

# Mcity: A 32-Acre Outdoor Lab

Mcity is the world's first full-scale simulated urban environment designed expressly for testing the performance and safety of connected, automated, and autonomous vehicles under controlled and realistic road conditions. It is a 32-acre outdoor laboratory for advanced mobility systems that includes:

- Urban and suburban streets, including various lane configurations and sidewalks, pedestrian crossings, bike lanes, ADA ramps, street lights, parallel and diagonal parking, and a bus turnoff/stop.
- Instrumentation throughout, including a control network to collect data about traffic activity using wireless, fiber optics, Ethernet, and a highly accurate real-time kinematic positioning system.

Other features include:

**Straight gravel roadway** with a railroad crossing.

**Traffic circle**, a smaller version of a roundabout that is common in Europe and some older cities in the U.S.

**Signalized intersections** in different configurations, with mast arms, wood and metal poles, and pedestrian crossings.

**Trunk line road**, a rural roadway with a fully equipped railroad crossing, guard rail, and temporary and permanent pavement markings.

**Brick paver road** simulated with stamped concrete.

**Underpass**, simulated by a tunnel that blocks vehicles from wireless and satellite signals.

**Roundabout**, an increasingly common approach to intersection design intended to improve safety.

**Open test area** that can be configured for a wide range of scenarios, including parking lots and novel intersection geometries.

**4-way stop intersection**, with straight as well as tight and sweepingly curved approaching roadways.

**Tree canopy**, a simulated tree cover that reproduces the attenuation of signals that pass through trees.

**Metal bridge deck**, a bridge surface that poses special challenges for radar and image processing sensors.

**Moveable building facades** up to two stories high allow researchers to test the effects of various materials and geometries on sensor performance.

**Meandering gravel roadway**

**Limited access freeway** with access ramps, highway signage, guardrails, crash attenuators, and a concrete jersey-style barrier.

**Calibration mound** to calibrate inertial measurement sensors on vehicles.

**Open test area** that can be configured for a wide range of scenarios, including parking lots and novel intersection geometries.

