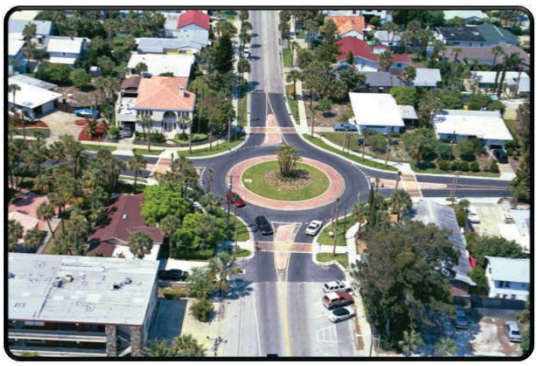
Roundabout

Background

- Designing and assisting in the design of roundabouts since 1976, first roundabout in Melbourne, Australia
- Migrated to the US in 1988
- First roundabout built in Gainesville 1991.
- More than 500 in about 40 states
- Most sizes and shapes

What is a Roundabout?

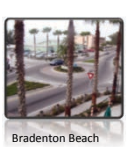


Roundabouts are not Traffic Circles – Kingston, NY

Roundabouts versus Traffic Circles

	Modern Roundabouts	Traffic Circles/Rotaries
Central Island Diameter	10 to 200 feet diameter	300 to 600 feet diameter
Design Principle	Low-speed entry, circulation and exit	High-speed entry, circulation and exit
Typical Operating Speed	15 to 23 mph	30 to 50+ mph

Many Shapes and Sizes


Bradenton Beach


Lenexa, Kansas


Venice


Cape Coral


Clearwater Beach- 58,000 vpd, 350 bicyclists and 8,000 pedestrian crossings


Port St Lucie

Roundabouts at Schools


Pre-School Honolulu


Elementary school, Bainbridge, WA


Middle school, Montpelier, VT


Middle school, Clearwater, FL

Middle School, Sarasota

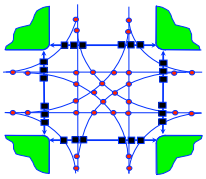
Why Use Roundabouts?

1. Fewer conflicts
2. Lower Speed
3. Therefore safer for <u>all users</u>
4. Almost no maintenance
5. Pretty
6. Higher capacity than signals or stop control with fewer lanes
7. Less delay
8. Fewer stops
9. <u>Pedestrians have right-of-way over vehicles – less waiting</u>

Negatives – Drivers have to slow
Bad Design

Fewer Conflicts

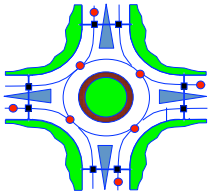
Standard Intersection - Stop or Signals



32 Vehicle to vehicle conflicts

24 Vehicle to pedestrian conflicts

Roundabouts



8 Vehicle to vehicle conflicts

8 Vehicle to pedestrian conflicts

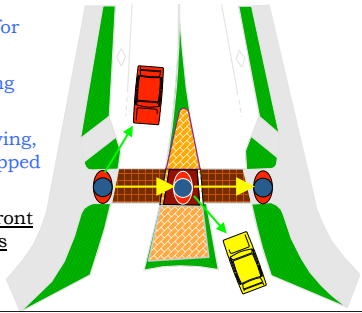
Pedestrians are safer - cross from curb to island, island to curb

Look one-way for vehicles,

Vehicles moving slowly

Walk behind moving, or in front of, stopped cars

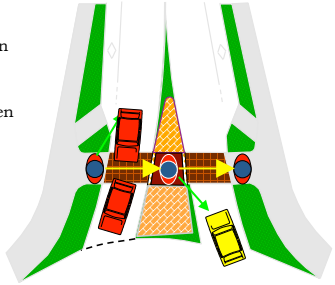
<u>Do not walk in front of moving cars</u>



Pedestrian Safety

About 20-feet from yield line to pedestrian crossing

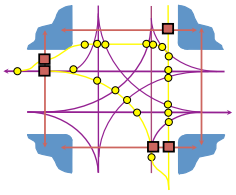
One physical vehicle length, measured when the vehicle is on an angle so that the crosswalk is open for pedestrians to use when a vehicle is stopped.



Clearwater Beach -up to 58,500 Vehicles, 8,000 Pedestrians and 350 bicyclists per Day

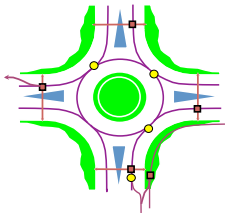
Bicycle - Conflicts

Standard Intersection - Stop or Signals



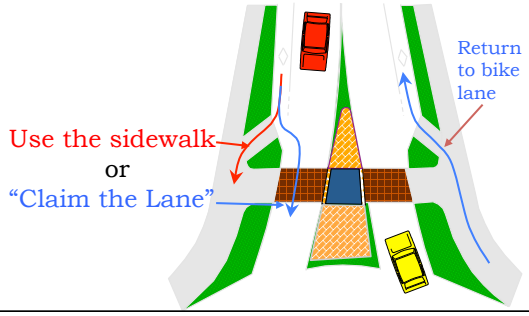
- 7 – 13 Bicycle to vehicle conflicts to make a left turn
- 2 Bicycle to pedestrian conflicts

Roundabouts



- 4 Vehicle to vehicle conflicts
- 2 Bicycle to pedestrian conflicts

Bicyclists Are Given a Choice



Bicycle Ramps

Lower Speeds

East Approach
Lots of deflection

West Approach
No deflection

North - no crashes
East - 3 minor crashes

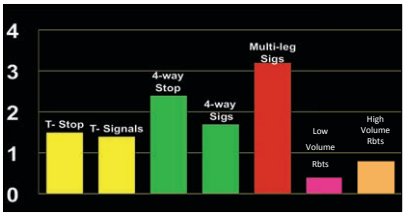
South - no crashes
West - 19 right angle crashes

Deflection is essential to control vehicle speeds and reduce crashes

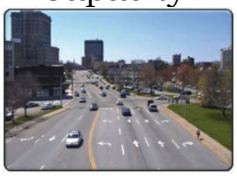
Safety

Roundabouts Decrease Crashes:

- Overall: 39%
- Injury-producing: 76%
- Fatal or incapacitating: 90%



Capacity



College Street
Asheville, NC,
18,000 vpd

La Jolla Boulevard, San Diego, CA, 21,000 vpd

La Jolla Blvd, San Diego – 5 to 2 lanes, 21,000 vpd

Asheville, NC
18,000 vpd
10 years ago

Truck Apron Montpelier, VT

Front wheels travel within circulating roadway

Rear wheels travel over truck apron

Landscaping

Landscaping

Landscaping

Lighting

Up lighting can create a theme, a grand entrance at night

Y intersection
Jackson, WY

Michael Wallwork
Roundabout Expert

Samples

First Roundabout in Australia

Twin roundabouts

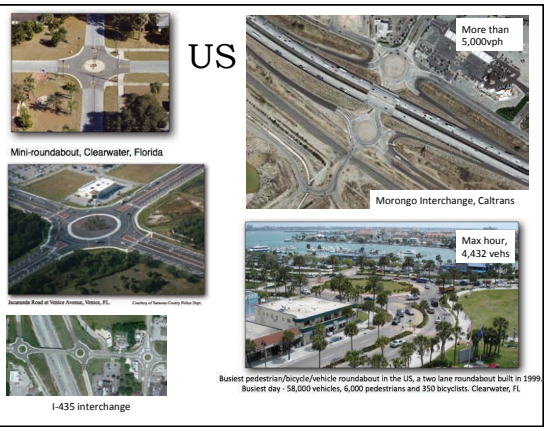
Roundabout with LRV
44,000ADT/35,000ADT

Roundabout Corridor/Interchange

Most unusual – more than 90,000 vpd – 4 LRV routes

Roundabout Interchange

Melbourne, Australia



Roundabout vs. Signal Operation

- Roundabouts are more efficient that signals because:
- 1. No all-red time
- 2. No yellow time

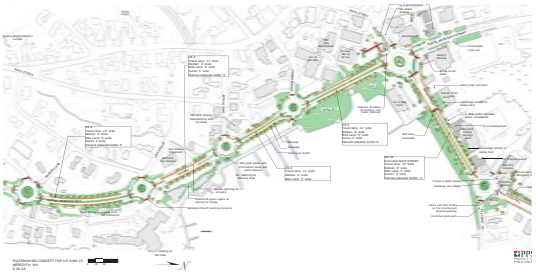
"Lost Time"= lost capacity

- 3. Drivers waiting vehicles at signals cannot take advantage of gaps in vehicle flow = lost capacity
- Roundabouts – any driver waiting can take advantage of a gap at a roundabout up to 30+% more capacity

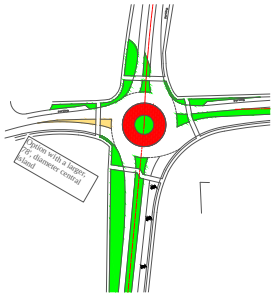
Meredith, NH

NH 25 and NH 3

Options – Place Making



Some of the Options Considered



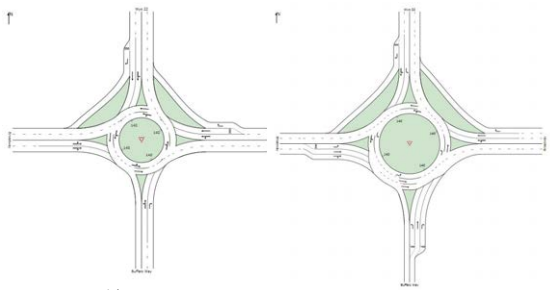
Result

- Do not destroy the town center, the Village, for two nightly peaks during ski season
- Accept traffic congestion
- Enjoy a pedestrian friendly environment outside of those times
- Use the smaller roundabout to create a Village Center

University Place, WA – Development of a Town Center

Initial Analysis

	Time Period	Level-of-Service	Average Delay (sec)	95th Percentile Queue (ft.)	Volume/ capacity ratio
2013	AM	B	12.6	241	0.809
	PM	A	9.7	126	0.636
2033 + 21%	AM	A	8.4	131	0.605
	PM	A	9.0	103	0.554
2033 + 30%	AM	B	10.1	176	0.692
	PM	B	10.7	135	0.638
2033 + 40%	AM	B	13.7	261	0.805
	PM	B	13.5	186	0.744



Initial Layout

Possible 2035 Layout

One Possibility 2035

Gateway Roundabouts

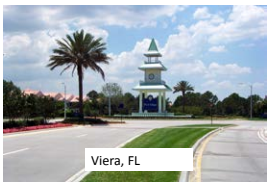
Cities
- Clearwater Beach, FL
- White horse, Canada
- Bird Rock, San Diego, CA
- Morongo, CA
- Grand Junction, CO
- Viera, FL
- Lake Worth, FL
- Overland Park, KS
- Flemington, NJ
- Kingston, NY
- Village of Hamburg, NY
- Asheville, NC

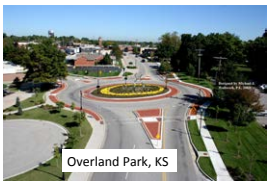
Educational
- Emory University, GA
- Jackson State, MS
- UNC, Raleigh, NC
- UNH, Durham, NH

Developers
- Village Merrick Park, Coral Gables, FL
- Haile Plantation, FL
- Ion, SC
- Lake Hutto, FL
- PGA, St Lucie, FL
- Lenexa, KS (8)

Gateways


Clearwater Beach, FL at opening in 2000



Viera, FL


Overland Park, KS


Asheville, NC


Village of Hamburg, NY


Yelm, WA


Lacey, WA


University, WA


Coral Gables, FL

Benefit cost Analysis –
Life Cycle costs typically includes the following:

Item	Roundabout	Signals
Construction	Intersection Geometry	Intersection Geometry Plus signals ($200,000)
Maintenance	$1,000 per year	$3,000 to $5,000 a year plus $250,000 every 30 years for replacement
Lifetime	100 years plus	30 years
Crash	Very low	Quite high
Delay, fuel cost	Low	High
Cost of capital	Low	Higher
Environmental	Reduce impervious surface, lower emissions	Increases impervious surface, higher emissions
Right-of-way	Corner clips	1,000 or more feet along each approach

Town of Jackson
2015 Community Streets Plan

Plan recommends complete streets but does not mention roundabouts.

One of the best ways to achieve low speeds on complete is to use roundabouts because they:
1. Slow vehicle speeds
2. Mostly eliminate most left turn lanes
3. Less road space
4. More space for median/pedestrian refuges.
5. Less conflict area for pedestrians

Healesville, Australia
– 35 years ago

Carlton, Melbourne

Bridgeport Way, University Place, WA 1998


BIRD ROCK HISTORY MUSEUM


Asheville, NC


Village of Hamburg, NY Route 62 – State Truck Route