

# Modern Roundabouts in Georgia

## A Safer Intersection Choice



**GDOT**  
Georgia Department of Transportation

# Today's Discussion

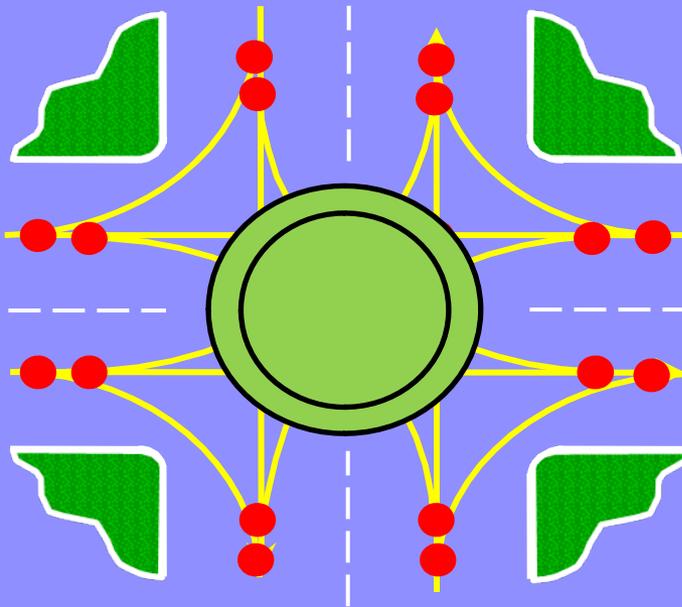
- National Overview of Roundabouts
- Where are we in Georgia
  - Website
  - Georgia's policy
  - Analysis Tool
  - Georgia's roundabouts
- Questions and Answers

# What is a roundabout?

- **Circulatory roadway**
- **Around a central island**
- **All traffic flows counter-clockwise**
- **Viable intersection alternative when placed appropriately**
- **Can be significantly safer than traffic signals**
- **Operate more efficiently than 4 way stops**
- **Can operate more efficiently than traffic signals**
- **Not a traffic circle**



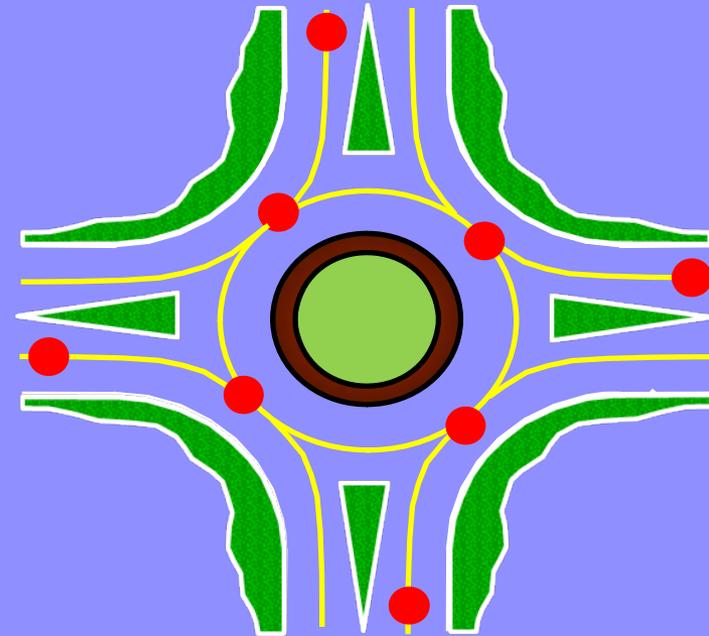
# Comparison of Vehicle Conflict Points



32 conflict points

- High-speed
- High-angle
- High-energy

**75% fewer  
conflicts**



8 conflict points

- Low-speed
- Low-angle
- Low-energy

# Roundabouts are SAFER !!!

## NCHRP Report 572 – Roundabouts in the US

### Before-after studies at 55 intersections

- **35% overall decrease in crashes**
- **76% decrease in injury crashes**
- **81% decrease in fatal/incapacitating crashes for single lane urban roundabouts**
- **71% decrease in fatal/incapacitating crashes for single lane rural roundabouts**

# Where are roundabouts appropriate ???

Roundabouts are being utilized nationally under a wide variety of conditions



- Freeway interchanges
- High speed rural
- High volume conditions
- High pedestrians
- High truck volumes
- Awkward geometry
- Near schools
- "Gateways"
- Light rail corridors

# FHWA Memo – Consideration and Implementation of Proven Safety Countermeasures; July 10, 2008



## Memorandum

Subject: ACTION: Consideration and Implementation of Proven Safety Countermeasures Date: July 10, 2008

From:  Jeffrey A. Lindley Associate Administrator for Safety In Reply Refer To: HSSI

To: Division Administrators Federal Lands Highway Division Engineers

Improving safety is a top priority of the US Department of Transportation, and FHWA remains strongly committed to reducing highway fatalities and serious injuries on our Nation's highways. We know that a comprehensive mix of strategies is required—including stronger policies to support system-wide and sustainable improvements. We believe our area of greatest potential influence is how Federal funds are used and targeted to implement improvements that will have a positive impact on safety.

In our stewardship and oversight role for federally funded highway programs, we have the opportunity to strongly encourage Federal, State, local agencies, and tribal governments to include safety in their investment decision-making process. While there is still much work to do on determining the precise effectiveness of some safety countermeasures, we are highly confident that certain processes, infrastructure design techniques, and highway features are effective and should be encouraged whenever Federal funds are used. Safety should be considered at every stage of the project development process. Every investment decision should consider the impact on safety and every federally funded project should include appropriate safety enhancement features.

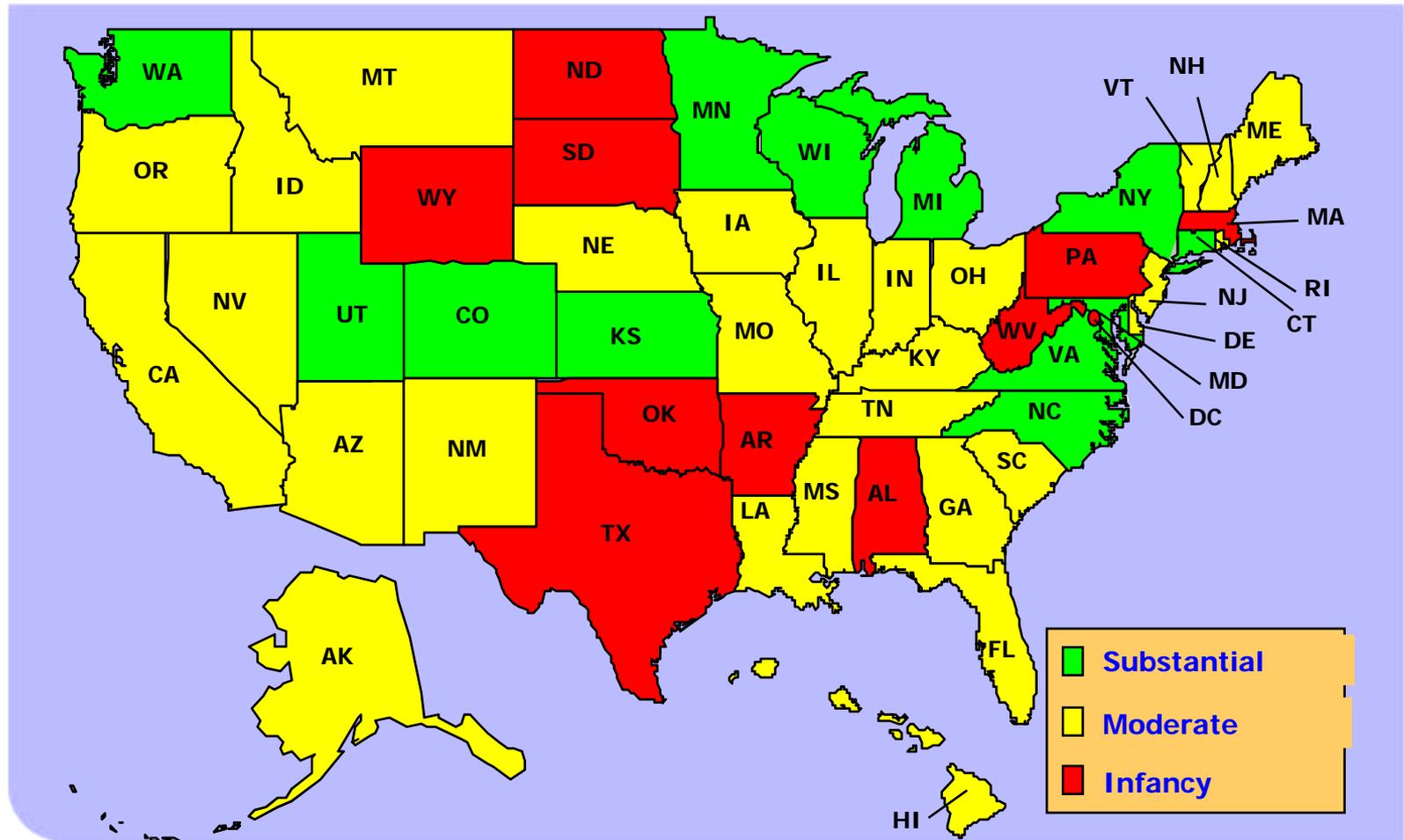
This guidance memorandum highlights when and where we believe certain processes, design techniques, or safety countermeasures should be used. This document also includes countermeasure descriptions and background on the proven effectiveness and benefits; a statement on when the countermeasure or process should be applied; links to reference documents; and current FHWA technical contacts for each topic. This guidance was developed based on effectiveness data for various crash types compiled from a variety of sources. It reflects the types of circumstances and situations that we are confident will yield high pay-offs and be cost beneficial for all projects.

MOVING THE  
AMERICAN  
ECONOMY 

### GUIDANCE STATEMENT:

Roundabouts are the preferred safety alternative for a wide range of intersections. Although they may not be appropriate in all circumstances, **THEY SHOULD BE CONSIDERED AS AN ALTERNATIVE FOR ALL PROPOSED NEW INTERSECTIONS ON FEDERALLY-FUNDED HIGHWAY PROJECTS**, particularly those with major road volumes less than 90 percent of the total entering volume. Roundabouts should also be considered for all existing intersections that have been identified as needing major safety or operational improvements. This would include freeway interchange ramp terminals and rural intersections.

# National Progress in building roundabouts



Disclaimer: This is a subjective assessment solely representing the opinion of Mark Doctor at FHWA based on information related to multiple factors.

# Where are we in Georgia

## Roundabouts Website:

<http://www.dot.ga.gov/travelingingeorgia/roundabouts/Pages/default.aspx>

- Background
- Frequently Asked Questions (FAQs)
- Guidance Statement/Application
- Roundabout Analysis Tool
- Georgia Roundabout Policy (4A-2)
- Roundabouts in Georgia (Photo Gallery)
- Training (Upcoming LTAP Class – Sept 22, 2009)
- Links to other Roundabout Sites
- Contacts: roundabouts@dot.ga.gov

# Georgia's Roundabout Policy

## TOPPS 4A-2

### **Created December 2004**

- new policy
- not meant to be a design guide

### **Modified March 2008**

- encourages roundabouts as intersection alternatives

### **Revised March 2009**

- allows multi-lane roundabouts
- Requires consideration as alternative
- Requires analysis if within thresholds

# **Georgia's Roundabout Policy**

## **TOPPS 4A-2**

### **Description/Background**

**“GDOT recognizes that the roundabout is a viable intersection alternative when placed in the appropriate location, and designed properly for the local conditions”**

**“The Chief Engineer has developed the guidance ... for determining when the use of a roundabout is acceptable in Georgia”**

# Georgia's Roundabout Policy

## Guidance Statement/Application

Roundabouts are the preferred safety and operational alternative for a wide range of intersections of public roads. A roundabout **shall** be considered as an alternative in the following instances:

- Any intersection in a project that is being designed as new or is being reconstructed.
- All existing intersections that have been identified as needing major safety or operational improvements.
- All signal requests at intersections (provide justification in the Traffic Engineering Study if a roundabout is not selected).

# Georgia's Roundabout Policy

## Georgia Roundabouts Selection Criteria

Roundabouts may not operate well if there is too much traffic entering the intersection or if the percentage of traffic on the major road is too high. Candidate intersections **shall** be analyzed to determine whether a roundabout will perform acceptably. Shown below are thresholds to determine if a roundabout capacity analysis is required:

<u># of Circulatory Lanes</u>	<u>ADTs (current/build year)</u>	<u>% traffic on Major Road</u>
Single Lane	less than 20,000	less than 80%
Multi-Lane	less than 40,000	less than 80%

- Other things to consider when evaluating roundabouts as an alternative are Right of Way, sight distance, environmental impacts, and access to adjacent properties.

# Georgia's Roundabout Policy

## Georgia Roundabouts Approval Process:

- Proposed concepts for installation of new roundabouts, or retrofit of existing intersections with roundabouts, must be approved by the State Traffic Engineer.
- The concept report should include an existing conditions sketch, preliminary design sketch, traffic counts, turning movement counts, capacity analysis, and crash data.

# Georgia's Roundabout Analysis Tool

## Version 1.0 – March 2009

- **Excel 2007 Spreadsheet**
  - Adapted from ODOT Roundabout Calculator
- **Planning/Concept Level Analysis Tool**
  - NCHRP 572 – Roundabouts in the US
  - FHWA 2000/ British model

## New Version 1.1 – September 2009

# Georgia's Roundabout Analysis Tool

## Analysis Tool Components

- **Roundabout Considerations Worksheet**
  - ADT Split Calculator
  - *New* Proposed Design Configuration Chart (useful for Multi-lane Configurations)
- **Single Lane Analysis**
  - With Bypass Analysis
- **Multi-Lane Analysis**
  - With Bypass Analysis
- **Instructions/References**

# Georgia's Roundabout Analysis Tool

## Roundabout Considerations Worksheet

1. Initial Input in START Tab
2. Roundabout Characteristics

**Proposed Design Configuration Chart**

*Directions for this Section only: (see Instructions Tab for other sections)*

1. **Select** the type of roundabout you are analyzing.
2. **Key in** the number of approaches and the street names at the proposed intersections.
3. Complete the Approach Characteristics Chart:
  - a. **Select** the Street Name from the pulldown menu for each approach leg
  - b. **Select** the Lane Type for each entry approach lane  
 \*The first box is the inner lane, the second box is the outer lane
  - c. **Select** Yes or No if a right turn bypass will be added to each approach leg

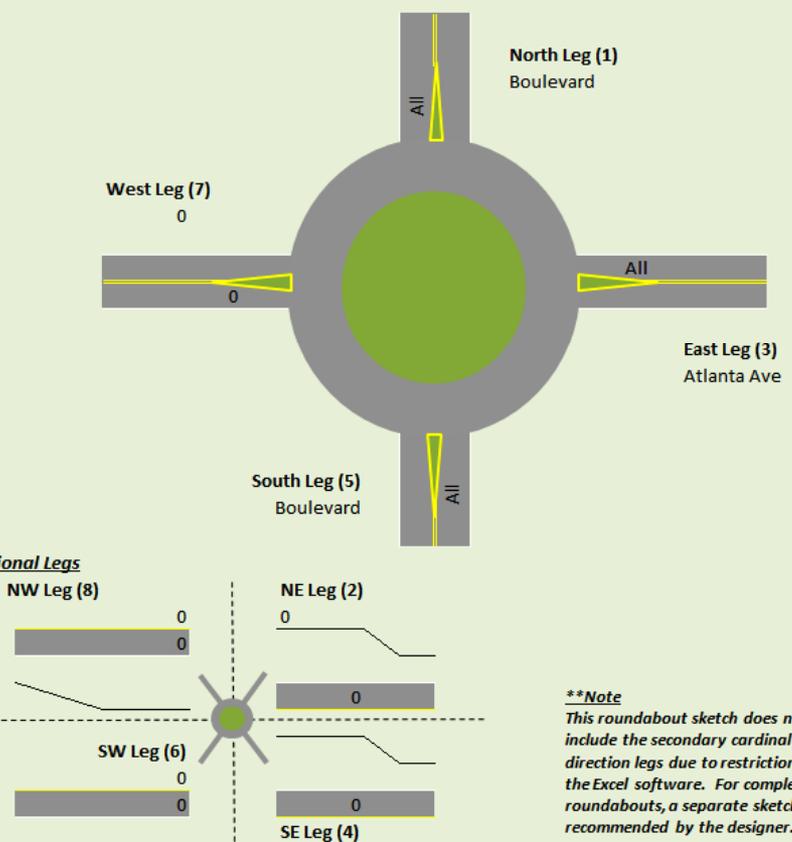
Roundabout Characteristics

Roundabout Type:	Single Lane	Chart Key:	Street Name
# of Approaches:	3	Single Lane	All
Name of Streets:	Boulevard	Multi-lane	Bypass?
	Atlanta Ave		Street Name
			Inner Ln
			Outer Ln
			Bypass?

Approach Leg Characteristics:

	North Leg (1)	NE Leg (2)	East Leg (3)	SE Leg (4)
Street Name:	Boulevard		Atlanta Ave	
Entry Lane Config	All		All	
Bypass to Adj Leg?				
	South Leg (5)	SW Leg (6)	West Leg (7)	NW Leg (8)
Street Name:	Boulevard			
Entry Lane Config	All			
Bypass to Adj Leg?				

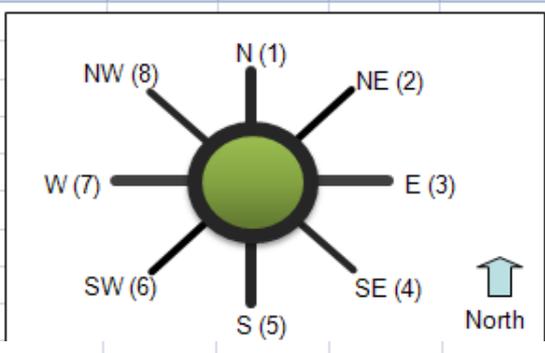
**Preliminary Roundabout Rendering\*\***



# Georgia's Roundabout Analysis Tool

## Single Lane Analysis

General & Site Information	
Analyst:	PDD
Agency/Company:	ITE - Georgia
Date:	9/11/2009
Project Name or PI#:	0002009
Year, Peak Hour:	2020 AM
County/District:	Fulton
Intersection:	Boulevard @ Atlanta Ave



1. Initial Input
2. Roundabout Characteristics
3. Input Volumes and Traffic Characteristics
  - Heavy Vehicle Percentage
  - Peak Hour Factor
4. Check Results
  - ✓ V/C Ratio,
  - ✓ Control Delay,
  - ✓ Queue Length are all essential MOEs
  - ✓ Consider both Models
5. If unacceptable, consider adding a Right Turn Bypass Lane
  - Input Volumes and select Entry/Exit Legs
  - **Make sure RT Volumes are adjusted**
6. Check Updated Results

### Results: Approach Measures of Effectiveness

NCHRP-572 Model	N	NE	E	SE	S	SW	W	NW
Entry Capacity, pcu/h	767	NA	719	NA	791	NA	NA	NA
V/C ratio	0.76		0.54		0.82			
Control Delay, sec/pcu	18		11		22			
LOS	C		B		C			
95th % Queue (ft)	188		83		237			

UK Model	N	NE	E	SE	S	SW	W	NW
Entry Capacity, pcu/h	1001	NA	966	NA	1018	NA	NA	NA
V/C ratio	0.58		0.40		0.64			
Control Delay, sec/pcu	8		6		10			
LOS	A		A		A			
95th % Queue (ft)	101		50		125			

Notes:

Control Delay, sec/pcu	19.8							
LOS	C							
95th % Queue (ft)	189							

Entry Legs (FROM)					
E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
		400			

Analysis Methods  
**CHRP 572**  
 Formula (FHWA 2000)

*Key Difference is in Driver Familiarity. Use Engineering Judgment.*

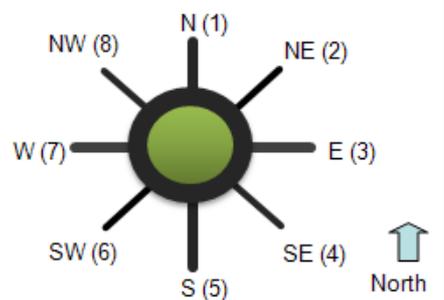
Output	NW (8), vph	
	Total Vehicles	515

# Georgia's Roundabout Analysis Tool

## Multi-Lane Analysis

- For a Multi-Lane Analysis:
- 1. Roundabout Characteristics**
    - ✓ Lane Configuration
  - 2. Volume Input with Balancing, and Traffic Characteristics**
  - 3. Check Results**
    - ✓ V/C Ratio,
    - ✓ Control Delay,
    - ✓ Queue Length

General & Site Information	
Analyst:	PDD
Agency/Company:	ITE - Georgia
Date:	9/11/2009
Project Name or PI#:	0002009
Year, Peak Hour:	2020 AM
County/District:	Fulton
Intersection:	Boulevard @ Atlanta Ave



### Results: Approach Measures of Effectiveness

NCHRP-572 Model	N	NE	E	SE	S	SW	W	NW
Crit. Entry Capacity pcu/h	968	NA	703	NA	881	NA	NA	NA
Crit. Lane Entry Flow pcu/h	424	0	443	0	452	0	0	0
V/C ratio	0.44		0.63		0.51			
Control Delay, sec/pcu	6.6		13.5		8.3			
LOS	A		B		A			
95th % Queue (ft)	59		115		78			

UK Model	N	NE	E	SE	S	SW	W	NW
Entry Capacity pcu/h	2265	NA	1938	NA	2169	NA	NA	NA
Entry Flow pcu/h	808	0	665	0	876	0	0	0
V/C ratio	0.36		0.34		0.40			
Control Delay, sec/pcu	2.5		2.8		2.8			
LOS	A		A		A			
95th % Queue (ft)	43		40		52			



	SW	W	NW
100%	100%	100%	100%
0%	0%	0%	0%
0%	0%	0%	0%
0%	0%	0%	0%
0.92	0.92	0.92	
1.000	1.000	1.000	

does not  
indicate  
restrictions in  
complex  
sketch is  
signer.

# Roundabouts in Georgia



## Dawson County

Dawson Forrest Rd @ Lumpkin Campground Rd

# Roundabouts in Georgia



**Douglas County**  
**SR 5 @ SR 166**

# Roundabouts in Georgia



## Hall County – Gainesville College

Landrum Education Dr @ Frontage Rd / Mathis Dr

# Roundabouts in Georgia



**Monroe County**

**SR 7/US 341 @ SR 74**

**Let to Construction July 2008**



# Roundabouts in Georgia



- Cobb County: West Sandtown at Villa Rica Road**
- **Constructed 2008**

# Roundabouts in Georgia



## DeKalb County

- Lullwater Road at North Decatur Road
- Klondike Road at Rockland Road

# Roundabouts in Georgia



**Glynn County - St. Simons Island**

Demere Road at Fredericka Road (multi-lane)

# Roundabouts in Georgia



## **Liberty County - Hinesville**

– Washington Avenue at Memorial Drive

# Roundabouts in Georgia

## **Coweta County - City of Newnan**

- **East Broad Street/Lower Fayetteville Road at Greison Trail/East Newnan Road**
- **\$520,838 roundabout**
- **Opened to traffic on Oct. 28, 2008**

## **Gwinnett County**

- **Arnold Road at Hutchins Road**

## **Rockdale County - City of Conyers**

- **Travis Street at Hardin Street/Okelly Street**

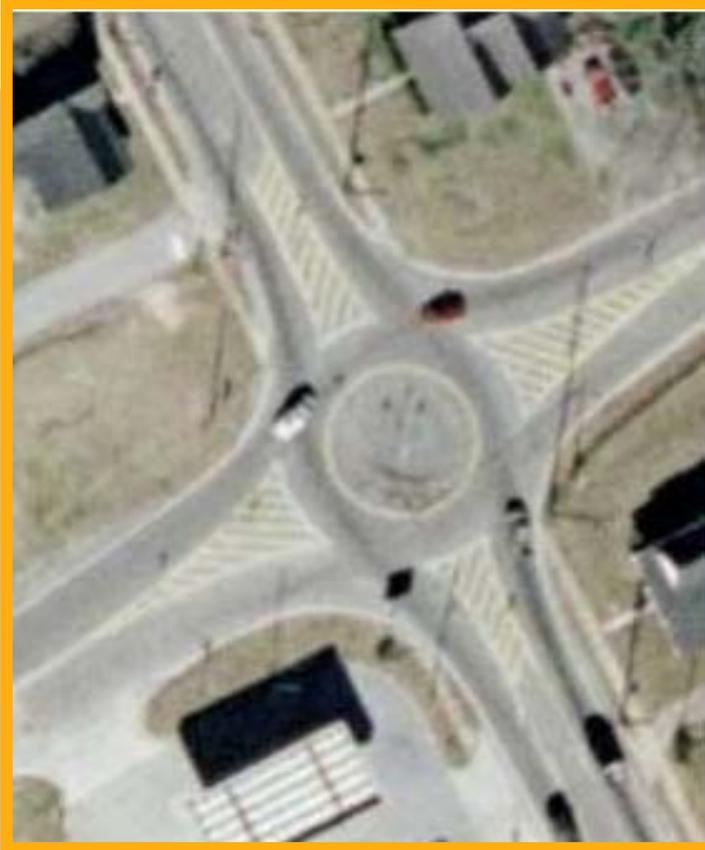
# “Roundabouts” in Georgia



## **Gilmer County - City of Ellijay**

- State Route 2/52 at  
N Main Street/Dalton Street/Broad Street

# “Roundabouts” in Georgia



**Whitesburg**  
**SR 5 at SR 16/US 27 Alt**



**Roopville**  
**SR 5 at Old US 27**

## Carroll County

# Roundabouts in Georgia

## 76 More Roundabouts Under Consideration

Baldwin 1

Bartow 3

Ben Hill 1

Berrien 1

Bibb 2

Brooks 1

Butts 4

Carroll 3

Catoosa 1

Chattooga 2

Cherokee 3

Colquitt 2

Columbia 1

Coweta 7

Crisp 1

Dawson 2

Dougherty 1

Douglas 2

Effingham 1

Emanuel 1

Fannin 1

Fayette 2

Franklin 1

Fulton 3

Gwinnett 2

Habersham 1

Hall 2

Hancock 1

Hart 1

Henry 1

Jackson 1

Jefferson 2

Lumpkin 1

Monroe 4

Paulding 2

Peach 1

Pickens 1

Pike 1

Randolph 1

Richmond 1

Rockdale 1

Screven 1

Tift 2

Twiggs 1

Whitfield 2

# Myth: The public will never accept roundabouts



Photo source: NYSDOT

## Sometimes it takes perseverance!!!

# Questions?

Scott Zehngraff, P.E.

Traffic Operations

404-635-8127