To Whom It May Concern:

No apologies for the following long explanation. I constantly hear such views and comments, so I have taken the trouble to give a fairly comprehensive reply.

The statements forwarded in your e-mail contain common misconceptions that are circulating widely in the USA. (no pun intended)

1. Roundabouts are not suitable for unequal traffic distribution?

The belief that roundabouts are unsuitable for unequal traffic distribution **is a total myth**
I have to debunk it at **every** seminar / workshop I do in the USA as it is always raised.
I have heard that it was started by a US Professor who is a specialist in **Traffic Signals!**

Roundabout capacity is mainly a function of two things

1. Approach Geometry 2. Circulating Flows.

Capacity for a specific approach is a straight-line graph plotted against the circulating volumes. If the geometry is changed the slope and intercept change.

Approaches that are passed by large circulating volumes simply need higher capacity approach geometry to achieve the desired capacity / LOS. Consider a roundabout at a crossroad with large flow imbalance - large main road volumes - small side road volumes. The small side road volumes create small circulating volumes past the main road entries. this gives large capacity for the large main road volumes (just where needed). The large main road volumes create large circulating volumes past the side road. this creates lower capacity fro the lower side road entry volumes. The VC ratios and LOS will be about the same.

Roundabout designers **tailor** the geometry to the traffic needs (using a good computer model) just like a signal designer tunes the signal settings.

I have designed, reviewed and modified over 1000 roundabouts and **I have never seen one with an equal flow distribution**. The UK has many thousands of very high volume roundabouts (UK traffic density is very high with 60M people on an island the size of Florida). They operate very successfully **without equal traffic distributions**. In fact the AM and the PM volumes and distributions are usually very different and one feature of roundabouts is their great flexibility to accommodate these differences.

Roundabouts are real world solutions.

Like all myths there is usually a gem of truth. If a distribution is very unbalanced it will eventually lead to failure in the extreme. As volumes increase **as the most heavily used legs are likely to overload first.** Often this does not happen as the surrounding network cannot supply such volumes. However, even if it does happen it is very easy to fix as Roundabout entry capacity is VERY sensitive to geometry. I have spent about 50% of my time modifying old congested roundabouts and have seen queues in excess of 100 vehicles / lane vanish overnight due to subtle geometric modification within the existing ROW.

2. Two laners OK < 40,000 ADT?

The statement that a two lane roundabouts are unsuitable for situations over 40,000 ADT is also a crude and often untrue generalisation.

Roundabouts are designed for the peak hour. Typically, the peak is about 1/10 the ADT (sometimes more sometimes less). When I give workshops and seminars in the USA, I show a

video of a UK 2 lane roundabout operating in the peak hour (the video was made by Data Collection to count the turning volumes). I ask the delegates to estimate the total volume on the roundabout in the peak hour. The estimates are usually between 1500 and 2500 vph. There are no queues or delays and it operates slowly and rhythmically. The volumes peak at a little over 5000 vph and no one believes it.

I initially used the video to help convince a client in Michigan. When they first viewed the video they rang me to say that I had sent the wrong video as the traffic volumes where low. I asked them to slow the video and count traffic for 5 minutes and factor by 12. They where amazed to get over 5000 vph. The roundabout was run of the mill - nothing special. In fact it was about 35 years old and was not a very efficient design.

It is misleading to talk about roundabout overall capacity. The capacity of an approach makes more sense.

Suppose there is 40,000 ADT with 4000 in the peak.

Assume 1000 arrives on each leg. The geometry is fixed.

1. If 100% made a right from each approach the circulating volumes past each would be zero and the capacity of each leg would be ~ 2400 on a two laner (assuming double right turns) making the total capacity ~ 9600

2. If 100% turned left the circulating volumes would be 2000 vph past each approach. The capacity of each would be ~ 1000 vph (assuming double left turns)

Exhibit 4-4 in the FHWA Roundabout informational guide give the graph for a SPECIFIC GEOMETRY two lane entry. (Two laners with different geometry have larger intercepts and lower gradient). Circulating volumes of ~ 2000 give entry capacities of ~ 1000 vph which is about 4000/hour on 4 leg roundabout. If the circulating volumes are lower the capacity will be higher.

As the circulating volumes are derived by summing the relevant turning volumes, the lower the percentage of left turn volumes and the higher the percentage of right turn volume the lower the circulating volumes - the higher the capacity.

Two lane roundabouts can usually accommodate well over 40,000 ADT. Each is case specific and needs to be evaluated with good roundabout software. (Gap models greatly underestimate capacity at high circulating volumes and this is partly responsible for such theoretical misconception emerging from Universities - friendly jibe intended)

The Sagamore Rotary

Rotaries and old Traffic Circles are NOT Modern Roundabouts. The former have low capacity and lots of crashes, while modern roundabouts have high capacity and low crashes.

There is a whole arsenal of techniques for dealing with the 90,000 ADT at Sagamore. Bypass lanes may remove large volumes from the roundabout? A modern three lane type roundabout may work or possibly a carefully designed double roundabout. These have higher capacity and are safer than large single roundabouts. The circulating volumes past each leg is lower as significant proportion of the total traffic only uses a single roundabout. The reduced entry and circulating volumes significantly increase capacity and reduce entry conflict and crashes. A divide and conquer principle.

This would need expert evaluation.

Barry Crown