STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

memorandum

subject: Use of Roundabouts on State Highways

date: August 26, 2004

to Messrs. John F. Carey
Thomas A. Harley
James H. Norman
Joseph J. Obara

from Carl F. Bard
Engineering Administrator
Bureau of Engineering
and Highway Operations

There has been increased interest in installing roundabouts on the Connecticut State Highway System.

Roundabouts are being used extensively in Europe and Australia. States such as Maryland, Florida and Colorado have been installing Modern Roundabouts in recent years. Closer to home, New York has recently converted some old style traffic circles into modern roundabouts and has construction projects in the works for the installation of some new roundabouts. In addition, Vermont has installed a few modern roundabouts.

The major impetus behind the use of roundabouts is that the number of accidents is reduced at a roundabout intersection versus a normal intersection. Statistically significant reductions were found in both total accidents and injury accidents. Total accidents were reduced by approximately one-third, while injury accidents were cut in half. It should be noted that these statistics are for single-lane roundabouts only. Multi-lane roundabouts have similar total accidents compared with normal intersections, although injury accidents are shown to be reduced.

One reason for the reduction is the design speed of the roundabout. Typically, a roundabout is designed for 20-25 mph. In addition, there are significantly fewer conflict points in a roundabout (8) than a 4-legged intersection (32). However, there are locations and situations where a roundabout may not be appropriate.

In order to standardize the use of roundabouts on the Connecticut state highway system, a Roundabout Review Team (RRT) has been established to review all proposed roundabouts. The RRT will consist of Mr. Charles S. Harlow of the Division of Traffic Engineering, Mr. Mario Marrero of the Project Concept Unit, and Mr. William W. Britnell of the State Design Unit. Mr. Harlow will lead the team and all correspondence should be addressed to him.

The originating unit requesting the construction of a roundabout will submit to the RRT, and need to address, the information listed on the attached Use of Roundabouts list. The RRT will review the submission and make a determination on the appropriateness of a roundabout for the particular location.

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Upon positive notification on using a roundabout, the originating unit will present the request to the Scoping Committee for final approval.

Should you have any questions on the process, please contact Mr. Harlow at 860-594-2788.

Attachment

Use of Roundabouts:

In preparing this paper, information was gathered from the FHWA publication "Roundabouts: An Informational Guide," NCHRP Synthesis 264 "Modern Roundabout Practice in the United States," NY DOT's "Roundabouts Interim Requirements and Guidance" and from information gathered at a seminar given by the FHWA entitled "Roundabout Design Workshop."

When determining the use of a roundabout, the following items need to be considered:

- Single lane urban or rural roundabouts should be the only type considered when first installing roundabouts in an area. It is recommended that no multi-lane roundabouts be considered until after motorists become familiar with the operation of single lane roundabouts.

- Peak hour volumes of 1800-2000 vph (total entering volume) are the maximum that single lane roundabouts can handle.

- Capacity analysis using design year volumes should be done for each leg. If the V/C ratio is greater than 0.85 on any approach then it will essentially operate as a stop controlled intersection and a roundabout is not recommended.

- Queuing analysis should be performed comparing what is expected for a roundabout versus a signalized intersection using design year volumes.

- The signal warrants should be provided. Those locations, which just meet or nearly meet the warrants, should be given consideration for roundabout installation. Intersections that are, or proposed to be, all-way stop controlled may also be good candidate locations for a roundabout.

- Right-of-way impacts need to be assessed. While roundabouts usually require less R.O.W. on the approaches to the intersection, additional R.O.W. impacts may be required at the corners of the intersection.

- A cost comparison of the use of a roundabout and more traditional engineering options needs to be provided.

- The grades on the approaches to a roundabout should ideally be no greater than 4 percent. Grades greater than 4 percent may limit visibility and also make it difficult for large vehicles to maneuver around the roundabout.

- Adequate sight lines must be provided before considering the use of a roundabout. These sight lines shall include the visibility of the motorist in the roundabout, the motorist entering the roundabout, and the visibility to and from the pedestrians.

- The accident history of the location being considered for a roundabout must be reviewed. The types of accidents the frequency of which may be reduced by the introduction of a roundabout include head-on left-turning accidents and angle accidents.

- The functional classification of all intersecting roadways needs to be considered. The roundabout gives each approach equal weight for assigning right of way. Therefore, consideration must be given to delay added to the arterial roadway.

- Balanced flow on the approach legs will provide better operation of the roundabout. If the arterial volume represents over 80 percent of the total entering volume, excessive delay could result.

- A high percentage of left-turning vehicles on the arterial generally make a roundabout more advantageous than a conventional intersection.

- Roundabouts should not be installed when located in a signal system. The roundabout will break up the platoons of traffic.

- A bottleneck downstream, such as a drawbridge, a railroad at-grade crossing or an over-saturated intersection may preclude consideration of a roundabout since traffic may back up into the roundabout.

- Pedestrian activity needs to be considered (low/average/high). Visually impaired pedestrians have difficulty negotiating the crossings of roundabouts and are opposed to their use. High pedestrian activity may cause the roundabout to breakdown as yielding traffic can back up into the roundabout.

- Truck volume needs to be considered (low/average/high). Trucks have more difficulty maneuvering through roundabouts. Frequently truck aprons are installed to help mitigate this situation. However, high truck volumes may cause the roundabout to break down.

- Bicycles need to be considered. Bicycle accidents are typically increased with a roundabout. If a bike route or high volumes of bicycles are present, a roundabout may not be the best option.

- Illumination is essential to light up the inner circle and the pedestrian crossings. If illumination is not acceptable to the stakeholders, the use of a roundabout is not recommended.

- An intersection with an unusual number of legs or where the major move makes a 90-degree turn maybe better served with a roundabout.

- Roundabouts should not be used solely for traffic calming. They can be used in conjunction with other traffic calming strategies. On a median divided road to facilitate u-turns or as a transition from a commercial to a residential area, a roundabout could be considered.