An Introduction to Highway Data
One State’s Approach

Final presentation for the NYSDOT Highway Data Workshop
&
First for the 2019 national Highway Data Workshop & Conference
Welcome to the
2019 HiDaC
the seventh national
Highway Data Workshop and Conference

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An Introduction to Highway Data
One State’s Approach

An introduction to the highway data concepts addressed by HiDaC

(using New York State as an example)
Not gigantic, but not small, either: ranks 27th in total area amongst states
Diverse state, ranging from this residential area in Queens.....

ABOUT 1/3 OF A MILE ACROSS
….. To about 8 miles east of here in the Town of Saratoga (east of the City of Saratoga Springs).

ABOUT 1/3 OF A MILE ACROSS
Highway system is equally diverse
Start off with definition of a “road” or “highway”

No NY state law defining an open-to-the-public road; use the FHWA HPMS definition
More details in the LHI manual
Inventory of public roads
Evolution of NYS Inventories

- Local highway aid – back to 1930’s
- “Highway Sufficiency” in 1950’s
- HPMS – need to fill in the gaps
- ISTEA & management systems
- Ongoing need to add “missing links”
- ARNOLD, comprehensive network

HPMS – 1980’s
ISTEA – 1990’s
ARNOLD – 2000’s
Roadways are categorized
863 miles non-NYSDOT, non-Thruway
706 miles are touring routes
157 miles are non-NYSDOT, non-Thruway ref rtes mostly Reg 10&11, many parkways
In addition to length, carry data on all roads

Highway System Extent

- Basic data collected for all roads
- More extensive for State System
- Physical characteristics
  - Length, number of lanes, pavement type & width
  - Shoulders, median, access control
- Administrative characteristics
  - Jurisdiction, Functional Class, National Highway System
  - Route signing, truck route designation, toll roads
How many miles of “state” highways are there?

• **State System?**
  • Touring & reference routes
• **State Routes?**
  • Touring routes (US, NY, Interstate)
• **State-owned?**
• **State-maintained?**

Common question from “management”
OTHER:
600 miles Thruway
500 other state agencies
600 Federal (Fort Drum, West Point, etc)
State: five state DOT’s own over 50% of mileage - **West Virginia-89%**, Delaware-84%, Virginia-78%, North Carolina-75%, **South Carolina-54%** (all adjacent states)

Next highest in 30%’s

lowest – **New Jersey at 6%**

County: top four states **Kansas-80%**, Iowa-78%, Hawaii-73%, Michigan-73%

ten states more than 2/3, 23 states over half of mileage owned by counties

eight states with no county roads – New England (Connecticut, Massachusetts, New Hampshire, Rhode Island, Vermont, except Maine-1.6%), Delaware, **North Carolina, West Virginia**

Municipal: top four in New England with **Massachusetts at 90%**, 14 states over 50% including New York

six states under 10% with Hawaii at 0%

Federal: Oregon highest at 28% followed by Arizona at 22%; eight over 10%-Oregon, Arizona, Idaho, New Mexico, Montana, Wyoming, Alaska, Washington

17 states less than 1%; Oklahoma at 0%
Maryland hangs out there by itself (Hawaii is always out there by itself)
Municipal Share of Road Ownership

- >30%
- 25-60%
- 10-15%
- <10%
Levels of Government

- State
- County
- Municipal – city, town, village
- Authority/district/agency
- Special purpose

*Can all “own” roads*
New York Co. (Manhattan) 1.6 million people 34 sq miles
Hamilton County 4800 people 1808 sq miles

NYC 8.2 million people
Sherrill 3000 people
Villages are an oddity; most states just have counties, towns, cities

NY villages range from 10 people (barrier island) to 56,000 (Hempstead)

Keep losing villages; 18 dissolved since 2010
One new Town, Palm Tree, to be formed
Connecticut: “only exist to fill in Federal forms”

Delaware – 3 counties,
Texas – 254 counties,
average - 62 counties (as in NYS)

38 independent cities in Virginia plus Baltimore, St Louis, and Carson City (41 total)
Consolidated city-counties (40)
Other boundaries

- Metropolitan Planning Areas
- Place names/hamlets
- DOT Regions/Districts
  - DOT maintenance residencies
- Urban areas

*Non-ownership boundaries*
SHOWS MPAs and COUNTIES

14 urban areas, 14 MPOs
Moving more and more to automated systems.

- Annual pavement condition survey
- Input from Region/District staff
- Profiler data collection
- Official orders, approved changes, final construction plans
- Photolog
Updating the Inventory: the Local Highway Inventory

Annually updated by reaching out to the 57 non-NYC counties and the nearly 1600 Towns, Cities, and Villages throughout New York State
## LHI Local Road Listings

**New York State Department of Transportation**
**Local Roads Listing**

**City: City of Saratoga Springs - Inner District**
**County: Saratoga County**

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>State</th>
<th>City</th>
<th>County</th>
<th>Length (miles)</th>
<th>Length (km)</th>
<th>CV</th>
<th>No. of</th>
<th>One</th>
<th>Two</th>
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<th>Stick</th>
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**New York State Department of Transportation Region: 1**
Research & Verification Tools

- GIS / aerial photos
- Local and county maps, web sites
- Private web sites – Wikipedia, others
- Aerial & other photos
  - Google Maps, Earth, Street View
  - Bing Maps, Streetside
City of Saratoga Springs with inner and outer tax districts, Town of Saratoga to the east.

Yellow are villages: Village of Ballston Spa southwest of Saratoga Springs and partly in the Town of Milton and the Town of Ballston.

Villages of Schuylerville and Victory, both in the Town of Saratoga.
Embassy Suites – white building slightly above center at the left edge
Can use Streetview to read correct names off road signs.
Highway Data

- Highway System Designations
  - Functional Classification & the National Highway System

Functional Classification

- The grouping of streets and highways into classifications describing the type of service they provide or are intended to provide
  - Local or long distance travel
  - Degree of land access provided

New York State Department of Transportation
Three Main Classifications

<table>
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<th>Arterial</th>
<th>Service</th>
<th>Land Access</th>
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<tr>
<td>Collector</td>
<td>Connecting other roads to arterials</td>
<td>Some</td>
</tr>
<tr>
<td>Local</td>
<td>Short distance trips, such as to collectors</td>
<td>Primary purpose</td>
</tr>
</tbody>
</table>

New York State Department of Transportation

ISSUES

- PA – Expressway/Freeway
  - Controlled access, At grade intersections
- Arterial vs. Collector
- Major vs. Minor Collector
- Federal funding eligibility is often the driving force
- Minimal objective criteria
- Bureaucracy keeping up with reality

New York State Department of Transportation
National Highway System
23 USC 103(b)

- Established in 1995
- Primarily selected Principal Arterials
- Entire Interstate System
- Strategic Highway Network (StraHNet)
- Intermodal Connectors
- Significant enhancement with MAP-21

NHS Intermodal Connectors

- Describe a “path” from major facility to a mainline NHS highway
- Can be on any Functional Class
- Qualification based on intermodal facility, not the highway characteristics
NHS Intermodal Connectors
Part 470

- Airports
- Ports
- Truck/Rail
- Pipelines
- Amtrak
- Intercity Bus
- Public Transit
- Ferries

National Highway System Issues

- Lack of objective criteria
- No automatic adjustment, such as when a facility is closed or moved
- Map based approved system is subject to error
- Technical corrections
Highway System Designations

- Title 23 United States Code: Highways
  Section 103: Federal-aid Systems
- 23 Consolidated Federal Regulations: Highways
  Part 470: Highway Systems

National Highway System, Functional Classification, Interstate Designation, Urban Area Boundaries

New York State Department of Transportation

Highway System Designations
TOURING ROUTE NUMBERING

- **Interstates** – FHWA, AASHTO approval
- **US Routes** – AASHTO approval
- **State Routes**
- **County Routes**
- **Other**

New York State Department of Transportation
TOURING ROUTES – Interstate, US, NY, County

Highway Data

- Highway System Performance
  - traffic volumes & condition
  - probe data (NPMRDS)

National Performance Management Research Data Set
The Traffic Monitoring Program

- Volumes
- Vehicle Classification
- Weigh-in-Motion
- Speed

Traffic Monitoring

- Annual Average of Daily Traffic
- Design hour proportions
- Truck percentages

*The Traffic Monitoring portion of the annual NYSDOT Highway Data Workshop was held earlier this week.*
Pavement Performance

- Surface condition
  - Annual pavement condition survey
- Pavement roughness
- Rutting, faulting, cracking, etc
- HPMS data requirements
- Life cycle analyses
- Management attention to data

Profiler Vehicle

- HPMS data on required systems
  - Interstates
  - Remainder of NHS
  - Samples
- Entire State System
- Non-state Fed aid roads
- Grade / Curve
- Photolog
The Federal Program

• HPMS

The Highway Performance Monitoring System

A summary of the Highway System Extent, Designation, and Performance

HPMS

• Pulls together data
  – Inventory
  – Designations
  – Traffic Data
  – Pavement Data
  – And now Geospatial Data (GIS)

• More detail for Samples
• Generalized for Non Fed Aid roads
• Summation of “Highway Data”
SOME FINAL COMMENTS …

... on working with Highway Data

Must be very careful with details
also, New York State has:

- 62 Counties
- 62 Cities
- 932 Towns
- 539 Villages
- 15 Large Urban Areas (50,000+)
- 48 Small Urban Areas (5000-50,000)
- 14 Metropolitan Planning Areas
- 10 Reservations

24 of the 62 Cities are surrounded by a Town of the same name:

<table>
<thead>
<tr>
<th>Amsterdam</th>
<th>Ithaca</th>
<th>Oneonta</th>
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<tbody>
<tr>
<td>Batavia</td>
<td>Johnstown</td>
<td>Oswego</td>
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<td>Kingston</td>
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<tr>
<td>Geneva</td>
<td>Olean</td>
<td>Watertown</td>
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</table>
194 Villages are within a Town of the same name:

Adams Addison Alton Afton Alexander Alfred Allegany Almond Andover Angelica Antwerp
Arcade Argyle Athens Attica Avoca Avon Babylon Bainbridge Bath Bergen Bolivar Boonville
Broadalbin Brownville Burke Caledonia Cambridge Camden Camillus Canajoharie Candor Canisteo
Canton Cape Vincent Castile Cato Catskill Cazenovia Champlain Chateaugay Chatham Cherry Creek
Cherry Valley Clayton Cobleskill Cohocton Colonie Corinith Coxsackie Cuba Dannemora Dansville
Delhi Deposit Deruyter East Hampton Edwards Elba Elbridge Ellicottville Ellsburg Esperance Fabius
Fishkill Fort Ann Fort Edward Frankfort Franklinville Gainesville Galway Geneseo Goshen
Gouverneur Granville Greene Groton Hamburg Hamilton Hammond Hancock Hannibal
Haverstraw Hempstead Herkimer Hermon Homer Horseheads Hunter Kinderhook Lake George
Lancaster Lansing Laurens Le Roy Leicester Lewiston Liberty Lima Lisie Little Valley Livonia Lodi
Lowville Lyons Macedon Madison Malone Manchester Manlius Marathon Marcellus Massena
Mayfield Mexico Middleburgh Milford Monroe Montgomery Moravia Morris Morristown Mount
Morris Naples Nassau New Berlin New Hartford New Paltz Newark Valley Newport Nichols North
Collins Nunda Oakfield Orchard Park Ossining Otego Ovid Owego Oxford Palmyst Parish Pawling
Perry Phelps Philadelph Pitsford Portville Potsdam Red Hook Remsen Rhinebeck Richmondville
Salem Sandy Creek Saugerties Schaghticoke Schoharie Sherburne Sherman Sidney Skaneateles
Smyrna Sodus Southampton Spencer St. Johnsville Stamford Stillwater Theresa Tully Tupper Lake
Turin Unadilla Van Etten Vernon Victor Waddington Walton Warsaw Warwick Waterford Waterloo
Wayland Webster Wellsville Westfield Whitehall Wilson Windsor Wolcott

Six Villages have the same boundary as the Town they are within:

- East Rochester
- Green Island
- Harrison
- Mount Kisco
- Scarsdale
- Woodbury*

* A small part of the town is incorporated as the Village of Harriman.
Villages with the same name but in a different County:

- Dansville
  - Steuben & Livingston Counties
- Mohawk
  - Montgomery & Herkimer Counties
- Poland
  - Chautauqua & Herkimer Counties
- Waverly
  - Franklin & Tioga Counties

Towns with the same name but in a different County:

- Albion Oswego & Orleans
- Chester Warren & Orange
- Clinton Clinton & Dutchess
- Dickinson Franklin & Broome
- Franklin Franklin & Delaware
- Fremont Steuben & Sullivan
- Greenville Greene & Orange
- Lewis Essex & Lewis
Other interesting (?) tidbits

Towns named for
- Countries
  - Greece, Italy, Malta, Mexico, Norway, Peru, Poland, Russia, Sweden, Wales
- States
  - Alabama, Maine, Maryland, Ohio, Washington, Florida
- Famous cities – Boston, Philadelphia, Providence
- Places around the world
  - Babylon, Jerusalem, Persia, Cairo, Smyrna, Lima, Bombay, Ontario

A lot of European namesakes
- Antwerp
- Waterloo
- Austerlitz
- Greenwich
- Dunkirk
- Paris
- Batavia
- Berlin
- Hamburg
- Rome
- Athens
- Ithaca
- Syracuse
- Utica
- Troy
- Corinth
- Macedon
- Sparta
- Milan
- Naples
- Venice
- Amsterdam
- Rotterdam
- Belfast
- Warsaw
- Edinburg
- Geneva
And we even have a Nashville!

Not to mention the people so honored

- Alexander
- Hannibal
- Ovid
- Homer
- Franklin
- Hancock
- Hamilton
- Washington
- Jefferson
- Madison
- Monroe
- Harrison
- Bolivar

.....and, of course,
Alfred!

What does this mean?

- Highway Data staff have to be very careful and meticulous with place names, the assignment of roads, and analysis of highway data
  - It is easy to get confused!