



# CAIT

Center for Advanced Infrastructure & Transportation  
Rutgers, The State University of New Jersey

## QUARTERLY PROGRESS REPORT

Project Title:	Operational Improvements at Traffic Circles (Project 2002-16)		
RFP NUMBER:	NJDOT RESEARCH PROJECT MANAGER: Robert Sasor		
TASK ORDER NUMBER/Study Number: 129 / 4-26544	PRINCIPAL INVESTIGATOR: Kaan Ozbay (Rutgers) / George List (RPI)		
Study Start Date: 01/01/2002 Study End Date: 08/31/2005	Period Covered: 1 <sup>st</sup> Quarter 2005		

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Phase 1: Preliminary Literature Search	5%		100%	5%
Phase 2				
Task 1: Literature Review	10%	%	100%	10%
Task 2: Selection and Use of Computer Tool.	10%	1%	100%	10%
Task 3: Evaluation of Operational Alternatives.	30%	10%	80%	24%
Task 4: Safety Evaluation	20%	10%	60%	12%
Task 5: Cost – Benefit Analysis	10%		65%	6.5%
Tasks 6: Final Recommendations	5%			
Tasks 7: Administration / Final Report.	10%	10%	50%	5%
<b>TOTAL</b>				72.5%

### Project Objectives:

**Objective 1:** Simulation Modeling and Validation of Geometry and Traffic Patterns of Existing and Proposed Operational Improvement Alternatives of Circles Under Study.

**Objective 2:** Determination and Evaluation of Operational and Safety Improvement Alternatives using a Series of Measures of Effectiveness (travel time, delays, air pollution, gas consumption, etc.)

**Objective 3:** Recommendation of best operational and safety improvements based on a rigorous and realistic cost-benefit analysis

### Project Abstract:

Traffic circles have been used in the United States since 1905. However, their use has been limited since the 1950s due to the realization that they worked neither efficiently nor safely (NCHRP- WEB Page). Recently, there has been increasing interest in improving existing traffic circles to address these safety and efficiency problems. Several States including New Jersey are in the process of exploring effective operational alternatives for enhancing safety and efficiency of these traffic circles built in the early parts of 20th Century.

Many existing traffic circles in New Jersey that were designed to handle lesser traffic volumes than today's volumes fall under this category of traffic circles that need to be improved since they are faced with increasing congestion and accident problems. Although replacement of these traffic circles appear to be a viable option time and money needed for the construction of alternative solutions can be prohibitive especially in this atmosphere of diminishing resources for any kind of major investment due to the budget problems of the State.

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The next best option appears to be the implementation of operational alternatives that can extend the life of these circles until they can be rebuilt in the next 5 to 20 years.

To study operational alternatives, traffic simulation computer software that can accurately model the geometry & traffic on circles, and provide animated graphics of traffic movements is needed. The major goal of this computer based analysis of the traffic circles as proposed in this study is to accurately evaluate the effectiveness of various traffic engineering measures such as metering, sign and line treatments, reconstructing or adding lanes, in terms of improve traffic flow or safety at a specific circle.

1. Progress this quarter by task:

• **Task 3:**

Below a summary of our efforts in this quarter:

- The traffic data at the signalized intersection nearby Asbury circle was provided by NJDOT. The simulation model of the Asbury circle is revised based on these new data. The gap rejection and acceptance models at the yield signs are estimated using the ground-truth data and incorporated in the simulation model using Application Programming Interface (API) feature of Paramics.
- Sensitivity analysis and validation of Asbury circle will be included in the draft report, and be submitted at the quarterly meeting.

• **Task 4:**

- RPI has finished safety analysis on Collingwood circle. The draft report explaining their analyses was submitted to NJDOT.
- The necessary simulation data to perform safety analysis at Brooklawn circle is being analyzed by RPI. RPI is working on finalizing the safety analysis and recommendations for the Brooklawn circle

- **Task 5:** The draft chapter for the Cost-Benefit analysis includes the analysis of Brooklawn circle with the proposed operational alternatives as suggested in the DVRPC report. Based on the safety recommendations by RPI this part will be finalized by the quarterly meeting.

2. Proposed activities for next quarter by task

- We will continue Tasks 3, 4 and 5.

3. List of deliverables provided in this quarter by task (product date)

A final report on modeling and analysis of the Asbury circle.  
Safety analysis on the Brooklawn Circle.

4. Progress on Implementation and Training Activities

NJDOT officials will be visited to present the Brooklawn circle analysis and results.

5. Problems/Proposed Solutions

We have revised percent of total complete for Tasks 3 and 4 to reflect some of the delays due to the data availability and additional time needed for calibration.

Last quarter we requested a no-cost extension.

Total Project Budget	\$ 422,524
<b>Modified Contract Amount:</b>	
Total Project Expenditure to date	\$348,952
% of Total Project Budget Expended	83%

\* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.