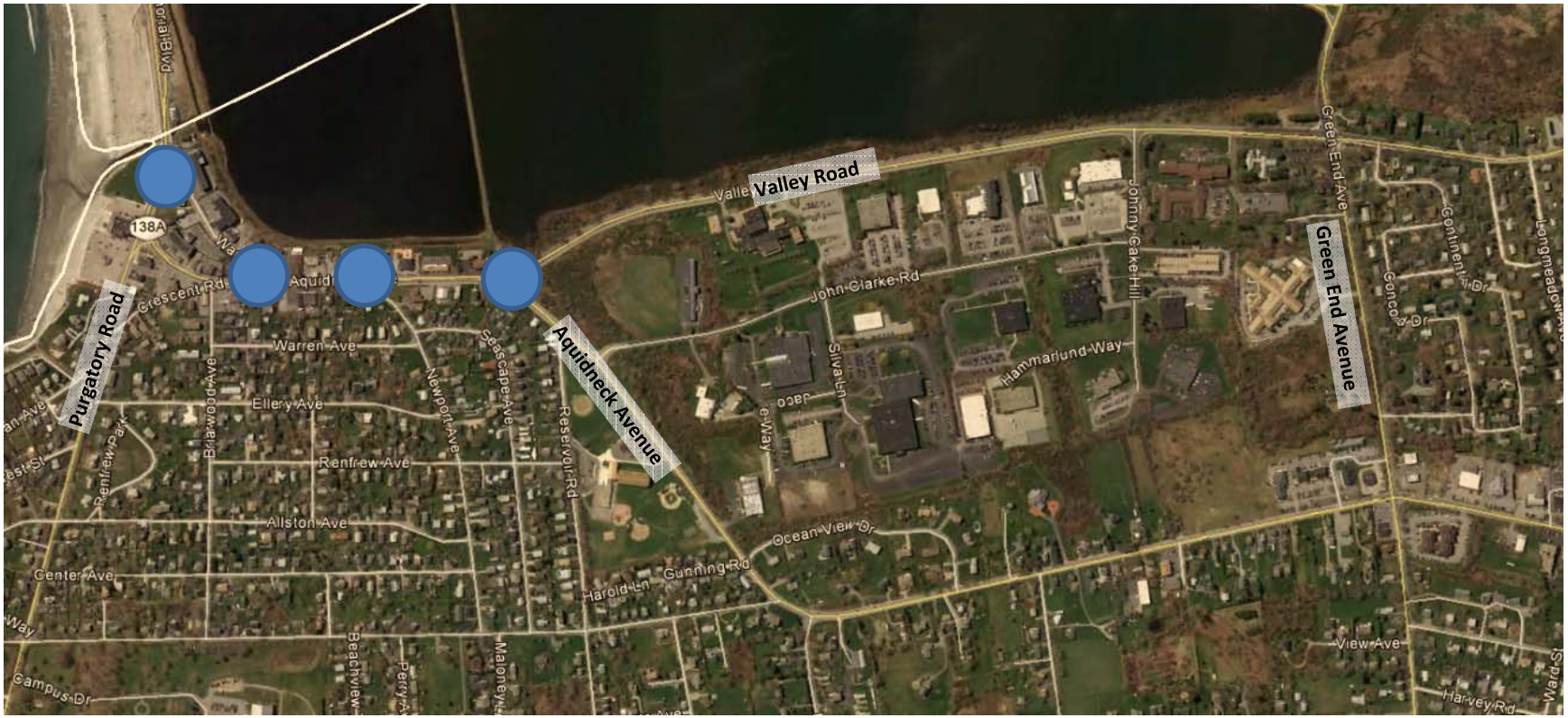
Roadway Safety Improvements to Aquidneck Avenue

Middletown Town Council - June 18, 2015

Study Area



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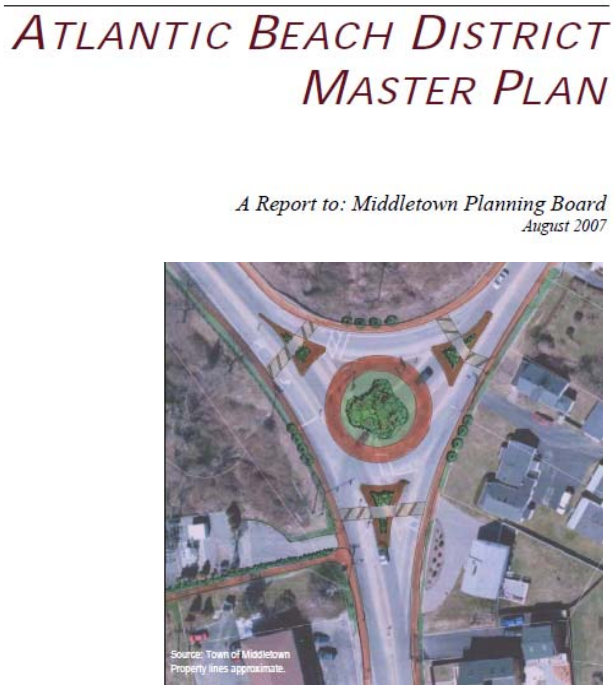
Atlantic Beach Master Plan



- Listed in Master Plan for improvements at Aquidneck Avenue intersections with:
  - Valley Road
  - Crescent Road
  - Newport Avenue
  - Purgatory Road
- Improvements from Master Plan include traffic calming and enhanced pedestrian facilities

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Aquidneck Avenue at Valley Road

- Lack of pedestrian facilities
- Driver confusion
- 5-year crash data
  - 29 crashes – 1 injury
  - Majority - rear-end crashes
  - 5 head-on/angle-type crashes

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Aquidneck Avenue at Valley Road

- Remove existing signal
- Install single-lane roundabout
- Construct within existing curb
- Landscaped center island
- Northern gateway to Atlantic Beach District
- Reduce head-on and angle-type crashes
- Slower speeds during off-peak conditions

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Aquidneck Avenue at Valley Road

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Aquidneck Avenue at Newport Avenue

- Lack of pedestrian facilities
- Skewed intersection

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Aquidneck Avenue at Newport Avenue

- Realign intersection
- Install curbing and sidewalks
- Upgrade ramps to meet ADA
- Old alignment can be used for open space.

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Aquidneck Avenue at Crescent Road

- Lack of pedestrian facilities
- Skewed intersection

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Aquidneck Avenue at Crescent Road

- Realign intersection
- Install curbing and sidewalks
- Convert Crescent Road to one-way
- Upgrade ramps to meet ADA

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Aquidneck Avenue at Crescent Road

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Aquidneck Avenue at Purgatory Road

- Identified as safety concern as part of the Aquidneck Island Transportation Study (public concern)
- Lack of pedestrian facilities
- Driver confusion
- High speeds onto Purgatory Road
- 5-year crash data
  - 22 crashes – 1 injury
  - Majority - rear-end crashes

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Aquidneck Avenue at Purgatory Road – Alternative 1

- Install landscaped bump-out and remove free movement adjacent to Atlantic Beach Club
- Install pedestrian signal equipment
- Upgrade ramps to meet ADA
- Southern gateway to Atlantic Beach District

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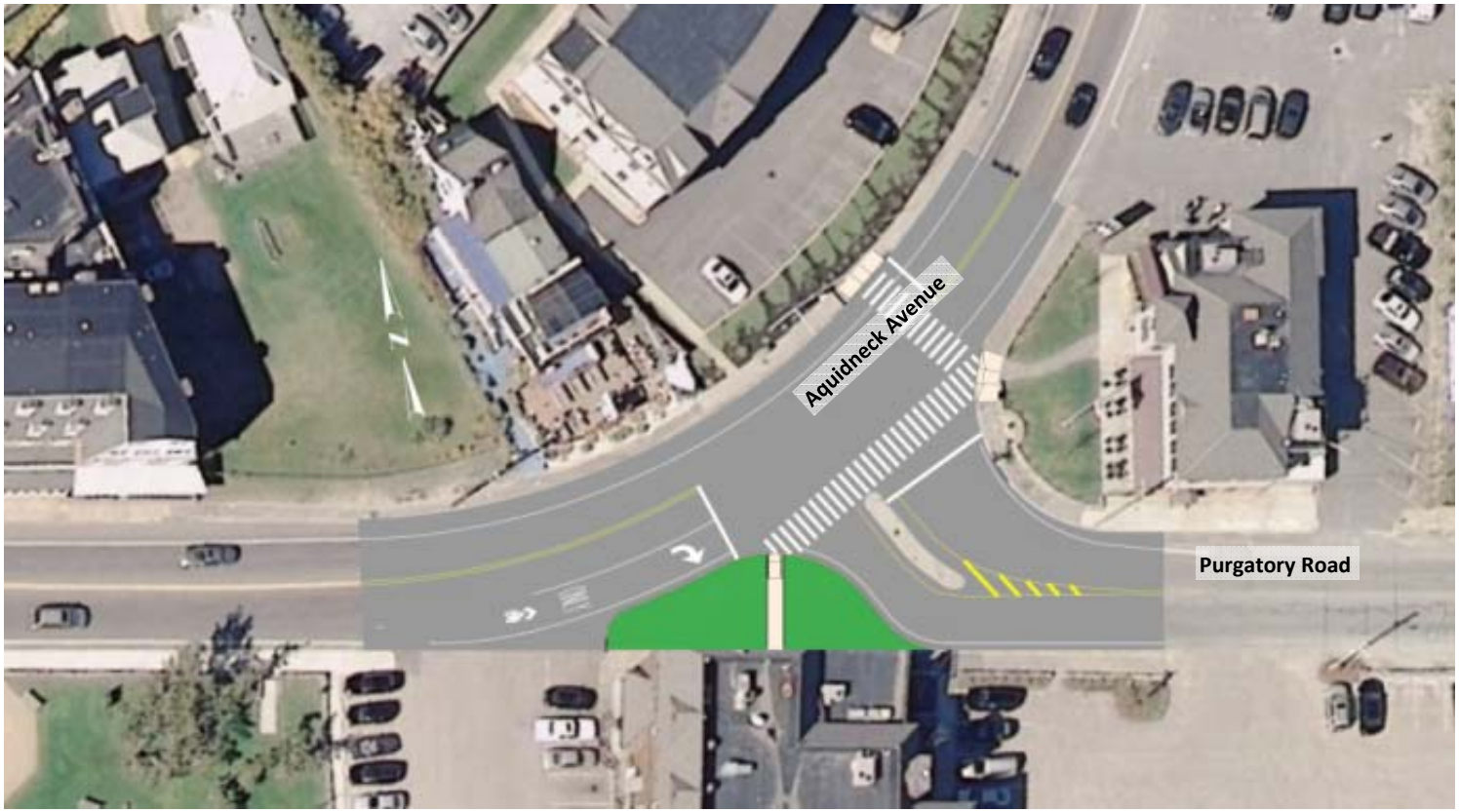
Aquidneck Avenue at Purgatory Road – Alternative 1



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Aquidneck Avenue at Purgatory Road – Alternative 2

- Remove existing signal
- Install single-lane roundabout
- Construct within existing curb
- Landscaped center island
- Southern gateway to Atlantic Beach District
- Reduce head-on and angle-type crashes
- Better pedestrian connectivity
- Slower speeds during off-peak conditions

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Aquidneck Avenue at Purgatory Road – Alternative 2

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Thank You

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Benefits of Roundabouts

- Safest At-Grade Intersection Possible
- High Capacity/Low Delay
- Good for All Modes of Traffic
- Reduce Vehicle Emissions
- Geometric Flexibility
- Aesthetics

Roundabouts vs Traffic Circles

	Modern Roundabouts	Traffic Circles (Rotaries)
Size	150’ to 230’ 2-lane roundabout	600’ or more
Circulatory speed	15 to 25 mph	30 to 35 mph
Deflection at entry	Sharper curve at entry	Smoother curve or no deflection

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Roundabout vs Traffic Circles

	Modern Roundabouts	Traffic Circles (Rotaries)
Traffic Control	Yield Control	Stop Control
Right of Way	Vehicles in the Roundabout	Vehicles Entering the Circle
Pedestrian Access	Never in the Center Island	Allow Pedestrians in the Center Island
Direction of Circulation	Counterclockwise around the Center Island	Counterclockwise or Clockwise

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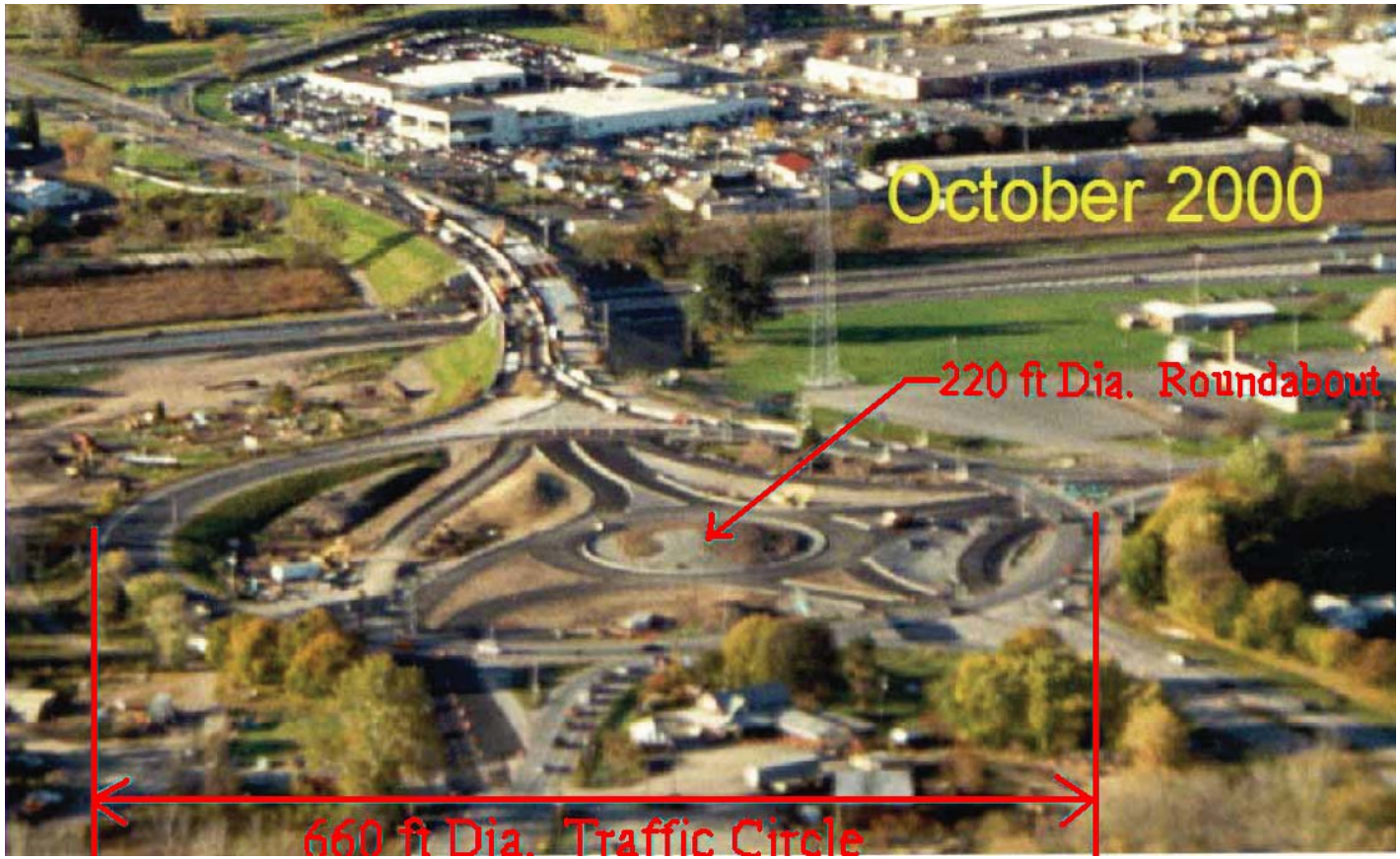
Roundabout vs Traffic Circles – Kingston, NY



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Roundabouts vs Traffic Circles – Kingston, NY

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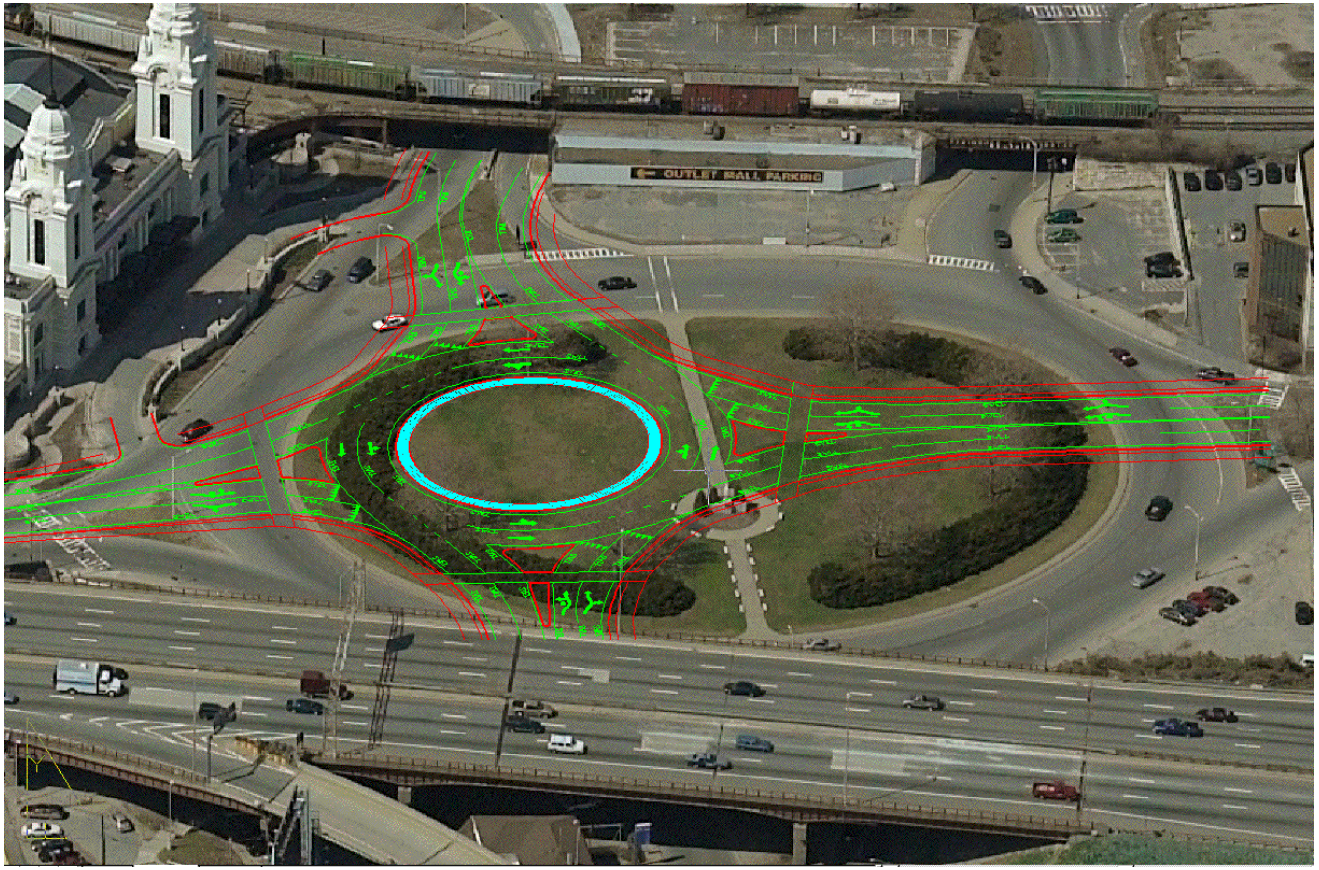
Roundabouts vs Traffic Circles – Washington Square, Worcester, MA



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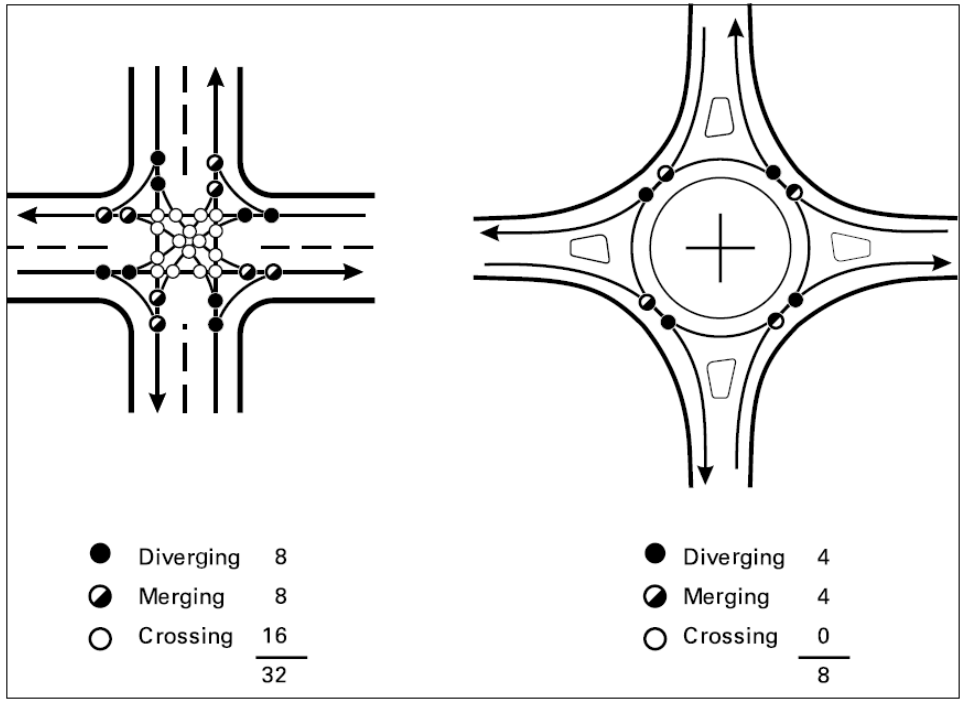
Roundabouts vs Signalized Intersections

- Reduce points of conflict from 32 to 8 compared with a traditional intersection



Federal Highway Administration. 2000. Roundabouts: an informational guide. Report no. RD-00-067. Washington, DC: US Department of Transportation.

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Roundabouts vs Signalized Intersections

Before – Signalized Intersection

After – Roundabout

Asheville, North Carolina

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Reduce Number and Severity of Accidents

- 2001 Study by Insurance Institute for Highway Safety showed that:
  - 24 intersections in the US converted from signal or stop control to roundabout
  - Reduced number of crashes by 39%
  - Reduced number of injury crashes by 76%
  - Reduced fatal or incapacitating crashes by 90%

Reduce Number and Severity of Accidents

- 2002 Study in Maryland:
  - 15 intersections converted from signal or stop control to single lane roundabout
  - Reduced number of crashes by 60%
  - Reduced number of injury crashes by 82%
  - Reduced fatal or incapacitating crashes by 100%
  - Reduced property damage only (PDO) by 27%

Reduce Vehicle Delays

- 2004 Study in Kansas showed:
  - 11 state intersections converted from signal or stop control to roundabout
  - Reduced average vehicle delay by 65%
  - Reduced average of vehicle stops by 52%

Reduce Vehicle Emissions and Fuel Consumption

- 2004 study of roundabouts across the US:
  - Reduced Carbon Monoxide Emissions by 32%
  - Reduced Nitrous Oxide Emissions by 34%
  - Reduced Carbon Dioxide Emissions by 37%
  - Reduced Hydrocarbon Emissions by 42%

Mandavilli, S.; Russell, E.R.; and Rys, M. 2004. Modern roundabouts in United States: an efficient intersection alternative for reducing vehicular emissions. Poster presentation at the 83rd Annual Meeting of the Transportation Research Board, Washington DC.

Reduce Vehicle Emissions and Fuel Consumption

- Study of 10 intersections in Virginia showed that consumption was reduced on more than 200,000 gallons of fuel per year*
- Study of the US showed that fuel consumption was reduced by about 30%**

* Bergh, C.; Retting, R.A.; and Myers, E.J. 2005. Continued reliance on traffic signals: the cost of missed opportunities to improve traffic flow and safety at urban intersections. Arlington, VA: Insurance Institute for Highway Safety.

** Várhelyi, A. 2002. The effects of small roundabouts on emissions and fuel consumption: a case study. Transportation Research Part D: Transport and Environment 7:65-71.

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Modern Roundabouts – Avon, CO

- Avon Road at I-70

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Modern Roundabouts – Worcester, MA

- Washington Square

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Roundabouts in Rhode Island

- Centerdale, North Providence
- Twin River Road, Lincoln
- Royal Mills, West Warwick
- Quonset Industrial Park, North Kingstown
- Fruit Hill, North Providence
- Division Street, East Greenwich*
- Apponaug Bypass, Warwick *

* In construction

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Roundabouts in RI – North Providence

- Centerdale Road

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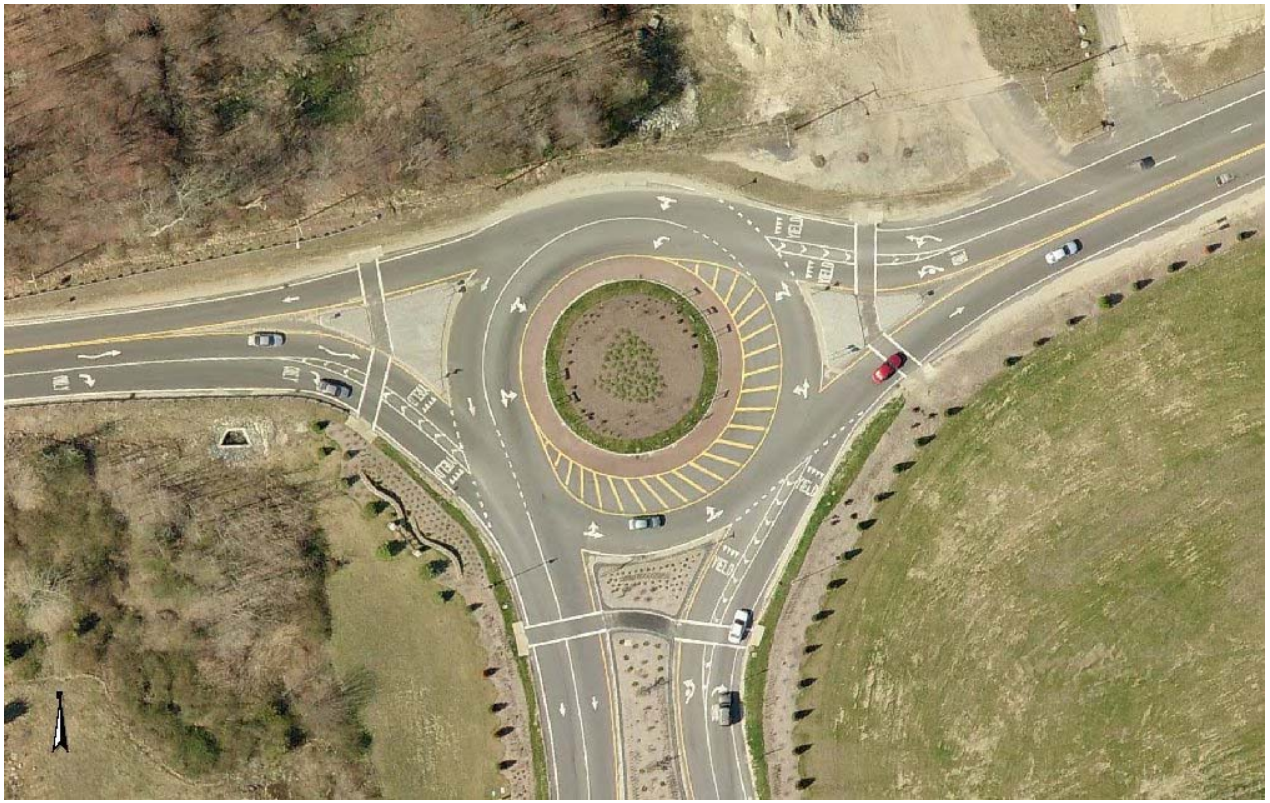
Roundabouts in RI – Lincoln

- Twin River Road



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Roundabouts in RI – West Warwick

- Royal Mills

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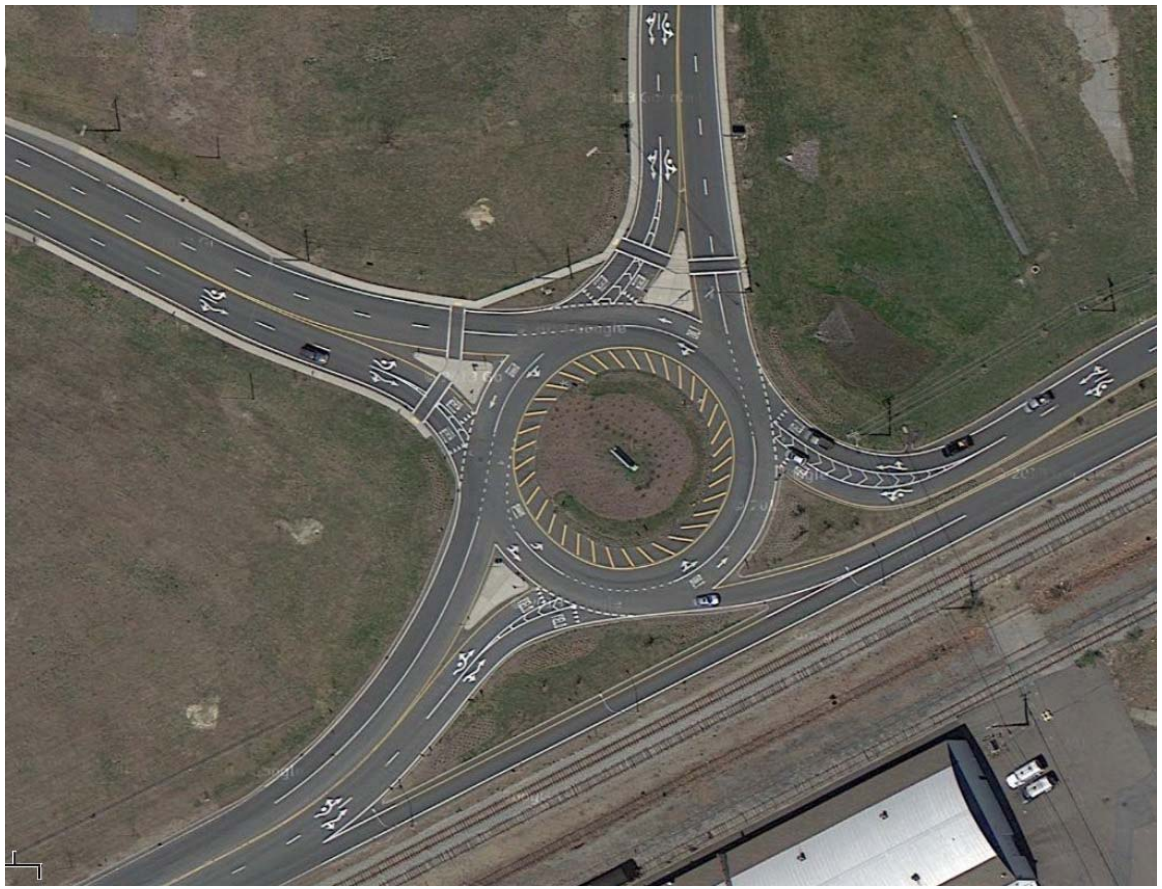
Roundabouts in RI – North Kingstown

- Quonset



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Roundabouts in RI – North Providence

- Fruit Hill

Roundabouts in RI – Providence

- Rhode Island College

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Roundabouts in RI – Warwick

- Apponaug

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Conclusions

- Increase Safety
- Reduce Vehicle Speed
- Fit all Kinds of Vehicles
- Reduce Congestion and Vehicle Emissions
- Aesthetics

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Conclusions

- 6 existing roundabouts
- 1 existing mini-roundabout
- 4 retrofitted rotaries
- 6 under construction
- 28 at different design stages

Thank You

Questions?

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