

Intersection Improvements
Route 140 at Route 62 Intersection, Sterling, MA



12/14/2021

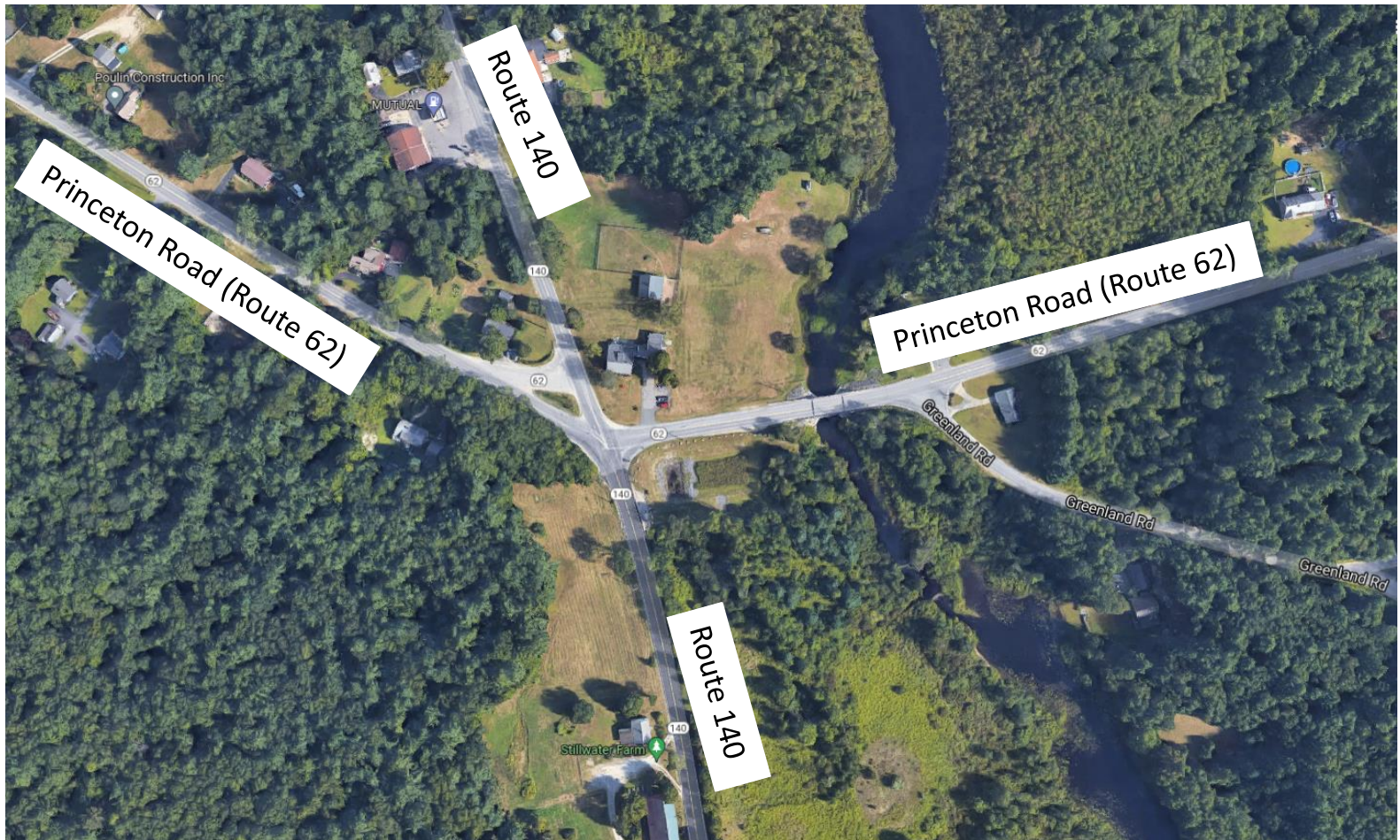


CURRENT STATUS

- **Green was engaged by the Town to prepare a Project Need Form (PNF) and Project Information Form (PIF) and apply for TIP Eligibility with MassDOT**
- **Presented the project to MassDOT District 3 personnel on 9/30/21.**
- **Application was submitted on 11/12/21**
- **MassDOT currently reviewing the applications.**
- **Proposal to provide 25% Design Services to the Town is in draft.**



PROJECT STUDY AREA





EXISTING CONDITIONS

- **No Existing Bicycle or Pedestrian Facilities**
- **Roadways under local jurisdiction**
- **One lane approach for each direction, with slip lane for eastbound left-turns and southbound right-turns.**
- **Intersection operating with Route 62 under STOP control with flashing beacon.**
- **Route 140 posted speed limit is 35 mph through the intersection**
- **Poor sight distances looking from Route 62 north and south on Route 140**
- **High crash rate**



TRAFFIC VOLUMES

Existing Traffic Count Data

- ADTs collected on all four legs in 2016
- Adjusted 2016 counts using established growth rates per MassDOT COVID guidance
- Adjusted ADT (2021):
 - Route 140 (North of Intersection) – 6,110
 - Route 140 (South of Intersection) – 7,113
 - Route 62 (West of Intersection) – 3,528
 - Route 62 (East of Intersection) – 2,543

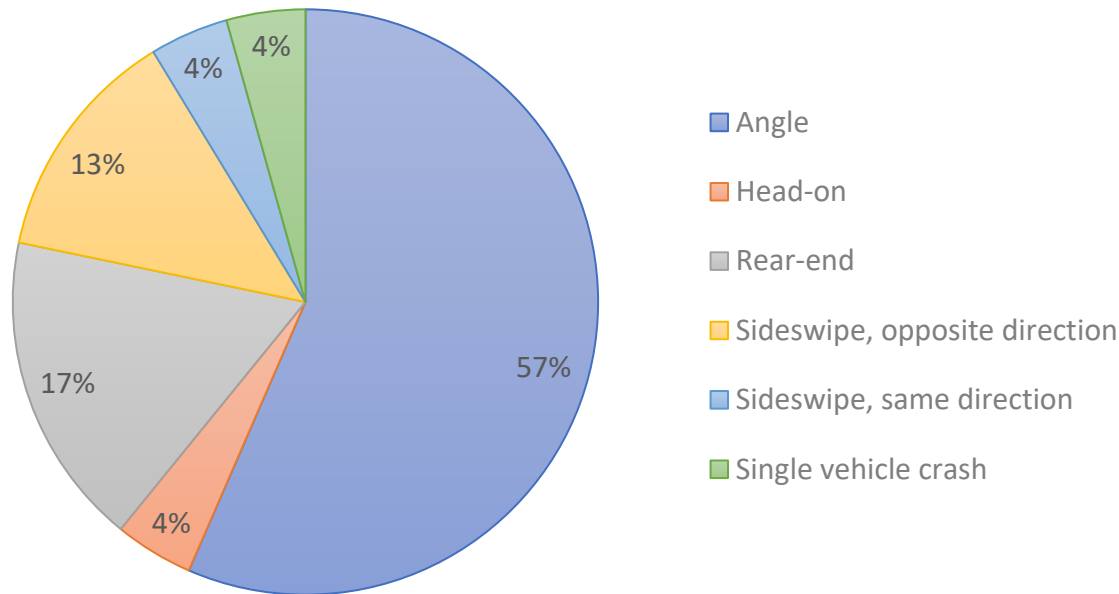
Additional Data Collection

- Peak Hour Turning Movement Counts (TMCs) were performed from 7-9 AM, 4-6 PM on 7/21/2021
- Adjusted to pre-COVID conditions using ATR data above



CRASH HISTORY

- Source: MassDOT Crash Record (2016–2018)
- Crash data for Route 140 @ Route 62 higher than normal:
 - Crash count of 23 and crash rate of 1.64 from 2016-2018
 - District 3 average for unsignalized intersections is **0.61/MEV**
 - Most common type were angle crashes
 - Not HSIP Location (No RSA required)





EXISTING OPERATIONS

- HCM Capacity Analysis reveals poor operations for the westbound left turn approach on Route 62 during the PM Peak scenario, some congestion for other approaches/peak times
- Operations for Route 140 are at acceptable conditions

		2021 Existing Conditions – AM Peak Hour			
		Delay (S)	LOS	V/C	95th Q (FT)
<i>Route 140 at Route 62</i>					
	NBL	8.5	A	0.05	3
	EBL	31.8	D	0.66	110
	WBL	29.5	D	0.40	45
	SBL	7.7	A	0.04	3

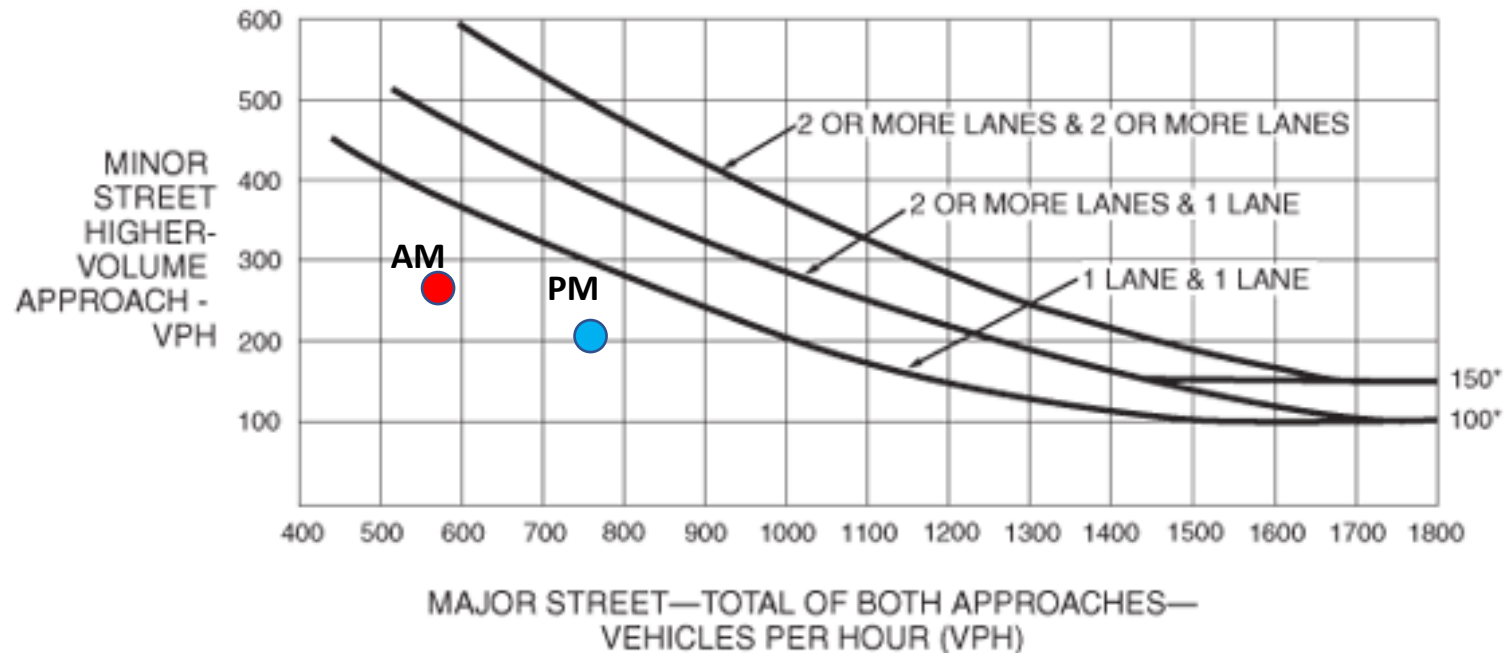
		2021 Existing Conditions – PM Peak Hour			
		Delay (S)	LOS	V/C	95th Q (FT)
<i>Route 140 at Route 62</i>					
	NBL	8	A	0.09	8
	EBL	30	D	0.51	68
	WBL	77.9	F	0.89	185
	SBL	8.5	A	0.04	3



SIGNAL WARRANT ANALYSIS

- Peak Hour Traffic volumes for the intersection does NOT meet MUTCD Warrant 3: Peak Hour (or other warrants)

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.



LEFT TURN LANE ANALYSIS

- No left turn lane is required for the Route 140 NB and SB
- Thru volumes do not exceed minimum required values
- Based on Exhibit 6-23 criteria from MassDOT.

Exhibit 6-23

Criteria for Left Turn Lanes

A. Unsignalized Intersections, Two-Lane Roads and Streets:

Design Speed	Opposing Volume (motor vehicles per hour)	Advancing motor vehicle volume (vehicles per hour)			
		5% Left Turns	10% Left Turns	20% Left Turns	30% Left Turns
30 mph or less	800	370	265	195	185
	600	460	345	250	225
	400	570	430	305	275
	200	720	530	390	335
35 MPH	800	330	240	180	160
	600	410	305	225	200
	400	510	380	275	245
	200	640	470	350	305
50 mph	800	280	210	165	135
	600	350	260	195	170
	400	430	320	240	210
	200	550	400	300	270
60 mph	800	230	170	125	115
	600	290	210	160	140
	400	365	270	200	175
	200	450	330	250	215

AM:

122 vph (from counts) < 157 vph
(req'd for 35mph speed)

PM:

162 vph (from counts) < 288 vph
(req'd for 35mph speed)

B. Signalized Intersections:

Left-Turn Lane Configuration	Minimum Turn Volume
Single exclusive left-turn lane	100 motor vehicles per hour
Dual exclusive left-turn lane	300 motor vehicles per hour



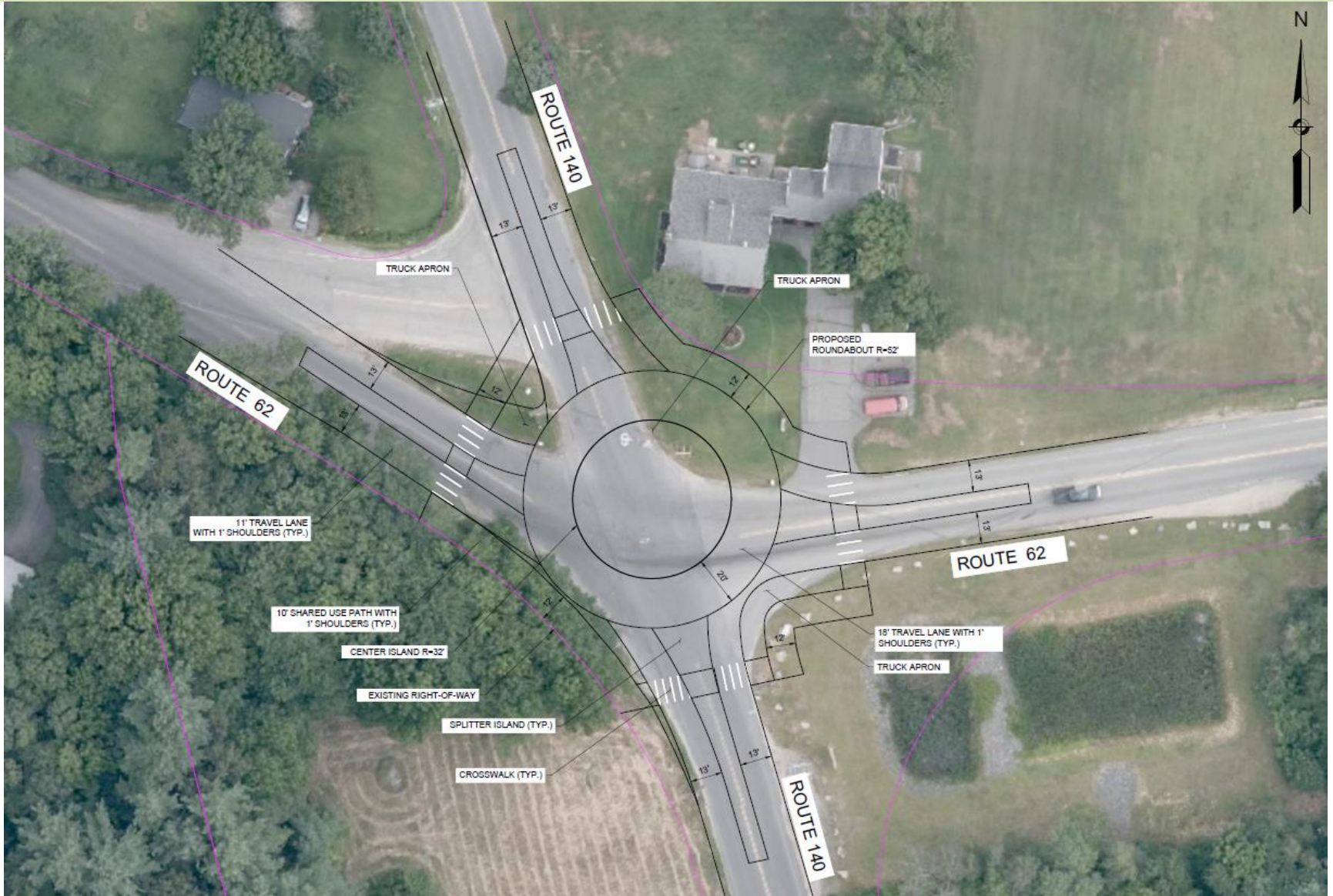
Proposed Conditions - Overview

- Will require bicycle and pedestrian facilities with MassDOT funding
- Roadways remain under local jurisdiction
- One lane approach for each direction remains (left-turn lane warrant not met).
- Three options were looked at

Permitting required

- DEP Wetland Areas, within 100-foot buffer
- 200-foot Riverfront Area
- NHESP Rare Habitat, within 100-foot buffer
- Outstanding Resource Waters – Aquifer Protection District
- Multiple Core Habitats, within ½ mile buffer
- Potential Article 97

Alternative 1: Proposed Mini Roundabout





Alternative 1: Proposed Mini Roundabout

- Mini-roundabout appropriate given traffic volumes
 - Fewer property impacts than traditional roundabout
- Analysis shows that all approaches operate under LOS A with queues no greater than 60 feet.
- Roundabout configuration reduces crashes by ~37%, reduces injuries from crashes by 75%.
- May increase impervious area
- ROW Impacts are anticipated on NE and SW quadrants
- Permitting required
- Construction cost ~ \$2 - \$3 million (not including ROW)
- Preferred concept



NEXT STEPS

- MassDOT to complete review of project and assign project number
- Coordination with MassDOT will be required during 25% Design preparation
- Advance the project to 25% Design and Design Public Hearing. This is the point when MassDOT and MRPC takes the project more seriously.
- Meet with MRPC January 2023 to promote project for TIP funding (i.e. assign a TIP year)



WHAT THE TOWN SHOULD EXPECT

- TIP funding covers the cost of construction. It does not cover the cost of design, permitting or right-of-way acquisitions. These are the Town's responsibility.
- The use of TIP funding means MassDOT oversight will be required.
- We will need to follow the MassDOT Project Development Process.
- We will need to meet MassDOT design standards (bike lanes, travel lane widths, sidewalks, right of way plan development etc..)



ANTICIPATED SCHEDULE

- July 2022 - Town authorizes funding for 25% Design
- January 2023 - Present/Introduce Project to MRPC for upcoming TIP. Prepare preliminary TEC Scoring.
- July 2022 to February 2023 – Prepare 25% Submittal
 - Survey
 - Pre-25% Design Coordination with MassDOT
 - 25% Design Plans
 - Functional Design Report
 - Design Justification Workbook
 - 25% Preliminary ROW Plans
 - Early Environmental Coordination
 - Utility Coordination
- November 2023 – Design Public Hearing

*MassDOT will need
120 days to review
the 25% Submittal*



ANTICIPATED SCHEDULE

- January 2024 – Present project again to MRPC.
Update TEC scoring
- November 2023 to February 2024 – Prepare 75% Design
 - 75% Design Plans
 - Draft Permits
 - 75% Preliminary ROW Plans
- Spring or Fall 2024 – Hold Town Meeting to approve ROW acquisition
- Fall 2024 – Finalize permitting of project



ANTICIPATED SCHEDULE

- July 2024 – Submit 100% Design
- November 2024 – Submit PS&E Submittal
- Early 2025 – Advertise project for construction

The schedule is based on MassDOT schedule template and typical timelines and review. A formal schedule will be required once the 25% Submittal to MassDOT is made.



BUDGETARY ENGINEERING COSTS

- **Total Budgetary Cost = \$550k to \$650k**
 - **Survey, 25% Design, Early Environmental Coordination – \$250k**
 - **Permitting - \$90k**
 - **75% Design – \$110k**
 - **100% Design – \$75k**
 - **Right of Way Plans - \$60k**
 - **PS&E - \$40k**
 - **Construction Phase Services – TBD**

** All costs are approximate based on assumptions. Actual scopes of work and engineering cost estimates will be prepared prior to each submittal based on actual expected scope.*