

# I-91 Interchange 19 Improvements

## Northampton, MA

Project Advisory Committee

Meeting #5

July 20, 2010



# Meeting Agenda










- ▶ Review Evaluations
- ▶ Select Alternatives to Advance for Additional Study
- ▶ Next Steps

# Evaluation of Alternatives

## ► Alternatives Evaluated:

- No Build
- 10 Roadway Alternatives
  - Localized Improvements: Concepts 12, 13, 13A, 13B & 13C
  - Interchange Access Improvements: Concepts 15, 15A, 16, 17, 18
- Transportation Demand Management (TDM) Package

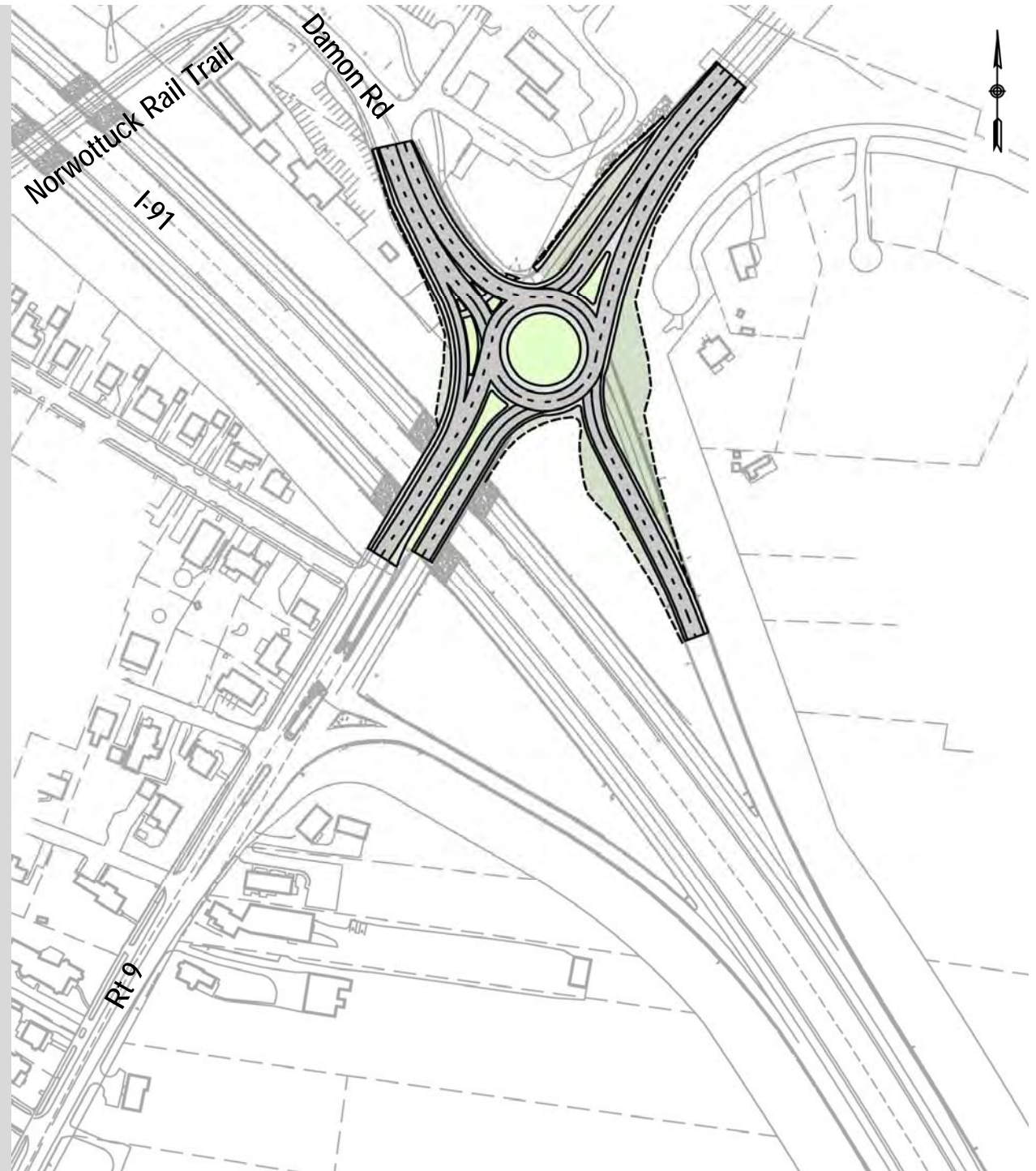
# Evaluation Criteria

Legend			
	Some	Moderate	Substantial
Benefits			
Impacts			
Negligible Benefit or Impact			

# Concept 12

## ► Concept 12 - Roundabout

- Converts Route 9/Damon Rd. Intersection to a 2 Lane Roundabout
- Generally stays within existing roadway layout
- Introduces a degree of traffic calming



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# Concept 13

## ► Concept 13 – Intersection & Ramp Improvements

- Modified to add additional WB left turn lane onto SB on-ramp
- Modified to add additional NB through lane to Damon Road from NB off-ramp
- Left turn lane extended under bridge by relocating sidewalk or replacing the structures
- Improves on and off-ramps
- Does not provide a full access interchange



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# Concept 13A

## ► Concept 13A – Inter. & Ramp Improvements w/ Roundabout

- Adds additional WB left turn lane onto SB on-ramp
- Converts Damon Road/Route 9 intersection to a roundabout
- Left turn lane extended under bridge by relocating sidewalk or replacing the structures
- Improves on and off-ramps
- Does not provide a full access interchange



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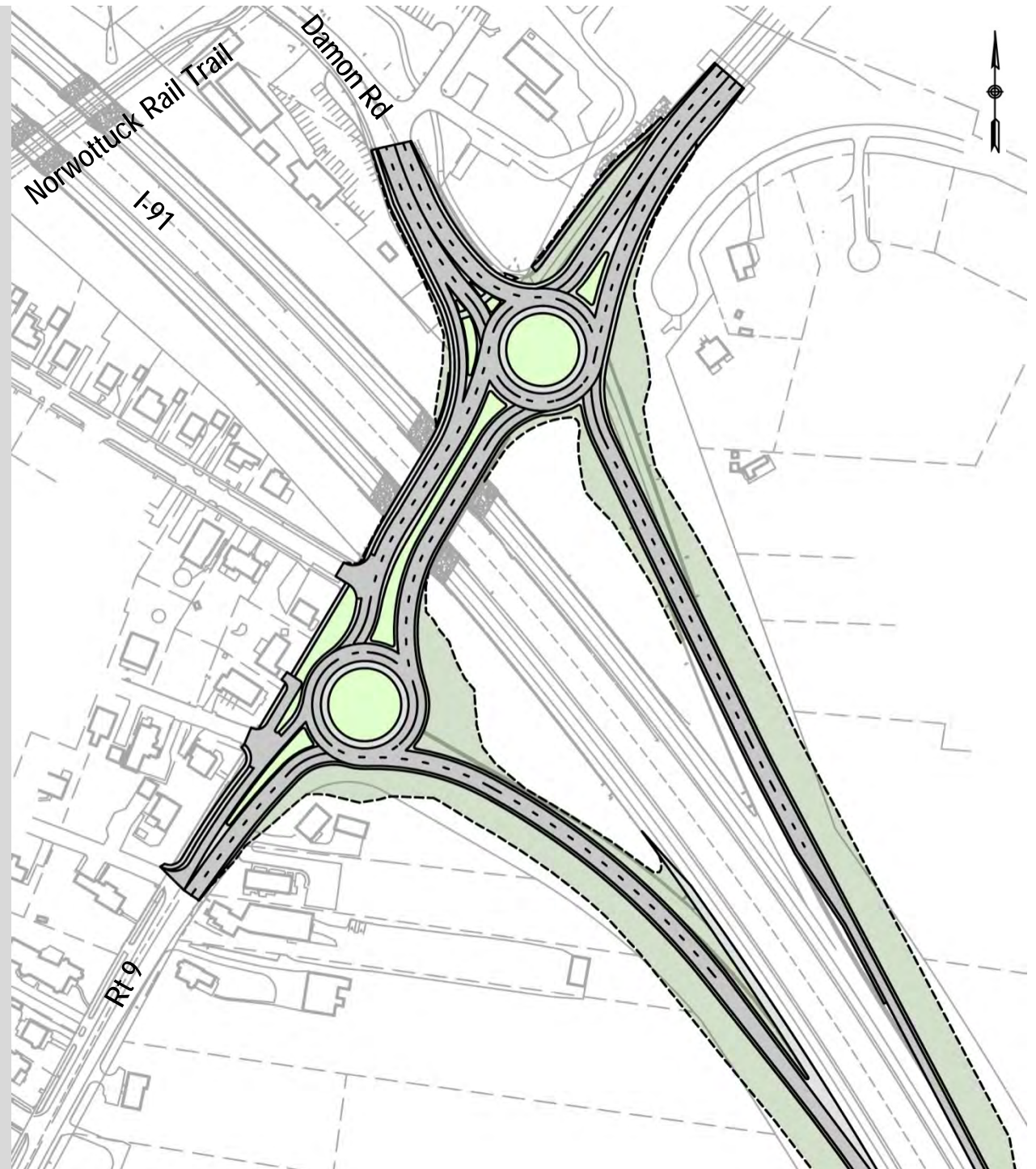
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# Concept 13B

## ► Concept 13B – Inter. & Ramp Improvements w/ Double Roundabout

- Converts Damon Road/Route 9 & Route 9/SB On-Ramp intersections to roundabouts
- Improves on and off-ramps
- Does not provide a full access interchange



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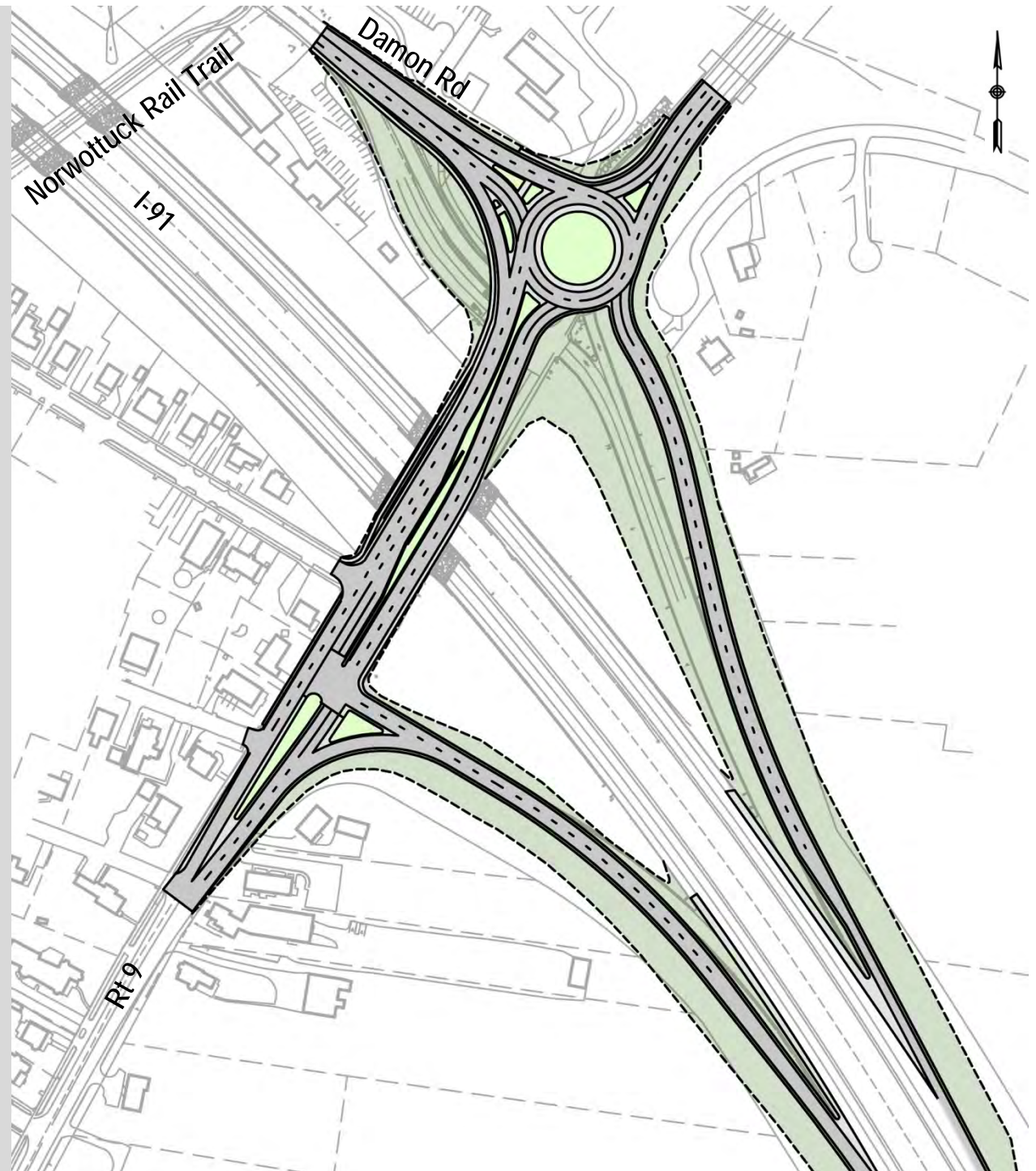
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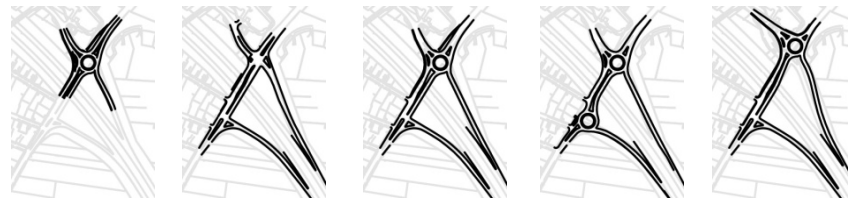
# Concept 13C

## ► Concept 13C– Inter. & Ramp Improvements w/ Roundabout & Relocated Damon Road

- Converts Damon Road/Route 9 intersection to a roundabout
- Shifts Damon Road eastward onto old alignment (better spacing between intersections)
- Left turn lane extended under bridge by relocating sidewalk or replacing the structures
- Improves on and off-ramps
- Does not provide a full access interchange

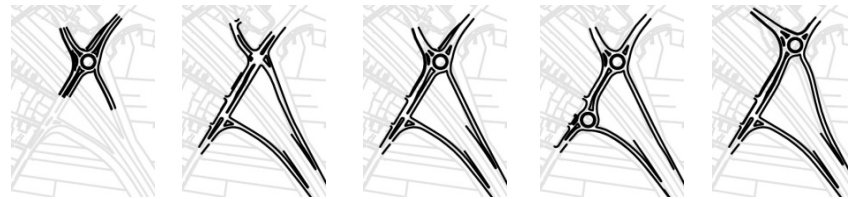


# Evaluation Matrix



		Alternatives				
		C12	C13	C13A	C13B	C13C
Safety	Crash Rates	○	○	○	○	○
	Emergency Vehicle Access	□	◇	□	□	□
	Traffic Calming	◐	◇	◐	●	◐
Traffic	Delays (LOS)	○	○	◐	◐	◐
	Travel Time	○	○	○	○	○
	Queueing	○	○	◐	◐	◐

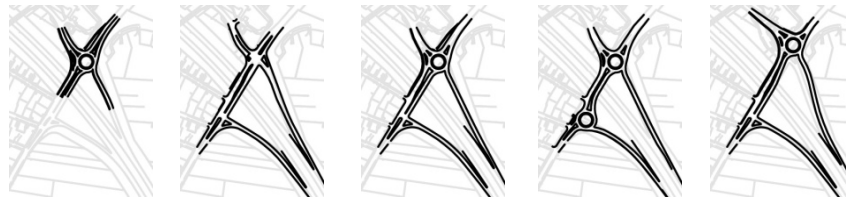
# Evaluation Matrix



		Alternatives				
		C12	C13	C13A	C13B	C13C
Construction	Costs	\$1.1M	\$2.6M	\$2.6M	\$2.6M	\$3.0M
	Duration (Years)	1 To 2	1 To 2	2 To 3	2 To 3	2 To 3
Multi-modal	Impacts during Construction					
	Pedestrian Accommodation					
	Bike Accommodation					
	Transit Access					



# Evaluation Matrix



		Alternatives				
		C12	C13	C13A	C13B	C13C
Community Impacts	Property	□	□	□	▬	▬
	Recreation Impacts/Access	◇	◐	◇	◇	■
	Community Cohesion	◇	○	◇	◇	◇
	Agricultural	◇	□	◇	◇	◇
	Aesthetics	◐	◇	○	◐	○
	Airport Impacts	◇	◇	◇	◇	◇

# Evaluation Matrix



		Alternatives				
		C12	C13	C13A	C13B	C13C
Environmental Impacts	Noise	◇	◇	◇	◇	◇
	Wetland	◇	◇	◇	◇	◇
	Flood Plain	◇	◇	◇	□	□
	Rare Species	◇	◇	◇	◇	◇
	Open Space	◇	◇	◇	◇	◇
	Air Quality	○	○	◐	◐	◐
	Light	◇	◇	◇	□	□

# Evaluation of Alternatives

## ► Project Team Recommends Advancing Following Limited Build for Additional Study:

- Concept 13
  - Traditional (familiar design)
  - Reduces bicycle concerns
- Concept 13A
  - Operational benefits
  - Traffic calming
- Concept 13B
  - Operational benefits
  - Traffic calming



# Concept 15

## ► Concept 15 Full Access Interchange

- Preferred concept from previous study
- SB Off-Ramp constructed as loop ramp
- SB On-Ramp relocated westerly
- NB Off-Ramp converted to right turn only
- Second NB Off-Ramp connects directly to Damon Road (for Damon Road & WB Route 9 movements)
- NB On-Ramp constructed off of Damon Road
- Damon Road raised by approximately 5' to accommodate ramps
- Provides full access interchange for all movements



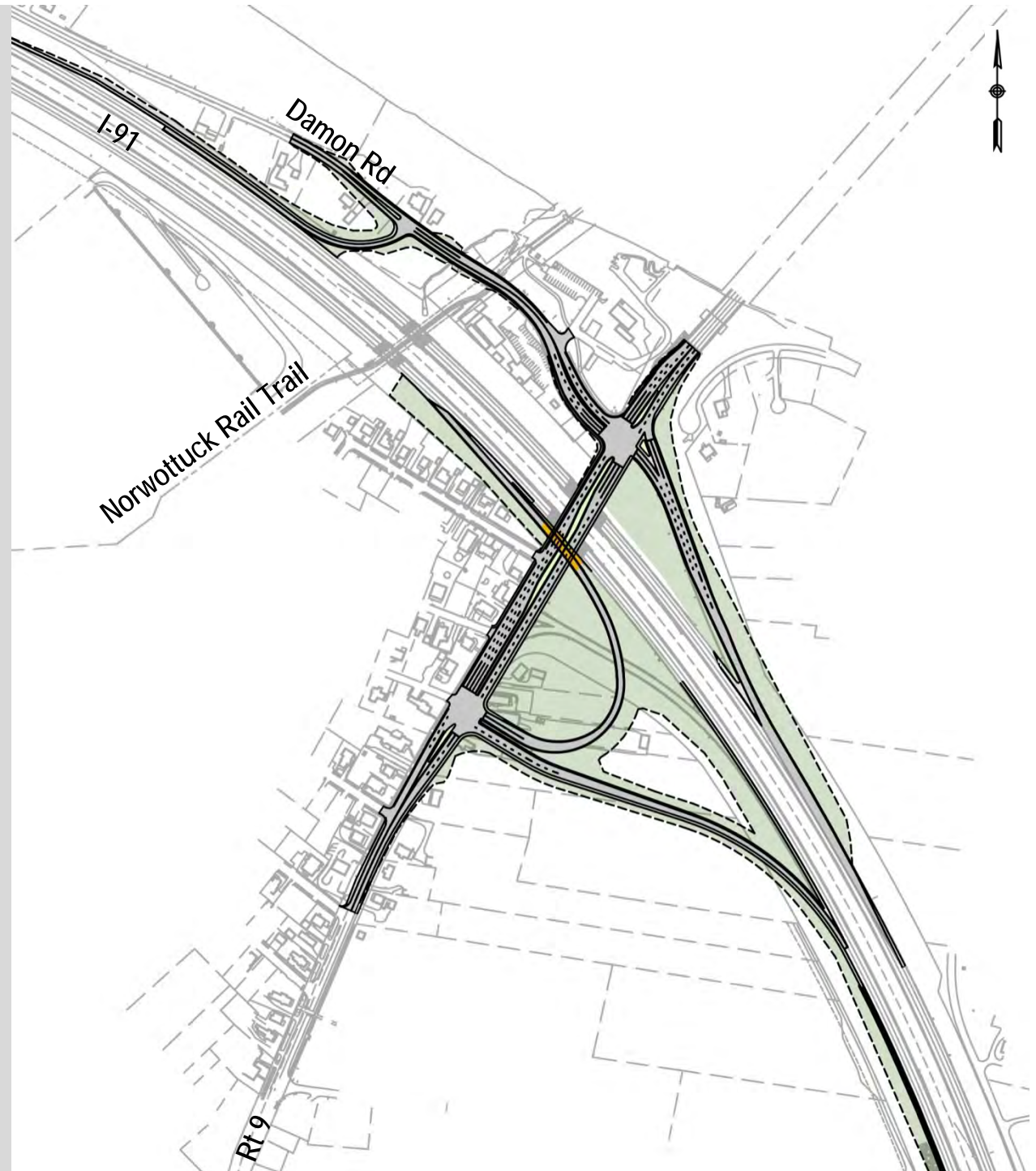
# Concept 15A

## ► Concept 15A - Full Access Interchange

- SB Off-Ramp constructed as loop ramp
- SB On-Ramp relocated westerly
- Additional through lane added to NB Off-Ramp
- Eliminates 2<sup>nd</sup> NB Off-Ramp from C15
- NB On-Ramp constructed off of Damon Road
- Provides full access interchange for all movements
- Significant property impacts

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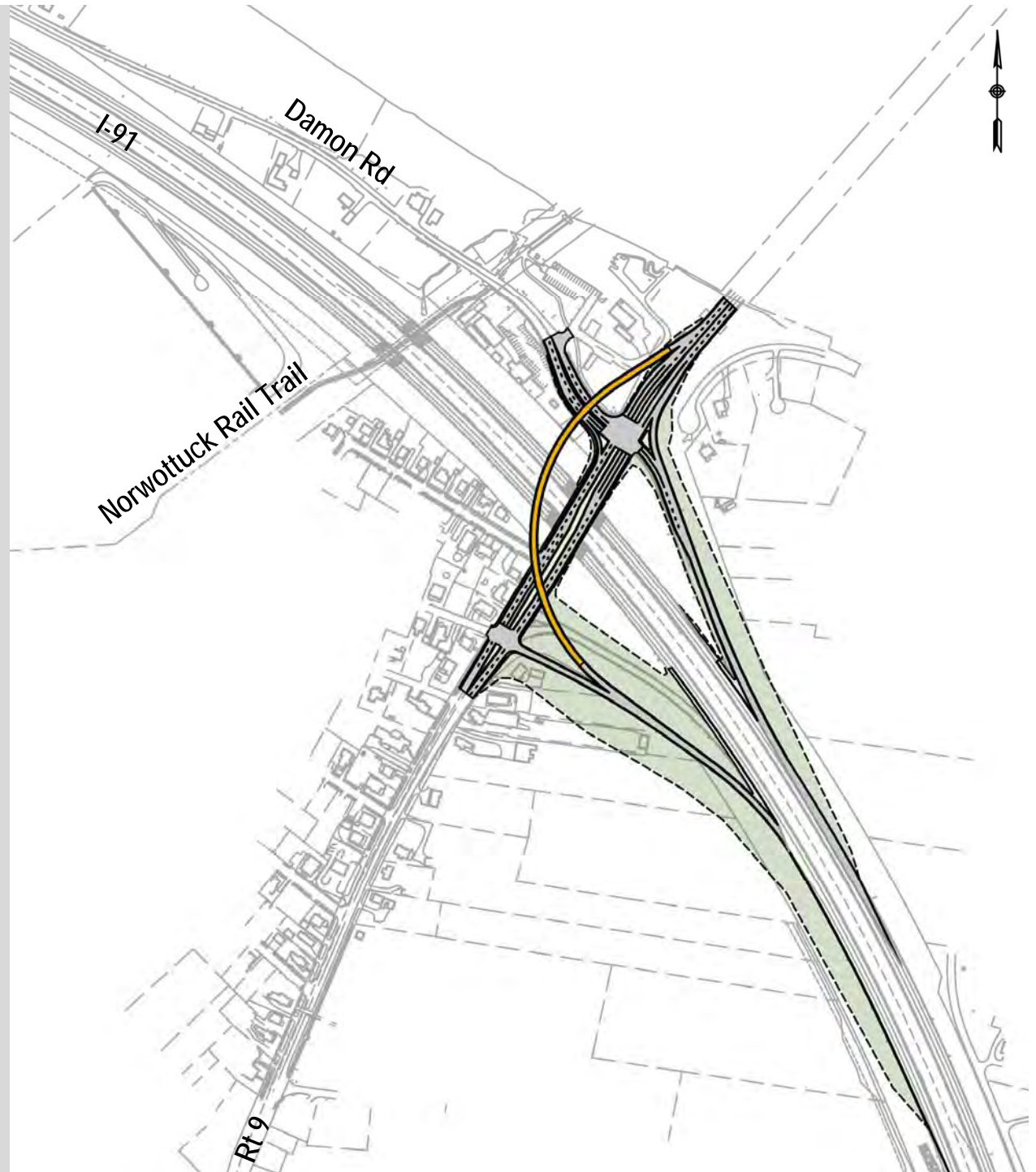
# Concept 16

## ► Concept 16 – Single Flyover

- Flyover ramp constructed from WB Route 9 to SB On-Ramp
  - Improves operations by removing large portion of left turning traffic from Route 9
- All other elements generally unchanged
- Flyover would have undesirable horizontal and vertical alignments
- Flyover would be on “3<sup>rd</sup> level” of interchange
- Does not provide full access interchange

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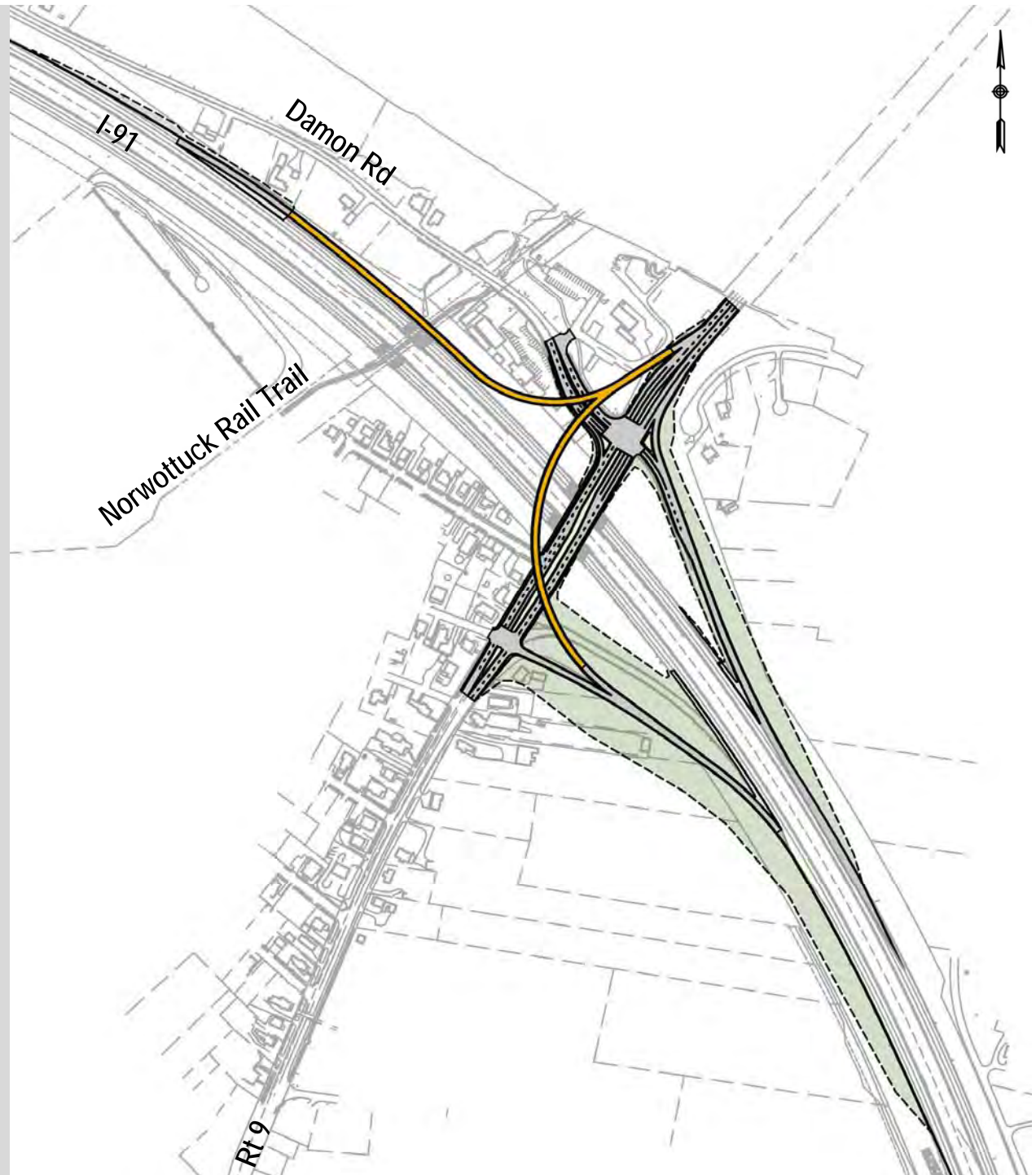
# Concept 17

## ► Concept 17 – Double Flyover

- Flyover ramp constructed from WB Route 9 to SB On-Ramp
  - Improves operations by removing large portion of left turning traffic from Route 9
- 2<sup>nd</sup> Flyover from WB Route 9 to NB I-91
- All other elements generally unchanged
- Flyover would have undesirable horizontal and vertical alignments
- Flyover would be on “3<sup>rd</sup> level” of interchange
- Does not provide full access interchange

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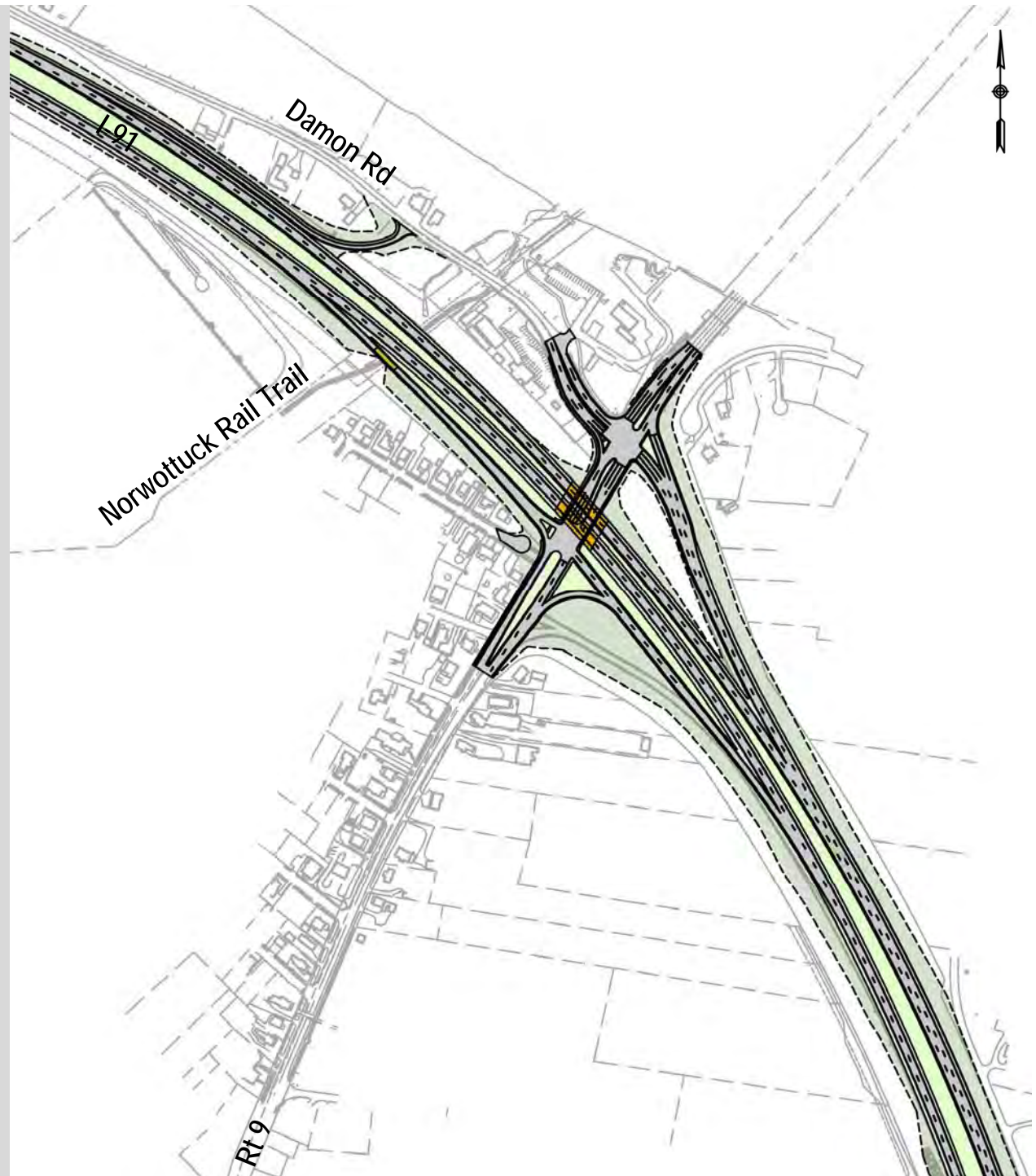
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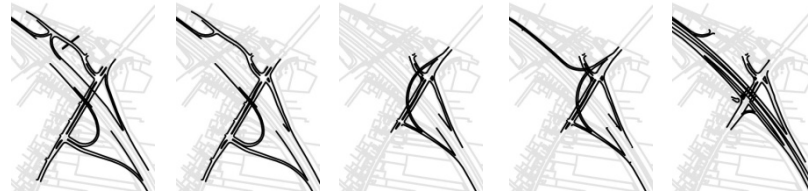
# Concept 18

## ► Concept 18 – Compressed Diamond

- I-91 SB shifted to median
- New SB off-ramp constructed on portion of existing I-91 SB roadway footprint
- SB on-ramp shifted easterly
- NB on-ramp constructed off of Damon Road (similar to Concept 15)
- Requires at least 3 new bridges on I-91
- Provides full access interchange
- Special treatment required for Damon Road accepting lanes



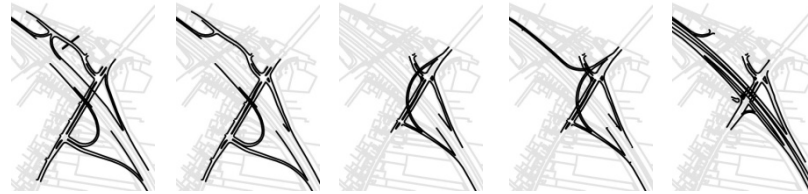
# Evaluation Matrix



		Alternatives				
		C15	C15A	C16	C17	C18
Safety	Crash Rates					
	Emergency Vehicle Access					
	Traffic Calming					
Traffic	Delays (LOS)					
	Travel Time					
	Queueing					

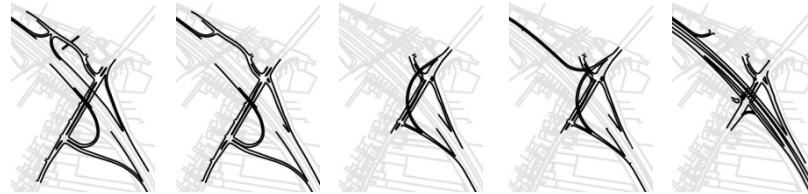


# Evaluation Matrix



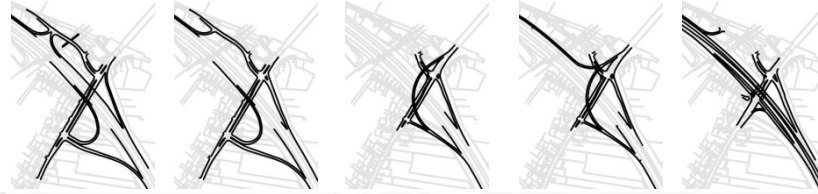
		Alternatives				
		C15	C15A	C16	C17	C18
Construction	Costs	\$16.5M	\$12.8M	\$23.6M	\$38.0M	\$35.0M
	Duration (Years)	3 To 4	3 To 4	2 To 3	3 To 4	4 To 5
Multi-modal	Impacts during Construction					
	Pedestrian Accommodation					
	Bike Accommodation					
	Transit Access					

# Evaluation Matrix



		Alternatives				
		C15	C15A	C16	C17	C18
Community Impacts	Property	■	■	■	■	□
	Recreation Impacts/Access	□	□	▤	▤	◇
	Community Cohesion	■	■	▤	▤	◇
	Agricultural	■	■	■	■	◇
	Aesthetics	▤	■	■	■	▤
	Airport Impacts	◇	◇	□	□	◇

# Evaluation Matrix



		Alternatives				
		C15	C15A	C16	C17	C18
Environmental Impacts	Noise					
	Wetland					
	Flood Plain					
	Rare Species					
	Open Space					
	Air Quality					
	Light					



# Evaluation of Alternatives

- ▶ **Project Team Recommends that No Full Build Alternatives are Advanced for Additional Study**
  - Some operational benefits to King St/Damon Road
  - Some traffic moved from local roadway network to highway
  - But, significant property, environmental and cost impacts

# Transit and TDM Concepts - Route 9 Bus Service

## ► M40 – Route 9 Express

- Afternoon service is overcrowded. Increase frequency from every 30 minutes to every 20 minutes in the afternoon.

## ► B43 – Route 9 Local

- Increase frequency to reduce crowding and improve service.

Changes in frequency:

- 20 minutes to 15 minutes 6 am to 5 pm
- 30 minutes to 15 minutes 5 pm to 8 pm
- 45 minutes to 30 minutes 8 pm to end of service

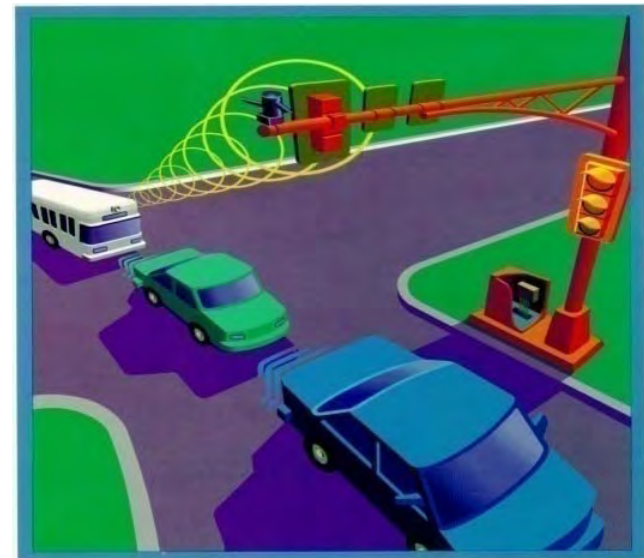
# Transit and TDM Concepts-Transit Signal Priority (TSP)

## ► Implement TSP

- Every intersection on Route 9 from Routes 5 & 10 in Northampton to University Drive in Amherst

## ► Time Savings

- Assume “aggressive” TSP reduces average bus delay to 5 seconds per signal
- Bus routes B43 and M40: 5 min
- Bus route 39: 2 min (turns at Bay Road)





# Transit and TDM Concepts-Supporting Improvements

## ► Expand “Universal Pass” program to employers

- Similar to existing Five College pass program, but for all employers in the transit district.
- Employers purchase deeply discounted transit passes for all employees
- Generally no cost to the employee
- Modeled after Denver-Boulder program



## ► Supporting improvements

- Enhanced bus shelter program
- “Next bus” information accessible via cell phone
- Automated stop announcements & fare collection already planned

# Transit and TDM Concepts-Norwottuck Improvements

- Winter maintenance of Norwottuck Rail Trail
- New traffic signal, Route 9 at West St, Hadley
  - Permit safe crossing from Norwottuck Trail to businesses on the south side of West St and Route 9
- Reconfigure South Maple St, Hadley
  - Between the Norwottuck Trail and Rt 9, reduce from 4 to 3 lanes plus bike lanes to improve bicycle access to malls.



# Transit and TDM Concepts-Cost and Traffic Impact

## ► Cost estimate

- Capital: \$1.7 million (3 new buses + shelters)
- Operating: \$2.2 million /yr (increased bus frequency)

## ► Traffic impact

- -218 vehicles/day (-70 vehicles/PM peak hour)
- Bridge St – Damon Rd – I-91 Off ramp: -6 sec delay compared to No Build (remains LOS E)
- Bridge St – I-91 On-ramp: -4 sec delay compared to No Build (remains LOS D)



# Evaluation of Alternatives

- ▶ **Project Team Recommends that TDM Concepts be Advanced for Additional Study**
  - Particular focus on capital improvements

# Evaluation of Alternatives

## ► Recommendation Summary:

- Advance Study of Concepts 13, 13A & 13B
- Continue to Compare/Consider No Build Option
- Investigate Components of TDM Package for Inclusion in Final Recommendation

# Next Steps

- Further Develop Narrowed List of Alternatives
- Identify Preferred Alternative
- Hold Public Informational Meeting
- Begin Design (if required)



# Comments & Questions



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