HPMS & Traffic Data

Session 4
November 16, 2011
2011 Highway Information Seminar

Traffic Data – Basic Engineering Information

- Uses of State based HPMS Traffic Data
  - Sampling
  - Apportionment
  - Travel Modeling
  - Statistical Analysis
  - Legislation
  - Research

HPMS v8 - Home - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

Submittal | Review | National

DATA EDITORS | DATA VALIDATION | SAMPLE MANAGEMENT | CALCULATION | REPORTS & ANALYSIS | SUBMIT DATA | ADMIN | EXIT

Sections - AADT

Year: **2010** State: **8 - Colorado**

Pick Data Item

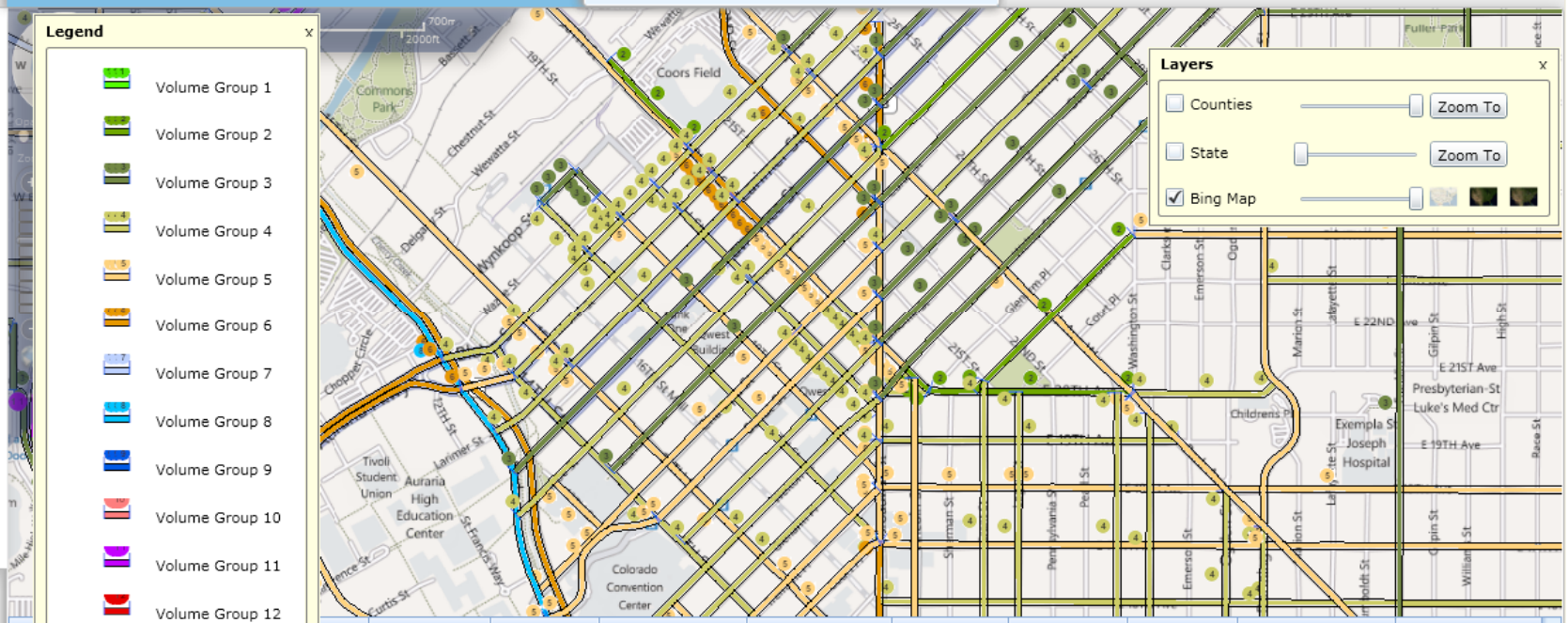
Add

Copy

Create Geoms.

Legend

- Volume Group 1
- Volume Group 2
- Volume Group 3
- Volume Group 4
- Volume Group 5
- Volume Group 6
- Volume Group 7
- Volume Group 8
- Volume Group 9
- Volume Group 10
- Volume Group 11
- Volume Group 12



Layers

- Counties — Zoom To
- State — Zoom To
- Bing Map

		ID	Begin Point	End Point	Section Length	Value Numeric	Value Text	Value Date	Comment	Last Modified By	Last Modified On
	AADT	001 11200	0	0.330	0.330	4700.000				Abbott, Kelley J	6/16/2011 12:38:2
	AADT	001 11200	1.330	2.430	1.100	190.000				Abbott, Kelley J	6/16/2011 12:38:2
	AADT	001 11200	3.430	3.930	0.500	190.000				Abbott, Kelley J	6/16/2011 12:38:2
	AADT	001 11200	4.930	6.930	2.000	310.000				Abbott, Kelley J	6/16/2011 12:38:2
	AADT	001 11200	7.930	8.930	1.000	290.000				Abbott, Kelley J	6/16/2011 12:38:2
	AADT	001 12000	0	1.700	1.700	20000.000				Abbott, Kelley J	6/16/2011 12:38:2
	AADT	001 12000	2.700	7.630	4.930	1500.000				Abbott, Kelley J	6/16/2011 12:38:2
	AADT	001 12000	7.630	8.130	0.500	750.000				Abbott, Kelley J	6/16/2011 12:38:2
	AADT	001 12000	9.130	12.130	3.000	570.000				Abbott, Kelley J	6/16/2011 12:38:2
	AADT	001 12400	0	1.050	1.050	8500.000				Abbott, Kelley J	6/16/2011 12:38:2

1 2 3 4 5 6 7 8 9 ...

Total Sections - AADT: 11049

Page 1 of 442

Done | Trusted sites | 100%

HPMS v8 - Sections - Future AADT - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

Submittal | Review | National

DATA EDITORS | DATA VALIDATION | SAMPLE MANAGEMENT | CALCULATION | REPORTS & ANALYSIS | SUBMIT DATA | ADMIN | EXIT

Sections - AADT

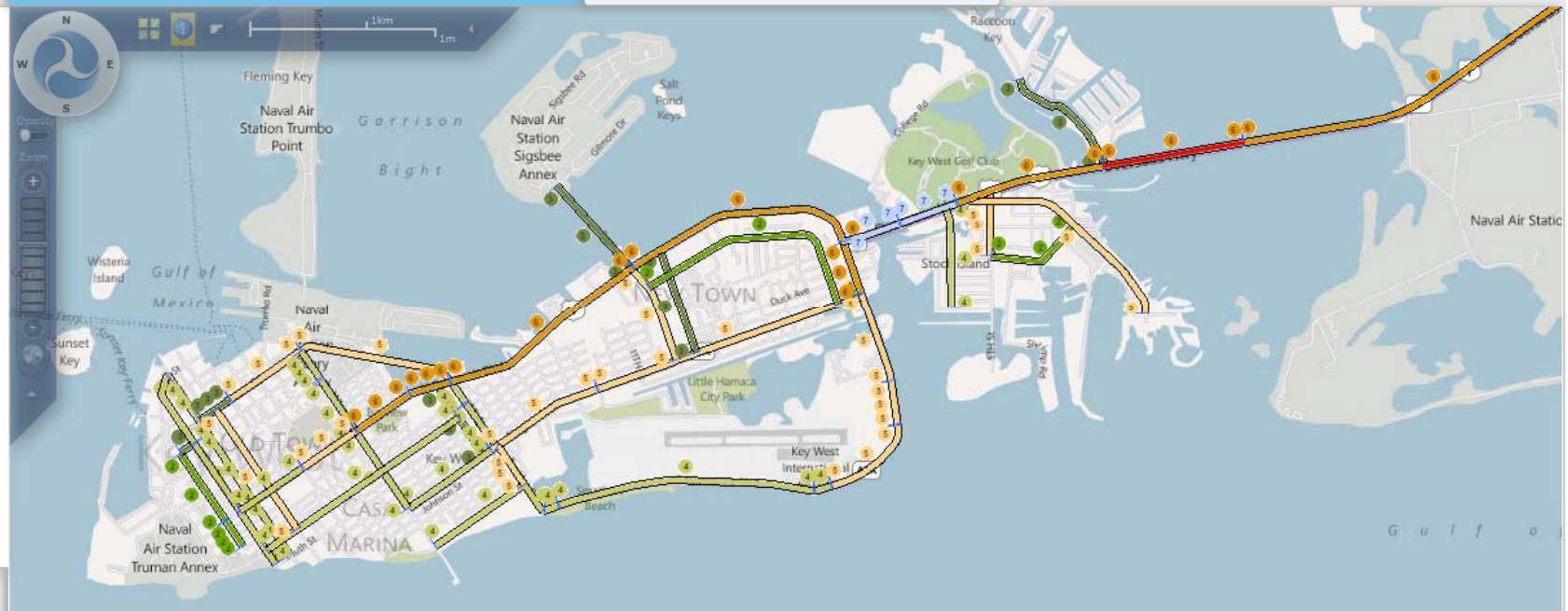
Year: **2010** State: **12 - Florida**

Pick Data Item

Add

Copy

Create Geoms.



Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value Text	Value Date	Comment	Last Modified By
AADT	90010000	4.230	4.531	0.301	36027.000				Brickner, Eric W
AADT	90020000	0	0.760	0.760	22500.000				Brickner, Eric W
AADT	90020000	0.760	1.466	0.706	22500.000				Brickner, Eric W
AADT	90020000	1.466	3.547	2.081	22500.000				Brickner, Eric W
AADT	90020000	3.547	6.160	2.613	20500.000				Brickner, Eric W
AADT	90020000	6.160	9.587	3.427	17500.000				Brickner, Eric W
AADT	90020000	9.587	9.965	0.378	17500.000				Brickner, Eric W
AADT	90020000	9.965	15.439	5.474	17500.000				Brickner, Eric W
AADT	90020000	15.439	23.256	7.817	15900.000				Brickner, Eric W
AADT	90020000	23.256	24.993	1.737	18500.000				Brickner, Eric W

... 760 761 762 763 764 765 766 767 ...

Total Sections - AADT: 21225

Page 764 of 849

Done | Trusted sites | 100%

Traffic Data (cont'd)

- Guidance to be discussed:
  - Traffic Counts (Volume)
  - Vehicle Classification
    - Car, Truck etc.
  - Metadata
  - Other Sources of Traffic Data Guidance

Traffic Count (Volume) Data

- Required for all Federally Aided Roads (Full Extent)
- Minimum 3-yr count cycle for Principal Arterial System (PAS) and HPMS Sample Sections
- Minimum 6-yr count cycle for other sections, including Minor Arterials , Collectors, & Ramps
- 48 Hour Minimum Duration Required (Fed -Aid Routes)

Traffic Count (Volume) Data (cont'd)

- Use adjustment factors to estimate AADT when necessary
- Use growth factors to estimate AADT when measured values are unavailable
- Rounding of AADTs per AASHTO Guidelines is acceptable, but not encouraged

Traffic Count (Volume) Data (cont'd)

- Use the following to estimate VMT for non Federal-Aid roads:
  - Current traffic growth rates on collectors and higher systems
  - Limited sample of short term counts
  - Combination of sample and estimated counts
  - Area-wide average daily traffic counts
  - Railroad Crossing Counts

AADT Volume Groups

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

- AADT data is stratified into 12 volume groups
- Used for all sampled functional systems
- Stratification is used for expanding sample data items based on AADT ranges

HPMS v8 - Home - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

HPMS v8 - Home

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

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

Sample

Year: **2010** State: **39 - Ohio**

Add

Create TOPS

Check Adequacy

Expansion Factors

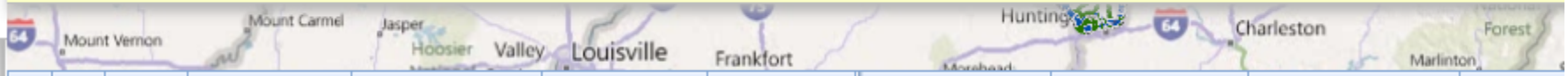
Create Geoms.

Check Adequacy

	Precision Level	Volume Group 1		2		3		4		5		6		7		8		9		10		11		12	
Interstate																									
Akron, OH	90-10	0	0	0	0	0	0	0	0	3	0	3	2	4	9	5	8	3	9	0	0	0	0	0	0
Canton, OH	90-10	0	0	0	0	0	0	0	0	0	0	3	5	2	1	3	4	3	3	0	0	0	0	0	0
Cincinnati, OH--KY--IN	90-10	0	0	0	0	0	0	0	0	0	0	3	2	4	2	4	22	3	13	3	15	3	0	0	0
Cleveland, OH	90-10	0	0	0	0	0	0	0	0	2	1	3	7	5	21	4	6	3	12	3	11	0	0	0	0
Columbus, OH	90-10	0	0	0	0	0	0	0	0	2	2	0	0	3	2	3	28	4	21	3	20	1	1	0	0
Dayton, OH	90-10	0	0	0	0	0	0	0	0	0	0	0	0	5	13	4	8	4	14	0	0	0	0	0	0
Huntington, WV--KY--OH	80-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lima, OH	80-10	0	0	0	0	0	0	0	0	0	0	0	0	3	6	0	0	0	0	0	0	0	0	0	0
Lorain--Elyria, OH	80-10	0	0	0	0	0	0	3	3	2	2	3	2	4	7	3	3	0	0	0	0	0	0	0	0
Mansfield, OH	80-10	0	0	0	0	0	0	0	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0
Middletown, OH	80-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	0	0	0	0	0	0
Newark, OH	80-10	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Parkersburg, WV--OH	80-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sandusky, OH	80-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Springfield, OH	80-10	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	7	0	0	0	0	0	0	0	0
Toledo, OH--MI	90-10	0	0	0	0	0	0	0	0	2	2	4	10	4	6	5	16	3	7	0	0	0	0	0	0
Weirton, WV--Steubenville, OH--PA	80-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Legend: - Required - Selected Samples * Red numbers indicate insufficient selected samples.

Cl



Sample ID	Route ID	Begin Point	End Point	Volume Group	F System	Urban Code	Facility Ty

Ramp Counts

- Grade-separated ramps only
  - All Federal-aid highways
- Why are ramp counts needed?
  - Many interchange bottlenecks
  - Large amounts of Federal funds spent
  - No Federal data on ramps
- First year: count or estimate
- Minimum of 1 count every 6 years

Estimating Ramp AADT

- Factor counts
  - Use nearby ATRs
    - e.g., anchor points for ramp balancing
  - Use factors for either mainline
    - e.g., road with the predominant flow
- Ramps with no counts
  - Traffic matrix estimation
  - Compare turning movement estimation

Vehicle Classification Data

- Vehicle Classification Data is used to:
  - Provide accurate percentage of truck traffic
  - Develop seasonal and day of week vehicle classifications
  - Analyze impact of trucks on pavement deterioration

Vehicle Classification Data (cont'd)

- Collect data that represents all functional systems
- Observe same count cycles as those for volume data
- Report data that represents HPMS reporting year

Vehicle Classification Data (cont'd)

- Collect data for all lanes in both directions
- Ensure axle class algorithm used is consistent among equipment and vendors
- Develop axle correction factors for all seasons
- Use adjusted raw count data which reasonably represents truck travel patterns

HPMS v8 - State Summary - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

HPMS v8 - State Summary

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

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

State Summary

Year: **2010** State: **39 - Ohio**

Edit

SUMMARY | PAVEMENT DATA | VEHICLE TYPE

	Rural			Urban		
	Interstate	Other Arterial	Other Rural	Interstate	Other Arterial	Other Urban
Motorcycles	0.00 %	1.00 %	1.00 %	0.00 %	1.00 %	1.00 %
Passenger Cars	55.00 %	65.00 %	72.00 %	74.00 %	77.00 %	80.00 %
Light Trucks	13.00 %	18.00 %	21.00 %	13.00 %	16.00 %	16.00 %
Buses	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %
Single Unit Trucks	3.00 %	3.00 %	2.00 %	2.00 %	2.00 %	1.00 %
Combination Trucks	29.00 %	13.00 %	4.00 %	11.00 %	4.00 %	2.00 %
Total	**100.00 %**	**100.00 %**	**100.00 %**	**100.00 %**	**100.00 %**	**100.00 %**

Last Modified On: 9/16/2011 1:40:52 PM

Last Modified By: Hankus, Victoria L

Summary Travel Data

- Vehicle miles of travel (VMT) – Percent
  - Rural minor collector & local
  - Small urban – local
  - Urbanized areas – local
- Travel data by vehicle type
  - 6 functional systems
  - 6 vehicle types

HPMS v8 - Urban Summary - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

HPMS v8 - Urban Summary

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

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

Urban Summary

Year: **2010** State: **8 - Colorado**

Add

Urban Code	Local DVMT (x1000)	State Portion Pop (x1000)	State Portion Land (Sq. Mile)	Last Modified By
9298 - Boulder, CO	206	107	37	Abbott, Kelley J
18856 - Colorado Springs, CO	1108	531	380	Abbott, Kelley J
23527 - Denver--Aurora, CO	5053	2,293	814	Abbott, Kelley J
30628 - Fort Collins, CO	502	242	187	Abbott, Kelley J
34273 - Grand Junction, CO	198	112	85	Abbott, Kelley J
34786 - Greeley, CO	192	133	91	Abbott, Kelley J
46126 - Lafayette--Louisville, CO	133	54	38	Abbott, Kelley J
51175 - Longmont, CO	122	76	30	Abbott, Kelley J
72613 - Pueblo, CO	300	143	246	Abbott, Kelley J
99998 - Small Urban	1014	220	558	Abbott, Kelley J
99999 - Rural	6049	1,164	101,230	Abbott, Kelley J

HPMS v8 - State Summary - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

HPMS v8 - State Summary

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

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

State Summary

Year: **2010** State: **8 - Colorado**

Edit

SUMMARY | PAVEMENT DATA | VEHICLE TYPE

		Rural	Small Urban (x1000)
Travel	Local	4,033	1,014
	Minor Collector	2016	
Demography	Population (x1000)	1,164	220
	Net Land Area	101,230	558

Last Modified On	6/6/2011 4:01:24 PM
Last Modified By	Abbott, Kelley J

Metadata (traffic)

- Year of Record
  - Ex. 2009
- State Code
  - Ex. 39
- Metadata Type
  - AADT_Pct_Actual
  - AADT_24
  - AADT_48
  - AADT_Season
  - AADT_Week
  - AADT_Axle
  - AADT_Growth
  - Class_Pct_Actual
  - Class_24
  - Class_48
  - Class_Season
  - Class_Week
  - Class_Growth
  - Travel_Source
  - Travel_Volume_Type
  - Travel_Class Type
  - Travel_QA
- Functional System
  - i.e. 1, 2, 3, 4, 5, 6, 7
- Rural/Urban Designation
- State Owned
- Metadata Item Value
  - See Field Manual Table 3.22
- Numeric value associated with the metadata reported
  - See Field Manual Table 3.22

HPMS v8 - Sections - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

HPMS v8 - Sections

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

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

Sections - AADT Combination

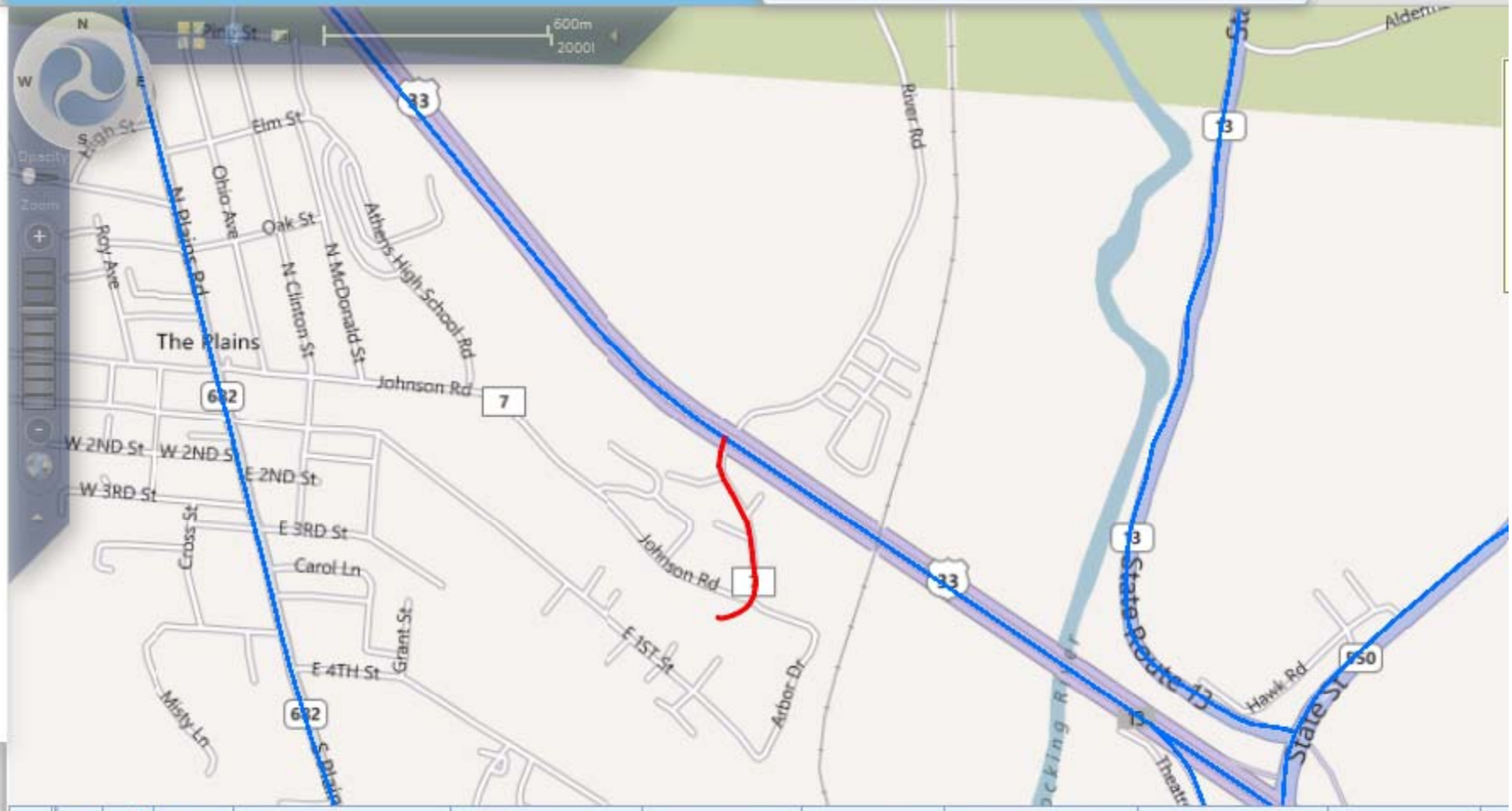
Year: **2010** State: **39 - Ohio**

Pick Data Item

Add

Copy

Create Geoms.



Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value Text	Va

HPMS v8 - Sections - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

HPMS v8 - Sections

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

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

Sections - AADT Single Unit

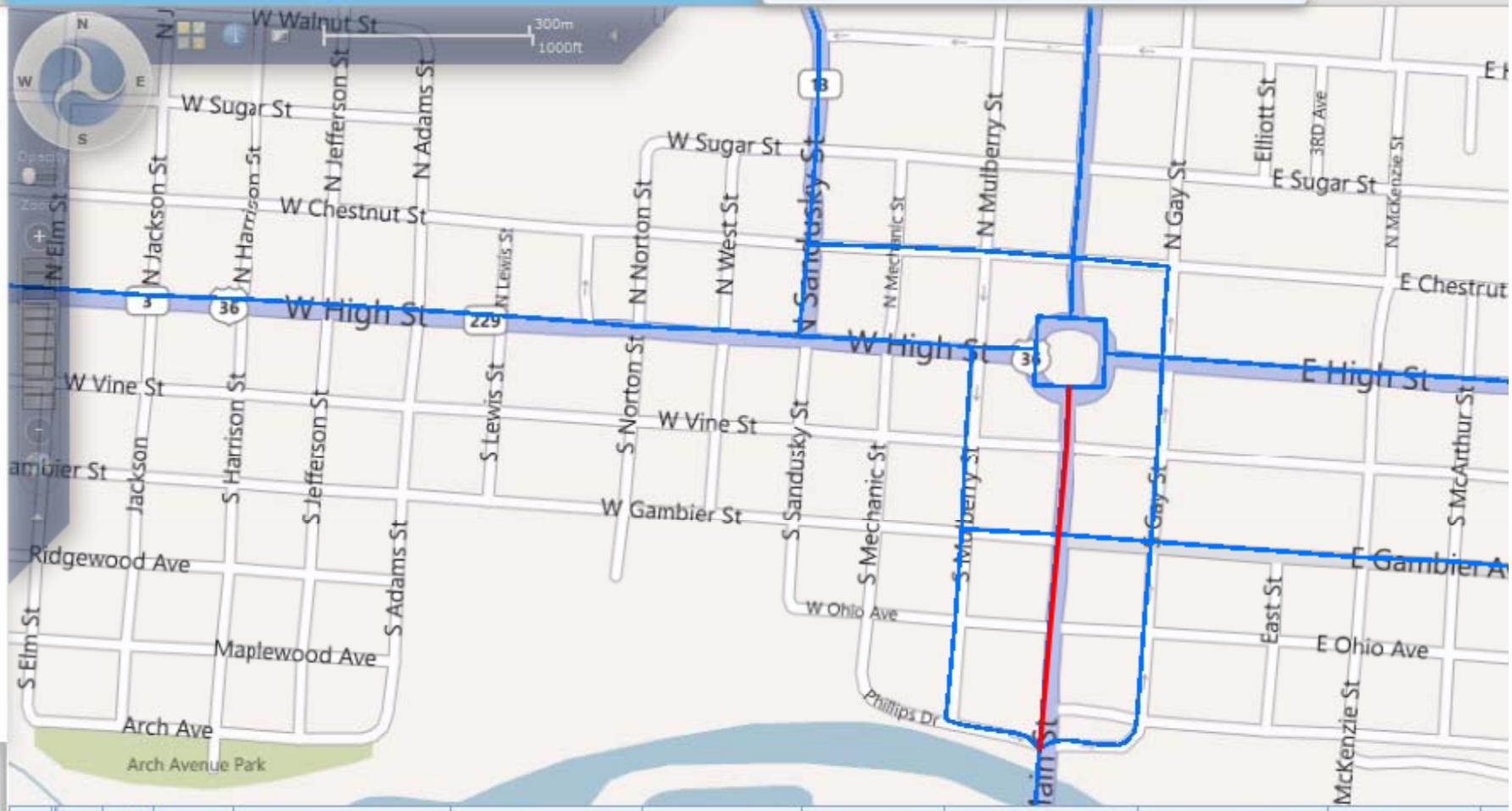
Year: **2010** State: **39 - Ohio**

Pick Data Item

Add

Copy

Create Geoms.



Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value Text	Va
AADT_SINGLE_UNIT	CJACCR00500**C	0.400	1.120	0.720	89.000		

HPMS v8 - Sections - AADT Single Unit - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

HPMS v8 - Sections - AADT Single Unit

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

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

Sections - Directional Factor

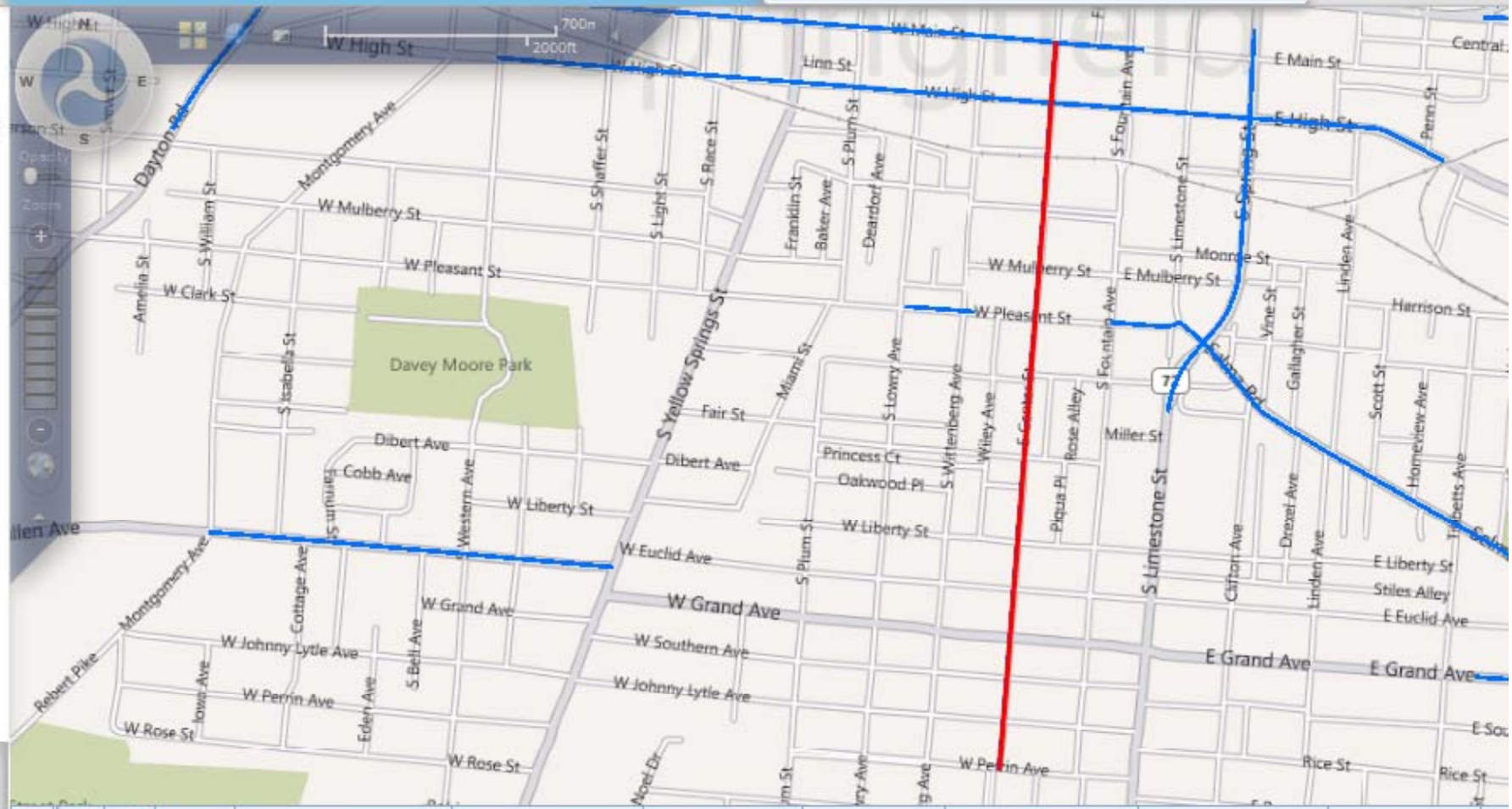
Year: **2010** State: **39 - Ohio**

Pick Data Item

Add

Copy

Create Geoms.



Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value Text	Va

HPMS v8 - Sections - Future AADT - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

HPMS v8 - Sections - Future AADT

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

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

Sections - Future AADT

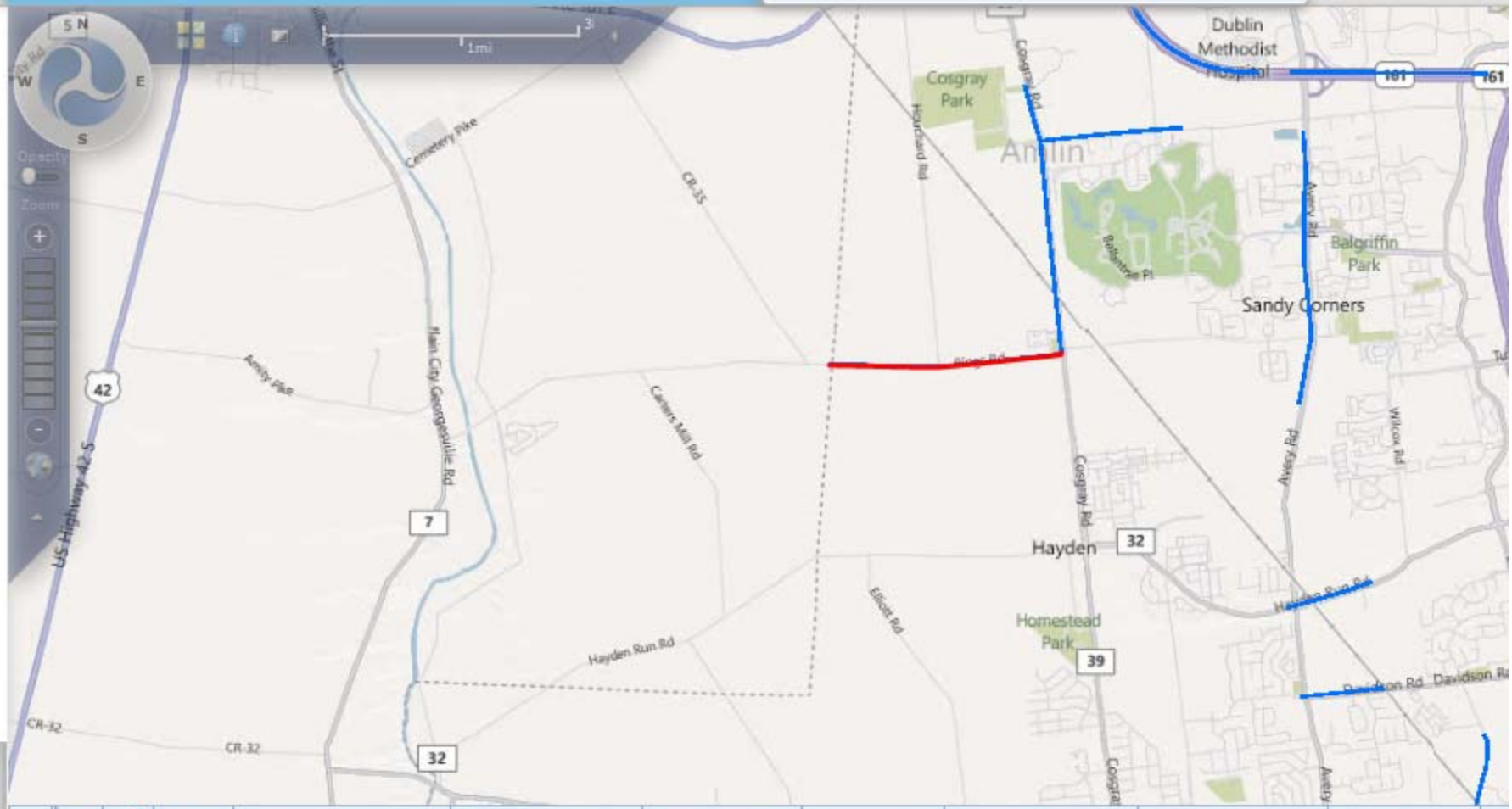
Year: **2010** State: **39 - Ohio**

Pick Data Item

Add

Copy

Create Geoms.



Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value Text	Va

HPMS v8 - Sections - Future AADT - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

HPMS v8 - Sections - Future AADT

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

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

Sections - K Factor

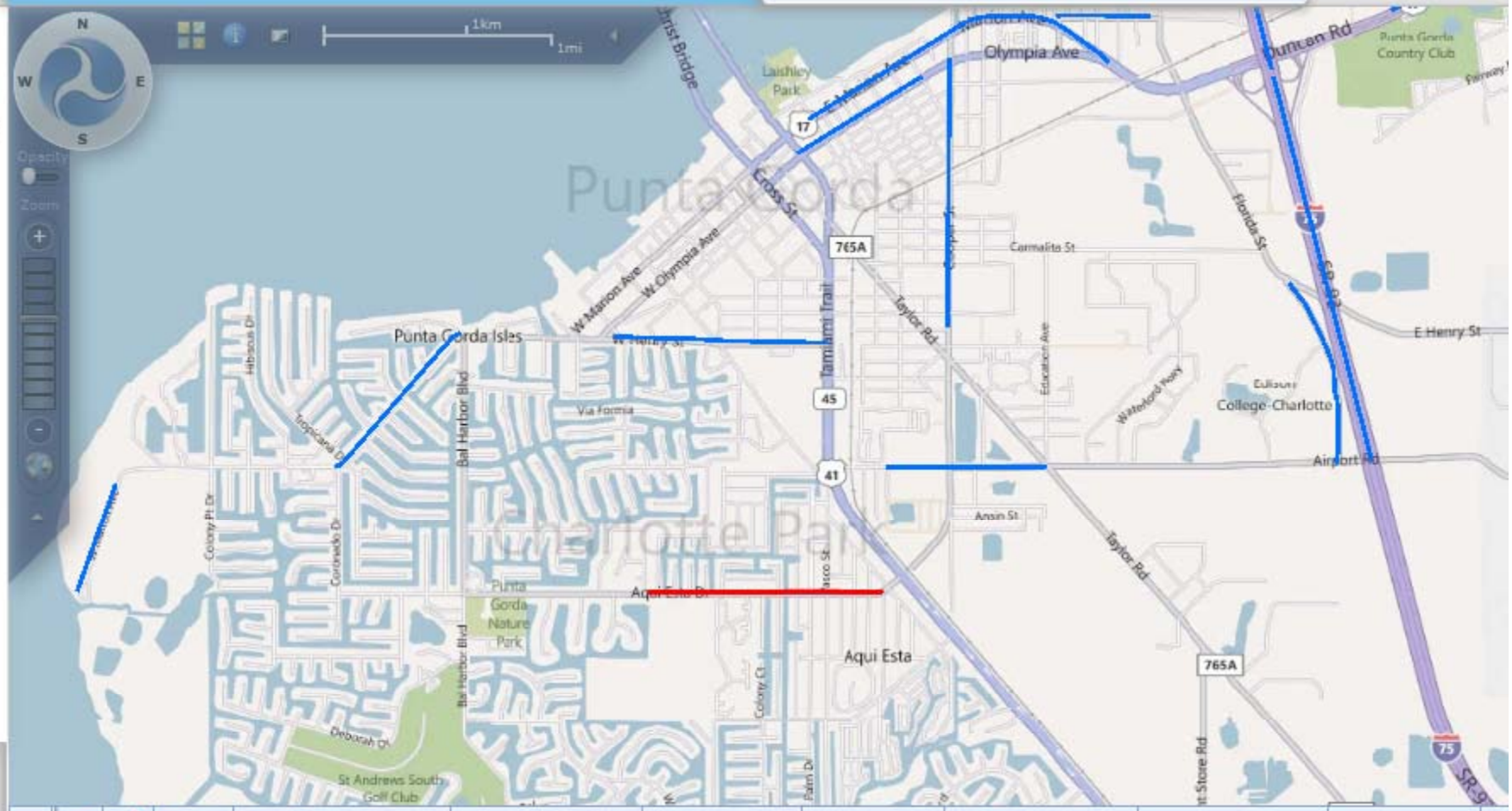
Year: **2010** State: **12 - Florida**

Pick Data Item

Add

Copy

Create Geoms.



Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value Text	Va

HPMS v8 - Sections - Future AADT - Windows Internet Explorer

https://fhwapap03.fhwa.dot.gov/hpms8p/#/State

HPMS v8 - Sections - Future AADT

U.S. Department of Transportation
Federal Highway Administration

Highway Performance Monitoring System v8.0

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

Sections - Directional Factor

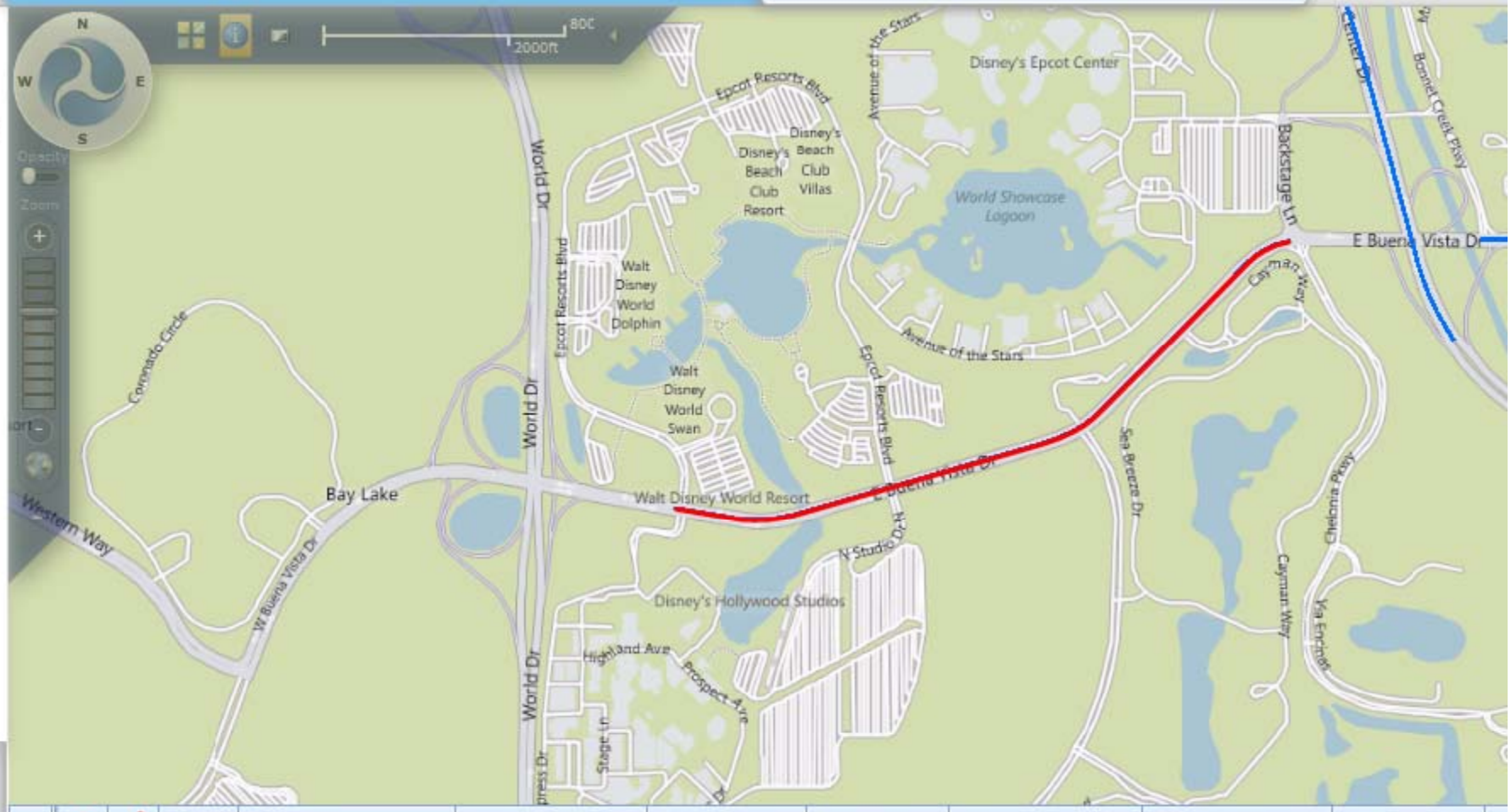
Year: **2010** State: **12 - Florida**

Pick Data Item

Add

Copy

Create Geoms.



Data Item	Route ID	Begin Point	End Point	Section Length	Value Numeric	Value Text
DIR_FACTOR	75000152	0	0.718	0.718	55.000	

Additional Sources of Traffic Data Guidelines

- AASHTO Guide
- ASTM International Standards
  - E1318-09 – WIM systems User Reqts. & Test Methods
  - E1957-04(2010) – Std. Practice using Pneumatic Tubing
  - E2300-09 – Std. spec. Highway Traffic Monitoring Devices

Additional Sources of Traffic Data Guidelines, cont'd

- ASTM International Standards, cont'd
  - E2415-05 – Installing Piezoelectric Highway Traffic Sensors
  - E2467-05 – Developing Axle Count Adjustment Factors
  - E2532-09 – Evaluating performance of Hwy Traffic Monitoring Devices
  - E2561-07a – Installation of Inductive Loop Detectors
  - E2759-10 – Highway Traffic Monitoring Truth-in-Data

Questions??