



Stow Lower Village Traffic Study Summary

**Prepared for:
Town of Stow**

October 12, 2006

Basic Assumptions

- ▣ **Study area – Great Road (Routes 117/62) between White Pond Road and Bradley Road/Deerfield Lane**
- ▣ **Ten-year horizon to 2015**
- ▣ **45.5K SF of new retail development in Lower Village**
- ▣ **18-20% traffic growth from 2005 to 2015 includes 1% background growth plus new retail development in Lower Village area**
- ▣ **One through lane in both directions; minimize auxiliary lanes**
- ▣ **Enhance pedestrian walking environment regardless of traffic alternatives through appropriately-located median locations and a continuous/expandable sidewalk system**
- ▣ **Retain & enhance Stow Lower Village 'sense of place' and historic features**
- ▣ **Employ Stow Lower Village Committee's preferred treatment of pedestrian zone (11 feet both sides) to maximum extent possible**



Stow Lower Village Traffic Study
Town of Stow, Massachusetts

Fay, Spofford & Thorndike, LLC
Engineers • Planners • Scientists

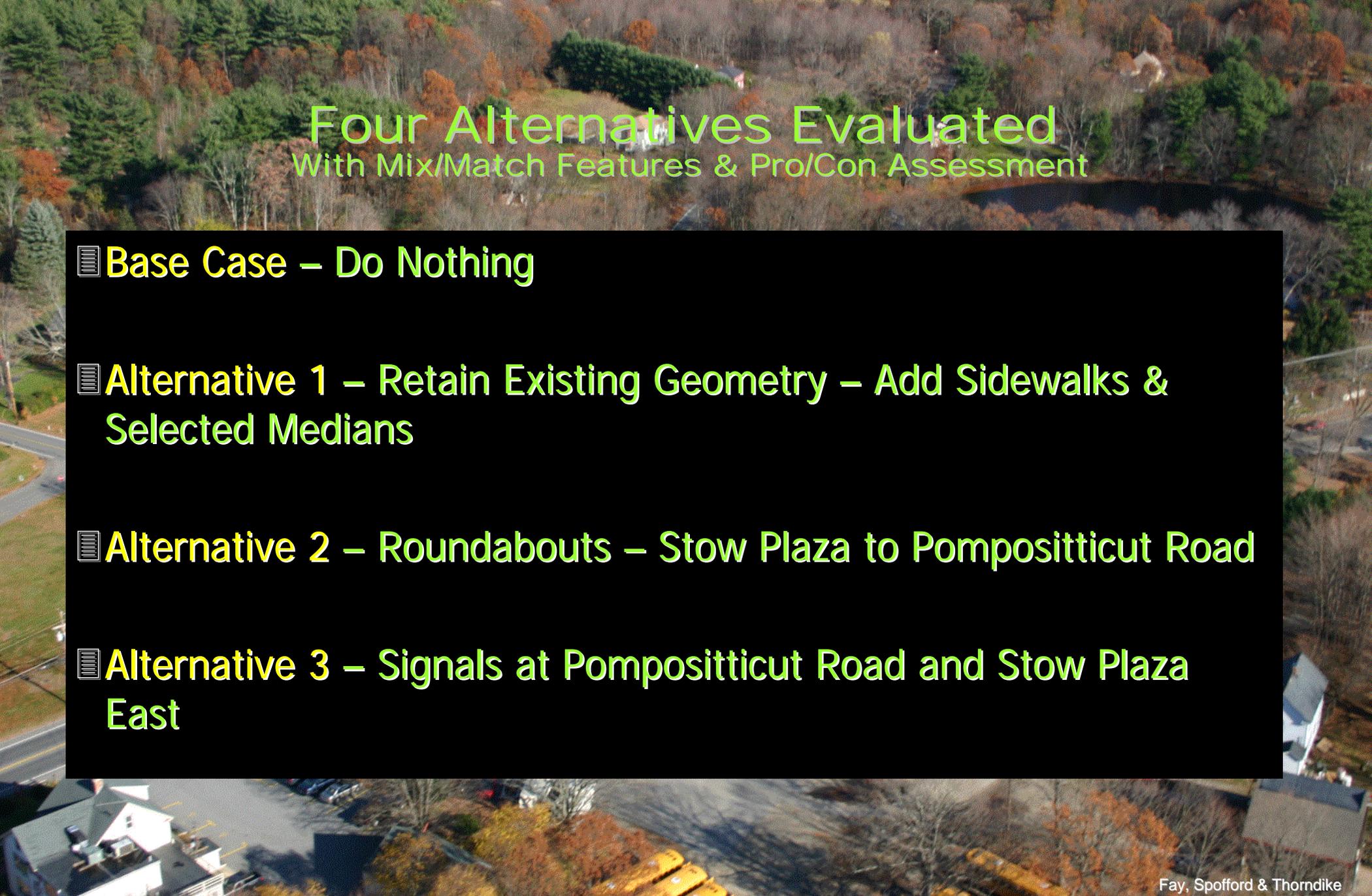
Study Area

No-Build Alternative

Figure 3-1

Schematic Diagram:
Not to Scale





Four Alternatives Evaluated

With Mix/Match Features & Pro/Con Assessment

▣ **Base Case – Do Nothing**

▣ **Alternative 1 – Retain Existing Geometry – Add Sidewalks & Selected Medians**

▣ **Alternative 2 – Roundabouts – Stow Plaza to Pompositticut Road**

▣ **Alternative 3 – Signals at Pompositticut Road and Stow Plaza East**

Alternative 1 – Pedestrian Improvements		
Feature: White Pond Road Median with Crosswalk		
	Rank (+1, 0 or -1)	Comments
Feature: Red Acre Road one-way northbound between Great Road and Gardner Road		
	Rank (+1, 0 or -1)	Comments
Feature: Median with Crosswalk at Town Common		
	Rank (+1, 0 or -1)	Comments
Feature: Expanded Town Common		
	Rank (+1, 0 or -1)	Comments
Feature: Move Stow Plaza East Driveway further east		
	Rank (+1, 0 or -1)	Comments
Feature: Median with Crosswalk across from Stow Plaza		
	Rank (+1, 0 or -1)	Comments
Feature: Median with Crosswalk west of Samuel Prescott Drive		
	Rank (+1, 0 or -1)	Comments
Feature: Median with Crosswalk east of Elmridge Road		
	Rank (+1, 0 or -1)	Comments
Feature: Continuous Sidewalks along Lower Village Main Corridor		
	Rank (+1, 0 or -1)	Comments
Feature: Expanded Curb Cuts throughout Lower Village		
	Rank (+1, 0 or -1)	Comments

Alternative 2 – Roundabout/One-way Pair		
Feature: Roundabout at Pompositicut, Red Acre and Great Roads		
	Rank (+1, 0 or -1)	Comments
Feature: Red Acre Road one-way northbound between Great and Gardner Roads		
	Rank (+1, 0 or -1)	Comments
Feature: Re-direction of Gardner Road/Expanded Town Commons		
	Rank (+1, 0 or -1)	Comments
Feature: One-way Pair at Stow Plaza		
	Rank (+1, 0 or -1)	Comments
Feature: On-street Parking at One-way Pair		
	Rank (+1, 0 or -1)	Comments

New Alternatives (require expanded Right of Way)		
Feature: Roundabout at Deerfield Lane		
	Rank (+1, 0 or -1)	Comments
Feature: Roundabout at Elmridge Lane		
	Rank (+1, 0 or -1)	Comments

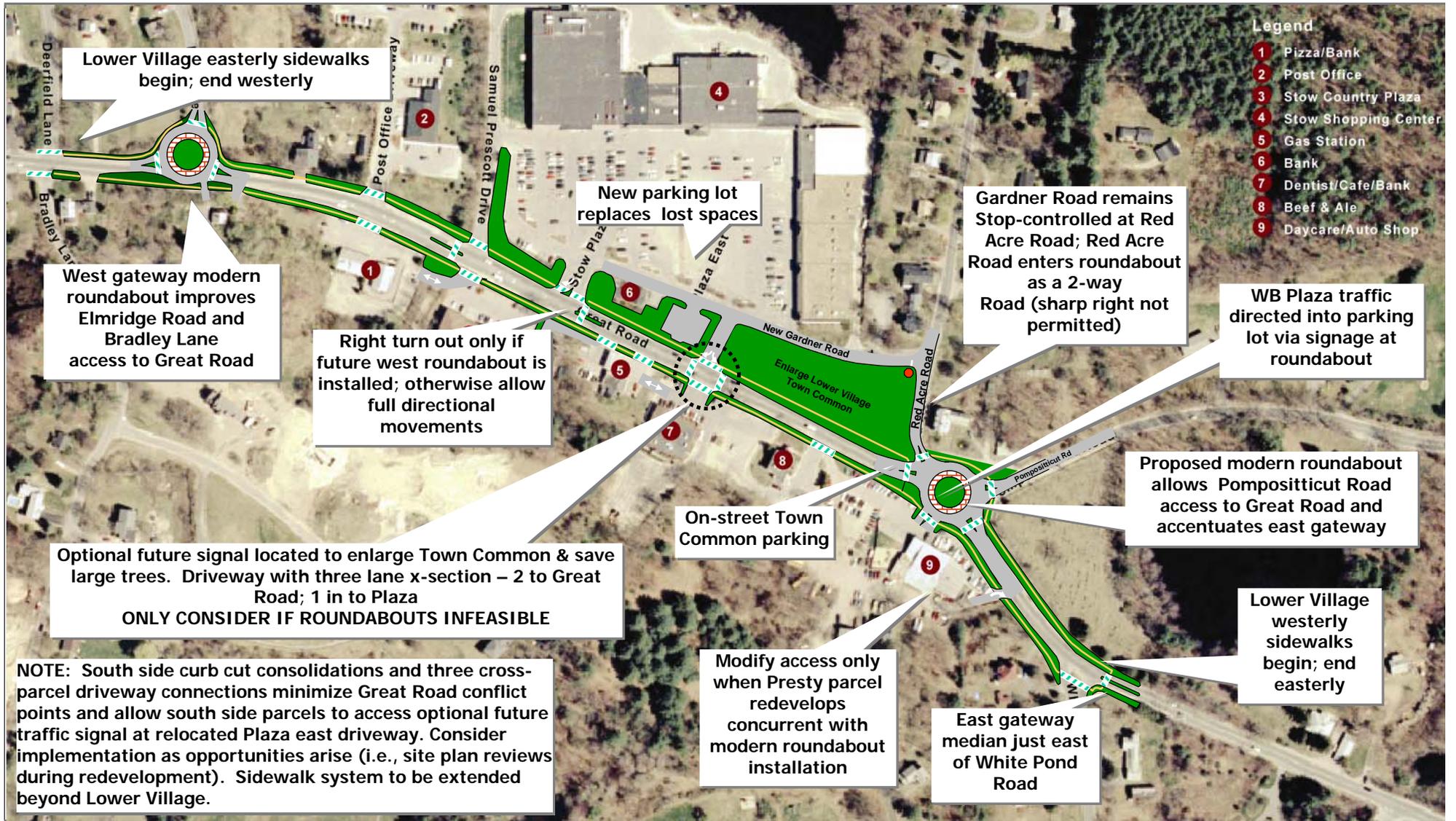
Alternative 3 – Traffic Signal Control		
Feature: Signal at Intersection of Pompositicut and Great Road with Auxiliary Lanes		
	Rank (+1, 0 or -1)	Comments
Feature: Red Acre Road one-way northbound between Great and Gardner Roads		
	Rank (+1, 0 or -1)	Comments
Feature: On-street parking at Red Acre Road		
	Rank (+1, 0 or -1)	Comments
Feature: Re-designed corner at Red Acre and Gardner Roads		
	Rank (+1, 0 or -1)	Comments
Feature: Re-direct Gardner Road/Expanded Town Common		
	Rank (+1, 0 or -1)	Comments
Feature: Signal at Stow Plaza East Driveway		
	Rank (+1, 0 or -1)	Comments
Feature: Optional Right Turn Lane at Signalized Stow Plaza East Driveway		
	Rank (+1, 0 or -1)	Comments
Feature: Splitter island at Stow Plaza West Driveway – right turn exit only		
	Rank (+1, 0 or -1)	Comments





Lower Village Committee Selects a Preferred Alternative

SAMUEL PRESCOTT DR



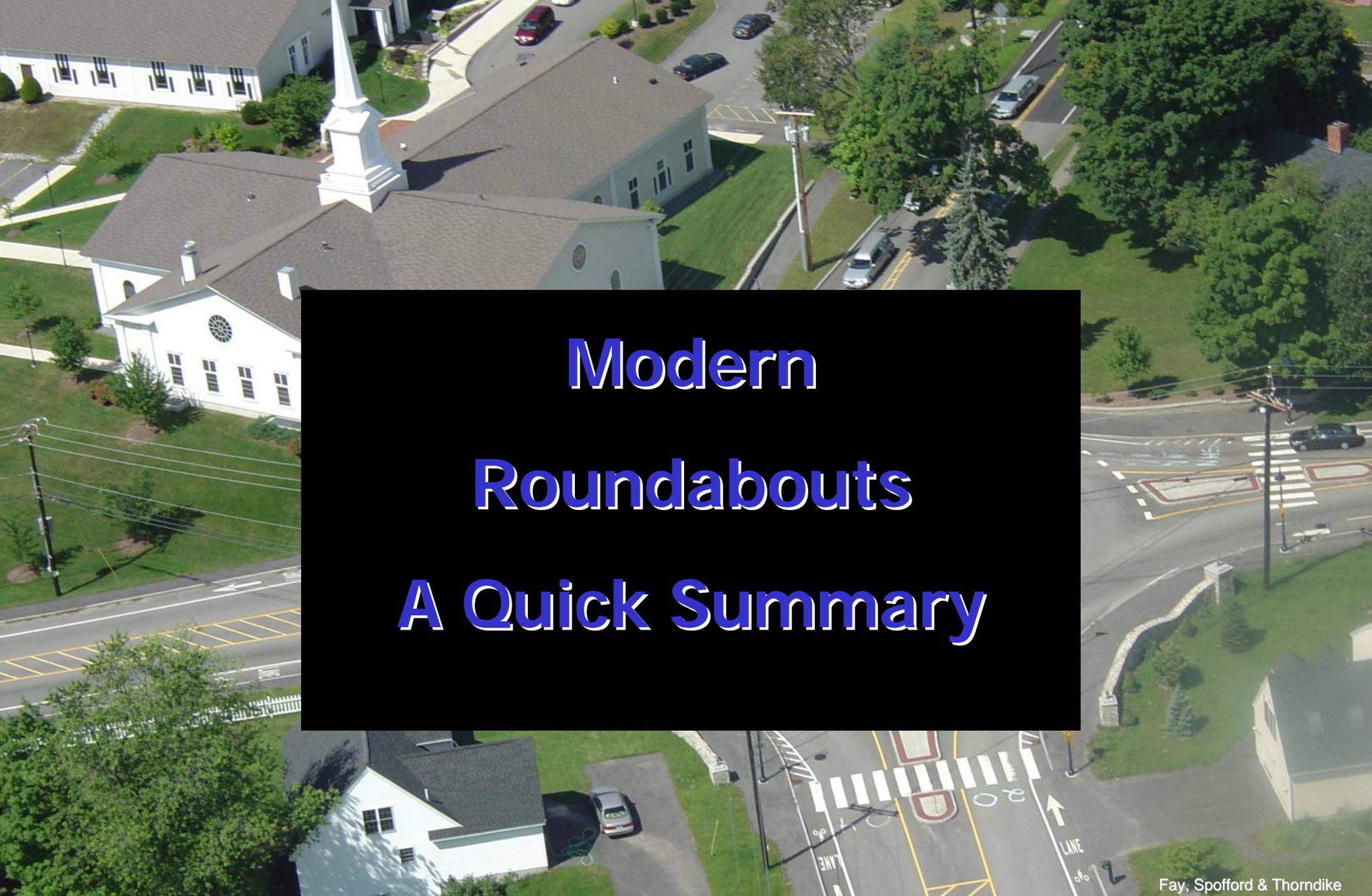
Stow Lower Village Traffic Study
Town of Stow, Massachusetts

Fay, Spofford & Thorndike, LLC
Engineers • Planners • Scientists

Lower Village Committee's Preferred Alternative

Schematic Diagram:
Not to Scale

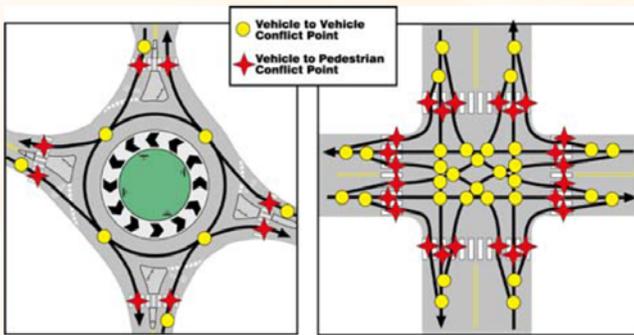


An aerial photograph showing a white church with a prominent steeple on the left side. To the right, a modern roundabout intersection is visible, featuring a central landscaped island with trees and a stone wall. The road has white crosswalks and yellow lane markings. Several cars are visible on the roads. The background is filled with green trees and a clear sky.

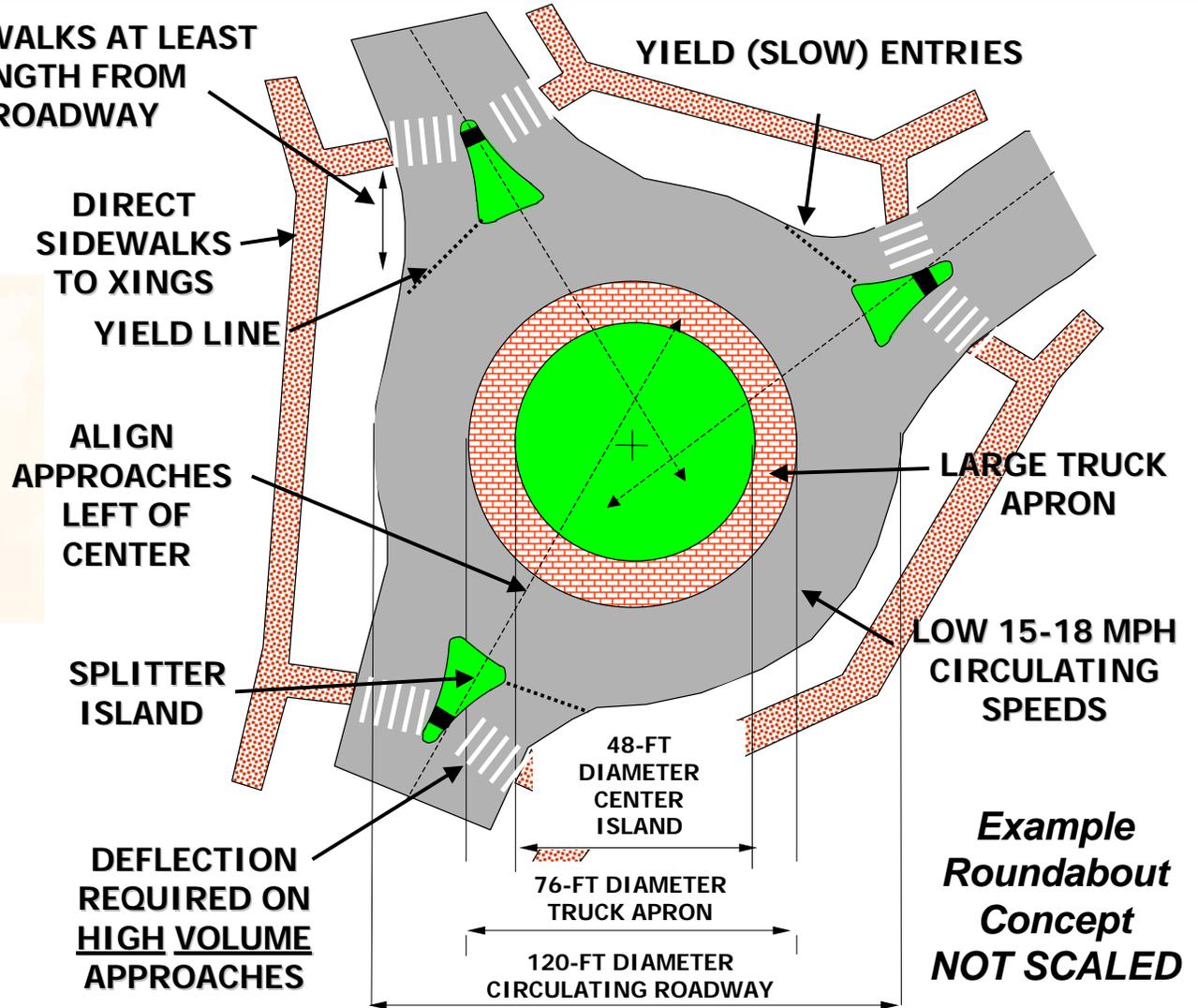
Modern Roundabouts A Quick Summary

PEDESTRIAN CROSSWALKS AT LEAST ONE VEHICLE LENGTH FROM CIRCULATING ROADWAY

VEHICLE/PEDESTRIAN CONFLICTS COMPARISON W/SIGNAL
SOURCE:USDOT

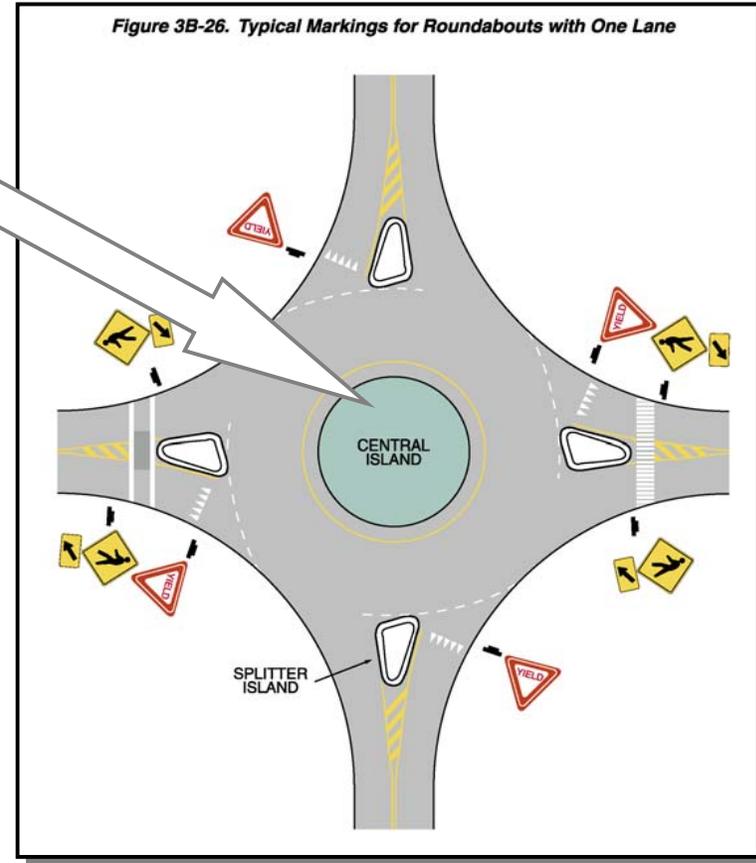


Modern Roundabout

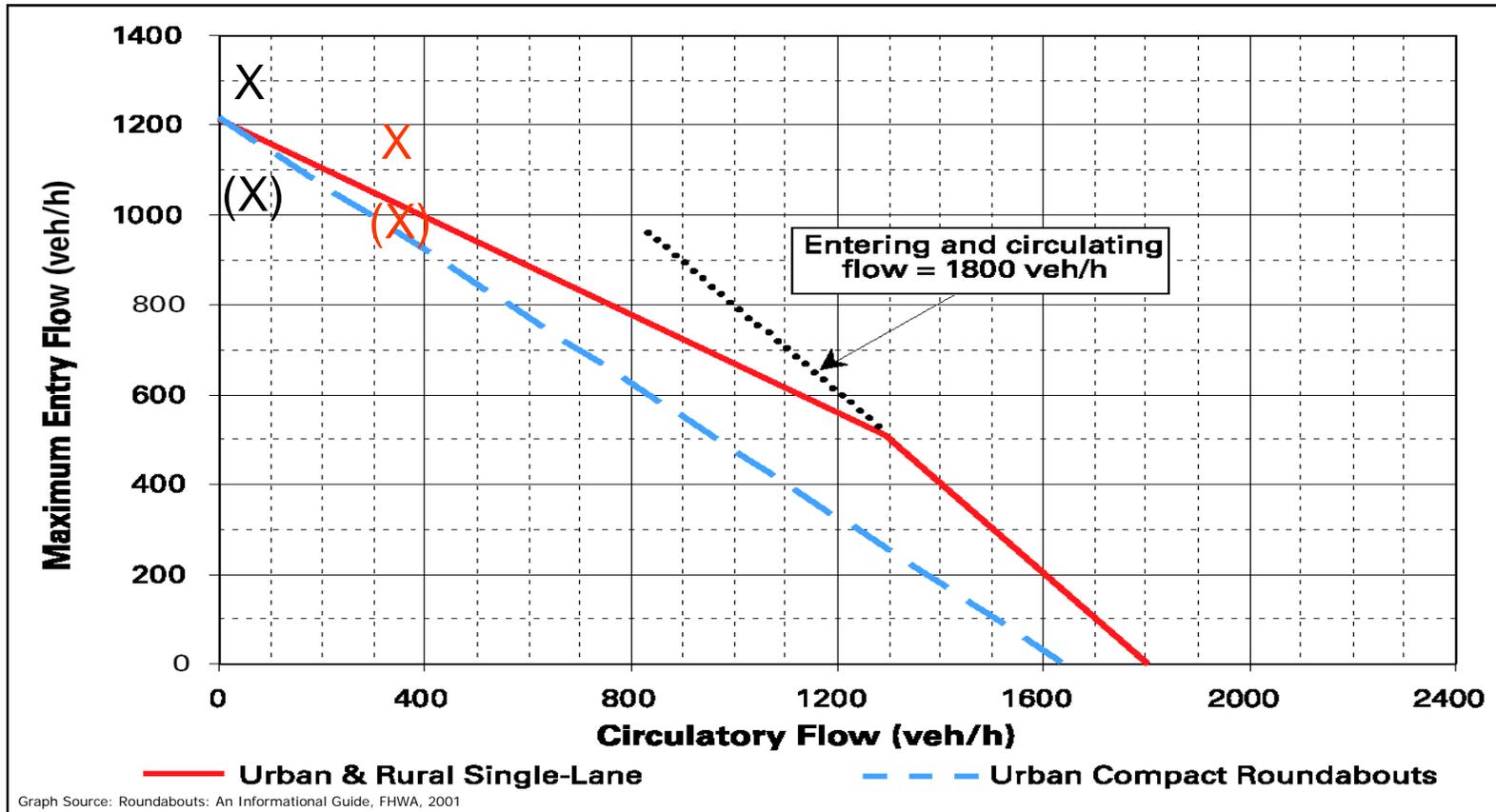


Typical Roundabout Features

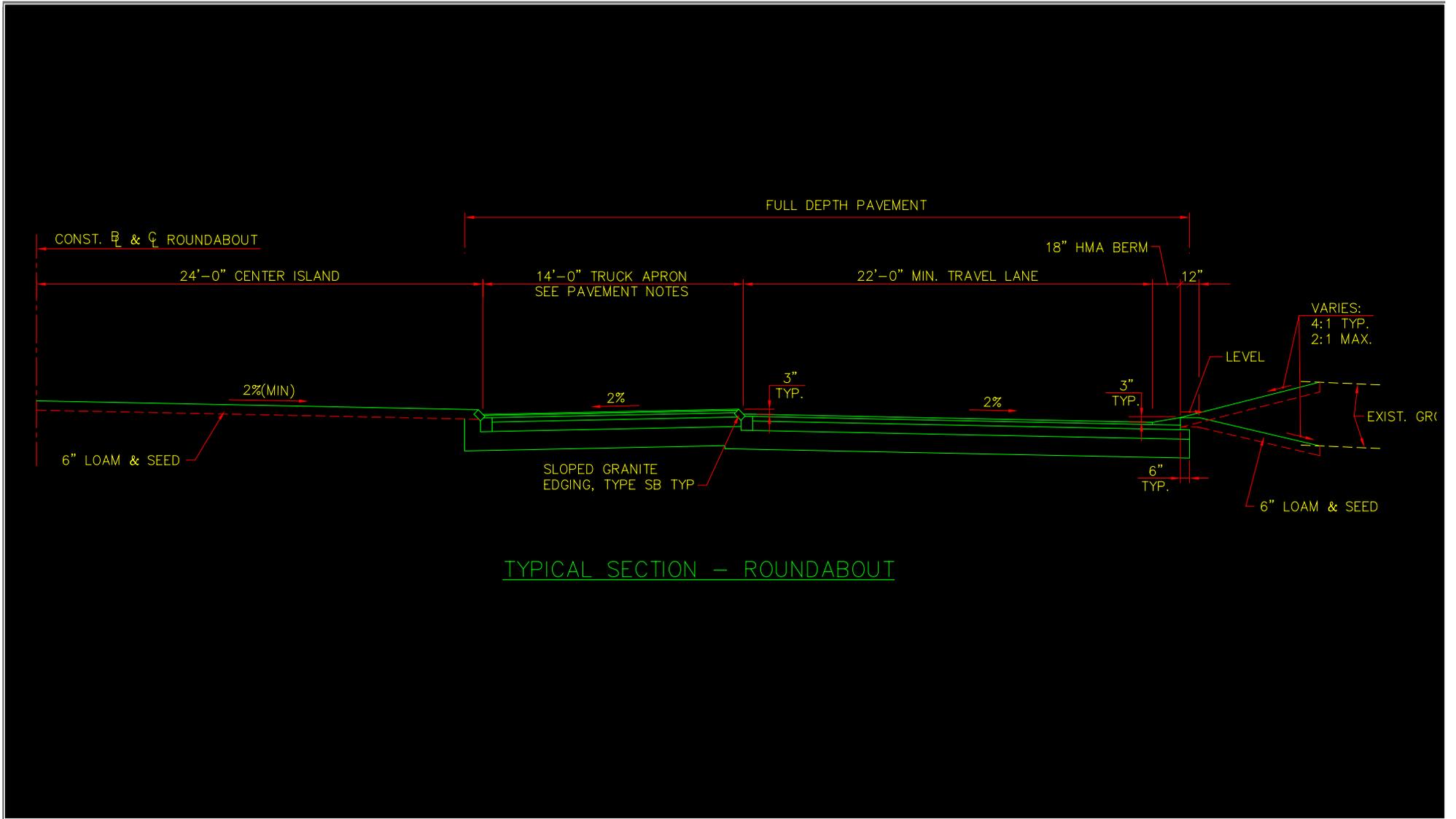
Note: Central island must be well-lighted at night; warning signs must be placed on all approaches (see below)



Source: Manual on Uniform Traffic Control Devices (MUTCD) Millenium Edition (June, 2001)



X = AM and X= PM Peak Direction of flow (EB AM/ WB PM)



Stow Lower Village Traffic Study
Town of Stow, Massachusetts

Fay, Spofford & Thorndike, LLC
Engineers • Planners • Scientists

Typical Roundabout Center to Edge Cross-section

Schematic Diagram:
Not to Scale



Advantages

- FEWER CONFLICT POINTS
- LESS SEVERE/FEWER ACCIDENTS
- HIGHER INTERNAL LANE CAPACITY/GREATER EFFICIENCY IN PROCESSING TRAFFIC FLOWS
- YIELD HAS LESS DELAY THAN STOP OR SIGNAL CONTROL
- LOWER LONG RANGE MAINTENANCE REQUIREMENTS
- SPLITTER ISLANDS PROVIDE PEDESTRIAN REFUGE
- LOW SPEED IMPROVES BICYCLE SAFETY
- MORE AESTHETIC/SEASONAL LANDSCAPING OPPORTUNITIES
- RECOVER FROM CONGESTION FASTER THAN SIGNALS

Disadvantages

- MAY INITIALLY INCREASE ACCIDENTS
- NO EMERGENCY VEHICLE PRE-EMPTION
- EXCEPT FOR QUEUING, SIGNAL WILL OPERATE BETTER WHEN DEMANDS EXCEED CAPACITY
- GEOMETRIC-ENFORCED DELAYS ARE AROUND THE CLOCK – DRIVERS MAY DISLIKE
- OVER-CAPACITY QUEUING CAN CAUSE DRIVERS TO 'JUMP' GAPS
- REQUIRES MORE NIGHT ILLUMINATION THAN A SIGNAL
- TRUCKERS NEED TO SLOW, MAY INCREASE NOISE
- MAY HAVE HIGHER INITIAL INSTALLATION COSTS





Fay Spofford & Thorndike

Elmridge Road at Great Road Roundabout Concept



***Pompositticut and Red Acre Roads at Great Road
Roundabout Concept***

Lower Village Committee

Preferred Alternative

Dual Roundabouts

Pros

- Slows eastbound and westbound through traffic through roundabouts
- Creates significant eastbound and westbound gateways
- Creates significant landscaping opportunities at roundabouts
- Allows Stow Plaza, Deerfield/Bradley, Pompositicut/Red Acre improved access to Great Road
- Minimizes queuing during off-peak hours
- Pedestrians cross one way flow
- Should improve safety vs. traffic signalization

Cons

- Significant through traffic impacts; large truck operations will be slowed; perhaps more noisy
- Peak hour congestion is likely at the roundabout; queues are not expected to be as long as with signalization
- Historic character impacts – continuity of Great Road
- One lane roundabouts can accommodate no more than 1,200 vph conflicts; unbalanced flows not recommended
- Most costly of alternatives

Preliminary Cost Estimate

						<u>Low</u>	<u>High</u>
<u>Stow Lower Village Committee Recommended Measures</u>							
Sidewalk and Committee Fencing Areas*						\$195,000	\$225,000
Recommendation - East Gateway at White Pond Road						\$30,000	\$40,000
Recommendation - Modern Roundabout (Pompositticut/Red Acre Roads)						\$250,000	\$350,000
Recommendation - Gardner Road/Red Acre Road Plaza Realignment						\$115,000	\$125,000
Recommendation - Stow Plaza Realignment and Replacement lots						\$245,000	\$255,000
Recommendation - Two medians and channelization						\$40,000	\$60,000
Subtotal Range of Costs						\$1,125,000	\$1,355,000
25% Contingency						\$281,250	\$338,750
Total Range of Costs*						\$1,406,250	\$1,693,750
*Excludes right of way purchase costs.							
** Optional Traffic Signal at Stow Plaza East would be an additional \$100,000.							

Other Issues

▣ Pedestrian continuity

▣ Regional traffic growth – Maynard Planning Board withdrew its support for a redevelopment proposal at 129 Parker Street; former DEC site (10/11/06).

▣ The withdrawn plan included:

▣ 175K of retail/food store

▣ 50 K of office

▣ 100 residential units

▣ Regardless of what is developed, it will likely generate additional traffic on Great Road through Stow Lower Village increasing 'background' traffic to a greater or lesser amount depending on the type of land uses development

Next Steps

- ☰ **Town selects its 'Preferred Alternative'**
- ☰ **FST Prepares final report incorporating Tech Memos & Town's Preferred Alternative**
- ☰ **Implementation in steps**

Questions?

EXTRA SLIDES

Base Case

No-Build Alternative

Pros

- **Best for through traffic**
- **Lowest Cost**
- **No impact on historical resources**

Cons

- **Worst LOS of alternatives considered**
- **Congestion at Pompositticut, Red Acre, and Stow Plaza remains**
- **Side street queuing remains**
- **No improvements to pedestrian activity**
- **Gardner Road 5-legged intersection remains**
- **Frequent curb cut conflict points remain**

Alternative 1

Sidewalk, Curb cut Consolidations, and Crossing Enhancements

Pros

- **Enhanced pedestrian environment**
- **Reduces curb cut conflicts**
- **Reduces Red Acre Road congestion through diversion**
- **Retains historic Town Common between Pompositticut and Red Acre Roads**
- **Enlarges the Town Common area**
- **Is better for through traffic than the other Build Alternatives**

Cons

- **Worst LOS of Build alternatives considered**
- **Congestion remains at Pompositticut and worsens at Stow Plaza east due to diversions of Red Acre Road approach traffic to Gardner Road**
- **Side street queuing remains on approaches to Great Road**
- **Divides the enlarged Town Common**



Stow Lower Village Traffic Study
Town of Stow, Massachusetts

Alternative 1 - Sidewalk, Curb Cut Consolidations and Crossing Enhancements

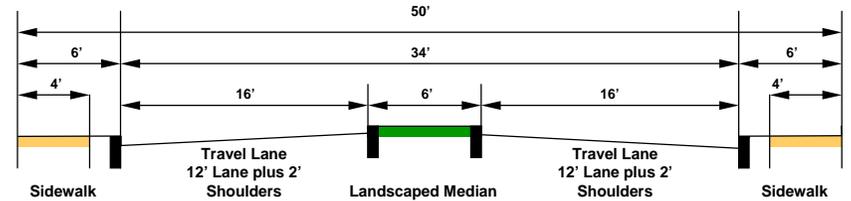
Figure 3-2





Looking East on Great Road (Route 117) at White Pond Road

Not to Scale



Minimum Typical Median Section
Existing Right-of-Way
Great Road (Route 117) East of White Pond Road

Alternative 2

Roundabout/One-way Pair

Pros

- Slows through traffic – particularly westbound through roundabout
- Creates a significant westbound gateway
- Reduces Red Acre Road congestion through diversion
- Creates significant landscaping opportunities
- Addresses Pompositticut Road congestion
- Minimizes queuing during off-peak hours

Cons

- Significant through traffic impacts; large truck operations
- One-way treatment requires land-takings at Stow Plaza & significant number of curb cut consolidations to be effective
- Peak hour congestion is likely at the roundabout; queues are not expected to be as long as with signalization & less during off hours
- Historic character impacts – continuity of Great Road
- Roundabouts can accommodate up to 1,800 vph conflicts
- Most costly of build alternatives



Stow Lower Village Traffic Study
Town of Stow, Massachusetts

Alternative 2 – Roundabout/One-Way Pair
Figure 3-3





Stow Lower Village Traffic Study
Town of Stow, Massachusetts

Roundabout Concept - Pompositticut Road at Great Road Aerial View

Figure 3-5



Stow Lower Village Traffic Study
Town of Stow, Massachusetts

Enhanced Pedestrian Crossing – Elmridge Road at Great Road Aerial View
Figure 3-6



Stow Lower Village Traffic Study
Town of Stow, Massachusetts

Alternative 3 - Traffic Signal Control
Figure 3-4



Alternative 3

Traffic Signal Control

Pros

- **Stow Plaza east driveway and Pompositticut Road would have better access to Great Road**
- **Creates landscaping opportunities, particularly if Stow Plaza east driveway is not relocated per Alternative 1**
- **Eases pedestrian crossings of Great Road at signal locations**
- **Creates gaps for side street traffic**

Cons

- **Potential Stow Plaza right turn lane adversely affects Town Common (w/o lane a ¼ mile backup occurs in the PM peak)**
- **Through traffic impacts most significant of Build alternatives**
- **More pavement than other alternatives -- widening needed at Pompositticut Road and Stow Plaza entrance**
- **Signals are not rural in character; westbound visibility of Pompositticut signals is a design issue**
- **Signals may increase rear end crashes**

Intersection	No-Build				Alternative 1- Enhancements				Alternative 2 - Roundabout/1-way				Alternative 3 - Signal				
	AM				AM				AM				AM				
	LOS	Average Delay worst approach	Queuing	ICU	LOS	Average Delay	Queuing	ICU	LOS	Average Delay	Queuing*	ICU	LOS	Average Delay	Queuing*	ICU	
2	Great Road and Post Office Drive	B	14	2	72%	B	14	2	72%	B	14	2	72%	B	0	2	72%
4	Great Road and White Pond Road	E	38	26	62%	E	38	26	62%	E	38	26	62%	E	1	26	62%
7	Great Road and Deerfield Lane	F	77	45	80%	F	77	45	80%	F	77	45	80%	F	1	45	80%
9	Great Road and Elmridge Road	E	37	13	79%	E	37	13	79%	E	37	13	79%	E	1	18	79%
12	Great Road and Samuel Prescott Drive	F	55	32	77%	F	55	33	77%	F	55	33	77%	F	2	52	77%
15	Great Road and Stow Plaza West Drive	F	91	67	82%	F	91	67	82%	F	100+	449	91%	C	1	12	75%
16	Great Road and Stow Plaza East Drive	F	100+	176	80%	F	100+	329	83%	D	26	14	76%	C	20	N/A	83%
19	Great Road and Red Acre Road	F	100+	198	105%	A	3	3	98%	N/A				A	2	3	98%
20	Great Road and Pompositicut	F	100+	221	119%	F	100+	221	119%	VIC = 1.13 (congestion expected)				A	8	540	71%
23	Great Road and East Bank Plaza	F	63	2	79%	F	63	2	79%	F	58	2	77%	F	0	2	79%
26	Great Road and Pizza Bank	F	53	34	79%	F	53	34	79%	E	45	30	79%	F	2	47	79%
28	Great Road and Country Plaza Drive	E	44	4	78%	E	44	4	78%	E	44	4	78%	F	0	5	78%
35	Great Road West and Stow Plaza West Drive									F	60	143	56%				
36	Great Road West and Stow Plaza East Drive									C	22		52%				

Intersection	No-Build				Alternative 1- Enhancements				Alternative 2 - Roundabout/1-way				Alternative 3 - Signal				
	PM				PM				PM				PM				
	LOS	Average Delay	Queuing	ICU	LOS	Average Delay	Queuing	ICU	LOS	Average Delay	Queuing	ICU	LOS	Average Delay	Queuing	ICU	
2	Great Road and Post Office Drive	F	100+	187	91%	F	100+	187	91%	F	100+	187	91%	F	14	187	91%
4	Great Road and White Pond Road	F	65	33	75%	F	65	33	75%	F	65	33	75%	F	1	33	75%
7	Great Road and Deerfield Lane	F	100+	77	97%	F	100+	77	97%	F	100+	77	97%	F	5	77	97%
9	Great Road and Elmridge Road	F	100+	34	89%	F	100+	34	89%	F	100+	34	89%	F	67	39	89%
12	Great Road and Samuel Prescott Drive	F	91	66	89%	F	91	66	89%	F	91	66	89%	F	2	66	89%
15	Great Road and Stow Plaza West Drive	F	100+	215	97%	F	100+	215	97%	D	34	77	97%	F	698	N/A	97%
16	Great Road and Stow Plaza East Drive	F	100+	190	98%	F	100+	190	98%	C	19	8	110%	B	14	N/A	89%
19	Great Road and Red Acre Road	F	100+	204	92%	A	4	8	84%	N/A				C	0	8	84%
20	Great Road and Pompositicut	F	100+	861	142%	F	100+	861	142%	VIC = 1.43 (congestion expected)				D	42	>1/4 mi	96%
23	Great Road and East Bank Plaza	F	100+	52	87%	F	100+	52	87%	F	100+	52	87%	F	0	1.8	87%
26	Great Road and Pizza Bank	F	100+	5	90%	F	100+	5	90%	F	100+	5	90%	F	2	6.6	90%
28	Great Road and Country Plaza Drive	F	100+	25	89%	F	100+	25	89%	F	100+	25	89%	F	7	47.8	88%
35	Great Road West and Stow Plaza West Drive									F	100+	527	97%				
36	Great Road West and Stow Plaza East Drive									F	100+	306	87%				

LOS - Level of Service A-F (A is best, F is worst)

Average Delay - Average delay - Seconds per vehicle during the peak 15 minute period of the peak hour. On the worst approach for unsignalized; average overall for signalized locations (italicized).

Queuing in feet overall in all directions

ICU - Intersection Capacity Utilization. This is a summary capacity term given in the SYNCHRO for information only.