Development of a Roundabout Guide for TxDOT

Jen Duthie, PhD
Center for Transportation Research
The University of Texas at Austin

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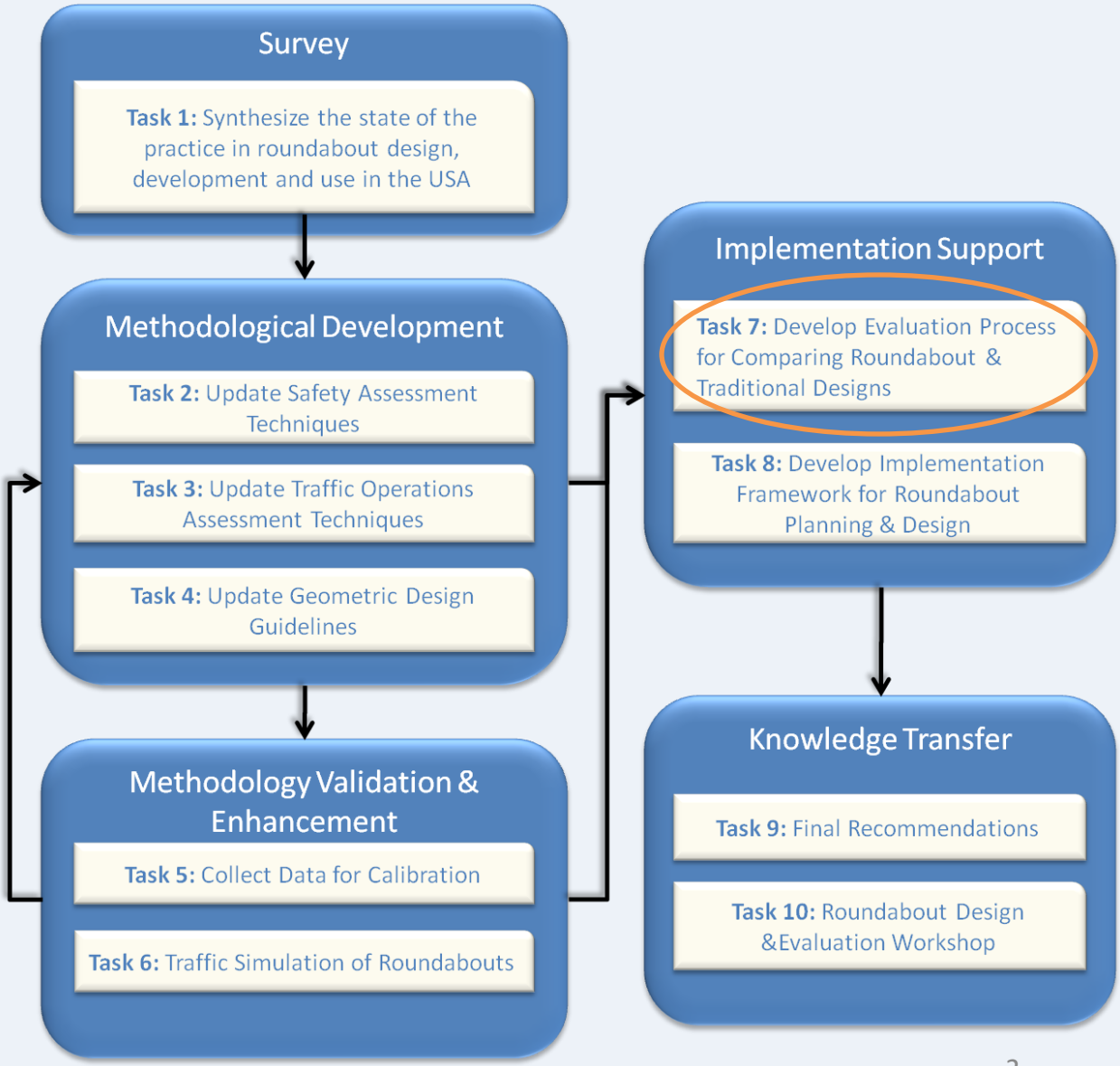
OVERVIEW

- **Purpose:**

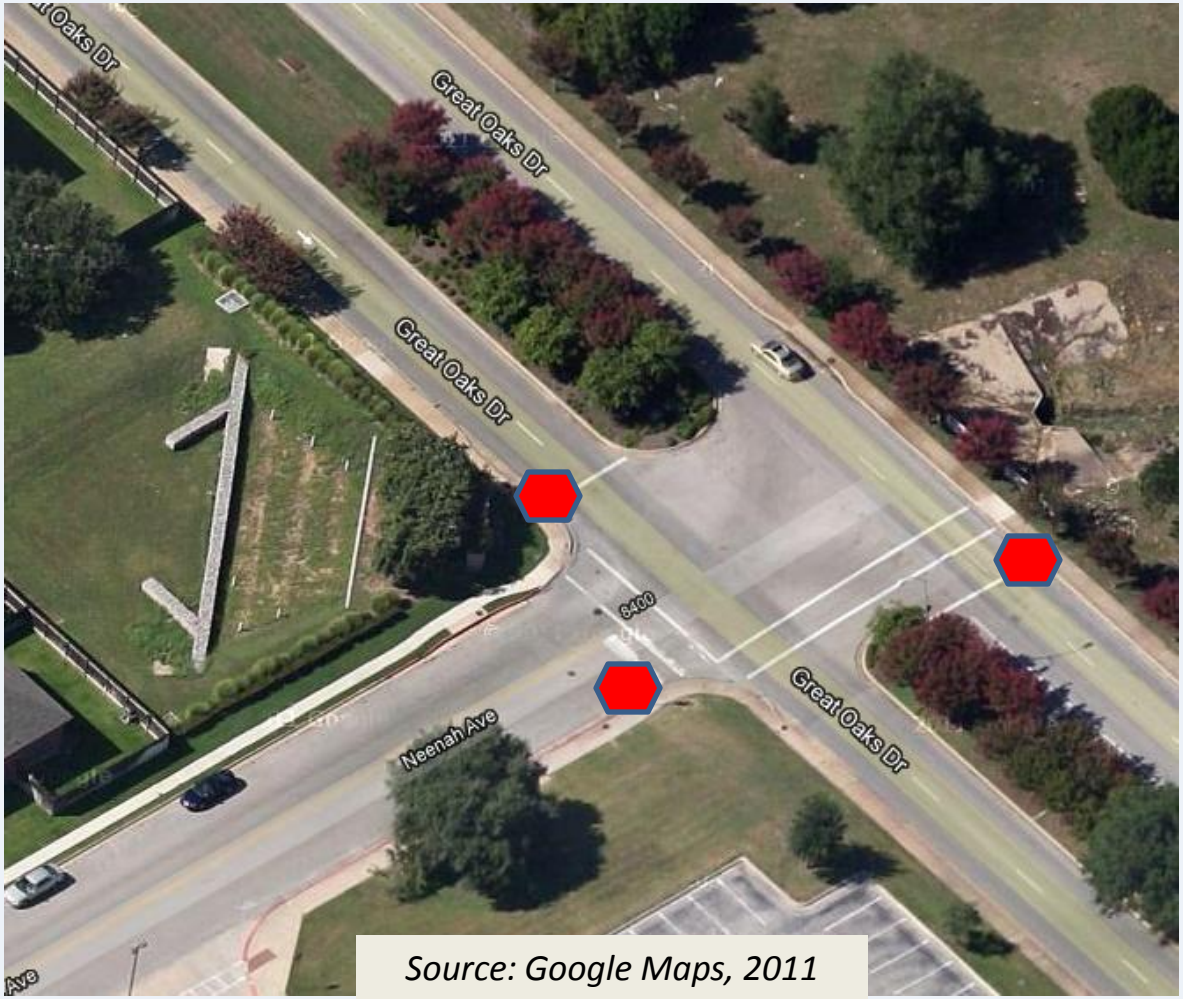
  Develop roundabout guidelines for Texas that incorporate successful practices, recent U.S. research, and Texas specific conditions.



TRAFFIC ANALYSIS

Spreadsheet Evaluation Tool

- Evaluation of possible conversion of all-way stop to a roundabout



Source: Google Maps, 2011

TRAFFIC ANALYSIS

Spreadsheet Evaluation Tool

- **Step 1: Check for Roundabout Feasibility**

  Is there space available for the roundabout?

Source: Google Maps, 2011

Maximum inscribed diameter = 120’

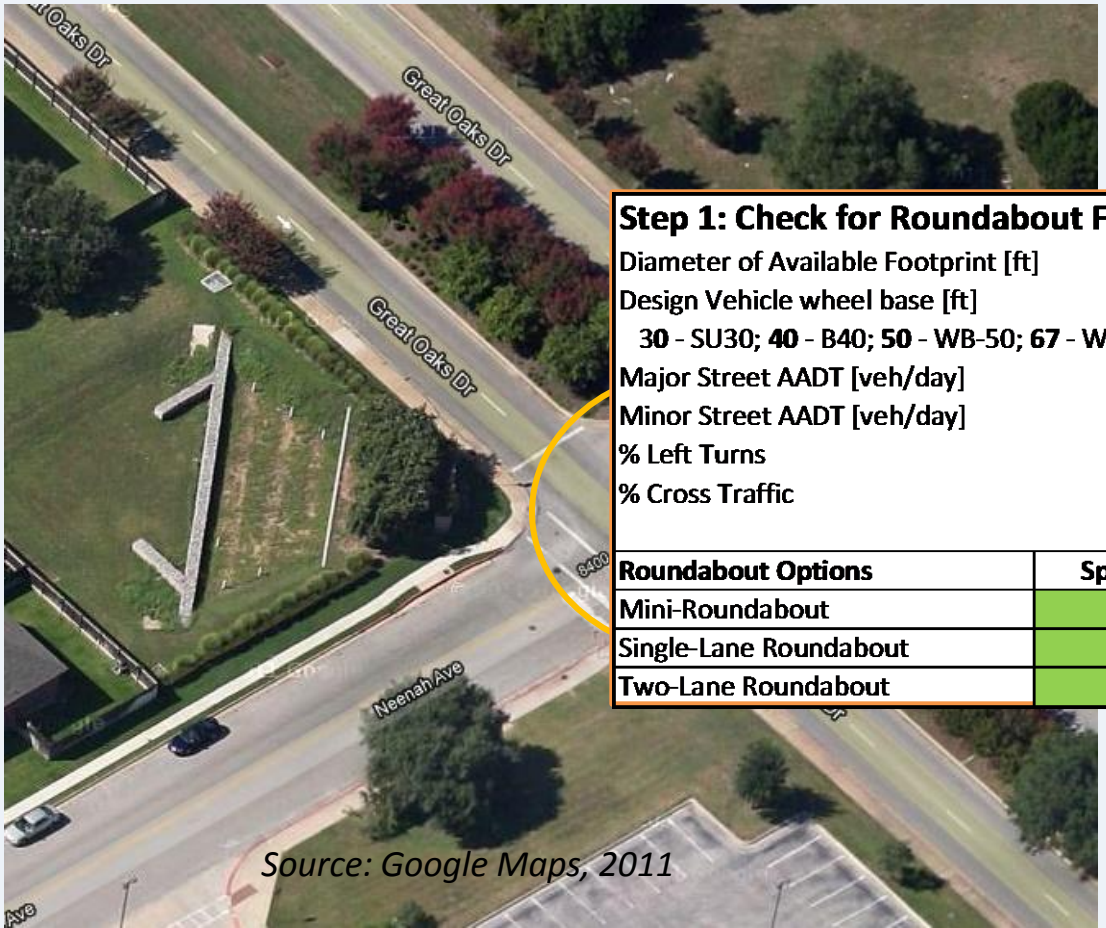
Design vehicle = single unit bus

TRAFFIC ANALYSIS

Spreadsheet Evaluation Tool

- **Step 1: Check for Roundabout Feasibility**

  Is there space available for the roundabout?



Source: Google Maps, 2011

Maximum inscribed diameter = 120’

Step 1: Check for Roundabout Feasibility	
Diameter of Available Footprint [ft]	120
Design Vehicle wheel base [ft]	40
30 - SU30; **40** - B40; **50** - WB-50; **67** - WB-67	
Major Street AADT [veh/day]	
Minor Street AADT [veh/day]	
% Left Turns	
% Cross Traffic	

Roundabout Options	Space Available?	Handle Traffic?
Mini-Roundabout	N	?
Single-Lane Roundabout	Y	?
Two-Lane Roundabout	N	?

TRAFFIC ANALYSIS

Spreadsheet Evaluation Tool

- **Step 1: Check for Roundabout Feasibility**

  Can it handle the traffic demand?

Step 1: Check for Roundabout Feasibility	
Diameter of Available Footprint [ft]	120
Design Vehicle wheel base [ft]	50
30 - SU30; **40** - B40; **50** - WB-50; **67** - WB-67	
Major Street AADT [veh/day]	10100
Minor Street AADT [veh/day]	1690
% Left Turns	57%
% Cross Traffic	14%

Roundabout Options	Space Available?	Handle Traffic?
Mini-Roundabout	N	Y
Single-Lane Roundabout	Y	Y
Two-Lane Roundabout	N	Y

TRAFFIC ANALYSIS

Spreadsheet Evaluation Tool

- **Step 2: Enter Intersection Data**

  How many lanes are needed on each approach?

Peak Hour Factor = 0.91

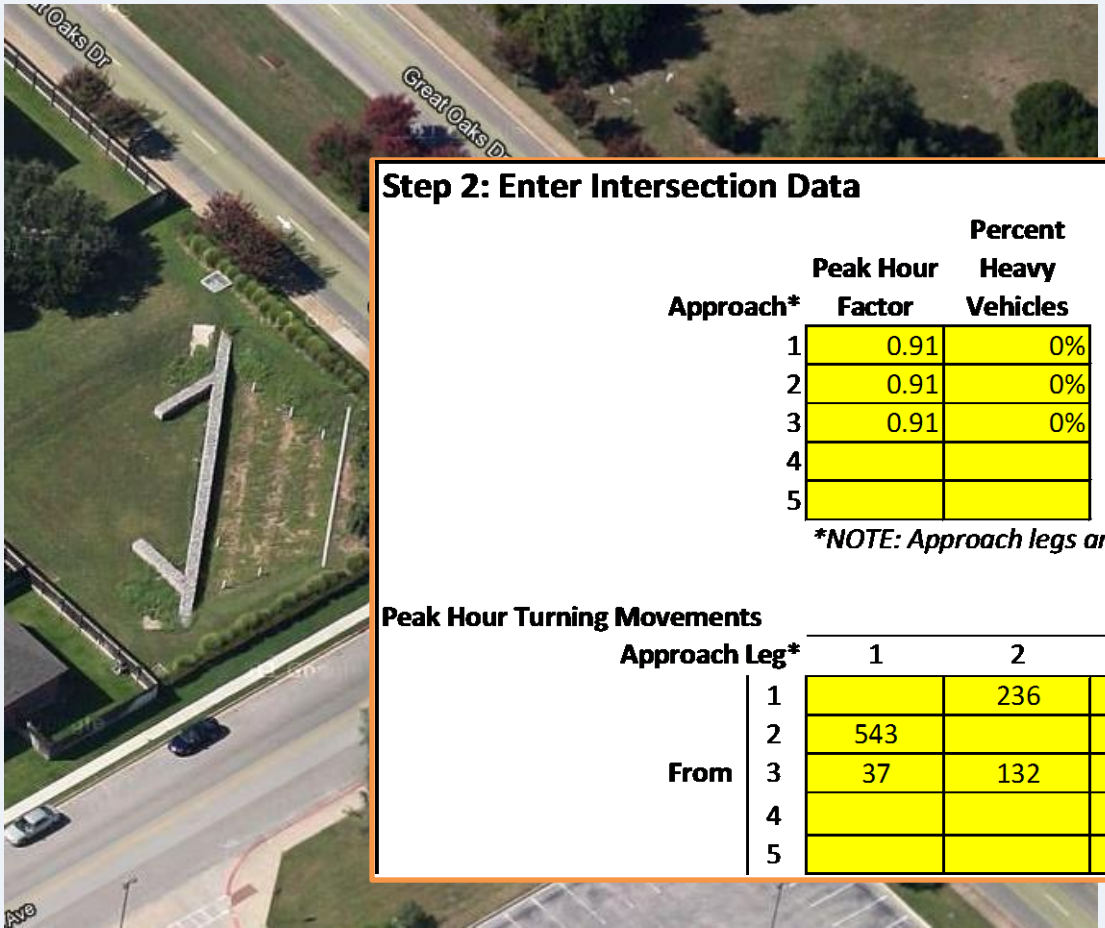
0% Heavy Vehicles

TRAFFIC ANALYSIS

Spreadsheet Evaluation Tool

- **Step 2: Enter Intersection Data**

  How many lanes are needed on each approach?



Step 2: Enter Intersection Data

Approach*	Peak Hour Factor	Percent Heavy Vehicles
1	0.91	0%
2	0.91	0%
3	0.91	0%
4		
5		

**NOTE: Approach legs are labeled clockwise*

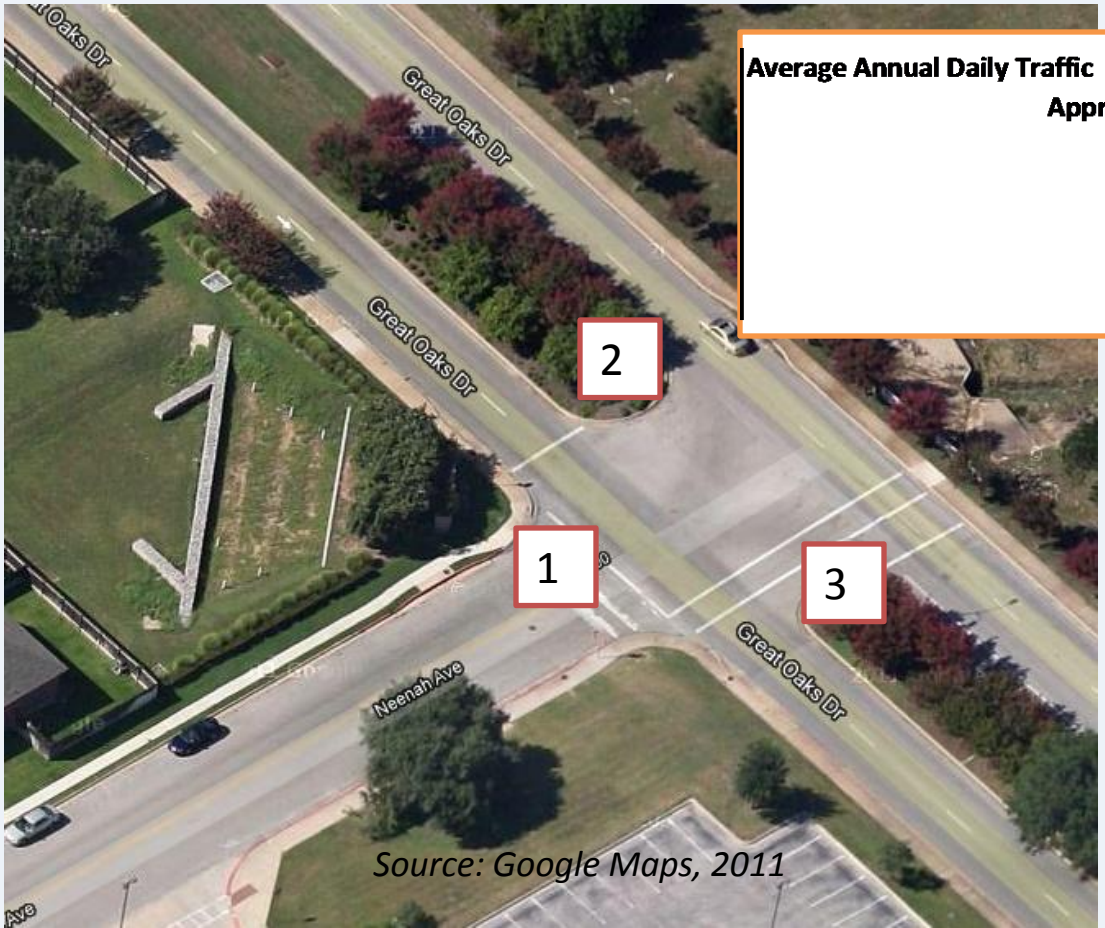
Peak Hour Turning Movements		To					Recommended # Lanes for Roundabout
	Approach Leg*	1	2	3	4	5	Approach
From	1		236	88			1
	2	543		143			1
	3	37	132				1
	4						0
	5						0

TRAFFIC ANALYSIS

Spreadsheet Evaluation Tool

- **Step 2: Enter Intersection Data**

  Optional data entry for crash prediction



Source: Google Maps, 2011

Average Annual Daily Traffic	AADT**		Circulating
Approach	Entering	Exiting	AADT
1	3240	5800	11790
2	6860	3680	
3	1690	2310	
4			
5			

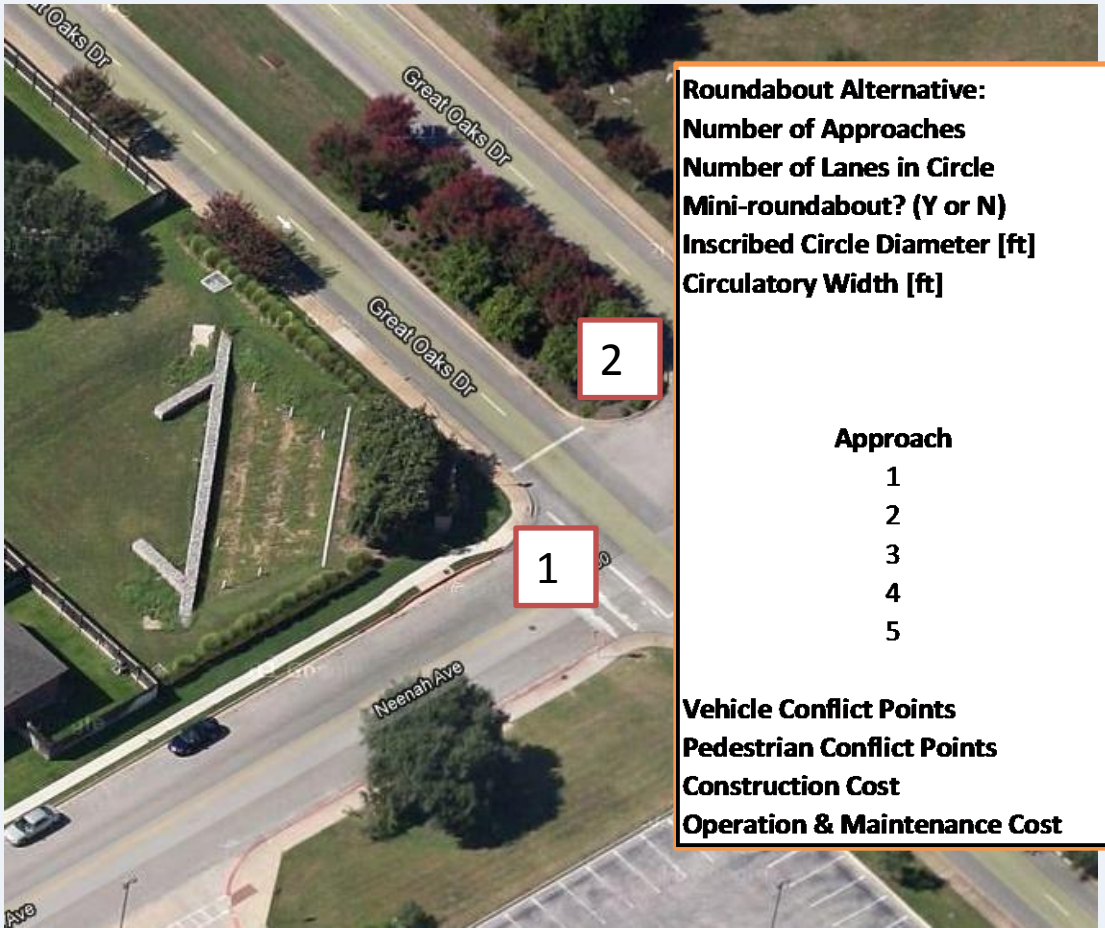
*Assumed peak hour counts are 10% of daily counts

TRAFFIC ANALYSIS

Spreadsheet Evaluation Tool

- **Step 3: Inputs for Roundabout Alternative**

  Data needed to calculate performance measures



Roundabout Alternative:	Single-lane roundabout				
Number of Approaches	3				
Number of Lanes in Circle	1				
Mini-roundabout? (Y or N)	N				
Inscribed Circle Diameter [ft]	120				
Circulatory Width [ft]	20				

Approach	# Lanes	RT Bypass Lane? (Y or N)	# Exit Lanes	Entry Width [ft]	Angle to Next Leg [deg]
1	1	N	1	18	90
2	1	N	1	18	90
3	1	N	1	18	90
4					
5					

Vehicle Conflict Points	6				
Pedestrian Conflict Points	6				
Construction Cost					
Operation & Maintenance Cost					

TRAFFIC ANALYSIS

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- **Step 4: Inputs for Non-Roundabout Alternative**

  Option manual entry of non-roundabout alternative characteristics

Non-Roundabout Alternative ("signalized","TWSC", or "AWSC"):					AWSC
New (N) or Existing (E)?	E				
Number of Approaches	3				
Approach	# Lanes	Level of Service	Volume-to-Capacity	Average Delay [sec/veh]	95% Queue Length
1	1	A	0.27	5	1
2	2	A	0.57	8	3
3	2	A	0.15	5	1
4					
5					

Vehicle Conflict Points	11
Pedestrian Conflict Points	10
Intersection Total Crash Prediction [crashes/year]	2.90
Intersection Injury Crash Prediction [crashes/year]	
Average Speed [mph]	25
Construction Cost [$]	
Operation & Maintenance Cost [$]	

TRAFFIC ANALYSIS

Spreadsheet Evaluation Tool

- Compare Performance (see “Comparison” tab of spreadsheet)

Thank you.

jduthie@mail.utexas.edu