# Road Safety Audit Review

## Ferry Road, Charlotte

## July 23, 2020

## Vermont Agency of Transportation
## Operations & Safety Bureau

# Operations & Safety Bureau

Road Safety Audit Review

## ***RSAR Process***

A road safety audit review (RSAR) is a formal examination of an existing road in which an independent, multi-disciplinary team (the Audit team) reports on potential safety issues. According to the Federal Highway Administration (FHWA), the purpose of a RSAR is to determine which elements of the road may present a safety concern, to what extent and under what circumstances as well as to identify opportunities to mitigate the identified safety concerns.

The RSAR process starts with a commencement meeting during which the Audit team reviews data and gathers community concerns. A site inspection is then performed by the Audit team. The site visit involves the identification of safety deficiencies as seen in the field by driving and walking the location. Following the site inspection, the Audit team holds a post inspection meeting**.** It is during this meeting that the team members discuss their observations and identify safety issues. The team is to reach a consensus on the importance of each safety issue mentioned. Only those issues for which a consensus is reached are included in the RSAR findings which are presented in a written report.

The written report identifies safety concerns and proposes guidance. These issues and solutions are presented in a tabular format associated to a responsible entity for ease of reporting. The responsible entities are any groups who own a roadway feature or who are responsible for making an improvement or for initiating further studies. These could include for example, the VTrans design section, the local town, the local police or the local RPC.

## ***Location***

The location of this RSAR is the section of Ferry Road in Charlotte from the railroad crossing to the ferry landing. This correspond approximately to mile points 0.76 to 2.81. Ferry Road is a minor collector and is referenced as S0329 by VTrans.

## ***Purpose of the RSAR***

This RSAR was conducted at the request of the Town of Charlotte. Over the past year and a half, the Charlotte Selectboard has heard increasingly more reports from residents about safety issues along Ferry Road. The main safety issues that are of concern include the following:

- Traffic coming from and going to the ferry often exceeds the speed limit of 50 mph. Some drivers engage in unsafe practices, such as passing in opposing lanes.
- The speeding traffic is particularly dangerous for pedestrians and bicyclists.
- Roadway departure crashes are common on Ferry Road.

The RSAR herein has sought to identify potential safety hazards and physical features which may affect road user safety. However, it is possible that not every deficiency has been identified. It should further be recognized that the implementation of the guidance in this report might contribute to improve the level of safety of the facility reviewed but not necessarily remove all the risks.

## ***RSAR Participants***

Mario Dupigny-Giroux from the Operations & Safety Bureau Data Unit, VTrans, was the RSAR coordinator.

The other participants were:

Sai Sarepalli CCRPC

Tyler Guazzoni, Traffic Ops VTrans
James Marshall, Dist 5 VTrans
Joshua Taylor, Traffic Ops VTrans

Brandon Doll, VSP
Andrew Leise, VSP

Dean Bloch, Town Administrator
Stuart Morrow, Town Road Commissioner
Megan Price, Town Resident

## ***Information Reviewed***

*Geometry*

At the commencement meeting, the Road Commissioner mentioned that the roadway width was twenty-two feet.

There is a horizontal curve at Wings Point Rd. The current advisory speed eastbound is 20 mph. There is no advisory speed for the westbound direction. During the site visit, the audit team ballbanked the curve in both directions and determined that the advisory speed should be 15 mph in both directions.

*Speed Limit*

The most recent Traffic Ordinance document amended April 14, 2014 references a maximum speed of forty miles per hour on Ferry Rd from the intersection with Greenbush Rd and extending westerly to the railroad crossing. The amended document does not specify a speed limit for the section of Ferry Rd west of the railroad crossing. The statutory limit of 50 mph therefore applies for that section of road.

Speed Studies

CCRPC collected speed data in July 2020 at the three locations shown on the map below.

At site 1, the 85th percentile speed in the westbound direction is 52 mph with 59% of the traffic traveling between 41 mph and 50 mph. In the eastbound direction, the 85$^{th}$ percentile speed is 54 mph with 58% of the traffic traveling between 41 mph and 50 mph.

In comparison, data collected by CCRPC in 2015 at the same site showed that the 85$^{th}$ percentile speed was around 51-52 mph. The speed data collected at site 1 in 2020 in the westbound direction is very similar to the data collected in 2015. The data collected in 2020 for the eastbound direction shows slightly higher speeds compared to 2015.

At site 2, the 2020 data indicates that the 85th percentile speed is 54 mph in the westbound direction and 53 mph in the eastbound direction with 53% of the westbound traffic traveling between 41 mph and 50 mph and 58% of the eastbound traffic traveling within the same 10-mile pace range.

At site 3, the 85th percentile speed is 38 mph in the westbound direction and 39 mph in the eastbound direction. At this site, 74% of the eastbound traffic travels between 31 mph and 40 mph and 68% of the westbound traffic travels within this same range.


| | Site 3 | | Site 2 | | Site 1 | | Site 1 | |
|---|---|---|---|---|---|---|---|---|
| | 2020 | | 2020 | | 2020 | | 2015 | |
| | WB | EB | WB | EB | WB | EB | WB | EB |
| 85th Percentile | 38 | 39 | 54 | 53 | 52 | 54 | 52 | 51 |
| 90th Percentile | 40 | 41 | 57 | 55 | 54 | 57 | | |
| 95th Percentile | 41 | 43 | 59 | 57 | 56 | 59 | 57 | 55 |
| 10-mph Pace | 31-40 | 31-40 | 41-50 | 41-50 | 41-50 | 46-55 | 41-50 | 41-50 |
| % in Pace | 68% | 74% | 53% | 58% | 59% | 53% | 59% | 58% |

*Enforcement*

Enforcement is conducted by the Vermont State Police.

*Traffic Calming Devices*

The Vermont State Police periodically places a speed cart on Ferry Road. A speed cart was installed at the time of the road safety audit.

*Traffic and Pedestrian Volumes*

The 2018 Average Annual Daily Traffic was 1800 vehicles per day.

The Town representatives indicated that this portion of Ferry Road had a relatively high number of pedestrians and bicyclists. Destinations include the ferry and the town beach on Lake Road, and pedestrians and bicyclists also use this portion of Ferry Road as part of a circuit/loop or for an out-and-back route.

The Champlain Bikeway runs along Ferry Rd between Greenbush Rd and Lake Rd. There is short path on the north side of the Ferry Rd that connects to Lake Rd.

*Past Projects*

Ferry Road had just been repaved with an overlay at the time of the road safety audit. This project was completed via a FY 2020 Class II Highway Grant.

*Crash History*

Crashes were reviewed for the period ranging from 2012 to July 2020 (with the understanding that not all crash data may have been available for 2020).

During this period, a total of eleven crashes were reported, and Ferry Road was not a high crash location. Most of the crashes reported were reported as non-reportable[1].

During the commencement meeting, the Vermont State Police indicated that most crashes on this section of road were lane departure crashes involving single vehicles. A resident further explained that many crashes were not called in by the operators and that people were being pulled out of ditches by area residents or friends.

The available data indicates that 66% of the crashes happened during daylight compared to 33% of the crashes during dark conditions and that 44% happened during the summer months compared to 33% during winter and 11% each during spring and fall.

A summary table of the crash data is presented in Appendix A.

***Identified Safety Concerns***

The areas of safety concern identified by the audit team along with the potential safety enhancements suggested by the team are summarized in the table below. These concerns and remedial actions are further discussed in the section following the table.

In the table, the entities listed under the column called “Potential Responsibility” are suggested groups that could possibly implement some of the countermeasures.

For each suggested countermeasure, its safety effectiveness is mentioned in the table if an industry measure is available.

In formulating suggested remedial actions, time frames and costs were qualified as follows: Short term, < 1 year; mid-term 1-3 years; long term > 3 years; low cost, < $15,000; medium cost, $15,001 - $75,000; high cost, > $ 75,001.

[1] A motor vehicle incident that did not result in an officer's written report. Rather, is a brief record existing in a CAD/RMS that indicated a vehicle incident occurred and no injury or damage was conveyed.

The following safety concerns were identified by the audit team (the concerns are not necessarily listed in order of importance):

1. Traveling speeds are high at times
2. Roadway departure crashes are common
3. Walking and biking could be hazardous

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## Potential Safety Enhancements Summary Table

| | Safety Concerns | | | | | | Potential Responsibility | Safety Payoff[2] | Time Frame | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| **Safety Enhancement** | 1 High Speed | 2 Off Road | 3 Peds/ Bikes | 4 | 5 | 6 | | | | |
| Inspect speed limit signs and cut brush | X | X | X | | | | Town | | Now | Low |
| Review the speed limit on Ferry Rd | X | X | X | | | | Town (with help from CCRPC) | | Now to Short | Low |
| Review the locations of intermediate speed limit signs | X | X | X | | | | Town | | Now to Short | Low |
| Recurring enforcement of the high-risk drivers (>= 5 mph above 85th percentile speed) | X | X | X | | | | VSP or Town via contracts | | On-Going | Medium |

[2] The CMF Clearinghouse explains that the star quality rating indicates the quality or confidence in the results of the study producing the CMF. The star rating is based on a scale (1 to 5), where a 5 indicates the highest or most reliable rating. The review process considers five categories for each study: study design, sample size, standard error, potential bias, and data source.

## Potential Safety Enhancements Summary Table

| | Safety Concerns | | | | | | Potential Responsibility | Safety Payoff[2] | Time Frame | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| **Safety Enhancement** | 1 High Speed | 2 Off Road | 3 Peds/ Bikes | 4 | 5 | 6 | | | | |
| Continue the periodic use of a speed cart | X | X | X | | | | VSP | 45-73% reduction # of vehicles traveling 5 and 10 mph over the speed limit[3] | Now to Short | Low |
| Manage speeds using a portable speed radar feedback sign | X | X | X | | | | Town | 45-73% reduction # of vehicles traveling 5 and 10 mph over the speed limit | Short | Medium |
| Evaluate the appropriateness of longer-term traffic calming measures | X | X | X | | | | Town | | Mid to Long | Medium |

[3] https://safety.fhwa.dot.gov/speedmgt/ref_mats/rural_transition_speed_zones.cfm

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## Potential Safety Enhancements Summary Table

| | Safety Concerns | | | | | | Potential Responsibility | Safety Payoff[2] | Time Frame | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| **Safety Enhancement** | 1 High Speed | 2 Off Road | 3 Peds/ Bikes | 4 | 5 | 6 | | | | |
| Consider the curve and intersection warning sign enhancement shown in Appendix C | X | X | | | | | Town | | Now to Short | Low |
| Consider installing white edge line markings | | X | | | | | Town | 15% reduction all crashes[4] | Now to Short | Low to Medium |
| Consider Wider shoulder | | X | | | | | Town | 53% reduction off road crashes[5] | Mid to Long | High |
| Consider the Safety Edge in future paving | | X | | | | | Town | 21% reduction off road crashes[6] | Long | Low |

[4] http://www.cmfclearinghouse.org/detail.cfm?facid=5646
[5] http://www.cmfclearinghouse.org/detail.cfm?facid=3654
[6] http://www.cmfclearinghouse.org/detail.cfm?facid=9211

| Potential Safety Enhancements Summary Table | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Safety Concerns** | | | | | | **Potential Responsibility** | **Safety Payoff[2]** | **Time Frame** | **Cost** |
| **Safety Enhancement** | 1 High Speed | 2 Off Road | 3 Peds/ Bikes | 4 | 5 | 6 | | | | |
| Conduct a pedestrian facility study to evaluate shoulder or off-road path[7] | | X | X | | | | Town (with assistance of CCRPC) | | Short | Medium |

[7] VTrans bike/ped grants could be used for this purpose. These grants are available every year and the application deadline is usually in June (link to the application web page: https://vtrans.vermont.gov/highway/local-projects/bike-ped). The study could also be done via CCRPC's UPWP

Discussion of Safety Concerns

This section lists and discussed the areas of safety concern identified by the audit team during the site inspection and from the analysis of available data. This section also reports the potential safety enhancements suggested by the audit team. The concerns are not listed in order of importance.

Concern: Traveling speeds are high at times

Discussion:

The recent speed data collected by CCRPC indicates that the 85th percentile speed on some parts of Ferry Rd where the roadway is more open and where it traverses some fields is between 52 and 54 mph and that it is around 38 and 39 mph where the roadway characteristics are more compact with trees, narrow clear zones and more closely spaced driveways (from Converse Bay Rd to about 2087 Ferry Rd).

The roadway width is generally narrow at about 22 ft and there is a relatively high usage of Ferry Rd by pedestrians and cyclists.

Given the above information, there are potentially two distinct areas within the study area where there could be different speed limits.

The Manual on Uniform Traffic Devices (MUTCD) indicates that if a speed limit within a speed zone is posted, it should be within 5 mph of the 85th-percentile speed of free-flowing traffic. The MUTCD also stipulates that other factors that may be considered when establishing or reevaluating speed limits are the following: Road characteristics, shoulder condition, grade, alignment, and sight distance; The pace; Roadside development and environment; Parking practices and pedestrian activity; and Reported crash experience for at least a 12-month.

Guidance for setting speed limits is also available in Setting Speed Limits: A Guide for Vermont Towns, which was produced by Vermont Local Roads[8].

USLIMITS2 is an expert-system tool provided by FHWA that could also be used to evaluate speed limits[9].

Safety Enhancements:

*Speed Limit Related*

Immediate Term

- Inspect the speed limit signs in the corridor and cut brush as needed. At least one sign was observed with vine growing around it.

[8] https://localroads.vermont.gov/sites/localroads/files/files/resources/materials/Setting%20Speed%20Limits%20Guide%20Update%20August%202016.pdf

[9] https://safety.fhwa.dot.gov/uslimits/new.cfm

Immediate to Short Term

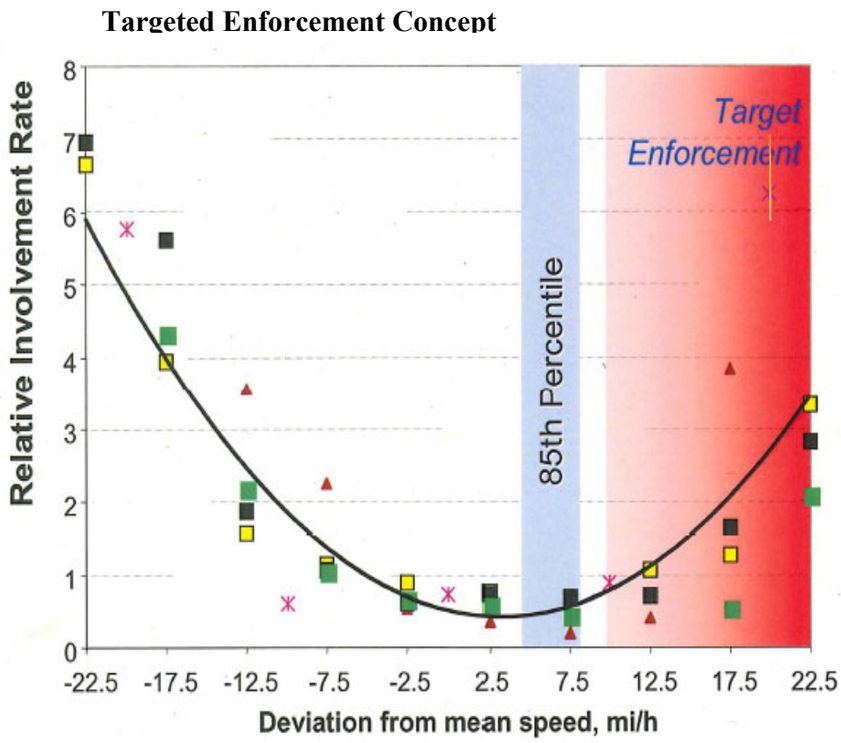
- Review the speed data, road characteristics and pedestrian activity and determine if the speed limit could be reduced in some portions of the study area.
- Review the locations of intermediate speed limit signs within each speed zone. Ensure that intermediate signs are present following major intersections in each direction and that there are intermediate signs every mile for a 50 mph speed limit (and if lower speed zones are established, every 0.5 to 0.8 miles for 35 to 45 mph zones).
- If lower speed limits are set, consider using an oversized (30" x 36") speed limit sign for the first speed limit sign at the beginning of a zone and use also Reduced Speed Limit Ahead signs if the transition between speed zones is 10 mph or more.
- If speed limits are modified, inform the community via various media and install a speed cart for a period of time in each of the modified zones.

Enforcement related

- Conduct recurring speed limit enforcement campaigns for the high-risk drivers (as per the discussion below, target drivers at or above 58 mph).

In doing this, consider targeting drivers who are traveling at or above the 90th percentile speed as per the following concept suggested by NHSTA. The next graph shows that the crash involvement rate increases as traveling speeds deviate from the 85th percentile speed. This means that targeting motorists that are traveling above the 85th percentile speed will apprehend motorists that are more likely to cause a crash. Crash involvement starts to increase more drastically 5 mph above the 85th percentile speed or around the 90th percentile speed.

Applying this concept to this section of Ferry Rd means that the focus should be put on vehicles that are traveling at or above 58 mph (5 mph above the 85th percentile).



*Traffic Calming Related*

Now to Short Term

- Continue the periodic use of speed carts.

Short Term

- Consider installing a portable speed radar feedback sign that could be moved at two or three locations within the corridor.

Mid to Long Term

- Review the corridor for the appropriateness of longer-term measures like speed tables to physically force motorists to slow down (note that, as mentioned in Appendix B, these measures are usually not recommended when the pre-implementation 85th percentile speed is 45 mph or more).

Traffic calming is usually defined as a set of physical design and other measures to force motorists to reduce their travel speed. The typical measures include vertical deflections such a speed humps, speed tables, and raised intersections, horizontal shifts and roadway narrowing. Other measures would include a speed cart and a speed radar feedback sign.

Speed carts and speed radar feedback signs are easy to implement and are usually well accepted among the community. Vertical deflection measures such as a speed table are appropriate on collector roads but generally only when the posted speed is 35 mph or less. Appendix B presents information about speed tables and other devices.

*Geometric Features Related*

Now to Short Term

- Replace the existing curve signage.
  See the layout in Appendix C for a visual of the suggested improvements.

  At the turn by Wings Point Rd, in the westbound direction, consider replacing the existing turn sign with a new turn sign with a side road up. In the eastbound direction, replace the curve sign with a turn sign with a side road on it. For both signs, add a new 15 mph advisory speed plaques (W13-1P) and consider installing a Wings Point Rd street name plaque underneath each sign (W16-8P). Replace also the large arrows (W1-6) as per the proposed layout.

  At the curve west of residence #2563, replace the existing curve sign with a new curve sign (W1-2).

  At Converse Bay Road, install a new westbound turn sign with a side road with a Converse Rd street name plaque below it (W16-8p). Replace the large arrow (W1-6) at the intersection.

- At the intersection with Lake Rd, replace the existing intersection warning signs (W2-1) with new signs and add a Lake Rd street name plaque below each sign (W16-8p). At the Whalley Rd intersection, install a new intersection side road sign (W2-2) for each direction and install a Whalley Rd street name plaque (W16-8p) below each sign.

- For all new warning sign, consider using Type IV sheeting.

Concern: Roadway departure crashes are common on Ferry Road.

Discussion:

The Vermont State Police and local residents described the most common type of crashes on this road as being roadway departure crashes along the edge of pavement.

Safety Enhancements:

Now to Short Term

- Consider installing white edge line markings.

  As per the MUTCD, white edge lines are suitable on roads with traveled way of 20 feet or more. White edge lines would improve visibility at night and during rain events. On the other hand, the installation of edge lines has been found in the research to increase speeds on average by 5 mph[10].

Mid to Long Term

- Evaluate the installation of wider shoulders

  Wider shoulders would provide a recovery area for motorists and reduce the likelihood of crashes as well as the severity of crashes. On the other hand, wider shoulder widths are known to be associated with higher speeds[11]

- Specify the use of the Safety Edge[12] the next time the road is paved.

  The Safety Edge is a countermeasure that helps minimize pavement edge-drop off related crashes. It is implemented in conjunction with pavement resurfacing and involves shaping the edge of the pavement to 30 degrees.

Concern: Walking and biking are perceived hazardous along Ferry Road

Discussion:

Ferry Road is heavily used by pedestrians and bicyclists. Part of Ferry Road is designated as the Champlain Bikeway. The relatively narrow roadway width provides almost no shoulders and

[10] http://ctr.utexas.edu/wp-content/uploads/pubs/0_5090_2.pdf
[11] https://www.fhwa.dot.gov/publications/research/safety/15030/15030.pdf
[12] https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/safetyedge.cfm

leaves little room for joggers, bikers and cyclists. Traffic traveling at high speeds contribute to making these modes of transportation and recreation a safety issue.

Safety Enhancements:

Short Term

- Apply for a VTrans grant for the conduct of a pedestrian facilities scoping study to determine the feasibility of reducing vehicle – bike/pedestrian conflicts by widening the road to add shoulders or creating an off-road multi-use path)[13]. Alternatively, the Town could work with CCMPO to see if this could be done as part of the Unified Planning Work Program (UPWP).

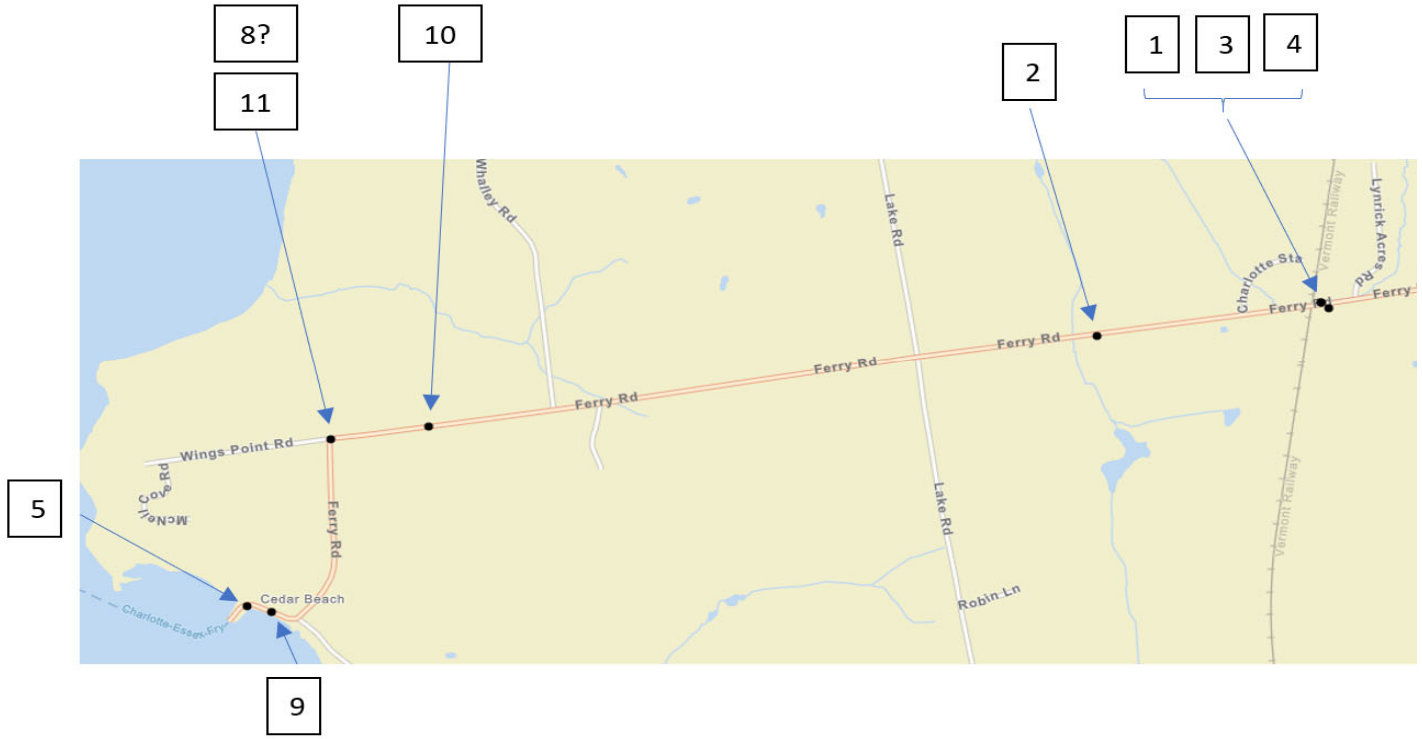
[13] Grants will be awarded in July 2021. Contact Jon Kaplan for more information on how to apply (jon.kaplan@vermont.gov).

## Appendix A

### 2012 to July 2020 Crash Data

| Crash # | Incident # | Crash Date | Time | Weather | Contributing Circumstances | Direction of Collision | Location |
|---|---|---|---|---|---|---|---|
| 1 | 12A104756 | 12/3/2012 | 5:44 PM | Cloudy | Failure to keep in proper lane | Single Vehicle Crash | Ferry Rd at RR Tracks/Greenbush Rd |
| 2 | 13A104259 | 10/29/2013 | 9:36 AM | [No Weather] | | [No Direction of Collision] | Miinl C 0674 (1069 Ferry Rd.) |
| 3 | 15A100888 | 2/15/2015 | 3:24 AM | [No Weather] | | [No Direction of Collision] | Min. C 674 Ferry Rd. at Lake Rd. |
| 4 | 15A105151 | 10/5/2015 | 8:52 AM | [No Weather] | | [No Direction of Collision] | Min. C 0674 Ferry Rd. |
| 5 | 16A101663 | 4/6/2016 | 12:44 PM | [No Weather] | | [No Direction of Collision] | 2901 FERRY RD; F5 |
| 6 | 16A103496 | 7/14/2016 | 12:38 PM | [No Weather] | Failure to keep in proper lane | No Turns- Thru moves only- Broadside ^< | 86 Ferry Road at US Rt. 7 |
| 7 | 16A103902 | 8/2/2016 | 3:43 PM | [No Weather] | | [No Direction of Collision] | 200 Block FERRY RD |
| 8 | 17A103093 | 7/8/2017 | 6:36 PM | Clear | Other improper action- No improper driving | Left Turns- Opposite Directions- Head On/Angle Crash --^v-- | 2901 Ferry Rd at Ferry Dock |
| 9 | 17A103855 | 8/25/2017 | 11:39 AM | [No Weather] | | [No Direction of Collision] | 2900 Block FERRY RD |
| 10 | 19A100912 | 2/18/2019 | 9:11 PM | [No Weather] | | [No Direction of Collision] | 2187 FERRY RD |
| 11 | 19A104020 | 8/21/2019 | 4:38 PM | [No Weather] | | [No Direction of Collision] | Wings Point |

The crashes in red maybe outside of the study area



# Appendix B

## Speed Tables and Other Traffic Calming Measures

The following information was taken from FHWA's Traffic Calming ePrimer
(https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm)

A speed table is a raised area placed across the roadway designed to physically limit the speed at which a vehicle can traverse

Most agencies implement speed tables with a height of between 3 and 3.5 inches and an overall travel length of 22 feet. The most common speed table consists of a 10 foot plateau with 6 foot approaches on both sides that can be straight, parabolic or sinusoidal in profile. Speed tables with heights as great as 6 inches, ramps of up to 10 feet, and plateaus between 18 and 23 feet in length have been tested and found to better accommodate large vehicles with long wheelbases (such as fire trucks and transit buses).

Single speed table reduces 85th percentile speeds to the range of 25 to 35 mph when crossing the table; speed reduction effects decline at the rate of approximately 0.5 to 1 mph every 100 feet beyond the 200 foot approach and exit of a speed table;

ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration only on a street with a posted speed limit of 30 mph or less; many jurisdictions follow the same maximum (e.g., South Carolina, Pennsylvania); others have chosen a 35 mph maximum (e.g., Delaware, Pasadena)

Generally not appropriate when the pre-implementation 85th percentile speed is 45 mph or more.

## Applicability and Acceptability of Individual Traffic Calming Measures

Table 3.1 presents a simplified summary of the potential applicability of each individual traffic calming measure and the likelihood of its acceptability for a particular setting. The screening is presented in terms of the location (intersection or roadway segment), the roadway functional classification, and other attributes of the roadway function (emergency services access requirements, presence of a transit route). It is critical to remember that the applicability of a particular traffic calming measure has as much to do with the problem to be addressed as the physical setting elements listed in the table.

Table 3.1 can be used as an initial screening tool to identify whether a particular traffic calming measure has a likely fatal flaw in terms of its overall applicability and acceptability. For example, the table illustrates that neither a speed hump nor traffic circle is an appropriate measure along a thoroughfare or major street.

**Table 3.1. Likelihood of Acceptability of Traffic Calming Measure**

| Traffic Calming Measure | Segment or Intersection | Functional Classification | | | Street Function | |
|---|---|---|---|---|---|---|
| | | Thoroughfare or Major | Collector or Residential Collector | Local or Local Residential | Emergency Access | Transit Route |
| **Horizontal Deflection** | | | | | | |
| Lateral Shift | Segment | 3 | 5 | 5 | 5 | 5 |
| Chicane | Segment | 1 | 5 | 5 | 3 | 3 |
| Realigned Intersection | Intersection | 1 | 5 | 5 | 5 | 5 |
| Traffic Circle | Intersection | 1 | 3 | 5 | 3 | 3 |
| Small Modern & Mini-Roundabout | Intersection | 3 | 3 | 5 | 5 | 5 |
| Roundabout | Intersection | 5 | 3 | 1 | 5 | 5 |
| **Vertical Deflection** | | | | | | |
| Speed Hump | Segment | 1 | 5 | 5 | 1 | 3 |
| Speed Cushion | Segment | 1 | 5 | 5 | 5 | 5 |

| Traffic Calming Measure | Segment or Intersection | Functional Classification | | | Street Function | |
|---|---|---|---|---|---|---|
| | | Thoroughfare or Major | Collector or Residential Collector | Local or Local Residential | Emergency Access | Transit Route |
| Speed Table | Segment | 3 | 5 | 5 | 1 | 3 |
| Offset Speed Table | Segment | 3 | 5 | 5 | 5 | 3 |
| Raised Crosswalk | Both | 3 | 5 | 5 | 1 | 3 |
| Raised Intersection | Intersection | 3 | 5 | 5 | 3 | 3 |
| **Street Width Reduction** | | | | | | |
| Corner Extension | Intersection | 5 | 5 | 5 | 5 | 5 |
| Choker | Segment | 5 | 5 | 5 | 5 | 5 |
| Median Island | Both | 5 | 5 | 5 | 5 | 5 |
| On-Street Parking | Segment | 5 | 5 | 5 | 5 | 5 |
| Road Diet | Both | 5 | 5 | 3 | 5 | 5 |
| **Routing Restriction** | | | | | | |
| Diagonal Diverter | Intersection | 1 | 3 | 3 | 1 | 3 |
| Full Closure | Both | 1 | 3 | 3 | 1 | 1 |
| Half Closure | Intersection | 1 | 5 | 5 | 3 | 3 |
| Median Barrier | Intersection | 3 | 5 | 5 | 1 | 3 |
| Forced Turn Island | Intersection | 3 | 5 | 5 | 3 | 3 |

Legend:

5 – traffic calming measure may be appropriate
3 – caution; traffic calming measure could be inappropriate
1 – traffic calming measure is likely inappropriate

# Appendix C

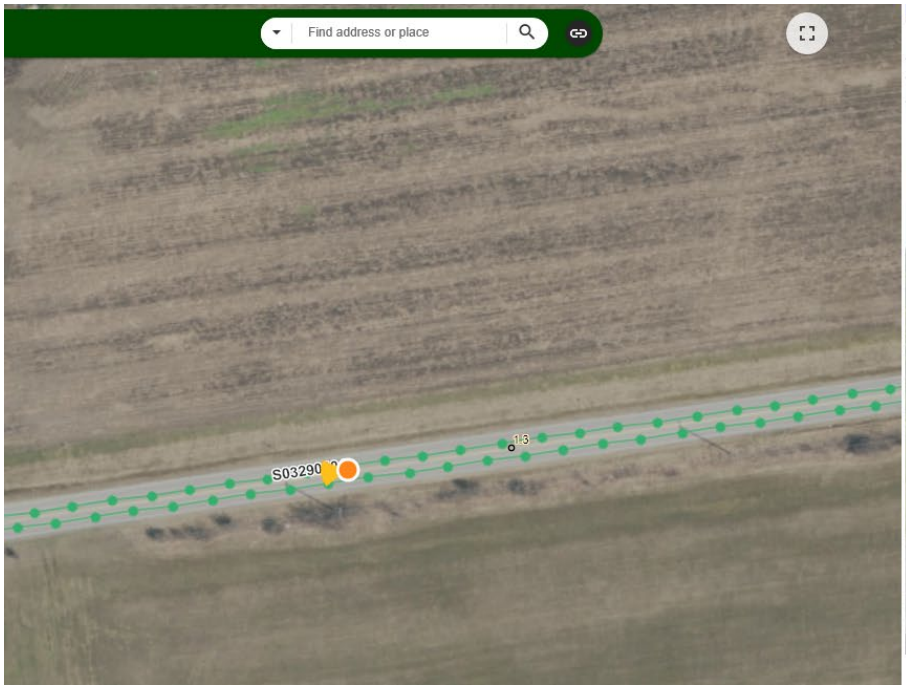
## Proposed Warning Signs Layout

## &

## Details

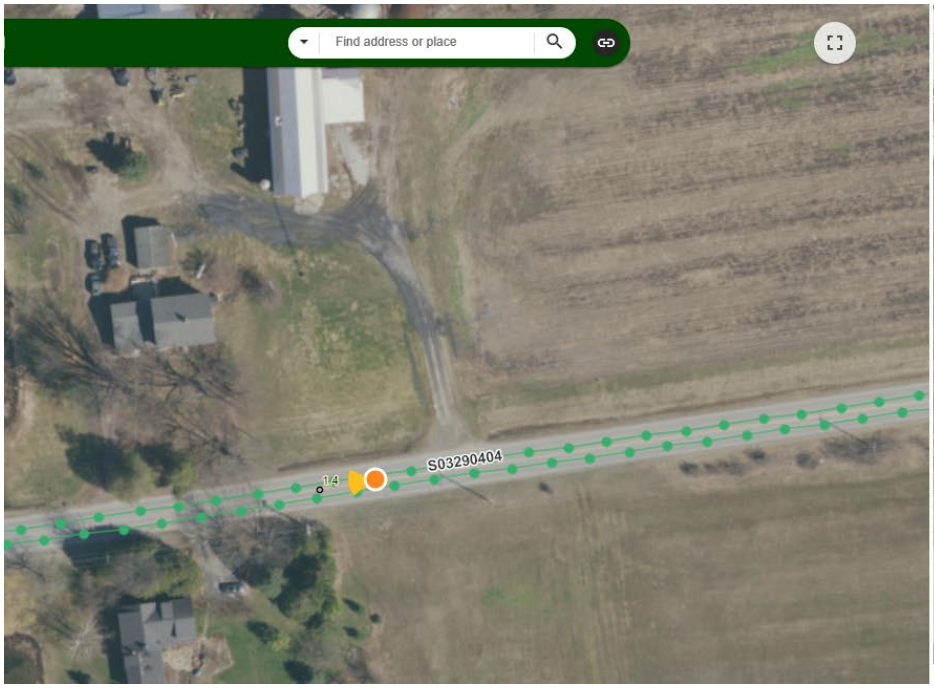
Westbound - Traveling Towards the Ferry

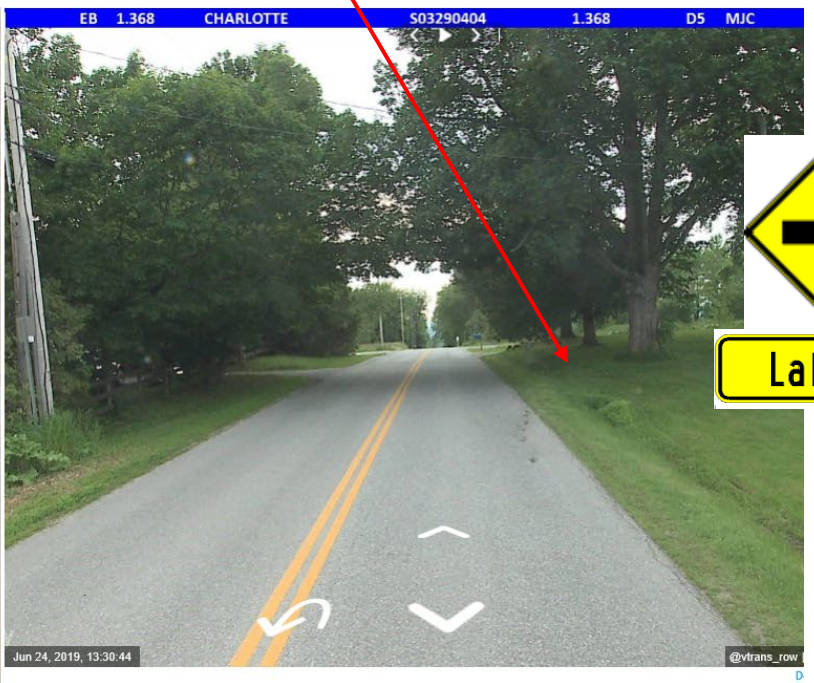
Remove the existing intersection sign for westbound Lake Rd intersection.




Westbound - Traveling Towards the Ferry

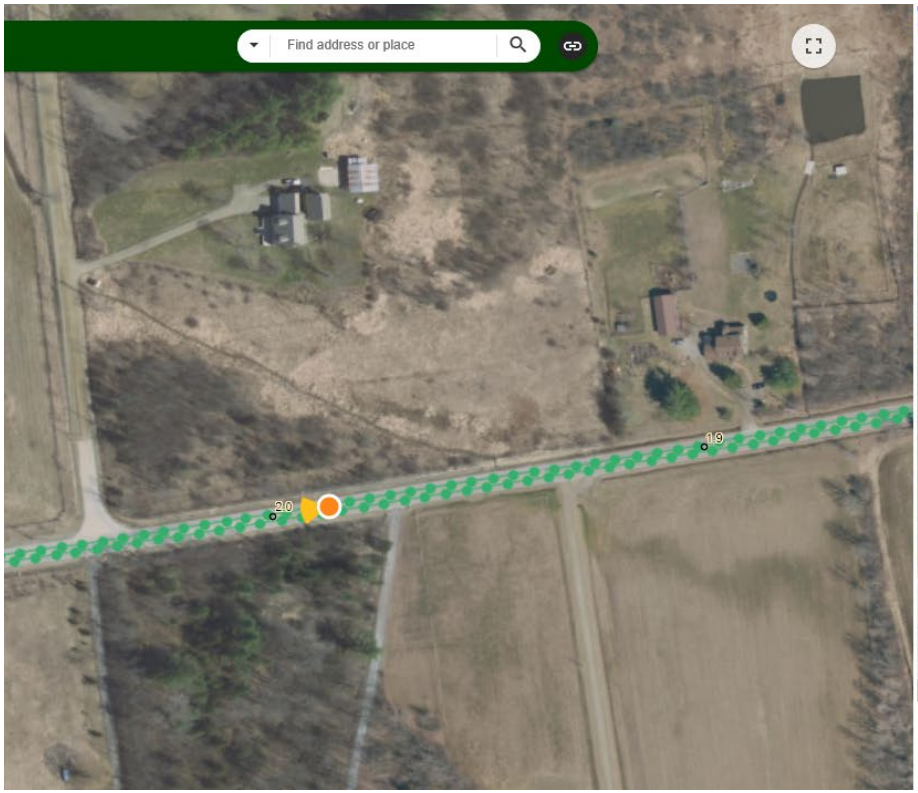
Install an intersection sign (W2-1) with a Lake Rd street name plaque (W16-8P) about 300 ft east of Lake Rd.



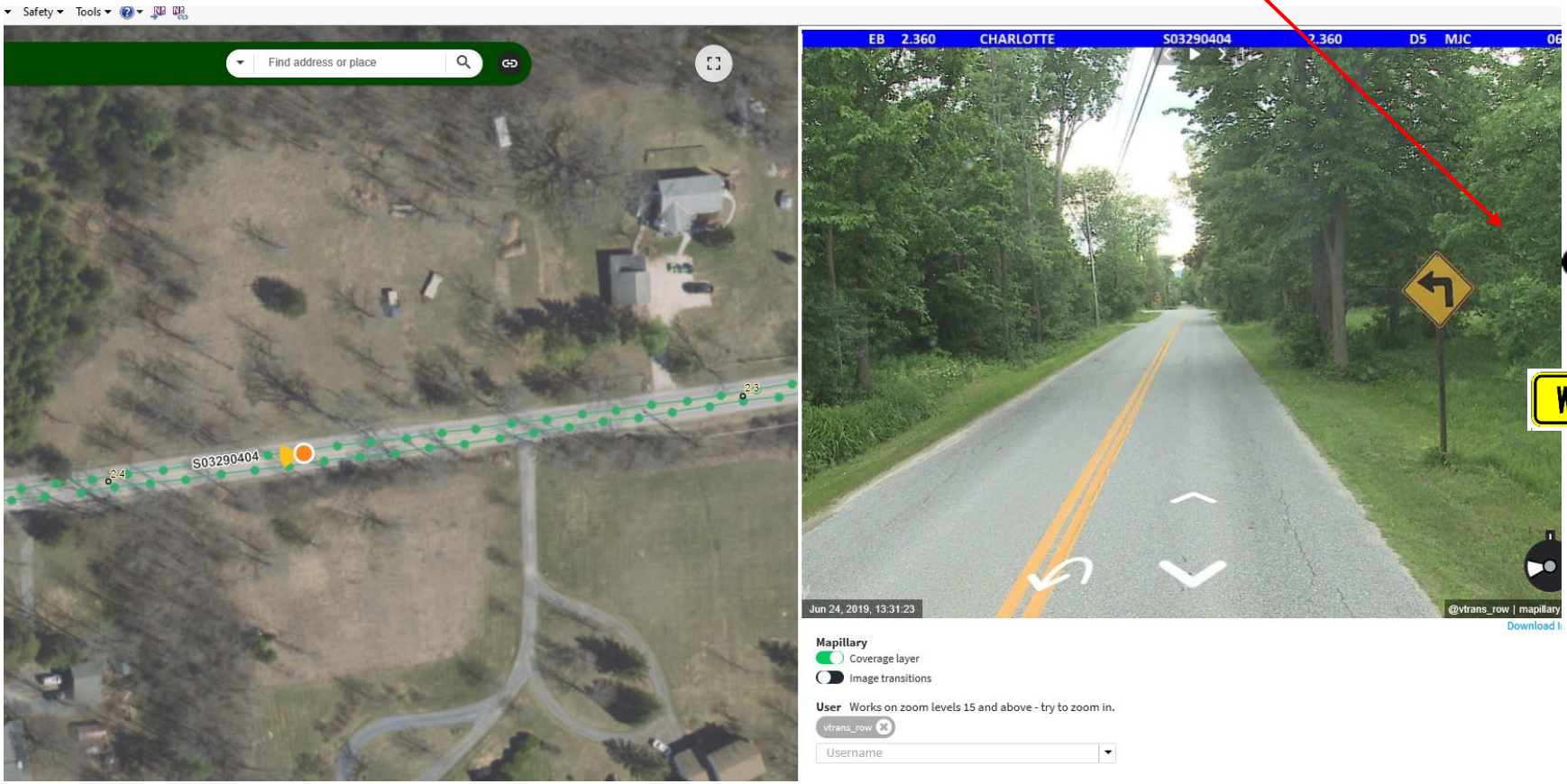

Westbound - Traveling Towards the Ferry

Install a side road intersection sign (W2-2) with a Whalley Rd street name plaque (W16-8P) 300 ft east of Whalley Rd.



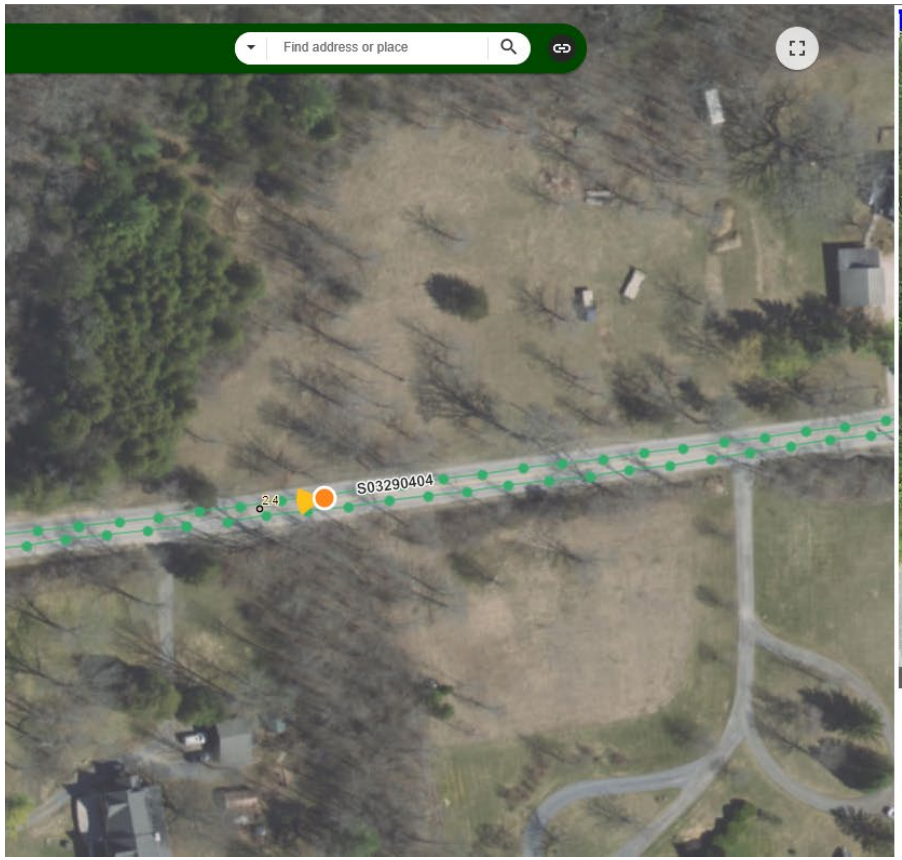

Westbound - Traveling Towards the Ferry

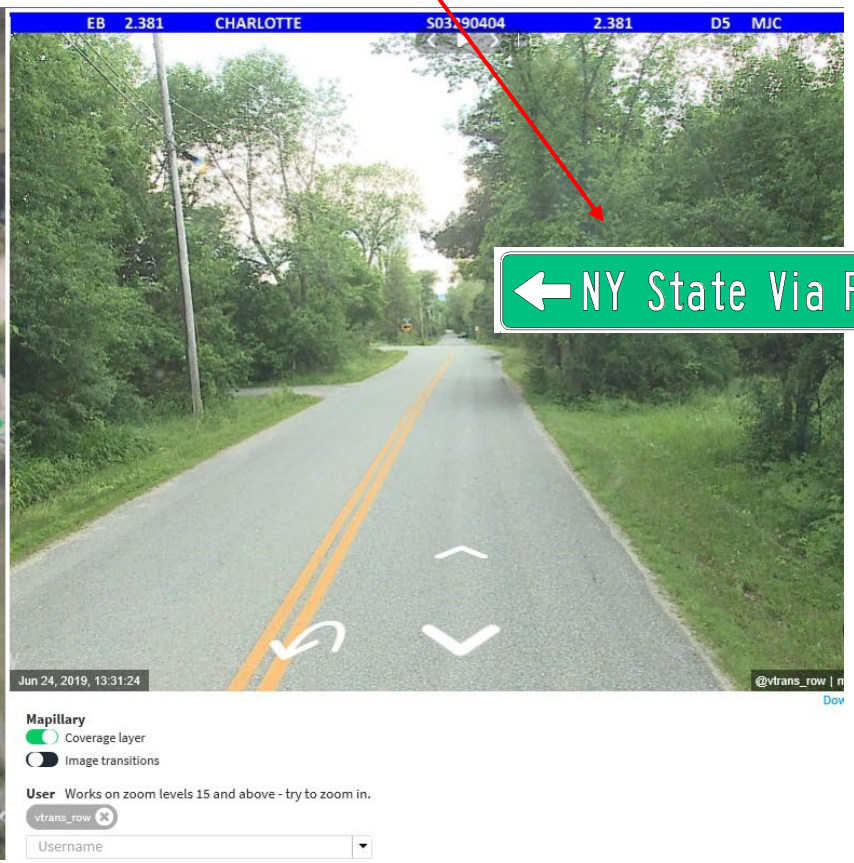
Replace the turn sign with a modified turn sign with a side road up and a 15 mph advisory speed plaque (13-1P), and a Wings Point Rd street name plaque (W16-8P).




Westbound - Traveling Towards the Ferry

Install a Ferry destination sign (VD1-1) on two posts here.

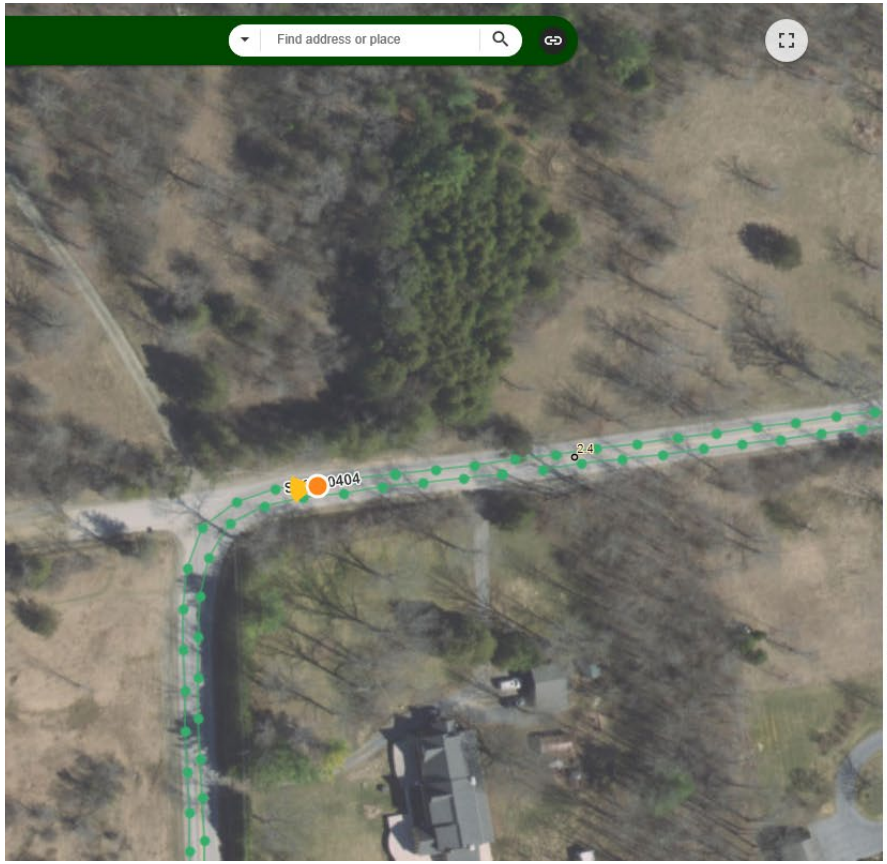


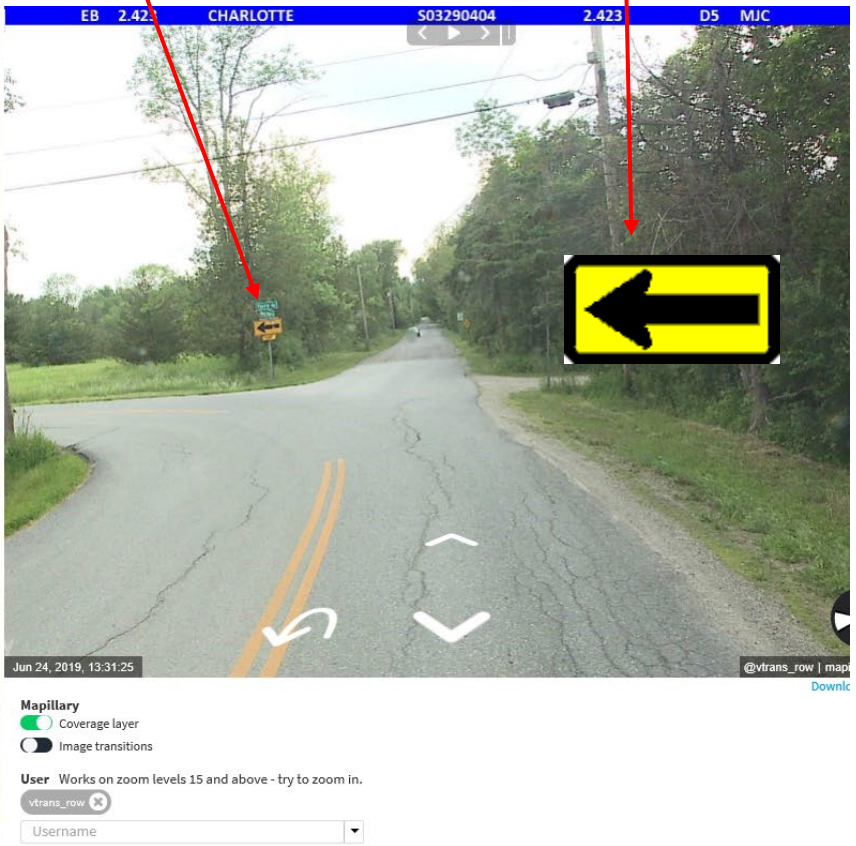



Westbound - Traveling Towards the Ferry

At Wings Point Rd, remove the large arrow and the small yellow ferry sign.

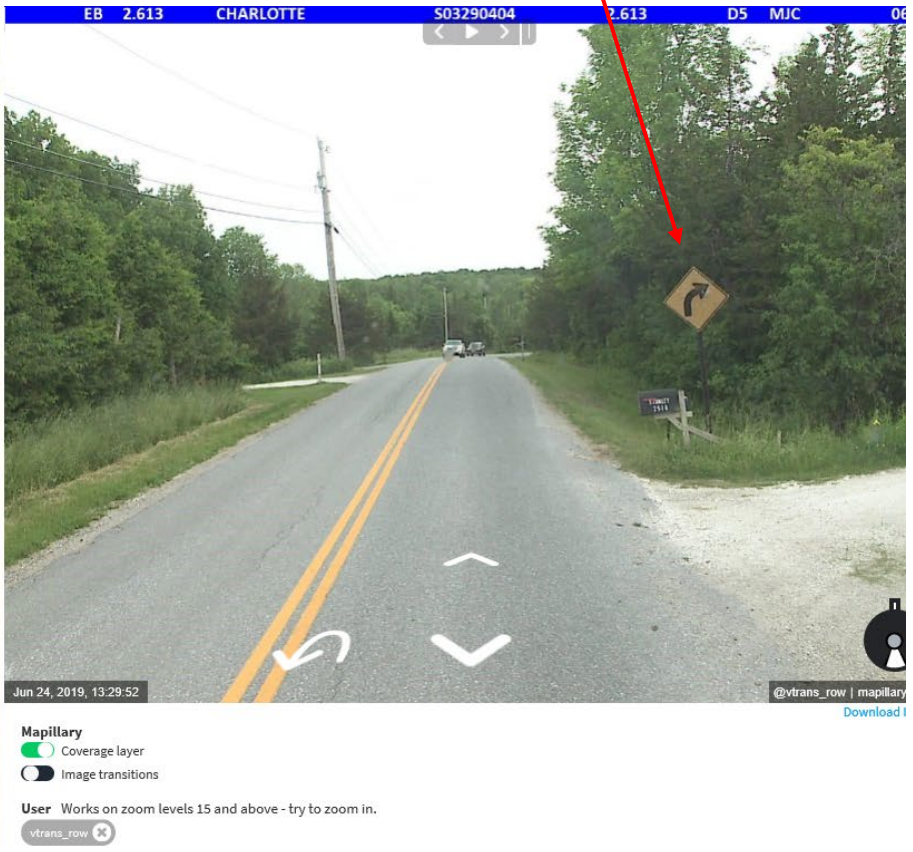
Install a new large arrow (W1-6) here.



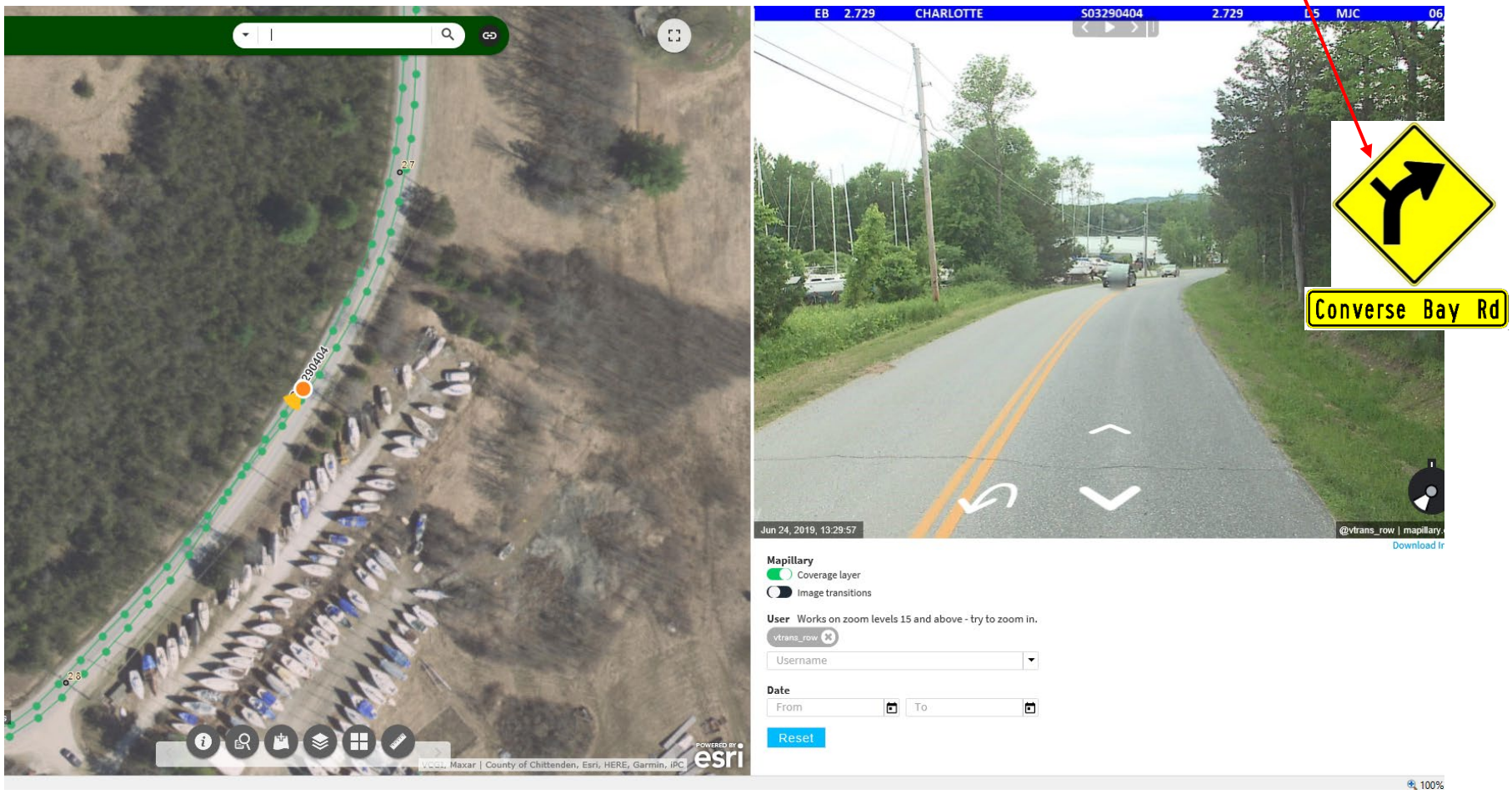
Westbound - Traveling Towards the Ferry

Replace the existing curve sign (W1-2) by mailbox #2518.

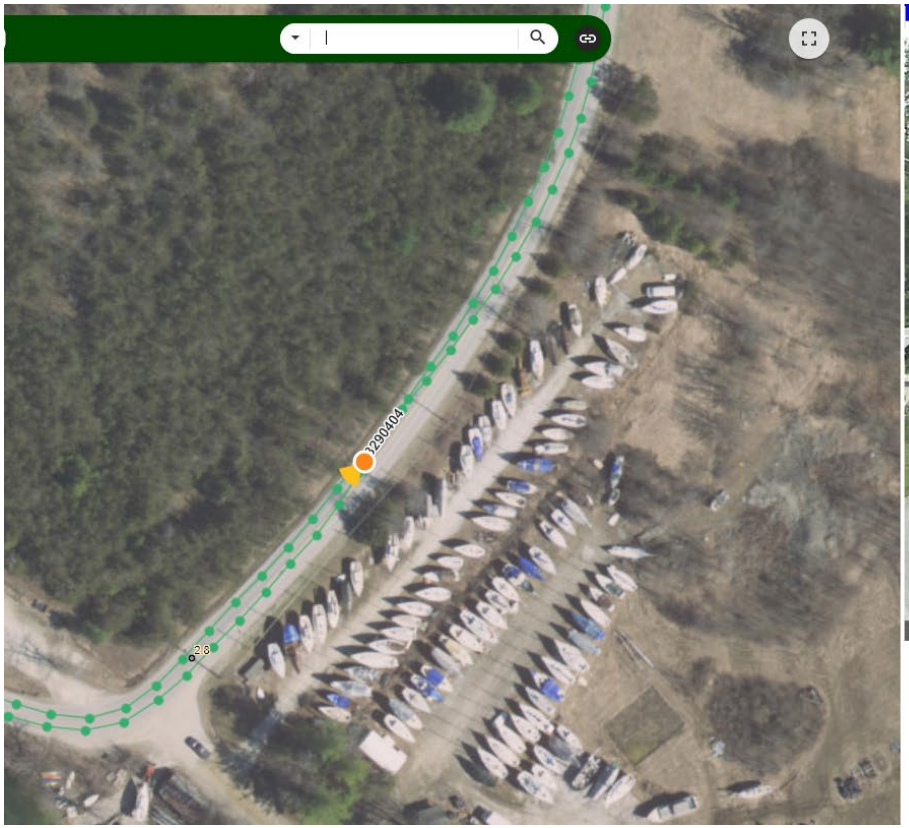
Westbound - Traveling Towards the Ferry

New curve sign with side road (W1-10) and Converse Bay Rd street name plaque (W16-8P). Approximately 150 east of new Ferry Rd destination sign or if chose not to install the Ferry Rd destination sign, 200 ft east of Converse Bay Rd. Install on two posts.



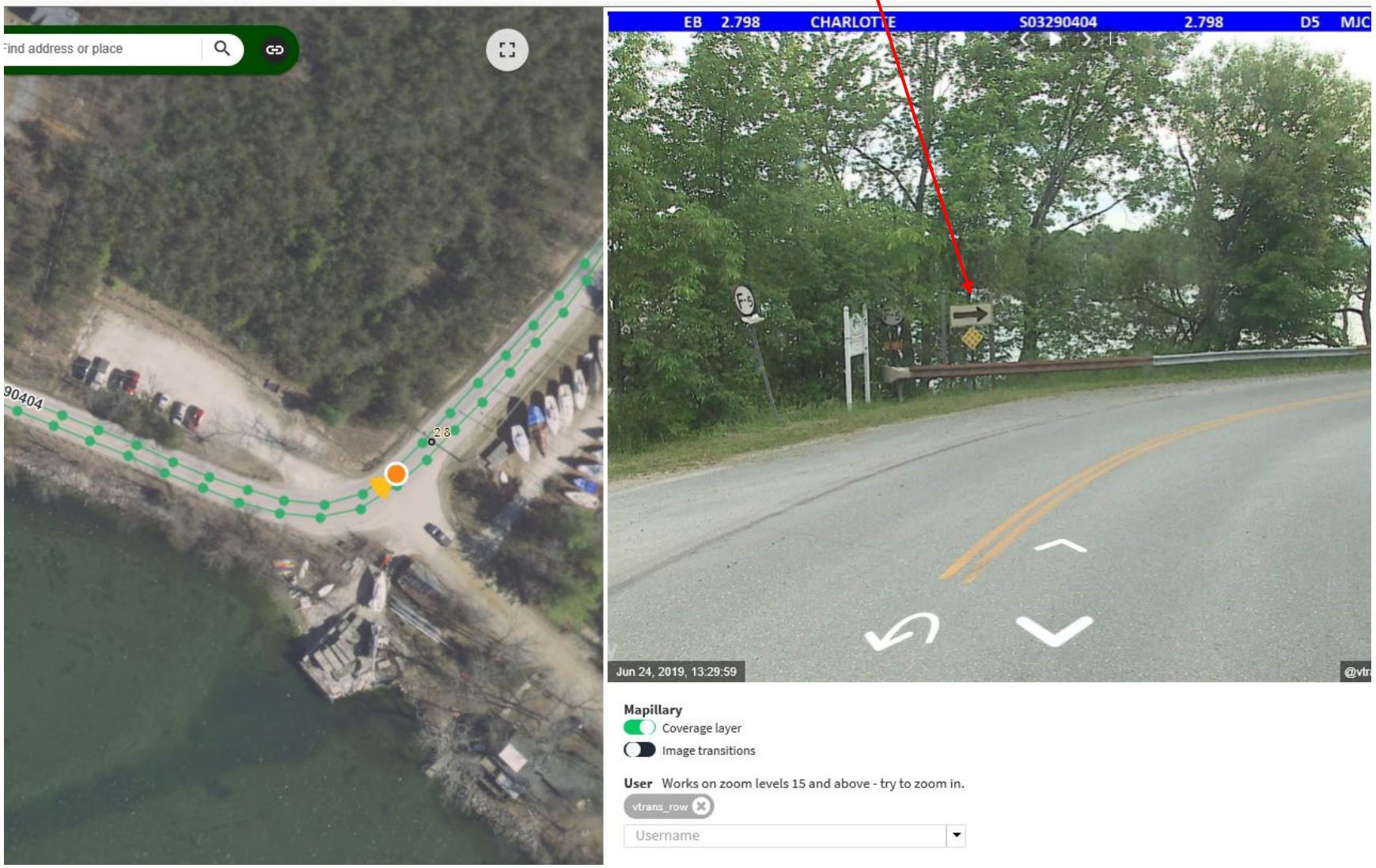
Westbound - Traveling Towards the Ferry

New Ferry destination sign (VD1-1). Approximately 200 ft east of Converse Bay Rd. Install on two posts.



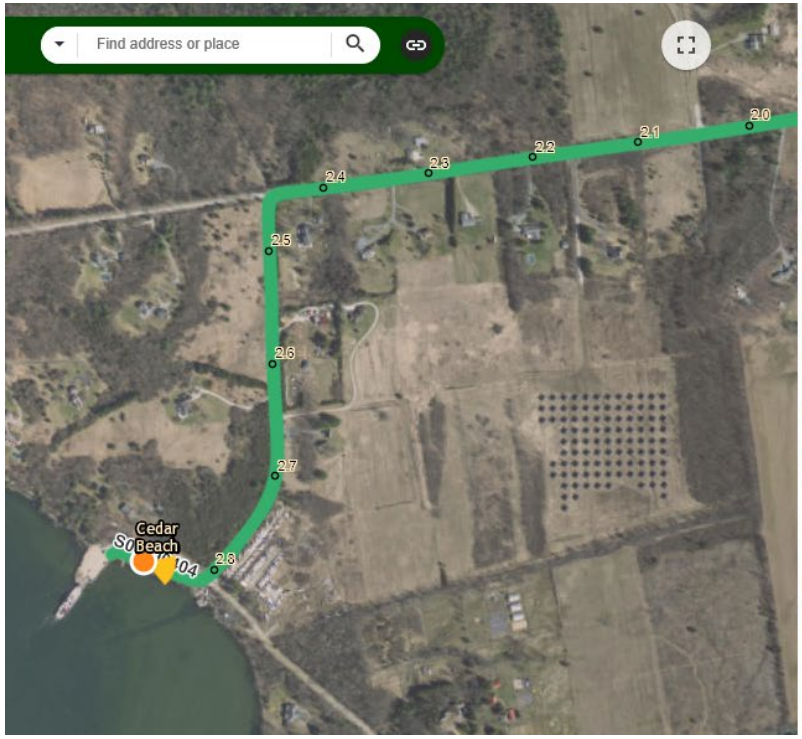

Westbound - Traveling Towards the Ferry

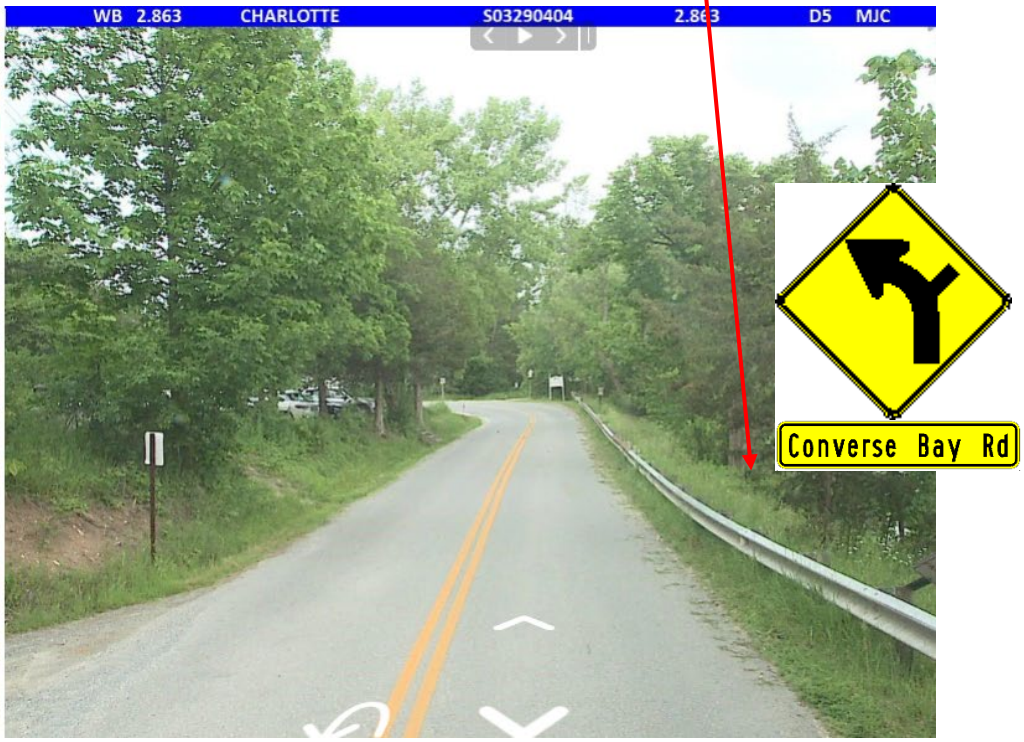
Remove the diamond object marker. Replace the existing large arrow with a new large arrow (W1-6). Install on two posts.



Eastbound - Traveling Towards the Railroad Tracks

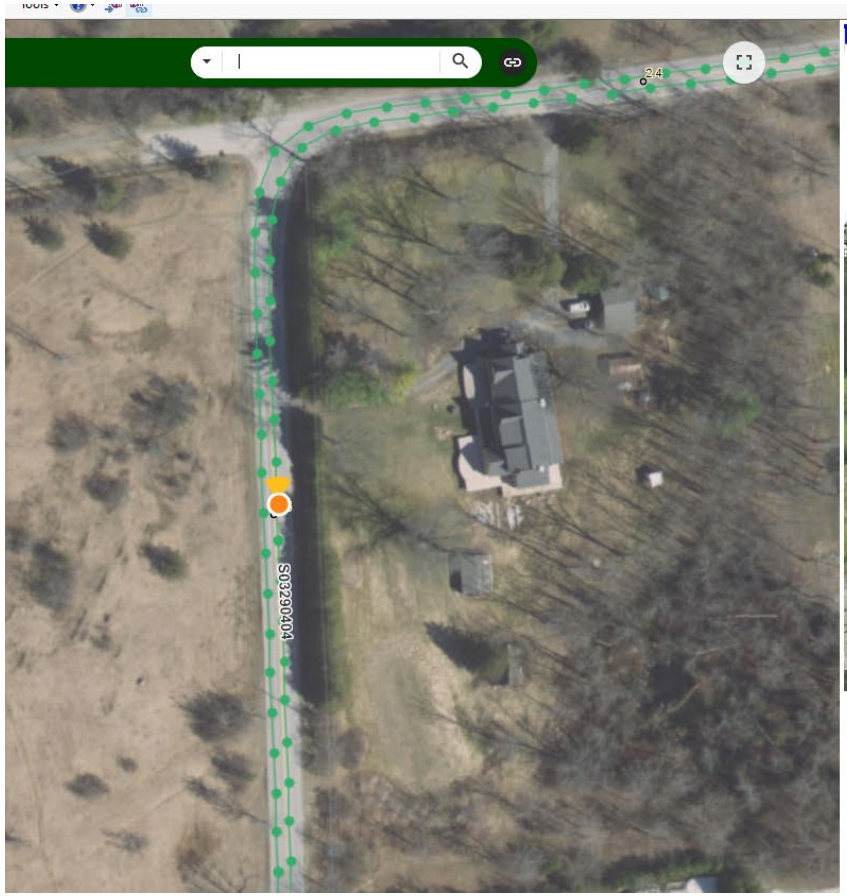
New curve sign with side road (W1-10 L) and Converse Bay Rd street name plaque (W16-8P). Approximately 200 ft west of Converse Bay Rd. Install on two posts.



Eastbound - Traveling Towards the Railroad Tracks

Replace the curve sign with a modified turn sign with a side road and a 15 mph advisory speed plaque (13-1P), and a Wings Point Rd street name plaque (W16-8P)

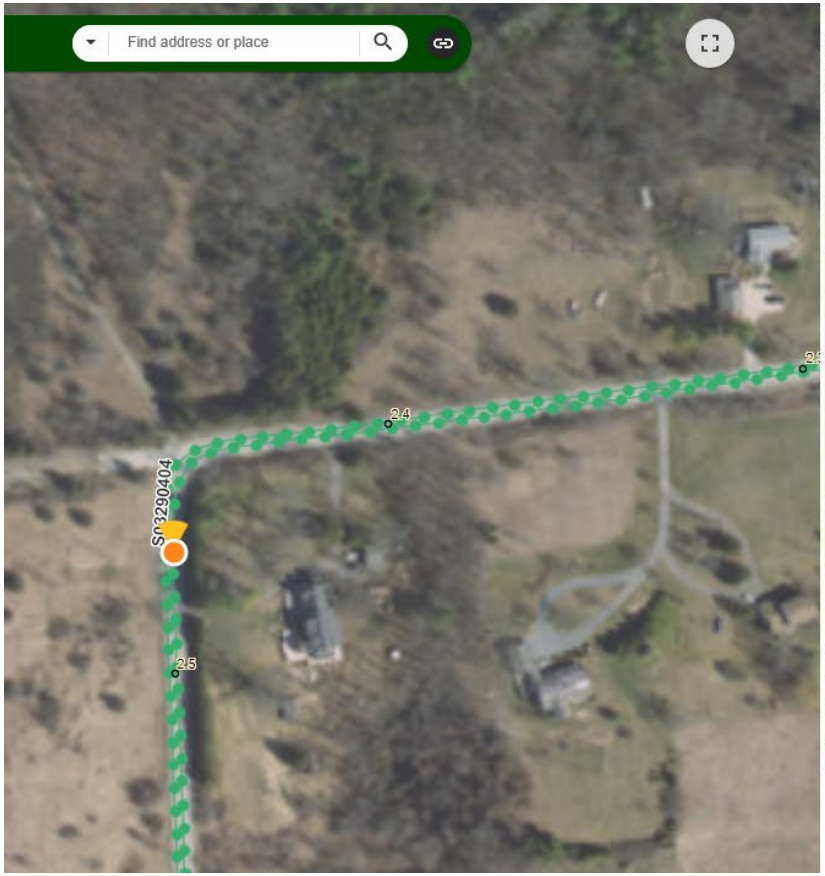






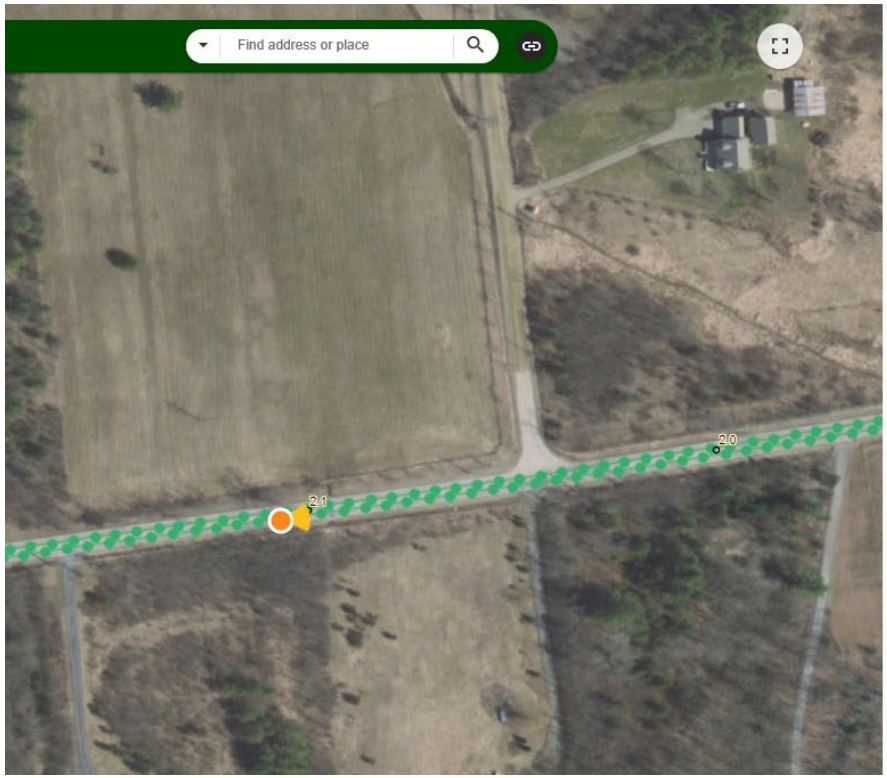

Eastbound - Traveling Towards the Railroad Tracks

Remove the existing large arrow in the red circle and install a new large arrow (W1-6) on the other side of the drive (where the arrow is pointing)



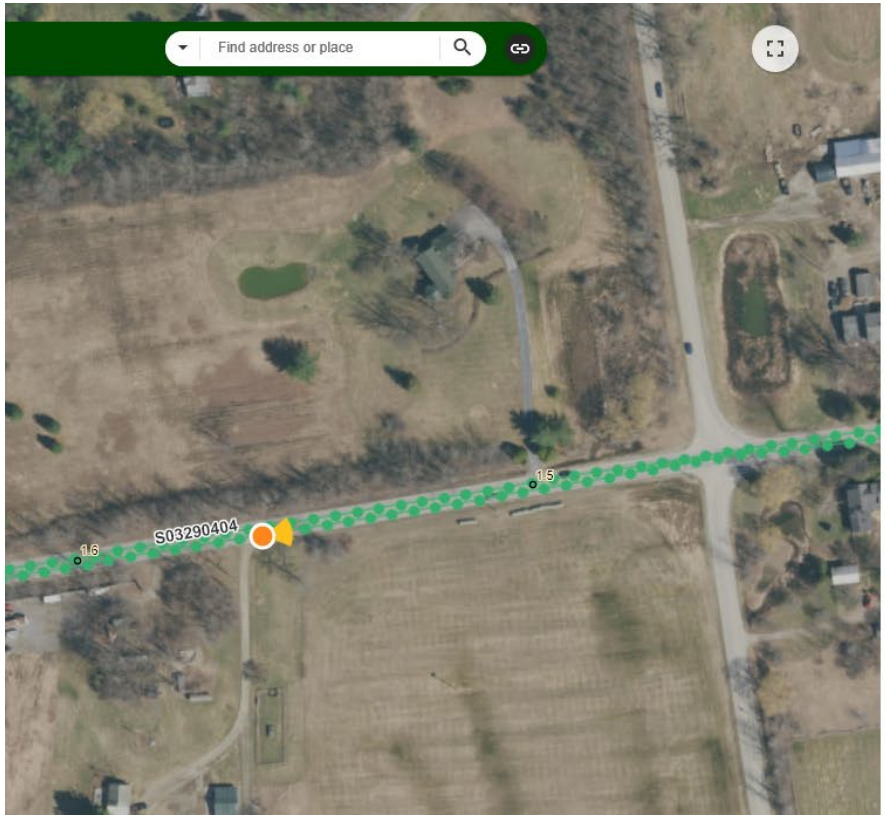

Eastbound - Traveling Towards the Railroad Tracks

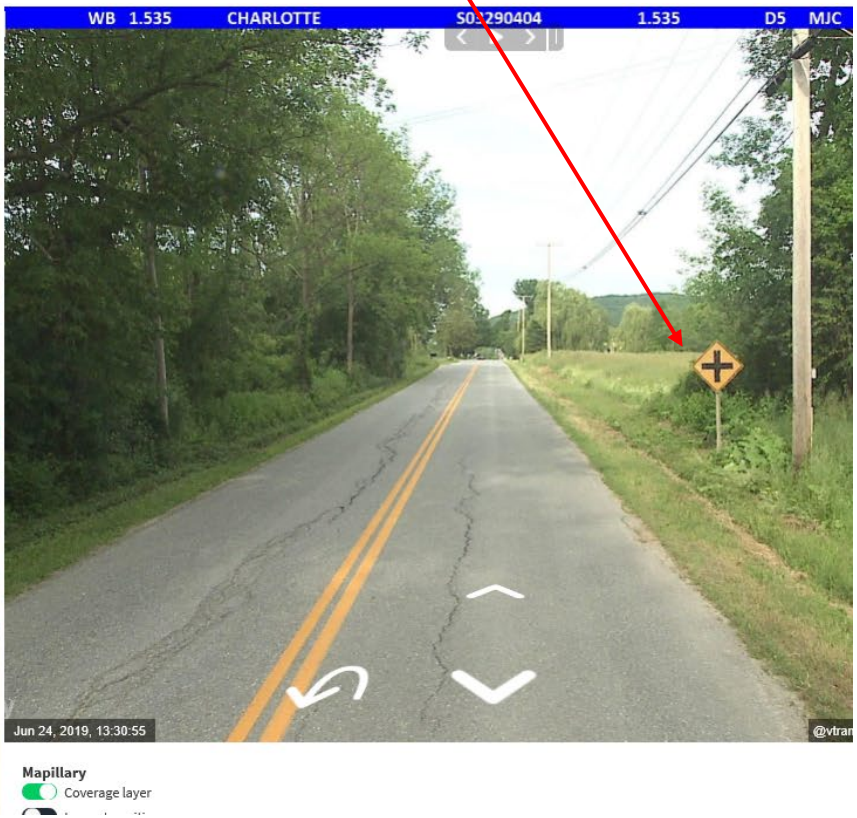
Install a side road intersection sign (W2-2) with a Whalley Rd street name plaque (W16-8P) 300 ft east of Whalley Rd




Eastbound - Traveling Towards the Railroad Tracks

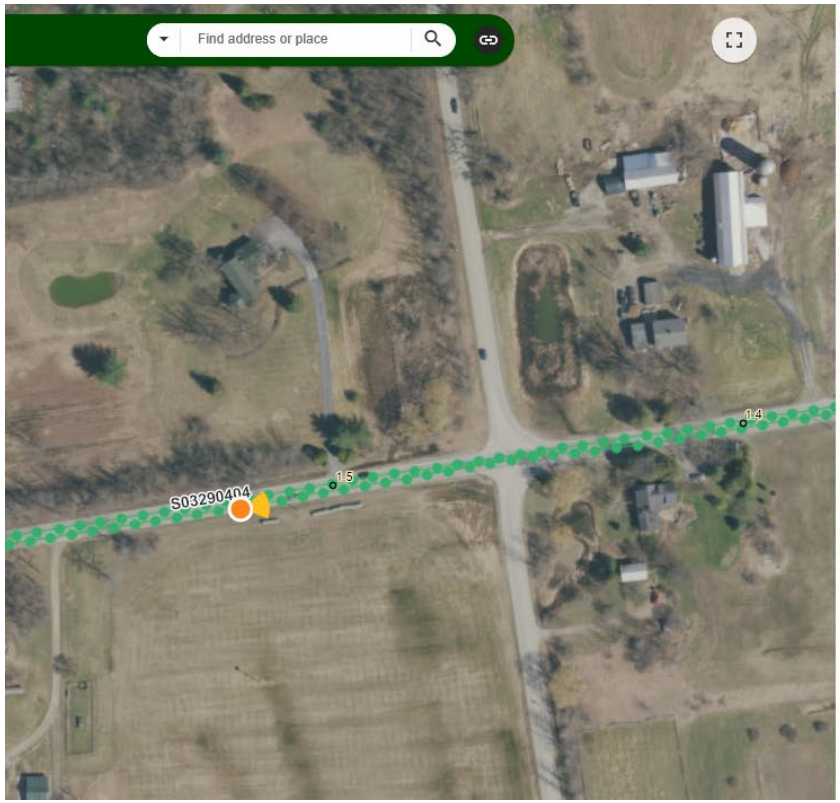
Remove the existing intersection sign for eastbound Lake Rd intersection



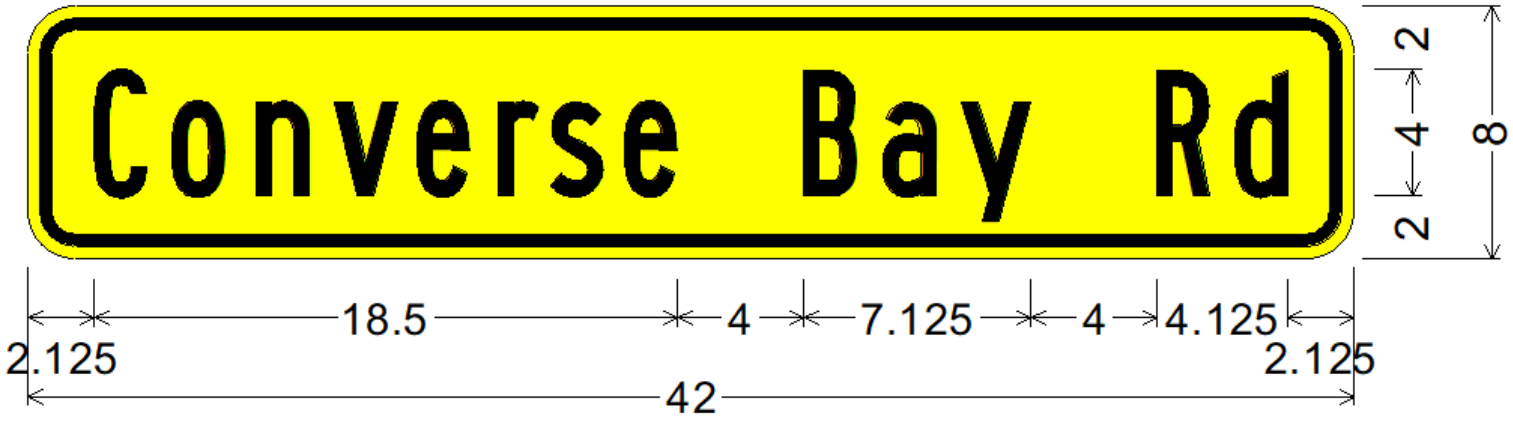



Eastbound - Traveling Towards the Railroad Tracks

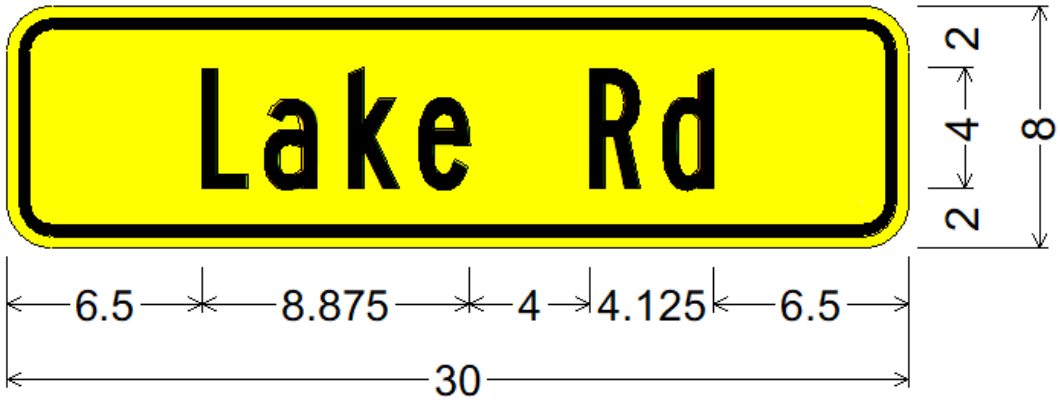
Install an intersection sign (W2-1) with a Lake Rd street name plaque (W16-8P) about 300 ft east of Lake Rd



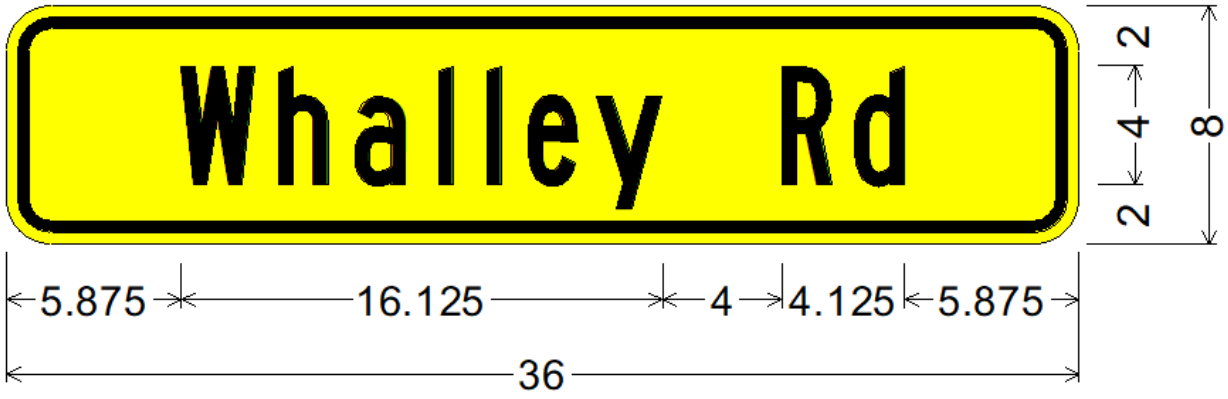

# Sign Details



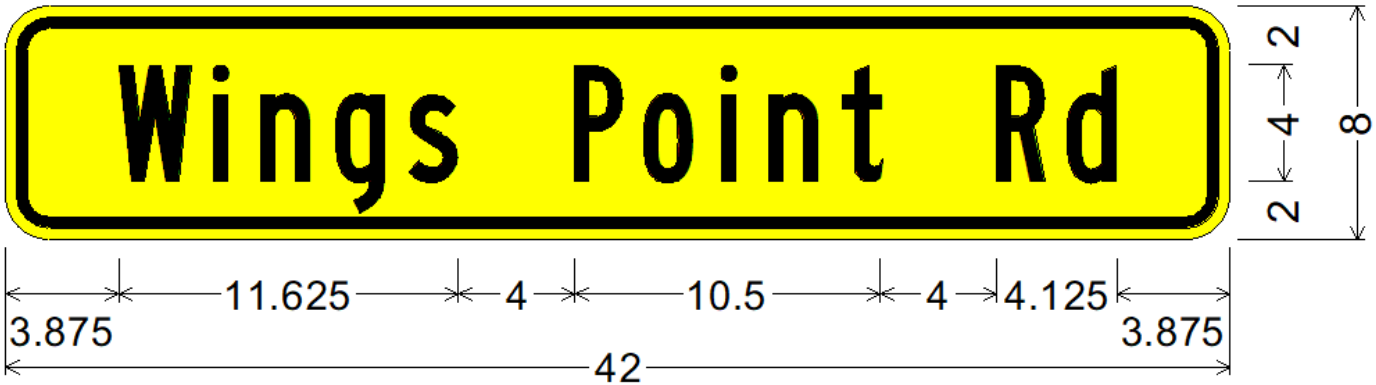

1.500" Radius, 0.375" Border, 0.375" Indent, Black on, Yellow;
"Converse Bay Rd", B;



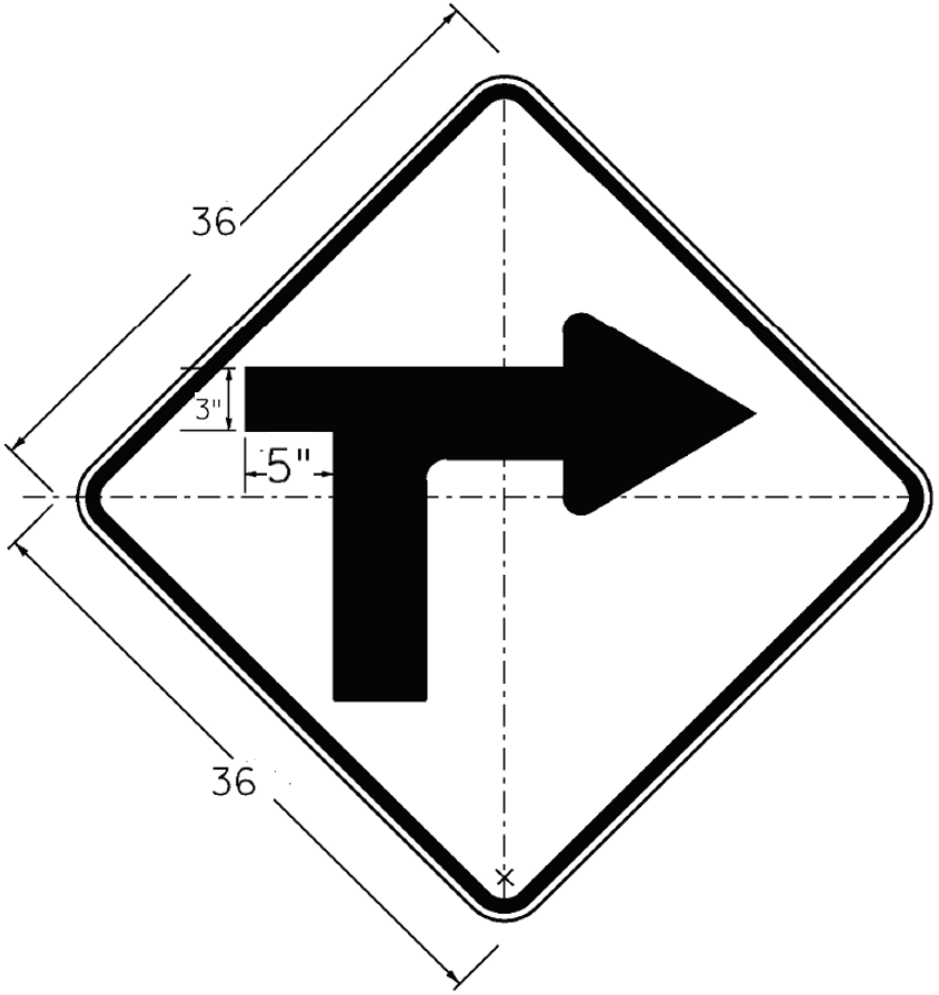

1.500" Radius, 0.375" Border, 0.375" Indent, Black on, Yellow;
"Lake Rd", B;




1.500" Radius, 0.375" Border, 0.375" Indent, Black on, Yellow;
"Whalley Rd", B;

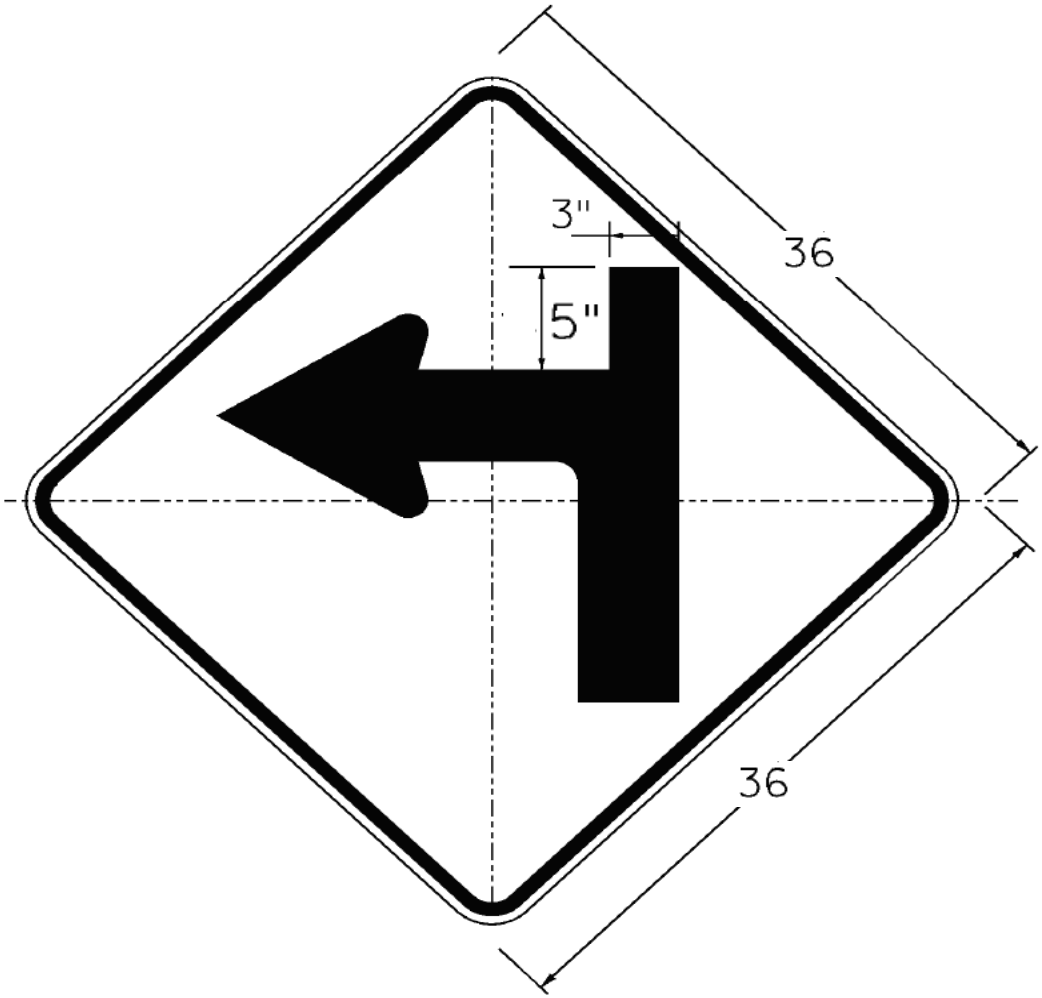



1.500" Radius, 0.375" Border, 0.375" Indent, Black on, Yellow;
"Wings Point Rd", B;

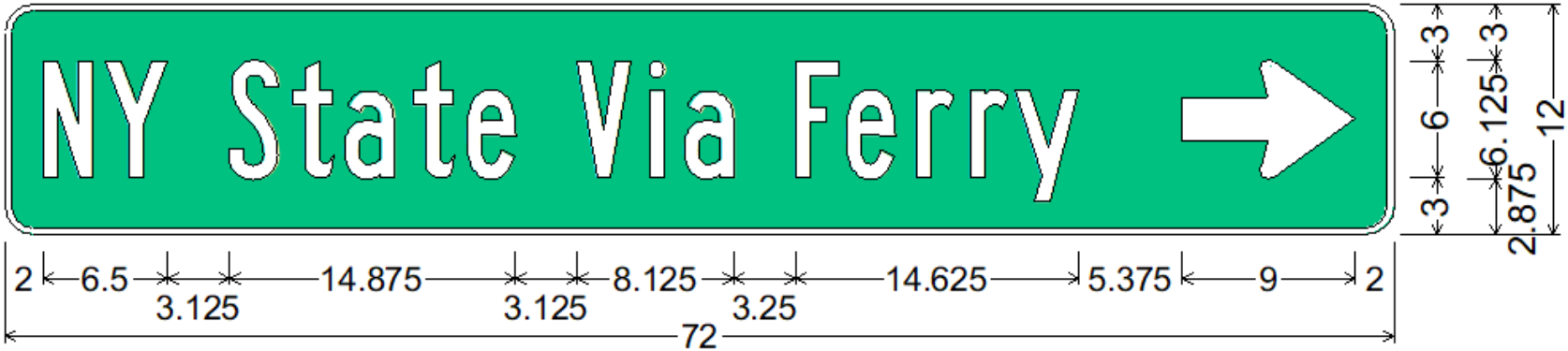



W1-1Ma R

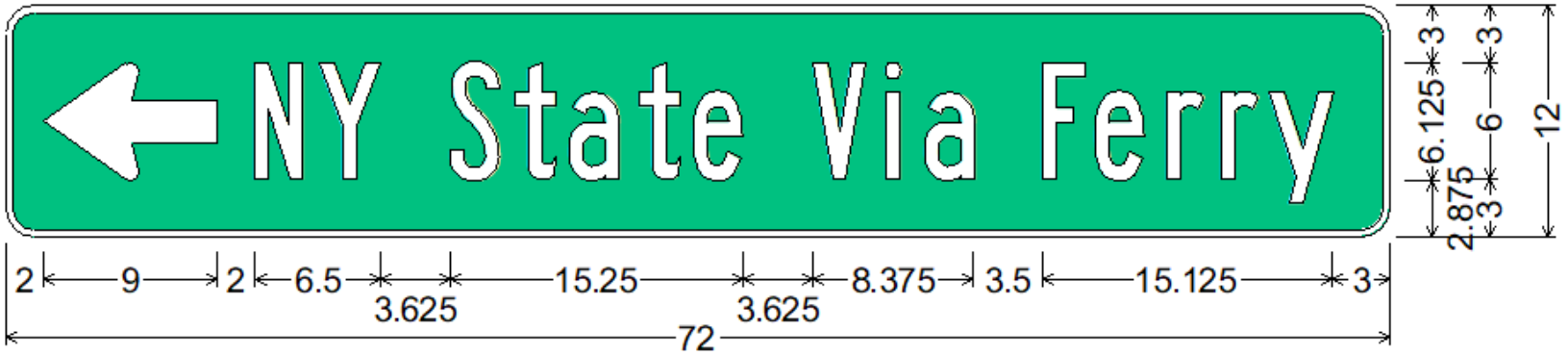
(W1-1 R Modified), Black on Yellow




W1-1Mb L
(W1-1 L Modified), Black on Yellow




1.500" Radius, 0.375" Border, White on, Green;
"NY State Via Ferry", B 80% spacing; Standard Arrow Custom 9.000" X 6.125" 0';




1.500" Radius, 0.375" Border, White on, Green;
Standard Arrow Custom 9.000" X 6.125" 180'; "NY State Via Ferry", B 90% spacing;