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Do you want to learn more about PTV Vistro’s traffic signal workflow and capabilities? Scan the QR code above to read our in-depth PTV Vistro Knowledge-Base article.
president’s message

Active Transportation, For Who?

Our world has drastically changed since COVID-19 hit in March. Half of the department stores anchoring retail districts have closed permanently. Hotels are projecting occupancies below 20 percent. Student housing, multi-family, and senior housing demand have experienced uncharacteristic, disproportional demand reductions. Increased work from home (WFH) has reduced the need for office space. Major event venues are closed. Active transportation depends upon people's need to travel. What happens when near-term events etch indelible change in how and what people find a need to travel for?

What should ITE members be ready for, and how can active transportation continue to help shape your community? Here are a couple areas for us to be thinking about in the coming months.

How Can I Cross the Street?

With most of us working from home, our travel has significantly decreased. People are active within their neighborhoods and an increased need for active transportation has emerged. The desire for supporting travel that builds upon a “new normal” with more WFH and home delivery is before us. Seems like community investments in walking and biking will be rewarded with greater citizen support now more than ever. But how can we advance this opportunity to improve safety when crossing the road? And can we be more equitable in addressing these feelings and negative safety outcomes for people with limited economic means?

As ITE members, one area where we tip the safety scale in favor of people is establishing a standard of care. We do this using the wealth of research on the subject of pedestrian street crossing treatments. The array of signs, markings, street design, speed management, gap availability, sidewalk widening, and visibility enhancements is staggering. With good intent, we create new shiny objects every month. The outcome becomes so many options with disjoined, siloed criteria that many practitioners misapply perfectly good countermeasures in various contexts. The ITE Pedestrian and Bicycle Standing Committee of the Complete Streets Council is tackling this subject (see more on page 16). This year they will be circulating concepts that provide greater clarity in the selection of enhancements based upon characteristics (speed, width), context (functional class, area type), and users (pedestrians, vehicles).

Emergence of E-Bike for Short Trips. When looking at mode share in most urban areas, the potential for WFH to become the second mode choice in North America is favorable with its barriers destroyed by the pandemic. What mode could have the potential to pick up a greater share? E-bike is where I would invest. Electric bikes are affordable and compact, providing convenience to bike travel (less sweat). There is room for significant growth. To have major impact, one does not need to bike every day—one to two days a month, once a week, or multiple times a week when paired with daily bicycling equates to big mode-share shift. Not to mention its environmental benefits. For suburban areas, these trips have potential to grow with networks of buffered lanes and trails, and in urban areas, slow lanes and better speed management.

There will be lots to discuss at our virtual meeting in August—I can’t wait to see how all of us are shaping our communities.

RANSFORD S. MCCOURT,
P.E., PTOE (F)
ITE International President

boards.jpg
Active Transportation

31 Advancing Climate, Safety, and Equity Goals by Putting Pedestrians First
By Kathleen Mayell

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By Kristen Brookshire, MCRP (M), Kristin Blank, and Lauren Blackburn, AICP

43 Bicycle Signals in the United States: An Inventory, Typical Use Cases, and Research Gaps
By Chris Monsere, Ph.D., P.E., David S. Hurwitz, Ph.D. (F), Christina Fink, P.E., Sirisha Kothuri, Ph.D., and Douglas Cobb, Ph.D., P.E., PTOE, RSP1

On the cover: The street beside English Bay in Vancouver, British Columbia, Canada has been closed to cars during the COVID-19 pandemic and turned into a bicycle path.
Looking Ahead

As states and cities begin to “reopen,” there is a lot of discussion about what the post-COVID-19 world might look like. I think of it as happening in two stages—pre-vaccine and post-vaccine. It is clear that for the near-term, we will need to keep managing the risk of COVID-19, and the pandemic will continue to affect our lifestyles—and, in turn, transportation. Travel modes that have passengers in close proximity for extended periods of time have been the most impacted, and will have the hardest recovery. Work-from-home (WFH), single occupant vehicle travel, and biking/walking will remain favored.

Are these short-term shifts, or will we see lasting changes? Does COVID-19 present an opportunity for us to rethink the allocation of space to these various modes? What can we do to ensure that everyone can travel safely?

COVID-19 has forced many organizations with limited experience and tepid support for WFH to jump in with both feet. Previously reluctant CEOs now profess full support for WFH. Are these statements made purely out of necessity, or will we see lasting changes?

The answer could have a significant impact on our cities and transportation systems. It is estimated that 30 percent of all workers have jobs that allow them to work from home, at least some of the time. Will a significant number of businesses conclude that it is more cost efficient to reduce the amount of office space they lease? For prospective employees, will WFH flexibility be a differentiator?

While some are quick to suggest that these changes are fleeting, and forecast that in a couple of years we will have gone right back to pre-COVID-19 conditions, I am not so sure. Though we need to be careful in making snap judgements, this feels different. Employees (myself included) who have gotten an extended taste of a work life free from commuting will not be anxious to rush back to the office. I am not suggesting we will all be happy working from our home offices and “Zoom”ing all day long. We are social creatures, and I miss the opportunities to spontaneously brainstorm with colleagues or have casual conversation in the hallway. And I look forward to the day when we can safely gather again at ITE meetings. There is no virtual replacement for the learning and relationship building that takes place outside of formal meeting rooms.

However, we may see a lasting shift in the percentage of work done at home. This could have significant implications on central city office occupancy rates; the viability of supporting restaurants, shops, and other businesses; and the number of people traveling in and out of the central city.

Our goal is to bring you the latest information and facilitate discussions on these topics. I hope you have tuned into the great dialogues that have been taking place on the ITE e-Community. At the upcoming virtual ITE Annual Meeting and Exhibit, COVID-19 impacts and implications will be woven throughout our program, beginning with our Opening Plenary session. Gary Golden, a noted futurist, will forecast potential post-COVID-19 scenarios and examine their implications on transportation and on the workplace. Leaders from across our profession will be discussing different aspects of our recovery and how it could impact our communities, profession, and jobs for years to come. I hope you will join us. As always, you can reach me at jpaniati@ite.org or on Twitter: @JPaniatiITE.

Jeffrey F. Paniati, P.E. (F)
Executive Director and Chief Executive Officer
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PEOPLE IN THE PROFESSION

Obituaries
ITE recently learned of the passing of the following members. We recognize them for their contributions to ITE and the profession, and send condolences to their families.

Richard P. Kramer, P.E. (F) of Huntsville, AL, USA passed away on February 18, 2015. He was a Life Member of ITE.

Ronald V. Sherwood, AICP (M) of Marietta, GA, USA passed away on July 21, 2019.

Todd B. Delk, P.E. (M) of Raleigh, NC, USA passed away on October 8, 2019.

Bruce G. Leonard, P.E. (F) of Raleigh, NC, USA passed away on October 28, 2019. He was a Life Member of ITE.

Alan W. Mess, P.E. (M) died peacefully at the age of 82 in Marlborough, MA, USA on May 14, 2020. He was a Life Member of ITE. In 1976, Alan co-founded Barkan and Mess Associates, the Connecticut-based Traffic Engineering and Transportation Planning firm acquired by Milone and MacBroom in 2007.

For more than 30 years, Alan shared his professional expertise with public and private sector clients, emphasizing the importance of planning for transportation by all modes of travel and demonstrating the expertise to engineer the solutions he recommended. Prior to founding Barkan and Mess Associates, he served his country in the U.S. Army. After four years of service, he was honorably discharged as a captain. It was there that he acquired his attention to detail and integrity, traits that he passed on to the countless engineers and planners that worked for and with him for three decades. Alan is survived by his wife, Mary Christine (Power); his two sons, Raymond and Darwin; his daughter-in-law, Kerry Lynn; and his grandson.

ITE extends thanks to Dave Sullivan, P.E. (M) for contributing this obituary.

New Members
ITE welcomes the following new members who recently joined our community of transportation professionals.

Canadian
Damilare Olaniyan
Ragunathan Ragu
Nathan Satgunanathan

Florida Puerto Rico
Stephen Cooper, P.E.
Dominique Simeus
Yang Zhao

Global
Paul Omulokoli Olukoye
Veer Sanghvi

Mountain
Gannon Hunter Chamberlain
Kerry Perrillo Childress
Douglas Keith Haskins
Shayne Nelson
Michael J. Policastro
Kevin Szuch
Bill Thomas
Naveen Kumar Veeramisti
Qichao Wang
Scott Whaley, P.E.
Justin Wisting

Northeastern
Emma Enteado
Lauren Kenwick
Jared Woolston

Southern
Adam Young

Texas
Matthew Baker
Keith Brooks
Aisling O’Reilly
Kiara Perez

Western
Renzel Agra Balance
Maggie Bartley
Daniel Danicic
Gurpreet S. Dhaliwal
Lourdes Ortega
Don Wisehart

Letters in parentheses after individuals’ names indicate ITE membership status: S - Student Member; IA - Institute; M - Member; F - Fellow; R - Retired Member; and H - Honorary Member. Information reported here is based on news releases and other sources. If you have news of yourself or the profession that you would like considered for publication, please send it to Holly Stowell, hstowell@ite.org.
Community Corner

Community Corner highlights the efforts of ITE members to not only encourage transportation education among our youth but to improve the daily lives of people in their community beyond transportation through acts of service.

Despite the social distancing and lockdowns of COVID-19, the North Central Section of ITE (NCITE) conducted a Virtual Trash Pickup during Arbor Week, led by the Section’s Young Member Committee. Participants individually cleaned up their local streets, parks, and other public places (while maintaining social distancing and safety guidelines, of course) throughout the week of April 24, and shared pictures to Twitter with the hashtag #ITreeE. The group was fortunate to have great weather throughout the week, and the event had a great turnout.

This is the second year for the trash pickup event, and the Young Member Committee wants to continue the event next Arbor Day (hopefully in-person next time!). Thanks to NCITE Secretary Tyler Krage for submitting this Community Corner.  

We want to hear from you!

Have you, your Section, or Chapter taken on a community project or provided assistance to a non-profit organization? Large or small, we want to hear about it! Please send photos (300 dpi or higher) along with a write-up (no more than 200 words) to Pam Goodell, pgoodell@ite.org for inclusion in a future issue of Community Corner.

ITE Talks Transportation Podcast

New from the Thought Leadership Series

The Safe System Approach with Robert Wunderlich, P.E. (F)

Robert Wunderlich, P.E. (F), director of the Center for Transportation Safety at the Texas A&M Transportation Institute, discusses the Safe System approach to reducing serious injuries and fatalities on roadways. He highlights the various aspects of the Safe System, including roadway design that reduces user error and lowers impact forces, and explains what transportation professionals can do to help implement a Safe System approach.

All episodes available at www.ite.org/learninghub/podcast.asp | Subscribe for free via iTunes at http://apple.co/2hOUz8t
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Although it looked a little different this year, in May we celebrated National Bike Month! Since 1956, communities from coast to coast have been celebrating and promoting the many benefits of cycling to encourage more people to give biking a try. ITE Journal asked you to send in photos of yourselves biking, whether it be with family, friends, colleagues, or going solo. The submissions are featured here. Thanks to all who participated!

To enable more people to participate as the economy re-opens, the League of American Bicyclists has announced that Bike to Work Week will now take place September 21-27, 2020, and Bike to Work Day will be Tuesday, September 22.
Tyler Krage P.E., PTOE (M) battled at a cyclocross event. Mike Sawyer P.E. (M), Richmond, VA, USA.

Michael Moule, P.E., T.E., PTOE (M) and Peter Koonce (M) battled at a cyclocross.

Mike Sawyer, P.E. (M), Richmond, VA, USA.

A biker in Tewksbury, MA, USA. Photo submitted by William J. Scully.

Larry Marcus (M), Portugal.

Jeff Smithline, P.E., PTOE (M), daughter Sara, and wife Ruti, Block Island, RI, USA.

Jeff Riegner, P.E., AICP, PTOE (F) and son Andy, Great Allegheny Passage and C&O Canal towpath.

Eric Lewis, P.E., T.E. (M) and Julien Van Simaeys, Moreno Valley, CA, USA.

US 301/Baldwin Bypass, Jacksonville, FL, USA. Submitted by Martha Moore, P.E., PTOE (M).

Greg Richards, P.E. (M), Monroe County, IN, USA. The Hilly Hundred event draws riders from across the country and attracts upwards of 5,000 riders for the weekend.

North Central Section of ITE Young Member Group, Minneapolis, MN, USA.

Michael Dannemiller P.E. (M) leads the inaugural ride along the 1,300-mile multi-use September 11th National Memorial Trail.

Brad Sommers (M) and daughter Katie, Orange County, CA, USA.

Matt Magnasco, P.E., Assoc.DBIA (M) and friends, Charlotte, NC, USA.

Michael Griffith, RSP1 (M), Cape Cod National Seashore, MA, USA.

Ryan Vanderputten P.Eng. (F), kids Michael and Alanna, Calgary, Alberta, Canada.

Peter Jager, P.E., PTOE (M), Zion National Park, UT, USA.

Jonathan Enloe, P.E. (M) with his wife and son taking "The Monarch" to their local farmer's market, East Point, GA, USA.

Arjan Van Andel (M), Annapolis, MD, USA.
Help ITE Celebrate 90 Years by Giving $90

In honor of ITE’s 90th anniversary year, please consider donating $90 to support the ITE Legacy Fund. The Legacy Fund helps support our Diversity Scholars, the student-led Student Leadership Summits, LeadershipITE scholarships, the STEM competition, and the Matson and Hammond Mentoring Program. Throughout our 90th anniversary year, members will have several opportunities to contribute to the $90 for 90 campaign. Visit bit.ly/ITE90for90Campaign to give. To see who has already donated, go to bit.ly/90for90contributors. Make a difference by adding your name to the list today!

bit.ly/ITE90for90Campaign

My 30 years of participation in ITE has opened up professional opportunities that I couldn’t have dreamed of at the beginning of my career.

Making a donation to ITE’s Legacy Fund ensures that the generations who follow us will have even greater opportunities to experience personal growth and advance our profession. What a worthwhile investment!

Jeff Riegner

2020 EVENTS

Due to the fluid nature of COVID-19, event dates and times are subject to change. For an up-to-date listing of ITE event information, please visit https://www.ite.org/events-meetings/event-calendar/.

ITE INTERNATIONAL ANNUAL MEETING AND EXHIBITION
August 2020 | See page 15 for more information

TEXAS DISTRICT ANNUAL MEETING
September 16–18 | Denton, TX, USA

MOVITE FALL MEETING
September 23–25 | Lincoln, NE, USA

TRANSPO 2020/FLORIDA PUERTO RICO DISTRICT ANNUAL MEETING
October 11–14 | Bonita Springs, FL, USA

MET SECTION ANNUAL MEETING
November 12 | Astoria, NY, USA

WHERE IN THE WORLD?

Can you guess the location of the “Where in the World?” photo in this issue? The answer is on page 50. Feel free to send in your own photos to hstowell@ite.org. Good luck! itej
The ITE 2020 Annual Meeting and Exhibition has been designed with you in mind. The program starts at 11:00 a.m. ET and will be spaced out three days a week, Tuesday-Thursday, over a 2-week period, with an additional week of ITE Council and Committee meetings. This allows you to manage ongoing work responsibilities while still taking advantage of this great learning opportunity. Enjoy the flexibility of registering for a day, a week, or the entire conference. PLUS! Access recordings of any sessions that you are unable to attend.

#ITE2020 Focuses on Shaping the Future of Transportation

Opening Session (Tuesday, August 4):
The future of transportation will not happen in a vacuum. While it will have an influence on a variety of business sectors, the transportation industry will also be impacted by these same sectors. Sponsored by the ITE Consultants Council, this session features Garry Golden, an academically trained Futurist who speaks on issues shaping the business and society in the 21st century. He also has experience in the transportation industry, working with a wide range of transportation organizations. Garry will forecast several different COVID-19 recovery scenarios and explore the future of society, travel and the workplace under each.

Power Plenary: Transportation and Equity (Thursday, August 6):
Join us for a thoughtful and provocative discussion on the challenging and complex topic of transportation and equity. We are privileged to have four thought leaders who are here to help us understand more about the factors that we need to consider and how to achieve equity in transportation.

MODERATOR: Alyssa Rodriguez, ITE International Vice President

SPEAKERS: Tamika Butler, Esq., Director of Planning – California, Director of Equity and Inclusion, Toole Design
Emiko Atherton, Director, National Complete Streets Coalition
Shirley Gonzales, Councilwoman, City of San Antonio, Texas
Meghna Khanna, AICP, Senior Director, Countywide Planning and Development Mobility Corridors, Los Angeles Metropolitan Transportation Authority

More Info: www.ite.org/annualmeeting

Earn up to 22 PDHs during the live event and up to 67 total PDHs by also accessing on-demand content. Join the Annual Meeting and Exhibit e-Community (ITE members only).

HAVE YOU REGISTERED YET?
ITE Pedestrian and Bicycle Standing Committee

Who We Are
The Pedestrian and Bicycle Standing Committee (PBSC) represents and promotes the needs of pedestrians, bicyclists, and other forms of small and non-motorized (human-powered) travel in the planning, design, construction, operation, and maintenance of transportation infrastructure. The PBSC seeks to promote the development of comprehensive transportation infrastructure that is inclusive of all modes of travel; serve as a crosscutting resource between other organizations and agencies on pedestrian and bicycle matters; and educate ITE membership, agencies, organizations, and policy-makers on the needs of the pedestrian and bicycle communities.

What We Do
In 2020, the PBSC is focused on developing technical products to advance the state of the transportation planning and engineering practice and delivering webinars to educate and inform ITE members.

Technical Products – This year, the PBSC is producing bite-sized technical products that respond quickly to emerging topics and needed resources to the transportation profession. Four technical products are slated for delivery in the coming year:

**Micromobility Design Practitioner’s Guide** – Led by Nikki Silva, this project will present a working definition of micromobility and consider use cases and the full lifecycle of a micromobility trip, including parking/storage, travel way, connections to other modes, and interactions with other right-of-way users. The guide also identifies design challenges posed by the unique characteristics of the devices and presents real world examples and discussions of key design considerations and guidance for addressing these modes.

**Bicycle Signal Resource Hub** – Led by Bob Murphy, this project will serve as the go-to resource for up-to-date design, implementation, and operation guidance of bicycle signals in the United States and some internationally. The resource hub will include information on Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD) Interim Approval IA-16 and available Requests for Experimentation. It will also include various design guidance, manuals, and research on bike signal practices across the United States.

**Crosswalk Policy Guide** – Led by Ryan McClain, this guide will consolidate available information, provide sample crosswalk policies, and address potential steps to take when creating a policy, including both controlled and uncontrolled crosswalks. Other elements addressed include phasing strategies, potential liability considerations, potential stakeholders, and data collection through emerging technologies.

**Decorative Crossings Working Group** – ITE frequently receives requests related to an official position or information on decorative crossings. Led by Claude Strayer, this working group will allow ITE to collect information from members to better understand the locations and characteristics of active installations of these decorative crossings. ITE is currently in the process of reviewing submissions which reflect crossings in more than 25 cities around the country, and may then use this information to compose a white paper, informational report, case studies, and/or inform other ongoing ITE initiatives.

The PBSC has two upcoming webinars, register today!

**Considering E-Scooters Safety in Vision Zero and MaaS/MOD Programs, Policies, and Practice.**
July 7, 2020, 2–3:30 p.m. ET. Earn 1.5 PDH credits.

**Latest Research and Innovations for Pedestrian Hybrid Beacons.**
July 23 from 2-3:30 p.m. ET.

Register for these webinars in the ITE Learning Hub at https://www.ite.org/professional-and-career-development/learning-hub.
How You Can Get Involved
Volunteering with the Pedestrian and Bicycle Standing Committee is a great way to build relationships with leading experts in the field, broaden or deepen your technical expertise, and give back to the transportation community.

Join the PBSC ITE e-Community – This is a way to stay in touch with all things pedestrian and bicycle transportation and PBSC. Subscribe today in the PBSC ITE e-Community.

Join a Meeting – The PBSC typically meets by conference call once every two months on the first Monday of even months. We also meet in person twice a year, at the ITE Annual Meeting and the Transportation Research Board Annual Meeting, to get hands-on input and collaborate with members on our developing trends and technical products in the realm of pedestrian and bicycle topics. To join a meeting, contact Ray Yparraguirre.

Host a Webinar – Interested in one of the upcoming webinar topics or have your own idea? You could help coordinate a webinar! ITE staff guide scheduling, webinar technology, and promotion so you can focus on the fun part: identifying a topic, gathering a group of speakers, helping develop a webinar description and learning objectives, and identifying a moderator or leading the discussion yourself. If you are interested in coordinating a webinar for PBSC, contact Bill Ruhsam at bill.ruhsam@mbakerintl.com.

Lead a Technical Product – Have an idea for technical guidance that would be useful to ITE members? You could lead a technical product! Level of effort ranges from Quick Bite single page fact sheets to case studies to a Recommended Practice. Technical product leads typically work with a committee of contributors and reviewers, providing opportunities to collaborate with experts in your technical area of interest. If you have an idea or want to lead a technical product for PBSC, contact Alex Rixey.itej

Contact
Any questions or see something you want to become involved in? PBSC would love to hear from you!

Chair
Alex Rixey
a.rixey@fehrandpeersdc.com

Vice Chair
Claude Strayer
c.strayer@fehrandpeers.com

Secretary
Ray Yparraguirre
ray.yparraguirre@hdrinc.com

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A Passion for Active Transportation

Bill Schultheiss, P.E. (M)
Vice President and Director of Sustainable Safety, Toole Design

Education
Bachelor of Science, Civil Engineering, Northeastern University, 1998

Professional Appointments/Affiliations
15-year member of National Committee on Uniform Traffic Control Devices-Bicycle Subcommittee
Association of Pedestrian and Bicycle Professionals
StrongTowns

Fun Fact
Bill recently started learning to play the banjo.

Active transportation has been on the rise during the COVID-19 pandemic, with cities in the United States and across the world closing down streets to traffic temporarily or permanently for residents to bike, walk, and recreate. Two ITE members share their perspective on the importance of active transportation, and emphasize the criticality of planning and shaping our communities around it.

ITE JOURNAL: What makes a community livable? What are some of the hallmarks of these places and their streets?

SCHULTHEISS: A livable community is a place where people have access to the necessities of life (food, housing, jobs, recreation, commerce, fellowship) and the ability to access them in a sustainable and safe manner. They are truly multimodal, allowing people the freedom to choose how they move. Street design doesn’t degrade or endanger people outside of vehicles. These places are often recognized as “walkable communities” such as parts of Ann Arbor, MI, USA; Boston, MA, USA; Greenville, SC, USA; Seattle, WA, USA; or Victoria, British Columbia, Canada. Their cozy main streets prioritize pedestrians, not through traffic. I am heartened to see transportation and political leaders acknowledging that we cannot solve our traffic (or societal) problems by continuing to prioritize expanding road capacity to serve single-use, auto-dependent development. Walkable communities should not be expensive and exclusive exceptions. They should be available to everyone.

ITE JOURNAL: COVID-19 has highlighted and exacerbated ethical disparities in our cities. What opportunity does this present to transportation professionals who want to help close the equity gap?

SCHULTHEISS: Engineering ethics are too narrowly applied and understood. Ethics trainings focus on corrupt business practices and fail to discuss ethical decision making applied to street design and the equitable allocation of resources. I often see a lack of empathy for those who are poor, disabled, or do not drive a vehicle—a consequence of the fact our profession is middle-class and more than 80 percent white and male. The empathy gap is revealed in the built environment where tens of thousands of bus stops have unsafe crossings and missing sidewalks. It is revealed in research showing poor communities have lower quality infrastructure and disproportionately higher rates of pedestrian crashes than wealthier communities. To address this reality, Toole Design put out a call for our industry to shift to a values-based decision-making framework centered on Ethics, Empathy, and Equity in the February ITE Journal. Further, the Color of Law (Richard Rothstein) and Dangerous By Design (Smart Growth America) should be mandatory reading for everyone in this profession and incorporated into ethics courses.

ITE JOURNAL: Active transportation has come to the forefront during COVID-19. How can we ensure these slow street trends will continue after the pandemic?
**SCHULTHEISS:** Essential workers will still be essential after the pandemic. People who don’t have access to a car will still need safe ways to walk and bike to reach transit or their jobs. As we reopen, if people who have access to a car all choose to drive, we will degrade our communities and dramatically increase climate change-inducing emissions. For those of us with privilege, the pandemic shed a light on realities that many others have always known: most streets don’t provide enough space for people to walk and bike safely, and our transit systems are in desperate need of investment. The ongoing protests also show that enforcement strategies can be harmful to communities of color. Slow Streets should absolutely NOT involve the presence of law enforcement. Moving forward, Slow Streets are an opportunity to engage in public conversations to create streets that are equitable and safe for all and to reorient our transportation system into a more sustainable path.

**ITEJ:** Throughout your career at several prominent agencies and municipalities, how have you seen active transportation evolve? What shifts or trends have you noticed in the way people move?

**CHANG:** I think as transportation professionals, we are listening and responding to the needs of our communities in a more comprehensive way. Active transportation was focused on skilled and confident users along when I started at the Washington State Department of Transportation (WSDOT). There was very little focus and resources allocated to active transportation for the 16 years that I worked there. WSDOT is now a national leader in transforming bicycle and pedestrian facilities that serve people of all ages and abilities. They have chaired the update to the AASHTO Bicycle Design Guide that we are eagerly waiting for adoption, helping to revise the AASHTO Green Book to better serve people walking and bicycling, and are completing their active transportation plan this year.

In Seattle, we are seeing increases in usage of transit, walking, and bicycling as commute modes after investing and improving our streets that our communities have requested. According to the 2018 U.S. Census Survey, 23.1 percent took public transportation, 12.1 percent walked, 3.8 percent bicycled, and 7.7 percent worked from home. When we installed separated bike lanes on 2nd Avenue in 2014, we recorded a ridership increase of 300 percent from 332 riders to 1,311 riders. The ridership increased 900 percent with 3,383 riders when we extended bicycle lanes. We are seeing more families and older people using electric assist bicycles getting around downtown.

**ITEJ:** How can the professionals designing and building our streets and communities keep up with the ever-changing pace of mobility while prioritizing safety?

**CHANG:** ITE is such a great resource for professionals to engage and collaborate with others in the field. ITE’s e-Community discussion forum is an excellent platform for asking, answering, and having a dialogue with peers about past practices and latest topics. Join and engage with ITE’s Technical Councils and Committees where members are our leaders and experts in the industry. From Complete Streets to Safety, members in these committees work together to position ITE as the go to resource for our profession.

**ITEJ:** COVID-19 has brought unprecedented changes to active transportation, and Seattle recently closed 20 miles of streets to through traffic, permanently. Do you think this is a trend we will see continue after the pandemic in cities and communities?

**CHANG:** Yes, I do. We all have experienced the inequitable street allocation during this pandemic and realize that there are things we can do improve how we serve our most vulnerable users and improve conditions for our businesses. The challenge is acknowledging that each community knows what they need, and being good listeners.

Dongho Chang, P.E., PTOE (F)
City Traffic Engineer
City of Seattle, WA, USA

**Education**
Master of Public Administration, University of Washington, 2004
Bachelor of Science in Civil Engineering, University of Washington, 1993

**ITE Involvement**
Member of ITE delegation to NCUTCD
Inaugural LeadershipITE Class of 2014
Washington State ITE Section President, 2014

**Fun Fact**
Dongho drove a Zamboni during high school, which he considers as his “coolest” job ever!
Complete Streets, COVID-19, and Creating Resilient Communities

Over the past decade, many communities across North America have seen an increase in the need and demand for streets that support biking, walking, and rolling. That’s because having active transportation infrastructure isn’t just about Saturday bike rides—it’s a key contributor to healthy communities that are resilient and equitable, and provide safe, reliable, and affordable access to jobs, healthcare, the grocery store, places of worship, and schools.

COVID-19 has highlighted this need for communities to create more places to walk, bike, and roll—not just for physical distancing—but so people can access their jobs and other essential services. This article highlights the role active transportation plays in building healthy and resilient communities, how communities are adapting transportation as part of their COVID-19 response, and what transportation professionals can learn about transportation now to help build stronger communities later.

Complete Streets isn’t just a want, it’s a need.

Since 2006, the United States has seen an increase in the number of people using active transportation, with biking to work increasing 50 percent and trips by foot increasing 13.3 percent. Active transportation is also a key contributor to economically thriving communities. Repeated surveys by the National Association of Realtors demonstrate the demand for walkable communities. In addition, a recent study from Portland State University found that installing bike lanes has a positive impact on the adjacent local businesses.

However, the need for more active transportation infrastructure isn’t just about recreation—it’s a matter of life or death, especially for our most vulnerable road users. Between 2008 and 2017, drivers struck and killed 49,340 people who were walking on streets all across the United States. Older adults, people of color, and people walking in low-income communities are disproportionately represented in these fatal crashes involving people walking.

Without access to transportation, our most vulnerable populations can’t access essential destinations and resources. Said otherwise, reliable transportation can make or break disenfranchised communities’ ability to get to work, access healthy food, make it to school, or get to a doctor’s appointment. Transportation is also a major barrier to accessing healthcare. Prior to COVID-19, approximately 3.6 million people living in the United States missed or delayed essential, non-emergency medical care because they experienced transportation barriers, with the chronically ill, women, ethnic groups, the elderly, and low-income individuals facing the largest transportation burden.

Unfortunately, many communities do not have the infrastructure to support walking and biking to everyday destinations, such as a job or doctor’s office. Evidence shows very limited public investments are made in low-income communities to improve roads, sidewalks, lighting, and other transportation infrastructure that would improve people’s everyday mobility, physical activity, and safety. Without this infrastructure, some communities are literally cut off from access to economic opportunity.

Community Response Far Outweigh Federal Efforts

Over the last decade, communities have responded to the need for more active transportation infrastructure by adopting Complete Streets policies, Safe Routes to Schools plans, bike and pedestrian plans, and funding and building more sidewalks, crosswalks, and bike lanes. For example, since 2005, communities in the United States have adopted more than 1,500 Complete Streets policies at the local, regional, and federal levels. However, in the United States, efforts at the federal level have fallen short, with Congress supporting no major transportation policy or funding initiatives that would increase active transportation infrastructure.

Trends with Communities, Complete Streets, and COVID-19

COVID-19 is demonstrating that people want or need to use public space for more than just driving, but to exercise and access jobs and other essential services. In response, cities across the country have made temporary or permanent adjustments to their infrastructure, like opening streets for physical distancing. The National Complete Streets Coalition and Smart Growth America are tracking trends in how cities across the country are adjusting their infrastructure to respond to COVID-19.
While COVID-19 has also exacerbated a number of pre-existing challenges and inequities in our country, the pandemic has also presented an opportunity to rethink the way we shape and build our communities.

**Cities respond rapidly.** Some cities quickly responded by opening streets to people (and closing them to cars), extending sidewalks, and building temporary bike lanes. For example, Oakland, CA, USA rolled out its Slow Streets program in early April. By June, the city had installed 20 miles of slow streets along 19 corridors. Seattle, WA, USA, which has seen a 57 percent drop in vehicle traffic volumes accessing downtown areas, is adjusting its signal timing to give more time for pedestrians to cross streets and permanently closed 20 miles (32 kilometers [km]) of its neighborhood streets to cars. To the south, Bogota, Columbia, just announced building an additional 50 miles (80.5 km) of bike lanes, in addition to the 300 existing miles (482 km).

Open Streets, in particular, have received mixed reviews by community-based organizations throughout the United States. While organizations are supportive of reclaiming space for people, many advocates have highlighted concerns about whether cities are implementing Open Streets equitably throughout their communities, whether people of all races feel safe in Open Streets, how the cities are engaging with their residents to plan and implement the streets closures, and whether the street closures are helping essential workers actually access their jobs and healthcare, or whether they are just for people to recreate.

How cities implement Open Streets, slow streets, and other transportation adjustments will be critical for building support for active transportation now and in the future. For example, transportation professionals should:

- Ensure the temporary projects help provide people who are walking, biking, rolling, and taking transit, with access to jobs, healthcare, and other essentials services—especially in communities that have experienced historic disinvestments.
- Make sure that all projects, temporary and permanent, are helping frontline workers access their jobs.
- Allocate transportation resources and infrastructure equitably, not just to communities who are speaking the loudest.
- Work with artists and designers to make improvements, such as the installation of bike lanes and widening of sidewalks to allow for physical distancing, high quality and easy to understand (while considering budgets) so that people have a positive experience with the changes.
- Employ COVID-19 transportation demonstration projects as communication tools, where cities can explain what it means to bring more active transportation to their neighborhood.
Use the projects as opportunities to pilot new processes to inclusively engage the community, especially those who have limited access to computers, broadband, do not use English as a first language, or are not able to attend virtual convenings because of time constraints or lack of capacity. Be open to changing or iterating the projects based on community feedback.

**Accelerated speeding.** Almost overnight, we saw our roads clear of vehicles. Streets previously filled with moving cars now had 100 feet of open right of way. Unfortunately, this reduction in traffic is not corresponding with a reduction in speeds. In fact, across the board increases in average speeds have been the norm, even during peak periods.

Speeding already contributes to 25 percent of all traffic fatalities and is one of the main determination factors in whether a crash is fatal. Community based organizations are asking their cities to make the temporary and permanent infrastructure changes needed to slow speeds, like Complete Streets, and give more space for walking, biking, and rolling. During this challenging time that highlights how much of public space has been dedicated to vehicular traffic, we can use this opportunity to:

- Track, highlight, and call out data and new stories that highlight increased speeding during COVID-19.
- Encourage transportation agencies to right size streets through temporary and permanent measure slow speeds through design (i.e. Washington, DC, USA changing its default speed limit from 25 to 20 miles per hour (40 to 32 kilometers per hour), which went into effect June 1, 2020).11
- Continue to hold state departments of transportation accountable for reaching their safety targets.

**Struggles to elevate the voices of underserved populations.** Transportation decisions have not often considered the needs of communities, especially communities of color, those who cannot afford a car, or those who can’t or do not want to drive. Thanks to community-based groups, cities are moving towards incorporating more inclusive community engagement processes into their transportation projects. This may mean offering translation services, providing compensation for participation, or giving more power to communities to make decisions.

With that said, COVID-19 is highlighting the flaws in the community engagement practices used by most transportation agencies. These groups are struggling to develop processes to engage with households who may not have computer or broadband access, do not use English as a first language, or are overwhelmed working and caring for their family. While some agencies are using virtual community engagement, outstanding issues remain about what segment of the community is able to participate in these forums, and whether this type of engagement is continuing to perpetuate the longstanding inequities in transportation projects. To advance inclusive, equitable engagement we should:

- Partner with and compensate local trusted partners in the community to have them engage communities now and the future.
- Make sure engagement materials are culturally appropriate, in multiple languages and mediums, accessible, and easy to understand.
- Look at incorporating engagement into already existing activities, such as food banks and health centers.
- Consider whether a project and any interaction with the community should be paused until it is safe to conduct in-person engagement.

**Health Disparities and the Built Environment**

Unfortunately, COVID-19 is impacting certain communities more than ever. For example, disproportionate burden of (the) illness and death among racial and ethnic minority groups.12
However, this is not because the virus targets certain communities. It is because, in part, the race-based policies and practices we used to build our communities resulted in vast health disparities across neighborhoods. COVID-19 is a wake-up call that we must focus our work on undoing the harm caused by these policies and working with communities to co-create healthy places for all. To continue to reduce health disparities, we should:

- Continue to track data and lift up the stories of how certain communities are most disproportionately impacted by the built environment.
- Institutionalize the needs of the racial and ethnic groups into all of our work. For example, we should make sure all of our transportation and land use plans prioritize historically marginalized populations first.
- Partner with public health to align goals and priorities to support the health of all, with an emphasis on those facing the greatest health disparities.

A Call for Action

Though COVID-19 has highlighted many inequities in our transportation system, we can use this time to rebuild our communities with equity and people in mind.

COVID-19 has shown that there are new ways to design streets at a rapid pace using tactical urbanism tools and information at our fingertips to make quick transportation decisions to create complete streets that create complete trips for all road users. We can help support local businesses and restaurants by making it easier and safer for people to walk and roll to those destinations. We can build transportation projects and land use regulations that build communities where your health is a priority. We can reclaim our public realm for people by redesigning our roads for all modes. We can work to embed more inclusive practices into how we engage communities so we reflect the needs of all those historically left out of the planning process into the rebuilding efforts. We can make it easier for people to walk, roll, or take transit to work, helping us meet our climate goals. We can invest more funding into transportation projects that help everyone, not just drivers, get to their jobs and healthcare in a safe, affordable, convenient, and reliable way.

COVID-19 is challenging each of us to look at the way we work and how we can help create resilient communities. As transportation professionals, we are in a unique place to help be part of the rebuilding process. We should use our position to make sure we put people and equity first now and in the future. }

References


ITE Response to COVID-19

ITE is here to assist you during this time of uncertainty. The following are examples of ITE’s continuing efforts to bring relevant and timely information on industry responses to COVID-19.

NEW ENGAGEMENT OPPORTUNITIES

Virtual Drop-In Sessions
- Short, highly interactive on transportation-related subjects.
- Allow ITE members to engage with fellow professionals and stay on top of key industry topics.
- Topics have included congestion impact post-COVID; decorative crosswalks; touchless pedestrian push buttons; and more.

REIMAGINED ANNUAL MEETING AND EXHIBITION
- The Annual Meeting you have come to know and trust, in a virtual format.
- August 4–20, every Tuesday–Thursday from 11:00 a.m.–5:30 p.m. ET.
- Affordable registration rates.
- Participate from the comfort of your home or office with no travel or extended time away.
- Technical Sessions, poster presentations, and workshops.
- Virtual exhibit hall.

DEEPER DIVES
- ITE Talks Transportation Podcast: Paul Skoutelas, President and CEO of the American Public Transportation Association, on the impacts of the pandemic on public transit.
- Open Streets Webinar: This ITE Learning Hub webinar explores how streets are changing across the world due to COVID-19.
- Traffic Counting Considerations Working Group: The Traffic Counting Considerations Working Group, chaired by ITE President Randy McCourt, is developing a white paper providing guidance on the practice of traffic counting and estimation during COVID-19, expected to be available later this summer.

COVID-19 CURATED RESOURCES

ITE has set up a COVID-19 Resources page to help you during the COVID-19 crisis. We are continuously updating this page to bring you the latest and most relevant information and related resources.

Visit www.ite.org to access all these resources.
Canadian District Administrator

In celebration of its 90th anniversary, ITE is recognizing each of its District Administrators throughout the year in a series of profiles. Each month this column will also feature historical facts and figures on the various Districts, including important dates and people throughout their history.

Steven Garner has been the District Administrator (DA) for the Canadian District of ITE (CITE) since 2015. The position was initially described to him as being responsible for taking care of the District’s website and maintaining a filing system and contact lists. However, it has very much evolved into so much more. He tells ITE Journal he appreciates the variety and flexibility of the position. “One of the great things about doing this work is that it is so varied and I’m able to apply many facets of my skills and experience to making things run smoothly,” he says, “whether that be providing IT support and implementing solutions, advising on processes, reviewing contracts, or providing a liability risk assessment, it’s been well suited to someone with my background.”

Garner’s professional background is in geographic information systems (GIS), specifically in local government. From this focus, he gained experience not only in GIS but also in municipal operations (because, he explains, GIS touches pretty much all of them) as well as in information technology. In addition to GIS-specific work, he also served in a role as an IT coordinator in municipal government.

Throughout his working life, Garner has lent his level one accounting training and professional perspective as a member of many non-profit organization boards. These roles have provided him with insight on the myriad financial and legal aspects of running a non-profit. The variety of missions and experiences have been very gratifying for Garner, who cites his most rewarding work in this regard was on the board of the Central Saanich Police in British Columbia, Canada. “I served as the board sponsor of the strategic plan at the time and was an instrumental contributor in coming up with the new motto that now appears on the force’s crest—‘Strength through Community.’ That motto also relates so well to ITE.”

Garner’s adventurous and pioneering spirit is evident to all who have crossed paths with him. So it’s not surprising that he doesn’t credit degrees or certificates or any kind of formal training when talking about what led him to CITE. “What really prepared me for work as a District Administrator was my venture into purchasing and running a small marine supply retail store in the village where I live. You really are a true jack of all trades when you are running something like this. You learn to solve problems as you go,” he notes. “I really feel for small local enterprises like this, especially in the current climate. It’s a hard slog and I wish more people would support their local business, which are often the lifeblood of our communities.”

One of Garner’s proudest accomplishments as the Canadian DA is steering the organization into incorporation as a national non-profit organization. At the time, the organization did not fully comprehend the benefits (or the risks) of not incorpo-

Steven Garner
Self-employed small business coach and WordPress website developer

Education
Bachelor of Arts (Honors), Geography, University of Victoria
Master of Science, Geography, University of Victoria

Fun Fact:
Steven lives on Southern Vancouver Island, Canada in the community of Cowichan Bay.

Hobbies
Painting, flying, sailing, photography
rating. Under Garner’s direction, not only did incorporation put in place a protective legal framework for the organization, but he believes it helps to legitimize all that they do.

Garner takes great pride in what he does and who he serves, but he is not officially a member. “Interestingly, it is only recently—based on changes to the ITE bylaws—that I would qualify for membership. Having said that, being an ITE member, in my mind, has one key and overarching benefit: that is the community built around the organization. I have met so many great people doing great work through ITE. It’s the community that really matters, and ITE is a good one!”

CITE is indeed a strong community and clearly in good hands with Steven Garner’s consistent behind-the-scenes work. Yet perhaps one of the keys to his success is achieving balance while pursuing his many interests, whether that’s on the land, on the sea, or in the sky. His academic career began in visual fine arts, and he still breaks out the paints and easel or grabs his camera to experiment with photography. As an avid sailor, you can find him with his wife Shelley and their puppy Luna, an Icelandic Sheepdog, heading out to enjoy the beautiful waters around Southern Vancouver Island. He also enjoys flying and is three-quarters of the way to completing his private pilot’s licence. Although, things are at a stand-still with COVID-19, he looks forward to completing the requirements as soon as he’s able. In the meantime, this renaissance man reflects on the attitude that helped him succeed. “Do things willingly to help people and don’t think about what’s in it for you. The sooner you can do this, the faster you will surround yourself with good people and success.”

Getting to Know ITE’s Canadian District

Sections
Canadian District
Atlantic Provinces Section
BC Interior Section
Greater Vancouver Section
Hamilton Section
Manitoba Section
National Capital Section
Northern Alberta Section
Quebec Section
Saskatchewan Section
Southern Alberta Section
Lethbridge Chapter
Southwestern Ontario Section
Toronto Section
Vancouver Island Section

Members
2,031 members

Student Chapters: 16

District Board Leadership
President – Julia Salvini, P.Eng. (M)
Vice-President – Ryan Vanderputten, M.Eng., P.Eng. (F)
Secretary-Treasurer – Pedram Izadpanah, Ph.D., P.Eng. (M)
Past-President – Edward Soldo, P.Eng., FITE (F)
International Director – Jen Malzer, MSc., P.Eng. (F)

Did You Know?
• A new initiative called excite was formed to help people get involved in CITE and develop in their profession. excite is for emerging members, whether they are a student or recent grad, early in their career, or just getting involved in CITE.
• CITE was named the 2020 District Innovation Award winner by ITE. 2019 marked a significant year in CITE’s efforts to support Sections, streamline operations, and enhance its Annual Conference while continuing regular programming for members. These initiatives have been undertaken to provide the best member experience and facilitate the work of CITE’s Section volunteers.

Historical Perspective
• The first ITE Annual Meeting held in Canada took place in Ottawa, Ontario in 1976.
• The Canadian District began as a Section and was formed in 1951.
• Leo E. Laviolette became the first Canadian to serve as ITE International President in 1982.

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Looking Back: Transportation through the Decades

In celebration of ITE’s 90th anniversary, throughout 2020 ITE Journal will feature a monthly snapshot of the transportation industry by decade, beginning with the turn of the 20th century through present day. These are the technologies, events, and key players that transformed transportation to bring us where we are today.

1980s
In 1980, ITE celebrated its 50th anniversary. As traffic congestion became a major issue in many political jurisdictions, ITE conducted six traffic congestion regional forums, and hosted its first mid-year Technical Conference that focused on emerging issues. In the United States, national deregulation of trucking led to a boom in the industry, and the commercial driver’s license was introduced.

Trucking Deregulation – January 1, 1980
The number of trucking companies in operation dramatically increases when President Jimmy Carter signs the Motor Carrier Regulatory Reform and Modernization Act into law.

Jess and Joe Jaca of Jaca Truck Lines in Paradise Valley, NV, USA in 1981.

Traffic Signs and Signals

Traffic Signs and Signals

1988 MUTCD
In announcing the publication of the 1988 Manual on Uniform Traffic Control Devices (MUTCD), the Federal Highway Administration announced it would not make routine, incremental changes to the 1988 MUTCD. Only those changes having a direct impact on the motoring public or pedestrians would be advanced through rulemaking. New Content in 1988 MUTCD:
- Recreational/Tourist Signs
- Specific Information Business Signs (LOGO) Signs
- Tourist-Oriented Directional Signs (TODS)

Example of a LOGO sign in Leesburg, VA, USA, providing motorists and tourists with information on services and tourist attractions.

Willamette Valley Express Inaugural – August 2, 1980
“In fiscal year 1980, demand for passenger rail service resulted in the creation of five new state-supported routes in California, Illinois, Missouri, Oregon and Pennsylvania, for a total of 15 state supported routes across the nation. Changes to the Rail Passenger Service Act of 1970 made it easier for states to fund services and test the market. Among the new services initiated that year was the twice-daily Willamette Valley Express.”

First Female Secretary of Transportation – January 1, 1983
Ronald Reagan selects Elizabeth H. Dole as the eighth Secretary of Transportation. She was the first female to hold the title, serving from February 7, 1983 to September 30, 1987.
The inaugural Willamette Valley Express breaking through a paper banner at Portland Union Station on August 2, 1980. This photo appeared in the September-October 1980 issue of Amtrak NEWS.

Highway Improvement Act – January 1, 1984
The Highway Improvement Act threatens to cut aid to states that don’t raise their alcohol drinking ages to 21.

Commercial Vehicle Safety Act – January 1, 1986

ITE Presidents – 1980s

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Construction of the I-10/I-17 Stack interchange in the late-1980s in Arizona, USA.
A Fresh Approach to Getting you There.

FOR TODAY. FOR TOMORROW. FOR THE GREATER GOOD.

We believe nobody should be stuck in traffic, nobody should have to hunt for parking, and nobody should be limited by a single-vendor solution.

We craft innovative solutions while never forgetting who they’re for... Our families. Our friends. Our neighbors. All of us.

Getting You There
www.q-free.com | www.intelight-its.com
Advancing Climate, Safety, and Equity Goals by Putting Pedestrians First

By Kathleen Mayell

The City of Minneapolis, MN, USA released a draft of the Minneapolis Transportation Action Plan, a 10-year action plan in March 2020 to guide future planning, design, and implementation of transportation projects for all people in all the ways they move around. The Transportation Action Plan advances the transportation vision outlined in the Minneapolis 2040 Comprehensive Plan—a framework that emphasizes equity and a commitment to addressing our climate emergency by focusing on low or no-carbon transportation options.
The plan defines six goals—climate, safety, equity, prosperity, mobility, and active partnerships—and outlines actions across seven topic areas to achieve those goals within 10 years. The plan focuses on putting people first, in line with established city policies such as Complete Streets and Vision Zero. More than 50 strategies and 280 actions address the following topics: walking, bicycling, transit, technology, freight, street operations, and design. At the core, the plan aims to leverage the 22 percent of land area that comprises our street space for larger citywide goals, with streets reflecting city values and the space being used to reach citywide transportation goals.

Highlights of the draft plan include:

- Reaching a mode shift goal of having three out of every five trips taken by walking, bicycling, or transit to help achieve the city’s climate, equity, and mobility goals.
- Improving the experience of people walking and rolling on city streets with actions focused on safer street crossings, improved street lighting for greater visibility, and a step toward energy goals and a new plaza program.
- Expanding transit coverage so 75 percent of residents are within a five-minute walk (0.25 miles [0.4 kilometers (km)]) of high frequency transit and 90 percent are within a 10-minute walk (0.5 miles [0.8 km]).
- Using street design to provide a comfortable and healthy environment for people, including more green infrastructure and trees in street projects.
- Nearly doubling the All Ages and Abilities Network—for bicycling and micromobility—with a focus on a low-stress and high-quality protected design.
- Implementing a network of mobility hubs where people can connect to multiple shared, low or no-carbon transportation options, such as bikes, scooters, cars, and transit.

Figure 1. Minneapolis draft plan sets mode share goal of three of five trips taken by walking, biking, or transit.

Building Prioritized Networks for People

The draft Transportation Action Plan establishes two new networks focused on active mobility—the Pedestrian Priority Network and the All Ages and Abilities Network. These networks are designed to prioritize people as they walk, roll, and bike through our streets and make the choice for no-carbon travel an easy, comfortable, and safe one.

The Pedestrian Priority Network is a grid of streets that represent where people frequently walk and will be used to focus investments to improve the ease, comfort, and safety of people walking throughout the year. The network, at 282 miles (454 km), covers more than 10 percent of all streets in Minneapolis, and will be the focus of planning, design, operations, and maintenance improvements for pedestrians across the city. The Pedestrian Priority Network was developed by considering numerous factors that influence where people walk, including transit services, high-den-
sity areas, commercial activity, land use, and High Injury Streets for pedestrians. Trails are also noted on the Pedestrian Priority Network; a large portion of trails are owned and managed by the Minneapolis Park and Recreation Board and provide important connections for the network as they are key walking places.

The All Ages and Abilities Network is the city's new bicycle network, and focuses on low-stress and protected bikeways for all system users. To make bicycling, in all its new forms—like scooters or one wheels—a real option for more people, the plan establishes an All Ages and Abilities Network to be constructed over the next 10 years. This network will include protected lanes and trails that are physically separated from moving cars, trucks, and buses, and will feature improved intersection crossings and be accessible year-round. The goal for the All Ages and Abilities Network is for people on bikes to only share space with cars on quiet low-speed streets or on neighborhood greenways.

The All Ages and Abilities Network will nearly double our existing protected network and will include 136 miles (219 km) of new or upgraded bikeways, including 79 miles (127 km) of protected bike lanes that provide a low-stress riding experience on high volume corridors, 48 miles (77 km) of new neighborhood greenways that manage motor vehicle volume and speed, improve safety at major crossings and reduce stopping at minor crossings, and nine miles (14.5 km) of new trails that provide connections along the Mississippi River or along rail lines that could be converted to trails.

Focusing on Climate and People

In December 2019, Minneapolis declared a climate emergency, which demands a massive-scale mobilization to halt, reverse, and address the consequences and causes of climate change. Minneapolis has set a goal of reducing greenhouse gas emissions by 80 percent by the year 2050.1 Emissions from on-road transportation account for approximately 24 percent of greenhouse gas emissions in Minneapolis.2 Even with mass adoption of electric cars, Minneapolis will need to reduce automobile passenger miles by 38 percent to reach our goal of reducing greenhouse gas emissions by 80 percent by 2050.3

The draft plan calls to reshape the transportation system to address climate change using technology, design, and mobility options to aggressively reduce greenhouse gas emissions caused by vehicles. The plan sets a goal to have one quarter of all trips taken by walking, creates a Pedestrian Priority Network, and focuses on safe pedestrian crossings, including developing new standards for crosswalks and eliminating pedestrian push buttons.

Figure 3. The draft All Ages and Abilities Network will focus on nearly doubling low stress and protected bikeways for users of all ages and abilities.

Figure 4. The plan's climate goal encompasses mode shift, reduced vehicle miles traveled, and reduced greenhouse gas emissions goals.
Focusing on Safety and People
Giving prominence to people walking and biking aligns with the city’s commitment to Vision Zero, which aims to eliminate fatal and severe injuries on our streets by 2027. People walking and biking are overrepresented in severe and fatal crashes in Minneapolis, with people biking and walking comprising 19 percent of all trips in the city but 45 percent of all fatal and severe injuries. Minneapolis is currently lowering speed limits citywide to 20 miles per hour (mph) (32 kilometers per hour [km/hr]) on most residential streets and 25 mph (40 km/hr) on most other city-owned streets, supporting Vision Zero efforts and a move to support safer and more comfortable trips for people walking and biking.

Focusing on Equity and People
Equity translates to fair and just opportunities and outcomes for all people. Minneapolis is committed to the development of policies, practices, and strategic investments to reverse racial disparity trends, eliminate institutional racism, and ensure that outcomes and opportunities for all people are no longer predictable by race. Transportation is a critical part of this work.

Not all people have the same access to transportation. More than one of every six people in Minneapolis (16.5 percent) live in a household without an automobile. In some neighborhoods as many as 40 to 50 percent of households don’t have access to a vehicle. While some households choose not to own a car, there are many households that cannot afford to do so. Transportation is one of the top two household costs, accounting for approximately 19 percent of household income in Minneapolis.

One of the goals of the draft plan is to reduce single occupancy and high-carbon motor vehicle trips. The current transportation network affords more opportunities to those who can purchase a car, such as access to more jobs. To design, build, and operate an equitable transportation system, it is imperative that we focus on underserved communities that are in need of expanded, improved, and affordable mobility options.

Additionally, 11 percent of Minneapolis residents self-report a disability, which may present mobility challenges. Given these realities, the existing transportation system results in different challenges for different people. The approach to our work recognizes these realities and will help address them.

Draft Plan Helped Prepare for Rapid Mobilization during COVID-19
In part due to the solid policy foundation leading up to and cultivated during the development of the draft Transportation Action Plan, including stakeholder engagement, workgroups with agency partners, and internal coalescing around the approach to reaching citywide goals, the City of Minneapolis was well positioned to react once COVID-19 hit. The city was able to rapidly respond to changing demands and travel patterns on our streets due to the pandemic. The week after the draft plan was released, schools shut down throughout the city, many workers started working remotely, and shortly thereafter stay-at-home orders were issued by the governor. The Public Works Department quickly worked to implement numerous activities that helped people stay safe, businesses thrive, and keep people connected. Three main components of this work have been to implement the following:
Stay Healthy Streets: Minneapolis opened up space for walking, rolling, and biking to support active recreation and safe access to essential businesses. Stay Healthy Streets complement the miles of parkways the Minneapolis Park and Recreation Board has opened up to give people more space for outdoor activities. Together with the Park Board, 40 miles (64 km) of street changes have been instituted to support comfortable walking, biking, and rolling while social distancing during the COVID-19 emergency.

Pick up zones: The Public Works Department has issued permits for and installed more than 50 Pick-up only zones for businesses. The Pick-up zones allow parking for up to 10 minutes for people picking up take-out food or other items.

Pedestrian push buttons: The city has transitioned traffic signals to reduce the need for pedestrians to push a button to get a walk signal at more than 400 signalized intersections, bringing the citywide total to 770 of 820 signals. Crews placed signs on the signal posts notifying people that the signal will change automatically. For blind and visually impaired people, the button is still operational in order to call the audible features.

During COVID-19, Minneapolis has made quick progress on a plan highlight—to act quickly to improve streets, focusing on paint and lower-cost infrastructure improvements to make change that improves street design and operations. Over the past several months, the city has acted quickly to see real results on its streets, using data and best practices, to leverage the public right of way for multiple citywide goals.

The plan is still draft, but even within the period it has been out for public review, it is clear that by sticking to the vision set in Minneapolis 2040, refining the transportation goals, and setting out a clear pathway to prioritize people, Minneapolis is in a position to reach the stated objectives of the plan, making the choice to travel by walking, rolling, or biking a safer, more convenient, and comfortable experience.

Acknowledgement
Information in the above article was obtained in part directly from the draft Minneapolis Transportation Action Plan, news releases from the City of Minneapolis, and from the City of Minneapolis website on Stay Healthy Streets; many staff from Public Works contributed to these efforts and are acknowledged here.

References

Kathleen Mayell joined the City of Minneapolis in 2016 as a transportation planning manager and is the project manager for the city’s Transportation Action Plan. She leads transportation planning activities and initiatives, and oversees the Vision Zero effort and the city’s role in regional transit projects. Kathleen previously held positions at the Minnesota Department of Transportation; the City of Somerville, MA, USA; and Project for Public Spaces in New York City, NY, USA. She holds a master’s degree in City Planning and an Urban Design Certificate from the Massachusetts Institute of Technology.
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An increasing number of cities and states are looking to bicycle transportation to achieve community goals related to health, safety, and the environment. Research over the past few decades has shown that bikeways improve safety and comfort and increase ridership for bicyclists.1 While practitioners focused on planning and designing for bicyclists are already familiar with the range of design options, they seek more guidance for selecting the type of design that will meet the needs of a broad spectrum of current, and potential, bicyclists.

Bikeways using a bikeway that is separate from motor vehicles.
Introducing a Bikeway Selection Process
The Federal Highway Administration (FHWA) supports a flexible approach to bicycle facility design and agencies can access a variety of design guidance from organizations like American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), and National Association of City Transportation Officials (NACTO). In 2015, FHWA released its Separated Bike Lane Planning and Design Guide. The new FHWA Bikeway Selection Guide complements these guides and fills a gap for transportation agencies by providing a resource that helps practitioners consider and make informed decisions about design that are grounded in the reality of complex user needs, fiscal constraints, and often limited rights-of-way.2

The Bikeway Selection Guide provides guidance for determining the appropriate level of bicyclist separation based on factors like roadway characteristics and traffic use (i.e., speed, volume, heavy vehicle mix), land use, and bicyclist profile (i.e., level of comfort or skill). The Guide also emphasizes that practitioners should consider bicyclists’ preferences and in doing so this will encourage bicycle ridership and use of facilities. This approach stands in contrast to decades of transportation planning and design focused on the mobility of motor vehicles.

A Brief History of Planning for Bicyclists
Bikeways provide a way for communities to meet the demand for livable and accessible places while working toward achieving community goals related to health and mobility, among others. In fact, bicyclists were heavily involved in the Good Roads Movement, which included advocacy for well-connected, paved streets in the late 1800s and early 1900s. Over time, due to a variety of factors, roadway design and construction became increasingly focused on mobility for motorists; however, with the energy crises of the 1970s, government agencies and the public had growing interest in bicycling for transportation. This interest is reflected in the first AASHTO Bicycle Guide, which was published in 1974 by the Standing Committee on Engineering Operations. The 1974 guide included warrants for “protected” and “unprotected” bicycle lanes and a variety of intersection treatments designed to minimize conflicts between bicyclists, pedestrians, and motorists. However, the bicycling advocates with the loudest voices were the ones insisting that bicyclists operate like other drivers using a shared lane and the 1981 AASHTO Bicycle Guide mirrored this view—bikeway warrants were dropped and protected bicycle lanes were prohibited. Bicyclists who were more experienced and can ride at faster speeds for longer distances, also known as vehicular cyclists, continued to influence roadway design for much of the middle and late 20th century.3

Through the 1980s, the primary source of funding for surface transportation projects, including bikeways, was the gas tax. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 was the first major investment and recognition of the importance and need for active transportation facilities. ISTEA supported research and planning for bicycle and pedestrian transportation and mandated the National Bicycling and Walking Study, which set goals of increasing bicycling and walking trips while decreasing fatalities and injuries.

Despite the legislative and federal resources to promote bicycling, key design guidance continued to echo the desires of vehicular cyclists and their “right to the road” up until the fourth edition of AASHTO’s Guide for the Development of Bicycle Facilities (2012), which reintroduced bikeways with more physical separation, but still emphasized design for the confident bicyclist. FHWA’s Separated Bike Lane Planning and Design Guide (2015) outlines planning considerations for separated bike lanes and provides design options but recognized a need for a decision support tool to help practitioners select facilities. This is where the Bikeway Selection Guide comes into play.

Planning and Designing for All Ages and Abilities
Bikeway selection decisions are often part of a broader planning process that accounts for roadway and traffic characteristics of all modes. The community goals, transportation policies, and funding priorities are consulted and public engagement shapes the decision. Bikeway selection should also be informed by an understanding of the different types of bicyclists and consideration of the relationship between a bikeway and the bicycle network. Characteristics commonly used to classify design user profiles are comfort level, bicycling skill and experience, age, and trip purpose. Selecting the design user profile is often the first step in assessing a street’s compatibility for bicycling.

A study by researchers at Portland State University found that of adults who have stated an interest in bicycling, there are three types of potential and existing bicyclists: highly confident bicyclists, somewhat confident bicyclists, and interested but concerned bicyclists.4 Keeping...
in mind that comfort and stress are inversely related, agencies can consider these “types” of bicyclists as they evaluate different bikeway options and determine where higher quality facilities are needed most within their bicycle network. For example, high-comfort and low-stress networks, or, those networks with lower exposure to high motor vehicle speeds and volume, are appealing to the most people; low-comfort and high-stress networks are appealing to the least when comparing relatively similar options from Point A to B.

As the Guide introduces each bikeway type and important considerations, it draws on research where available, and encourages Guide users to employ engineering judgement, design flexibility, documentation, and experimentation. The efficacy of each bikeway type is dependent upon factors like traffic volume, traffic speed, intersection design, and land use. Consideration of road context (i.e., rural, suburban, or urban settings), project type (i.e., new construction, reconstruction, or retrofit), and project purpose all help further refine the menu of bikeway options. For example, retrofit projects often have more constraints, so it may be more challenging to implement the preferred bikeway type.

Despite the expanding toolbox of bikeway facilities, intersections remain a challenging component of bikeway design, so while the mechanics of intersection design are not the focus of the Guide, the Guide summarizes the intersection performance characteristics for each bikeway type (i.e., safety, visibility, predictability, etc.) and explains the relationship between bicyclist comfort and exposure at different types of intersections. Bikeway design should be consistent and continuous from midblock locations through intersections. For example, it is not in keeping with best practices to design midblock separated bike lanes that transition to shared lanes at each intersection as this breaks the continuity of the bikeway and exposes the bicyclist to motor vehicles. For more information on specific strategies at intersections, NACTO’s Don’t Give Up at the Intersection details different geometric designs and signal phasing strategies.

Trade-Off Decisions in Practice

Bikeway selection is a context-sensitive decision that involves a planning- and engineering-based analytical process. Sometimes once a preferred bikeway type has been identified there are real-world conditions like available right-of-way and budget that may require adjustments to preferred design values or eventually downgrading the facility to the next best bikeway type and/or providing a parallel bikeway. Other factors involved in the discussion of trade-offs may include traffic volume and mix; parking and curbside activity; driveways and intersections; vulnerable populations; connectivity gaps; transit considerations; and more.

For instance, a conventional bike lane may yield high comfort when vehicle speeds and volumes are low, but the design also relies upon perfect driver and bicyclist behaviors to avoid crashes. A separated bike lane or a sidepath with protected intersections may be the most comfortable for bicyclists due to separation from motor vehicle traffic, but visibility may be reduced due to parking, which would then require vehicle parking restrictions.

Notes

1. Chart assumes operating speeds are similar to posted speeds. If they differ, use operating speed rather than posted speed.
2. Advisory bike lanes may be an option where traffic volume is <3K ADT.
3. See Section 4.4 for a discussion of alternatives if the preferred bikeway type is not feasible.

This chart provides guidance for how motor vehicle volume and speed can be taken into consideration to determine a preferred bikeway type for urban, urban core, suburban, and rural town contexts. The Guide includes a separate chart for preferred shoulder widths on rural roadways. Section 4 of the Guide describes many other considerations that will arise in the bikeway selection process.
Technical, political, or financial realities may mean that not all roads can be retrofitted or designed with the appropriate bikeway. At locations where the preferred bikeway cannot be provided on the primary route and a parallel route is not feasible, agencies must recognize that bicycle activity may be suppressed, and the safety of bicyclists operating on this roadway segment may be reduced. When this occurs, other remedies such as the reduction of traffic speed or volume may be considered to help the community meet bicycling goals established in their adopted plans.

Uptake and Training
Since the release of the Guide, a webinar and series of workshop trainings have engaged practitioners across the United States. The Bikeway Selection Guide webinar is available to view on the Pedestrian and Bicycle Information website (www.pedbikeinfo.org/webinars) and includes discussion among Guide authors from the consulting firms Toole Design and VHB.

To encourage use of the Guide, FHWA hosted in-person workshops across the country and has adapted the format to include virtual learning in response to COVID-19. During the workshops, instructors emphasize the importance of assessing planned bikeway projects and conducting formal feasibility studies. The Guide introduces these as specific steps in the overall process, prior to moving into final bikeway selection and designing the bikeway, as opportunities to identify and evaluate the trade-offs between bikeway options. The instructors use visualizations to illustrate typical challenges to bikeway implementation—such as curbside traffic, driveway conflicts, on-street parking, and utility infrastructure. Participants work together to identify trade-offs and options for bikeways by examining local case studies.

For some agencies, these workshops provide a “nudge” when leadership has been reluctant to shift from a car-centric focus to one of multimodal inclusion, and for other agencies these workshops can reinforce their commitment to planning for bicycling while helping them work through the inherent tradeoffs.

For the Northeast Arkansas Regional Transportation Planning Commission, the shift to multimodal transportation planning has been slow and not universally supported according to MPO Director Cecelie Cochran. Ms. Cochran found that “through the FHWA Bikeway Selection Guide workshop, we were able to discover the incorporation of available options that are practical to our roadway system.” She added that her staff will use what they learned to identify and prioritize improvement projects throughout the region. In Ohio, workshop participants will apply what they learned as the Ohio Department of Transportation develops a statewide pedestrian and bicycle policy plan in 2019-2020.

By talking through these group exercises, workshop participants become more confident that they can clearly articulate the benefits and challenges of bikeway options to stakeholders and decision makers. This clarity promotes transparency and often leads to increased public support for bikeway implementation.

The full FHWA Bikeway Selection Guide is available at: https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf. To learn more about technical assistance and training workshop opportunities, contact Tamara Redmon, +1-202-366-4077, tamara.redmon@dot.gov

References
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Guidelines for Determining Traffic Signal Change and Clearance Intervals

ITE has published guidance on yellow change and red clearance intervals for signalized intersections. The goal of this guidance is to create a consensus methodology for calculating and evaluating traffic signal change intervals that can be consistently implemented by transportation agencies.

PURCHASE INFORMATION
Electronic Format: Member $75 | Non-Member $150
Print Format – price of electronic format plus $20 shipping and handling
For more information: http://bit.ly/ClearanceIntervals

Trip Generation Manual, 10th Edition Supplement

The supplement adds walk, transit, and bicycle trip generation data for 53 land uses and truck trip generation data for 50 land uses.

For pricing and purchasing information for the supplement, visit http://bit.ly/TripGenSupplement

Sustainable Traffic Signal Development: An Informational Report of the Institute of Transportation Engineers

The report provides summaries and examples of sustainable practices in planning, designing, and constructing traffic signals. The report also takes a brief look into the future and the convergence of automated vehicles, wireless communications, alternative energy sources, application of data, and automated performance measurement systems.

PURCHASE INFORMATION
Electronic Format: Member $50 | Non-Member $100
For more information: https://bit.ly/STSDPDF
Bicycle Signals in the United States: An Inventory, Typical Use Cases, and Research Gaps

By Chris Monsere, Ph.D., P.E., David S. Hurwitz, Ph.D. (F), Christina Fink, P.E., Sirisha Kothuri, Ph.D., and Douglas Cobb, Ph.D., P.E., PTOE, RSP1

Many communities across the United States are working to promote bicycling by improving the comfort and safety for bicyclists. The interactions between modes at signalized intersections present challenges for traffic engineers and designers, especially in busy urban settings. Bicycle signals can be used at intersections to control the movement of bicycles when geometric or operational conditions dictate that their movements be separated in time for safety or other reasons. Bicycle signals typically consist of a signal with green, yellow, and red bicycle symbols in the face. They have been standard tools in the European and Asian bicycling networks for some time.
The first application of a bicycle signal in the United States is believed to have been in 1994 at the intersection of Russell Boulevard and Sycamore Lane in Davis, CA, USA. Sometime later, bicycle signals with the bicycle symbol in the face were included in the 2002 update to the California Traffic Manual and subsequently adopted in the California Manual on Uniform Traffic Control Devices (MUTCD). Nationally, the MUTCD contained provisions for circular signal indications to control bicycle movements. The 2011 NACTO Urban Bikeway Design Guide highlighted the applicability of bike signals, publishing information on their use in 10 American cities and applications in Canada, Europe, and Asia. In 2013, the Federal Highway Administration (FHWA) issued Interim Approval for Optional Use of a Bicycle Signal Face that allows the use of bicycle symbols in the signal face with several restrictions. The most notable restriction is that the bicycle signal face can only be used in scenarios where there is no conflicting motor vehicle movements, which can limit the ability for practitioners to comply with the provisions of the IA-16.

Before IA-16, bicycle signals were in use at more than 40 intersections in a select number of jurisdictions. In recognition of growing use, the National Cooperative Highway Research Program (NCHRP) funded a research effort to summarize and synthesize the U.S. experience with bicycle signals using the bicycle symbol in the face. This updated inventory identified more than 500 intersections in 61 jurisdictions with a bicycle signal on one or more approaches. The research also identified research gaps related explicitly to road user comprehension and compliance and develop research needs statements (RNS). The full report can be accessed on the NCHRP website as Web-Only Document 273. The following sections describe the results of the literature review, an inventory of existing uses of bicycle signal faces, agency interviews, and identified research gaps.

**Review of Existing Research**

The use of green, yellow, and red bicycle symbols in signal faces (and other traffic control devices) is a widespread practice internationally. Figure 1 shows a small sample of the consistency of bicycle signal faces. While the symbols are very similar, there is a variation on other design details. For example, smaller near-side signal faces are more common jurisdictions than the United States. The faces from Shanghai, China, and Utrecht, Netherlands include an arrow in the bicycle symbol face indicating the allowed bicycle movement.

In the U.S. context, the bicycle signal housing, backplates, and mounting practices are similar, and often identical to, motor vehicle signals. The signal face with the bicycle symbol is often the only uniquely distinguishing feature. Human factors principles suggest that road user confusion might be possible with this design approach. In contrast, pedestrian or light rail transit signals use different shapes and colors that distinguish them from vehicular signals. While the literature review identified some anecdotal evidence of road user’s confusion (primarily due to lack of separation between vehicular and bicycle traffic signal faces), none of the published evaluation reports found evidence of significant user confusion. Importantly, the review of the literature found no published studies that directly evaluated visibility or comprehension of the bicycle signal face or the transferability of design assumptions from motor vehicle users. In other words, questions such as at what distance can the symbol be seen in various lens sizes and what movements road users assume as allowable from the symbol have not been formally researched.

**Bicycle Signal Inventory**

The research developed an extensive inventory of bicycle signals. The locations of bicycle signals were identified by starting with an existing list maintained by the bicycle technical committee of the National Committee on Uniform Traffic Control Devices (NCUTCD). The list was supplemented with responses to an online survey distributed by the research team to Transportation Research Board committees and Association of Pedestrian and Bicycle Professionals (APBP) channels. A total of 511 intersections were inventoried where the use of the bicycle symbol in the signal face on at least one approach was verified. For most installations (86 percent), current Google Streetview images were available and were the primary source for data collection. Using the measurement tool in Google Maps and an open-source software to scale images, the research team collected data for each approach.

![Figure 1 Examples of International Bicycle Signal Faces.](image-url)
such as the number of bicycle faces, mounting heights, distance from the stop line, use of arrows, lens diameter, use of colored housing or backplates, presence of visibility restricted louvers, and other data elements. The history option in Google Street View (when available) or agency data, the year of installation was determined for 80 percent of the inventory.

As would be expected, the inventory documented an increasing number of installations of bicycle signals after IA-16 was issued in 2013. The states with the most intersections with bicycle signals were New York (156), California (70), Illinois (40), Washington (51), Oregon (33), and Texas (26), with large cities in these states being the primary adopters. The map in Figure 2 shows the location of intersections. Table 1 highlights the cities with 10 or more intersections in the inventory.***

Detailed signal timing was challenging to obtain. Instead, the research team assessed the primary purpose of using the signal control for bicycles by inspection of the geometry and placement of the signals. A partial summary of this assessment is presented in Table 2. Many of the intersections in the inventory are part of a corridor, where signal control and design are replicated at multiple intersections. As a result, frequency summaries partially reflect repeated designs. The most common bicycle signal uses are to facilitate the contra-flow movement of a two-way bicycle lane and to provide separation when the bicycle lane is placed left of a left-turn lane or right of a right-turn lane. Other typical use cases include controlling bicycle movements at connections to two-way facilities or paths, controlling contra-flow and diagonal bicycle movements, left turns, and crossings for multiuse paths. In many of these applications, the bicycle signal face was not visible to drivers in motor vehicles.

Table 3 summarizes the number of signal heads, lens diameter, and visibility distance per approach. Visibility distance from the stop line to the signal face was measured using Google Maps. Though IA-16 only requires a second signal face for intersections when the primary signal face is more than 120 feet (ft.) (36.6 meters [m]) from the stop line and suggests a second signal face for more than 80 ft. (24.4 m), many installations used two signal heads for bicycles even when the distances to the stop bar were less than 120 ft. Two-thirds of the lenses with the bicycle symbol in the inventory were 8 inches. The selection of lens size did not have an apparent relationship with visibility distance. IA-16 also allows optional use of a 4-inch nearside signal. There were only a few locations identified with 4-inch heads (mostly in Portland, OR as the research team had direct knowledge of these locations) because the data collection approach made it difficult to identify these smaller signal heads optimally placed for viewing by persons on a bicycle.

Table 4 presents the summary of the horizontal and vertical distance between the far-side primary bicycle signal face and the nearest vehicular signal face, rounded to the nearest foot. The horizontal offset was measured between the edge (either the signal housing or the backplate) of the bicycle signal face to the nearest motor vehicle signal face. No protocol for the vertical separation measurement was found, so the distance was measured from the top edge of the bicycle signal face to the bottom edge of the motor vehicle signal. IA-16 suggests that a bicycle signal face be separated vertically or horizontally from the nearest motor vehicle traffic signal face for the same approach by at least 3 ft. (0.9 m). Most of the signal faces in the inventory met the horizontal and vertical separation from vehicular signal heads recommended in IA-16.

To make the inventory available to practitioners and researchers in an easy-to-use format, the research team posted the data collected from the project, including the map of signals online. Data for each intersection are posted in a sheet format and include most of the categories described in this section. The map interface includes direct links to the Streetview image of the bicycle signal face. The site includes a link to report new signal faces and the map includes locations identified after the end of the project.

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At the time of the inventory the research team was aware of signal faces in Hawaii (mostly along South King Street in Honolulu) but was unable to obtain further details.
Table 2. Summary of Typical Use Cases Identified for Bicycle Signal Faces.

<table>
<thead>
<tr>
<th>Sample Application Image</th>
<th>Los Angeles, CA</th>
<th>Chicago, IL</th>
<th>Portland, OR</th>
<th>Portland, OR</th>
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</thead>
<tbody>
<tr>
<td>129 - Bicycle Lane to the Left of a Left-Turn Lane</td>
<td>41 - Bicycle Lane to the Right of a Right-Turn Lane</td>
<td>69 - Two-Way Bicycle Lane on One-Way Street</td>
<td>36 - Multiuse Path Crossings</td>
<td>11 - Diagonal Crossing</td>
</tr>
<tr>
<td>41 - Two-Way Bicycle Lane on Two-Way Street</td>
<td></td>
<td>17 - Bicycle-Only Connections to Parks, Train Stations, or Center Bike Lanes</td>
<td>15 - Connection to a Multiuse Path</td>
<td>10 - Bicycle Left Turns</td>
</tr>
</tbody>
</table>

Agency Interviews

The research team interviewed agency staff to capture their experience with bicycle traffic signals. Interviews consisted of 25 questions that explored bicycle signal use, road user understanding, lens visibility and conspicuity, placement of the bicycle signal face, operations, and research needs. The research team sent recruiting emails to individuals at agencies with significant experience with bicycle signals. The research team interviewed 21 agencies, including six state departments of transportation (California, Delaware, Maryland, Minnesota, Oregon, and District of Columbia), 14 city agencies (Akron, OH; Atlanta, GA; Austin, TX; Cambridge, MA; Chicago, IL; Denver, CO; Lincoln, NE; Minneapolis, MN; Seattle, WA; Houston, TX; Los Angeles, CA; New York, NY; Portland, OR; San Francisco, CA), and one county (Hennepin, MN). Many interviews included multiple professionals at the agency.

The majority of the agencies either did not receive or were not aware of any reports of driver confusion with bicycle signals. The few reports of driver confusion stemmed from lack of familiarity with new installations of bicycle signals and intersection or corridor operations, or improper placement of bicycle signals. In one case, confusion was eliminated when new signal poles allowed the separation of faces. In other cases, confusion diminished with experience. Most agencies were not aware of any bicycle-motor vehicle crashes at locations with bicycle signals. About thirty-eight percent of the agencies interviewed undertook public education efforts to improve user expectancy and comprehension. While some agencies felt that additional research is warranted on lens visibility and conspicuity (52 percent) and size (76 percent), only 38 percent felt that design refinements to the bicycle symbol itself in the lens
needed additional research. The interviews suggest that agency practice guided many of the decisions on lens size. For example, New York City, NY uses almost exclusively 8-inch lenses and had 175 intersections in the sample. About 40 percent of the agencies reported that they were using visibility restricting devices to shield the bicycle signal face from the view of persons driving and were using or plan to use 4-inch bicycle signal heads.

While most agencies reported following the guidance set by IA-16, a majority (57 percent) of the agencies stated that the IA-16’s requirement of limiting bike signals to scenarios where there is no conflicting motor vehicle movements had limited their ability to use bicycle signals. One agency stated that research on the relative need or safety benefit of this requirement is critical, citing long delays that result to all users when only movements without conflicts are required. Some agencies have interpreted the guidance to limit the use of leading bike intervals (LBIs) and there are current RTEs to implement them. Other RTEs are active for applications with conflicting movements that do not comply with IA-16. A number of agencies indicated that they found the IA-16 requirement of providing at least 3 ft. of separation between bicycle and motor vehicle signal heads to be challenging to implement on existing poles.

While not the focus of the interview, a need was expressed for improved guidance and research on current practices for yellow change and red clearance intervals and determining if longer intervals increase safety and tradeoffs associated with signal timing and phasing strategies for bicycles (i.e., exclusive phasing, LBI, delayed turn).

Research Gaps Identified
A synthesis of the results from the literature review, inventory, and interviews identified three research needs about the road user’s understanding of bicycle symbols in the signal face. In priority order, the research needs identified were:

- Optimal methods to communicate allowable, protected, or permissive movements to bicyclists at signalized intersections.
- Evaluation of size, placement, and orientation of bicycle signal faces on bicyclist and driver comprehension and compliance.
- Guidance on visibility and detection of bicycle symbols in signal faces by lens size and distance.

Full text of NCHRP research needs statements were drafted and are being submitted to the relevant AASHTO committees for consideration in the research funding cycle.

Conclusion
Bicycle signals are an useful tool for controlling the movements of bicycles in unique situations and for separating bicycle movements when needed for safety or operations. This study documented an increasing number of installations of bicycle signals in a wide range of U.S. jurisdictions, especially after Interim Approval 16 was issued in 2013. A wide range of applications were identified, including use on two-way bicycle facilities, locations with heavy vehicle turning traffic (either left or right), connecting bicycle facilities to shared-use paths, contra-flow bicycle lanes, left-turns, and others. The interviews with agencies identified positive results and challenges with implementing IA-16 in some situations. The effort suggests more research is warranted on bicycle signal faces, bicycle symbols, and the appropriate traffic control design for permissive movements by bicyclists. itej

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References
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Answer to “Where in the World” on page 14: Montefalco, Italy. Photo courtesy of Matt Magnasco, P.E., Assoc.DBIA (M).

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