

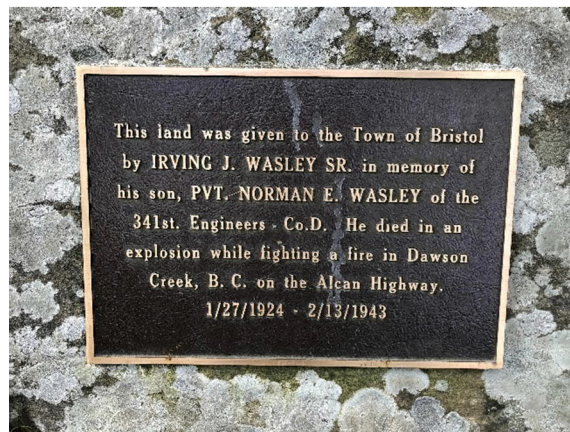
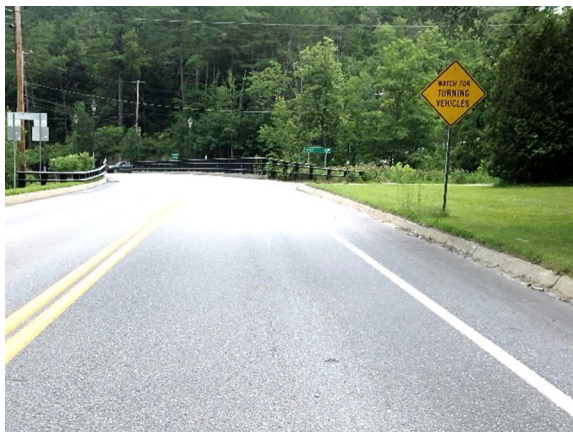
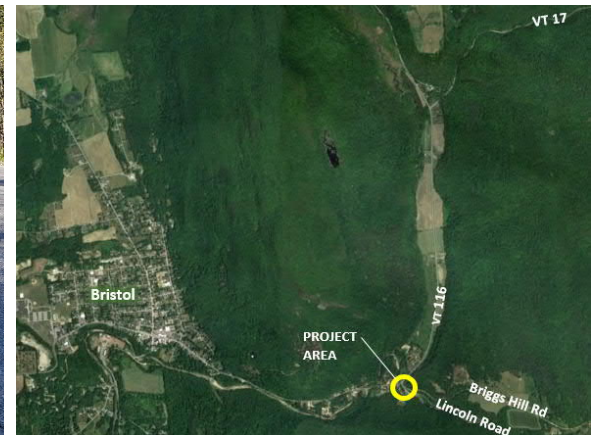
VT 116 / Lincoln Road / Briggs Hill Road Intersection Study Town of Bristol

Public Informational Meeting September 13, 2021



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

- Project Overview
- Existing Conditions
- Project Alternatives
- Alternatives Evaluation
- Community Survey
- Planning Study Report



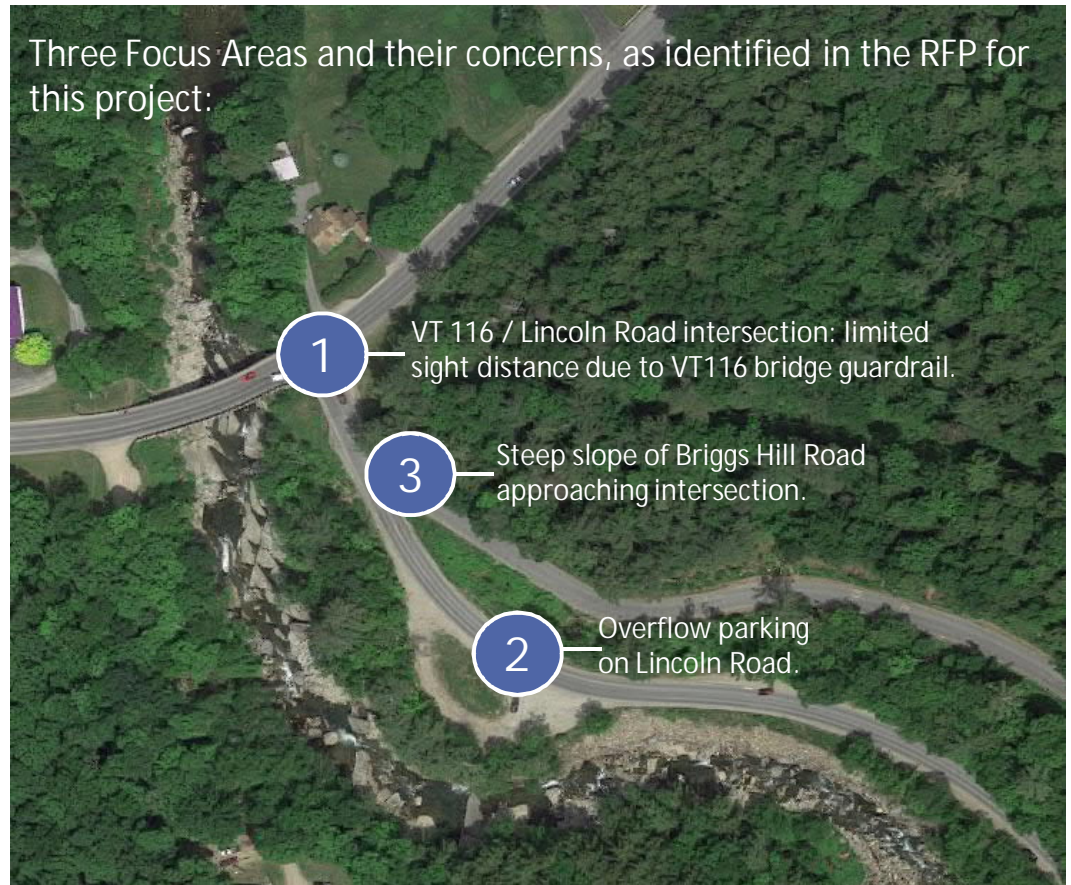
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Project Goal:

Develop a Scoping Study Report that identifies alternatives at the project area for the Town to consider for future improvements to reduce respective concerns at the 3 focus area locations.

Three Focus Areas and their concerns, as identified in the RFP for this project:



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

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 - intersection approach grade
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Speed Limits

VT 116: 40mph

Lincoln Rd: 35 mph

Briggs Hill: 35 mph

Speed Data

VT 116 west of intersection (approx. 0.4 mi. west of intersection)

85th %ile speed: 43mph (2017)

VT 116 east of intersection (approx. 0.9 mi. east of intersection, speed limit of 50mph)

85th %ile speed: 59 mph (2015)

2019 Average Annual Daily Traffic (AADT)*:

VT 116 (to west): 4920

VT 116 (to east): 3750

Lincoln Rd (VT116 to town line): 1887

**2019 traffic volumes shown above. 15% decrease in 2020 AADT (likely due to Covid-19 pandemic).*

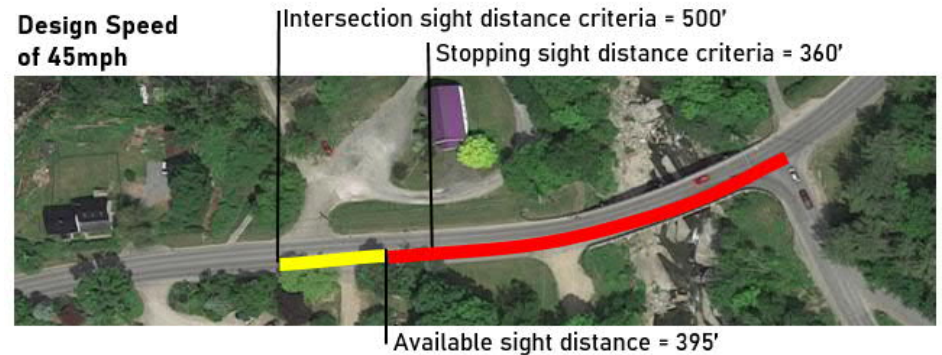
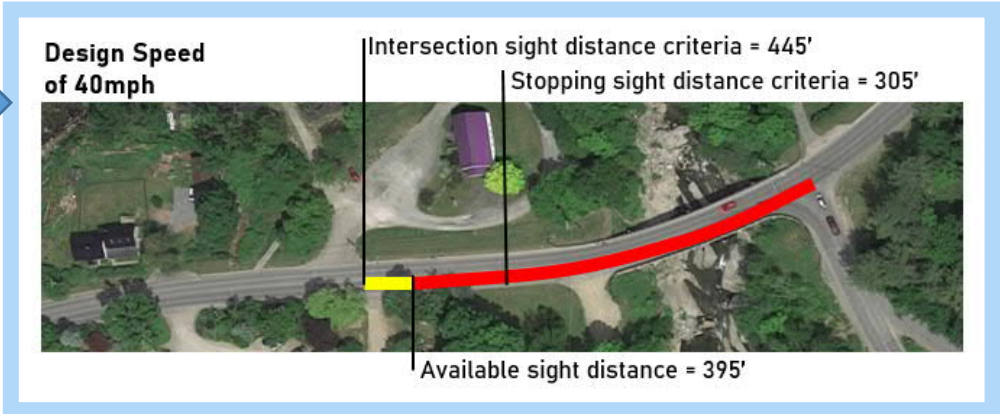
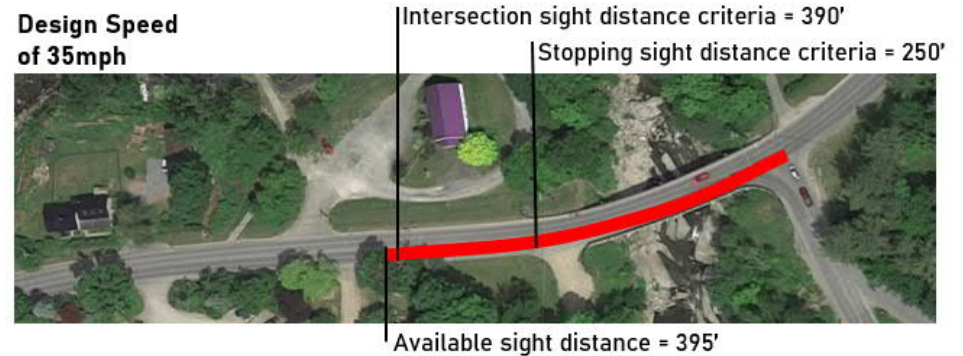
VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Sight Distance Review

- Project Overview
- Existing Conditions
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VT116 speed limit = 40mph

Design Speed (mph)	Stopping Sight Distance (ft)	U.S. Customary	
		Calculated (ft)	Design (ft)
15	80	165.4	170
20	115	220.5	225
25	155	275.6	280
30	200	330.8	335
35	250	385.9	390
40	305	441.0	445
45	360	496.1	500
50	425	551.3	555
55	495	606.4	610
60	570	661.5	665
65	645	716.6	720



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

- Project Overview
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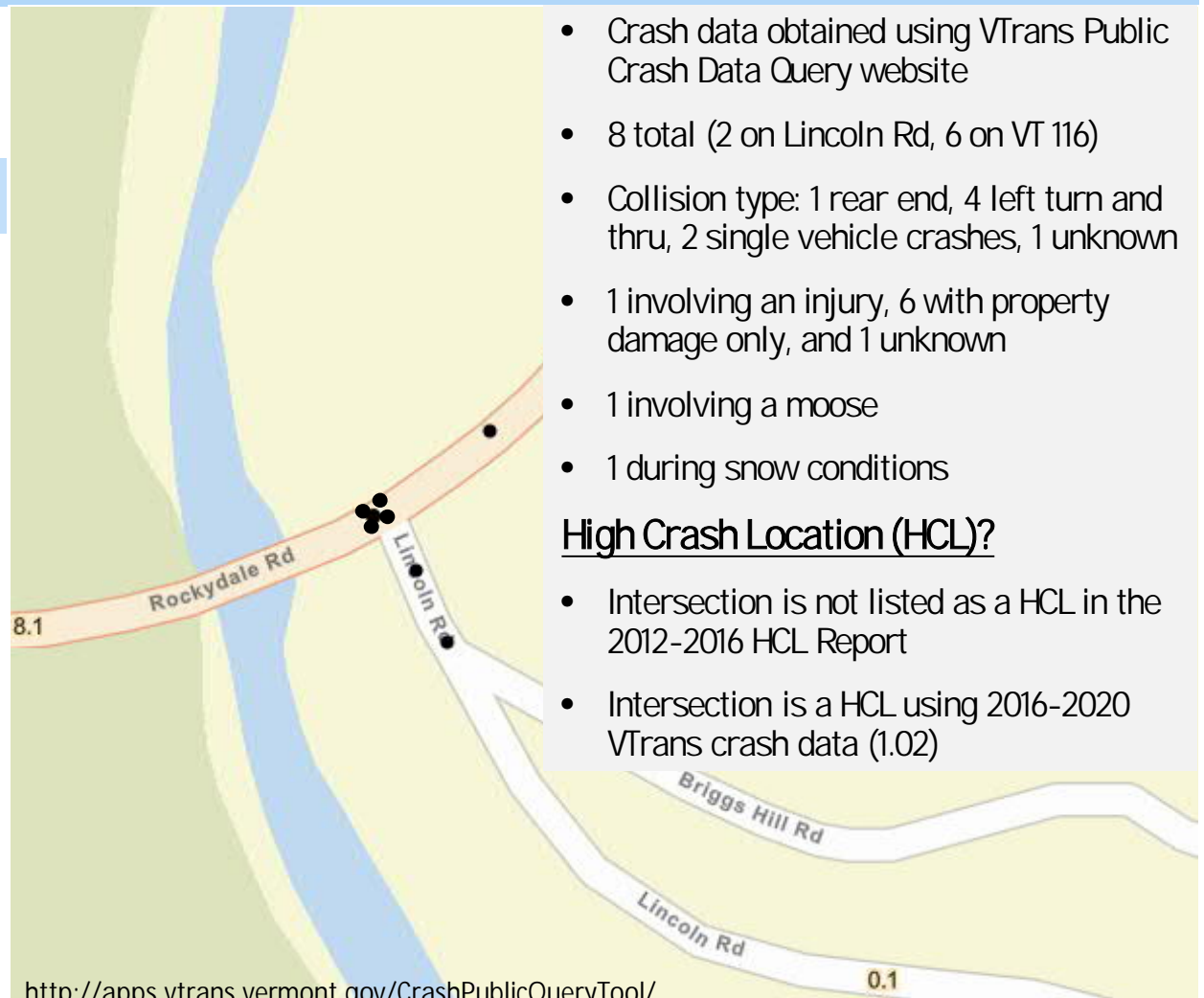
Crash Data Review

2016-2020 (5-Year Data)

- Crash data obtained using VTrans Public Crash Data Query website
- 8 total (2 on Lincoln Rd, 6 on VT 116)
- Collision type: 1 rear end, 4 left turn and thru, 2 single vehicle crashes, 1 unknown
- 1 involving an injury, 6 with property damage only, and 1 unknown
- 1 involving a moose
- 1 during snow conditions

High Crash Location (HCL)?

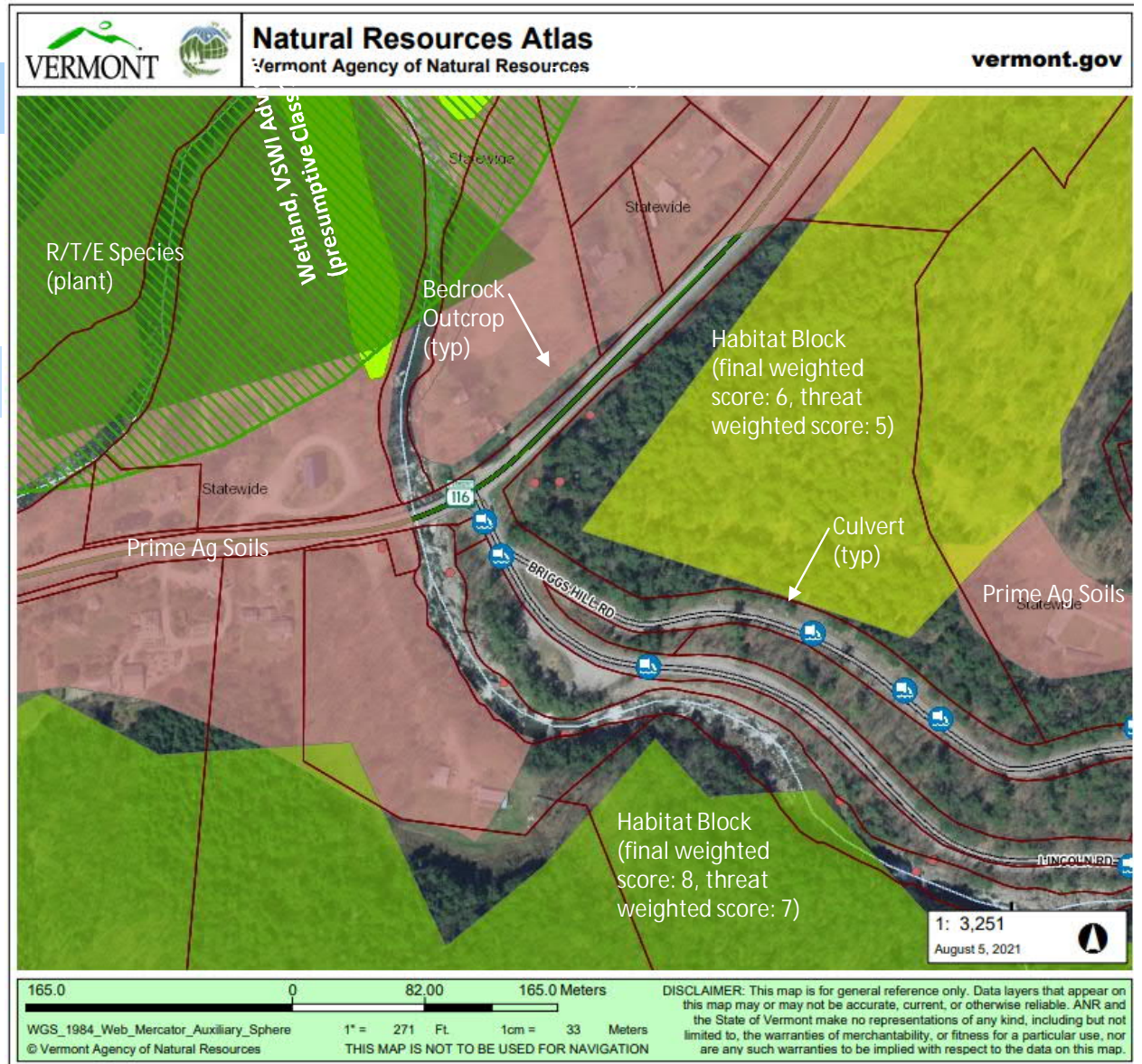
- Intersection is not listed as a HCL in the 2012-2016 HCL Report
- Intersection is a HCL using 2016-2020 VTrans crash data (1.02)



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

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Environmental Data Review



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

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Project Alternatives:

- Broken out into the three focus areas. The goals for each focus area are different, therefore there are different alternatives for each focus area.
- Short-term and long-term measures with wide range of cost ranges.

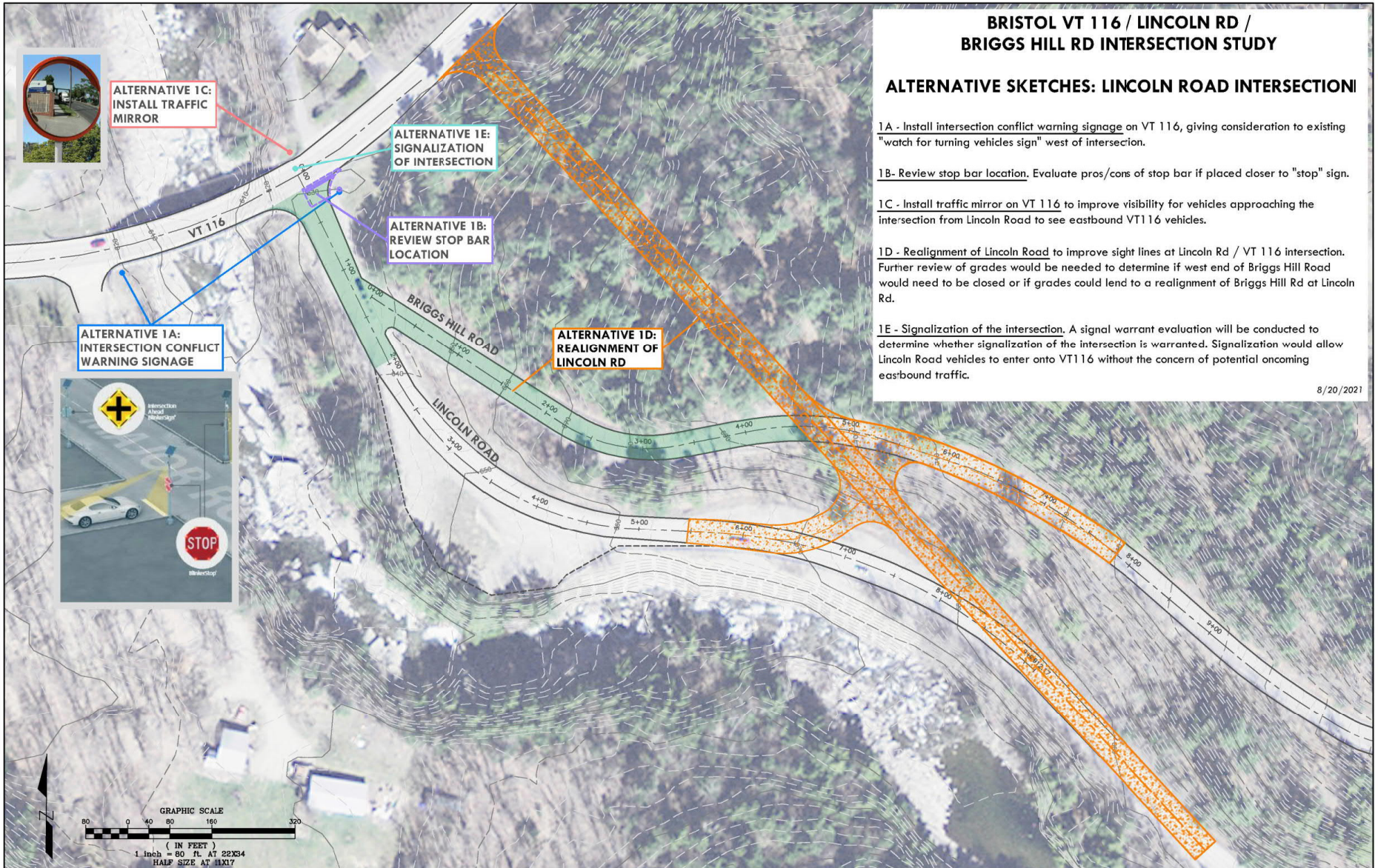
Project Assumptions:

- No alternatives related to the VT 116 bridge or guardrail are being evaluated. VT 116 is a State owned road and the design and location of the bridge at its current location is based on evaluations made during the bridge design phase. The guardrail needs to meet State standards (height, spacing of rails, etc) for safety purposes.
- No alternatives related to the grade of Lincoln Road at VT 116. The current slope meets VTrans standards and raising the grade would not meet State standards.
- We understand traffic speeds along VT 116 are a concern to residents, however traffic calming along VT 116 is outside of the scope of this project.

VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Project Alternatives:

1. VT 116 / Lincoln Road Intersection

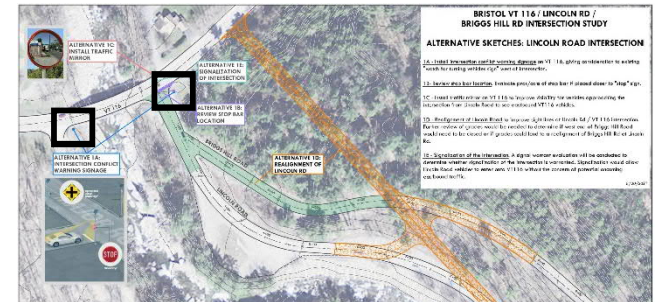


VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Alternatives at Lincoln Road Intersection:

1A. Intersection Conflict Warning Signage

- On a State route, therefore would need VTrans support.



SPECIALTY WARNING SOLUTIONS INTERSECTION CONFLICT WARNING SYSTEMS

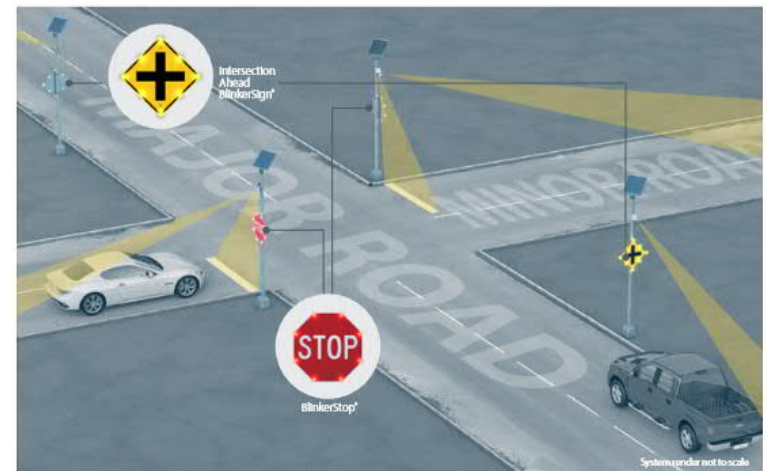
SPECIALTY WARNING SOLUTIONS INTERSECTION CONFLICT WARNING SYSTEMS

Intersection Conflict Warning Systems reduce the likelihood of collisions at dangerous two-way stop intersections by providing real-time warning to approaching drivers when cross traffic is present.

- Custom design maximizes safety for each location
- Solar power capability allows for installation in any environment
- Presence detector confirmation eliminates inductive loop maintenance calls in rural locations
- Radio communication activates all warning alerts in unison

30% severe crash reduction at two-way stop intersections*

* MINDOT RURAL INTERSECTION CONFLICT WARNING SYSTEM SAFETY REPORT



Minor road configuration using solar-powered BlinkerStop® with radar and presence detector. Major road configuration using solar-powered Intersection Ahead BlinkerSign with radar detection.



Radar detection paired with presence detector



Radar detection

MINOR ROAD DETECTION

Minor roads require two detection points:

1. to detect vehicles approaching the intersection
2. to detect vehicles at the stop line

Paired with radar for advanced vehicle detection, inductive loops or pole-mounted presence detectors are used for stop line detection.

MAJOR ROAD DETECTION

Radar detection is installed on major road warning alert poles to identify vehicles approaching the intersection.

See page 9 to learn more about these activations.

MINOR ROAD OPTIONS

- Includes: Warning alert of choice; pole mounting hardware; radio installed in cabinet; sensor of choice with corresponding solar/battery package.
- Radar and inductive loop: 55 watt solar panel/48Ah battery package
- Radar and presence detector: 85 watt solar panel/105Ah battery package
- BlinkerBeacon® comes standard with 12" red beacon LEDs and black housing.
- Static signs and poles sold separately. See page 47 for common pole kits.

WARNING ALERTS	BLINKERSTOP DIMENSIONS	SENSOR	POWER	PART NUMBERS
	-	Radar and Presence Detector	Solar	600370
	-	Radar and Inductive Loop	Solar	600371
	30"	Radar and Presence Detector	Solar	600372
	30"	Radar and Inductive Loop	Solar	600374
	36"	Radar and Presence Detector	Solar	600373
	36"	Radar and Inductive Loop	Solar	600375

MAJOR ROAD OPTIONS

- Includes: Radar sensor; pole mounting hardware; radio installed in cabinet; warning alert of choice.
- BlinkerSign®: 30 watt solar panel/35Ah battery package
- BlinkerBeacon®: 55 watt solar panel/48Ah battery package, comes standard with 12" amber beacon LEDs
- Static signs and poles sold separately. See page 47 for common pole kits.

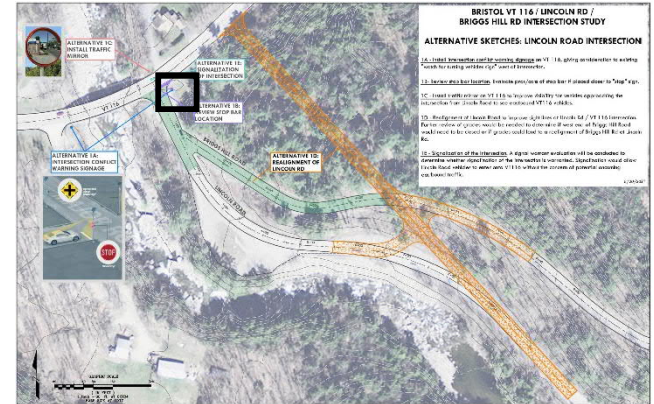
WARNING ALERTS	BLINKERSIGN DIMENSIONS	POWER	PART NUMBERS
	-	Solar	600376
	-	Solar	600376
	30"	Solar	600379
	36"	Solar	600380

VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Alternatives at Lincoln Road Intersection:

1A. Intersection Conflict Warning Signage

1B. Review Stop Bar Locations



at stop sign – can see further to the west,
but sight limitations on west side of
bridge

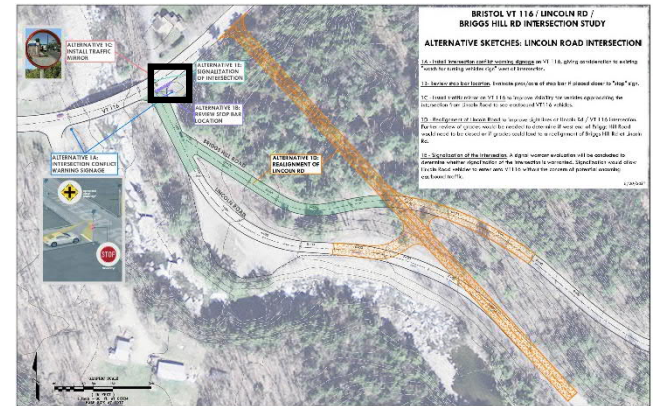
at stop bar – can see vehicles on
bridge, but sight limitations
seeing past bridge



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Alternatives at Lincoln Road Intersection:

- 1A. Intersection Conflict Warning Signage
- 1B. Review Stop Bar Locations
- 1C. Traffic Mirror on VT 116



Traffic Mirror on VT 116

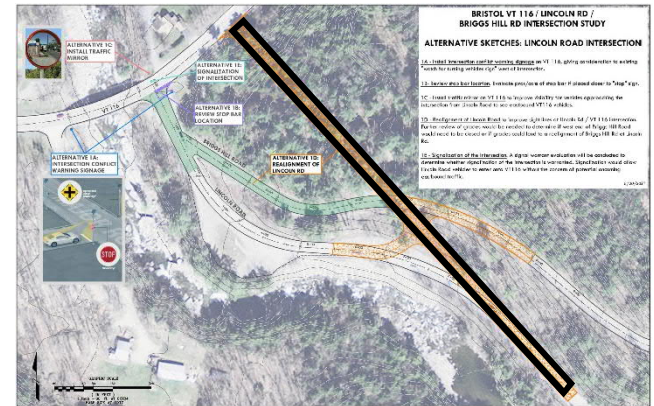
This measure will not improve the length of sight lines, however it will be an added measure to improve visibility of vehicles on VT 116 bridge.



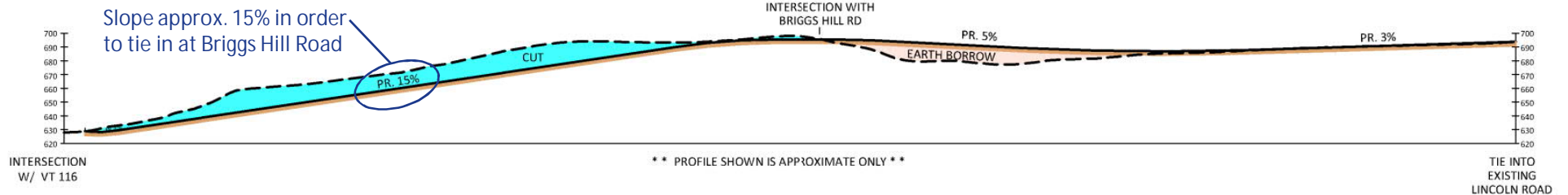
VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Alternatives at Lincoln Road Intersection:

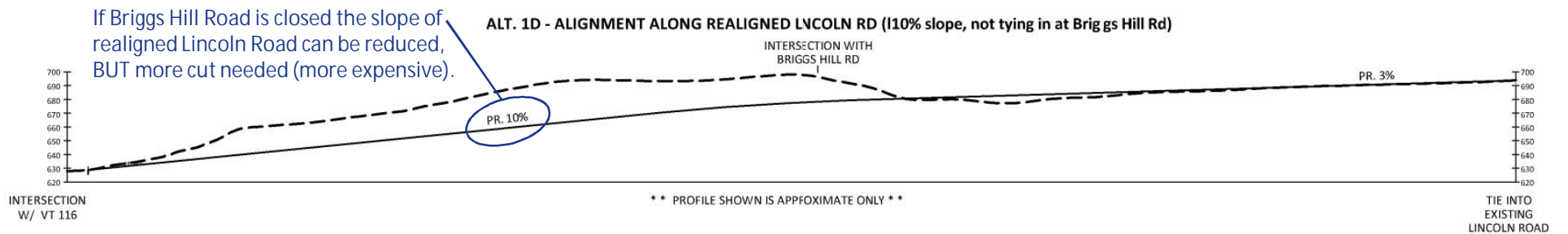
- 1A. Intersection Conflict Warning Signage
- 1B. Review Stop Bar Locations
- 1C. Traffic Mirror on VT 116
- 1D. Realignment of Lincoln Road



ALT. 1D - ALIGNMENT ALONG REALIGNED LINCOLN RD



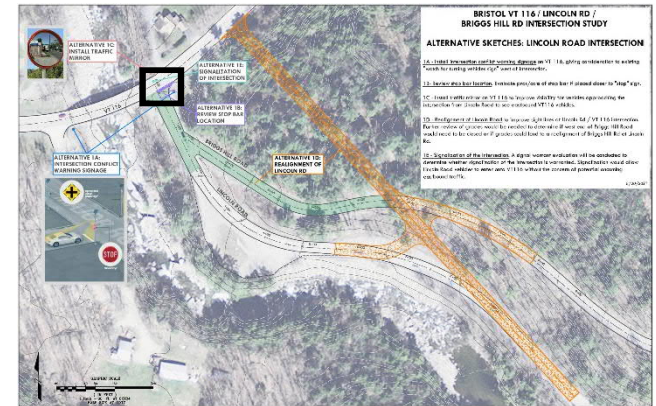
ALT. 1D - ALIGNMENT ALONG REALIGNED LINCOLN RD (10% slope, not tying in at Briggs Hill Rd)



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Alternatives at Lincoln Road Intersection:

- 1A. Intersection Conflict Warning Signage
- 1B. Review Stop Bar Locations
- 1C. Traffic Mirror on VT 116
- 1D. Realignment of Lincoln Road
- 1E. Signalization of Intersection



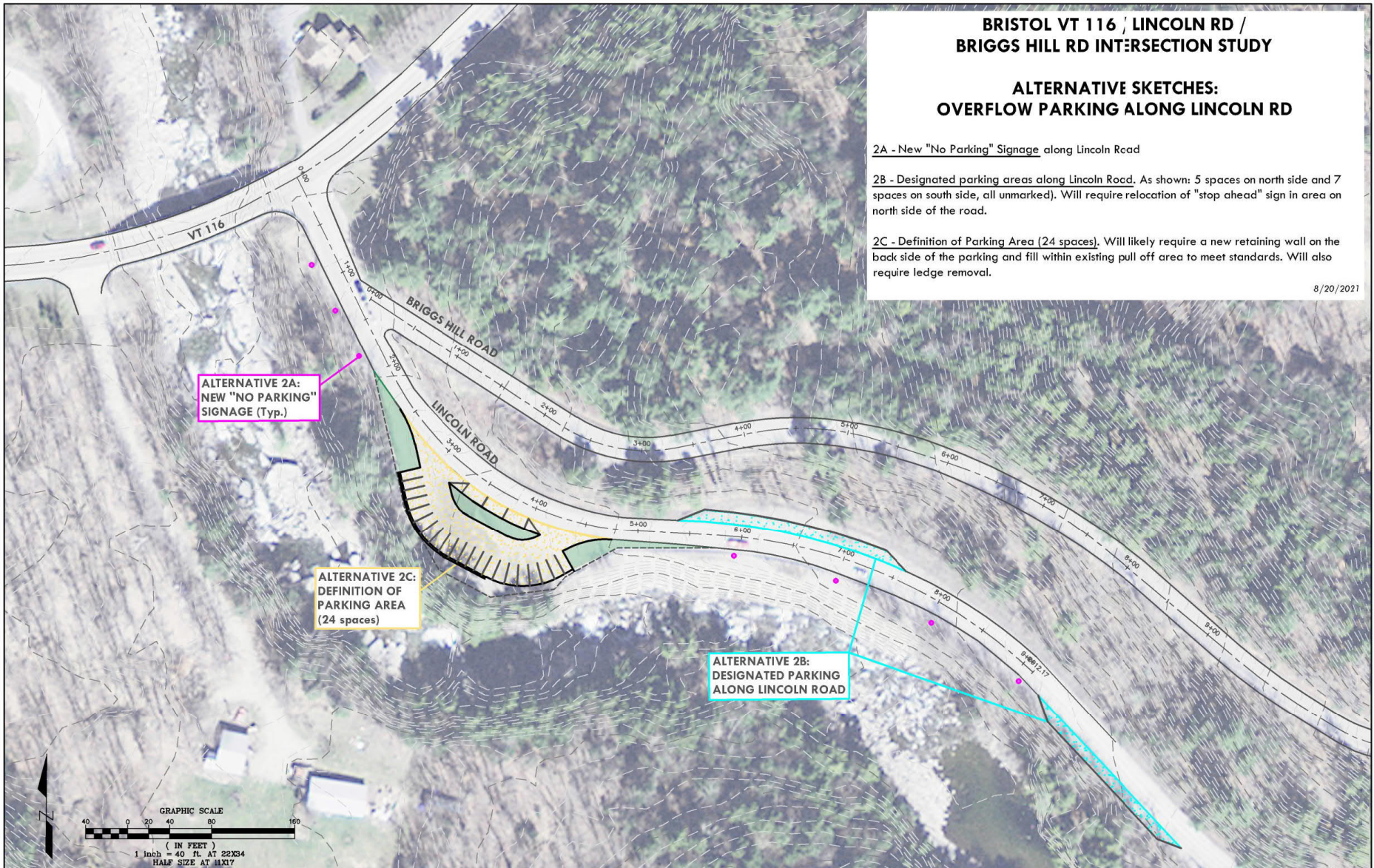
Signal Warrant Analyses:

- Utilized traffic data from 2014 VTrans turning movement counts, projected to year 2021
- Evaluated using MUTCD traffic signal warrant methodology
 - Warrants evaluated include the 8-hr vehicular volume, 4-hour vehicular volume, peak hour, pedestrian volume, and crash experience warrants
- No signal warrant criteria were met

VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Project Alternatives:

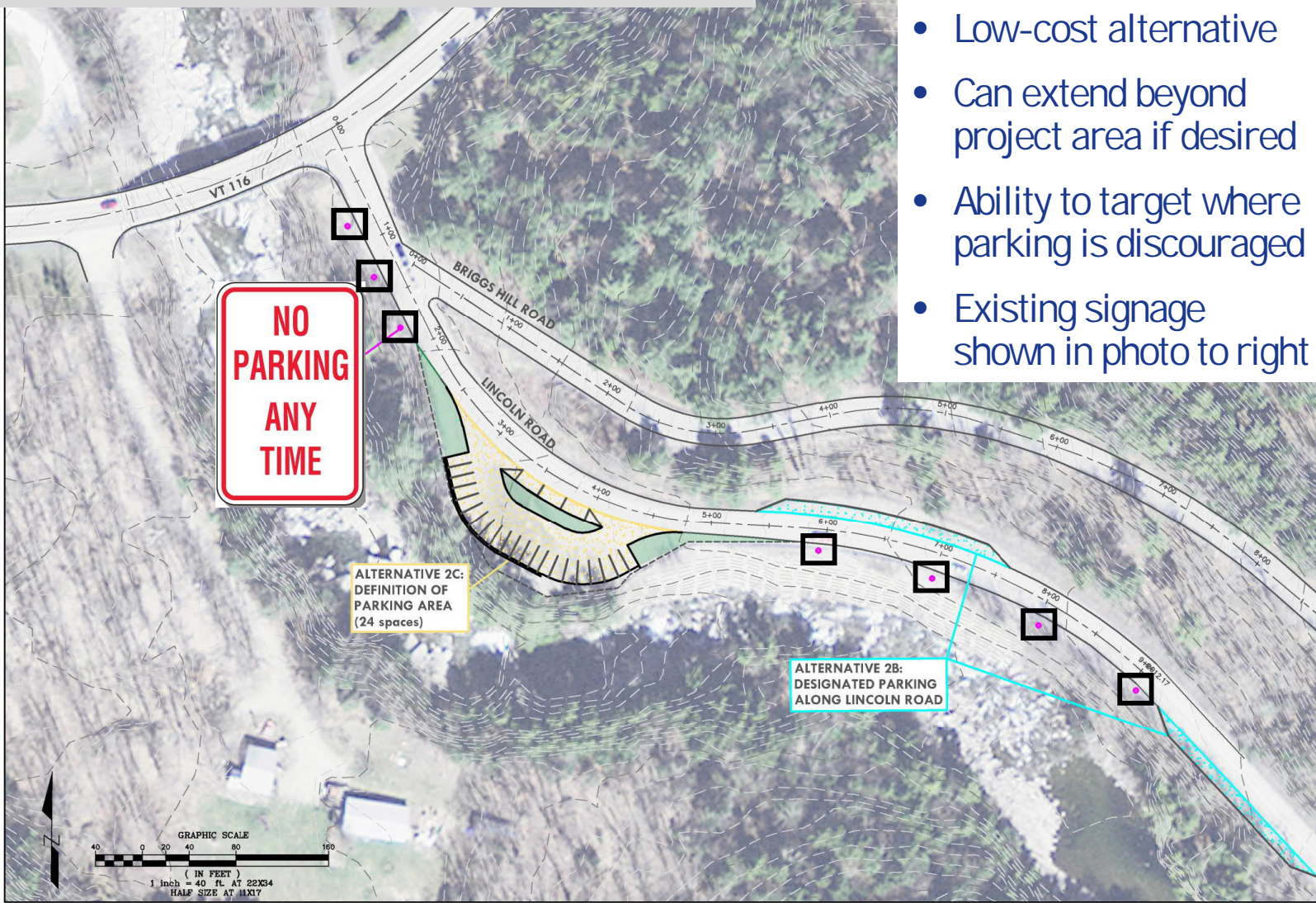
2. Parking Concerns at Lincoln Rd



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Alternatives for Parking Concerns at Lincoln Rd: 2A. New "No Parking" Signs

- Low-cost alternative
- Can extend beyond project area if desired
- Ability to target where parking is discouraged
- Existing signage shown in photo to right



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Alternatives for Parking Concerns at Lincoln Rd:

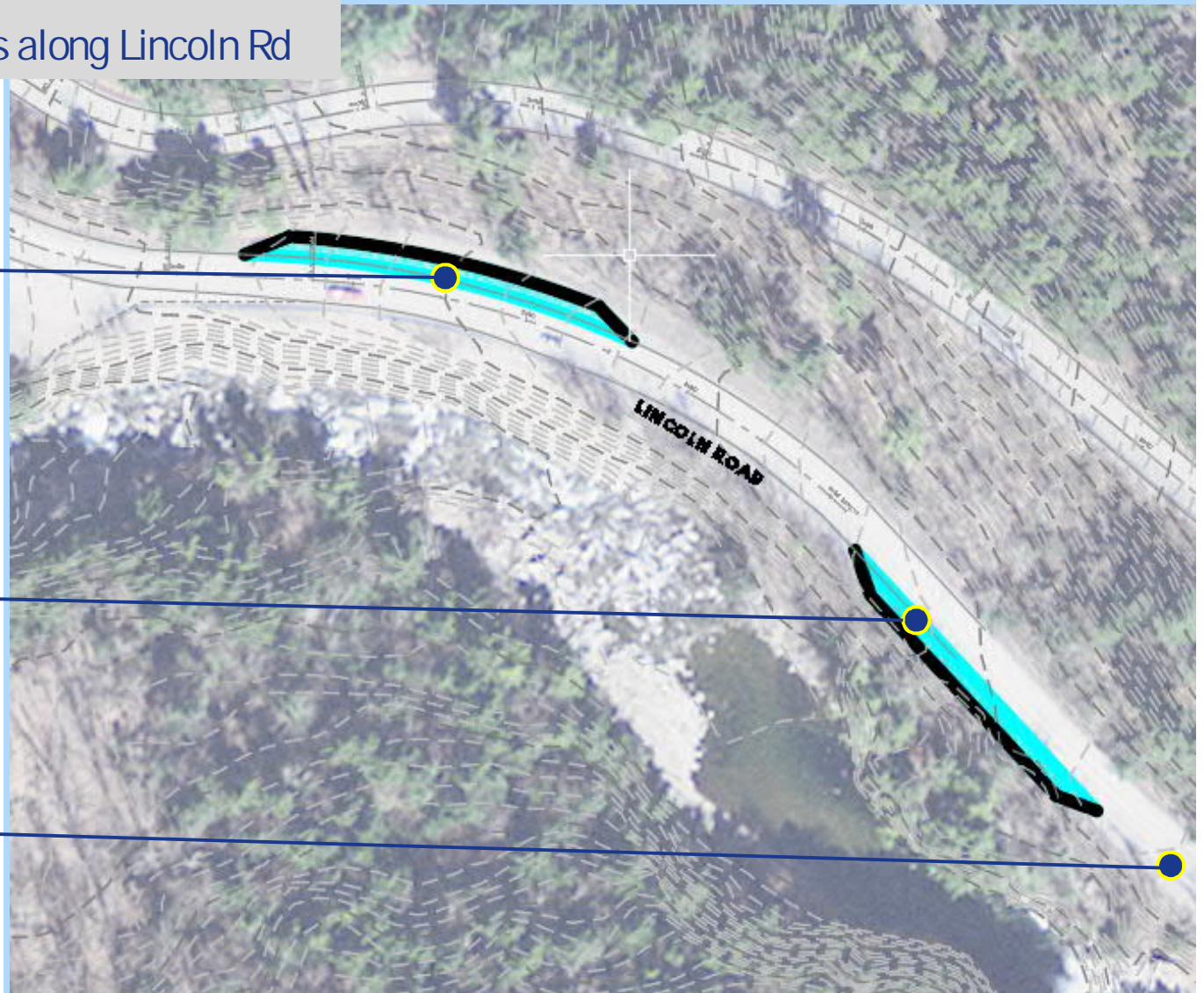
2A. New "No Parking" Signs

2B. Designated parking areas along Lincoln Rd

New paved areas to discourage parking on road

As shown, 9' parking space width, plus 2' buffer

Town could consider additional location(s)



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study:
Alternatives Presentation Meeting

Alternatives for Parking Concerns at Lincoln Rd:

2A. New "No Parking" Signs

2B. Designated parking areas along Lincoln Rd

2C. Definition of Parking Area

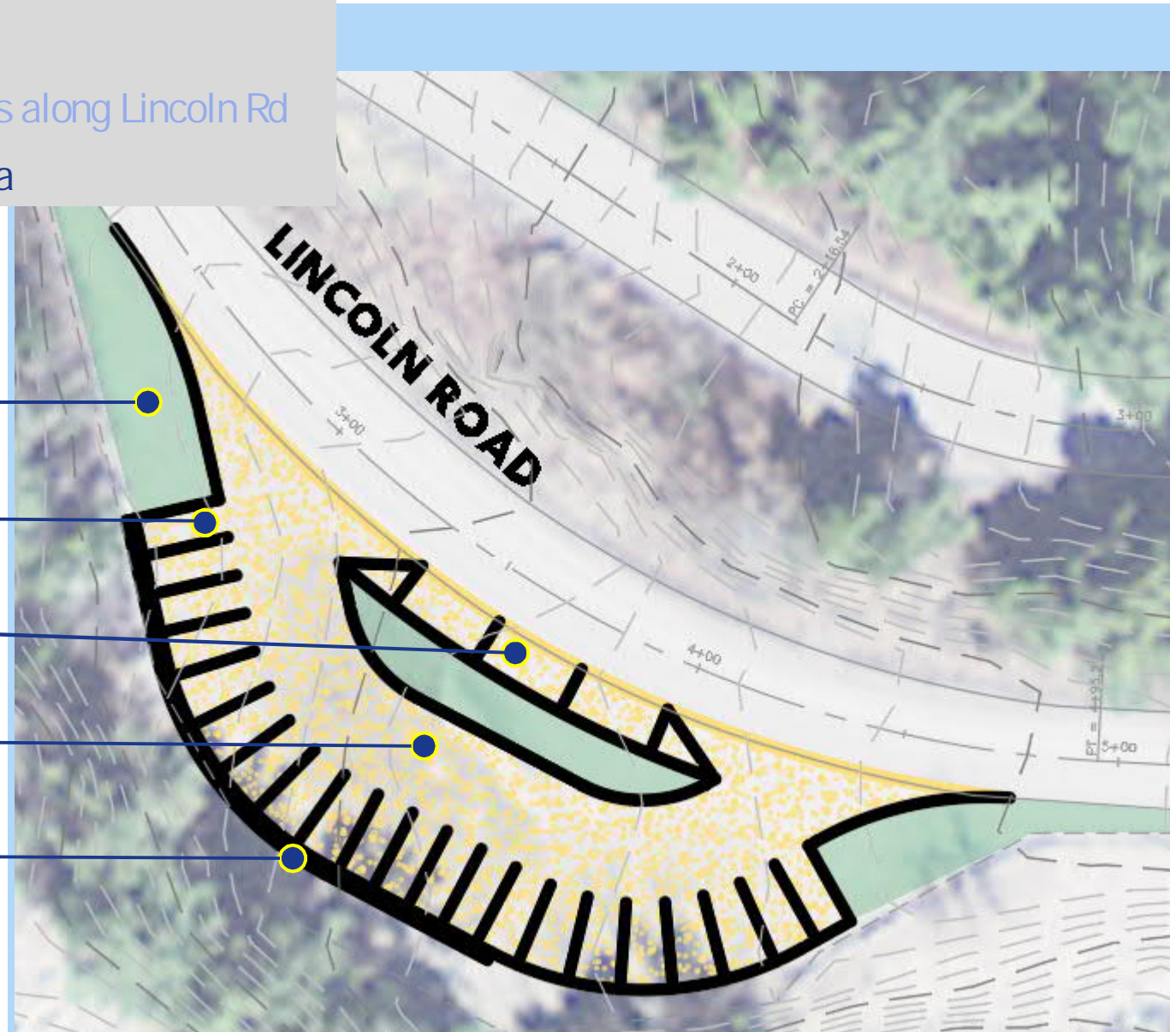
Green space opportunities

Increased parking capacity
over existing conditions

Opportunity for bus parking

New paved surface

Retaining wall may be
needed (further evaluations
would be needed to
determine if necessary,
height needed, etc.)

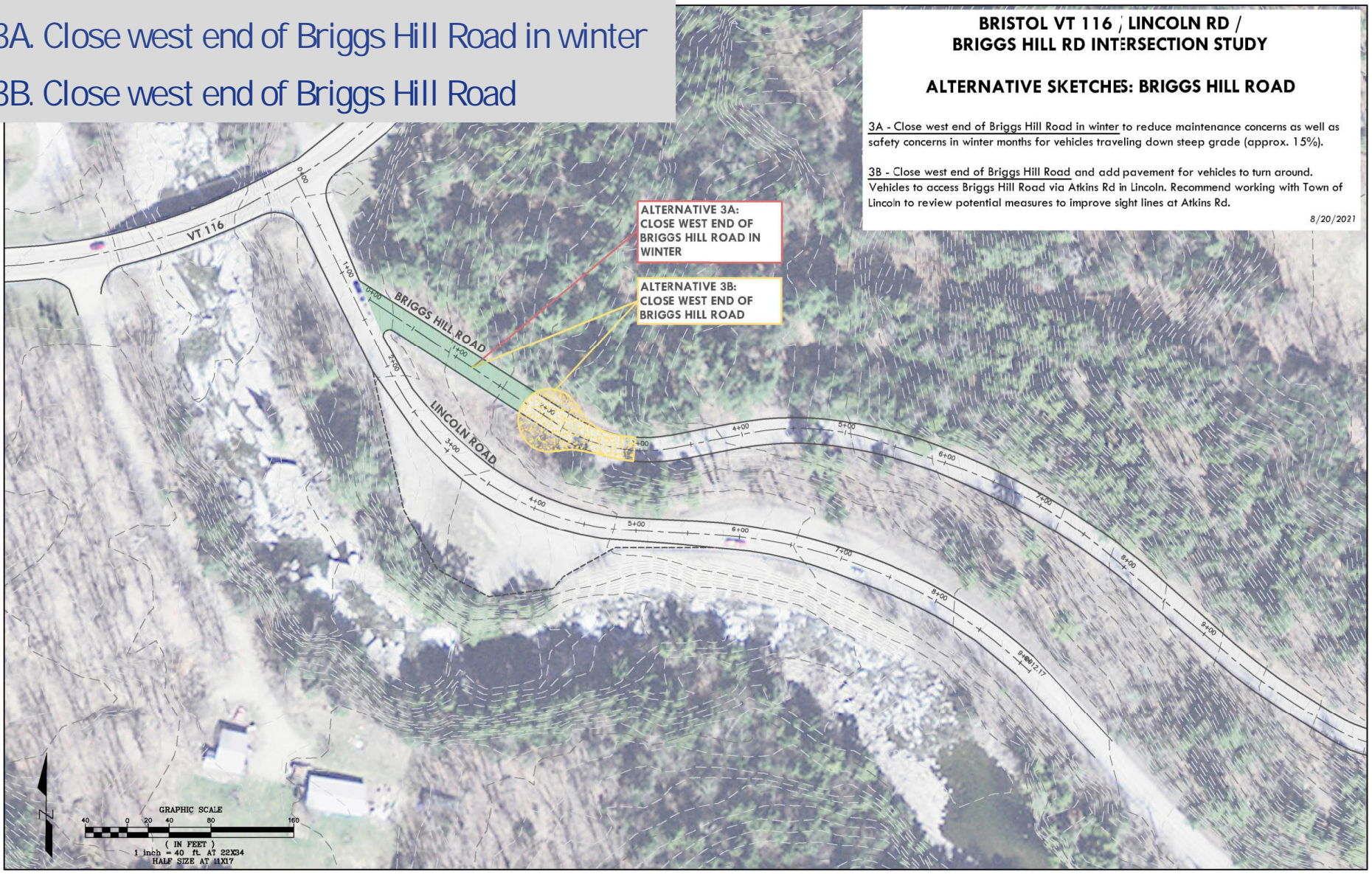


VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Project Alternatives:

- Alternatives for Briggs Hill Rd approach:**
- 3A. Close west end of Briggs Hill Road in winter
- 3B. Close west end of Briggs Hill Road

3. Briggs Hill Road



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study:
Alternatives Presentation Meeting

- Project Overview
- Existing Conditions
- Project Alternatives
- Alternatives Evaluation
 - project cost estimates
 - evaluation matrix
- Community Survey
- Planning Study Report

Alternatives – Conceptual Costs:

1. Lincoln Road alternatives

- 1A. Intersection Conflict Warning Signage - \$22,000
- 1B. Review Stop Bar Locations - \$400
- 1C. Traffic Mirror on VT 116 - \$500
- 1D. Realignment of Lincoln Road* - \$1.4M
- 1E. Signalization of Intersection - \$500,000

2. Parking concerns at Lincoln Road

- 2A. New “No Parking” signs - \$4,000
- 2B. Designated parking along Lincoln Rd* - \$25,000
- 2C. Definition of parking area* - \$700,000

3. Briggs Hill Road

- 3A. Close west end of Briggs Hill Rd in winter - \$3,000
- 3B. Close west end of Briggs Hill Rd* - \$45,000

* Includes, where applicable, engineering design and construction inspection estimates.

VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Alternatives - Evaluation Matrix

Bristol VT 116 / Lincoln Road / Briggs Hill Road Intersection Study - Evaluation Matrix

		LINCOLN ROAD INTERSECTION						PARKING CONCERNS ALONG LINCOLN ROAD				BRIGGS HILL ROAD		
		1A. Conflict Warning Signage	1B. Review Stop Bar Location	1C. Traffic Mirror on VT116	1D. Lincoln Road Realignment	1E. Signalization of Intersection	1F. Do Nothing Alternative	2A. New "No Parking" Signs	2B. Designated Parking along Lincoln	2C. Definition of Parking Area	2D. Do Nothing Alternative	3A. Close west end of Briggs Hill in Winter	3B. Close west end of Briggs Hill	3C. Do Nothing Alternative
Project Costs	Construction	\$22,000	\$400	\$500	\$1,100,000	\$400,000	-	\$4,000	\$21,000	\$560,000	-	\$3,000	\$38,000	-
	Engineering Design + Resident Engineer	-	-	-	\$300,000	\$100,000	-	-	\$4,000	\$140,000	-	-	\$7,000	-
	Total Project Costs (excluding ROW)	\$22,000	\$400	\$500	\$1,400,000	\$500,000	-	\$4,000	\$25,000	\$700,000	-	\$3,000	\$45,000	-
Level of Meeting Goal of Focus Area	Overall Safety Improvement	MEDIUM (increases visibility, does not change overall sight lines)	LOW (potential (but minor) improvements to sight lines)	MEDIUM (increases visibility, does not change overall sight lines)	HIGH (improves sight lines)	MEDIUM (allows for gaps for traffic turning movements, does not change overall sight lines)	-	LOW (deters vehicles from parking on road)	MEDIUM (improves opportunities for safe locations to park)	HIGH (significantly improves opportunities for safe locations to park)	-	HIGH (removes vehicles from steep slope in winter)	HIGH (removes vehicles from steep slope year round)	-
Roadway or Land Use Impacts	ROW Impacts	-	-	-	significant	minimal	-	-	unlikely	unlikely	-	-	minimal	-
	Utility relocation	-	-	-	-	minimal	-	-	-	-	-	-	-	-
	Other	-	-	-	-	Signal is not warranted per MUTCD signal warrants	-	-	-	-	-	-	-	-
Environmental/Cultural Resource Impacts	Streams/Floodplain	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fish & Wildlife	-	-	-	-	-	-	-	-	-	-	-	-	-
	Wetlands	-	-	-	-	-	-	-	-	-	-	-	-	-
	Wildlife/Cons. Areas	-	-	-	-	-	-	-	-	-	-	-	-	-
	Agricultural Lands	-	-	-	-	-	-	-	-	-	-	-	-	-
	Archaeological / Historic	-	-	-	unlikely	-	-	-	-	-	-	-	-	-
	Public Lands (Section 4f)	-	-	-	-	-	-	-	-	-	-	-	-	-
	LWCP (Section 6(f))	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hazardous Waste	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	impact to habitat block	-	-	-	-	-	-	-	-	-	
Permitting	Act 250	-	-	-	-	-	-	-	-	-	-	-	-	-
	Section 404 (wetlands)	-	-	-	-	-	-	-	-	-	-	-	-	-
	Section 401 Water Quality	-	-	-	-	-	-	-	-	-	-	-	-	-
	State Wetlands Permit	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stream Alteration Permit	-	-	-	-	-	-	-	-	-	-	-	-	-
	Construction Phase Storm Water Discharge Permit	-	-	-	potential	-	-	-	-	-	-	-	-	-
	Operational Phase Storm Water Discharge Permit	-	-	-	potential	-	-	-	-	-	-	-	-	-
	Lakes & Ponds	-	-	-	-	-	-	-	-	-	-	-	-	-
	R, T, E Species	-	-	-	-	-	-	-	-	-	-	-	-	-
	Section 1111 Permit	yes	potential	yes	yes	yes	-	-	-	-	-	-	-	-
Community Support	Level of community support	43% support	56% support	43% support	24% support	29% support	15% support	51% support	66% support	47% support	17% support	28% support	9% support	38% support

VT116 / Lincoln Road / Briggs Hill Rd Intersection Study:
Alternatives Presentation Meeting

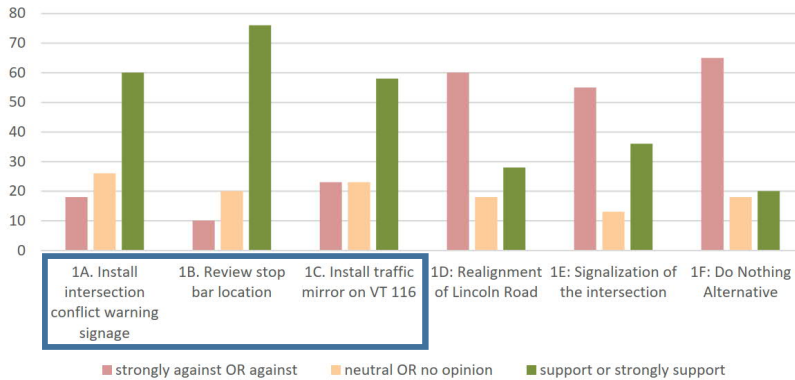
[Community Survey](#)

- Project Overview
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 - Planning Study Report
- 122 responses!
 - 64% live in Bristol, 26% live in Lincoln, 10% other.
 - Roughly 2/3 drive through VT116/Lincoln intersection at least 2-3 times a week.
 - Approx. 1/2 drive through Lincoln/Briggs intersection at least 2-3 times a week.
 - Close to 90% have frequently witnessed vehicles parking along Lincoln Road.
 - Concern level of steep slope of Briggs Hill approach to Lincoln? 43% no or slight concern, 15% neutral, 41% concerned or very concerned regarding steep slope.

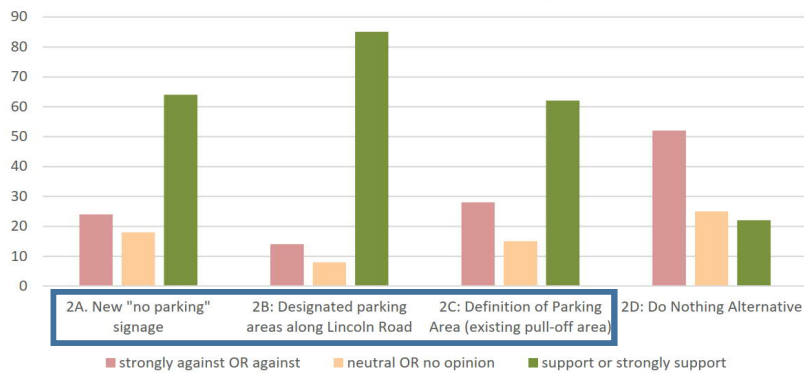
VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Community Survey

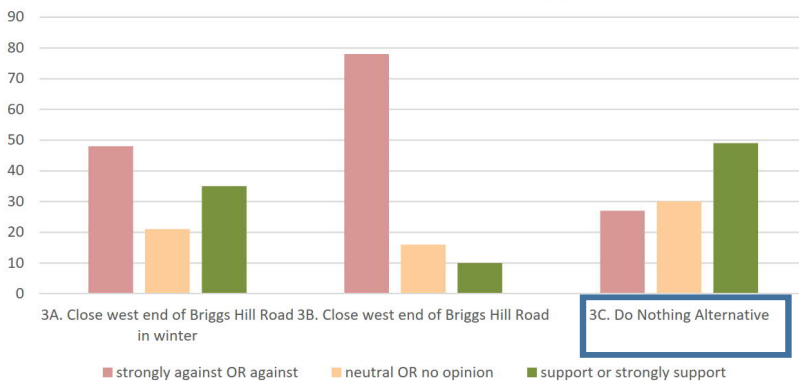
FOCUS AREA 1: General Level of Support



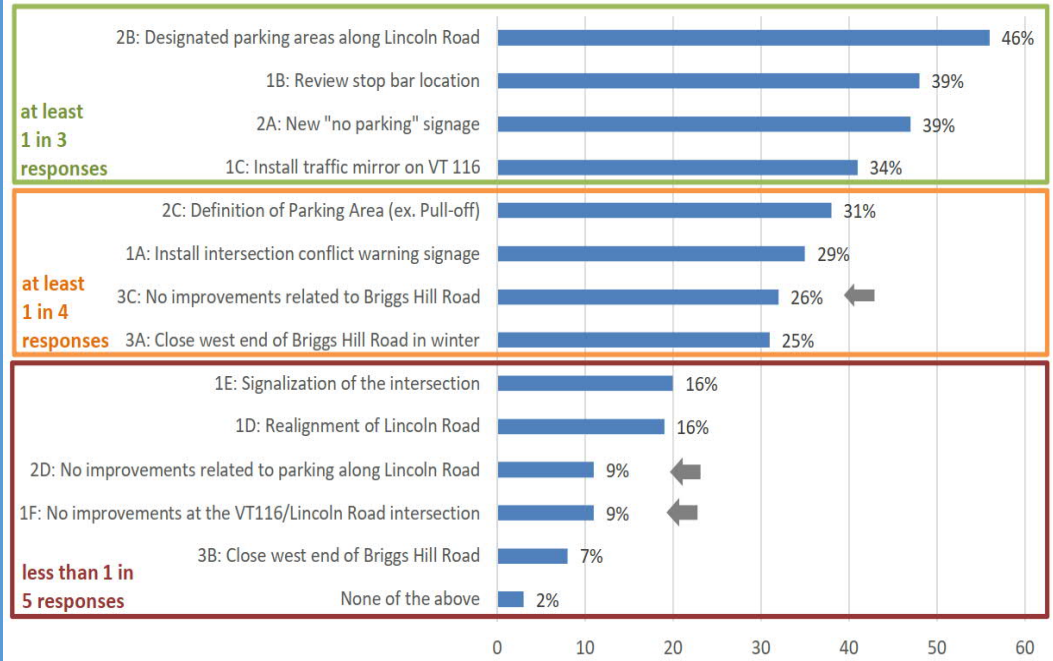
FOCUS AREA 2: General Level of Support



FOCUS AREA 3: General Level of Support



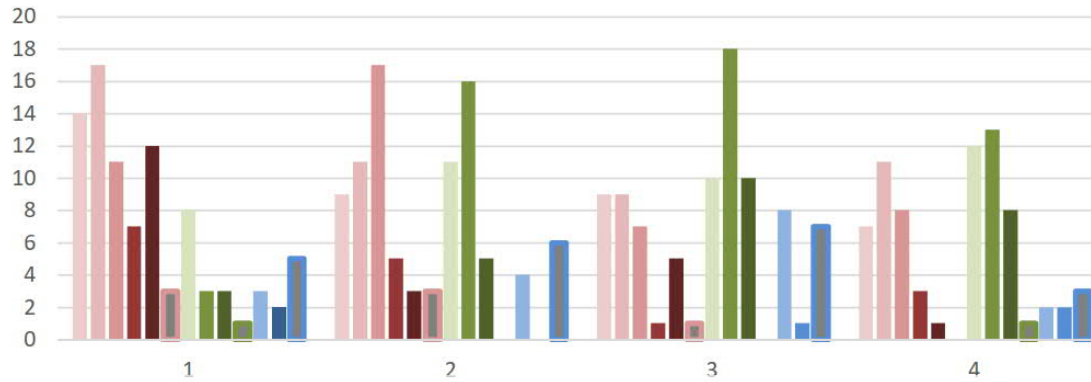
Select the alternatives that you support
(can select more than one):



VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

Community Survey

Summary of Alternatives that were Ranked 1-4



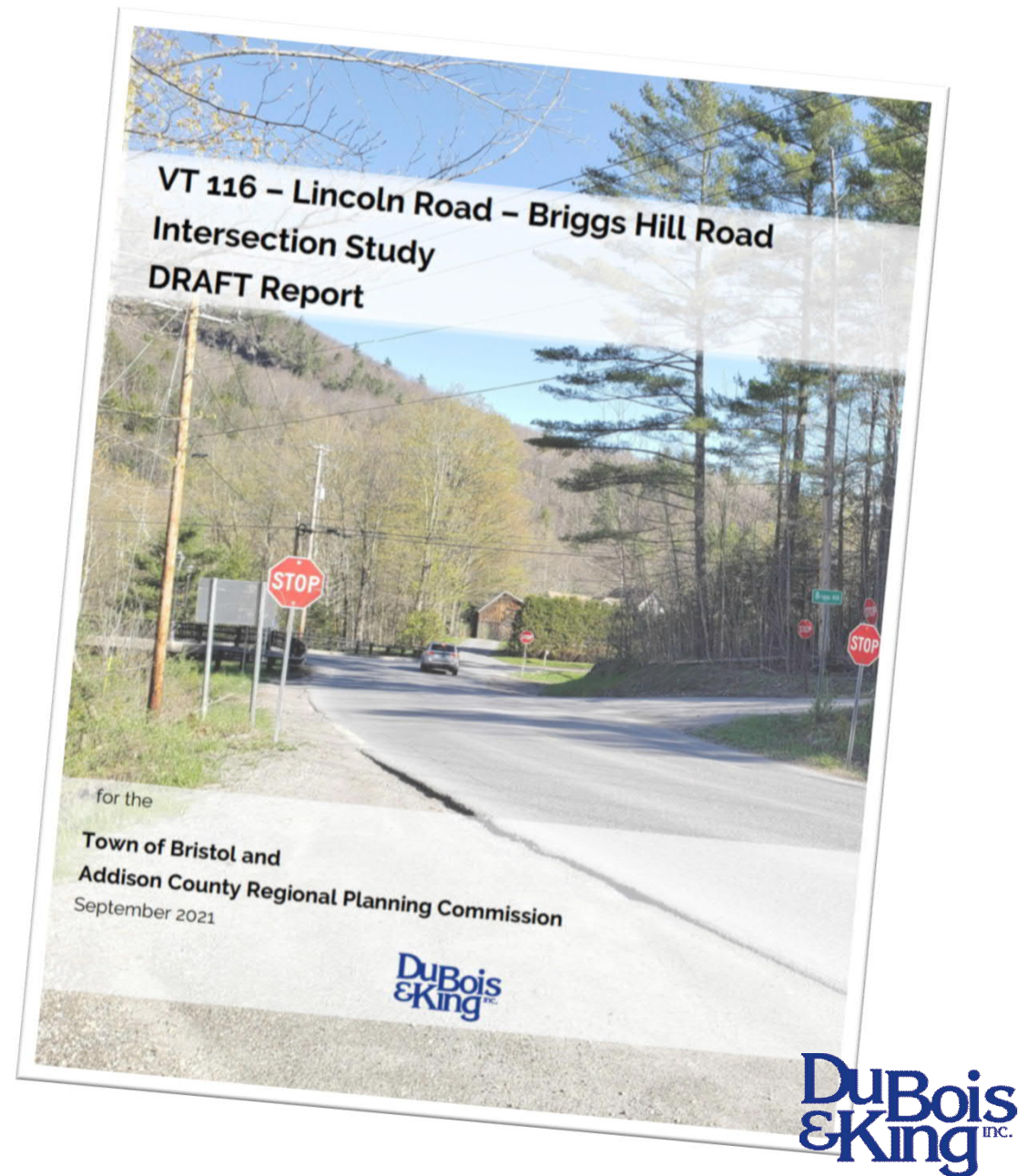
- 1A: Install intersection conflict warning signage
- 1B: Review stop bar location
- 1C: Install traffic mirror on VT 116
- 1D: Realignment of Lincoln Road
- 1E: Signalization of the intersection
- 1F: No improvements at the VT116/Lincoln Road intersection
- 2A: New "no parking" signage
- 2B: Designated parking areas along Lincoln Road
- 2C: Definition of Parking Area on south side of Lincoln Road
- 2D: No improvements related to parking along Lincoln Road
- 3A: Close west end of Briggs Hill Road in winter
- 3B: Close west end of Briggs Hill Road
- 3C: No improvements related to Briggs Hill Road

General Ranking Observations:

- 3 times more likely to rank a Focus Area 1 alternative as top ranked priority.
- Alternative with highest number of #1 rankings is 1B (review stop bar location).
- Highest number of top 3 ranking votes: 1B (review stop bar), 1C (traffic mirror), and 2B (designated parking areas along Lincoln).
- Of the Focus Area 2 alternatives, 2B (designated parking along Lincoln Rd), had the highest number of supportive "votes", but of all the Focus Area 2 support votes, 2A (no parking signs) had the highest number of #1 priority votes.
- 40 responses supported one or both Briggs Hill alternatives, but only 5 responses ranked a Focus Area 3 improvement as #1.

VT116 / Lincoln Road / Briggs Hill Rd Intersection Study: Alternatives Presentation Meeting

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 - Currently in the process of finalizing the Scoping Report for this project.
 - Concerns noted by residents at meetings and through the outreach survey that are unrelated to the specific project scope but relevant to the project area will be noted in the Report.



VT 116 / Lincoln Road / Briggs Hill Road Intersection Study

Questions? Comments!



Jenny Austin, P.E. – DuBois & King, Inc. – jaustin@dubois-king.com

Mike Winslow, Addison County Regional Planning Commission – mwinslow@acrpc.org