	0.00	5,891.64	6,747.68	24,845.46	12,568.65	68,576.40	161,037	3,979.13	4,174	5,668.66	1,000.34	585.94	0.00	37,156.50	57,671	201,857
Tennessee	2,811.82	0.00	6,003.61	6,898.19	10,328.18	21,032.49	97,112.10	144,186	2,314.58	6,933.39	5,798.67	6,595.13	4,947.92	0.00	39,441.52	231,499	674,296
Texas	8,358.49	0.00	22,827.26	22,727.12	70,479.59	35,315.11	283,089.83	442,797	6,002.67	7,655.41	23,225.02	25,985.13	28,283.97	0.00	139,441.52	231,499	674,296
Utah	2,918.57	0.00	2,458.73	2,993.07	6,779.80	7,787.85	48,030.06	70,968	1,516.14	81.02	1,516.14	2,513.47	1,959.89	57.62	17,478.16	24,932	95,901
Vermont	1,119.79	0.00	724.07	1,470.42	4,024.78	1,772.79	17,205.21	26,317	161.32	49.21	239.68	308.81	432.29	0.00	8,732.20	3,065	29,382
Virginia	2,727.58	1.83	5,409.43	7,555.09	19,175.12	4,900.96	66,070.11	105,840	2,673.43	1,124.45	5,423.40	6,465.85	5,538.98	0.00	34,310.83	55,537	161,377
Washington	2,086.29	1,836.82	2,568.08	3,861.01	16,685.68	12,006.20	81,633.86	121,758	1,912.94	1,458.65	4,613.33	5,807.18	4,922.99	0.00	33,080.30	51,796	173,554
West Virginia	1,543.38	0.00	2,795.65	2,699.56	11,307.94	4,433.18	45,230.32	68,010	822.60	36.60	1,034.86	1,543.42	1,469.48	0.00	6,722.83	11,630	79,640
Wisconsin	1,986.66	852.38	7,385.23	9,713.00	24,565.82	17,243.13	126,334.41	188,081	1,228.74	1,482.00	5,808.88	5,935.68	5,186.01	0.00	29,920.44	49,562	237,642
Wyoming	3,249.68	0.00	4,133.59	2,541.78	5,504.09	13,852.74	23,477.49	52,579	404.52	11.52	721.61	474.67	66.38	18.40	3,562.96	6,160	58,919
US Total:	123,835	15,691	239,980	282,613	843,317	526,107	4,075,567	6,107,110	92,714	53,852	230,352	277,272	244,712	7,358	1,554,283	2,460,543	8,567,652
Grand Total:	123,835	15,691	239,980	282,613													

Appendix B: Report Types Continued

National Level Reports: VM-2

HPMS 8.0.1

Functional System Travel (VM-2)
Vehicle-Miles

Stage: Review
Year: 2011
Date: 12/05/2012

State	RURAL										URBAN										Total
	Interstate	Other Freeways and Expressway	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local	Total	Interstate	Other Freeways and Expressway	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local	Total					
Alabama	15,655,344	960,807	16,424,317	12,790,836	14,297,174	4,548,104	18,483,870	83,172,454	20,417,924	1,870,710	21,185,898	17,454,491	10,205,902	714	23,539,503	94,675,142	177,847,596				
Alaska	2,382,915	0	2,382,915	408,710	819,900	415,000	1,600,000	5,933,683	1,804,388	0	2,050,559	1,267,942	0	721,234	786,000	6,630,123	12,583,807				
Arizona	19,178,554	254,636	9,230,136	4,794,145	7,919,861	1,268,508	4,424,943	47,066,284	20,992,162	33,458,636	20,944,069	8,433,929	1,329	16,562,756	116,522,754	163,219,039					
Arkansas	11,215,586	4,233,363	7,793,245	10,990,893	1,993,164	5,699,680	5,407,584	11,300,680	2,305,660	9,940,206	8,569,181	3,504,898	93,669	4,040,177	39,784,470	90,282,033					
California	46,413,641	860,483	43,086,004	24,956,149	26,139,550	7,117,109	6,439,018	154,151,471	185,588,629	146,802,099	162,435,546	132,725,205	50,516,161	0	46,640,905	724,708,544	878,686,015				
Colorado	11,721,971	1,915,379	10,353,281	6,457,332	2,573,834	431,060	2,166,838	10,709,601	26,114,155	10,321,244	10,157,860	14,012,033	6,939,015	0	8,698,000	86,975,012	127,668,394				
Connecticut	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Delaware	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
District of Columbia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Florida	25,868,964	5,157,144	21,107,750	11,041,851	10,160,134	4,467,466	17,526,266	95,375,955	32,156,106	10,491,598	73,434,361	51,328,682	0	99,673,398	430,254,059	525,630,014					
Georgia	26,277,744	0	17,333,625	17,028,099	15,620,246	4,095,161	18,711,185	99,077,577	51,713,558	8,178,976	33,906,037	41,572,504	13,141,324	0	49,542,908	198,055,307	297,132,884				
Hawaii	300,699	0	1,316,738	1,707,331	777,627	1,068,317	6,570,223	1,007,688	1,449,993	5,204,986	1,976,322	2,550,548	0	5,019,162	21,008,897	27,579,121					
Idaho	6,022,705	0	5,957,379	2,456,995	4,362,280	670,000	5,920,000	25,389,360	3,031,177	56,489,956	42,133,582	22,181,297	0	2,251,000	18,272,556	43,661,916					
Illinois	24,392,649	2,568,411	20,491,918	12,622,630	13,466,235	1,120,363	13,483,734	72,343,734	60,628,494	29,098,043	22,749,150	13,783,350	67	35,329,676	130,673,061	282,832,923					
Indiana	20,143,408	0	12,590,817	9,737,983	17,755,235	5,158,313	13,489,519	78,875,517	16,789,081	3,528,695	29,098,043	22,749,150	13,783,350	67	35,329,676	130,673,061	282,832,923				
Iowa	13,305,424	0	15,653,319	6,982,409	9,518,176	2,374,000	4,275,000	52,110,328	20,968,000	9,824,701	8,871,512	2,583,717	0	5,221,000	33,572,717	85,683,044					
Kansas	8,764,403	0	12,358,516	6,156,176	7,635,094	706,000	9,957,246	40,268,751	4,881,475	9,924,722	7,670,542	3,244,445	0	6,310,811	41,981,241	82,249,992					
Kentucky	20,118,606	5,597,517	14,198,757	7,659,125	12,547,909	6,811,000	9,430,000	76,400,723	16,574,450	2,280,678	16,948,276	8,781,985	4,861,000	0	5,810,000	55,274,109	131,674,834				
Louisiana	14,629,836	0	6,047,232	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Maine	9,622,448	0	5,077,425	4,194,311	3,751,040	2,284,000	3,500,000	28,230,639	4,004,842	1,976,798	2,488,458	2,000,000	0	1,156,000	10,805,605	39,036,244					
Maryland	3,512,210	0	9,325,639	1,508,000	1,789,269	4,264,334	1,890,679	11,159,041	16,094,899	27,710,390	17,061,995	9,468,955	0	8,226,000	115,417,426	150,114,281					
Massachusetts	14,508,672	6,828,105	11,429,518	18,009,223	22,145,997	2,509,000	2,268,000	124,878	42,232,222	15,481,174	29,860,267	23,952,427	7,428,626	0	20,399,701	138,955,240	150,114,281				
Michigan	11,286,272	97,841	19,962,298	9,296,283	6,338,566	3,669,711	7,112,237	67,353,213	22,533,421	9,447,202	12,892,044	23,118,808	7,493,599	11,580	18,696,491	87,947,382	155,300,579				
Minnesota	10,332,168	2,568	15,398,093	9,296,283	115,435	1,245,415	15,500,000	63,185,383	13,333,987	1,333,987	6,481,583	4,339	0	8,300,506	43,254,951	106,440,334					
Mississippi	16,337,050	10,144,746	12,656,072	9,656,098	11,543,500	1,276,550	1,276,550	79,471,419	34,234,314	13,082,106	15,108,488	8,081,908	0	75	211,400,000	108,992,207	188,463,626				
Missouri	6,710,450	0	6,258,441	1,105,236	1,200,368	3,349,000	33,866,344	989,210	2,474,982	2,698,185	1,516,281	1,459,171	0	1,945,311	8,057,758	31,944,104					
Montana	7,137,669	2,915,780	6,158,386	6,298,926	4,193,209	653,000	3,349,000	30,344,970	40,314,775	4,693,901	5,421,292	12,207,414	0	3,002,000	21,965,491	52,310,463					
Nebraska	5,201,156	8,448	4,191,377	6,298,926	4,193,209	653,000	3,349,000	30,344,970	40,314,775	4,693,901	5,421,292	12,207,414	0	3,002,000	21,965,491	52,310,463					
Nevada	3,433,303	856,474	2,892,359	2,611,017	3,888,548	1,539,210	1,101,426	15,201,807	2,500,712	2,500,712	4,846,352	2,445,245	0	1,955,587	12,784,466	52,892,429					
New Hampshire	4,138,303	0	4,964,473	2,138,081	2,006,637	794,000	1,000,000	17,255,300	30,669,472	3,453,878	4,846,352	3,054,703	10,944,934	0	30,154,000	183,001,577	200,356,907				
New Jersey	11,989,290	0	8,621,154	9,900,000	11,302,100	25,683,000	10,445,000	39,973,673	7,232,616	10,097,436	41,138,374	11,318,189	0	43,711,000	29,978,713	69,953,306					
New Mexico	16,852,338	1,758,650	8,703,143	12,400,000	11,302,100	25,683,000	10,445,000	39,973,673	46,360,261	501,206,996	47,802,561	20,569,167	0	40,350,000	260,057,914	349,933,335					
North Carolina	16,361,757	79,513	21,039,650	14,461,868	3,840,110	9,362,959	7,238,000	18,531,290	1,847,228	15,371,667	35,285,192	32,710,409	14,868,010	144	34,141,783	173,986,643	284,307,834				
North Dakota	4,420,427	0	6,137,990	2,177,470	2,896,404	5,268,869	15,704,000	99,580,110	13,112,566	15,111,837	34,058,287	35,696,608	25,833,140	0	1,093,000	20,241,662	306,821,779				
Ohio	24,698,871	0	17,952,412	11,796,472	23,901,490	4,955,937	5,938,337	59,100,361	13,112,566	7,201,702	15,897,541	15,351,909	5,666,666	0	15,384,812	70,936,632	306,821,779				
Oklahoma	13,951,426	0	11,987,820	6,699,563	5,524,506	1,631,910	4,018,281	40,181,281	3,016,947	17,026,004	44,817,440	34,524,577	21,430,414	0	5,907,481	51,252,685	91,435,968				
Oregon	28,874,642	5,157,073	11,452,828	18,855,961	12,124,894	5,741,102	5,408,884	97,667,282	4,773,313	3,268,572	5,556,049	2,682,434	21,794,990	0	20,373,737	174,124,988	271,792,271				
Pennsylvania	1,091,465	0	363,812	355,937	437,985	98,000	64,112,244	4,775,222	2,226,133	19,861,686	15,249,497	9,466,162	0	779,708	19,239,365	21,647,749					
Rhode Island	20,442,020	0	9,446,629	13,553,652	13,393,471	762,197	651,429,966	17,745,703	100,790	1,531,167	2,196,109	671,234	0	702,337	6,917,442	24,663,145					
South Carolina	5,587,047	0	4,666,228	2,932,777	2,885,305	404,766	9,967,171	17,745,703	1,945,805	1,531,167	2,196,109	671,234	0	1,131,811	10,099,579	19,564,491					
South Dakota	23,699,290	0	15,027,590	13,666,802	8,754,642	7,500,000	3,646,496	17,273,824	39,192,882	88,776,536	101,642,684	99,570,202	52,726,176	0	18,665,370	116,564,816	193,838,641				
Texas	42,584,693	0	4,475,922	2,361,245	2,360,742	625,770	2,970,291	192,019,452	16,949,700	5,119,234	29,443,684	9,957,020	4,180,563	5,754	20,420,020	50,561,329	71,840,072				
Tennessee	8,484,773	0	5,619,979	33,099,900	37,903,657	7,108,364	15,117,705	92,019,452	1,030,368	765,676	8,262,580	9,957,020	4,180,563	0	1,131,811	10,099,579	19,564,491				
Texas	3,429,775	0	1,947,277	2,552,017	3,230,888	588,906	2,258,408	14,473,911	1,030,368	172,357	1,778,071	963,529	613,914	0	1,131,811	10,099,579	19,564,491				
Vermont	25,074,672	0	17,500,426	14,175,143	13,647,478	1,493,309	9,258,408	11,499,436	9,301,230	35,487,467	28,612,660	11,318,189	0	151,29,584	140,699,117	221,846,554					
Virginia	12,331,482	5,019,138	6,025,532	5,867,475	10,889,158	3,185,413	3,260,514	46,578,328	29,787,946	14,471,243	24,051,739	20,714,447	8,391,892	0	12,043,927	109,461,194	156,039,926				
Washington	7,414,537	0	6,929,242	4,349,670	7,451,880	1,049,000	2,844,000	30,038,326	209,965	209,965	5,620,970	1,808,879	0	1,482,000	21,915,442	51,953,770					
West Virginia	14,251,508	4,527,575	18,941,268	14,423,300	3,699,127	4,617,047	76,539,173	14,262,550	12,443,464	2,073,962	12,360,897	5,721,973	0	4,354,900	72,507,208	149,046,381					
Wisconsin	6,5																				

Appendix B: Report Types Continued

National Level Reports: National ETR

Stage: Review
 Year: 2011
 Date: 12/04/2012

Extent and Travel Report
 Nationwide Summary

HPMS 8.0.1

	Miles			Lane Miles			Vehicle Miles		
	2011	2010	% Change	2011	2010	% Change	2011	2010	% Change
1 - Alabama	228,596	228,340	0.11%	478,818	476,726	0.44%	450,370,333	443,637,945	1.52%
2 - Alaska	36,037	35,190	2.41%	73,452	71,837	2.25%	31,797,736	33,397,902	-4.79%
4 - Arizona	153,681	151,683	1.32%	337,752	333,086	1.40%	442,590,832	445,657,205	-0.69%
5 - Arkansas	213,177	213,093	0.04%	437,937	437,463	0.11%	220,348,577	223,895,174	-1.58%
6 - California	434,524	434,370	0.04%	976,099	980,958	-0.50%	2,480,368,842	2,494,487,597	-0.57%
8 - Colorado	196,361	196,136	0.11%	411,728	411,147	0.14%	342,351,800	345,479,197	-0.91%
9 - Connecticut	58,084	57,956	0.22%	124,364	124,121	0.20%	245,706,127	246,524,428	-0.33%
10 - Delaware	15,712	15,665	0.30%	34,290	34,161	0.38%	66,254,839	65,929,169	0.49%
11 - District of Columbia	4,502	4,509	-0.17%	10,261	10,238	0.22%	29,326,973	29,513,636	-0.63%
12 - Florida	324,989	324,916	0.02%	723,776	722,728	0.14%	1,484,544,066	1,511,949,247	-2.01%
13 - Georgia	287,090	285,657	0.50%	611,777	607,765	0.65%	712,321,075	817,527,548	-3.08%
15 - Hawaii	11,166	11,134	0.29%	24,778	24,684	0.14%	71,167,137	75,507,737	0.87%
16 - Idaho	102,658	103,363	-0.68%	210,744	212,051	-0.62%	105,596,388	104,580,705	0.97%
17 - Illinois	320,270	320,358	-0.03%	679,646	679,254	0.06%	776,153,035	795,990,792	-2.49%
18 - Indiana	221,027	220,852	0.08%	463,556	457,200	1.37%	545,770,106	544,984,006	0.88%
19 - Iowa	240,175	240,156	0.1%	494,411	494,144	0.05%	265,938,805	205,882,461	-0.46%
20 - Kansas	294,006	294,284	-0.09%	602,371	602,722	-0.06%	206,431,212	205,837,077	0.31%
21 - Kentucky	171,072	171,224	-0.09%	358,213	357,761	0.13%	315,623,778	318,540,156	0.03%
22 - Louisiana	140,433	138,990	1.04%	299,692	294,909	1.62%	365,666,566	321,270,653	1.88%
23 - Maine	48,754	48,732	0.04%	100,177	100,695	-0.53%	88,871,093	90,856,199	-2.18%
24 - Maryland	82,640	80,489	2.65%	182,795	178,288	2.53%	423,474,996	422,163,540	0.31%
25 - Massachusetts	100,921	100,760	0.16%	213,832	213,451	0.18%	465,666,666	435,471,555	0.85%
26 - Michigan	279,661	279,921	-0.09%	594,233	594,434	-0.03%	696,677,334	714,464,048	-2.49%
27 - Minnesota	298,220	296,959	0.42%	615,627	613,133	0.41%	398,548,577	398,106,261	0.11%
28 - Mississippi	161,248	161,192	0.04%	337,270	337,622	-0.10%	256,135,618	263,229,424	-2.69%
29 - Missouri	287,173	285,641	0.54%	598,576	596,690	0.32%	485,919,458	498,250,335	-2.47%
30 - Montana	152,942	152,760	0.12%	312,362	311,873	0.16%	71,945,966	68,955,091	4.34%
31 - Nebraska	193,629	193,734	-0.05%	394,917	395,108	-0.05%	126,586,415	129,325,886	-2.12%
32 - Nevada	81,896	78,155	4.79%	177,472	169,974	4.41%	185,436,625	168,795,464	9.86%
33 - New Hampshire	37,082	37,104	-0.06%	76,550	76,584	-0.04%	89,252,274	91,654,953	-2.62%

Appendix B: Report Types Continued

National Level Reports: National ETR (Page 2)

Stage: Review
 Year: 2011
 Date: 12/04/2012

Extent and Travel Report
 Nationwide Summary

HPMS 8.0.1

	Miles			Lane Miles			Vehicle Miles		
	2011	2010	% Change	2011	2010	% Change	2011	2010	% Change
34 - New Jersey	110,342	110,352	-0.01%	240,618	240,633	-0.01%	583,515,392	582,629,096	0.15%
35 - New Mexico	144,673	144,664	0.01%	303,568	303,153	0.14%	169,883,484	168,469,445	0.84%
36 - New York	277,619	277,575	0.02%	592,730	592,887	-0.03%	959,924,584	988,576,191	-2.90%
37 - North Carolina	0	246,873	0.00%	0	526,625	-100.00%	0	731,913,169	-100.00%
38 - North Dakota	175,621	175,603	0.01%	357,223	356,179	0.01%	56,515,151	51,582,765	9.56%
39 - Ohio	291,533	291,391	0.05%	627,307	626,616	0.11%	820,885,114	820,133,224	0.09%
40 - Oklahoma	241,751	241,835	-0.03%	504,801	504,830	-0.01%	831,017,228	332,781,106	-0.53%
41 - Oregon	131,208	131,200	0.01%	277,333	272,222	0.04%	234,120,617	236,689,573	-1.09%
42 - Pennsylvania	285,693	285,426	0.09%	598,845	598,334	0.09%	717,709,129	726,718,678	-1.24%
44 - Rhode Island	18,229	18,247	-0.10%	37,499	38,500	-0.26%	65,515,151	65,634,691	-4.72%
45 - South Carolina	148,369	148,420	-0.03%	315,958	315,958	-0.02%	336,409,779	338,878,408	-0.73%
46 - South Dakota	167,886	167,855	0.02%	342,143	342,012	0.03%	53,247,833	55,446,456	1.44%
47 - Tennessee	216,502	216,650	-0.07%	467,381	453,162	1.81%	1,242,098	501,107,839	0.63%
48 - Texas	725,607	720,435	0.69%	1,587,696	1,569,117	0.70%	1,759,544,297	1,734,310,484	1.45%
49 - Utah	102,441	101,487	0.94%	216,799	214,719	0.94%	194,241,173	196,584,065	-1.19%
50 - Vermont	30,045	30,338	-0.96%	61,828	62,160	-0.53%	44,219,551	44,774,737	-1.24%
51 - Virginia	172,993	172,593	0.23%	378,291	377,749	0.14%	584,200,225	593,507,661	-1.54%
53 - Washington	191,169	191,155	0.01%	397,905	398,702	0.05%	421,541,145	422,999,215	-0.34%
54 - West Virginia	82,662	82,617	0.05%	177,909	170,745	0.10%	125,822,982	127,533,811	-1.34%
55 - Wisconsin	252,517	252,377	0.05%	524,847	524,447	0.08%	370,599,969	401,428,916	-7.68%
56 - Wyoming	59,291	0	0.00%	123,999	0	0.00%	58,151,734	0	0.00%
66 - Guam	0	0	0.00%	0	0	0.00%	0	0	0.00%
69 - Northern Marianas	0	0	0.00%	0	0	0.00%	0	0	0.00%
72 - Puerto Rico	0	0	0.00%	0	0	0.00%	0	0	0.00%
Grand Total	9,003,280	9,166,120	-1.78%	19,067,728	19,409,728	-1.76%	20,801,527,431	21,633,564,918	-3.85%

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