



# Intersection Redesign NH Route 49 and NH Route 175: Campton, NH

Josie Bourgeault, Britt Brogna, Farrah Hardenbergh, Isaac Lapointe, Aiden Nick  
 Department of Civil Engineering, University of New Hampshire, Durham, NH 03824



## Introduction

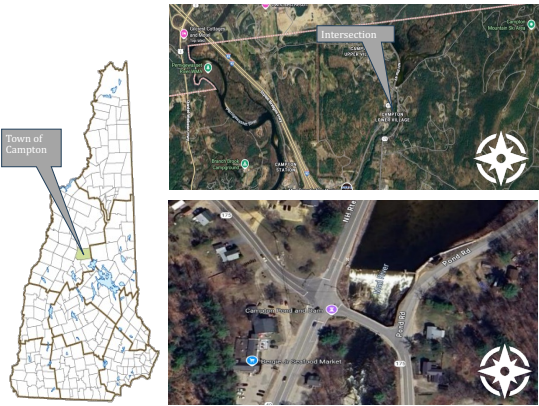
### OVERVIEW

This project focuses on redesigning the intersection of NH Route 49 and NH Route 175 in Campton, New Hampshire to improve **safety, traffic flow, pedestrian accessibility, and drainage**, while enhancing overall functionality and transforming the area into a more welcoming village center for residents and visitors

### SCOPE OF WORK

During Fall 2025, existing conditions were analyzed through traffic data, crash data, and site observations, and conceptual design alternatives were developed based on project goals and design standards. In Spring 2026, the preferred design was finalized, including the development of a drainage plan, a cost estimate, and enhanced pedestrian infrastructure to support a more defined village center.

## Location



## Design Alternatives

### Alternative: Compact Roundabout



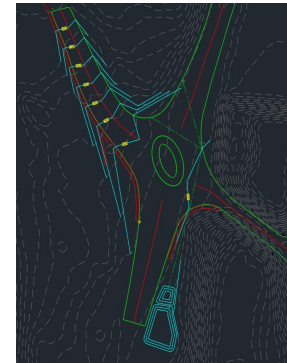
- Circular, compact roundabout
- Lower speeds (15-20 mph)
- Creates village center feel
- Landscape center island
- Mountable truck apron
- Most expensive alternative
- Designed per AASHTO Green Book

### Alternative: Additional Turning Lane



- Adds left turn lane to western approach to NH Route 175.
- Altered geometry reduces crashes and improves traffic efficiency
- Reduces crash rates by 20-60% (AASHTO Green Book)
- Only accounts for one approach to the intersection.

## Drainage Design

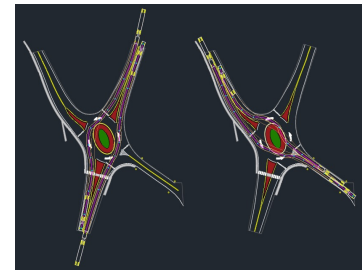


- Goal of mitigating stormwater runoff
- Slope of NH Route 175 is increased from 6% to 8%
- Center island is the highpoint and road slopes away at about 2-4%
- Stormwater is directed to five catch basins and discharged into a sediment forebay and infiltration basin
- Sediment forebay pretreats the runoff and the infiltration basin provides treatment.
- HSG A soil with high KSAT infiltration rate
- Side slopes of basin 3-1 and sediment forebay is 2' deep
- HydroCAD modeling is in process

## Decision Matrix

Category	Weight	Proposed Alternatives					
		Circular Roundabout		Elliptical Roundabout		Addition of Turn Lane	
		Rank	Score	Rank	Score	Rank	Score
Pedestrian Safety	0.25	2	0.5	2	0.5	1	0.25
Vehicle Safety	0.25	2	0.5	2	0.5	1	0.25
Cost	0.2	1	0.75	1	0.5	2	0.25
Aesthetics	0.15	2	0.5	3	0.75	1	0.25
Constructability	0.1	1	0.25	1	0.5	2	0.75
Environmental Impact	0.05	2	0.5	2	0.5	1	0.25
SUM	1		2.5		2.75		2

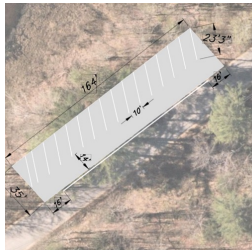
## Design Vehicle



Accommodating the most likely vehicle to use the intersection is a key part in the design process. AutoTurn was utilized to effectively model a WB-67 truck and run it through our preferred roundabout layout. All existing turns are still makeable with the given layout.

## Pedestrian Infrastructure

### Gravel Lot Connected to Launch Dock



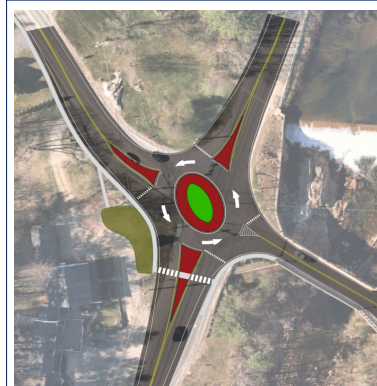
Single row, 1-way lot: 14 spots with 1 handicap & access aisle

### All Pedestrian Additions Overview



Gazebo area, Pedestrian bridge, Crosswalk, Gravel lot

## Preferred Alternative



### Final Elliptical Roundabout Concept

- Geometry: 110-ft major axis - 75-ft minor axis, 20-ft entry lanes, 16-ft exit lanes, and larger 45-ft turning radii
- Added features: Stamped brick truck apron and landscaped central island
- Safety improvements: Reduces conflict points from 32 to 8 and lowers vehicle speeds
- Pedestrian design: 6-ft refuge islands with two-stage crossings for safer navigation
- Visibility enhancements: High-visibility crosswalks and warning lighting
- Operational benefit: Continuous traffic flow reduces delays compared to signals
- Trade-offs: Higher cost and larger footprint, though slightly less impactful than the circular alternative

## Cost Estimate

Total Project Cost	
Construction	\$1.45M
Preliminary Engineering & Design (PED)	\$0.29M
Inspection	\$0.218M
Contingency	\$0.29M
<b>TOTAL PROJECT</b>	<b>\$2.25M</b>

- Construction cost based on NHDOT weighted average unit prices and detailed quantity takeoffs
- Estimate includes demolition, roadway construction, pedestrian infrastructure, drainage, and traffic control features
- Additional costs (PED, Inspection, Contingency) applied as percentage-based estimates
- **Total project cost: ~\$2.25M**

## References & Acknowledgements

AASHTO Green Book (2018)  
 FHWA Shared-Use Paths (2006)  
 NHDOT Unit Prices (2025)  
 NHDOT Typical Sections  
 NHDOT Design Manual (2024)  
 HCM (2010)  
 NCHRP 279 (1985)  
 PROWAG (2025)  
 NH Stormwater Manual 2025

Project Sponsor:  
 Jordan Pike, PE, Connor Golden, & Claudia Damboise  
 HEB Engineers

Faculty Advisor:  
 Dr. Jo Sias  
 University of New Hampshire