Submission Process Introduction

- States prepare submittal per their business processes
- FHWA web-based HPMS software application must be used for data submission purposes
- Attribute data must be submitted in Character Separated Value (CSV) file format
- Geospatial network data must be submitted for linear referencing purposes
HPMS Workflow / Timeline

Data Collection, Aggregation, and Quality Review

- District Office #1
  - HPMS Data Dist #1
- District Office #2
  - HPMS Data Dist #2
- District Office #N
  - HPMS Data Dist #N
- MPOs
  - HPMS Data MPOs
- Local Governments
  - HPMS Data Local Govts

State Central Office

Traffic Database

Pavement Database

Spatial Component

Road Inventory

Submittal to FHWA

FHWA Review and Certification

Data Distribution and Reporting

Certified Public Road Mileage

Interstate Pavement and Related Data

Non-Interstate Pavement, Non-Pavement, Sample and Summary Data

Travel Time Metric Data

Performance Assessment

Highway Statistics

Conditions and Performance Report

National Highway Datasets

1Beginning April 15, 2019
2Beginning June 15, 2021 (Non-IS NHS Pavement)
3Beginning June 15, 2018
## Example DOT HPMS Workflow

<table>
<thead>
<tr>
<th>Month</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>GIS prepares a new public road shape-file with LRS. This shape-file will constitute the upcoming calendar year’s HPMS routes submission. All data provider’s will use this LRS starting January 1&lt;sup&gt;st&lt;/sup&gt; of each year. The current year’s public roads shape-file, prepared last December, will still control the upcoming HPMS submission.</td>
</tr>
<tr>
<td>January 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Planners supply 1) official urban boundary shape-file and 2) “csv” file containing F_System and Urban_Code data items. The F_System data should be for all roads having a functional classification greater than “local” as of this date. The “csv” file must use the LRS described in the new GIS shape-file. F_System and Urban_Code prepared here will be used in TOPS generation (see below). The F_System and Urban_Code data, prepared last January, will still control the upcoming HPMS submission.</td>
</tr>
<tr>
<td>February 15&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Inventory supplies “csv” file containing Facility_Type and Through_Lanes data items. At a minimum, those roads designated as Federal-Aid eligible by the planner’s must be reported, however, it is preferable to match the F_System limits above. The “csv” file must use the LRS described in the new GIS shape-file. Facility_Type and Through_Lanes prepared here will be used in TOPS generation (see below). The Facility_Type and Through_Lanes, prepared last February, will still control the upcoming HPMS submission.</td>
</tr>
<tr>
<td>March 15&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Traffic Surveys supplies “csv” file containing AADT data item. At a minimum, those roads designated as Federal-Aid eligible by the planner’s must be reported. The AADT file will consist of previous calendar year data and LRS. This data will be used for this year’s HPMS submission.</td>
</tr>
<tr>
<td>April 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Highway Statistics will create Table of Potential Software (TOPS) using new F_System, Urban_Code, Facility_Type, Through_Lanes, and previous years AADT. Sample locations will be determined allowing various data collectors to incorporate the locations into this year’s data collection season.</td>
</tr>
<tr>
<td>May 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Statewide Summary (for previous calendar year) 1) Inventory supplies paved and unpaved lengths for rural minor collector, rural local, and urban local functional classifications. Mileages must match County Summary. 2) Traffic Surveys supplies VMTs for rural minor collector, rural local, and urban local functional classifications. 3) Planners supply a) population for rural and small-urban areas. b) land area for rural and small-urban areas. Vehicle Summary (for previous calendar year) 1) Traffic Surveys supplies travel activities data summarized by functional system group covering all public roads.</td>
</tr>
<tr>
<td>May 1&lt;sup&gt;st&lt;/sup&gt; (cont.)</td>
<td>Urbanized Area Summary (for previous calendar year) 1) Traffic Surveys supplies VMT for Casper and Cheyenne local functional classification. 2) Planners supply population and land area for Casper and Cheyenne urbanized areas. County Summary (for previous calendar year) 1) Inventory supplies “csv” file of lengths designated as rural minor collector and rural/urban local. File must be aggregated by county, urban code, and ownership. Estimates (for previous calendar year) 1) Materials supplies “csv” file showing statewide pavement defaults for all federal-aid eligible roads. Metadata (for previous calendar year) 1) Materials supplies “csv” file describing variability of pavement collection for all federal-aid eligible roads. 2) Traffic Surveys supplies “csv” file describing variability of traffic collection for all federal-aid eligible roads. Sections (for previous calendar year) Inventory, Planners, Traffic Surveys, Traffic Operations, and Materials supply “csv” files for remaining data items collected last year. The “csv” files must use last year’s LRS and not the new one. However, data items being collected this year will use this year’s new LRS. This should conclude HPMS data submission for previous year.</td>
</tr>
<tr>
<td>May 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Inventory submits certified mileage letter for previous calendar year. Mileage must match HPMS submitted mileage.</td>
</tr>
</tbody>
</table>

Note 1: TOPS uses the data from F_System, Urban_Code, Facility_Type, Through_Lanes, and AADT to provide a table of “potential” sample sizes. Whenever possible, selected sample locations will correspond to previously used sample locations. However, FHWA’s sample adequacy requirements will always cause a few new locations to be selected every year. Note 2: Data for the previous year can always be submitted earlier than the shown dates. The above dates should be considered an absolute deadline. Earlier submission will facilitate the fixing of errors in a group’s data and is highly encouraged. Note 3: All “section” data items must be processed through a computer program that removes milepost equations. If milepost equations are used during data collection or are just part of the source data, the data provider should not try to remove them. GIS has developed a computer program to accomplish the task.
Submittal Workflow

Import
- Routes
- Sections
- Summary
- Estimates
- Metadata

Samples
- Create TOPS
- Import Samples

Validate
- LRS
- Sections
- Samples
- Coverage

Verify
- Sample Adequacy
- Expansion Factors
- Reports
- Calculations

Submit
- Import Status/Checks
- Confirm Mileage
- Confirm Validations

Mapping
Create Geometries: Routes/LRS, Sections, TOPS, Samples, Validations, Query

Review
National
### Samples

**Year:** 2014  **State:** Oregon

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<tr>
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<th>End Point</th>
<th>Expansion Factor</th>
<th>Comments</th>
<th>Last Modified On</th>
<th>Last Modified By</th>
<th>Structure Type</th>
<th>Access Control</th>
<th>Own</th>
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</table>

**Total Samples:** 2305
Software Validations

Sections data is checked to ensure that:

• The data is formatted correctly
• All required data fields contain values
• The coding for data items is logical with respect to other data items
Routes data is checked to ensure that:

- Measures exist over entire extent of each route
- Measures consistently increase over entire extent of each route
- Measures on each route are logical
## HPMS Software Reports

### Reports

<table>
<thead>
<tr>
<th>Report Name</th>
<th>Report Status</th>
<th>Submitted By</th>
<th>Submitted On</th>
<th>Create</th>
<th>Cancel</th>
<th>Download</th>
<th>Preview PDF</th>
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<tr>
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Pavement Report Card (cont’d)
### Validation Summary Report

**Validation Category:** Coverage Validation

<table>
<thead>
<tr>
<th>Error Message</th>
<th>Records</th>
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<tbody>
<tr>
<td>Pct_Peak_Combination Must Exist on Sample (Coverage Criteria 25)</td>
<td>13</td>
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<tr>
<td>Rutting Must Exist on Sample Where Surface_Type in (2,6,7,8) (Coverage Criteria 50)</td>
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<td>Cracking_Percent Must Exist on Sample Where Surface_Type in (2,3,4,5,6,7,8,9,10) (Coverage Criteria 52)</td>
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<tr>
<td>Counter_Peak_Lanes Must Exist on Sample Where Facility_Type = 2 AND (Urban_Code &lt; 99999 OR Through_Lanes&gt;=4) (Coverage Criteria 11)</td>
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<tr>
<td>IRI Must Exist Where (F_System in (1,2,3) or NHS) and Facility_Type (1,2,3) or (Sample and F_System = 4 and Urban_Code = 99999) (Coverage Criteria 47)</td>
<td>1908</td>
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<tr>
<td>PSR Must Exist on Sample Where IRI is NULL and (F_System in (4,5,6) and Urban_Code &lt; 99999 and Facility_Type in (1,2,3) or F_System in (5) and Facility_Type in (1,2,3) and Urban_Code = 99999) (Coverage Criteria 48)</td>
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<tr>
<td>F_System Must Exist Where Facility_Type in (1,2,3,4) (Coverage Criteria 1)</td>
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<tr>
<td>AADTCombination Must Exist Where (F_System in (1) or NHS) and Facility_Type in (1,2,3) or Sample (Coverage Criteria 24)</td>
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<tr>
<td>Thickness_Flexible Must Exist on Sample Where Surface_Type in (2,6,7,8) (Coverage Criteria 58)</td>
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<tr>
<td>Access_Control Must Exist Where Facility_Type in (1,2,3) and (F_System in (1,2,3) or Sample or NHS) (Coverage Criteria 5)</td>
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<td>AADT_Single_Unit Must Exist Where (F_System in (1) or NHS) and Facility_Type in (1,2,3) or Sample (Coverage Criteria 22)</td>
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<tr>
<td>Pct_Peak_Single Must Exist on Sample (Coverage Criteria 23)</td>
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<tr>
<td>Cracking_Length Must Exist on Sample Where Surface_Type in (2,6,7,8) (Coverage Criteria 53)</td>
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<tr>
<td>Last_Overlay_Thickness Must Exist on Sample Where Year_Last_Improv Exists (Coverage Criteria 56)</td>
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<tr>
<td>Grados BP/EP Must Align with Samples BP/EP (Coverage Criteria 71)</td>
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<tr>
<td>Sum of Curves Length Must Equal to the Sample Length Where Sample and F_System in (1,2,3) or Sample and F_System in (4) and Urban_Code=99999 (Coverage Criteria 72)</td>
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<td>Sum of Grades Length Must Equal to the Sample Length Where Sample and F_System in (1,2,3) or Sample and F_System in (4) and Urban_Code=99999 (Coverage Criteria 73)</td>
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### Sample Data Items

#### Missing Data Items Breakdown Summary

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<th># of Samples</th>
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<td>Cracking_Percent</td>
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#### Samples Data Items

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<th>Urban Code</th>
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Total: 273
Post-Submittal Expectations - Flowchart

- Review of data submittals for quality, completeness, and timeliness
- Questions/concerns transmitted to each State via the FHWA Division Offices

- Communication of questions/concerns and discussion of resolution

- Address critical data issues to the extent possible, or provide justification for any identified issues.

- Summary of outstanding issues to be addressed in future submittals transmitted via official correspondence to each State’s FHWA Division Office
Questions???
Instructor Contact Info

- Ronald Vaughn, PMP
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  NHI Instructor ID: 0811

- Justin Clarke, AICP
  FHWA / Office of Highway Policy Information
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  NHI Instructor ID: 0819