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Spring 2022

DOING the RIGHT THING:

Building a Road and Preserving a Community—

The Newtown Pike Extension Project

ALSO IN THIS ISSUE:

NEW LOOK! Guest Editorial Focuses on Equity in Transportation

Partnering to Address Flooding, Protect Assets

ITS-JPO Marks 30 Years of Innovation

U.S. Department of Transportation
Federal Highway Administration

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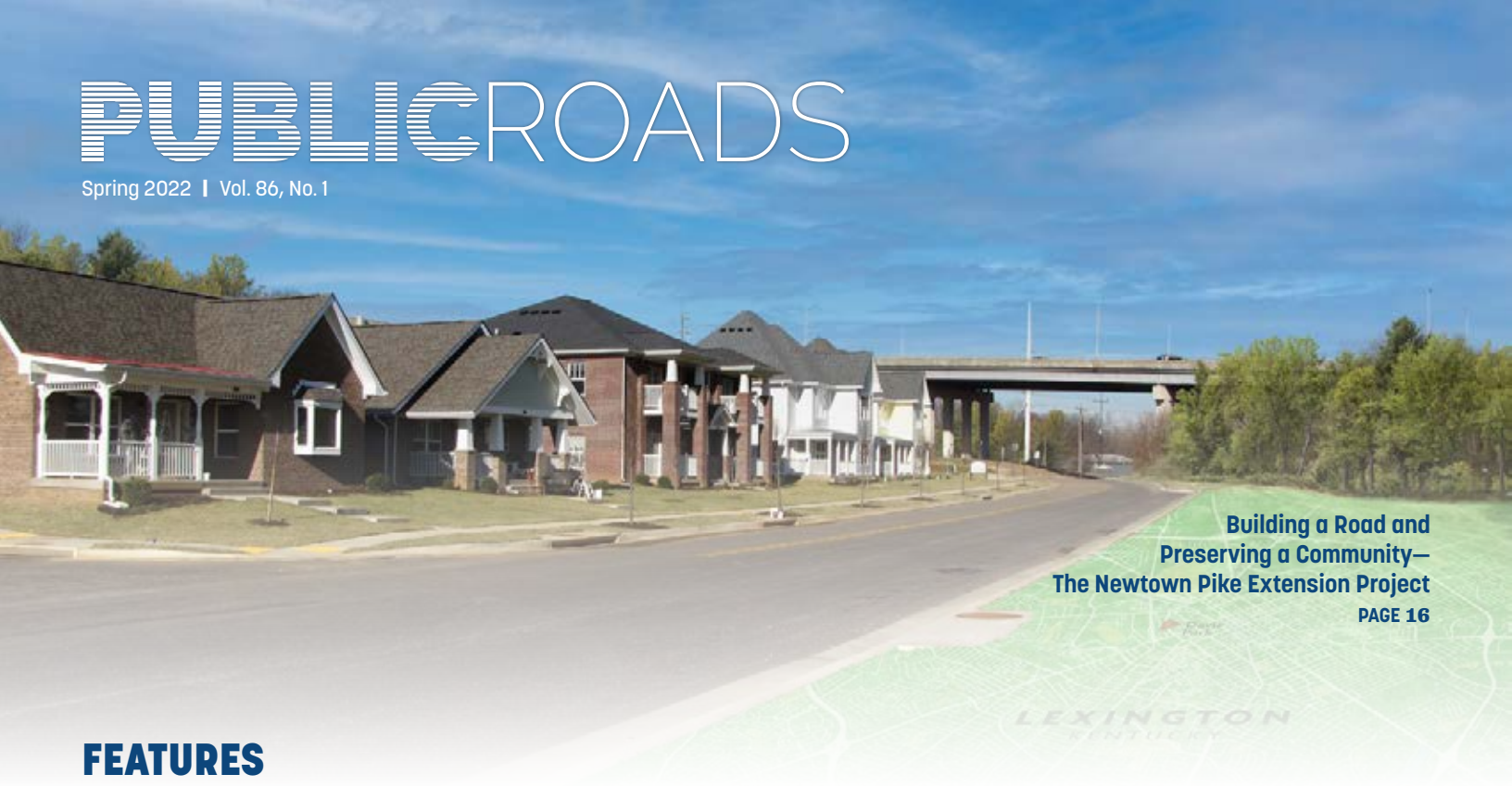

Building a Road and Preserving a Community—The Newtown Pike Extension Project
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Source: FHWA.

DEPARTMENTS

COVERS and ABOVE—Rental housing along DeRoode Street looking north to the West High Street viaduct in 2014. Rental housing includes two fourplexes, two duplexes, and two single-family homes that were funded in part by the Low-Income Housing Tax Credit program.

Photo © Pam Clay-Young. Map © ink drop / AdobeStock.com.

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Intentional Actions Can Create Pathways to Equity

As transportation professionals of the modern age, our common mission is to change the world through infrastructure and the access to the opportunities it provides. Like so many of my colleagues, I view public service as a ministry—an opportunity to promote changes that better the lives of all members of the community. And I believe that it is incumbent on us to grasp the gravity of the moment that we have to make a significant change to the way we invest in the future of transportation. Leaders in both the public and private transportation sectors must take up the cause and take meaningful action on diversity, equity, and inclusion (DEI). If our industry commits now to creating pathways to equity, we can create a modern transportation system that serves and provides opportunity to all, regardless of race, gender, or income.

I boldly support and agree with the Biden Administration's spotlight on DEI and believe that it will be a game changer in modern day public policy. But we in the transportation industry must act now to ensure that these principles are sustained by creating a new framework that incorporates measures of accountability. If we do not want to repeat the mistakes of the past, and we want to make real, sustainable change, the principles of DEI must be woven into the fabric of transportation planning and investment.

We cannot erase the past, but we can design a more equitable future. We must embrace the diversity that tries to divide us. As we go forward, transportation planners must look through the lens of equity in the planning, design, and investment in the future transportation and infrastructure needs of our communities. State and local agencies must consider how to mitigate the barriers of the past to promote communities that are healthier, more inclusive, fair, and empowering. The industry must ensure that the negative effects of transportation infrastructure projects are not concentrated in the communities that look differently than the collective of the decisionmakers.

> *"Words are valued, but actions are transformative..."*

The first step is to hire and promote so that the transportation industry workforce is reflective of the communities we serve. By delivering this "new normal," transportation agencies will empower our workforce, challenge our thinking, broaden the base on common issues that will have a far greater impact on public priorities, and expand the conversation on issues that matter most. By new normal, I am suggesting we look at how we hire and promote: a workforce and leadership with DEI at heart will enrich our quality of work as biases are minimized; attract new talent to the workforce; generate innovative ideas; and provide new opportunities to collaborate. We have to talk to people that might not agree with us in order to strengthen our understanding of the issues. Taking the time to listen, learn, and understand different perspectives will create a comprehensive modal that provides equitable opportunity for all.

Words are valued, but actions are transformative and have a lasting impact.

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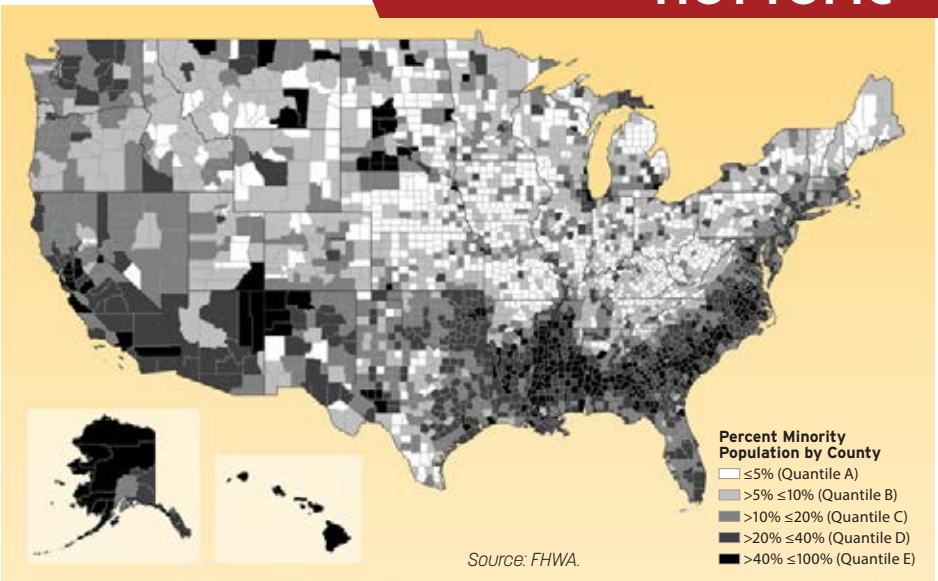
Shawn D. Wilson, Ph.D.
Secretary, Louisiana Department of Transportation and Development
President, AASHTO

Equity in Transportation

by **DERRELL E. TURNER**



Source: FHWA.

Since World War II, the United States has invested heavily in its infrastructure. Much of this investment has gone into the Nation's highway system. These investments in infrastructure have led America to become what is arguably the most prosperous Nation on Earth. But since its inception, America has experienced troubling times, and times where the Nation has been forced to reckon with some of the questionable decisions made by its forefathers. This history includes slavery, the forced migration of Native Americans, and the internment of Asian Americans during World War II. But, our Nation has always sought to correct these missteps with the passage of various laws and social programs.

The transportation industry has not been immune to poor decisionmaking. Some of those decisions not only have left some communities behind, but also, in some cases, totally obliterated others. This inequitable result was most evident during the construction of urban freeways across the country. In some cases, Black and brown communities were targeted by decisionmakers for a number of reasons such as low property values, pursuit of economic growth, and lack of equal access to decisionmakers. However, the Nation sought to self-correct itself with the passage of laws such as the National Environmental Policy Act, the Relocation Assistance and Real Property Acquisition Policies Act (known as the Uniform Act), the Civil Rights Act, and numerous Executive Orders. That self-correction continues today.

Is the Nation still trying to self-correct? The answer is "yes," and you will need to look no further than the demographics of the Federal Highway Administration's workforce and that of the State departments of transportation. The demographics on both sides are vastly different today than they were nearly 40 years ago. Now, metropolitan planning organizations, which are composed of local leaders (many of which better reflect the demographics of their communities now more than ever), have taken on a much bigger role in shaping transportation in urban areas. When decisionmakers resemble the populace at large, the discussions at the table are different, and better decisions are made. While that doesn't mean everyone will be happy with the final decisions, it does mean more people will have a seat at the table and get their issues considered. As more varied life experiences are shared at the discussion table and in our day-to-day lives, a broader perspective will be achieved by the decisionmakers.

Classroom instruction has changed over the years, with more minority teachers instructing students on topics such as science and computers.

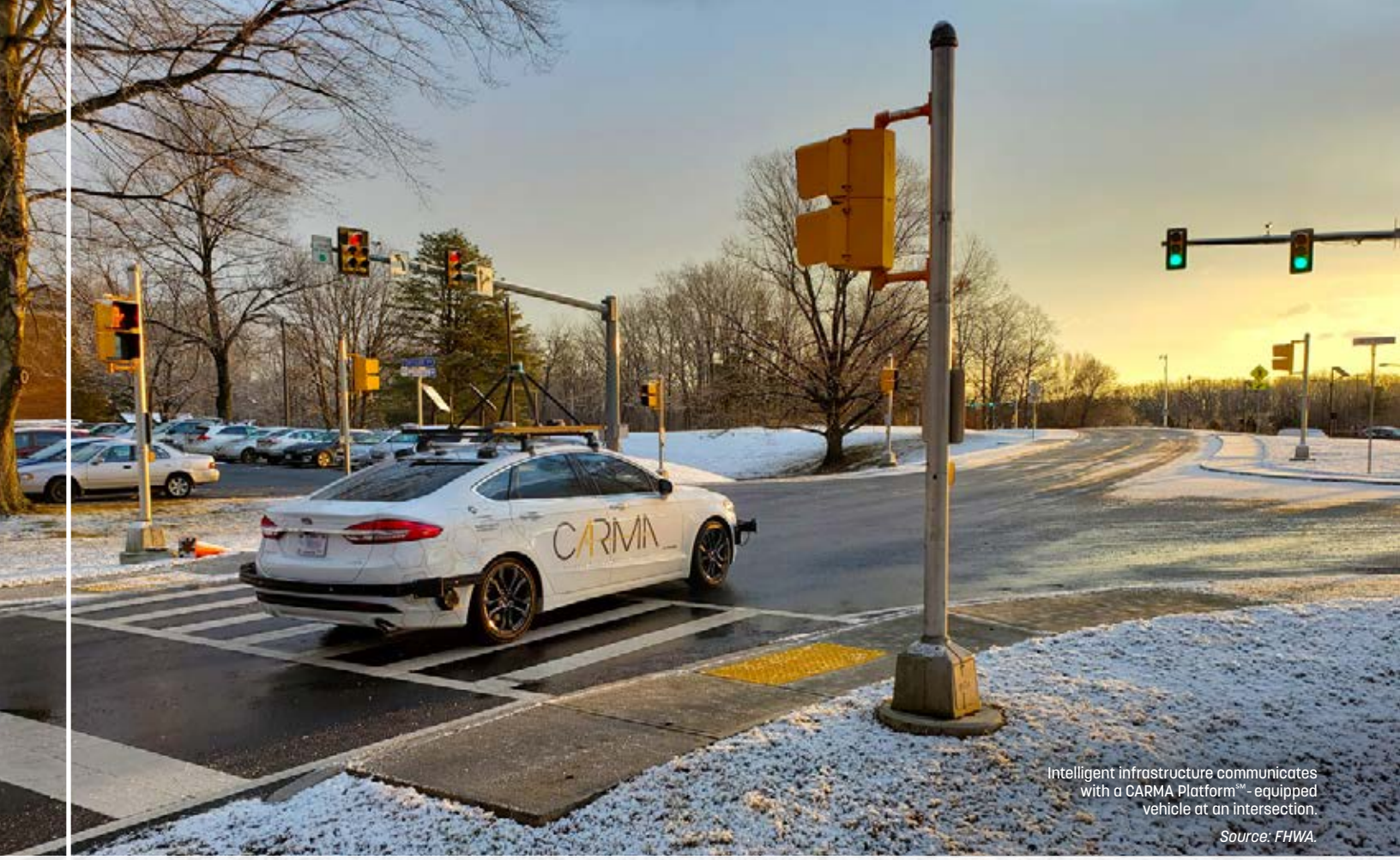
© moodboard / AdobeStock.com.

The U.S. Department of Transportation (USDOT) is addressing perceived inequities in transportation by supporting and engaging people and communities to promote safe, affordable, accessible, and multimodal access to opportunities and services while reducing transportation-related disparities and burdens in the built environment. In particular, the Office of the Secretary of Transportation (OST) formed an equity task force (EQTF) composed of noncareer modal agency leaders. The EQTF has created six teams referred to as workstreams. Each workstream has noncareer and career members from OST and additional career representatives from nearly every modal agency. The objectives of the Equity Data and Assessment workstream are as follows:

- Contribute to and review USDOT's 200-day report due to the Assistant to the President for Domestic Policy in August 2021.
- Assist in the development of an equity data and analysis tools research roadmap using USDOT's 200-day report and transportation equity data request for information detailing a long-term vision for research aimed at improving transportation equity.
- Contribute to the full implementation of Executive Order (EO) 13985, "Advancing Racial Equity and Support for Underserved Communities Through the Federal Government," through the development and use of data, tools, and assessments.
- Assist other EO 13985 workstreams with issues on data, tools, and assessment.
- Connect EO 13985 data, tools, and assessment deliverables to the agency's strategic plans and priorities.

The long-term goal is to help grant recipients make more informed decisions that fully take into account equity impacts just as we account for other social, environmental, and economic impacts when developing transportation projects.

DERRELL E. TURNER is the director of field services South and has been with FHWA for 37 years. He started his career on the Natchez Trace Parkway as a highway engineer trainee. He has held assignments in numerous Division offices, with his most recent headquarters assignment as Acting Associate Administrator for Infrastructure. He currently serves on the OST's Equity Data and Assessment workstream.



Intelligent infrastructure communicates with a CARMA Platform℠-equipped vehicle at an intersection.

Source: FHWA.

COOPERATIVE DRIVING AUTOMATION: REDUCING TRAFFIC CONGESTION

FHWA's Cooperative Driving Automation Program is leveraging the CARMA℠ Ecosystem to test technologies that promise safer and more efficient travel in the future.

by **PAVLE BUJANOVIĆ** and **STEVEN VU**

Every day, across our Nation's roadways, drivers experience traffic congestion to and from their destinations. Such congestion impedes safe and efficient travel, often resulting in longer commutes, more crashes, heightened levels of air pollution, and increased risks to mental health. Traffic congestion is an ongoing transportation challenge for transportation researchers and leaders as roadways are becoming more populated and will eventually be unable to efficiently support the increased demand.

Congestion occurs when the demand for using the roadway exceeds the capacity, resulting in slower speeds—sometimes even complete stops—in the flow of traffic. There are two types of congestion:

- *Recurring congestion* occurs when the density of vehicles on the road exceeds a certain threshold. As implied by the term "recurring," this type of congestion does not have an obvious cause, but rather, occurs periodically during peak hours of travel.
- *Nonrecurring congestion* occurs due to a certain event (e.g., vehicle crash, inclement weather, road work).

Cooperative driving automation (CDA) offers a potential solution for reducing congestion. As defined by the SAE International (SAE) J3216 standard, CDA enables communication and cooperation between vehicles equipped with driving automation features, other road users, and transportation infrastructure. CDA is poised to transform the current transportation system.

The U.S. Department of Transportation Federal Highway Administration's CDA Program is currently pursuing several research tracks to test CDA features that support transportation systems management and operations (TSMO). These research tracks leverage partnerships with Federal agencies and stakeholders to demonstrate the potential of CDA technologies to improve the transportation system.

FHWA's CDA research is enabled by the CARMA Ecosystem, a network of open-source software (OSS) products and evaluation tools. The CARMA Ecosystem is helping uncover opportunities to use CDA to improve transportation system safety and performance. The CDA Program leverages OSS research products, including CARMA Platform℠, which is installed in research vehicles to equip them with cooperative capabilities for SAE automated driving system Level 3+ functionality.

"CDA technologies have the potential to improve safety and reduce congestion by

enabling vehicles to work together more efficiently. We're excited to see the CARMA tools that the FHWA's CDA Program has developed to support CDA research, as this open-source effort benefits everyone," says Amanda Hamm, program manager of the Virginia Department of Transportation's Connected and Automated Vehicle Program.

CDA Reliability Research Track

The CDA Reliability research track, in partnership with the Intelligent Transportation Systems Joint Program Office (ITS JPO) and the Federal Motor Carrier Safety Administration (FMCSA), focuses on developing and testing CDA applications that will increase the reliability of the transportation network during nonrecurring traffic congestion scenarios, scenarios that are known, historically, to be unreliable. Under the Reliability research track, the research team recently finished testing the following use cases:

- *Road weather management (RWM):* This use case demonstrates interaction between infrastructure and CARMA Platform-equipped vehicles to manage traffic caused by inclement weather, such as a storm or ice on the road.
- *Traffic incident management (TIM):* This use case demonstrates the "Move Over" law, in which a traveling vehicle must move over to the next lane when approaching an emergency vehicle pulled over on the shoulder.
- *Work zone management (WZM):* This use case demonstrates CDA in a two-lane, two-way road, where a work zone has closed one of the lanes.

Testing for these use cases aims to emulate these real-world scenarios in a closed and controlled test track environment.

CDA Traffic Research Track

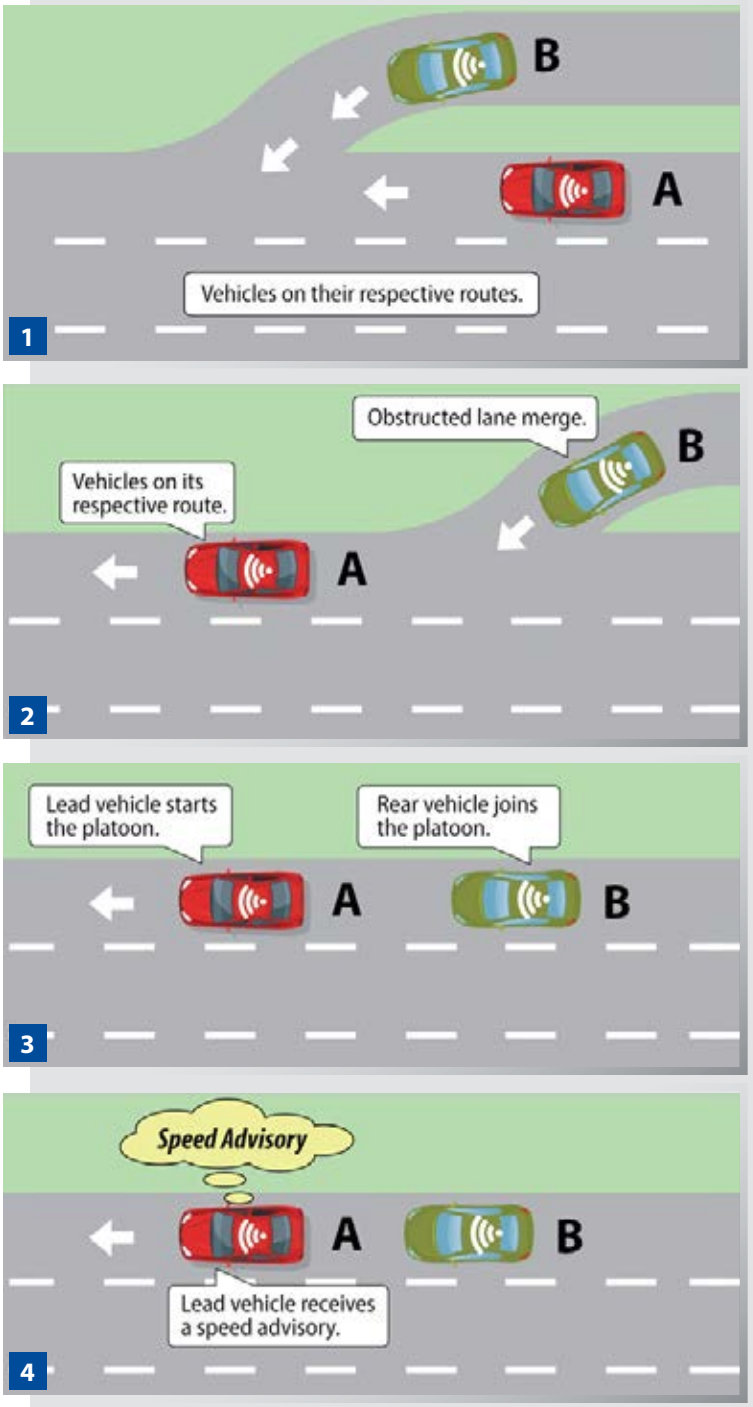
In partnership with ITS JPO, the Federal Transit Administration (FTA), and FMCSA, FHWA's CDA Traffic research track explores the application of CDA to recurring traffic congestion on freeways and arterials through several use cases, the first being the basic travel use case.

Basic Travel Use Case

This use case demonstrates how CDA can enhance traditional TSMO strategies and existing infrastructure for basic travel on freeways and arterials. The CDA features developed from this use case may improve efficiency and safety and reduce bottlenecks at merge points along a freeway. This use case is the first test of CDA technologies in which the vehicles are in complete control of lateral and longitudinal movement (i.e., no human driver controlling steering) while interacting with the surrounding infrastructure. Successful initial testing of the basic travel use case will facilitate further expansion of this use case as well as proof-of-concept testing of other CDA applications.

The concept-of-operations testing under the basic travel use case involves two CARMA Platform-equipped vehicles traveling in the same direction on a freeway. In this use case, one of the vehicles (Vehicle A) will be traveling on the freeway, while the other vehicle (Vehicle B) will be merging onto the freeway from the onramp, requiring vehicle-to-vehicle communication.

This use case demonstrates three CDA features: cooperative ramp merge, platooning, and speed advisory. To accomplish these actions, CARMA Platform-equipped vehicles must communicate with CARMA Cloud℠ (the cloud-based OSS enabling communication and cooperation between the transportation system and users) to make sure the vehicle can merge safely. Additionally, CARMA Cloud broadcasts a speed advisory that the vehicles receive through a nearby roadside unit.



1. Vehicles en route on a freeway. 2. Vehicles performing cooperative lane merge. 3. Vehicles forming a platoon. 4. Platoon responding to a speed advisory.

Source: FHWA.

Validation Testing

In September 2021, FHWA's CDA research team traveled to the American Center for Mobility in Ypsilanti, MI, to perform

CARMA Platform-equipped vehicle merges onto a freeway during validation testing.
Source: FHWA.

validation testing for the basic travel use case. The testing took place on a closed test track and involved two CARMA Platform-equipped vehicles, with the use case proceeding as follows:

Vehicle A, the lead vehicle, began its route on the test track at a speed of 25 miles per hour (mph). Vehicle B, the follow vehicle, entered from the ramp and performed an unobstructed lane merge at a speed of 25 mph. This differed slightly from the concept-of-operations testing use case, in which an obstructed lane merge was performed. During the validation testing, Vehicle B's release from the ramp was manually timed, and thus the merging process did not require any coordination between the vehicles.

After the merge was complete, the two vehicles formed a platoon and proceeded to drive as a platoon along the track. After the vehicles had been platooning for about 0.4 miles (0.6 km), Vehicle A received a speed advisory notice to be applied within a particular area. The speed advisory was broadcasted from a roadside unit connected to CARMA Cloud and instructed Vehicle A to slow its speed to 15 mph. Vehicle A subsequently communicated this speed change to Vehicle B. The vehicles decelerated together to 15 mph and continued to drive as a platoon until they reached the end of the route, at which point the platoon dissolved.

Collaboration

The CARMA OSS approach fosters and encourages collaboration between relevant stakeholders in Government, academia, consulting, and the technical industry to accelerate advancements in CDA research, development, and testing. The source code for CARMA products can be accessed on GitHub at *https://github.com/usdot-fhwa-stol*.

The CDA engagement efforts provide additional opportunities to foster this collaboration through CARMA Collaborative and CARMA Support Services. CARMA Collaborative is growing a community of users, prospective users, and other stakeholders who work toward the shared goal of advancing CDA through targeted communications and outreach activities. Deployers of CARMA tools can utilize the CARMA Support Services online help desk service to obtain troubleshooting support for their CDA research.

Looking Ahead

As one of the first tests of CDA technologies in which the vehicles were in complete control of lateral and longitudinal movement, the basic travel use case has set the framework for future research and testing of CDA applications for reducing recurring congestion. Similarly, results from RWM, TIM, and WZM use case testing have contributed to a growing body of research that aims to apply CDA to reduce nonrecurring congestion.

The introduction of CDA has the potential to transform existing and future transportation systems, improving transportation efficiency and safety. Closed track validation tests of use cases under the CDA Reliability and CDA Traffic research tracks are a step in the direction of real-world testing of CDA technologies, with the ultimate goal of technology deployment.

"The CARMA Ecosystem is setting the foundation for the future of open-source technology that advances our understanding of the role of infrastructure in supporting and enabling cooperative automation–an effort we believe strongly supports us in preparing our transportation system for the future," says Gregory Slater, former Maryland Secretary of Transportation.

PAVLE BUJANOVIĆ is a technical manager in FHWA's Office of Safety and Operations Research and Development, managing various CDA research projects. He earned a B.S. in civil engineering from Syracuse University, an M.S. in sustainable design and construction from Stanford University, and a Ph.D. in transportation engineering from the University of Texas at Austin.

STEVEN VU is a contracted communications specialist in FHWA's Saxton Transportation Operations Laboratory, contributing to marketing and outreach activities. He earned his B.A. degree from the University of Virginia.

For more information on the CDA Program, visit *https://highways.dot.gov/research/operations/CARMA*.

1. Vehicles form a platoon after the merge. 2. Lead vehicle receives speed advisory broadcasted by CARMA Cloud.
Source: FHWA.

Partnering for Resilience: The Southeast Michigan Flooding Risk Tool

Flooded roadway in Southeast Michigan.
© Jon Clark / SEMCOG.

SEMCOG and MDOT partnered to complete a study to assess flooding risk for roads, bridges, culverts, and pump stations in a seven-county region in Southeast Michigan.

by **ANDY PICKARD** and **RACHAEL BARLOCK**

The Southeast Michigan Council of Governments (SEMCOG) is home to over 4.7 million people in 93 cities like Detroit and Ann Arbor, 24 villages, and 115 townships. As flooding events continued to affect the region—and become potentially more severe and frequent—SEMCOG and the Michigan Department of Transportation (MDOT) both sought to understand where transportation assets were the most vulnerable to flooding and how to address such challenges. Their collaboration resulted in the SEMCOG Climate Resiliency and Flooding Mitigation Study, a comprehensive dataset, and an analysis tool that can be used to predict flooding risk for thousands of key infrastructure assets in the region. Information from the study will be used to guide planning and investment decisions within the transportation network of the seven-county (Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne) SEMCOG region. According to Kelly Karll, manager of the Environment and Infrastructure Department at SEMCOG, "Addressing flooding risk requires collaboration across different infrastructure sectors, including transportation and water infrastructure. This includes using a watershed approach to identify strategic, cost-effective solutions while considering impacts of changing precipitation events." A watershed approach allows for holistic stormwater management that extends beyond the bounds of the transportation network.

Resiliency—the ability to recover quickly from a damaging or catastrophic event—is a top priority in transportation plans. It is one of the 10 factors that must be addressed in the metropolitan transportation process per Title 23 of the Code of Federal Regulations (23 CFR 450.306(b)(9) and 23 CFR 450.206(a)(9): Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of

surface transportation. Several resources developed by the Federal Highway Administration also emphasize resiliency. These resources include the *Vulnerability Assessment and Adaptability Framework, 3rd Edition* (FHWA-HEP-18-020), U.S. Department of Transportation Vulnerability Assessment Scoring Tool (available at *https://www.fhwa.dot.gov/environment/sustainability/resilience/tools/scoring_tools_guide/index.cfm*), and the *2013-2015 Climate Resilience Pilot Program: Outcomes, Lessons Learned, and Recommendations* (FHWA-HEP-16-079). The Infrastructure Investment and Jobs Act (IIJA) also includes numerous references to resilience. For example, in the highway provisions section, resilience is referenced in requirements (e.g., "requires consideration of extreme weather and resilience in lifecycle cost and risk management analyses"), enhancements (e.g., "…protective features to enhance resilience"), and provisions (e.g., "climate and resilience provisions"). For information on the highway provisions portion of the IIJA, visit: *https://www.fhwa.dot.gov/bipartisan-infrastructure-law/docs/bil_overview_20211122.pdf*.

In recent years, SEMCOG has taken action to build resiliency by identifying vulnerable natural resources and infrastructure assets and planning to mitigate the impacts of climate hazards, including flooding. For example, in the *2045 Regional Transportation Plan for Southeast Michigan*, climate resiliency is called out as a key challenge in the region. In March 2018, SEMCOG also established a *Water Resource Plan for Southeast Michigan*, which highlights climate resiliency as a major topic of interest and identifies actions to build resiliency. Such actions include identifying vulnerable infrastructure assets and improving adaptive capacity of the systems; integrating resiliency priorities into local policies, plans, and projects; and evaluating opportunities to use natural resource areas for improving management of runoff from extreme precipitation events. Additionally, MDOT piloted a climate change vulnerability assessment in 2015 to identify transportation assets that may be at risk to climate hazards. In 2018, SEMCOG and MDOT received a State planning and research grant to expand the risk analysis to include flooding risk. The SEMCOG Climate Resiliency and Flooding Mitigation Study, described in this article, built upon the 2015 MDOT study and generated several new resources for transportation planners, including insight on how to:

- Leverage improved data to identify transportation assets at risk of flooding.
- Develop a repeatable flooding risk assessment tool, with the capability of expansion, to cover a larger geographic area or number of assets.
- Identify opportunities to integrate flooding risk results into existing planning and investment strategies.

Methodology

To identify flooding risk for four asset types (roads, bridges, culverts, and pump stations), researchers utilized an indicator-based (or flooding risk) methodology for the SEMCOG Climate Resiliency and Flooding Mitigation Study. This approach is similar to that used in the 2015 MDOT assessment, which was in alignment with the FHWA's *Vulnerability Assessment and Adaptation Framework*, but expanded the analysis used for the 2015 MDOT study in using data recently available on exposure and sensitivity. The exposure and sensitivity data allowed for a specific focus on the risk of flooding.

The flooding risk methodology is broken into multiple components: vulnerability, criticality, exposure, and sensitivity.

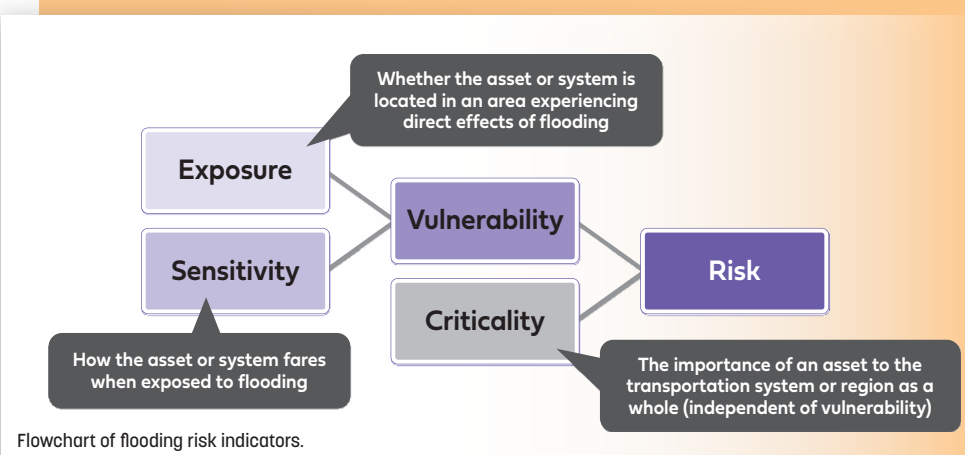
Flooded roadway from the Southeast Michigan flooding event in summer 2021.

© Jon Clark / SEMCOG.

Flooding risk is a factor of vulnerability and criticality, and vulnerability is a factor of exposure and sensitivity. Exposure indicates whether the asset is located in an area that experiences the direct effects of flooding. For example, if it rains, the rain will collect in a depressed freeway. Sensitivity refers to how the asset, the depressed freeway, fares when it is exposed to flooding. If that same depressed freeway has cleared catch basins attached to a collection system with enough capacity and pumping capability, it may not be very sensitive. Together, exposure and sensitivity create vulnerability.

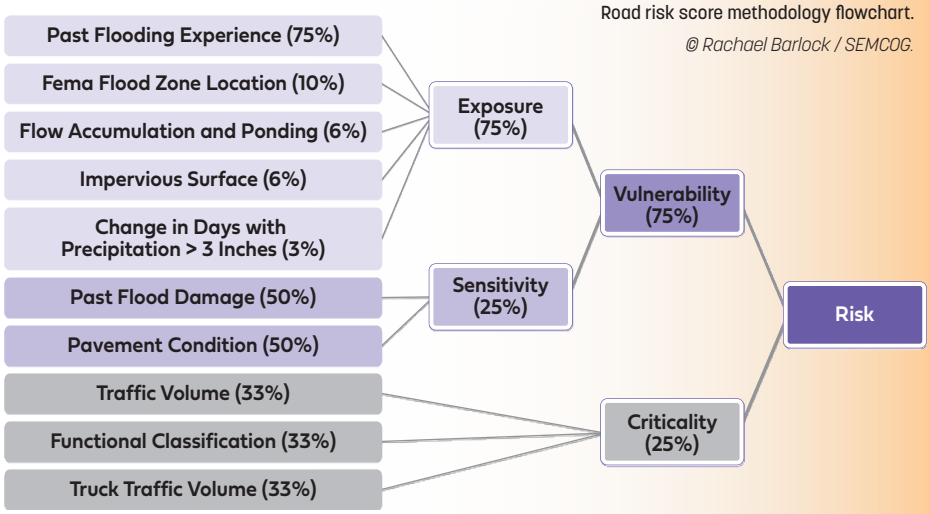
Criticality is the importance of an asset to the system or region; criticality is independent of vulnerability. For example, if a depressed freeway is a major shipping route, it would be vital to the area's local economy, and therefore deemed critical. Criticality and vulnerability create overall risk, and in the case of this study, risk correlates specifically to flooding risk.

In this study, several data sources were used to populate the indicators for the flooding risk, which included the Federal Emergency Management Agency (FEMA) Flood Map Service Center to pinpoint flood zone location, pavement condition, traffic volume, and function classification. Each indicator and scoring approach varied for each asset type. The flooding indicator weights and approaches were determined through conversations with the study's project team, MDOT,



Flowchart of flooding risk indicators.

© Rachael Barlock / SEMCOG.



Road risk score methodology flowchart.

© Rachael Barlock / SEMCOG.

Component	Roads	Bridges	Culverts	Pump Stations
Exposure	Past flooding experience			
	FEMA flood zone location			
	Flow accumulation and ponding			
	Impervious surface			
	Projected change in number of days with precipitation greater than 3 inches from baseline (1980–1999) to mid-century (2040–2059)			
Sensitivity	Past flood damage	Past flood damage	Past flood damage	Past flood damage
	Pavement Condition	Scour criticality	Condition index*	Rating
		For scour critical bridges only, the following were also included:	Age*	
		Channel condition	Inspection comments indicate "full" or "buried"	
		Fracture critical	Proportion of height filled with water	
		Single or multi-span	Stream substrate	
Criticality	Traffic volume	Traffic volume	Scored based on the criticality score of the corresponding road segment	
	Functional classification	Functional classification		
	Truck traffic volume	Truck traffic volume		
		Detour length		
		Replacement cost		

* MDOT is in the process of collecting data on culverts. Because of the current limited data available, but potential for improved future data availability, the project team developed a methodology that will be adaptable to take into account the best available data. Currently, few data exist to indicate culvert condition, but the methodology provides an option to use these data as they are collected.

Indicators used for road, bridge, culvert, and pump station assets to determine risk factors.

© Rachael Barlock / SEMCOG.

county transportation planners, and local road and stormwater professionals, as well as baseline guidance from the initial 2015 MDOT study.

It's important to note that the flooding risk scores ultimately allow SEMCOG, MDOT, and local road agencies to screen which assets are most likely to experience flooding, which can be useful in transportation and stormwater planning. However, flooding risk scores do not provide a direct prediction of flooding from a particular event, and they do not provide any input on expected duration of flooding.

Flooding Risk Tool

The results of this project included the development of the Flooding Risk Tool that calculates a flooding risk score for each road, bridge, culvert, and pump station in the seven-county SEMCOG region. The tool's calculations are repeatable, and results can be strengthened with additional data as it becomes available. The flooding risk scores produced by the tool are available via the SEMCOG Flooding Risk Tool Dashboard, an interactive online dashboard that allows interested parties to search for specific roads, bridges, or other infrastructure assets using an interactive map, review a flooding risk score and individual indicator scores, and export data as a geodatabase or spreadsheet. The dashboard is available at *https://semcog-community.maps.arcgis.com/apps/opsdashboard/index.html#/96cbdd4d71c2462ead70623966e2d1b1*. Of the assets included in the analysis, more than 6,300 were determined to be at high risk (a flooding risk score of at least 3 out of 4):

- Roads: 6,134 (of 71,599)
- Bridges: 209 (of 2,634)
- Culverts: 15 (of 3,022)
- Pump stations: 2 (of 143)

With respect to indicator scoring, the percentage weights can be changed at any time in the Flooding Risk Tool. For example, if it is determined by MDOT that pavement condition should be excluded from this scoring methodology, the tool allows for that modification. In the same way, should more data become available, the indicators can be adjusted and the tool run again.

In this study, the primary driver of high-risk scores was vulnerability, which is 75 percent of the risk score. Most of the high-risk roads, bridges, and pump stations are in Wayne County, and those scores are largely driven by criticality in the county.

SEMCOG will run the Flooding Risk Tool annually with any updated data and provide the results on the SEMCOG Flooding Risk Tool Dashboard.

Using Flooding Risk Scores to Improve Decisionmaking

Integrating the results of the Flooding Risk Tool into transportation and stormwater planning is a critical next step in this study. Resilience depends on a holistic strategy to ensure the application of the flooding risk scores. To determine the best implementation strategies, the project team facilitated working sessions with MDOT, SEMCOG, county and local representatives, and other regional stakeholders. The group identified opportunities to use the flooding risk results in transportation planning.

For instance, at MDOT, the *Transportation Asset Management Plan (TAMP)*, and Program Development Call for Projects Process can be modified to include flooding risk in various stages of the study's planning process. The TAMP identifies flooding in two threat categories: Climate change and project-level disruptions. Incorporating the flooding risk scores in the Call for Projects Process will allow for capital improvement projects to include flooding risk during the investment's decisionmaking process.

According to Steve Minton, Metro Associate Region engineer at MDOT, "Focusing on climate resiliency and flooding risk is an absolute must for MDOT when considering the impacts from major rain events and subsequent flooding that have occurred recently and will continue to occur with increased frequency. MDOT will need to look at both short-term solutions and evaluating our approach to stormwater management long term to transition to a resilient transportation network."

At SEMCOG, coordination will continue with MDOT, especially with respect to continued and improved data collection. Additionally, SEMCOG will continue to work with local partners to facilitate the implementation of the

A restricted storm drain during a 2021 heavy rain event.
© Rachael Barlock / SEMCOG.

To help collect locations of closed roads, flooded shoulders, and blocked culverts, SEMCOG developed a Geographic Information Systems-based application.

@ photogeek / AdobeStock.com.

flooding risk scores into transportation planning projects. Currently, SEMCOG is working with local agencies in their region to incorporate flooding risk scores generated by the tool into the Transportation Improvement Program.

Lessons Learned

As part of this study, some major themes emerged:

- Flooding risk information is an important component when making challenging investment decisions.
- Working sessions are an effective method for reviewing results and developing integration strategies for flooding risk information.
- Data sharing between agencies is key to evaluating flooding risk to assets.
- In an indicator-based risk assessment, complete asset data is critical for generating meaningful results.

Next Steps

The culvert data for this project was often incomplete or missing; a key step for both MDOT and SEMCOG, going forward, is to increase data collection on culverts.

Using geospatial analysis, SEMCOG has determined there are approximately 13,000 road/stream crossings in the region, but this project was only able to access data for about 3,000 culverts.

SEMCOG has also developed the Southeast Michigan Flooding App, a smartphone-based application to report or track the locations of flooding during wet weather events. The app can be found at *https://storymaps.arcgis.com/stories/6b834966ed0744c6818c0cf093986982*. During the data collection phase of this study, SEMCOG found that many municipalities did not keep a database of frequently flooded locations. To help collect locations of closed roads, flooded shoulders, and blocked culverts, SEMCOG developed a Geographic Information Systems-based application that allows the user to take a photo, record a GPS location, and indicate the severity of the flooding. The intended users of this application are professionals in the water or transportation industry, ranging from stormwater engineers and field technicians to watershed group volunteers and more. In the future, the data collected with this municipal-level flood tracking tool will become another indicator, similar to the FEMA flood maps, that can be used by the Flooding Risk Tool to more accurately calculate risk scores for local infrastructure assets.

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ITS JPO has celebrated three decades of innovative research and development initiatives that have helped increase the safety of travelers both inside and outside the vehicle, advance roadside infrastructure, and expand mobility options for Americans across the Nation.

Source: USDOT.

The Future of INTELLIGENT TRANSPORTATION SYSTEMS (ITS): Applying Lessons Learned From 30 Years of Innovation

ITS JPO celebrates transforming the way society moves.

by **EGAN SMITH**

For three decades, the U.S. Department of Transportation's Intelligent Transportation Systems (ITS) Joint Program Office (JPO) has spurred the development and use of ITS to move people and goods more safely and efficiently.

ITS JPO was established to coordinate intermodal policy in the implementation of the ITS program, originally termed the Intelligent Vehicle Highway System (IVHS) program. From its inception, the ITS JPO has pursued extraordinary challenges—starting with the 1994 signing of the National Automated Highway System Consortium (NAHSC) agreement. This agreement led to the embarkment on major research to develop what was expected to be the next significant evolutionary stage of the Nation's vehicle-highway transportation system. This research culminated with a successful demonstration of the congressionally mandated Automated Highway System (AHS). This demonstration was followed by the opportunity for elements of the Nation's transportation system to digitally connect through the dedicated radio spectrum, the Safety Band, but it required additional and substantial amounts of research.

As the prospect of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication became more imminent, ITS JPO supported the advancement of connected vehicle (CV) technology via a real-world pilot deployment program. Now, CVs are poised to positively transform streets, communities, and the manner in which people live and travel into a connected ecosystem. But before these technologies can be broadly deployed, there are several technical, institutional, and financial challenges that can only be understood and overcome by putting emerging technologies to work in real-world situations.

"As we look back at what the ITS JPO has accomplished in our 30-year history, we are also focused on how we can leverage our successes and lessons learned as we advance toward the future of transportation," says ITS JPO Director Kenneth M. Leonard. "Transportation's future revolves not only around connected and automated vehicles, which can efficiently increase safety and mobility for travelers, but also on emerging information communications technologies,

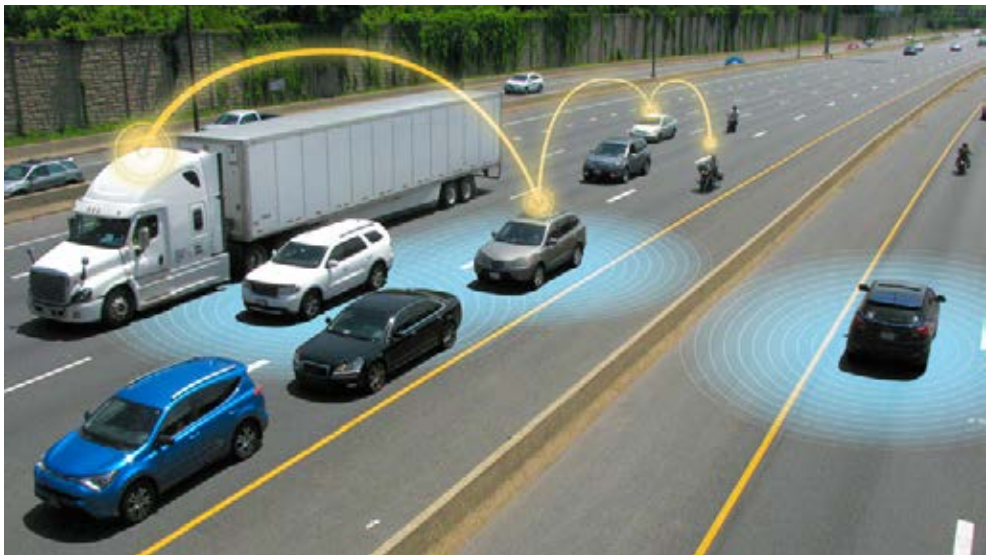
artificial intelligence, cybersecurity, and other ITS advances that will increase access to transportation for all Americans and make the transportation system more flexible, resilient, and affordable."

The Rise of ITS JPO

The early years of ITS JPO, dating back to the 1990s, were inspired by advances in computing and sensing technologies that had begun to spark keen interests based on their potential to transform surface transportation and offer new possibilities for a safer and more efficient transportation system.

To solidify the role and importance of ITS in maintaining, improving, and growing the U.S. transportation system, the Federal Government reauthorized the Federal-Aid Highway Program in 1991. This crucial step established the foundation for the Federal-aid ITS program. (Although it wasn't until 1994 that the USDOT officially sanctioned the term "ITS" as a replacement for IVHS—recognizing the multimodal nature of the activity and de-emphasizing the focus on technologies for vehicle guidance—and the IVHS program was renamed ITS JPO, clarifying the program's multimodal intent.)

In 1991, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), was signed into law, further acknowledging the importance of the development and application of advanced technologies for ITS. The Nation was then on the cusp of a transportation revolution.



A rendering of automated vehicles operating on a highway and commercial vehicle ITS infrastructure deployment.

Source: USDOT.

One of the major efforts to result from ISTEA was a congressional mandate for the development of a prototype AHS. The USDOT formed the NAHSC—comprised of the following nine public and private organizations: General Motors, Bechtel Corporation, the California Department of Transportation (Caltrans), Carnegie Mellon University, Delco Electronics, Hughes, Lockheed Martin, Parsons Brinckerhoff, and the University of California-Berkeley—to demonstrate that an automated highway could provide safer and more convenient travel. The NAHSC used communications, sensors, and obstacle-detection technologies on limited access roadways to automatically control vehicle throttle, steering, and braking. This pioneering work was showcased during a live demonstration in August 1997, referred to as Demo '97, where more than 20 fully automated vehicles operated on the I-15 in San Diego, CA, as elected officials, transportation stakeholders, the media, and the general public watched.

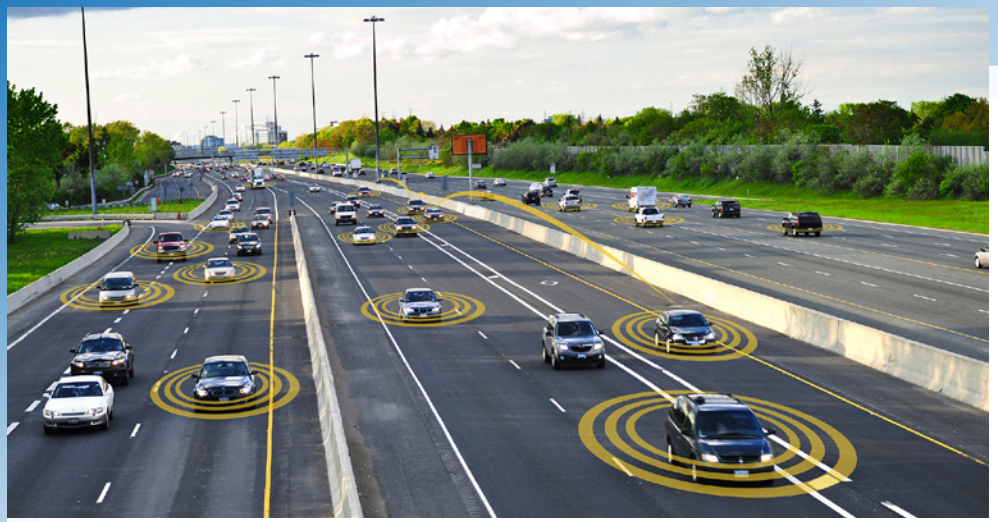
Another pivotal moment in ITS JPO's history includes the passage of the Transportation Equity Act for the 21st Century (TEA-21) in 1997. Through TEA-21, ITS JPO received funding for research, training, and standards development; the development of metropolitan and rural systems; and commercial vehicle ITS infrastructure deployment. TEA-21 helped ITS JPO transition from a moderate research program to a program steadfast in its pursuits to accelerate technology research into technology deployment.

A rendering of connected vehicle technology implemented on major roads and highways.

Source: USDOT.

Advancing Mobility and a Connected Transportation System

In 1999, the Federal Communications Commission allocated 75 MHz of radio spectrum for ITS use. The 2000s brought a rapid expansion in the use of communications technologies—the number of Americans with a smartphone skyrocketed, the number and speed of Wi-Fi networks grew, and cloud technology became more prevalent. These developments, coupled with other expanded uses and opportunities created by communications technologies, led ITS JPO and the transportation industry to become acutely interested in the tremendous potential of V2V and V2I technologies to address highway safety problems and other challenges. These developments also revealed possibilities for new transportation applications that could leverage communications technologies and connectivity to offer



ITS JPO recognized early on the potential to propel ITS forward by connecting vehicles, roads, and travelers' personal devices.

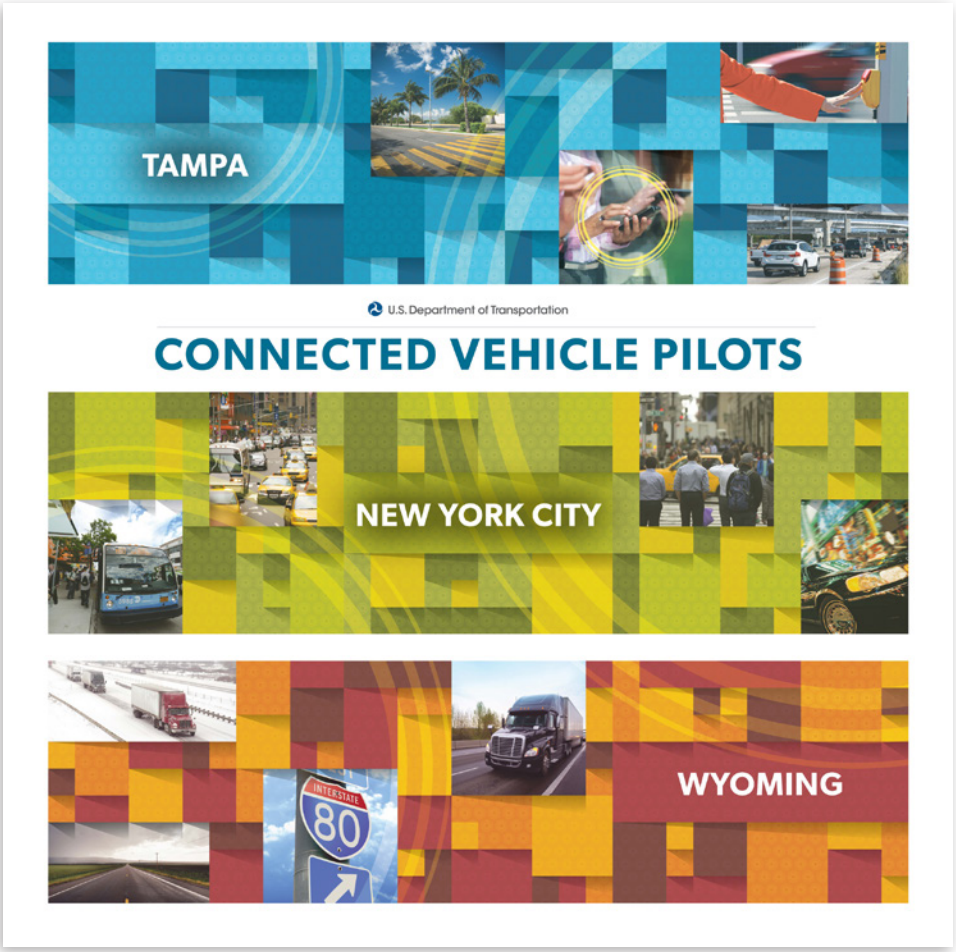
Source: USDOT.

more real-time information for travelers. For example, mobile and in-vehicle user devices for imminent crash alerts, upcoming queue warnings, and signal violations.

ITS JPO recognized the potential to propel ITS forward by connecting vehicles, roads, and travelers, and in 2012, launched the Connected Vehicle Safety Pilot. At the time, this safety pilot was the largest real-world test of CV technologies. More than 2,700 participating vehicles in Ann Arbor, MI, usedwireless safety technology to help everyday drivers avoid crashes as they traveled along their daily routes.

The success of the Connected Vehicle Safety Pilot paved the way for the more robust and nationwide Connected Vehicle Pilot Deployment program in 2015. This program awarded cooperative agreements collectively worth more than $45 million to three pilot sites in New York City, Tampa, FL (at the Tampa Hillsborough Expressway Authority), and along I-80 in Wyoming, to implement a suite of CV applications and technologies tailored to meet each region's unique transportation needs. Each site designed, built, tested, and is now operating deployments of integrated, interoperable wireless in-vehicle, mobile device, and roadside technologies.

"By uncovering and addressing barriers to deployment, documenting lessons learned, and providing a template for other early deployments, the pilots will ultimately help establish the foundation for growing a nationwide connected vehicle system," says Kate Hartman, ITS JPO chief of research, evaluation, and management.



The USDOT awarded three cooperative agreements for the regional connected vehicle pilots in New York City; Wyoming; and Tampa, FL.

Source: USDOT.

The Way Forward: Putting People First

In June 2021, the ITS JPO published the report, *Putting People First: Smart Cities and Communities*. Smart cities and communities (SC&Cs) use advanced information and communications technologies to find better ways to address age-old problems like potholes and pollution, traffic and parking, public health and safety, and equity and public engagement. Most importantly, successful SC&Cs put people first. For communities that are embracing SC&C solutions as a means to engage people to accomplish collective goals, that future is fast arriving.

The Nation has ambitious goals for climate, equity, and economic growth that hinge on the U.S. transportation network, and it has been local communities leading the charge to address these goals. By embracing bold policies and innovative solutions that leverage rapidly advancing technologies, communities are not only solving local problems like traffic and parking, but also creating a model for more inclusive, connected, and sustainable communities of the future. USDOT stands ready to support local governments as they learn from early pilots and begin moving toward integrated, sustainable systems—starting with listening, learning, and sharing what works, what doesn't, and what's next.

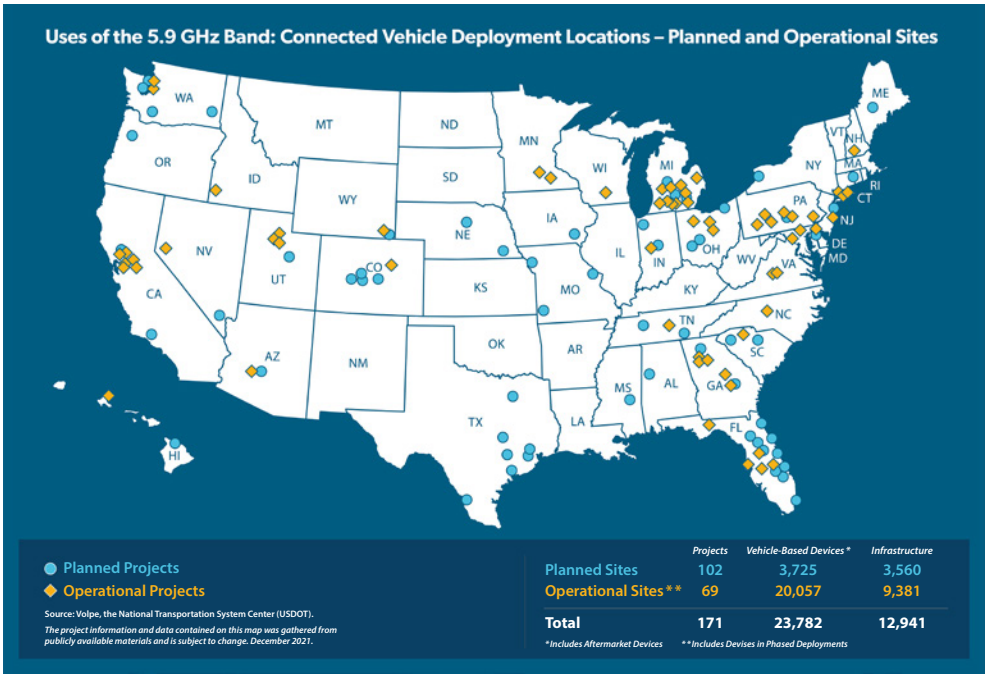
ITS JPO continues to lead with pilots focused on putting people first. For example, the Complete Trip – ITS4US Deployment Program kicked off in early 2021, and awarded over $38 million to five projects to advance transportation equity by solving mobility challenges for underserved communities that often face greater

challenges in accessing essential services. The program aims to provide more efficient, affordable, and accessible transportation options for individuals with disabilities, older adults, low-income individuals, rural residents, veterans, and travelers with limited English proficiency.

ITS JPO is also continuing to explore advanced communications technologies to support transportation connectivity, thereby enabling cooperative ITS and connected and automated transportation. This includes exploratory research into the viability of next-generation communications technologies, such as cellular vehicle-to-everything and 5G communications. In addition, the ITS JPO is exploring the use of artificial intelligence (AI) to support and augment the actions of traffic management center operators, transit and freight operators, and travelers to ensure safer, more efficient, and equitable travel. "AI holds significant promise to improve the safety, mobility, efficiency, equity, accessibility, and environmental impacts of our transportation network," says ITS JPO's Chief of Policy, Architecture, and Knowledge Transfer Dr. Jonathan Walker, P.E.

Paving the Path Forward

As ITS JPO looks toward the future, it remains committed to ensuring the safety of roads, highways, and communities for all travelers. According to Leonard, "Doing so requires we leverage our most innovative ideas and technologies as well as advanced management approaches to developing, deploying, and integrating complex systems of systems. This is not about continuing the status quo. Our Nation's transportation system must evolve and advance to continue to serve as a pipeline to our communities, our livelihood, and our productivity. It must become smarter, more connected, more integrated, and more accessible to fit the diverging needs of all people, communities, and society as a whole."



Connected vehicle technology is being deployed or planned to be deployed in over 170 sites across the United States.

Source: USDOT.

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For more information, see *https://www.its.dot.gov/history/index.html*. To learn more about the ITS JPO, visit *www.its.dot.gov*, *https://www.its.dot.gov/stratplan2020/index.htm*, or contact Egan Smith at (202) 366-9224 or *Egan.Smith@dot.gov*.

USDOT stands ready to support governments as they move toward integrated, sustainable transportation systems.

Source: USDOT.

DOING the RIGHT THING:

Building a Road and Preserving a Community—

The Newtown Pike Extension Project

Unique community involvement, interim housing, and a community land trust successfully ensure environmental justice and equity for a roadway construction project in Lexington, KY.

Rental housing along DeRoode Street looking north to the West High Street viaduct in 2014. Rental housing includes two fourplexes, two duplexes, and two single-family homes that were funded in part by the Low-Income Housing Tax Credit program.

© Pam Clay-Young.

by **PAM CLAY-YOUNG**, **JULIANA MCDONALD**, **SHANE TUCKER**, **DAVID WHITWORTH**, and **BERNADETTE DUPONT**

Across the United States, roadway projects have often devastated disadvantaged neighborhoods, which makes the story of the Newtown Pike Extension Project (NPEP) in Lexington, KY, unique. As early as 1931 road and park construction were suggested as catalysts to improve housing in an area that included a historical low-income neighborhood, Davis Bottom (DB). Road construction designs from the 1950s and 1970s were proposed that would have paved over DB. After those efforts failed, a 1997 revival of the NPEP and a subsequent 2007 agreement ensured a just outcome for the DB neighborhood. As a member of the NPEP team put it, "This is a story of conflict and resolution between a government highway project and a disenfranchised, diverse, low-income historic neighborhood that does not end in tragedy or frustration."

DB was built around 1865. In 1880, the U.S. Census officially recognized DB, recording the early diversity of the neighborhood where the population was 69 percent Black and 31 percent white. In 1931, the city of Lexington's Comprehensive Plan first suggested that building streets, parks, and schools in neighborhoods, including DB, might improve dilapidated housing. In 1958, a road project was proposed to extend two interstates into downtown, slating the DB neighborhood for destruction. This proposal was abandoned. The community was threatened again in 1971 when an extension of Newtown Pike was planned that would displace 140 DB families. Because construction of Rupp Arena, a sporting venue, had recently demolished an adjoining neighborhood, residents got strong support from the larger Lexington community. Although a city task force recommended that the cost of replacement housing be included as part of the road project, the entire effort was canceled. As a result, mistrust of any roadway plan became ingrained in the DB community.

By 1997, as urban growth and traffic congestion in Lexington became pressing concerns, city and State representatives along with transportation professionals revived the NPEP. In 2000, the project became a part of the Kentucky Transportation Cabinet's (KYTC) Six-Year Highway Plan.

At the right is rental and ownership housing in Davis Park created by the NPEP and the Lexington Community Land Trust to replace previous homes in DB, a neighborhood dating back to 1865.

Early environmental analysis revealed a variety of potential negative impacts of the NPEP. Unlike previous attempts, transportation professionals at the time had new laws (The National Environmental Policy Act (NEPA) of 1969, Title VI of the Civil Rights Act of 1964, Executive Order (EO) 12898 of 1994, and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the Uniform Act)) and innovative methods to protect vulnerable communities. NEPA requires Federal agencies to integrate environmental considerations into their decision-making processes. EO 12898 ensures that minority and low-income populations do not experience disproportionately high and adverse human health or environmental effects from Federal programs, policies, and activities. The EO also ensures that environmental justice analysis is included in a NEPA review process. Title VI of the Civil Rights Act of 1964 requires that any entity receiving Federal funds or financial assistance does not discriminate on the basis of race, color, or national origin in any program or activity. The Uniform Act provides payments to aid people who move because of Federal or Federally assisted projects. The Federal Highway Administration (FHWA) is the lead agency for implementing the provisions of the Uniform Act and has issued regulations in 49 CFR part 24. This project also integrated anthropology with engineering to engage and build trust with the local community.

From the beginning, the NPEP team faced numerous challenges, including protecting DB from high-end development, preserving its cohesion and history, gaining trust of local residents, addressing environmental contaminants, and providing affordable replacement housing. The project team anticipated the entire project corridor would be economically impacted by the proposed NPEP due to market-rate influence on land values. The residents of DB would be least able to cope with any increases in land values. The pressure of market-rate infiltration would intensify because many residents were renters. Landlords would seize the opportunity to raise rents or turn to more lucrative commercial land uses, with either option forcing out current renters. Homeowners would likely be forced out due to increases in property taxes. Without some form of protection, land use in the neighborhood would continue its progression towards either high-end residential or commercial and light industrial development, consistent with the zoning in place during the time of the NEPA analysis. Unless industrial zoning was removed in this neighborhood, it was unlikely that would it be rezoned as a residential neighborhood. The team's concern was that as the neighborhood became more commercially developed, it was less likely that existing residents, both homeowners and renters, would be able to continue to live there or that new affordable housing would be constructed in the area. Without some sort of mitigation plan, the project's cumulative effect would be the loss of an entire community.

The Record of Decision (ROD), approved by FHWA, KYTC, and the Lexington Fayette Urban County

A panoramic view of the park and surrounding area in DB reveals the various land uses in the neighborhood. There were several auto shops along DeRoode Street mixed in with residential housing. There was a dumpster truck rental business and the Nathaniel Methodist Mission which housed medical, dental, eye, and veterinary clinics. The bottom of the photo shows the concrete storm drain culvert. Obscured from view because of a tree line was a large metal recycling business.

Above: The phasing map for Newtown Pike Extension mitigation area in 2013. Phase I included moving residents into interim housing while replacement housing was constructed. Phase II involved the transfer of the remainder of the mitigation area to the LCLT and was completed in 2020. Phase III extends Oliver Lewis Way from South Broadway to South Limestone and has not been built. Phase IV extended Newtown Pike (Oliver Lewis Way) to Versailles Road and was completed in 2010.

Left: Phase I residences. The tops of the interim onsite housing can be seen in the upper portion of the photo. A white overlay displays where replacement housing will be built along the new DeRoode Street.

Davis Bottom 1865–2006

From its roots as a postbellum neighborhood, DB developed into a vibrant, tight-knit, and diverse community with a strong sense of independence and self-sufficiency. DB, located west of downtown Lexington, was named after Willard Davis, a white antislavery attorney who established the area between 1865–1867 with Rudolph DeRoode, a white music teacher. (See the phasing map.) DB received the "bottom" moniker because the area was considered "bottomland," flood-prone land in the lowest part of Lexington. Davis and DeRoode built homes there to sell to Black families that made weekly rent payments in lease-to-own arrangements. By 1900, according to Heather M. Dollins' 2011 study *East End and Davis Bottom: a Study of The Demographic And Landscape Changes Of Two Neighborhoods in Lexington, Kentucky,* the U.S. Census listed 941 persons in 215 households in DB, with 62 percent Black and 38 percent white.

Government (LFUCG) in 2007, cemented the NPEP plan to extend the Newtown Pike in a just and equitable fashion. After a long history beginning in the 1950s of flawed and unsuccessful planning, this agreement—along with extensive community member involvement—promised to build a road and rebuild the DB neighborhood. The roadway project planned to improve downtown traffic conditions, the downtown pedestrian and bicycling environment, access to the University of Kentucky (UK), and the quality of life in surrounding neighborhoods, all without placing an undue burden on a minority low income neighborhood. To protect the DB neighborhood, the project team decided to purchase 25 acres of DB as the NPEP mitigation area and place the land in a community land trust (CLT) that would rebuild and protect the affordable housing and other neighborhood amenities for the benefit of current and future residents. Acquisition of properties in the mitigation area began immediately after the ROD was signed.

The NPEP has greatly benefited from the personnel who have overseen the project. The project team, a diverse group of transportation professionals, city planners, historians, social workers, and anthropologists, has held a steadfast commitment to the project's equity and environmental justice principles. These principles included providing residents impacted by NPEP with a voice in the project's mitigation approach, affordable housing, and respectful and fair treatment. Their work helped ensure that the NPEP has provided a cleaner environment, new infrastructure, and channels for community dialogue while protecting local residents and the integrity of DB. This commitment endures into the present. Shane Tucker, appointed in 2018 as the fourth NPEP Project Manager, understands that the project's end goal is not just opening a road, it is a commitment to the residents of DB, to ensure that a long-neglected community has a meaningful voice in the development project.

Nathaniel Methodist Mission was a cornerstone of the neighborhood, providing free after-school care, medical, eye, dental, and veterinary care to those who could not afford it. In addition to religious services, it also provided a food bank and art classes.

Rare 1940 Works Progress Administration (WPA) photograph of DeRoode Street in Davis Bottom from West High Street viaduct. DeRoode Street, at the forefront of the photo, was paved by the WPA.

During the 1930s, DB saw a number of developments. White families from Eastern Kentucky began to migrate to DB and needed affordable housing. The Works Progress Administration paved DeRoode Street and constructed a major storm sewer parallel to it. Three social and cultural anchors were also established: the Nathaniel Methodist Mission (founded in 1934 on DeRoode Street), the George Washington Carver Elementary School (built adjacent to DB in 1936), and a small community green space (informally known as "The Park" until it was adopted by the city of Lexington as Southend Park in 1980). In the late 1940s, this space became a focal point of everyday life in DB including children's activities, family reunions, and church revivals. Local and traveling baseball teams, "just like the Cincinnati Reds" as one elder recalled, played games on the green space's baseball diamond.

In the following decades, DB faced numerous challenges. From the 1950s onward, the construction of tobacco warehouses and other businesses in this area gradually destroyed housing, negatively impacting the social fabric of the neighborhood. The threats of destruction from roadway projects in 1958 and 1971 took its toll. In 1980, the Lexington Leader (now known as the Lexington Herald-Leader) newspaper dubbed DB as the "Valley of Neglect" in a series about conditions there and an adjacent neighborhood, Irishtown. The article described a high percentage of absentee landlords who neglected housing upkeep due to plans to extend Newtown Pike. Many houses in DB had no plumbing or heating. Residents endured mosquito and rodent infestations. DB also had public health and environmental hazards, such as a storm sewer that regularly flooded and an unregulated scrapyard. As a result, residents, property owners, and government officials remained uncertain about the neighborhood's future.

DeRoode Street photographed from the West High Street viaduct in March 1979. The Nathaniel Methodist Mission can be seen at the end of the street. This photo was originally published as part of the "Valley of Neglect" series by the Lexington Leader (later known as the Lexington Herald-Leader) in 1980. Beginning in 2008, existing homes were demolished, and the NPEP began building new homes.

Posted by the Lexington Herald-Leader on October 1, 2017. https://kyphotoarchive.com/2017/10/01/irishtown-davis-bottom-1979-2017/

In 1997, the NPEP resurfaced as a transportation priority. Given the history of this neighborhood, KYTC leadership knew any plan to extend Newtown Pike was inextricably linked to preserving DB. This time there was no doubt the road would be built. The NPEP project team formed in the late 1990s to begin the planning process. In 2001, a project consultant developed a corridor plan that aimed to redevelop DB as a residential neighborhood and remove the industrial zoning. The plan also made a commitment that the project's adverse effects would be mitigated "to the highest degree." In 2003, the same consultant planned out the new neighborhood (called the Southend Park Urban Village Plan), creating new development design standards that added sidewalks, streetlights, elements of streetscape, and bus stops. A new park and community center were central to the plans. Initial onsite interim housing for current DB residents would protect community cohesion while a newly created CLT would build replacement housing for the displaced residents in a redesigned and rezoned neighborhood. In addition to the mitigation of the neighborhood itself, the project would build a noise wall, a new storm culvert, and remove hazardous waste. The final NPEP plan, as agreed upon in the ROD, divided the project into 4 phases.

As the NPEP plans became public, DB faced threats from real estate speculators that could harm the community's social fabric. As a result, when 12 occupied rental houses owned by an estate became available, the NPEP project team negotiated with the estate administrator to hold the properties until right-of-way funds were authorized to acquire them. This agreement prevented the displacement of current renters, stabilizing the DB neighborhood. These renters could remain until interim housing was provided during Phase I of the NPEP. Other property was needed earlier to prepare the interim housing site. Without interim housing, construction could not begin on replacement housing that would be offered to the displaced DB residents. David Whitworth, Engineering and Operations Team Leader in the Kentucky Division of the FHWA, approved these early acquisitions, so the project could move forward into Phase I.

Despite the project team's initial plans and actions, DB residents remained defensive and skeptical towards the NPEP. By the time project planning gained momentum around 2006, DB had an estimated population of 56 people—mostly older, 70 percent white and 30 percent Black, living in 30 households. Residents were distrustful of the local government, remembering Lexington's history of passing them over for improvement projects. In surveys, they expressed a desire to remain in the neighborhood but feared that the NPEP planning process would exclude them and ignore the impact the roadway project would have on their quality of life. The project team recognized they needed to win the trust of the local community and develop a better relationship with its residents for the project to succeed.

DeRoode Street in DB photographed from the West High Street viaduct looking south. The University of Kentucky's Patterson Tower can be seen in the background. Nathaniel Methodist Mission can be seen at the end of the street.

Carver Center on Patterson Street, formerly the George Washington Carver Elementary School.

© 2004 Juliana McDonald.

Project posters announcing Community Unity Day celebrations could be seen in the DB community every August when these events were held jointly with a community distribution of school supplies. The school supply distribution was typically sponsored by Kentucky Utilities and the YMCA. The remaining activities were sponsored by the NPEP.

© 2013 KYTC.

Community Engagement Efforts

In mid-2002, a community liaison was hired and set up in an office in the Carver Center, formerly the George Washington Carver Elementary School, to facilitate communication with the DB residents. In her role, the liaison shared project news and information, led personal finance and home ownership classes, and held regular resident meetings with the NPEP team. In these meetings, residents were able to share project-related concerns and questions. She gave residents cameras to photograph what they loved about their neighborhood, further informing the project team about the residents and what features should be retained in their new neighborhood. Starting in June 2003, the community liaison and the NPEP team organized annual Community Unity Days, which included engagement activities, such as a historic tour of the neighborhood conducted by noted local African American historian Dr. Yvonne Giles and NPEP team-led development field tours. Project team members and their families along with residents and their families attended. These activities facilitated relationship building, allowing a relaxed environment for residents and NPEP team members to discuss the project and get to know each other better.

Historical Preservation and Public Outreach

In compliance with Section 106 of the National Historic Preservation Act, archaeological excavations in 2003–2004 revealed remains of structures and features from the late 1800s–1900s and an archival history further supported the historical significance of DB. Based on this information, the Kentucky Archaeological Survey (KAS) created innovative public outreach and educational resources for the project with a permanent website (*https://www.kentuckyarchaeologicalsurvey.org/davis-bottom/*), including a digital media archive, excerpts from oral histories, photo collections, and historical resources. In addition, the KAS and Kentucky Heritage Council created an award-winning documentary titled "Davis Bottom: Rare History, Valuable Lives." The documentary was subsequently shown at the Lexington Public Library and a historic downtown movie theater, The Kentucky. DVD copies of the documentary were provided to neighborhood residents and made available online. The documentary included interviews with current DB residents whose lives were being upended by the NPEP, allowing them to feel heard and express pride in their neighborhood.

Stones from one of the DB's oldest houses, handbuilt by a resident, will be exhibited to honor DB elders.

© 2014 Juliana McDonald.

Resident involvement in the documentary eventually translated into more acceptance of the project.

Other plans exist for future DB historical preservation efforts. Four historic markers will be placed to document key sites and events in DB history. Stones from one of the oldest houses, hand built by a resident, will be exhibited in the new community center to honor DB elders.

The Community Land Trust

Sustainable affordable housing was the cornerstone of mitigating the impact of the NPEP. Unfortunately, due to lack of knowledge and expertise on the topic, the decision to choose which affordable-housing model proved to be the most difficult for members of the NPEP team, leading to discord. In the end, the project team employed a decision matrix to objectively evaluate possible affordable housing models, allowing members to visually see and identify the best solution. This process led to the adoption of the CLT model.

A CLT supports affordable housing and residents in many ways. A CLT removes land from the market and places it in a trust for the community, protecting public investment by keeping homes affordable for future buyers without additional public subsidy. This model thus ultimately benefits the wider community. With a focus on homeownership, families that live in CLT homes can build generational wealth.

New rental housing in Davis Park included two fourplexes.

© 2014 Pam Clay-Young.

New rental housing in Davis Park included two duplexes with a farm-house design made with clap-board style fiber cement siding with small porch entries on each side of the building.

© 2004 Juliana McDonald.

Homeowners enter a 99-year renewable lease giving them exclusive occupancy of the residential lot. The ground lease includes conditions and restrictions on financing, use, improvement, and resale of the house. Upon the resale of a CLT home, the seller receives all the equity derived from paying down the mortgage and any improvements that add to the home's value. However, the equity based on the increase in market value (shared equity) a homeowner receives is restricted, limiting the price that a subsequent home buyer will pay thus keeping it affordable for future owners. A CLT supports homeowners, protecting against maintenance deferral and foreclosure. CLT homes are affordable because of the reduced purchase price. The rate of taxation is based on limitations in sales price imposed by the resale formula, not on the fair market value (FMV) of the home, making property taxes more fair and more affordable. The CLT also owns and leases permanently affordable rental units. Finally, CLTs encourage community member involvement in land use planning. (See Pamela Clay-Young and Steven Douglas Kreis' 2020 report *Social Justice Mitigation in Transportation Projects* at *https://uknowledge.uky.edu /ktc_researchreports/1688/*.)

In mid-2003, a CLT consultant joined the NPEP and educated the team members about CLTs. He also facilitated public meetings to explain the model, bringing in residents from other CLTs to answer questions. The consultant led a steering committee composed of residents, members of the larger community who supported affordable housing, and project team members, which drafted bylaws for the soon to be formed Lexington Community Land Trust (LCLT).

The NPEP team then took a number of steps to establish the LCLT organizationally and financially. The project team provided legal documents to incorporate

DECISION MATRIX

	MUSTS								WANTS						
OPTIONS	Protects Housing Affordability Long term	Protects public financial investment long term	Involves community members in land ownership and land use planning	Holds and can transfer ownership of property	Protects neighborhood integrity	Can involve non-profits in housing development	Can provide rental units	Is self-sustaining	Has capacity to provide maintenance equipment	Has capacity to provide financial training	Has capacity to provide social support	Has capacity to provide economic support	**RISKS**		**TOTAL**
Value									**3**	**10**	**8**	**5**	Probability	Seriousness	**198**
CLT	✓	✓	✓	✓	✓	✓	✓	✓	6 **2**	100 **10**	56 **7**	20 **4**	M	M	**182**
Deed Restrictions	--	--	--	--	✓	✓	--	--	3 **1**	10 **1**	8 **1**	5 **1**	H	H	**26**
Community Development Corporation	--	✓	✓	✓	✓	✓	✓	--	3 **1**	100 **10**	24 **3**	15 **3**	L	H	**142**

The decision matrix used by the NPEP team to decide on the affordable housing model. Options considered were tested against services the team thought the model must provide. It also allowed a weighted consideration of the ability of the model to provide additional services. (Scale of 1–10, 1 being less important, 10 being most important). The probability and seriousness of failure of the model was also factored in.

© Pam Clay-Young.

the LCLT as a nonprofit in November 2008 and assisted when the LCLT filed for the appropriate tax status. The project team committed funds for a community center with office space for the LCLT and provided seed money allowing it to operate until it becomes self-sustaining. The project team also allowed the LCLT to receive any funds derived from the sale of property acquired by the NPEP but no longer needed for the roadway after construction was completed. Later, the team utilized mitigation funds to address the issue of the cost to build the homeownership units being greater than their FMV, allowing affordable housing dollars to focus on reducing the selling price to income-qualified buyers.

Through the LCLT, the NPEP team implemented a number of measures to maintain replacement housing for current DB residents in the future neighborhood. The project team promised that any DB resident could remain in or return to the future neighborhood if they so desired. In accordance with the Uniform Act, those eligible for relocation benefits (rent and mortgage payments for new housing) would remain at previous levels. Renters who wanted to become homeowners would have the opportunity to do so. The NPEP team used mitigation funds (funds related to mitigating environmental impacts as documented in the environmental ROD) to extend rent subsidies to 10 years for those remaining in the neighborhood to provide long-term protection to renters. In addition to purchasing the DB 25 acres, the project paid to have the titles to the rental units vested in the LCLT in 15 years. Had the project not done so, ownership would vest in the developer when their tax credit funding term expires, and units would be sold or rented at market rates. Relocated homeowners were given a resale formula allowing them to capture a percentage of the equity (based on the increase in the FMV) equal to the ratio of their initial investment in the property. The seller will also receive an additional 5 percent of the down payment ratio to guarantee fairness. Otherwise, moving into conventionally funded housing would have been the better financial choice. In the future, the cost of this incentive payment will be offset by an LCLT-controlled fund that will reduce the resale price of those units at the time they are resold. The offset ensures the resale price of the house being sold will continue to be affordable to the next income-qualified buyer.

The NPEP team tailored the LCLT specifically to address the economic diversity of DB residents. In one instance, the LCLT partnered with Habitat for Humanity for one long-term renter who was able to save money and had relocation benefits, per the Uniform Act, yet could not afford a mortgage payment. The assistance of the Habitat Program and its volunteers, including the NPEP team members, brought the cost of the home down to the point that it was affordable for this resident without the need for a mortgage.

From the beginning, the LCLT was controversial with DB residents. Homeowners, or those who planned to become homeowners, did not like that they would not own the land. For Black residents, the LCLT plan reminded them of the long history of racial discrimination in land ownership. For Appalachian residents, the plan reminded them of land lost at the hands of extraction industries. The ongoing conflict between the project team and residents over the LCLT led Phil Logsdon, the KYTC environmental coordinator and a previous NPEP Project Manager, to suggest hiring an anthropologist.

The first home purchased by a DB resident was built in partnership with Habitat for Humanity.

Developing Trust and Improving Community Involvement Using Anthropology

An anthropologist from the University of Kentucky (UK) conducted a social needs assessment and made recommendations about needs and perspectives of residents in a final report completed in 2006. The report included social characteristics, detailed information from community observations, mapping of existing activities and use of space, and informal social network analysis to understand the social fabric of life in DB.

The anthropologist's research found that residents had a steadfast attachment to history, place, and community in DB. Residents referred to themselves as "family" and "insiders" while nonresidents were "outsiders." Residents insisted the neighborhood was "integrated before we knew what integration was," as one said. DB had extensive social networks made up of families, kin, friends, and neighbors over generations. Although considered a low-income area, not everyone had the same economic circumstances. Many residents had good full-time jobs. A few residents suffered with chronic health problems, and the majority were elderly. The neighborhood operated as an informal economic system over generations. Residents bought, sold, bartered, or simply shared scarce resources, including food. Residents were protective of each other. "We take care of our own," one resident said. This information helped the team understand the neighborhood in a way that was previously not articulated, creating a deeper connection between the team and the residents.

While the report was informative and useful, the data collection process transformed the project. The anthropologist employed a rapid qualitative method where project team members were trained to collect information in tape-recorded interviews. Working in pairs, team members visited homes of residents who were willing to participate, allowing them to freely express how they felt and what they

knew about the NPEP. Recordings were reviewed and themes were identified to investigate in successive rounds of interviews. This cost-effective method generated a great deal of useful information. These two-way conversations caused a significant shift in the project and radically changed how residents and team members engaged with each other. The team gained a deeper understanding of how residents were experiencing the NPEP and how the impacts were affecting them.

The project team instituted new practices based on the report's recommendations, including increased, clearer, and more targeted two-way communication, particularly as it related to the LCLT and the future neighborhood. As a result, architects developed a method for including the community in decisions on the architectural style of homes and townhouses (e.g., porches were added to the designs). Neighbors had input into the redesign of a cul-de-sac and later selected street names for the reconstructed neighborhood. They also decided to name their new neighborhood Davis Park.

Opposition to the LCLT slowly lessened as better communication improved understanding of the model, particularly the financial details the project promised current residents. Though some residents did choose to use their Uniform Act relocation benefits to leave DB, other residents attended national CLT conferences, preparing to take on leadership roles. At the time of the LCLT's incorporation, a tripartite board of directors was established with one-third composed of residents. With project assistance, the LCLT sponsored the 2015 National CLT Conference, which included a neighborhood dinner and tour that highlighted the residents and new homes constructed in Davis Park. This conference gave residents professional opportunities to further learn and teach others about CLTs.

The NPEP engaged additional local expertise to support their work. A UK professor of psychiatry surveyed community resources in DB and made recommendations for social program development and social service delivery. These findings and recommendations were included in the social needs assessment report. As a result, the project team referred residents to job training programs and funded social workers who provided intervention and counseling services as well as prepared residents for their move into replacement housing. Local attorneys also provided free legal clinics for personal needs, such as wills, and later made pro bono legal representation available to DB residents eligible for relocation benefits under the Uniform Act during acquisition and relocation negotiations.

Sixteen manufactured homes were placed in Southend Park as interim housing. Residents moved into interim housing in 2008. Each home came with all appliances, including a washer and dryer. Residents were not required to pay rent or necessary utilities as they prepared for their move into replacement housing.

© 2008 Juliana McDonald.

Interim Housing

Interim housing served as a crucial part of maintaining DB's community cohesion during Phase I. The project team feared that if DB residents relocated elsewhere, they would never return. Interim housing provided necessary affordable alternative housing for residents during Phase I construction and kept the neighborhood together while the original homes were demolished, and replacement housing was built.

In 2008, 16 new manufactured homes were moved into DB to serve as interim housing. Residents were told it would be for 2 years, free of rent or utility costs, and mitigation funds provided moving assistance. Most renters were grateful to move from neglected housing. Homeowners were not as happy as the reality of moving from

The NPEP mitigation area under construction. The noise wall can be seen on the right. The difference in elevation due to added fill can be seen in the center of the photograph.

© Lexington-Fayette Urban County Government.

New rental units under construction during Phase I of the NPEP.

© Lexington-Fayette Urban County Government.

Oliver Lewis Way (part of the NPEP corridor) at the far left photographed from the West High Street viaduct. Oliver Lewis Way connects Newtown Pike to South Broadway. The UK's Patterson Tower can be seen in the background. On the right, rental units and individually owned homes in Davis Park can be seen. This housing was created by the NPEP and the LCLT to replace previous homes in DB (a neighborhood dating back to 1865).

their long-term home became imminent. Everyone had a conflicted sense of loss and uncertainty about the future combined with a sense of cautious optimism.

Interim housing and the roadway project caused issues for DB residents, requiring the NPEP team to innovate. For example, during the construction of Phase I, safety concerns prevented residents from traveling on foot to surrounding neighborhoods to which they previously had easy access. The project team, following a brainstorming session, authorized funds for purchase of prepaid cab fares to and from affected neighborhoods.

The inevitable complications typical of a large roadway project that the NPEP encountered prolonged the interim housing period. Hazardous-material mitigation meant removing 11,665 cubic feet of dirt. Plans also called for raising the elevation of the 25-acre mitigation area an average of 5–10 feet to mitigate soil contamination and prevent flooding. The storm water culvert was relocated underground, a task made more difficult by the discovery of porous limestone. Federal Housing and Urban Development (HUD) regulations required a noise wall between the rail yard and neighborhood. Local leadership pressured the project to put connecting utility lines underground along the Newtown Pike extension and Main Street. All these efforts took much more time than was anticipated.

A legal challenge to property acquisition required the then NPEP Project Manager, Stuart Goodpaster, to shift focus away from the project for a time. Hosting the 2010 World Equestrian Games shifted the NPEP priority to Phase IV to connect Newtown Pike to Versailles Road, diverting attention away from the environmental justice mitigation in DB. What was intended to be 2 years in interim housing for DB residents stretched into 6 years. These delays caused understandable anger and frustration among DB residents. Some changed their minds and decided to leave. The NPEP team continued to hold regular meetings with residents, giving them the space to vent their frustrations. In 2014, despite all obstacles, the LCLT's replacement rental units finally became occupied, and the following year the first homeowners started moving into replacement homes.

Status of the NPEP Environmental Justice Mitigation Today

The NPEP mitigation efforts are still ongoing. Residents are now in the process of planning the details of the new neighborhood park, community building, and commercial property. In December 2020, the LCLT, KYTC, and LFUCG entered into an agreement outlining their respective responsibilities necessary to complete all environmental justice obligations, with a final completion date slated for June 2023.

Lessons Learned and Tools to Use

During the NPEP planning and project mitigation process, the project team did several things that helped in its ultimate success:

- Created a statement of guiding principles and commitments. This statement articulated the conscience of the project, expressing its core values and concrete goals, which served the project team well, especially in difficult times. Whenever the team disagreed about complicated mitigation decisions, these guiding principles were reviewed, so the team could consider all options that reflected the project's core values.
- Established an independent advisory committee comprised of civic and government leaders who provided helpful advice and assistance whenever the project struggled in getting an objective accomplished.
- Formed an interdisciplinary team early on during the project, including outside professionals (e.g., anthropologists, city planners, social workers, affordable housing consultants, etc.)

There are certain lessons from NPEP applicable to future highway construction efforts when it comes to working with the local community:

- Emphasize effective communication with the community when making decisions.
- Be aware of the time and focus necessary to complete the project and address the needs of the neighborhood.
- Look at the community's history during the NEPA analysis to gain a deeper understanding of the residents.
- Thoroughly document all mitigation promises made to the community and keep that information easily accessible in case of staff turnover.
- Let residents voice concerns and vent. Listen to them; they will have good ideas.
- Employ decision matrices to arrive at objective and well thought out decisions.
- Practice environmental justice in doing environmental mitigation by developing meaningful collaboration with the local community. There is a difference in being invited to the table, being given an opportunity to be heard, and being given the power to make decisions.

FHWA produced two videos (a short

and longer version) titled "The Road that Rebuilt a Neighborhood" that give additional insight into lessons learned from the NPEP. These videos describe how Federal, State, and local agencies can collaborate to create "effective transportation planning, project development, and design [that] can preserve and enhance the quality of life."

Ultimately, the NPEP has been about doing the right thing for the residents it impacted. As James Ballinger, the first NPEP Project Manager and current KYTC State highway engineer, put it, "The NPEP was initially conceived as a transportation project; however, it rightfully transitioned into a successful community project because environmental justice was embraced by the project team." More importantly, as Kenneth Demus, a third-generation Davis Park resident and vice president of the LCLT board of directors, says, "It was hard, but it was worth it."

Kenneth Demus photographed at his new home on DeRoode Street. Kenneth is the third of five generations of the Demus family to have lived in DB, now known as Davis Park. Demus became a homeowner and serves as vice president of the LCLT board of directors. He also serves as an ambassador for Grounded Solutions, a national network of CLT organizations, traveling around the country educating people about CLTs.

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For more information go to:

http://ktc.uky.edu/npe-main/
https://www.fhwa.dot.gov/livability/resources/newtown_pike/index.cfm
https://highways.dot.gov/public-roads/winter-2018/advancing-environmental-justice
https://www.youtube.com/watch?v=zGAbX_rFR5Y

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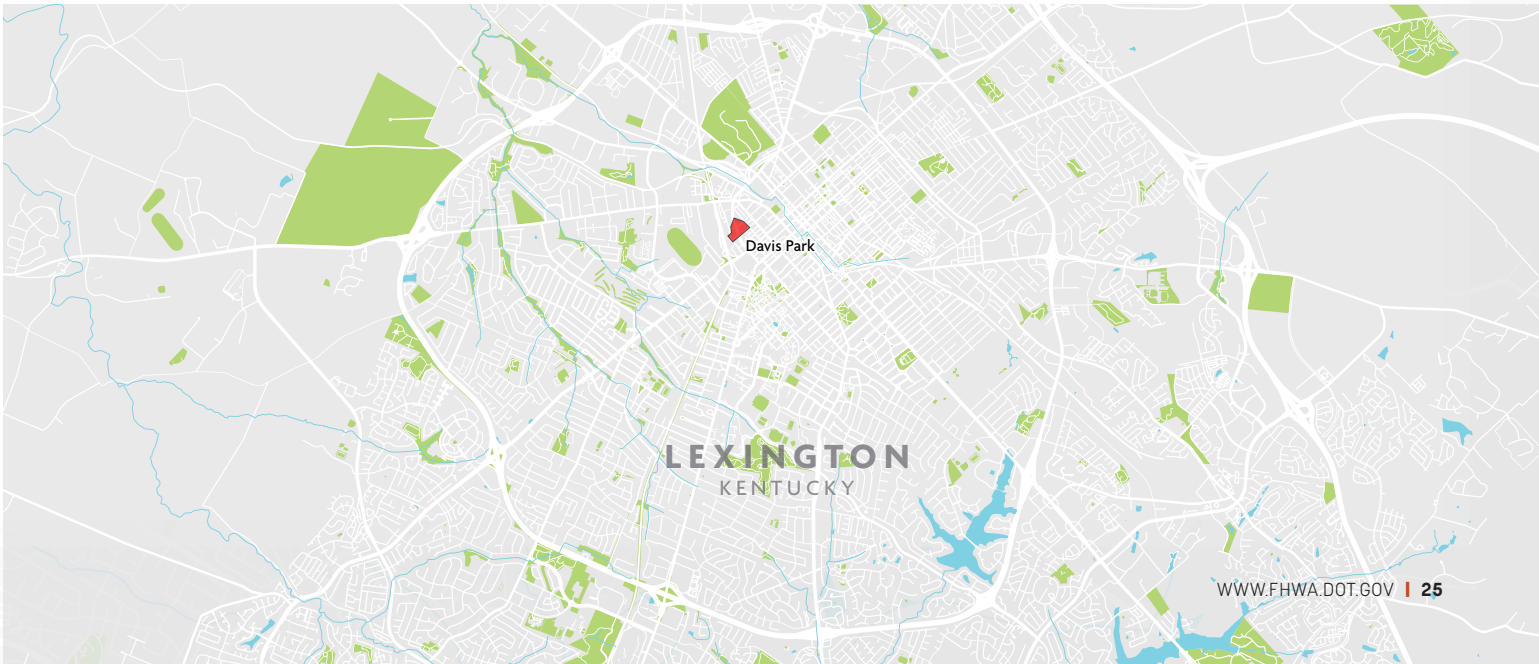

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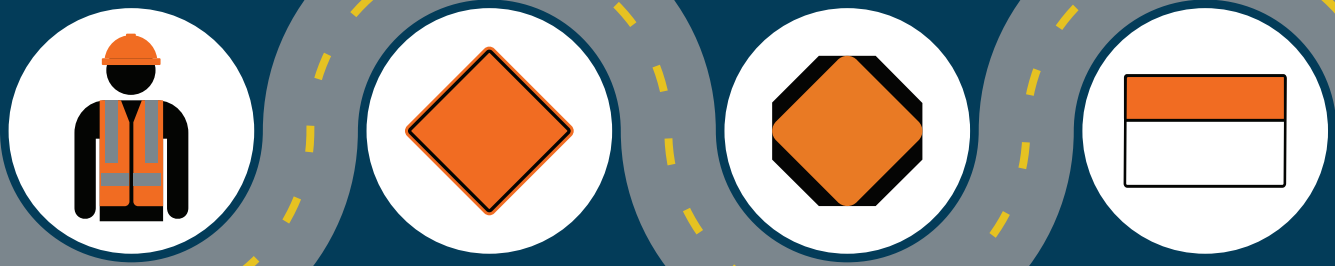
Questions? Contact us at ***PublicRoads@dot.gov.***

NATIONAL WORK ZONE AWARENESS WEEK
APRIL 11-15, 2022

WORK ZONES ARE A SIGN TO SLOW DOWN



We follow signs every day–where to enter, exit, and stop, and how fast to drive. Signs are crucial for guidance and safety, but especially those in work zones. Work zones are a necessary part of maintaining the Nation's roads and bridges. Reducing speed protects not only the public from crashes and fatalities but also the workers who spend their days on the road.

When you see a work zone, think safety first and follow these tips:

- **Slow down and follow posted speed limits**
- **Watch for workers and equipment**
- **Keep your eyes on the road**
- **Plan your trip in advance**

For more information and resources, visit FHWA's Work Zone Management website at **www.fhwa.dot.gov/workzones** and the National Work Zone Safety Information Clearinghouse at **https://www.workzonesafety.org/meetings-and-events/wz-awareness-week/**

Widening of the I-65 corridor near State Route 25 to near State Route 109 will improve traffic safety and reduce congestion in Tennessee.

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Along the Road is the place to look for information about current and upcoming activities, developments, trends, and items of general interest to the highway community. This information comes from U.S. Department of Transportation sources unless otherwise indicated. Your suggestions and input are welcome. Let's meet along the road.

Public Information and Information Exchange

TDOT Awards Most Expensive Highway Project in Its History

The Tennessee Department of Transportation (TDOT) awarded the Interstate 65 widening project—the expansion of 9.68 miles (15.87 kilometers) of major roadway—to a local contractor for $160 million. Though $160 million was the lowest bid for this project, it narrowly exceeds the $152 million awarded for Tennessee's 2018 Interstate 440 Reconstruction Project, making it the largest contract awarded for a TDOT project to date.

The I-65 widening project, due for completion in 2025, will improve safety and traffic operations and will provide the growing communities along the corridor the room needed to reduce congestion. I-65 enters Tennessee from Alabama, near the city of Ardmore, TN, and runs just south of Franklin, KY, and serves the State's largest city, Nashville.

Between Nashville and the Kentucky state line, the existing route is virtually two lanes in each direction. The widening project will encompass the construction of additional travel lanes in both directions as well as the replacement and widening of bridges, the replacement of overpasses, the construction of nearly 17 retaining walls, the conversion of a weigh station into truck parking, and the installation of Intelligent Transportation Systems facilities to improve safety, productivity, and mobility.

For more information, visit *https://www.tn.gov/tdot/news/2021/9/2/tdot-awards-largest-project-in-its-history.html*.

Wisconsin DOT adds Rustic Roads to Its Pool of GIS Road Systems

The Rustic Road system in Wisconsin is a group of scenic roads that are bordered by natural, picturesque features—native vegetation and wildlife, and rugged terrain—and are typically meant for slower, more relaxed travel.

The Rustic Road system in Wisconsin showcases an abundance of natural, picturesque features.

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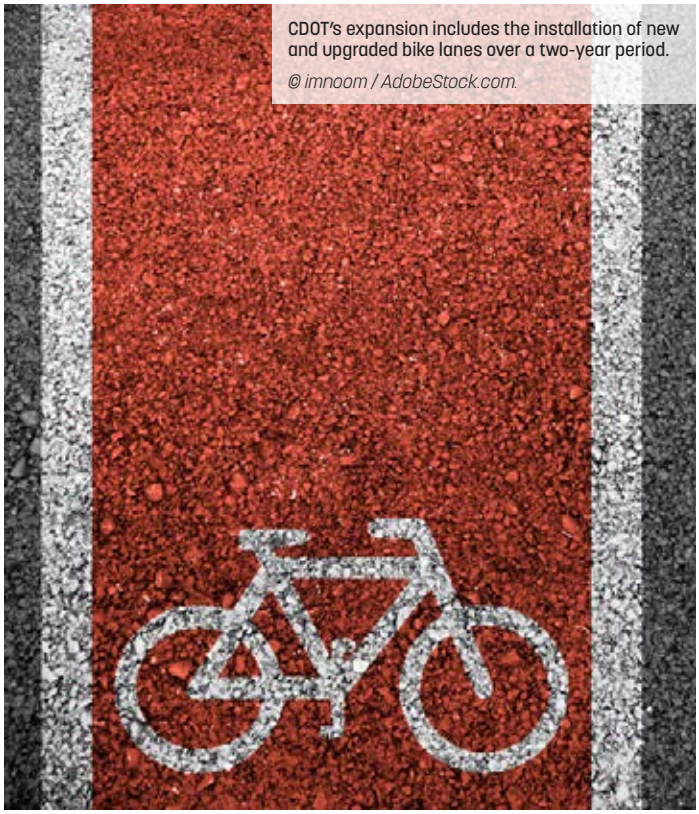
The Wisconsin Department of Transportation (WisDOT) announced that the 123 designated Rustic Roads in Wisconsin—spanning 743 miles (1,196 kilometers) collectively—are now a part of the State's collection of geographical information system (GIS) maps (*https://wisdot.maps.arcgis.com/home/index.html*). The Wisconsin Rustic Roads category is just one of the many types of interactive maps offered by WisDOT to make information more accessible to the public and to aid in a variety of decisions, from where to take a scenic route to where to establish a business. Other GIS map categories include Adopt-A-Highway, Culvert Inventory, Disadvantaged Businesses, WisDOT Traffic Counts TCMap, and Asphalt Pricing. Users can easily search and download GIS data in various formats to meet their needs.

WisDOT also provides geospatial data (for use with GIS software and tools) free of charge through WisDOT GIS Open Data (*https://data-wisdot.opendata.arcgis.com/*). This self-service website provides access to authoritative GIS data commonly requested by staff, agency partners, and the public.

Screenshot of the Wisconsin Rustic Roads GIS map.
© Wisconsin Department of Transportation (WisDOT).

CDOT Preps for a Record 100 Mile Bike Lane Expansion

In September 2021, the Chicago Department of Transportation (CDOT) announced its plans to embark upon the biggest bike lane expansion project in its history—the installation of 100 miles (161 kilometers) of new and upgraded bike lanes over a two-year period. This addition will boost the city's total available on-street bikeways to 400 miles (644 kilometers).



CDOT's expansion includes the installation of new and upgraded bike lanes over a two-year period.
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The announcement, alongside the release of the actual blueprints, underscored CDOT's emphasis on safety, accessibility, community-led planning, and connected neighborhood networks. CDOT consulted with community stakeholders on expanding bike infrastructure and will utilize protected bike lanes for physical protection from passing traffic, among other approaches. To help connect people with meaningful destinations, the city's Divvy bike-share system is increasing its fleet of bikes by expanding its service area to the newly installed lanes and adding 3,500 electric assist bikes to its fleet, on top of the 3,500 e-bikes deployed in 2020.

For more information, visit *https://www.chicago.gov/city/en/depts/cdot/provdrs/bike/news/2021/september/cdot-announces-biggest-bike-lane-expansion-in-city-s-history-thr.html*.

The Broadband Infrastructure Deployment final rule encourages the installation of broadband technology during road construction and utility projects.

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Technical News

FHWA Publishes "Dig Once" Final Rule to Promote Broadband Access

The Federal Highway Administration published the Broadband Infrastructure Deployment final rule that supports the "dig once" approach with the installation of broadband technology during road construction and utility projects. This rule promotes the minimization of costs and traveling disruptions for the public and requires State departments of transportation to identify broadband utility coordinators and processes by which to register broadband entities.

Broadband technology provides high-speed internet, and faster internet speeds equate to a stronger internet connection and ability to access information.

With improved access, underserved communities can secure opportunities to learn and work remotely. Other probable benefits include increased access to healthcare and mental health resources, additional means of income and financial stability, increased access to higher education, improved mental health and overall well-being, increased social and emotional connections, and access to other essential services and communications. Digging once also works toward advancing a safer highway system; as crews lay the fiber optic cables to extend broadband capabilities, they too can lay the wirework needed to enable communication between automated vehicles.

For more information, visit *https://highways.dot.gov/newsroom/fhwa-publishes-final-rule-promote-broadband-access-underserved-communities*.

Policy and Legislations

Pennsylvania Offers New License Option for Visually Impaired Drivers

Effective September 2021, visually impaired residents of Pennsylvania can begin using bioptic telescope lenses to meet the visual acuity standards required to obtain a Bioptic Telescope learner's permit and driver's license.

Bioptic telescope lenses contain miniature telescopes, and aid in a driver's ability to hone in on objects while driving, including traffic lights, stop signs, and other road signage. Telescopic lenses are not consistently looked through while driving; they support safe driving practices similar to a vehicle's rear-view and side mirrors.

The use of bioptic telescope lenses while driving is legal in 46 other U.S. States. For Pennsylvania, the Pennsylvania Department of Transportation (PennDOT) developed a training program and licensing process which includes the completion of a minimum of 20 hours of behind-the-wheel driver training using the bioptic telescope with a PennDOT approved driving instructor or rehabilitation specialist.

Additional prerequisites and conditions are required to be met before and after a permit or license is issued. For instance, bioptic telescope drivers may only drive during daylight hours (with a few exceptions), are limited to roads other than freeways, and may only drive passenger vehicles of a certain weight.

For more information, visit *https://www.dmv.pa.gov/Driver-Services/Driver-Licensing/Pages/Driving-with-Bioptics.aspx*.

The pollution standard is the first in the country to consider the role of transportation planning to reduce GHG emissions.

© Colorado Department of Transportation / Flickr.

Colorado DOT Advances Its Plans for GHG Reduction

In December 2021, the Colorado Transportation Commission voted to approve the Colorado Department of Transportation's (CDOT) greenhouse gas (GHG) planning standard, a transportation strategy that seeks to reduce GHG emissions and smog and to improve air quality. CDOT expects to notice GHG reductions by 2030 that are equivalent to burning 169 million fewer gallons of gasoline or the absence of 300,000 cars from the road for a year.

According to the standard, CDOT and Colorado's five metropolitan planning organizations will look to determine the total pollution and GHG emissions expected from each future transportation project during the early stages of development. This standard, according to CDOT, is the first in the country to consider the role of transportation planning in the reduction of GHG emissions.

This planning standard also paves the way for transportation strategies to routinely integrate air quality and quality of life initiatives into projects, to positively impact the environment of surrounding communities, and to provide travelers with a variety of transportation options (e.g., sidewalks/walking paths, bike lanes, and connectivity to transit facilities).

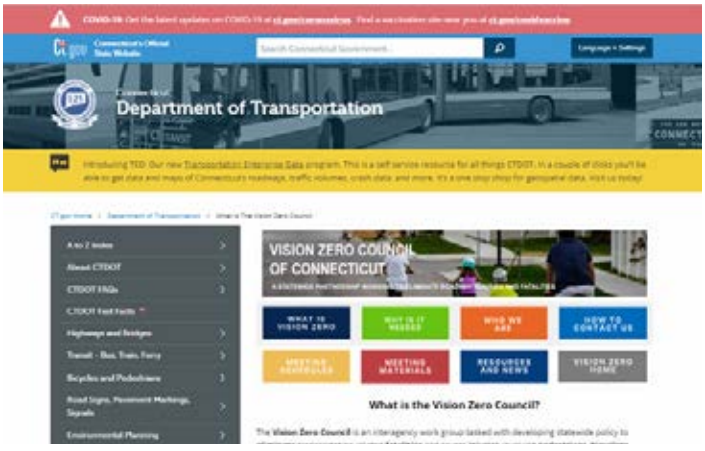
For more information, visit *https://www.codot.gov/programs/environmental/greenhousegas*.

Internet Watch

CTDOT Launches New Vision Zero Council Website for Safety and Public Engagement

In December 2021, the Connecticut Department of Transportation (CTDOT) launched a new website to serve several important purposes: Host the work of the Vision Zero Council; provide a wide variety of traffic safety information; and encourage the public's participation in eliminating roadway injuries and fatalities.

The Vision Zero Council was established by the Connecticut General Assembly in 2021 and is an interagency work group comprised of commissioners (or their designees) from Connecticut's departments of Public Health, Emergency Services and Public Protection, Motor Vehicles, Education, Aging and Disability Services, Office of Early Childhood as well as CTDOT and the Division of Criminal Justice. This group is tasked with developing statewide policy to eliminate transportation-related fatalities and severe injuries involving pedestrians, bicyclists, transit users, motorists, and passengers. The Vision Zero website was launched to keep the Vision Zero Council members, safety stakeholders, and the public abreast of Connecticut's Vision Zero activities.



The Vision Zero Council of Connecticut webpage launched in 2021 to encourage public participation and to serve as a communication portal.

© Connecticut Department of Transportation (CTDOT).

The Vision Zero Council website also encourages public engagement in that it provides access to council meeting materials (e.g., meeting minutes, recordings, and presentations); opportunities to participate in Vision Zero activities and initiatives; means to communicate with the Vision Zero Council; and opportunities to serve on subcommittees concerning engineering, enforcement, education, emergency management services, and equity.

For more information, visit *https://portal.ct.gov/DOT/VisionZeroCouncil/WhatIsTheVisionZeroCouncil*.

Internet Watch - Update

Additional information on the article "Internet Watch - Complete Streets Website" in the Winter 2022 issue is available at *https://highways.dot.gov/complete-streets*. Contact Anthony Boutros at *anthony.boutros@dot.gov* for more information about this initiative.

Utility managers review transportation project efforts.
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Learn How to Mitigate Challenges and Conflict in Utility Coordination

Source: FHWA.

by **JULIE JOHNSTON** and **SABRINA SYLVESTER**

Many public and private utility organizations participate in utility construction projects. Many of these projects involve the accommodation or relocation of utilities. Scheduling and budgeting conflicts are common challenges with utility construction.

To avoid the pitfalls in utility construction projects, learn the best techniques to coordinate utility activities—virtually—from the comfort of your own home or office.

The Federal Highway Administration's (FHWA's) National Highway Institute (NHI) now offers two utility coordination courses that provide paths and strategies on mitigating and avoiding common project challenges.

Course participants will be able to explain the importance of early and effective cooperation, communication, and coordination with regard to utility-related activities. Participants will also learn how to identify successful techniques to avoid these challenges throughout the project development and delivery process, and how to explain the impacts of conflicts or issues later identified on a project's schedule or budget.

Updated Prerequisite Course

The *Introduction to Utility Coordination for Highway Projects* (FHWA-NHI-134006A) is Web-based training where course participants will learn about regulatory utility requirements, subsurface utility engineering, and their State's Utility Accommodation Policy.

At the end of the course, participants will know how to predict utility-related complications and mitigate their impact at the right time. This knowledge and action will reduce unforeseen disruptions to the timeline and budget of the project.

Virtual Utility Course

The *Utility Coordination for Highway Projects* (FHWA-NHI-134006V) course continues teaching how to mitigate utility challenges. This virtual instructor-led training teaches people how to identify utility risks and issues and then evaluate ways to avoid or mitigate them. Course participants will also learn how to explain the skills necessary to identify utility conflicts.

This course teaches participants how to develop a personal resource toolkit for six major areas of project development, including: planning, design, environmental considerations, right-of-way, construction, and maintenance. The course requires completion of the prerequisite training (FHWA-NHI-134006A).

If you are a U.S. Department of Transportation contractor, risk manager, right-of-way staff member, mid-to-senior level manager, or engineering consultant involved in the accommodation or relocation of utilities, then these courses are designed for you.

How to Attend or Host a Course

NHI invites professionals interested in earning continuing education units or professional development hours to visit *http://bit.ly/NHIHome* and browse the complete digital course catalog. The catalog lists more than 400 courses in 19 program areas.

To sign up for email alerts and to see when a particular course session is available, visit the description page for that course and then click on "Sign Up for Session Alerts" link.

Interested hosts can submit a Host Request Form or find more information about hosting NHI courses by visiting *http://bit.ly/NHIHome*.

NHI is an approved Accredited Provider by the International Association for Continuing Education and Training (IACET). As an IACET Accredited Provider, NHI offers continuing education units for its programs that qualify under the American National Standards Institute/IACET Standard.

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