



# Transportation safety solutions for everyday road safety challenges

## Cross Sectional Roundabout Study

### Study Objective

The objective of the study was to carry out a cross-sectional safety study of four roundabouts in Oakland County by analysis of video data using surrogate safety methods. Surrogate safety measures such as trajectories, speeds, volumes and conflicts were extracted from the collected video and used to determine the level of safety between several movements at each of the four roundabouts. Using the results from the surrogate safety study allowed for identification of the main cause(s) of the conflicts at the roundabouts in order to better plan for future road safety interventions.

### Study Area

All roundabouts studied are two-lane roundabouts with splitter islands and advisory speeds of 20 mph. Roundabouts 1 and 2 have outer diameters of approximately 250 feet, while roundabouts 3 and 4 are much smaller, with diameters of approximately 187 and 161 feet. In addition, the opening dates of the roundabouts vary; roundabouts 4 and 1 opened in 2010 and 2011, respectively, and roundabouts 3 and 2 opened in 2015 and 2017, much more recently to the time at which the study was conducted.

### Methodology

Transoft Solutions hired a third-party video data collector to set up cameras at the roundabouts which recorded video for a total of 60 hours over five days at each roundabout. After calibrating the videos and defining the movements of interest, Transoft processed the video data to obtain several safety indicators including Post-encroachment-time (PET), vehicle speed, road user type, and road user arrival patterns.

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### Study Findings

#### Speeding

At roundabout 1, 56% of circulating and exiting vehicles had average speeds higher than 30 mph, and at roundabout 4, 77% of exiting vehicles had average speeds higher than 30 mph. Given an advisory speed of 20 mph, this data indicates that over-speeding appears to be a problem at the roundabouts.

#### Conflicts

The most frequent conflict type across the roundabouts were conflicts between entering and exiting vehicles. Furthermore, vehicles entering the roundabout arrived at the conflict point first in 37% of conflicts at roundabout 3. This situation is critical because vehicles entering the roundabout do not have the right-of-way, therefore circulating vehicles might not expect to be cut off by the entering vehicle. Conflicts between vehicles circulating in the outer lane and cutting across to the inner lane, conflicting with vehicles exiting the roundabout were also of concern (Figure 3). While the rates of this conflict type were not of particularly high frequency, rates of the vehicle in the outer lane cutting in front of the vehicle behind it, which presents an elevated level of risk, occurred in 42-57% of cases.



Figure 1. Still from conflict video showing vehicle cutting from the outer to inner roundabout lane

Overall, over-speeding issues as well as a high frequency of unexpected movements at the roundabouts were identified as the two main factors resulting in conflicts and possibly collisions.