North Williston Road Scoping Study CCRPC









Town of Essex Selectboard Briefing October 21, 2013



Project Team

| Name | Representing |
|--------------------------------------|-----------------------------------|
| Jason Charest and Michelle Boomhower | CCRPC |
| Dennis Lutz | Town of Essex |
| Bruce Hoar | Town of Williston |
| Derek Lyman | VTrans – Traffic Safety |
| Nick Wark | VTrans – Hydraulics |
| Rebecca Pfeiffer | VANR – Floodplain Management |
| Lucy Gibson | DuBois and King – Project Manager |
| Matt Murawski | DuBois and King – Hydrologist |

Study Process

| Month | Activities |
|--------------------|--|
| April 2013 | Project Initiation and Scoping Meeting with Project Team |
| May - June 2013 | Assess existing conditions |
| July - August 2013 | Public Outreach via Front Porch Form |
| July - August 2013 | Hydrologic and Hydraulic Modeling |
| September 2013 | Public Meeting in Essex to present alternatives |
| October 2013 | Public Meetings in Williston and Essex |
| October 30, 2013 | CIRC Alternatives Task Force Meeting |

North Williston Road – WENTS Network



Residential and Agricultural Buildings

Agricultural Lands

Vorth Willigton Road

Floodway Boundary

New England Central Railroad

Winooski River

Route 117/River Road

Safety Issues



Operations Issues



Project Design Goals

- Address intersection safety and congestion
- Improve flood resiliency
 - Reduce duration of road closures
 - Better notification of closures and improved gates
 - Easier and quicker clean up and reopening of road
- Avoid any negative impacts to local agriculture
- Avoid impacts to the floodplain or increases in flood elevation



April 2011



May 2011



August 29, 2011 Tropical Storm Irene



Resiliency

- "A resilient transportation system is one that will continue to function throughout, or can be restored quickly soon after, a flood or other unanticipated disruption." *VTran*s
- Goal for this project: reduce the duration of road closures.

Hydraulic Screening Results

| Alternative | Elevation Increase | Reduction in Probability of Overtopping | Modeled floodplain impacts | Impacts to Agricultural Activities | Cost |
|-------------|---------------------------|---|----------------------------------|--|----------|
| No Build | 0 feet | 0% | None | None | None |
| A1 | + 1.5 feet | 17% | Possible | Minimal | Moderate |
| A2 | + 1.5 feet w/ culverts | 17% | None | Moderate | High |
| B1 | + 3 feet | 30% | Possible | Minimal | Moderate |
| B2 | + 3 feet w/ culverts | 30% | Possible | Moderate | High |
| С | +11 feet | 46% | Prohibitive | High | High |
| D | +12 feet bridge | 49% | Possible | High | Extreme |

Concerns About Raising the Road

- Erosion on opposite bank of Winooski River has increased in past decade, possibly due to past increase in road elevation.
- Increased velocity under bridge could contribute to scour.
- Culverts required to maintain flood elevation could become ineffective if clogged with debris
- Conclusion: Raising road by any amount is unlikely to garner permits

Options to Reduce Duration and Disruption of Closures

- Replace existing culvert with 6 feet concrete box culvert
- Intelligent signs to allow instant display of road closure alerts
- Stream gauge at bridge to allow more precision in need for closure
- Durable gates to prevent crossing during floods
- Reconstruct road bank at lowest elevation to prevent erosion and allow rapid re-opening

Warning Signs



Possible Sign Locations



Flood Detection and Warning

Install stream gauge on bridge to alert Town of Essex when flood levels require road closure



Roadway Design Features

Flatten slope for better hydraulic flow and reduced erosion



Gate Options







Replace and relocate gates to provide Improved protection and easier operation

Erosion Mitigation

300 feet segment where erosion is frequent





INTERSECTION

Average Annual Daily Traffic (AADT)



Vehicular Level of Service

| | 2012 AM Peak Hour | | | | | 2012 P | M Peak Hour | |
|----------|-------------------|-------|------------------------|------|-----|--------|------------------------|------|
| | LOS | Delay | Q Length (95%, veh) | V/C | LOS | Delay | Q Length (95%, veh) | V/C |
| NB Left | D | 27.2 | 2.4 | 0.47 | F | 115.3 | 12.6 | 1.08 |
| NB Right | В | 10.1 | 0.2 | 0.06 | В | 12.4 | 1.0 | 0.26 |
| WB Left | А | 8.5 | 0.5 | 0.14 | А | 8.7 | 0.2 | 0.08 |

Agricultural Buildings High Speeds along River Road/ **Sight Distance** Vermont 117 to west = 430 ft Residential **Limited sight** distance from Sight Distance **North Williston Rd** to east = 500 ftRoute 117/River Road **Adjacent vehicles** Floodway block visibility **Drainage Channel High Crash Location #83** Culvert **Others in Essex:** Susie Wilson/Kellogg #28 VT 15/Susie Wilson #41 26

Crashes 2008 through 2012



Alternatives

- Unsignalized Improvements
 - Provide westbound left- and eastbound right-turning lanes to improve safety by clarifying movements and improve level of service for northbound lefts.
- Signalization Improvements
 - Includes unsignalized improvements plus signalization of the intersection.
- Roundabout
 - Single lane, 140 feet in diameter modern roundabout

Unsignalized and Signalized Improvements



Roundabout



2013 Level of Service

| Alternative | AM LOS | AM Delay | AM V/C | PM LOS | PM Delay | PM V/C |
|------------------------------------|-----------|-------------|--------|---------------|-------------|--------|
| No Build (northbound lefts) | D | 27.2 | 0.47 | F | 115.3 | 1.08 |
| Unsignalized (northbound lefts) | С | 18.8 | 0.40 | F | 56.6 | 0.95 |
| Signalized (overall) | А | 9.2 | 0.32 | А | 9.6 | 0.53 |
| Roundabout (overall) | А | 8.2 | 0.26 | А | 9.5 | 0.55 |

2035 Level of Service

| Alternative | AM LOS | AM Delay | AM V/C | PM LOS | PM Delay | PM V/C |
|------------------------------------|-----------|-------------|--------|---------------|-------------|--------|
| Unsignalized (northbound lefts) | E | 49.4 | 0.82 | F | 394.8 | 1.79 |
| Signalized (overall) | A | 9.9 | 0.44 | В | 11.1 | 0.62 |
| Roundabout (overall) | A | 8.5 | 0.36 | А | 9.5 | 0.55 |

Alternatives Screening

| Alternative | Cost | Impact to Ag Lands and Hydric Soils | Right of way | Change in Volume on North Williston |
|--------------|-------------|---|--------------|---|
| Unsignalized | \$690,000 | 0.08 acres | 0.27 acres | Negligible |
| Signal | \$1,140,000 | 0.08 acres | 0.27 acres | Increase likely |
| Roundabout | \$1,370,000 | 0.21 acres | 0.35 acres | Increase likely |

- Construction costs only does not include right-of-way acquisition
- Utility relocation required for each alternative
- Additional archaeological investigation required for each alternative

Safety: Signal vs. Roundabout

| Context | Signal | Roundabout |
|-------------------|--------|------------|
| Allareas | -13% | -40% |
| Roads over 40 mph | -5% | -78% |

- Based on Crash Reduction Factors developed by the FHWA
- Roundabouts have much better record of reducing crashes at intersections, especially for rural higher speed roads.
- Cost of crashes at intersection estimated at \$72,885 per crash, or \$290,000 per year



Alternatives Performance

| Alternative | Safety - Crash Reduction | Congestion - LOS |
|--------------|--|--|
| Unsignalized | Reduced crashes due to turning lanes | Minor improvement due to turning lanes LOS F - North Williston Rd at PM Peak hour |
| ✓ Signal | Reduced crashes from signal control and turning lanes Possible increase of rear-end collisions and high speed broadside crashes | LOS A/B |
| ✓ Roundabout | Greatest crash and injury reduction due to design and low speed operations | LOS A |

Next Steps

- Present proposed project at CCRPC CIRC Alternatives meeting - October 30.
- Town of Essex endorsement of alternative(s).
- VTrans review of alternatives and selection.

