

FHWA's Fostering Multimodal Connectivity Newsletter

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Introduction

The Federal Highway Administration's (FHWA's) *Fostering Multimodal Connectivity Newsletter* provides transportation professionals with real-world examples of how multimodal transportation investments use accelerated project delivery, technology and design innovation, and public/private partnerships to promote economic revitalization, provide access to jobs, and achieve safer communities. The newsletter also showcases how FHWA and its partners are supporting the U.S. Department of Transportation (U.S. DOT) Strategic Plan by improving connectivity, accessibility, safety, and convenience for all transportation users.

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Boston Launches Pick-up/Drop-Off Zone Pilot to Reduce Congestion

Kris Carter, New Urban Mechanic, City of Boston

In 2018, the city of Boston saw the largest increase in Transportation Network Company (TNC) trips in the Commonwealth of Massachusetts, rising to over 100,000 trips per day on average. The next year, [INRIX Global Traffic Scorecard](#) named the city of Boston the most congested city in the United States. The city's population and employment hubs are growing rapidly, and people are looking for new ways to make their daily trips.



Figure 1: Location of the PU/DO pilot zone; Part of the outreach flyer to local businesses. (Image courtesy of the city of Boston)

While Boston encourages trips made by public transit, walking, or bicycling, city leadership recognizes that inaction on TNC management at the curb degrades the quality and safety of the experiences people have with those modes. In an effort to better manage congestion in a regulatory environment in which the city of Boston has little direct control over TNCs, [the city launched a pick-up/drop-off \("PU/DO"\) pilot](#) in March 2019. The initial focus was around two blocks within the Fenway neighborhood (a few blocks from historic Fenway Park) that TNCs identified as having a significant volume of trips. The two blocks are used primarily by patrons of the area's shops and restaurants, including a large retail chain.



The city of Boston installed the PU/DO pilot on two westbound blocks of Boylston Street, dedicating four pre-existing parking spots (two per block) to pick-up/drop-off activity from 5 p.m. to 8 a.m. The [Mayor's Office of New Urban Mechanics](#) spearheaded the project and worked with the city to select the time of day restriction based upon evaluation of TNC trip volumes, which spike at that location at dinnertime and during nightlife hours. Signage indicated that the driver must stay with the vehicle and could only stay in the spot for up to five minutes during these hours. Lyft and Uber apps also geofenced the PU/DO location, sending ride requests made in that area to the zone pick-up spots. The Disability Commission for the city also supported the evaluation and ensured that TNC providers would allow users to denote a need for a different pickup location to avoid walking the longer distances to and from the pick-up/drop-off area.

Over six months, the team conducted surveys of adjacent businesses, parking ticket data, Waze analysis, and manually collected count data. The team's final analysis included the following observations:

- **Curb productivity increased substantially.** The utilization rate of the curb, as measured by vehicles per hour, increased by over 350 percent in the PU/DO zone compared to its prior use. This means more people were accessing the curb and the sidewalk safely. More vehicles and people were able to access the curb in the PU/DO zone than when it was used for two-hour parking, indicating a better managed and more efficient use of the location's precious resource.
- **Parking incidents decreased**, including an eight percent drop in overall parking citations in the area. If this trend continues each year, this could result in fewer vehicles remaining in the travel lanes, improving sightlines for pedestrians, and decreasing congestion.
- **The team observed improved safety behavior.** Data indicated a notable decrease in PU/DO activity happening in the travel lane after the zone was installed. In one of the locations, there was, on average, a 38 percent decrease across the observation dates.
- **The team observed disruptive driver behavior.** Drivers often left three to five feet between the curb and their vehicle, thus blocking a travel lane. Food delivery drivers did not stay with their vehicles while picking up orders. In future iterations of the pilot, the city will use a longer stretch of curb to facilitate pulling in and out of parking spaces and hopes to conduct driver education for the public. The city also recognizes the need to implement roadway designs to address critical safety challenges for bicyclists that may arise from PU/DO activity.

As a result of this pilot, the city has expanded the PU/DO program to new locations with slightly different typologies. In the next round of locations, which began in October 2019, the city is considering a large employment hub, a nightlife location, and a seasonal music venue. Building upon the first round of PU/DO zones, these include specific informational signage, geofencing in apps, further consideration of accessibility factors (e.g. curb ramps, furniture zones, tree pits), and an attempt to experiment with the space constraints that led to the negative driver behaviors observed on Boylston Street. See the [full initial assessment report](#) and further information at [the project's website](#).



Columbus, Ohio Completes State's First Autonomous Electric Shuttle Deployment

Alyssa Chenault, Communications Project Manager, City of Columbus and Jeff Kupko, Assistant Program Manager of Emerging Transportation Technologies – Smart Communities, Michael Baker International

From December 2018 to September 2019, the [Smart Circuit](#) launched as Ohio's first self-driving shuttle deployment. The goal of the deployment was to navigate the autonomous vehicle procurement and licensing landscape in Ohio while educating community stakeholders and the public about the technology and its applications. The city collaborated with DriveOhio, a center for smart mobility supported by the Ohio Department of Transportation (ODOT), to elevate the knowledge base of Columbus surrounding autonomous vehicles before the city launched its self-driving shuttle project in the Linden neighborhood. The Smart Circuit is supported by Federal grant programs, and is the first of several shuttle projects. DriveOhio led the deployment in collaboration with The Columbus Partnership, a non-profit, membership-based organization of more than 70 CEOs from Columbus' leading businesses and institutions. The deployment was part of ODOT's cost-share commitment to a \$40 million grant from the U.S. Department of Transportation and \$10 million from the Paul G. Allen Family Foundation, awarded to Columbus as winner of the grant.

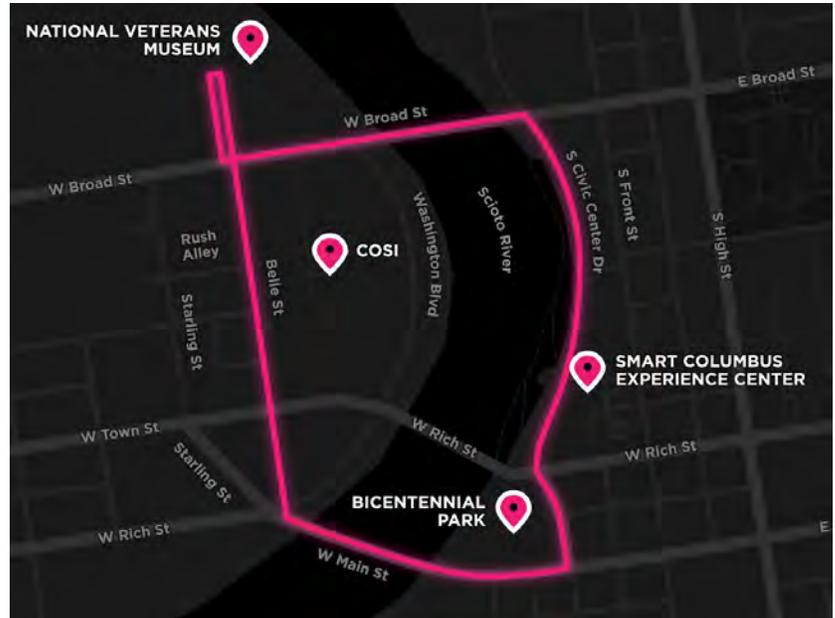


Figure 2: Map of the four stops serviced by the Smart Circuit's route in downtown Columbus. (Image courtesy of the city of Columbus)

The shuttle traversed the Scioto Mile in downtown Columbus seven days a week from 6 a.m. to 10 p.m. Columbus used the deployment to test procurement methods; document the steps for deployment to aid other projects in the future; educate residents and visitors about autonomous vehicle technology; and connect residents and visitors to the educational and cultural assets located along the 1.4-mile route. The route included four stops along the Scioto Mile: (1) Smart Columbus Experience Center, (2) Bicentennial Park, (3) Center of Science of Industry, and (4) National Veterans Memorial & Museum. The Smart Circuit team selected the route as a test case due to the low speed nature of its roads, the low risk of deployment, the route's accessibility to local transit options, and the low impact to riders if there were route disruptions. The shuttle reacted well to pedestrians and bicyclists in its environment through testing and daily operation and was able to cross signalized intersections without human interventions. The unsignalized intersections along the route did require manual operation from the operator on board.

During the deployment, the city of Columbus offered 16,062 rides covering 19,118 miles. A survey was available to all riders on the shuttle to help the city learn about expectations and experiences with the self-driving technology. About 87 percent of the riders had not ridden in a self-driving vehicle before embarking on the Smart Circuit. About two-thirds of the ridership had moderate to high trust in the technology prior to riding it. About half of riders' trust increased following a ride in the shuttle, while half remained the same. Overall, the response to the shuttle was positive, and most riders indicated they would recommend the shuttle to a friend.





Figure 3: The Smart Circuit autonomous shuttle operating in Columbus. (Image courtesy of the city of Columbus)

One unanticipated aspect of the deployment was riders using the shuttle as part of their daily commutes. Several parking lots on the west side of the Scioto River are significantly cheaper for daily parking than the downtown parking garages. The free shuttle service aided those crossing the river, particularly on days with inclement weather. While the city was not able to accommodate the requests during the deployment, the city is not aware of demand for additional stops at particular places of employment by passengers.

As agreed to ahead of deployment, the shuttle did not operate during holidays or weather events. The shuttle also operated on a slightly altered route during festivals. In the future, the city will improve the distribution of this information to potential riders both physically, with markers along the route, as well as through digital media such as social media channels and the project website.

With the unique nature of this emerging technology, providing as much information as possible about service suspension is important to assuage concerns from the general public about the technology or safety of the system. Therefore, the project team designed a physical sign to be placed at each stop to convey planned suspensions of service and suggest that potential riders visit the project's website for additional information. The project team placed these folding signs at each stop—an easily deployable approach for each holiday or event.

Lessons learned from this first deployment will aid in the second self-driving shuttle deployment as part of the Federal grant in a residential neighborhood setting beginning in early 2020. Beyond the need for improved communication mentioned previously, stronger data sharing requirements and demonstrated accessibility experience were incorporated into the second deployment's procurement to meet the goals of the city.



City of Oakland Leads Adaptive Bike Share Pilot for People with Disabilities

Matt Nichols, Bay Area Metro, Interim Active Transportation Planner

The [Bike Share Accessibility Pilot](#) is a one-year program with the goal of better understanding and meeting the bike share accessibility needs in Oakland, California and other San Francisco Bay Area cities with current or planned bike share programs. The city of Oakland initiated the pilot in response to a complaint made by the city of Oakland Mayor's Commission on Persons with Disabilities in October 2016. In January 2017, Oakland held a public meeting on "Bike Share City of Oakland Rollout: Older Adult and Community Needs Discussion." This meeting led to the formation of a partnership between the Metropolitan Transportation Commission (MTC), the San Francisco Bay Area's regional transportation agency, the City of Oakland, Lyft's Bay Wheels bikeshare operator for the region, and the Bay Area Outreach and Recreation Program (BORP).



Figure 4: Users of the adaptive bike share pilot riding at Oakland's Lake Merritt. (Image courtesy of the Bay Area Outreach and Recreation Program)

The City of Oakland was the lead agency and partnered with Lyft, which owns and operates the [Bay Wheels](#) (formerly GoBike) bike share program in five Bay Area cities. The partners officially launched the pilot program in May 2019 to provide a range of adaptive bikes for people with disabilities and their care providers. The pilot seeks to identify and evaluate potential strategies to address unmet shared mobility needs in the region. In order to accomplish this goal, the pilot program provides and evaluates the usage and experience of pop-up accessible bicycle locations in Oakland and San Francisco, in partnership with the Bay Area Outreach and Recreation Program (BORP). The city of Oakland is also conducting a Needs Assessment Study, which will be completed in Spring 2020.

Since the start of the pilot, BORP has been providing two models of hand-pedal cycles, foot-pedal tricycles, and side-by-side tandem bikes. BORP provides the bikes, lifts, and assistance to riders two days a week at Oakland's Lake Merritt, and one day a week in San Francisco's Golden Gate Park. These are primarily recreational riding areas, with a continuous park and trail circling Lake Merritt and a large road that is closed to cars on the weekends in San Francisco. The free six-month program is available to any person with disabilities with the Bay Wheels bike share app.

The San Francisco Bay Area MTC provided a \$30,000 grant and convened a regional Technical Advisory Committee (TAC), which included members of the disabled community and an MTC Commissioner representing the U.S. Department of Transportation to support the pilot accessibility bike share program. The TAC meets monthly to provide feedback on BORP's pop-up locations and the types of accessible bicycles to be provided, reviews the Needs Assessment Study, and makes recommendations for possible post-pilot programs. The TAC heard a detailed report at its October 30, 2019 meeting as the



six-month pilot neared completion. In Oakland, 47 unique riders used the bikes 59 times between July 10 and October 23, 2019. In San Francisco, 21 unique riders used the bikes 44 times during this same period. The users had a wide range of disabilities, with the side-by-side bikes providing a particularly unique opportunity for a caregiver to ride next to a cyclist with disabilities, who can pedal in a range of modes to fit their abilities.

Early lessons from both locations are that the accessible bike share “stations” should be conveniently located near public, accessible restrooms, transit stops, and available parking and loading zones. Other challenges include higher than expected wear and tear on the bicycles, and high costs of rental trucks and equipment storage. As with most pilot projects, staff and TAC members identified the need for more outreach to increase usage. Overall, users have reported being very pleased with the opportunity and range of available cycles, and some groups, including a community of people with cognitive impairments, have begun to schedule regular group rides.

The city of Oakland will use the lessons learned from the pilot to determine a long-term strategy for including people with disabilities in the Bay Wheels program. The TAC discussed the challenges with the pilot in providing shared bicycles for point-to-point use, including first/last mile commutes to transit. The pilot study team is also conducting surveys and focus groups to assess accessibility across all shared mobility options, including scooter-sharing, carsharing, and transportation network companies like Uber and Lyft. Accessibility may be expanded most effectively through a combination of efforts. These options may include electric pedal-assist bikes and more accessible scooters with features such as wider bases or three wheels. For automobile travel, ridesharing programs have expanded accessibility options through Wheelchair Accessible Vehicle programs. These programs provide adaptive vans with lifts or ramps to accommodate fixed-frame wheelchairs and scooters in several U.S. cities, including San Francisco, California; Phoenix, Arizona; and Portland, Oregon, as well as cities in the United Kingdom, India, France, and Australia.

“Cycling transforms people’s lives,” Greg Milano, BORP’s Adaptive Cycling Manager, told Streetsblog in May 2019. “Once people see what’s possible... they’ll be able to take equal advantage of the bike lanes and trails we’ve all invested in over the last decade.” In Oakland, project managers at Oakland’s Department of Transportation are personally and professionally dedicated to expanding transportation options for all people and providing useful insights and data for other regions and agencies. “Oakland is proud to be the first city in the Bay Area to launch adaptive bike share,” said Anh Nguyen, the city of Oakland’s ADA Programs Division Manager.



Road Diet in Gallup, New Mexico Improves Safety for Residents and Students at Nearby Schools

Delane D. Baros, Public Information Officer, New Mexico Department of Transportation, District Six



Figure 5: NMDOT installed bike lanes along Boardman Drive in Gallup as part of a road diet that converted the roadway from a four- to three-lane cross-section. (Image courtesy of NMDOT)

Gallup, New Mexico is a small city in the western part of the State along the historic Route 66. Gallup is surrounded by Native-American pueblos, including the Navajo Nation's capital of Window Rock. Tourists and locals gather in Gallup to experience its culture through the Gallup Inter-Tribal Indian Ceremonial, Red Rock Balloon Rally, and the Gallup Native Arts Market. These events contribute to considerable traffic volumes in and around the city.

Boardman Drive is classified as a principal arterial roadway and a main thoroughfare for two schools and an aquatic center in Gallup. In 2009, two intersections along Boardman Drive became eligible for placement on the signal priorities list due to an increase in pedestrian and vehicular traffic. In 2010, engineers from the New Mexico Department of Transportation (NMDOT) conducted a field review and worked with the city of Gallup to identify a 1.25-mile section of Boardman Drive (NM 564) to determine safety deficiencies and hazards to public right-of-way users and pedestrian crossing areas near the corridor's two schools and aquatic center.

In November 2012, NMDOT contracted to conduct a Road Safety Audit (RSA) to assess two signalized intersections, one two-way stop-controlled intersection, and four stop-controlled driveways. The RSA also evaluated two pedestrian crossing areas along the corridor. One crossing area was a marked mid-block crosswalk located just north of Kennedy Middle School, and the other crossing area was an un-marked mid-block crossing area near the aquatic center and Miyamura High School, utilized primarily by students. Data collected included vehicle-turning movement; vehicle speed; crash data; field visits with aerial photo reviews to obtain then-existing street and operational characteristics; preliminary capacity analysis investigating the feasibility of a road diet; and traffic signal warrant studies.

The RSA investigated the potential impacts of a road diet to convert the four-lane cross-section to a three-lane section including a two-way left-turn lane. [Research](#) indicates significant safety benefits from such a road diet, including removing left-turning movements out of the traffic stream, thereby reducing the risk of rear-end crashes and eliminating a substantial number of weaving maneuvers. The crash data used for the RSA indicated that between 10 and 23 crashes occurred per year along the corridor between 2002 and 2007, along with one pedestrian fatality. The lack of pedestrian and bicycle facilities along Boardman Drive made the area challenging and often unsafe for individuals to walk or bike.



NMDOT awarded the \$2.6 million Boardman Road Diet Project in late 2016, and work began in early 2017. Funding for the project came from the [Federal Highway Administration's \(FHWA\) Highway Safety Improvement Program \(HSIP\)](#) through the [High Risk Rural Roads](#) Program. NMDOT utilized this funding to address significant safety risks identified in the RSA, including:

- Cross-section width
- Lack of shoulders
- Hazardous roadside
- Field reviews
- Data analysis

Using recommendations from the RSA, the project involved installation of a road diet section with pedestrian improvements; signalization of intersections from Manor Drive to NM 118, including reconstruction of new pavement; and the installation of new curb, gutter, and sidewalk facilities. Construction included installation of new signals; lighting equipment; ADA compliant curb ramps; crosswalks; bicycle lanes; reconstruction of driveways for Kennedy Middle School, Miyamura High School, and the Gallup Aquatic Center; fog seal; and roadway restriping.

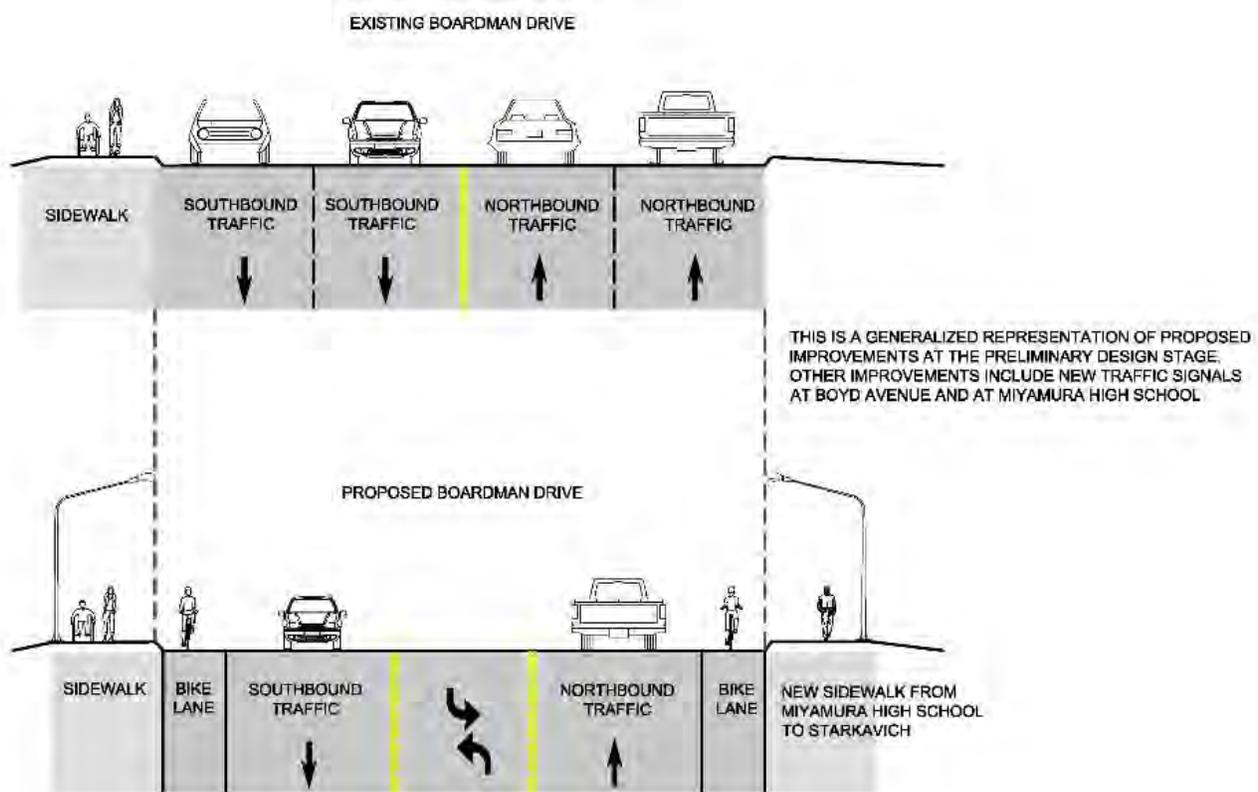


Figure 6: Boardman Road design of road diet, with two vehicular travel lanes in each direction modified to provide one vehicular travel lane in each direction and a two-way left-turn lane, with space remaining for bikeway facilities. (Image courtesy of NMDOT)

NMDOT satisfied HSIP project criteria for the Boardman Road Diet Project by addressing a priority in the State's Strategic Highway Safety Plan to identify projects through a data-driven process and target identified safety problems. Overall, the project will contribute to a reduction in fatalities and serious injuries in a location with a high volume of pedestrian and vehicular traffic.



NMDOT, the city of Gallup, and private sector contractors collaborated to incorporate pedestrian and bicyclist safety into the design of the Boardman Drive Road Diet. Buffered sidewalks and bicycle lanes promote comfort and safety and encourage a healthier commute for students at Kennedy Middle School and Miyamura High School. In addition, the design provides a safer driving experience to all who utilize Boardman Drive, aligning with NMDOT's goal of mobility for everyone. For more information on [conducting RSAs](#) and [implementing road diets](#), see the [FHWA Office of Safety website](#).

Announcements/New Resources

- The Federal Highway Administration (FHWA) produced two info briefs in conjunction with the Pedestrian Bicycle Information Center. Both documents are intended for transportation practitioners who are actively involved in integrating micromobility into their transportation planning process. The first info brief, "[The Basics of Micromobility and Related Motorized Devices for Personal Transport](#)," is an introductory document that provides an overview of powered forms of micromobility and compares features of micromobility with a spectrum of other traditional and emerging forms of transportation. The second info brief, "[E-Scooter Management in Midsized Cities in the United States](#)," documents best practices related to e-scooters in nine midsized U.S. cities. The document shares feedback from participating cities on issues including permitting and regulation, potential safety concerns, and infrastructure design observations.
- The [2019 Conference on Health and Active Transportation](#) convened by the Transportation Research Board took place on December 11-12, 2019. The purpose of this conference was to explore and collaborate on identifying the potential health impacts of transportation policies, planning, and infrastructure, and to develop an understanding of the institutional opportunities and barriers for considering health within the transportation field. The need to integrate health into transportation continues to grow with greater acceptance of the influence of transportation policy and infrastructure on health behaviors and outcomes.
- The [2020 Environmental Justice Conference and Training Program](#) convened by the U.S. Department of Energy will take place on April 22-25, 2020. Leaders from various sectors, including Federal and State agencies, local governments, tribes, community groups, business and industry partners, public interest groups, academia, and other entities will share new ideas and approaches for advancing environmental justice. Conference panels and interactive training sessions will feature voices of experience, research, and thought-provoking dialogue. The program format will feature needs and challenges of communities, governments, municipalities, tribes, faith-based organizations, and others with interests in environmental justice and healthy communities.
- FHWA recently developed a [Pedestrian and Bicycle Transportation University Course](#), which is designed to help educators inspire the next generation of practitioners to support safe, vibrant, and multimodal transportation systems. The course includes 21 PowerPoint slideshows with speaker notes and complementary materials including assignments, readings, and videos. The course and materials are intended for use in graduate or undergraduate courses in civil engineering, or urban and regional planning programs and can also be incorporated into public health, public policy and administration, and landscape architecture curricula.

