



**Department of  
Transportation**

# GIS and Changes to the Local Highway Inventory

# GIS and Changes to the Local Highway Inventory

## ➔ Background

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- ☐ CHIPS

## ➔ GIS project

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- ☐ Sources
- ☐ Process
- ☐ Edits
- ☐ Follow-up
- ☐ Tools

## ➔ Issues & Details

- ☐ Open to Public Roads
- ☐ Roads by Use
- ☐ Elevation changes
- ☐ Measures
  - Centerline to centerline
  - Dead ends & cul de sacs
- ☐ Public vs. Private Use
- ☐ Resolutions

## Local Highway Inventory

Listing of roads & streets under the responsibility of the towns, cities, villages, and counties of New York State

Used as input to CHIPS funding distribution formulas

*Note: GIS Project changes will not be incorporated into CHIPS until the project is completed statewide.*

Municipality: Village of Evans Mills  
Jefferson County

Geocode: 1160  
NYSDOT Region: 7

Jurisdiction: Village

| State                   | County       |              |                          |                         |                       |               |               |               | DIV        | No. of       | One        | Pvt         | Pvt          | Shldr        | Med         | Med          | Func         |            |
|-------------------------|--------------|--------------|--------------------------|-------------------------|-----------------------|---------------|---------------|---------------|------------|--------------|------------|-------------|--------------|--------------|-------------|--------------|--------------|------------|
| <u>DOT ID</u>           | <u>Route</u> | <u>Road#</u> | <u>Road/ Street Name</u> | <u>Start of Section</u> | <u>End of Section</u> | <u>Beg MP</u> | <u>End MP</u> | <u>Length</u> | <u>Hwy</u> | <u>Lanes</u> | <u>Way</u> | <u>Type</u> | <u>Width</u> | <u>Width</u> | <u>Type</u> | <u>Width</u> | <u>Class</u> | <u>NHS</u> |
| 178633                  |              |              | ACCESS RAMP              | EAST VILLAGE L          | INTERS NYS RT         | 0.00          | 0.15          | 0.15          |            | 2            |            | A           | 10           | 0            | None        | 0            | 19           |            |
| 178634                  |              |              | CEMETARY ST              | WILLOW ST               | VILLAGE LINE          | 0.00          | 0.51          | 0.51          |            | 2            |            | A           | 10           | 0            | None        | 0            | 19           |            |
| 178635                  |              |              | CHURCH ST                | PECK ST                 | LERAY ST              | 0.00          | 0.12          | 0.12          |            | 2            |            | A           | 10           | 0            | None        | 0            | 19           |            |
| 178636                  |              |              | FACTORY ST               | NOBLE ST                | VILLAGE LINE          | 0.00          | 0.33          | 0.33          |            | 2            |            | A           | 10           | 0            | None        | 0            | 16           |            |
| 178637                  |              |              | HENRY ST                 | LERAY ST                | DEAD END              | 0.00          | 0.18          | 0.18          |            | 2            |            | A           | 10           | 0            | None        | 0            | 19           |            |
| 276813                  |              |              | LERAY ST                 | EVANS MILLS V/          | N MAIN ST             | 0.10          | 0.57          | 0.47          |            | 2            |            | O           | 24           | 8            | None        | 0            | 16           |            |
| 178638                  |              |              | NOBLE ST                 | LERAY ST                | FACTORY ST            | 0.00          | 0.14          | 0.14          |            | 2            |            | A           | 10           | 0            | None        | 0            | 16           |            |
| 178639                  |              |              | NORTH MAIN ST            | SOUTH MAIN ST           | VILLAGE LINE          | 0.00          | 0.55          | 0.55          |            | 2            |            | A           | 10           | 0            | None        | 0            | 19           |            |
| 178640                  |              |              | PEARL ST                 | SOUTH MAIN ST           | DEAD END              | 0.00          | 0.07          | 0.07          |            | 2            |            | A           | 10           | 0            | None        | 0            | 19           |            |
| 178641                  |              |              | PECK ST                  | SOUTH MAIN ST           | CHURCH ST             | 0.00          | 0.09          | 0.09          |            | 2            |            | A           | 10           | 0            | None        | 0            | 19           |            |
| 178641                  |              |              | PECK ST                  | CHURCH ST               | VILLAGE LINE          | 0.09          | 0.36          | 0.27          |            | 2            |            | A           | 10           | 0            | None        | 0            | 19           |            |
| 178642                  |              |              | SHELL AVE                | NORTH MAIN ST           | DEAD END              | 0.00          | 0.09          | 0.09          |            | 2            |            | A           | 10           | 0            | None        | 0            | 19           |            |
| 178643                  |              |              | SOUTH MAIN ST            | NORTH MAIN ST           | NYS ROUTE US 1        | 0.00          | 0.60          | 0.60          |            | 2            |            | A           | 10           | 0            | None        | 0            | 19           |            |
| 277433                  |              |              | WILLOW AVE               | EVANS MILLS V/          | FACTORY ST            | 0.00          | 0.36          | 0.36          |            | 2            |            | A           | 20           | 5            | None        | 0            | 17           |            |
| Centerline Miles Total: |              |              |                          |                         |                       |               |               |               | 3.93       |              |            |             |              |              |             |              |              |            |
| Lane-Miles Total:       |              |              |                          |                         |                       |               |               |               | 7.86       |              |            |             |              |              |             |              |              |            |

Jurisdiction: Town of Le Ray

| State                   | County       |              |                          |                         |                       |               |               |               | DIV        | No. of       | One        | Pvt         | Pvt          | Shldr        | Med         | Med          | Func         |            |
|-------------------------|--------------|--------------|--------------------------|-------------------------|-----------------------|---------------|---------------|---------------|------------|--------------|------------|-------------|--------------|--------------|-------------|--------------|--------------|------------|
| <u>DOT ID</u>           | <u>Route</u> | <u>Road#</u> | <u>Road/ Street Name</u> | <u>Start of Section</u> | <u>End of Section</u> | <u>Beg MP</u> | <u>End MP</u> | <u>Length</u> | <u>Hwy</u> | <u>Lanes</u> | <u>Way</u> | <u>Type</u> | <u>Width</u> | <u>Width</u> | <u>Type</u> | <u>Width</u> | <u>Class</u> | <u>NHS</u> |
| 277432                  |              |              | KISER S H RD             | EVANS MILLS VL          |                       | 3.01          | 3.04          | 0.03          |            | 2            |            | A           | 18           | 4            | None        | 0            | 19           |            |
| 277432                  |              |              | KISER S H RD             |                         | FACTORY ST            | 3.04          | 3.10          | 0.06          |            | 2            |            | A           | 18           | 5            | None        | 0            | 19           |            |
| Centerline Miles Total: |              |              |                          |                         |                       |               |               |               | 0.09       |              |            |             |              |              |             |              |              |            |
| Lane-Miles Total:       |              |              |                          |                         |                       |               |               |               | 0.18       |              |            |             |              |              |             |              |              |            |

Jurisdiction: County County-maintained roads are shown below for reference.

| State                                                    | County       |              |                          |                         |                       |               |               |               | DIV        | No. of       | One        | Pvt         | Pvt          | Shldr        | Med         | Med          | Func         |            |
|----------------------------------------------------------|--------------|--------------|--------------------------|-------------------------|-----------------------|---------------|---------------|---------------|------------|--------------|------------|-------------|--------------|--------------|-------------|--------------|--------------|------------|
| <u>DOT ID</u>                                            | <u>Route</u> | <u>Road#</u> | <u>Road/ Street Name</u> | <u>Start of Section</u> | <u>End of Section</u> | <u>Beg MP</u> | <u>End MP</u> | <u>Length</u> | <u>Hwy</u> | <u>Lanes</u> | <u>Way</u> | <u>Type</u> | <u>Width</u> | <u>Width</u> | <u>Type</u> | <u>Width</u> | <u>Class</u> | <u>NHS</u> |
| THERE ARE NO COUNTY ROADS IN THIS Village of Evans Mills |              |              |                          |                         |                       |               |               |               |            |              |            |             |              |              |             |              |              |            |

Annual LHI update will continue to be distributed

- annual update is still required to capture newer road changes.

# CHIPS

## Distribution formula

- total dollars is not driven by the mileage
- accurate mileage measures ensures equitable distribution of CHIPS funds

## Inputs

- Centerline mileage of roadways maintained
- Lane-mileage of roadways maintained
- Motor vehicle registrations
- Amount of total funding made available

# GIS

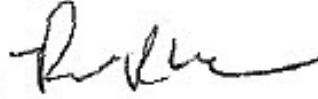


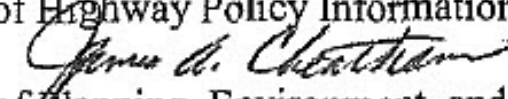
U.S. Department  
of Transportation  
Federal Highway  
Administration

## Memorandum

Subject: INFORMATION: Geospatial Network for All Public Roads

Date: AUG 07 2012

David R. Winter, P.E.   
Director, Office of Highway Policy Information

From: James Cheatham   
Director, Office of Planning, Environment, and Realty

Reply to HPPI-20  
Attn. of:

The *Highway Performance Monitoring System (HPMS) Field Manual* includes the requirement for States to submit their linear referencing system (LRS) network for all roads eligible for Federal Aid. The purpose of this memorandum is to announce that this requirement will be expanded to cover all public roads including dual carriageways on divided highways for the HPMS submittal of 2013 data due June 15, 2014. This is consistent with the updated HPMS

Project driven by Federal Highway Administration requirement....



Department of  
Transportation

# Purposes

- Federal**
  - Federal Highway Aid
  - Census Bureau
  - Dept of Interior (Nat Pks, Land Mgmt)
  - Truck routing / freight management
- State**
  - Funding allocations & distribution
  - Transportation planning
  - Highway safety engineering analyses
  - Truck routing / freight management
- Local**
  - Emergency services / 911

## Impact

FHWA accuracy requirement is rigid

Lengths that were “good enough” in the past no longer acceptable

Need for consistent, verifiable, and accurate means of measurement

Past problems must be “cleaned up” –  
duplicates, overlapping, rounding, boundary roads,  
“private”, missing, inconsistency

## Sources

- Statewide “**Streets**” from GIS Program Office
- System used for E-911, address ranges
  - Often used in county tax mapping

## Local Highway Inventory

**Aerial photography** and Geographic Information System (GIS) for editing

## Process

Match appropriate arcs from “Streets” to roads from Local Highway Inventory (LHI)

“Build” GIS route

Use aerial photography to measure road lengths

Edit GIS Street and/or LHI record to match measured length

## Edits

**Name** - try to match common names, particularly those which can be seen on road signs such as on Google Street View

**From/To descriptions** – preferably reflect visible features primarily using cross streets

**Posted Speed Limits** – may cite areawide limit noting where there are exceptions; ignore time-limited school speeds

**Length changes** – aerial photography used to validate

## Follow-up

Note major length changes versus LHI

Note roads that could not be found

Note roads found (exist in photos) but not in LHI

Begin outreach to county & local governments

- Started with NYSDOT Region 1
- Regions 2, 6, 7 in Fall 2015
- Remainder to begin in Spring 2016

## Tools

County highway & other published maps

Commercial Internet-based mapping tools

- Google Earth, Maps, and Street View
- Bing Maps, Birds Eye View

NYS aerial photography

Online county tax mapping

NYS planimetric quadrangle mapping

## Issues & Details

“Public” roadways

Roads by use

Elevation changes

Measurements

Public versus private

Resolutions

# Public Road

Federal Highway Administration  
Highway Performance Monitoring System

... any road or street owned and maintained by a public authority ... open to public travel ... available, except during scheduled periods, extreme weather or emergency conditions, passable by four-wheel standard passenger cars, and open to the general public for use without restrictive gates, prohibitive signs ...

## Town Roads

Typically acquired with defined boundaries and unambiguous rights of ownership:

- Purchase of lands
- Eminent domain
- Dedication

Roads by Use – “continuous use and public maintenance for a period of 10 years”

- Section 189 of NYS Highway Law\*

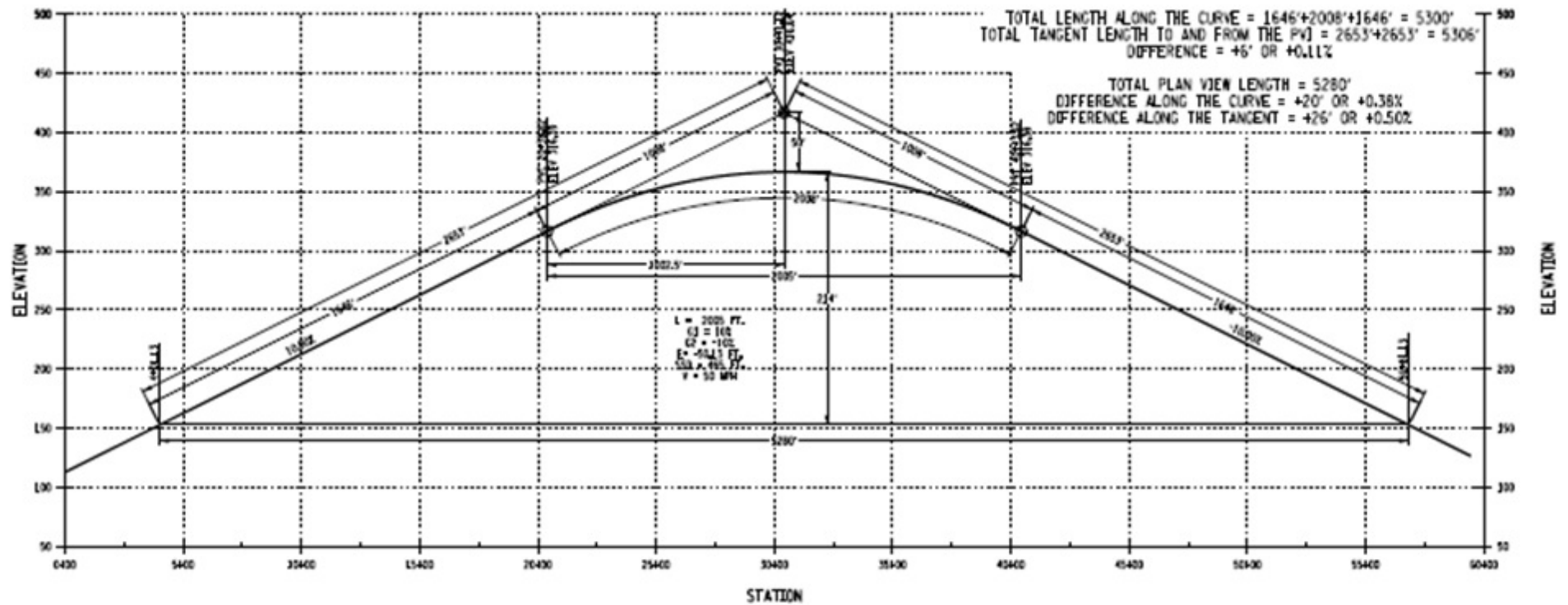
\*page 5, “Powers & Duties of Local Highway Officials”, 2014.

Cornell Local Roads Program, New York LTAP Center

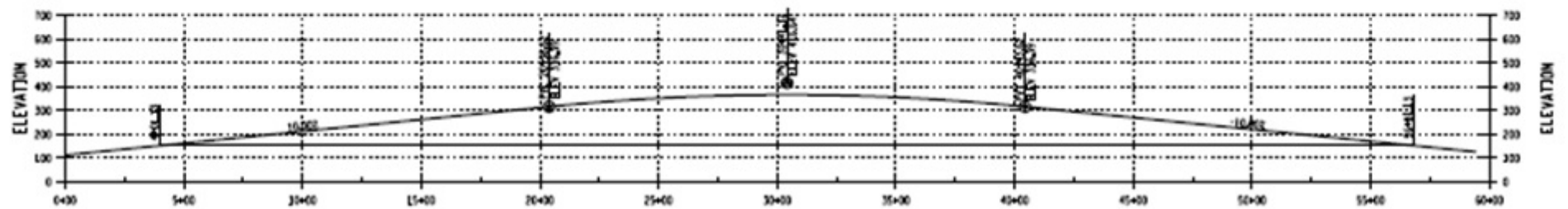
## Elevation Changes

- An evaluation of the impact of elevation changes on road length indicated virtually no impact on overall length when measured to precision of 0.01 miles (52.8 feet).
- Comparison of 2 & 3 dimensional approaches at several locations confirmed this result.

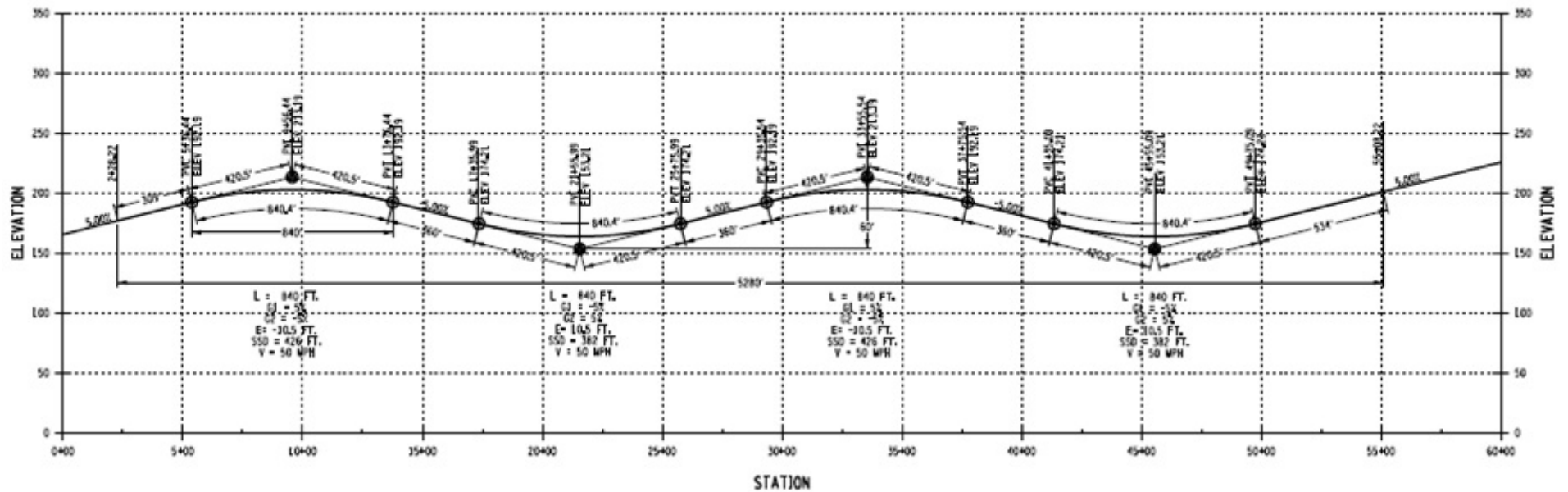
10X VERTICAL CURVE WITH 5:1 VERTICAL TO HORIZONTAL EXAGGERATION



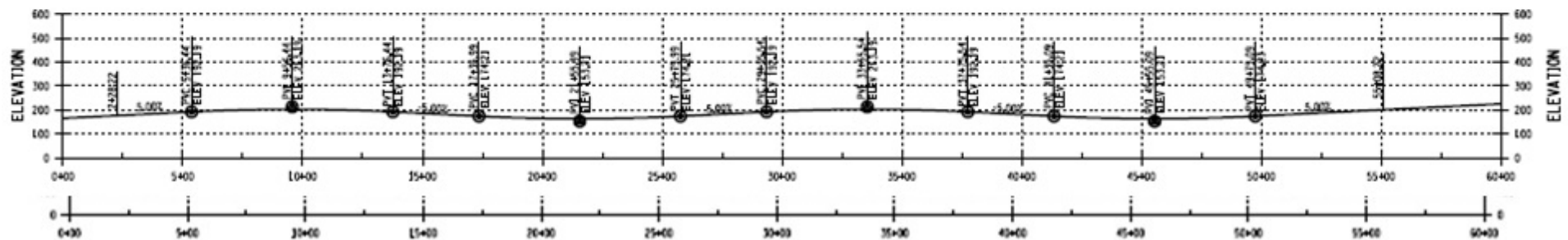
10X VERTICAL CURVE WITH 1:1 VERTICAL TO HORIZONTAL - NO EXAGGERATION



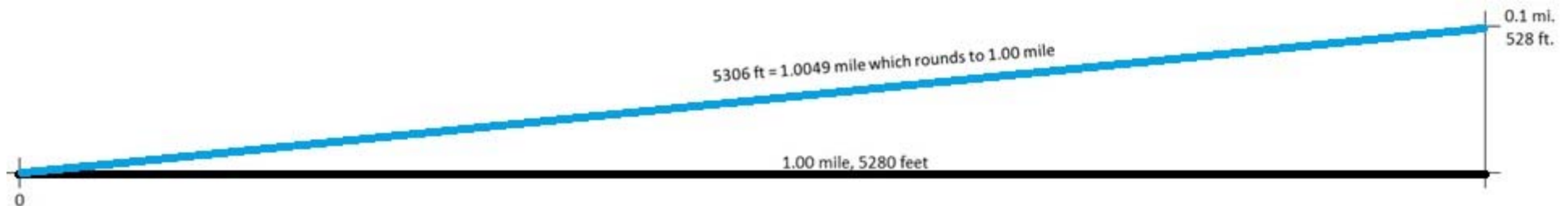
### 5% VERTICAL CURVES WITH 5:1 VERTICAL TO HORIZONTAL EXAGGERATION



### 5% VERTICAL CURVES WITH 1:1 VERTICAL TO HORIZONTAL - NO EXAGGERATION



# Elevation Changes



One mile at a continuous 10% climb yields a total length change of “zero” when using a precision level of 0.01 miles.

- actual “increase” in length is 0.0049 miles

## Elevation Changes

The NYSDOT Profiler vehicle with Distance Measuring Instrument (DMI) accurate to 0.001 mile was compared to aerial photograph/GIS and found no measurable difference for:

- NY 23A in Greene County
- NY 73 near Lake Placid
- Kelly Station Road near Schenectady
- NY 431 Whiteface Mountain

# Details

## Measurements

- centerline to centerline
- dead ends & cul de sacs
- boundary roads

## Public versus private

- appears to be driveway (public or private)
- tax parcels do not indicate right-of-way

## Resolutions

- to verify old roads, claim new roads

# Measurements

## Centerline to centerline



Ellsworth  
Jones Place  
From  
Maple Ave  
to Broadway

-0.05 curb to  
curb  
-0.06 cl to cl

# Measurements

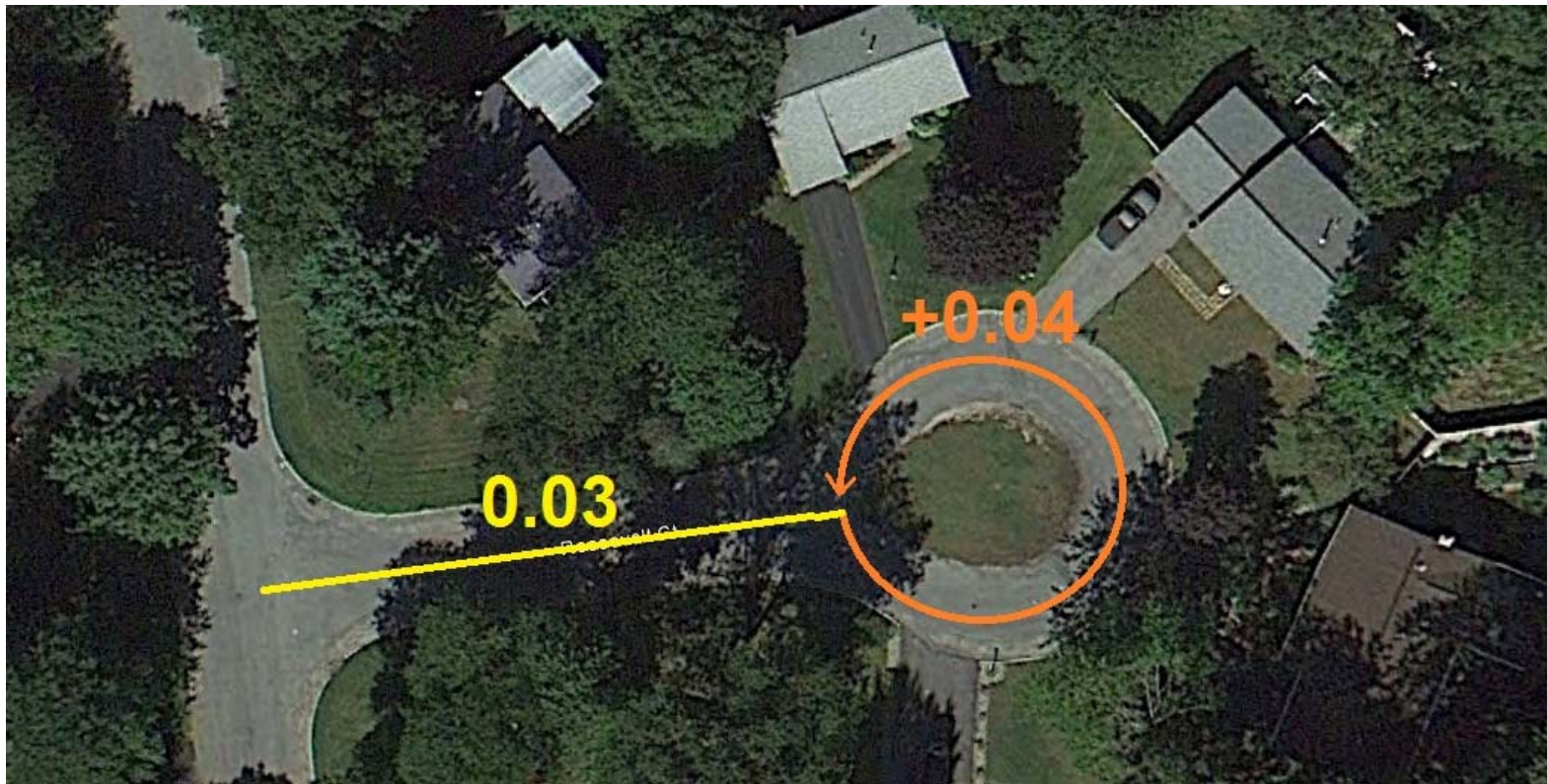
## Measure to the end of dead ends



“Bulb” at the end of a non-loop cul de sac is not part of measured length

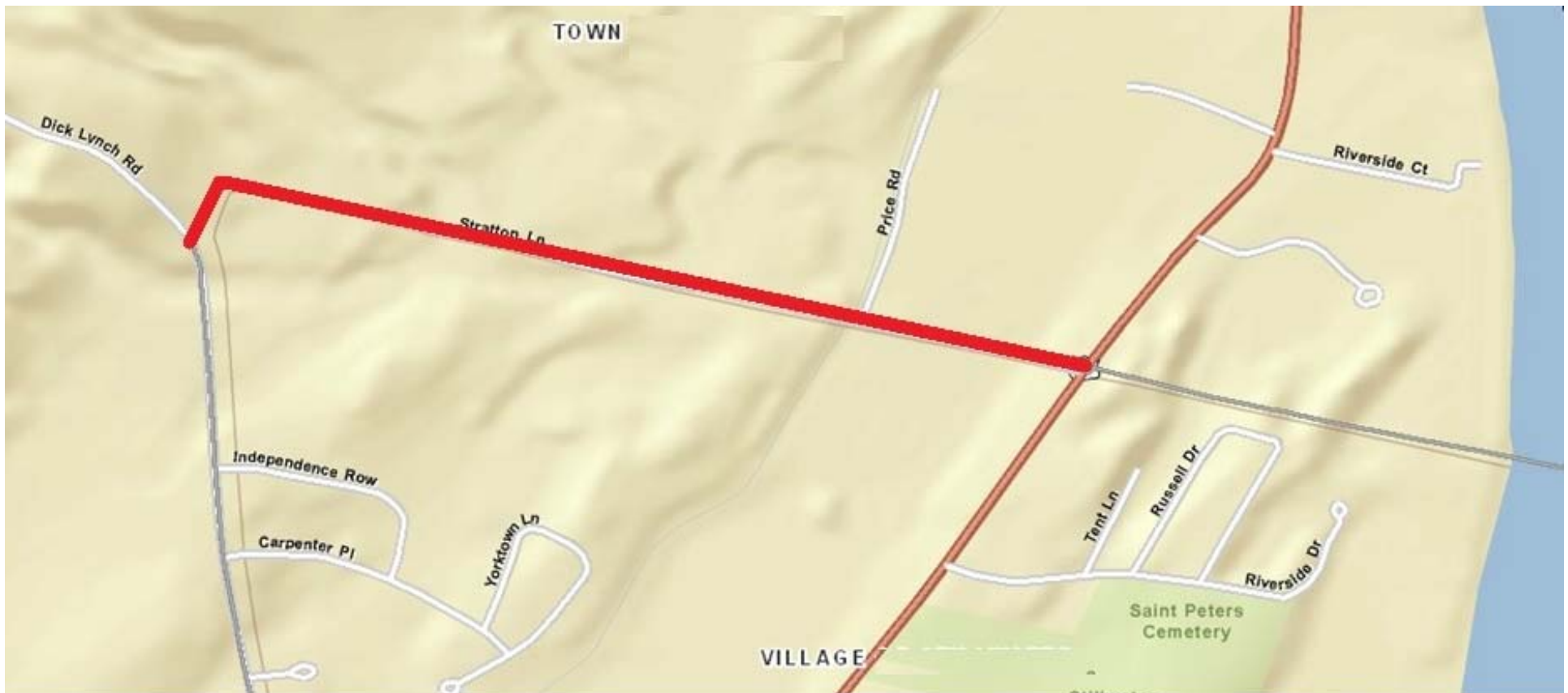
# Measurements

Around the loop where center median



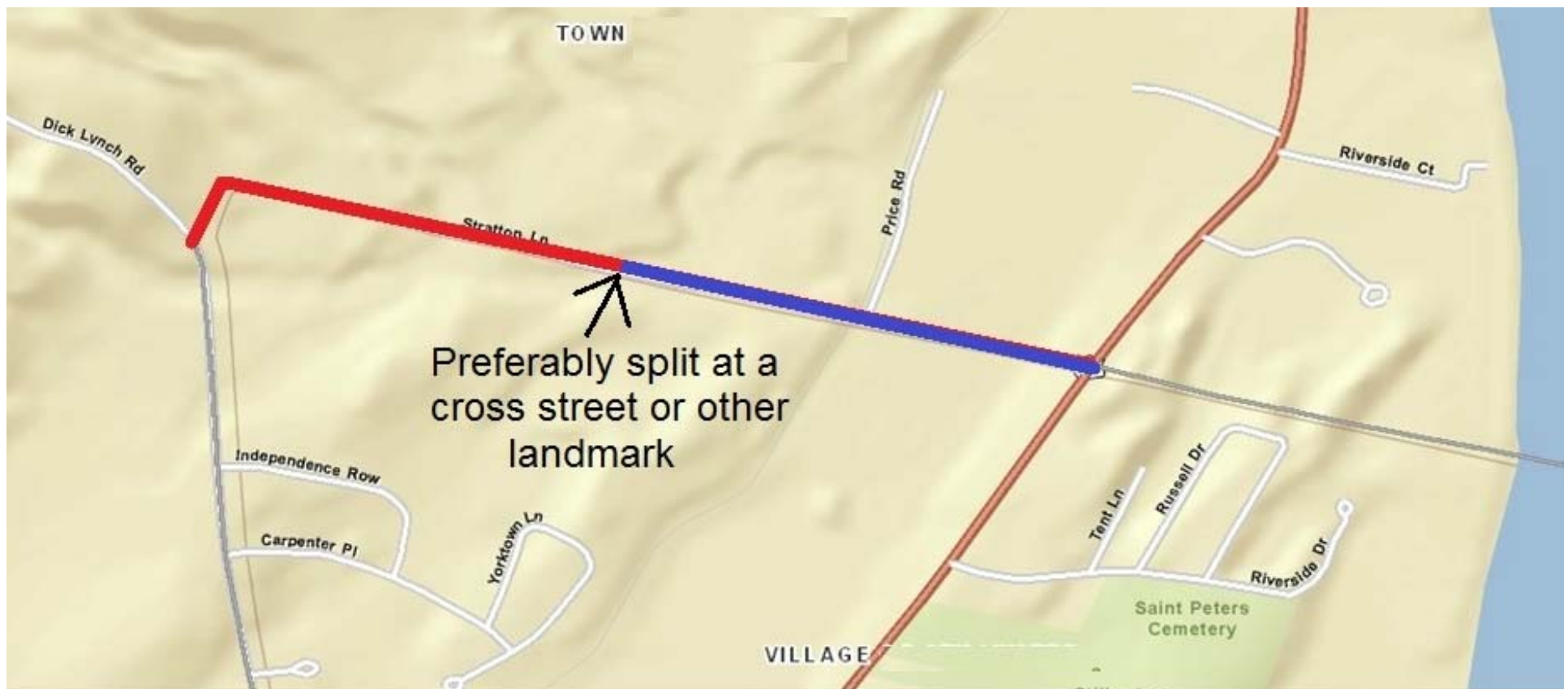
# Measurements

## Boundary roads



# Measurements

## Boundary roads



# “Private” roads



Google

Public  
road?

## “Private” roads

Maintained by municipality for utility access, but not a “public road”



This is a common situation on waterfront properties.



## “Private” roads

Public-owned does not equal “public road”. Roads typically not “open to the public”\*:

- park roads
- cemetery roads
- driveways such as at
  - town offices
  - town garages
  - landfills/brush landfills
  - transfer stations

\*without restriction



## “Private” roads



County  
tax maps  
as an  
indicator  
of public  
versus  
private

## “Private” roads



Green  
clearly  
shown as  
within a  
public  
R.O.W.

## “Private” roads



Yellow  
clearly  
shown as  
within  
private  
property

## “Private” roads

Tax maps may not always be “accurate” with respect to R.O.W. [it’s not their primary purpose]

But we often only have tax maps as “official” documentation

Can “correct” with a Town Board resolution

# Resolutions

Required to:

- accept new roads
- to add old roads not in inventory
- as acknowledgement that roads that appear to be private are actually public
- to accept more than minor length changes

Roads must exist and currently be open to the public (except for limited construction periods)

## Resolutions

Must include local governing body (Town Board) acceptance of all legal and maintenance & repair responsibility for the roadway

Must include an indication that the resolution has been voted upon and passed

Must mentioned each road specifically (may do so in an attachment)

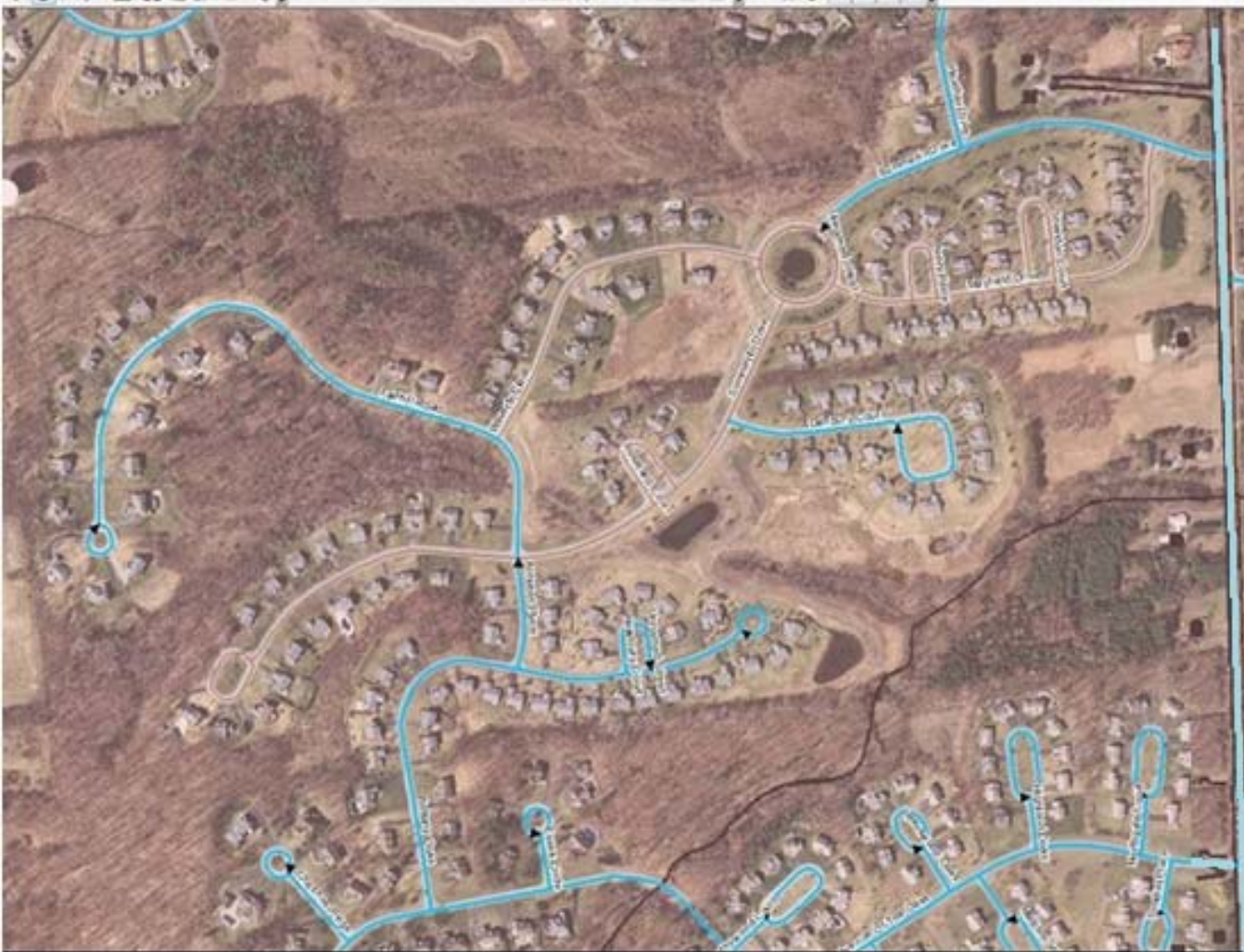
# Resolutions

May issue a new resolution for an old road

May use a “blanket” resolution if there is more than one road being added, although all roads must be listed

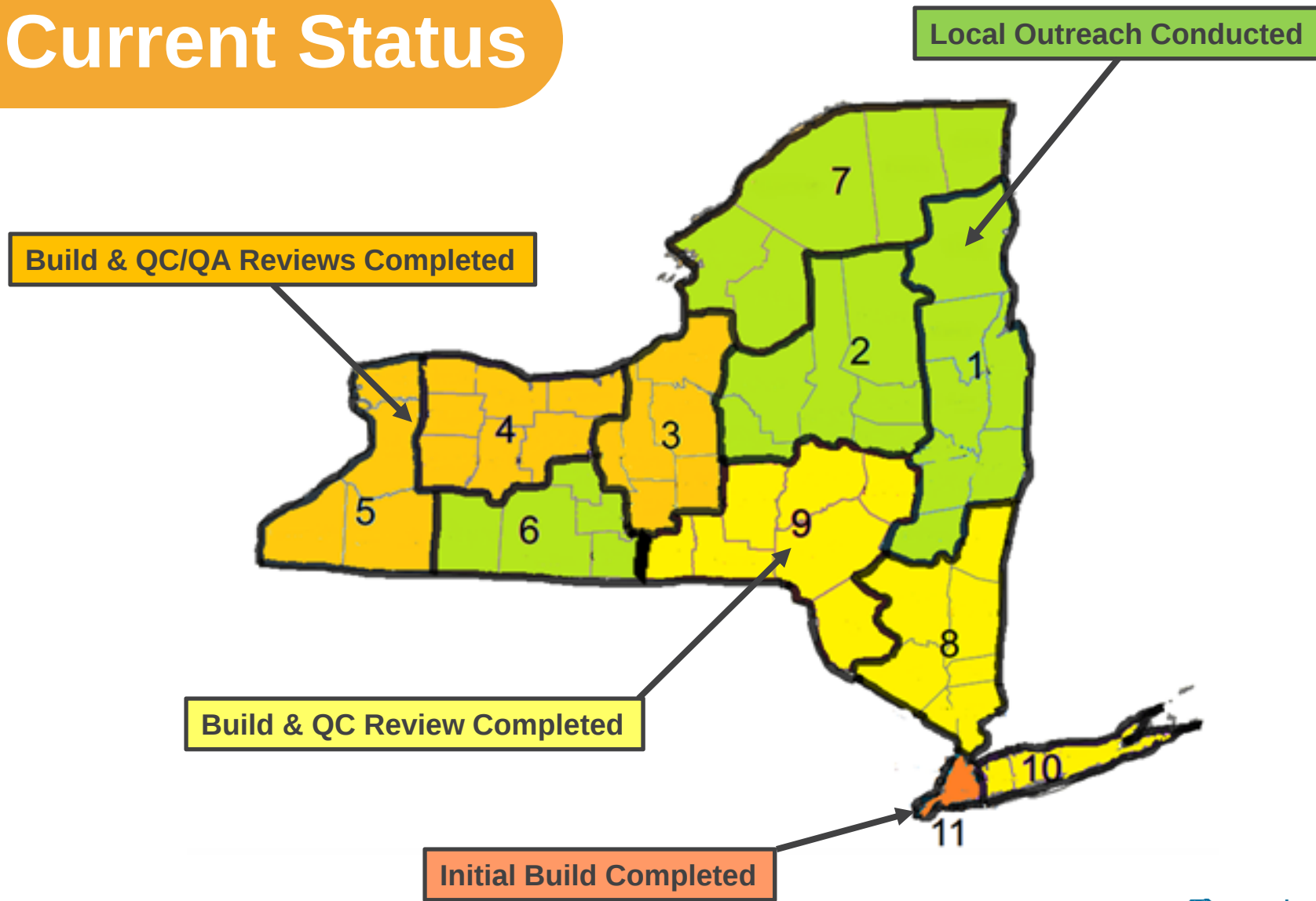
Original resolutions when the roads were first accepted are not necessary

# Resolutions



Even  
“obvious”  
roads need  
a resolution as  
we don’t  
know the  
circumstances  
(not finished,  
never  
approved,  
disputes with  
contractors,  
etc)

# Current Status



# Highway Data Services Bureau

## New York State Department of Transportation

50 WOLF ROAD, 4-2  
ALBANY, NY 12232  
518 457-1965

CAITLIN.CLARK@DOT.NY.GOV

Kelsey.Pianka@dot.ny.gov

Allison.Weber@dot.ny.gov

