Moving to a Complete Streets Design Model: A Report to Congress on Opportunities and Challenges

March 2022

U.S. Department of Transportation

Federal Highway Administration

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Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ABA	Architectural Barriers Act
ACEC	American Council of Engineering Companies
ADA	Americans with Disabilities Act
ASLA	American Society of Landscape Architects
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality Improvement Program
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HSIP	Highway Safety Improvement Program
ITE	Institute of Transportation Engineers
LOS	Level of Service
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century
MIRE-FDE	Model Inventory of Roadway Elements - Fundamental Data Element
MPO	Metropolitan Planning Organization
MUTCD	Manual on Uniform Traffic Control Devices for Streets and Highways
NACTO	National Association of City Transportation Officials
NEPA	National Environmental Policy Act
NHS	National Highway System
NHTSA	National Highway Traffic Safety Administration
PBIC	Pedestrian and Bicycle Information Center
PMT	Person Miles Traveled
RSA	Road Safety Audit
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SHSP	Strategic Highway Safety Plan
SOV	Single Occupant Vehicle
SRTS	Safe Routes to School
STBG	Surface Transportation Block Grant Program
STIP	Statewide Transportation Improvement Program
TA	Transportation Alternatives Set-Aside (of STBG)
TIP	Transportation Improvement Program
U.S.C.	United States Code
USDOJ	United States Department of Justice
DOT	United States Department of Transportation
VMT	Vehicle Miles Traveled

I. Introduction

The House Report accompanying the Departments of Transportation, and Housing and Urban Development, and Related Agencies Appropriations Bill, 2021, encouraged the United States Department of Transportation (DOT) to adopt a Complete Streets design model, and to evaluate its current activities related to that goal. Specifically, the Congressional direction states:

> *The Committee is concerned about recent increases in cyclist and pedestrian fatalities and encourages the adoption of a complete streets design model in which roads and streets are designed and operated to enable safe access for all users, including but not limited to pedestrians, bicyclists, motorists, and transit riders across a broad spectrum of ages and abilities. To lay the groundwork for the adoption of a complete streets design model, the Committee directs FHWA to review its current policies, rules, and procedures to determine their impact on safety for road users, particularly those outside automobiles, and to report their findings to the House and Senate Committees on Appropriations within one year after enactment of this Act. Subsequently, the Committee directs the Department to disseminate best practices for complete streets to State and local highway partners.*[1]

The FHWA shares the Committee's concern about recent increases in roadway fatalities, including those among cyclists and pedestrians, and the Department recently launched the National Roadway Safety Strategy (NRSS) to address these issues. We agree that the adoption of a Complete Streets design model can help make streets safer for all users, and this is one of the strategies outlined in the NRSS. This report provides an overview of current highway safety trends, and then provides a summary of FHWA activities that support improved agency and practitioner understanding and routine implementation of projects that prioritize the safety of all users.

In March 2021, FHWA established a Complete Streets initiative that seeks to work with State, Tribal and local transportation agencies across the United States to implement a Complete Streets design model as they plan, develop, and operate streets and networks that prioritize safety, comfort, and connectivity to destinations for everyone who uses the street network. The FHWA's Complete Streets initiative works to ensure that the agency plays a leadership role in the process of providing an equitable and safe transportation network for travelers of all ages and abilities, including those from underserved communities that have faced historic disinvestment. The FHWA's Complete Streets efforts focus not just on policy but on outcomes, including increasing the proportion of Federal-aid funded transportation projects that are routinely planned, designed, built, and operated as Complete Streets that are safe and accessible for all users.

This report both responds to the 2021 appropriations report language and reflects the work of the FHWA Complete Streets team. The Report identifies recent FHWA rules, guidance, and

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[1] United States Congress. "House Report 116-452 - Departments of Transportation, and Housing and Urban Development, and Related Agencies Appropriations Bill of 2021." July 2020.

resources that affect safety and access for the users of all surface transportation modes, as well as ongoing opportunities and challenges as FHWA moves ahead with its effort to implement a Complete Streets design model.

The report findings are based on an extensive review of Federal rules, policies, and guidance, primarily produced by DOT but including those issued by other relevant federal agencies as well as a few standards and guidance documents produced by professional organizations. They are also informed by feedback from interviews with State, regional, and local stakeholders as well as with professional organizations and FHWA subject matter experts. This Report has identified five overarching areas of opportunity for FHWA as it moves ahead in its Complete Streets efforts:

A. **Improve data collection and analysis** to advance safety for all users.
B. **Support rigorous safety assessment** during project development and design to help prioritize safety outcomes across all project types.
C. **Accelerate adoption of standards and guidance** that promote safety and accessibility for all users and support innovation in design.
D. **Reinforce the primacy of safety for all users** in the interpretation of design standards, guidelines, and project review processes.
E. **Make Complete Streets FHWA's default approach** for funding and designing non-access-controlled roadways.

Guided by these identified opportunities, FHWA and its local, Tribal and State transportation stakeholders will work together to positively impact the safety of all roadway users, using the Complete Streets design model as a powerful tool to help reverse the trend of increasing fatalities and serious injuries and creating a healthier, greener, and more equitable roadway system.

What Does Complete Streets Mean?

A Complete Street is safe, and feels safe, for everyone using the street. The Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL), Section 11206, defines Complete Streets standards or policies as those which "ensure the safe and adequate accommodation of all users of the transportation system, including pedestrians, bicyclists, public transportation users, children, older individuals, individuals with disabilities, motorists, and freight vehicles."[2] This section of the BIL requires that States and MPOs use 2.5 percent of their planning and research funds for Complete Streets activities that will increase safe and accessible transportation options. According to the National Complete Streets Coalition, in the last 20 years, hundreds of jurisdictions across the United States have adopted Complete Streets policies directing their transportation agencies to routinely plan, design, build, and operate safe street networks for everyone,[3] including two-thirds of the States, and many of those jurisdictions have gone on to create Complete Streets design models which transform their

[2] Pub.L. 117–58. *See* U.S. Congress. "H.R.3684 - Infrastructure Investment and Jobs Act." Accessed November 2021.
[3] Smart Growth America. "Complete Streets policies nationwide." Accessed October 2021.

project-development processes to prioritize safety. Many jurisdictions are accomplishing the goal of routinely providing for the safety of all users through initiatives such as Safe Streets or Context-Sensitive Solutions; the name is less important than the intent of elevating safety.

Building Complete Streets encompasses planning, designing, constructing, maintaining, and operating roadways and public rights-of-way with all users in mind to make the transportation network safer. In principle, Complete Streets are multimodal and provide safe access for all roadway users.[4] In practice, it is not always possible to accommodate all modes in a single street due to right-of-way constraints, so a practical approach to Complete Streets also focuses broadly on building Complete Networks to provide connectivity for different modes of travel. Complete Networks may use parallel routes to facilitate access that variously prioritizes different modes throughout an area while ensuring the safety of all roadway users.[5] Creating Complete Streets also requires safety data analysis and safety countermeasure identification and implementation.

Recent Safety Trends

In 2020, the last full year for which data is available, a total of 38,680 people died in motor vehicle crashes nationwide.[6] Despite fewer miles driven in 2020 due to the COVID-19 pandemic, the fatality rate spiked among drivers; pedestrian and bicycle deaths remained at historically high levels. Research by NHTSA suggests this upward trend is linked to changes in driving behaviors as drivers engaged in more risky behavior and more disproportionate impacts in 2020.[7] Behaviors include more frequent incidents of speeding and driving under the influence of alcohol or drugs. Impacts include dramatic increases in fatalities among non-Hispanic Black people (up 23%) and on rural local/collector roads (up 11%). NHTSA early estimates of motor vehicle traffic fatalities for the first nine months of 2021 show the largest nine-month increase ever recorded in the history of the Fatality Analysis and Reporting System (FARS): 31,720 deaths, an increase of approximately 12 percent from the first nine months of 2020 and the largest number of fatalities for that time period since 2006.[8]

While recent increases in fatal crashes need to be addressed, traffic safety is a longstanding problem. Overall, progress in reducing vehicle-related fatalities in the United States has flattened in the past decade. (Figure 1) However, during the same time period, the proportion of total fatal traffic crashes involving people traveling without the protection of a vehicle, such as motorcyclists, pedestrians, and bicyclists, has increased and reached a high of 34 percent in 2019. Figure 2 illustrates these contrasting trends in fatalities.

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[4] American Planning Association. "Complete Streets: Best Policy and Implementation Practices, PAS 559." April 2010.
[5] Active Transportation Alliance. "Complete Streets, Complete Networks." Accessed October 2021.
[6] National Highway Traffic Safety Administration. "Early Estimate of Motor Vehicle Traffic Fatalities in 2020." May 2021.
[7] National Highway Traffic Safety Administration. "2020 Fatality Data Show Increased Traffic Fatalities During Pandemic." June 2021.
[8] National Highway Traffic Safety Administration. "NHTSA Estimates Traffic Fatalities Continued to Rise at Record Pace in First Nine Months of 2021." February 2022.

A majority of pedestrian fatalities take place after dark (76 percent) and on arterial roadways (63 percent).[9,10]

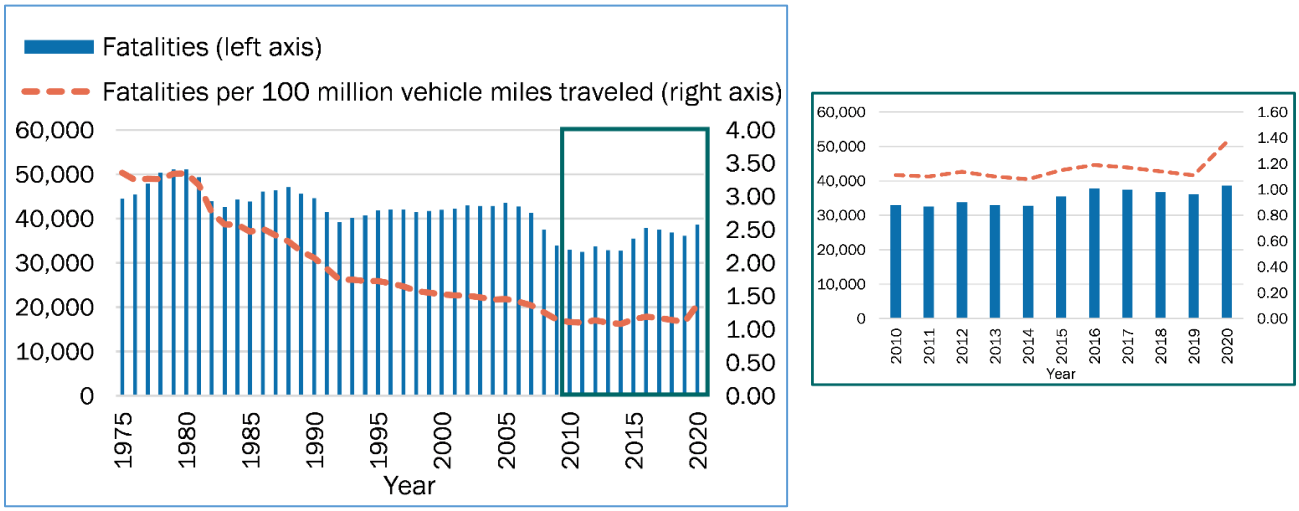

Figure 1: Roadway fatalities and the fatality rate declined consistently for 30 years, but progress has stalled over the last decade. Source: NHTSA

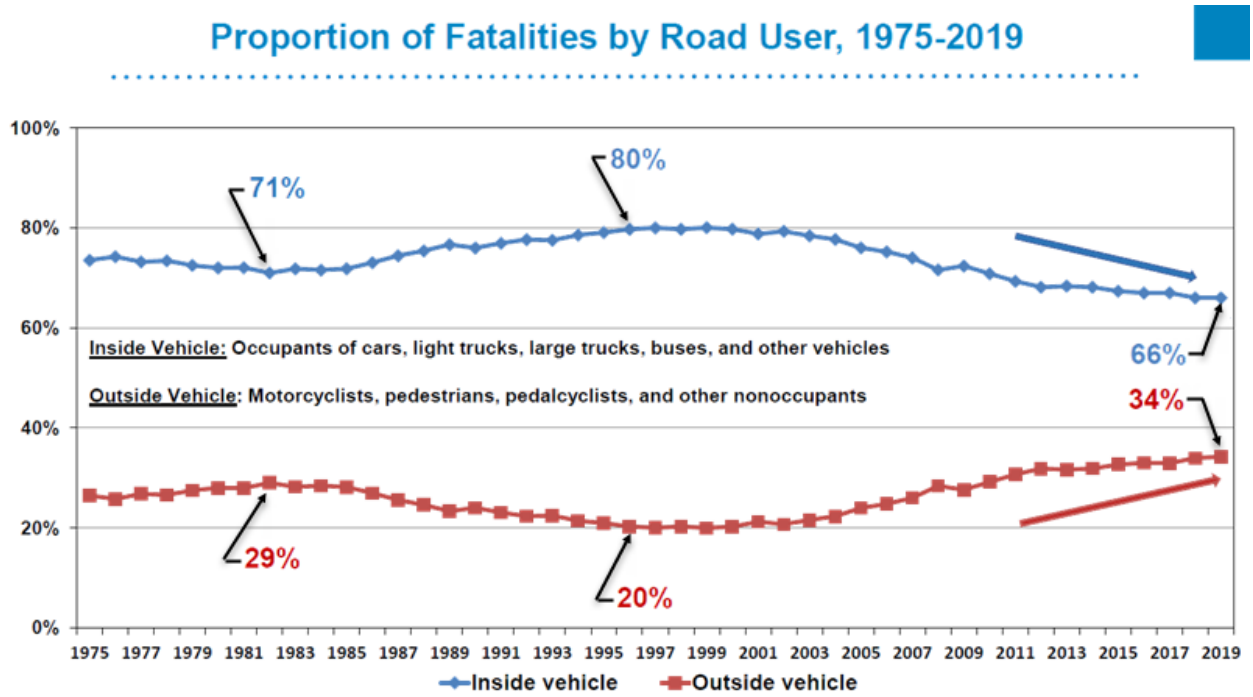

Figure 2. Graph. Proportion of Fatalities by Road User, 1975-2019 Source: NHTSA

[9] National Highway Traffic Safety Administration. "Traffic Safety Facts, 2019 Data: Pedestrians." May 2021.
[10] Governors Highway Safety Association. "Pedestrian Traffic Fatalities by State." March 2021.

The Safe System Approach and the National Roadway Safety Strategy

Since the 1990s, the transportation profession has shifted its focus from compliance with design standards to a "data-driven" practice based on actual or predicted safety performance as measured by crash frequency and severity. The practice has continued to evolve toward a focus on proactively preventing deaths and serious injuries on our transportation system.

The U.S. Department of Transportation recently announced the new comprehensive National Roadway Safety Strategy (NRSS)[11], a roadmap for addressing the national crisis in roadway fatalities and serious injuries. Bolstered by historic funding included in President Biden's Bipartisan Infrastructure Law, the NRSS is the first step in working toward an ambitious long-term goal of reaching zero roadway fatalities. The NRSS provides concrete steps that the Department will take to address this crisis systemically and prevent roadway deaths and serious injuries.

Figure 3. The Safe System Approach
Source: FHWA

The NRSS adopts the Safe System Approach to guide the Department's safety actions and help achieve the vision of zero traffic deaths.[12,13] Whereas traditional road safety strives to modify human behavior and prevent all crashes, the Safe System Approach refocuses transportation system design and operation on accepting that humans make mistakes, and lessening the impacts of crashes to reduce fatalities and serious injuries. See Figure 3 for FHWA's overview of the Safe System Approach. The six Safe System Principles are: *deaths and serious injuries are unacceptable; humans make mistakes; humans are vulnerable; responsibility is shared; safety is proactive;* and *redundancy is crucial*. The five Safe System Elements are: *safer roads, safer speeds, safer people, safer vehicles,* and *post-crash care*. Of these elements, FHWA focuses primarily on the design, construction, and operation of *safe roads* that protect road users while providing access and mobility, and on designs and countermeasures that encourage *safe speeds*. Complete Streets embodies both elements, making it a key component of FHWA's implementation of the Safe System Approach.

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[11] US Department of Transportation, "National Roadway Safety Strategy," January 2022.
[12] Homendy, Jennifer. "Keynote at Governors Highway Safety Association." Transcript available from the National Transportation Safety Board. September 2021.
[13] Federal Highway Administration. "Zero Deaths – Saving Lives Through a Safety Culture and a Safe System." Accessed October 2021.

Safer Roads and Safer Speeds can be achieved through a variety of changes to roadway design. For example, FHWA has identified a set of Proven Safety Countermeasures (PSCs) that support agencies when designing, accommodating, and operating streets that enable safe use and support mobility for all road users. The following statistics are from FHWA's PSC Fact Sheets:

- Increasing lighting at intersections has been found to reduce nighttime injury crashes involving pedestrians by as much as 42 percent.
- Center line rumble strips can reduce fatal head-on crashes on two-lane rural roads by 44 to 64 percent.
- Adding a bicycle lane on certain roads can reduce the total number of crashes on them by as much as 49 percent.
- Changing a two-way intersection with stop signs to a roundabout can reduce fatal crashes by 82 percent.

Much more information is available on FHWA's website on many methods to improve safety through infrastructure, and research to identify safety benefits is ongoing. FHWA staff participate in and contribute to several coalitions and partnerships that share the goal of eliminating all traffic fatalities on American roads, further advancing FHWA's safety mission.

Report Overview

DOT's 2017 *Safety for All Users Report: A Report Developed by the U.S. Department of Transportation Under Section 1442 of the Fixing America's Surface Transportation (FAST) Act* provided an overview of FHWA programs and activities that promote safety for all users, and an extensive list of resources developed by FHWA in the past decade.[14] The 2017 report also identified eight multimodal policy and program areas that State departments of transportation (State DOT) can adopt and implement to improve safety for motorists, pedestrians, bicyclists, transit users, and freight. These include Road Safety Audits (RSA); performance-based project evaluation criteria; Complete Streets policies; improving accessibility for all users; design flexibility; Safe Routes to Schools (SRTS); Zero Deaths Vision; and road diets implemented during routine resurfacing projects.

Since 2017, FHWA has undertaken a variety of activities related to these policy and program areas. This new report builds on the information provided in the 2017 report, identifying some of the key resources and programs highlighted in the 2017 report and adding information on updated and new activities. This report also identifies remaining challenges, including places where FHWA direction or guidance could be enhanced or further clarified.

In developing this report, the project team reviewed FHWA documents and conducted interviews with staff from State DOTs, local agencies, professional organizations, and DOT. A list of the agencies and organizations interviewed for this report is provided in Appendix 1.

[14] United States Department of Transportation. "Safety for All Users Report." December 2017.

In Part II, this Report provides a summary of DOT activities, and those of FHWA specifically, that have aimed to improve practitioner understanding and accelerate implementation of Complete Streets policies and practices. Part III of the Report identifies five areas of opportunity, along with challenges FHWA will face as it works to take advantage of those opportunities and advance Complete Streets and safety for all users. Each thematic section includes a brief list of existing FHWA resources that specifically address key issues, a discussion of ongoing challenges, and a list of potential solutions or actions – including ongoing activities – that address those issues and challenges.

II. FHWA Activities that Support Complete Streets and Promote Safety for All Users

Safety is consistently DOT's top priority. DOT strives to support State DOTs, metropolitan planning organizations (MPO), Tribes, Federal land management agencies, and local transportation agencies in providing a safe transportation system with options that allow the traveling public to choose the routes and modes that best suit their daily needs. Increasing traffic fatalities and serious injuries are alarming and detrimental to the Nation, and DOT is committed to reversing this trend.

In recent years, DOT and FHWA have committed to several ongoing initiatives to advance Complete Streets. This section of the report provides highlights of some of FHWA's key activities in recent years related to safety, connectivity, equity, performance management, infrastructure investments, research and guidance, design flexibility, and accessibility.

Safety

The DOT draft Strategic Plan Framework[15] calls for working toward a future where transportation-related serious injuries and fatalities are eliminated, and the Department recently released the previously described National Roadway Safety Strategy to guide DOT actions over the next 3 years. In addition to this **Safety** strategic principle, the framework also outlines other strategic principles that relate to Complete Streets: **Economic Strength**: investment in a transportation system to provide reliable access to jobs, resources, and markets; **Equity:** promotion of safe, affordable, accessible and multi-modal access to opportunities and services while reducing disparities, adverse community impacts, and health effects; **Climate and Sustainability:** substantially reduce greenhouse gas emissions and transportation-related pollution while building resilience; **Transformation** and modernization of our Nation's transportation infrastructure, and **Organizational Excellence** by establishing policies and processes to effectively serve communities. Safety policies are also prioritized in the Bipartisan Infrastructure Law, including a new Safe Streets and Roads for All Users grant program, an increase in Highway Safety Improvement Program funding, and Complete Streets Planning funds, [16] and FHWA is integrating safety across many program areas as it works to implement BIL.[17]

FHWA administers programs to promote innovative safety technologies, implement proven safety countermeasures, deliver technical assistance and training, and communicate best practices to transportation agencies nationwide. The Highway Safety Improvement Program (HSIP) requires each State to develop a Strategic Highway Safety Plan (SHSP), which provides a framework to reduce fatalities and serious injuries on public roadways.[18] FHWA's ongoing

[15] USDOT. "FY2022-26 DOT draft Strategic Framework" Accessed December 23, 2021
[16] Federal Highway Administration. "Bipartisan Infrastructure Law" accessed December 2021
[17] Federal Highway Administration, "Policy on Using BIL to Build a Better America," December 16, 2021
[18] Federal Highway Administration. "Strategic Highway Safety Plan (SHSP)." Accessed October 2021.

safety initiatives all contribute to the goal of eliminating deaths and serious injuries in the American transportation system. For example, the Every Day Counts program includes the Safe Transportation for Every Pedestrian (STEP) initiative, which promotes countermeasures to improve pedestrian crossing locations and reduce crashes.[19] Other programs, such as the Focused Approach to Safety and Proven Safety Countermeasures, provide agencies with information and resources on treatments and strategies that are proven to promote safety for all users, across multiple focus areas. FHWA has recently updated the Focused Approach to Safety, creating separate focus areas on pedestrian and bicycle crash types, creating a speed emphasis area, and including an equity screen.[20] FHWA also published new Proven Safety Countermeasures that specifically focus on better separation for pedestrians and bicyclists, better lighting strategies, and on setting appropriate speed limits.[21]

FHWA delivers technical assistance and training through PedBike Focus, a resource provided by the Resource Center Safety and Design Team, and through National Highway Institute trainings.[22,23] Courses include: Designing for Pedestrian Safety, Designing for Bicyclist Safety, Bikeway Selection, Complete Streets, Performance-based Intersections, and Flexibility and Risk Management in Geometric Design. FHWA also provides technical support to State, Tribal and local DOTs developing Pedestrian and Bicyclist Safety Action Plans and performing project reviews.

In the last ten years, FHWA has published several technical resources that serve as guidebooks to assist State, Tribal, and local transportation agencies in incorporating multimodal infrastructure into existing planning processes. These resources include the *Metropolitan Pedestrian and Bicycle Planning Handbook* and *Small Town and Rural Multimodal Networks*.[24,25]

Connectivity

Complete Streets provide users with essential access to the transportation network, regardless of mode choice. Access, or connectivity, determines how easily people can move throughout the transportation system. At its simplest level, network connectivity addresses how travelers can move safely and easily from place to place.[26] Safety and comfort for those who use transit, walk, bike or roll are integral to the objective of providing connections and access for those who choose to use those modes. For example, sidewalks may be built primarily to provide connectivity, but also reduce crashes involving people walking by as much as 89

[19] Federal Highway Administration. "Safe Transportation for Every Pedestrian (STEP)." Accessed October 2021.
[20] Federal Highway Administration. "Focused Approach to Safety." Accessed November 2021.
[21] Placeholder: not yet published but should be out by the time this is published
[22] Federal Highway Administration. "FHWA Resource Center." Accessed October 2021.
[23] National Highway Institute. "NHI Training." Accessed October 2021.
[24] Federal Highway Administration. "Metropolitan Pedestrian and Bicycle Planning Handbook." February 2017.
[25] Federal Highway Administration. "Small Town and Rural Multimodal Networks." December 2016.
[26] Federal Highway Administration. "FHWA Guidebook for Measuring Multimodal Network Connectivity." February 2018.

percent.[27] This makes access to walking, biking, rolling, or micro-mobility[28] critical in all transportation safety discussions. In order to meet our goal of zero fatalities, we must strive to provide the infrastructure so people can safely walk, bike, roll, and use public transportation or shared travel modes.

FHWA's 2016 *Strategic Agenda for Pedestrian and Bicycle Transportation* set a goal, to "increase the percentage of short trips represented by bicycling, rolling, and walking to 30 percent by the year 2025."[29] Achieving this goal would require safe and continuous routes, without gaps, such as those that may occur at intersections and pinch points where additional turn lanes or bridges constrain available right of way for sidewalks, bicycle facilities, and transit prioritization. Providing connections for those traveling outside of vehicles is inherently linked to the real and perceived safety and comfort of traveling on foot, by bicycle, micro-mobility, wheelchair, other non-motorized transportation. Providing complete, comfortable, and connected multimodal networks reduces conflicts between modes, thereby improving safety. Improving shared use paths, streets, and roadways that support multimodal travel has many benefits. Robust nonmotorized networks can also help communities to achieve goals to improve their natural environment by reducing greenhouse gas emissions and to advance public health by encouraging residents to walk and bicycle for everyday travel. These networks can help boost economic resilience by improving access to a variety of jobs, services, and activities for all residents, from low-income people living in isolated neighborhoods to high-income people seeking urban amenities.[30]

FHWA has addressed the topic of connectivity in a series of resources including a 2018 *Guidebook for Measuring Multimodal Network Connectivity* and a 2017 collaboration with Federal Transit Administration (FTA) on a *Manual on Pedestrian and Bicycle Connections to Transit*.[31,32] FHWA also issued grants to eight jurisdictions to perform multimodal network connectivity analyses in 2018, and recently published a report summarizing the grant products and lessons learned.[33]

Accessibility

Accessible sidewalks, intersections and transit facilities are key to full participation in our society for people with disabilities. Over 25 percent of Americans have a disability, a percentage

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[27] Federal Highway Administration. "Proven Safety Countermeasures – Walkways." October 2021
[28] Federal Highway Administration. "Micro-mobility: A Travel Mode Innovation," Spring 2021.
[29] Federal Highway Administration. "Strategic Agenda for Pedestrian and Bicycle Transportation." September 2016.
[30] Federal Highway Administration. "Strategic Agenda for Pedestrian and Bicycle Transportation." September 2016.
[31] Federal Highway Administration. "Guidebook for Measuring Multimodal Network Connectivity." February 2018.
[32] Federal Transit Administration. "Manual on Pedestrian and Bicycle Connections to Transit." August 2017.
[33] Federal Highway Administration. "Measuring Multimodal Network Connectivity Pilot Grant Program Final Report." October 2021.

that will increase as the U.S. population continues to age.[34] The Americans with Disabilities Act (ADA) requires pedestrian and transit facilities to be accessible to and usable by people with disabilities. State and local agencies have an obligation to remove barriers to access, but more than 30 years after the passage of the ADA, pedestrians and transit users continue to be limited by inaccessible infrastructure throughout the Nation. Only 13% of local public agencies have the required ADA transition plan,[35] which is their plan to achieve compliance with ADA requirements. Projects and funding that improve existing conditions and fix gaps in the network are an important part of the Complete Streets initiative.

FHWA works to maximize accessibility by issuing guidance on ADA programs, providing training on accessibility requirements, performing research to identify national best practices, providing technical assistance on development and implementation of ADA transition plans, and investigating ADA complaints. State and local agencies can agree to undertake voluntary compliance actions to remedy inaccessibility, including training and technical assistance. The FHWA Resource Center provides training and technical assistance, including how to design accessible transportation facilities. [36]Other resources include the joint statement issued by DOT and the U.S. Department of Justice (USDOJ) in 2013 on providing curb ramps when streets are altered through resurfacing.[37]

Equity

Safety, accessibility, and connectivity are closely linked to transportation equity. Equitable transportation provides access and options for all users regardless of race, gender, age, disability status, or class. Disparities in access to transportation for all users persist and affect many Americans, including 41.8 million American adults with disabilities, 40 million people over age 65, and 32 million Americans who live below the poverty line.[38] People walking in lower-income areas are struck and killed by motor vehicles at much higher rates than those walking in higher-income neighborhoods.[39,40] Of the top 30 pedestrian crash hotspot locations in the U.S., 75 percent are bordered by low-income communities.[41] Other studies have demonstrated that people living in underserved communities are more exposed to or put at higher risk of dying or being injured in a motor vehicle-involved crash and have less access to affordable and high

[34] Centers for Disease Control and Prevention. "Disability Impacts All of Us." Accessed October 2021.
[35] Cities Journal. "Are communities in the US Planning for pedestrians with disabilities?" July 2020

[37] USDOJ and DOT. "Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing." July 2013.
[38] Federal Transit Administration. "Transportation Needs of Disadvantaged Populations: Where, when, and how?" February 2013.
[39] Smart Growth America. "Dangerous By Design 2021." Accessed October 2021.
[40] Los Angeles Times. "People of color are dying from traffic violence at a much higher rate. Here's why." September 2021.
[41] Schneider, Sanders, and Proulx. "United States Fatal Pedestrian Crash Hot Spot Locations and Characteristics." January 2021.

quality transportation choices.[42,43,44] Similarly, studies show that rural communities experience an increased motor-vehicle related fatality rate that may be associated with the increased distance to hospitals and emergency medical services because, on average, rural Americans live nearly twice as far from the nearest hospital compared to Americans living in urban and suburban communities.[45,46]

FHWA has pursued equity via initiatives to ensure that transportation facilities are accessible to all people and that the benefits of infrastructure investment are distributed evenly to all communities. In 2015, FHWA published an *Environmental Justice Reference Guide* to help staff comply with Environmental Justice regulations.[47] In 2016, FHWA issued a white paper, *Pursuing Equity in Pedestrian and Bicycle Planning*, which included strategies and resources for addressing equity in bicycle and pedestrian planning.[48] In 2017, FHWA submitted a Report to Congress with the Tribal Transportation Strategic Safety Plan identifying priority topics, including pedestrian safety, which should be addressed to reduce fatal and serious injury crashes in Tribal areas.[49]

In 2021, President Biden built on the foundational 1994 Executive Order 12898 by signing Executive Order 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, which expanded the definition of underserved communities to include all persons who have been systematically denied the full opportunity to participate in all aspects of economic, social, and civic life.[50] The order directed agencies to engage with underserved communities and take other actions to allocate Federal resources to advance fairness and opportunity. FHWA has developed a set of outreach brochures on health and transportation, including one on Complete Streets, which highlight how infrastructure for all modes can improve access to jobs and economic opportunity and reduce barriers.[51]

Racial equity has also become an important facet of DOT discretionary grant programs. DOT's Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant program supports "projects that either proactively address racial equity and barriers to opportunity, including automobile dependence as a form of barrier, or redress prior inequities and barriers to

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[42] National Highway Traffic Safety Administration. "2020 Fatality Data Show Increased Traffic Fatalities During Pandemic." June 2021.
[43] South Seattle Emerald. "Transit and sidewalks need improvement for disabled Washingtonians, report says." August 2021.
[44] Nahar, Shamsun and Courtney Cronley. "Transportation Barriers among Immigrant Women Experiencing Violence." *Transportation Research Record.* April 2, 2021.
[45] Brown, J. "Distance matters: Effect of Geographic trauma system resource organization on fatal motor vehicle collisions." J Trauma Acute Care Surgery, July 2017
[46] Pew Research Center. "How Far Americans live from the closest hospital differs by community type." Dec. 2018
[47] Federal Highway Administration. "Environmental Justice Reference Guide." April 2015.
[48] Federal Highway Administration. "Pursuing Equity in Pedestrian and Bicycle Planning." April 2016.
[49] Federal Highway Administration. "Tribal Governments and Safety Data." May 2017.
[50] Executive Office of the President. "Advancing Racial Equity and Support for Underserved Communities Through the Federal Government." January 2021.
[51] Federal Highway Administration. "Making Connections – Complete Streets." Accessed October 2021.

opportunity."[52] The Infrastructure for Rebuilding America (INFRA) grant program also supports transportation infrastructure projects that support six objectives including racial equity, climate change and environmental impacts, and reducing barriers to opportunity.[53] The Bipartisan Infrastructure Law supports equity across many programs; for example, it directs that FHWA's Emergency Relief Manual be revised to "encourage the use of Complete Streets design principles and consideration of access for moderate- and low-income families impacted by a declared disaster.[54]

Transportation infrastructure is only part of the solution to addressing the needs of underserved people and communities. FHWA works with Federal agencies such as the U.S. Department of Health and Human Services (HHS), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Housing and Urban Development (HUD) to coordinate our work to amplify benefits for underserved communities. FHWA also encourages Federal-aid partners to engage a wide variety of stakeholders in the transportation planning and investment process. One recent way that FHWA has engaged in this coordination to improve equity, is by working with HUD, EPA, and the Centers for Disease Control and Prevention (CDC) to lay the groundwork for a potential new Thriving Communities program, which would "support communities with eliminating persistent transportation barriers and increasing access to jobs, school, and businesses."[55] FHWA also embraces Justice40, which is a whole-of-government effort to ensure that Federal agencies work with States, Tribes, and local communities to deliver at least 40 percent of the overall benefits from selected Federal investments in climate and clean energy and transportation to disadvantaged communities.[56]

Performance Management

Under Section 1203 of the Moving Ahead for Progress in the 21st Century Act (MAP-21), as amended by the FAST Act, Congress established seven national transportation goals and directed FHWA to establish national performance measures for the Federal-aid highway program. To meet the new statutory requirements, FHWA pursued several rulemakings. Collectively, the rules establish performance management requirements that address safety, infrastructure condition, system performance, traffic congestion, on-road mobile source emissions, and freight movement. Performance management increases the accountability and transparency of the Federal-aid highway program. It provides a framework to support improved investment decision making through a focus on performance outcomes in support of the national transportation goals. It also

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[52] United States Department of Transportation. "Notice of Funding Opportunity for the Department of Transportation's National Infrastructure Investments (i.e., the Rebuilding American Infrastructure With Sustainability and Equity (RAISE) Grant Program) Under the Consolidated Appropriations Act, 2021." April 2021.
[53] United States Department of Transportation. "Notice of Funding Opportunity for the Department of Transportation's Infrastructure for Rebuilding America (INFRA) Program for Fiscal Year 2021." February 2021.
[54] Section 11519(b)(1)(C)
[55] United States Department of Transportation. "2022 Budget Highlights." Accessed October 2021.
[56] U.S. White House. "The Path to Achieving Justice40." Accessed October 2021.

standardizes the metrics by which performance is measured, helping to establish a consistent method of assessment across all States and MPOs for the national measures.

The 2016 *National Performance Management Measures: Highway Safety Improvement Program Final Rule* requires State DOTs and MPOs to set targets for and report on five performance measures related to safety. The number of non-motorized fatalities and serious injuries is one of the five required performance measures. This represents the only measure of performance directly related to vulnerable road users, and establishes an important baseline for trend analysis, upon which future metrics and national performance measures could be developed. FHWA formally determines that a State DOT has met or made significant progress when at least four of the five safety targets have been met or the actual outcome is better than the baseline performance. For calendar year 2019 safety performance targets set by the States, a total of 22 States (42%) met or made significant progress and a total of 30 States (58%) did not meet or make significant progress. Information about the performance of specific States can be found at the State Performance Dashboard.

Research and Guidance

FHWA pursues a range of initiatives related to improving safety through infrastructure investments. These initiatives range from rulemaking to guidance and dissemination of best practices. Updated project selection criteria have also been part of the focus on infrastructure investments. In 2016, FHWA issued guidance on using the *Traffic Monitoring Guide* format for submitting non-motorized counts into the Travel Monitoring and Analysis System, which helps inform project selection.[57]

FHWA released a report on *Integrating Speed Management* in 2016 to examine roadway crash trends and integrate crash reduction strategies for pedestrians and bicyclists into infrastructure projects.[58] The 2017 *FTA Manual on Pedestrian and Bicycle Connections to Transit* helps transportation agencies plan, design, and build safe and attractive connections to transit for bicyclists, pedestrians, and other non-motorized road users.[59] FHWA also published *Strategies for Accelerating Multimodal Project Delivery* in 2018, which highlighted techniques for overcoming barriers and delays in multimodal project delivery processes.[60]

In October 2021, FHWA added nine new proven safety countermeasures, eight of which are proven to reduce speeds and improve vulnerable road user safety and is now disseminating these to the field. Five existing countermeasures focused on pedestrians and bicyclists were updated with recent research, applications, and considerations for implementation. FHWA promotes

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[57] Federal Highway Administration. "Coding Nonmotorized Station Location Information in the 2016 Traffic Monitoring Guide Format." November 2016.
[58] Federal Highway Administration. "Integrating Speed Management within Roadway Departure, Intersections, and Pedestrian and Bicyclist Safety Focus Areas." April 2016.
[59] Federal Transit Administration. "Manual on Pedestrian and Bicycle Connections to Transit." August 2017.
[60] Federal Highway Administration. "Strategies for Accelerating Multimodal Project Delivery." October 2018.

these countermeasures through peer exchanges, round tables, webinars, our website, and other training opportunities.[61] The FHWA published the resource *Incorporating On-Road Bicycle Networks into Resurfacing Projects* in 2015 to provide design and planning recommendations for transportation agencies in integrating bicycle facilities into their resurfacing programs.[62] This initiative is one example of making use of existing infrastructure investment programs to shift roadways to be more inclusive of multiple modes.

Funding for Infrastructure Investments

Projects supporting Complete Streets are eligible for Federal-aid funding under most FHWA Federal funding programs.[63] For example, the Surface Transportation Block Grant Program (STBG) provides flexible funding that can be used on any public road and can fund pedestrian and bicycle infrastructure and transit capital projects, including intercity bus terminals. Safety countermeasures and facilities for pedestrian and bicycle users and to reduce speeds are eligible for HSIP funds if they meet the program objectives and eligibility requirements. Similarly, HSIP funds can be used for collection, analysis, and improvement of safety data. The STBG "Transportation Alternatives set-aside" provides funding for on- and off-road pedestrian and bicycle facilities, improving non-driver access to public transportation and enhanced mobility, community improvement activities such as historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity; recreational trail projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former divided highways.[64] The Bipartisan Infrastructure Law included important changes to formula program eligibilities that will enable additional investment in Complete Streets and networks to enhance safety and accessibility for all; FHWA will update its guidance documents for these programs early in 2022 to highlight these enhanced eligibilities.

In addition, discretionary grant programs from DOT provide Federal funding for multimodal transportation projects, for which regional, Tribal, and local governments can compete directly. Over the past decade, the discretionary grant program currently known as RAISE – previously known as Transportation Investment Generating Economic Recovery (TIGER) and Better Utilizing Investments to Leverage Development (BUILD) – has funded many multimodal transportation projects.[65] New grant programs in BIL include the Safe Streets and Roads for All grants, and the Rural Surface Transportation Grants, and several others.

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[61] Federal Highway Administration. "Proven Safety Countermeasures." Accessed October 2021.
[62] Federal Highway Administration. "Incorporating On-Road Bicycle Networks into Resurfacing Projects." December 2015.
[63] Federal Highway Administration. "Pedestrian and Bicycle Funding Opportunities." January 2021.
[64] Federal Highway Administration. "Transportation Alternatives." Accessed October 2021.
[65] United States Department of Transportation. "RAISE Discretionary Grants." Accessed October 2021.

Context-Sensitive Design and Design Flexibility

FHWA has pursued design flexibility as a strategy, emphasizing that each project is unique and should be designed to fit its own distinct context, circumstances, and local characteristics. The first core principle of context-sensitive design is to ensure that the project provides safety for all users. Designers need flexibility to ensure projects respond to local community goals and needs. FHWA helps State, Tribal and local agencies understand design flexibility options through the Performance-Based Practical Design and Context-Sensitive Solutions initiatives.

In 2016, FHWA published *Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts* to provide examples of how to use design flexibility as a means of reducing conflicts between modes.[66] FHWA also revised the controlling criteria for design in 2016, allowing State, city, and county engineers more flexibility in designing lower speed (<50mph) non-freeway roadways, encouraging road designs that increase safety for all users.[67] FHWA is also focused on making speed management and speed limit setting more context-sensitive, an approach reflected in one of FHWA's newly-issued Proven Safety Countermeasures which addresses setting Appropriate Speed Limits for All Users[68]. That document emphasizes that when "setting a speed limit, agencies should consider a range of factors such as pedestrian and bicyclist activity, crash history, land use context, intersection spacing, driveway density, roadway geometry, roadside conditions, roadway functional classification, traffic volume, and observed speeds."

[66] Federal Highway Administration. "Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts." August 2016.
[67] Federal Highway Administration. "Memorandum: Revisions to the Controlling Criteria for Design and Documentation for Design Exceptions." May 2016.
[68] Federal Highway Administration. "Setting Appropriate Speed Limits for All Road Users". Accessed December 23, 2021.

III. Opportunities and Ongoing Challenges

Although DOT has contributed significant effort to support transportation safety for all users over the past decade, challenges remain. With rising fatalities and the Department's renewed focus on safety, DOT is exploring additional steps to improve safety for all roadway users and FHWA is working to understand and respond to feedback from staff at State, Tribal, and local agencies who are working to implement Complete Streets on the ground in their communities every day.

This Report discusses themes and lessons learned from a review of Federal rules, policies, and guidance and provides feedback from interviews with transportation professionals working to promote safety and improve multimodal access through Complete Streets. This section of the Report lays out five areas of opportunity for FHWA as it advances Complete Streets efforts:

A. Improve data collection and analysis to advance safety for all users.
B. Support rigorous safety assessment during project development and design to help prioritize safety outcomes across all project types.
C. Accelerate adoption of standards and guidance that promote safety and accessibility for all users and support innovation in design.
D. Reinforce the primacy of safety for all users in the interpretation of design standards, guidelines, and project review processes.
E. Make Complete Streets FHWA's default approach for funding and designing non-access-controlled roadways.

Each section below discusses these five key opportunity areas in turn and then identifies challenges and lists potential solutions based on practitioner interviews, document review, and FHWA subject matter experts. Each section also lists applicable resources, which are from FHWA unless specifically noted otherwise. Appendix 2 provides a comprehensive table of these resources organized by type.

A. **Improve data collection and analysis** to advance safety for all users

Data and performance measurement are critical to guiding and evaluating the success of Complete Streets initiatives. Access to accurate and comprehensive data for all modes helps agencies identify projects that will promote safety and access for vulnerable road users and ensures that projects are designed to balance modal trade-offs and advance related community benefits. Practitioners can also use these data to identify the benefits of Complete Streets initiatives for project review and project prioritization processes. Appropriate data on all modes is also critical for tracking the success and impact of safety projects and for ensuring that performance management efforts can incentivize safety projects that support all roadway users.

Selected Resources That Relate to These Issues

- 23 CFR § 924.9 Highway Safety Improvement Program: Planning
- Safety Performance Measures rule (PM1) - National Performance Management Measures: HSIP
- "Planning Rule": 23 CFR §450.206 Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning; Final Rule
- System Performance/Freight/CMAQ performance measure rule (PM3)
- Traffic Analysis and Intersection Considerations to Inform Bikeway Selection (2021)
- Guidebook for Measuring Multimodal Network Connectivity (2018)
- Bicycle-Pedestrian Count Technology Pilot Project (2016)
- National Highway Performance Program Guidance (2016)
- Guidebook for Developing Pedestrian and Bicycle Performance Measures (2016)
- Transportation Alternatives Program Performance Management Guidebook (2016)

Ongoing Challenges

1. *Data to support a data-driven project selection process needs to be improved.*

- **Incomplete pedestrian and bicycle network data may limit opportunities to deploy Complete Streets.**

  Many State transportation agencies are building databases that comprehensively list basic safety infrastructure across their network, using the Model Inventory of Roadway Elements (MIRE), established under direction provided in the 2012 Moving Ahead for Progress in the 21st Century Act (MAP-21). [69] Such data is necessary to effectively analyze crashes or to create models to assist with decision making.

  Accurate and comprehensive infrastructure data is particularly critical for travelers outside of vehicles, who are relying on infrastructure to provide for their safety. Interviewees noted that much of the roadway network includes minimal bicycle infrastructure and disconnected, inaccessible pedestrian infrastructure, even when it is needed for access to public transportation. Multimodal network analysis can quantify these discrepancies but requires information about the presence or absence of infrastructure elements, as well as specific design details and the quality of that infrastructure, which impact user safety, comfort, and accessibility. Interviewees indicated that State or local agencies do not have comprehensive or consistent information about their non-motorized roadway features like sidewalks, crosswalks, bus stops, pedestrian signals, or bike lanes. The lack of such data collection restricts road owner operators' ability to establish structured maintenance and operations plans on pedestrian and bicycle infrastructure in a manner that is consistent with asset management protocols for pavements and other roadway assets like signs and traffic signals.

  Many details about the characteristics of pedestrian, bicycle, and transit infrastructure are absent from the MIRE data set. Since the MIRE elements are intended to be used in analysis, the exclusion of these elements is due in part to a lack of pedestrian and bicycle predictive safety analysis tools ready for inclusion in the Highway Safety Manual (HSM). These omissions prevent the highway community from seeing a complete set of standardized criteria as a model for inventorying the presence and type of facilities that support safe active and transportation.

  There is an opportunity in the next edition of the MIRE to include additional data elements relevant to non-motorized and public transportation, to support consistent inventory measures. A new research report expected to be completed in 2022 will propose Pedestrian Bicycle Safety Performance Functions for the HSM.[70] Once these

[69] Federal Highway Administration. "Roadway Safety Data Program, What is MIRE?" Accessed October 2021.
[70] National Cooperative Highway Research Program. Study 17-84, "Pedestrian and Bicycle Safety Performance Functions for the Highway Safety Manual." Accessed November 2021.

analytical tools are included in the HSM, agencies will be able to conduct safety analysis that applies to pedestrian and bicycle travel and transit access and these elements can be included in a future edition of the MIRE.[71] Some elements can also be included in the MIRE's list of Fundamental Data Elements, which the States are required to collect.

Crash data represents another incomplete source of information, particularly for pedestrian and bicycle crashes. These data could be especially challenging to collect in areas that experience underreporting of crashes overall, such as Tribal communities.[72] Interviewees noted that crash data typically underrepresent pedestrian and bicyclist crashes and when they are reported, they may be missing critical information, such as direction of travel. Some interviewees noted partnerships with local emergency responders and medical providers to supplement crash data, though those types of arrangements present other challenges, including privacy and data sharing concerns.

Because pedestrian and bicyclist crashes are underreported in police records, those data reflect an incomplete picture of safety risks. Basing countermeasures and project designs on these incomplete crash data does not account for systemic safety risks, nor unmet demand for vulnerable road user safety and access upgrades.

A Safe System approach to safety proactively identifies locations for infrastructure improvements and upgrades based on anticipated risk, rather than documented crashes alone.[73,74] The Bipartisan Infrastructure Law includes specific reference to the Safe System approach under the revised Section 11111 on the Highway Safety Improvement Program (HSIP). This provision adds a requirement for all states to conduct and regularly update a vulnerable road user safety assessment for "high-risk" locations, which shall "take into consideration a safe system approach" as part of their State Highway Safety Plan.[75]

- **Planners and decision makers do not have consistent and comprehensive user count data for all modes.**

  Federal regulations require SHSPs prepared under the HSIP to "analyze and make effective use of safety data to address safety problems and opportunities on all public roads and for all road users."[76] However, the safety data that States are required to collect do not include pedestrian and bicycle user counts. Existing Federal data collection requirements, guidance, and best practices exclusively or predominantly apply only to motor vehicles.

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[71] Federal Highway Administration. "Safety Performance Management Measures Final Rules Overview." Accessed October 2021.
[72] Transportation Research Board. "NCHRP Report 788: Guide for Effective Tribal Crash Reporting." March 2016
[73] Federal Highway Administration. "Primer on Safe System Approach for Pedestrians and Bicyclists." May 2021.
[74] Federal Highway Administration. A Systemic Approach to Safety. Accessed November 2021
[75] United States Congress. "Infrastructure Investment and Jobs Act." 2021.
[76] 23 CFR 924.9(a)(3)(vi): Highway Safety Improvement Program, Planning

Representatives of the American Association of State Highway and Transportation Officials (AASHTO) Council on Active Transportation and other interviewees stressed that the lack of requirements to collect data on non-motorized use severely restricts the ability of State and local agencies to successfully advance active transportation projects. Several interviewees noted the lack of Federal standards for the collection of most non-motorized transportation data. Interviewees noted that, even if collecting these data were required, many State and local agencies and MPOs do not have sufficient expertise, technology, or resources to be able to collect and meaningfully use non-motorized data for planning and decision making. This is especially true for small, rural, and underserved communities. FHWA has conducted pilots on bicycle counting technology, however the field is evolving rapidly and further research is needed to identify best practices including a variety of counting methodologies, including the use of crowdsourced data.[77]

Interviewees noted that non-motorized traveler volumes are the most broadly applicable data that would aid in implementing Complete Streets. Without volume data, agencies cannot measure the efficacy of projects intended to increase pedestrian and bicycle travel. Agencies are also less able to develop robust models or conduct sophisticated scenario planning to forecast future pedestrian and bicycle volumes, as they do with motor vehicles, based on existing and historic volume data, and planned future projects. This also makes it harder to evaluate programs, forecast travel behavior, and determine the health and climate change benefits of pedestrian and bicycle projects. Without volumes, there is no way to estimate safety performance functions from which to analyze longitudinal trends, the standard for motorized travel.

2. Measures of performance to support decision makers in addressing all transportation modes should be improved.

- **Measures of performance that assess progress toward improving conditions for non-motorized users require specific data that are challenging to collect.**

  As discussed earlier, comprehensive, consistent data on pedestrian and bicycle volumes, trip type and length, and facility presence, quality, and condition are largely unavailable. There are few standards for the collection of these data, and State, Tribal, and local agencies are unlikely to possess the capacity or expertise to engage in such data collection without concerted resources and training from FHWA. FHWA, States, Tribes, and local governments may evaluate progress in other ways, such as by assessing the output (e.g., adoption of innovative practices, production of guidance, standards, and systems for data collection and maintenance, forecasted mode shift based on infrastructure investments or estimated crash reduction). The increased use of such

[77] Federal Highway Administration. "Bicycle-Pedestrian Count Technology Pilot Project." Accessed October 2021.

output measures has been recommended by the U.S. Government Accountability Office (GAO).[78]

- **Effective Complete Streets measures of performance should assess progress toward achieving broader community benefits.**

  Interviewees noted the need to improve the ability to measure the benefits of Complete Streets. The "output" measures they may typically have access to do not provide the same evidence of true progress as do "outcome" measures, such as changes in the numbers of fatalities and serious injuries, actual mode shift, greenhouse gas emissions reductions, air quality benefits, public health outcomes, person-miles traveled, or increased economic activity. The ability to measure these outcomes could allow Complete Streets to become more ingrained in planning and design."

Data Collection and Analysis - Potential Solutions

Potential solutions to address the issues about data collection and analysis raised in this section include the following:

1. **Improve network and usage data to better inform development of Complete Streets.**
   a. Increase efforts related to development of analytical tools that allow safety analyses that apply to pedestrian and bicycle travel and transit access.
   b. Add pedestrian, bicycle, and transit elements to the MIRE, once new analysis tools using these elements have been added to the Highway Safety Manual.
   c. Explore the feasibility and impact of scaling select Traffic Monitoring Guide (TMG) bike and pedestrian travel data collection recommendations into national data reporting requirements for States and MPOs.
2. **Provide clearer guidance on measures of performance for projects supporting safety for all users.** Assess State, Tribal, and local best practices, capabilities, and maturity regarding understanding and documenting performance relative to safety for all users.
   a. Develop foundational knowledge of pedestrian and bicyclist risk rates and other non-motorized safety data as described in DOT's Learning Agenda required by the Evidence-Based Policymaking Act.
   b. Issue new guidance on safety analysis and performance, including for rural areas and Tribes.

[78] United States Government Accountability Office. "Pedestrians and Cyclists: Better Information to States and Enhanced Performance Management Could Help DOT Improve Safety." May 2021.

B. **Support rigorous safety assessment** during project development and design to help prioritize safety outcomes across all project types

As projects move from concept into implementation, they must align with multiple review and approval processes including environmental review and review based on regional goals and performance measures. Sponsoring agencies may also need guidance on how to balance safety with other goals such as air quality and reduced congestion, since regulations and performance metrics prioritize both reducing congestion and improving safety. Incorporating a robust safety assessment as a lens during review processes can help to prioritize outcomes that support safety for all users.

Selected Resources That Relate to These Issues

- 23 CFR 490 National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program
- 23 CFR 450.322 Congestion Management Process
- Accelerating Project Delivery (23 U.S.C. 138, 139, 168, 169, 330; 49 U.S.C. 304)
- 23 CFR PART 771—Environmental Impact and Related Procedures
- 16 U.S.C. 470 - Section 106 of the National Historic Preservation Act
- 23 CFR 655.603 – Traffic Control Device Standards
- Sec. 2 42 U.S.C. § 4321 – NEPA
- CEQ NEPA Regulations
- Environmental Protection Agency Clean Air Act Text and Overview (EPA)
- Benefit-Cost Analysis Guidance for Discretionary Grant Programs (2021)
- FHWA Metropolitan Pedestrian and Bicycle Planning Handbook (2017)
- Level of Service memo (2016)
- Bicycle and Pedestrian Funding, Design, and Environmental Review: Addressing Common Misconceptions (2015)

Ongoing Challenges

3. *The safety and environmental benefits of Complete Streets need to be properly weighted in projects designed to reduce congestion.*

- **Many State and local agencies prioritize reducing traffic congestion, which can conflict with the goal of providing safe facilities for all users.**
  Safety and congestion management are two primary elements transportation agencies consider when evaluating projects, and these goal areas can sometimes conflict with each other. Several Federal regulations and policies, including highway design manuals, metropolitan planning requirements, and national performance measures include specific requirements to evaluate congestion. Safety and congestion are both national goal areas

under Transportation Performance Management.[79] Statewide and metropolitan planning requirements include increasing "the safety of the transportation system for motorized and non-motorized users" as a consideration for planning, however these requirements also include specific (and more quantitative) requirements related to managing congestion. For example, Transportation Management Areas must address congestion management to reduce vehicle miles traveled (VMT) and identify projects to support congestion reduction.[80,81]

Interviewees noted that a longstanding priority of providing capacity for anticipated future needs and use of the metric of automobile Level of Service (LOS) can conflict with safety goals. Some conflicts between safety and congestion goals may emerge from the ways that States, Tribal, and local agencies interpret the requirements. For example, several interviewees referenced examples of pedestrian, bicycle, and transit projects that were rejected or significantly altered because they reduced current or forecasted future vehicular LOS by limiting roadway capacity. While some acknowledged the 2016 policy clarification that FHWA does not have regulations or policies that require specific minimum LOS values for projects on the National Highway System (NHS), Level of Service remains a common metric of performance at the State, Tribal, and local level.[82]

Preserving existing or future roadway capacity for motor vehicles can potentially have other negative safety impacts. In one example shared by an interviewee, the State DOT required that a transit project include significant road widening to provide dedicated transit facilities rather than reallocating existing right-of-way from motor vehicle facilities; this added substantial cost, negatively impacted adjacent property owners, and extended the crossing distances for pedestrians at intersections, increasing pedestrian exposure to safety risks. In another example shared by an interviewee, a State DOT rejected curb extensions at intersections that were intended to reduce crossing distances for pedestrians because of the impact on LOS of removing right turn lanes at intersections.

Multiple interviewees also noted that safety and congestion may in fact have an inverse relationship: motor vehicle speeds generally increase as congestion decreases, and higher speed crashes result in more serious and fatal injuries. Some interviewees noted they would prefer to give less priority to forecasted future motor vehicle use to avoid inducing additional vehicle demand or creating conditions conducive to increased speeding on oversized roadways in the near term. Interviewees expressed support for proactive, rather than reactive, safety projects, and described the need to build the transportation network States and local governments want in the future, rather than the one they are forecasted to

[79] Federal Highway Administration. "Transportation Performance Management National Goals." Accessed November 2021.
[80] 23 U.S.C. 134: Metropolitan Transportation Planning
[81] 23 U.S.C. 135: Statewide and Nonmetropolitan Transportation Planning
[82] Federal Highway Administration. "Level of Service on the National Highway System." May 2016.

need according to auto-oriented regional traffic modeling. This may mean prioritizing pedestrian, bicycle, and transit capacity, safety, and connectivity.

Interviewees also noted that access to the tools to assess the benefits of Complete Streets (i.e. reduction in injuries and fatalities, increased economic development), can be a barrier for local communities due to the lack of data and data collection guidance available to support this need. This can make it difficult to adequately score safety through the project-selection tools used by States and MPOs, which include project scoring under specified criteria, eligibility analysis, and more rarely, formal benefit-cost analysis. Interviewees highlighted the need for new modeling techniques and tools to incorporate active transportation and equity analysis into planning.

- **State and local agencies may focus on the potential risks of increased congestion and negative air quality impacts, while discounting the potential benefits of projects that reallocate roadway space from motor vehicles toward higher volume, lower-emission transit and non-motorized transportation.**

  In areas of nonattainment for ozone or carbon monoxide pursuant to the Clean Air Act, congestion management is a primary strategy in reducing these pollutants. Interviewees indicated that projects that reduce automobile capacity and throughput may face additional scrutiny related to peak-period congestion impacts for vehicles because their impacts on mode shift are not consistently captured or forecasted. Some safety projects may remove vehicular travel lanes to make space for other features including transit lanes, bicycle lanes, or enhanced sidewalks. Adding or improving facilities for non-motorized travel and transit in constrained rights-of-way often requires reallocating roadway space from existing motor vehicle use. These projects increase modal choices and reduce the environmental impacts of transportation by shifting some travelers to non-motorized modes. Though on-the-ground conditions often adjust as travelers shift modes, projects that reallocate roadway space may show increasing vehicular congestion or air quality impacts in modeling if the benefits of mode shift are not also captured in environmental analysis or in regional models.

  Some interviewees noted that they were discouraged or blocked from pursuing these projects for this reason. One interviewee noted that projects that reduce vehicle capacity would not be approved in State design review; other stakeholders echoed related but more nuanced concerns about the environmental review process, and that local and regional travel demand models may not consistently have the capacity to capture the benefits of projects that reduce vehicle capacity. In addition, "Purpose and Need" Statements used to define the range of alternative scenarios under the National Environmental Policy Act might treat multimodal elements, which may be essential to provide safe access, as secondary rather than primary elements of the project. As a result, these elements may be de-prioritized during alternatives analysis and project development.

Current techniques for congestion and air quality modeling primarily capture the negative impacts of increased vehicular congestion that may result from projects that reduce motor vehicle capacity. While some regional and micro-scale modeling tools have the capacity to capture mode shift, data may not be consistently available at a local or regional level and not all communities have the technical expertise to evaluate and quantify the benefits of shifting to bicycle, pedestrian, or transit trips.

- **Many Federal transportation funding programs do not include requirements to conduct specific safety analyses.**

  Specific requirements to address safety in Federal statute applying to FHWA are primarily tied to the HSIP. The HSIP is the core Federal-aid safety program with the purpose of significantly reducing traffic fatalities and serious injuries on all public roads. A major component and requirement under the HSIP is for States to develop and update an SHSP. An SHSP is a statewide-coordinated safety plan that provides a comprehensive framework for addressing road safety by identifying a State's key safety needs, and guides investment decisions toward strategies and countermeasures with the most potential to save lives and prevent serious injuries. Under the Federal Performance Management framework adopted under MAP-21, States must establish and meet safety targets on an annual basis. States that do not meet their targets are required to submit an HSIP Implementation Plan and use a designated amount of their HSIP funds for safety projects.

  However, the HSIP formula constitutes only about 6 percent of all Federal funding.[83] There is no prescribed process to conduct a safety analysis of projects that receive the overwhelming majority of Federal transportation dollars. Such an analysis may include the evaluation and diagnosis of traffic crashes and their contributing factors, with an emphasis on fatal and serious injury crashes, using scientific tools and assessment techniques to determine appropriate safety countermeasures. This contrasts with existing requirements outlined above to address congestion and air quality impacts.

  Several sections of the Code of Federal Regulations (CFR) call for addressing safety concerns.[84] For example, 23 CFR 625.2(a)(1) requires that each Federal-aid project provide facilities that are conducive to safety. A goal of FHWA is to provide the highest practical and feasible level of safety for people and property associated with the Nation's highway transportation systems (23 CFR 625.2(c)). While the regulations do not

[83] Federal Highway Administration. "Fixing America's Surface Transportation Act Funding Apportionments." Accessed October 2021.

[84] Section 450.206 of Title 23 describes the statewide transportation planning process and provides for consideration and implementation of projects, strategies, and services that will address the safety of the transportation system for motorized and non-motorized users. The FHWA regulations at 23 CFR 450.208(a)(1) call for States to coordinate statewide transportation planning with metropolitan transportation planning activities and encourage States to rely on information, studies, or analyses provide by metropolitan planning organizations (MPOs) for portions of the transportation system located in metropolitan areas.

prescribe specific safety analysis or performance, for over 10 years, FHWA has been promoting the use of the latest evidence-based tools and approaches to assess an existing or proposed transportation facility's future safety performance, including the use of AASHTO's Highway Safety Manual (HSM),[85] to inform State DOT, Tribal, and local agencies project decision making and to target investments that improve safety. Many State DOTs have developed tools, policies, and procedures to assess and analyze the safety performance of their existing facilities and projects, and to determine project alternatives and countermeasures that improve safety.

- **Existing modeling capabilities are not designed for estimating impacts and benefits of projects that incorporate multiple features to ensure safety for a variety of users.**

  FHWA models and guidance primarily assess vehicle mobility and throughput at a national or regional scale. These models are not designed for analysis of safety for all users at a local scale. Past DOT guidance for conducting benefit cost analyses (BCA) has not provided a way to value non-vehicle trips, beyond safety benefits to pedestrians and cyclists and travel time savings to those users from improved connectivity, which has made it challenging for applicants to fully quantify the potential benefits of those projects.[86] Complete Streets benefits are also challenging to model due to limited Crash Modification Factors (CMF) for pedestrians and bicycles and limited accessibility metrics for people with disabilities. DOT's FY 2022 update of its BCA guidance for discretionary grant programs will provide new methodologies and recommended values for quantifying the health and journey quality benefits of active transportation improvements.[87]

Rigorous Safety Assessment - Potential Solutions

Potential solutions to address the challenges raised in this section include the following:

1. **Find ways to increase the assessment of safety outcomes across all types of Federal-aid projects, to improve safety performance.**
   a. Request information from stakeholders on how the safety performance of Federal-aid projects should be assessed.
   b. Update guidance to reflect new Vulnerable Road User Safety Assessment requirement and vulnerable road user fatality special rule.
   c. Study multi-variable CMFs to support context-sensitive safety analysis.

2. **Provide additional technical assistance and guidance that supports Complete Streets implementation.**

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[85] American Association of State Highway and Transportation Officials. Highway Safety Manual, 1st ed. Washington, DC: AASHTO, 2010, is available at http://www.highwaysafetymanual.org/Pages/default.aspx
[86] United States Department of Transportation. "Benefit-Cost Analysis Guidance for Discretionary Grant Programs." February 2021.
[87] United States Department of Transportation. "Benefit-Cost Analysis Guidance for Discretionary Grant Programs."

a. Conduct a National Complete Streets Assessment to develop, implement, and synthesize the results of a nationwide assessment of State DOTs maturity in implementing safety for all users; use the survey results to identify gaps in technical assistance and guidance.

b. Develop and enhance resources and modeling tools for balancing safety and operations, and for capturing the benefits of projects (environmental, mode shift, economic development, safety, etc.) including how to analyze tradeoffs between various investments.

C. **Accelerate adoption of standards and guidance** that promote safety and accessibility for all users and support innovation in design

Agencies use a variety of design criteria and guidance documents. Roadway owners must identify which constraints are mandatory and which design publications are intended to provide guidance on roadway features. Agencies apply standards and guidance to the appropriate design contexts and must stay up to date as guidance and design standards change. Agencies that implement Complete Streets practices and policies must develop designs that accommodate all modes adequately. Accommodating all modes adequately involves practitioners incorporating information from multiple guidance sources. For instance, FHWA recently published the *Curbside Inventory Report* to help practitioners make data-driven project decisions to help manage competing demands along the curb, including walking, rolling, bicycling, freight deliveries, transit, and passenger pickup/drop off zones.[88] This research report addresses many innovative new modes, and should be updated as needed to highlight innovation and current practices. Currently, there are limited references to curbside management in the body of FHWA Guidance. The lengthy process to update and clarify guidance documents may limit the ability of agencies to implement new safety improvements.

[88] Federal Highway Administration. "Curbside Inventory Report." Accessed October 2021.

Selected Resources That Relate to These Issues

- 23 U.S.C. 109(c) – Design Criteria for the National Highway System
- 23 CFR 625.4 – Standards, Policies, and Standard Specifications
- FHWA Civil Rights ADA Program Guidance
- Transportation Planning Capacity Building Program
- Guide for the Planning, Design, and Operation of Pedestrian Facilities (Dec. 2021, AASHTO)
- FHWA Curbside Inventory Report (2021)
- FHWA Bicycle and Pedestrian Planning, Program, and Project Development Guidance – Design Resources (2019)
- Bikeway Selection Guide (2019)
- Department of Justice/Department of Transportation Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing (USDOJ, Updated 2019)
- A Policy on Geometric Design of Highways and Streets , also called the "Green Book" (6th and 7th Editions from 2011 and 2018, AASHTO)
- FHWA Metropolitan Pedestrian and Bicycle Planning Handbook (2017)
- Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts (2016)
- Regional Cooperation and Bike/Ped and Transit Connections (2016)
- FHWA Memorandum on Design Standards (2016)
- Separated Bike Lane Planning and Design Guide (2015)
- Incorporating On-Road Bicycle Networks into Resurfacing Projects (2015)
- Relationship between Design Speed and Posted Speed (2015)
- Mitigation Strategies for Design Exceptions (2014)
- Bicycle and Pedestrian Facility Design Flexibility (2013)
- Pedestrian Safety Guide and Countermeasure Selection System (2013)
- Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition, updated 2012)
- DRAFT Public Rights of Way Accessibility Guidelines (PROWAG) – U.S. Access Board (2011)
- US DOJ 2010 ADA Standards for Accessible Design (2010)
- The Transportation Planning Process Briefing Book (FHWA/FTA)

Ongoing Challenges

4. *Federally recognized standards should enable context-sensitive design solutions for safety.*

Two documents that provide standards and govern design are incorporated through Federal statutes and regulations: the FHWA *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD) and the AASHTO *A Policy on Geometric Design of*

Highways and Streets ("Green Book").[89,90] Both of these documents are currently undergoing updates.[91]

The MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle path open to public travel. The MUTCD is currently undergoing revisions through a rulemaking process, and information about this process and the specific issues being addressed can be found in the *Federal Register*[92]. Its applicability is not limited to a particular classification or type of roadway or funding source because traffic control devices communicate directly with road users and need to be uniformly applied. When FHWA issues a new edition or revision of the MUTCD, States generally have two years to adopt it, with or without a State supplement, or to adopt a State MUTCD that is in substantial conformance with the new edition of the national MUTCD. Some States require a legislative action for these changes to take effect. The scope of the MUTCD is limited to traffic control devices – signs, signals, and markings that communicate a message to road users. The new Bipartisan Infrastructure Law emphasizes the safety scope of the MUTCD by adding that it must "promote the safety, inclusion, and mobility of all users," and that it must be updated within 18 months.[93]

The AASHTO Green Book is a publication adopted by FHWA as the design standard for roadways on the NHS.[94] The Green Book was last updated in 2018 and has become more flexible, multimodal, and performance based, with more information about safe design for different contexts. Federal-aid projects *not* on the NHS are to be designed, constructed, operated, and maintained in accordance with State laws, regulations, directives, safety standards, design standards, and construction standards.[95]

There are several other documents published by industry organizations that provide information on roadway design. Notably, the National Association of City Transportation Officials (NACTO) has published design guides specific to the context of city streets and has advocated for use of alternative manuals and changes to the MUTCD.[96] In 2015, the FAST Act expanded the list of publications to be considered

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[89] Federal Highway Administration. "Manual on Uniform Traffic Control Devices for Streets and Highways." Accessed October 2021.

[90] American Association of State Transportation and Highway Officials. "AASHTO Releases 7th Edition of Its Highway & Street Design 'Green Book.'" September 2018.

[91] The MUTCD update process functions as a rulemaking, with a public comment period. Various AASHTO committees and task forces contribute to the Green Book update, and it is balloted by AASHTO for adoption. FHWA contributes to the development of the design standards through membership on these working units, sponsoring and participating in research efforts, and many other initiatives. Following development of the design standards, FHWA adopts via notice-and-comment rulemaking those it considers suitable for application on the NHS.

[92] National Archives. "National Standards for Traffic Control Devices" Accessed January 31, 2022

[93] United States Congress. "Infrastructure Investment and Jobs Act." 2021.

[94] 23 CFR 625.4(a)(1): Design Standards for Highways; Standards, policies, and standard specifications

[95] 23 CFR 625.3(a)(2): Design Standards for Highways, Application

[96] NACTO. "NACTO Recommendations for Updates to FHWA Design Guidance." Accessed December 2021.

when developing design criteria for projects on the NHS and allowed local jurisdictions to use design publications different from those used by the State, as long as they meet specific conditions, including approval from the State.[97] The 2016 FHWA Memorandum, *Design Standards and Section 1404 of the FAST Act*, identifies specific resources from AASHTO and NACTO, and references previous FHWA guidance to consider these and other resources from the Institute of Transportation Engineers (ITE) that promote development of non-motorized transportation networks, particularly in urban areas. [98] The new Bipartisan Infrastructure Law clarifies that local jurisdictions may use design guides that are different from State standards on the roads they own that are not part of the NHS, without approval from the State.[99] Practitioners are expected to assess the guidance landscape and ensure they comply with all Federal requirements. While other guidance documents may provide useful information or innovative new treatments, they may not be fully consistent with Federal requirements.

Relatedly, several interviewees felt that local practitioners often have misperceptions about the source of roadway design requirements. State and local roadway designers may assume that Federal requirements are limiting design flexibility when those limitations are in fact due to State or local standards. This problem may be compounded in rural areas with limited staffing and limited training opportunities.[100]

University curricula and continuing education/training programs often still focus on motorized travel and the auto-oriented aspects of roadway design and design standards. They may provide little or no instruction on design considerations such as Americans with Disabilities Act (ADA) requirements, context-sensitive solutions, or multimodal design elements such as pedestrian or bicycle infrastructure and surface transit systems.

FHWA coordinated with AASHTO's Center for Environmental Excellence to survey 13 university planning and engineering programs to gauge the extent to which Complete Streets, Context Sensitive Solutions (CSS), and Context Sensitive Design (CSD) concepts are being taught in these programs. The initial findings suggest that most graduate programs teach the concepts, but they typically do not use CSS/CSD nomenclature. Seven of eight respondents to the Complete Streets question indicated that their courses do cover Complete Streets designs and their benefits. This suggests that professionals who achieve a graduate-level degree have better exposure to Complete Streets and related concepts, which may not be the case for those at the undergraduate level.

This educational gap can limit the practitioner's ability to apply design flexibilities or understand the trade-offs needed to design for safety for all users in constrained conditions. For example, FHWA may issue interim approval for new traffic control

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[97] Federal Highway Administration. "Information: Design Standards and Section 1404 of the FAST Act." October 2016.
[98] Federal Highway Administration. "Design Standards and Section 1404 of the FAST Act." October 2016.
[99] Section 11129
[100] Federal Highway Administration. "Planning for Transportation in Rural Areas." July 2001

devices or applications prior to issuing a new edition or revision to the MUTCD. Agencies may opt to use these devices by requesting approval from FHWA and committing to the requirements outlined in the interim approval. FHWA also has a process that allows agencies to experiment with new traffic control devices or applications by submitting a request to experiment and committing to follow associated protocols by conducting research and reporting on the efficacy of the experimental device. University, continuing professional education, and other training programs may not stay current on these changes, or even educate practitioners on the fact that the interim and experimental approvals exist, and may not provide information on how and where to make use of these options.

5. *Design document updates do not always keep pace with innovative practices.*

- **The long lead times associated with research- and consensus-based processes in developing and updating many key documents slows adoption of innovation.**

  Documents published by FHWA and professional organizations such as the MUTCD and Green Book discussed above contain demonstrated best practices and well-vetted design principles. However, interviewees noted the state of the practice moves more quickly than many of these publications, as cities and States pursue innovation in infrastructure designs and planning practices to provide safety for all users. These innovative treatments require extensive research before being incorporated into guidance.[101] The Bipartisan Infrastructure Law requires the MUTCD to be updated within 18 months of the passage of the bill and every four years thereafter. There may be opportunities for FHWA to support research and evaluation on the effectiveness and ability of innovative designs and traffic control devices to improve safety for all users.

- **FHWA has influence over the development of many key design documents but does not directly control the content release schedule of those publications.**

  FHWA produces significant guidance to support State and local practitioners and chooses to incorporate several documents published and maintained by non-DOT entities by reference in Federal regulations, thereby adopting them as standards. FHWA can also choose to incorporate portions of documents published by non-DOT entities. FHWA is often involved as non-voting liaisons to these entities but does not control the final content or update schedule of non-DOT publications. When updates are critically needed due to advances in the field, they may not be prioritized by the entities responsible for publication of key reference documents.

6. *Federal standards should be updated to improve accessibility for pedestrians with disabilities.*

- **There is currently no adopted Federal accessibility standard for pedestrian facilities in the public right-of-way.**

[101] Pedestrian and Bicycle Information Center. "Design Resource Index." Accessed October 2021.

The U.S. Access Board develops accessibility guidelines as required under the ADA, the Architectural Barriers Act (ABA) and the Rehabilitation Act. The Access Board proposed guidelines for pedestrian facilities in the public right-of-way in 2011, but these guidelines have not been finalized. The Access Board's guidelines are not binding standards until they are completed by the Access Board and adopted by DOT and USDOJ through separate rulemaking. According to the Access Board's Spring Regulatory Agenda[102], Final Action for the Guidelines is scheduled for October 2022. Current regulations require facilities to be "accessible to and usable by" people with disabilities. The lack of an enforceable standard creates uncertainty for project designers and for regulated entities seeking to comply with the law. Individuals with disabilities who have a right to accessible facilities will continue to face challenges until the Standards are in place.

- **FHWA will need to work with the U.S. Department of Justice to issue and implement guidance under the ADA and Section 504 of the Rehabilitation Act of 1973**

  The USDOJ has sole authority to coordinate the Federal Government's implementation of the ADA and Section 504 of the Rehabilitation Act of 1973. FHWA is ready to coordinate with and obtain concurrence from the USDOJ to post guidance related to the implementation of the ADA or Section 504 relative to street design and construction. FHWA will act as quickly as the concurrence process allows to provide guidance materials that clarify compliance expectations and help public entities expedite project delivery, save time and cost in the delivery of accessibility improvements, and reduce time-consuming complaints, investigations, enforcement actions, and litigation risk.

- **FHWA has limited authority to enforce requirements related to implementation of ADA Transition Plans.**

  The ADA regulation requires all public entities, regardless of size, to evaluate each service, program, or activity, and to remove barriers to program access.[103] Public entity programs include transportation services and facilities utilized by pedestrians and transit users. While the ADA does not require State or local agencies to provide pedestrian facilities, it does require that any public pedestrian facilities that are provided be accessible to and usable by individuals with disabilities to the extent practicable or feasible. This applies to newly constructed or altered facilities; in addition, public entities with 50 or more employees are required to develop a transition plan detailing any structural changes that would be undertaken to achieve program access and specifying a time frame for their completion.[104] The USDOJ regulations specifically require that ADA transition plans address issues with curb ramps because they present such a significant barrier to people with mobility limitations; however, the regulation also

[102] Architectural and Transportation Barriers Compliance Board. "Accessibility Guidelines for Pedestrian Facilities in the Public Right of Way." Accessed January 3, 2022.
[103] 28 CFR 35.150: Existing Facilities
[104] United States Department of Justice. "ADA Update: A Primer for State and Local Governments." June 2015.

requires transition plans to address physical obstacles that limit accessibility. Sidewalks, crosswalks, pedestrian signals and other pedestrian features may be overlooked by some jurisdictions if they focus on curb ramps to the exclusion of other barriers to safe and accessible pedestrian travel.

Transition plans are a requirement under the ADA implementing regulations adopted by USDOJ and not under transportation law. FHWA has worked with the States in recent years to ensure that State DOTs have ADA transition plans. However, there is no mandatory reporting for States to provide updates on progress toward implementing the improvements identified in their plans and the regulatory deadline for providing program access, January 26, 1995, has long since passed.

Adopt Standards and Guidance - Potential Solutions

Potential solutions to adopting standards and guidance include the following:

1. **Consider updates to FHWA products to better consider safety for all users.**
    a. Request information from stakeholders on any changes needed to design standards.
    b. Complete the current update of the MUTCD, incorporating changes based on the rulemaking process, within the 18 month statutory deadline. Begin planning for the next edition of the MUTCD, engaging a wide range of DOT partners, practitioners, and stakeholders with expertise in Complete Streets design.
    c. Update and lead the implementation of a robust, multimodal speed management program. Consider revising FHWA roadway design guidance and regulations to take into account safety for all users by encouraging the reduction of speed limits and creating roadways that help to "self-enforce" speed limits.
2. **Expedite DOT adoption of final accessibility guidelines published by the U.S. Access Board for pedestrian facilities in the public right-of-way.**
    a. Work with USDOJ and Access Board to finalize PROWAG and adopt it as a federal standard for accessibility of pedestrian facilities in the public right of way as expeditiously as possible once the Access Board final regulation is issued.

3. **Enhance stewardship and oversight activities to address accessibility issues more directly.**
    a. Work with DOJ to develop guidance on ADA Transition Plans to ensure that they are implemented for all safety infrastructure, including but not limited to sidewalks, signals, curb ramps, transit and bus facilities, and access to them.
    b. Elevate discussion of transition plan development and implementation in ongoing oversight activities, including discussion of dedicated funding. Encourage reporting on the progress in eliminating accessibility barriers identified in ADA transition plans through the development of measures of performance, tools, training, and outreach to State and local agencies.
4. **Partner with universities and related organizations to develop education and training programs that provide accurate and complete information on roadway design standards and practices.** Leverage UTC program to encourage universities to

create courses or modules that instructors can use or adapt to cover under-taught aspects of design standards or flexibility.

D. **Reinforce the primacy of safety for all users** in interpretation of design standards, guidelines, and project review processes

In addition to the challenges previously noted about data, the planning and review process, and project design, projects that fully incorporate safety for all users may encounter obstacles based on the way that Federal policies, rules, and guidance materials are interpreted and applied. In this federally assisted, State-administered program,[105] FHWA primarily disseminates advances in safe design through technical assistance. Over many years, FHWA has also broadened design standards originally tied to Interstate construction in order to encourage States to use engineering judgement to apply different designs in different contexts, and this approach has been commonly referred to as flexibility. However, the application of this flexibility can lead to inconsistent approaches at a State and local level.

Selected Resources That Relate to These Issues

- 23 U.S.C. §106. Project approval and oversight
- Federal Aid Program Overview
- Pedestrian and Bicycle Funding Opportunities (last updated 2021)
- Pedestrian and Bicycle Safety Guide for Transit Agencies (forthcoming)
- FHWA Bicycle and Pedestrian Planning, Program, and Project Development Guidance – Design Resources (2019)
- Guidance on NHS Design Standards and Design Exceptions (2019)
- Manual on Pedestrian and Bicycle Connections to Transit (FTA, 2017)
- Revisions to the Controlling Criteria for Design Exceptions (2016)
- Signalized Intersections Informational Guide, Second Edition (2013)
- Pedestrian Safety Guide for Transit Agencies (2008)
- Transit Oriented Development Resources (FTA)

Ongoing Challenges

7. Different interpretations of FHWA rules can lead to inconsistency or missed opportunities in addressing safety for all users.

- **Flexibility at the Federal level does not eliminate State and local hurdles during project development and review processes that can discourage Complete Streets applications.**

  Given the wide range of contexts in which roadway projects take place (e.g., topography, geometry, environmental conditions, adjacent land uses, local legal codes, etc.), FHWA promotes Context-Sensitive Design to ensure projects provide safety for all users and fit into the context of the community. This flexibility in the application of standards can provide discretion in decision making based on professional judgment.

[105] Title 23, Section 145

However, some interviewees noted that the open-endedness of the requirements can make it harder to advocate for Complete Streets. States make design decisions under the Stewardship and Oversight agreements made between each State DOT and FHWA. Under these agreements, State DOTs take responsibility for designs, plans, specifications, estimates, contract awards, and inspection of progress on projects while FHWA provides oversight.[106] Some interviewees noted that despite clear Federal guidance on the importance of designing to context and ensuring safety, in some States project proponents must make the case to be able to use designs or treatments that, while allowable, may not yet be common practice in their jurisdiction. Project proponents may be asked to provide additional analysis or justification to Federal and State reviewers to satisfy concerns about compliance with regulations, guidance, and design standards, or other associated issues, and the justification is sometimes requested for each installation of a particular treatment.

This burden may extend beyond the project level for local jurisdictions as they are working to create a Complete Streets network that includes State roads in their jurisdiction. A State that has not embraced the latest design manuals may not work closely with a local government on newer designs or innovative safety treatments (such as separated bike lanes) on roads it owns or controls. The State may take a hands-off approach. On these roads the local jurisdictions may then face the burden of funding, designing projects, leading public involvement and even securing funding for on-going maintenance.

- **Flexibility does not counteract concerns about liability.**

  Engineers may not be comfortable developing or approving designs that are unfamiliar to them or that use new or different design standards, or those which require design exceptions. Interviewees noted that a primary reason for reluctance to use innovative designs was fear of being found liable in the case of injury or death on a facility they designed according to something other than previous designs.

  Engineers traditionally relied on safety being accounted for through compliance with design standards. This has value in consistency and a uniform approach. Safety can also be addressed explicitly and quantitively, by estimating expected safety performance measured in terms of crash frequency and severity through analysis tools.[107] A study on improving pedestrian safety suggested that multimodal accommodation requires "not only new skills, but the ability to approach the profession with a new worldview." [108]

- **State and local laws may limit the use of Federal funding at a local level.**
  While Federal funding programs allow agencies to transfer funds between programs and even to use Federal funds in State- or regionally-defined programs, some State and local

[106] Federal Highway Administration. "Stewardship and Oversight." Accessed October 2021.
[107] Institute of Transportation Engineers. "Integration of Safety in the Project Development Process and Beyond: A Context Sensitive Approach." May 2015.
[108] Transportation Research Board. "NCHRP Synthesis 436: Local Policies That Support Safe Pedestrian Environments." 2012.

rules limit funding for projects that help create Complete Streets. Several interviewees said their States' defined project funding and eligibility categories that are more restrictive than allowed under the Federal funding programs, make it more difficult to fund pedestrian and bicycle projects. Some communities mentioned the State DOT would support only local projects over a certain size, while another interviewee indicated the State would no longer manage funds for multi-modal safety projects in their region, leaving the interviewee with challenges implementing the safety projects they had in the pipeline.

- **Different jurisdictions' road designs may differ based on their varying priorities.** Complete Streets must be part of complete networks to reap the most benefits. While travel patterns may be regional in nature, neighboring jurisdictions may not follow similar approaches to multimodal roadway design. In some cases, the State DOTs apply the same community design standards on the roads they control as the community in which they are located, and in other cases the State DOTs apply State standards that may not align with practice on roads under local control. These varied approaches can lessen the likelihood of complete networks that are safe, reliable, and accessible across even relatively short distances.

8. On-road transit and access to it should be better integrated into roadway safety planning, design, and operation.

- **Most transit operates on the street, but the need to accommodate transit and access to it by walking, biking and rolling can be left out of planning and design decisions because of jurisdictional differences.**

  Transit is often an important element of safe equitable and accessible travel; however, in many cases, different jurisdictions control roadways and transit service, resulting in gaps in the provision of resources and support for the design of on-road transit facilities. Many bus stops lack sidewalk connections, and the question of removing barriers for people with disabilities is complicated by differing jurisdictional responsibilities and overlap. Several interviewees noted a lack of resources or standards to address placement of bus stops, with concerns that locations are often selected by prioritizing vehicular LOS rather than pedestrian accessibility or proximity to key destinations.[109]

  The FTA provides resources for bus stop placement[110] and promote pedestrian and bicycle access to transit, but they do not focus on roadway design issues. Having bus stop placement in one set of resources and associated road design in another may leave transit agencies and transportation departments without the resources to navigate some of these

[109] There are some resources available through professional organizations such as the National Association of City Transportation Organizations (NACTO) Transit Street Design Guide or the Sustainability and Urban Design Standards from the American Public Transportation Association.

[110] Federal Transit Administration. "TCRP Report 19: Guidelines for the Location and Design of Bus Stops". 1996. 2022.

issues, as they may not have a direct relationship with FHWA. It may also lead to missed opportunities for improved pedestrian and bicycle facilities on roadway reconstruction projects funded through FTA grants. In addition, transit service models continue to evolve, such as through the advent of on-demand transit, or shared ride (vehicle or micro-mobility systems) which perform a similar function to transit in many communities. These new service models perform differently on the street and require consideration of novel safety issues. Transportation agencies may not be engaged in discussion of these changing needs.

The FTA's Transit-Oriented Development (TOD) Program supports a mix of commercial, residential, office and entertainment land use development centered around or located near a transit station with high quality multimodal connections. The FTA believes successful TOD makes transit more effective and depends on access to and density around the transit station, including for users arriving by all modes. Convenient access to transit fosters development, while density encourages people to use the transit system. Focusing growth around transit stations capitalizes on public investments in transit.

- **Current Federal resources for roadway safety, design, and operations do not adequately address needs of on-road transit vehicles.**

  Some treatments that are beneficial for pedestrian and bicycle and rolling safety, such as narrower vehicle travel lanes or tighter turning radii, are known to be challenging for larger vehicles to navigate. One interviewee noted that FHWA currently provides some resources on design considerations for large trucks but does not currently have similar guidance supporting on-road transit vehicle accommodation. For example, communities and transit service providers could benefit from additional resources and coordination on design issues such as lane widths, turning radii, bus lanes, bus stop placement, and transit signal priority. Both AASHTO and NACTO have issued guides on transit facilities, but these guides have not been formally adopted by FHWA.[111,112] FHWA is publishing a *Pedestrian and Bicycle Safety Guide for Transit Agencies*, which will help to fill some of that need.

Primacy of Safety for All Users - Potential Solutions

Potential solutions to address the issues about the primacy of safety for all users raised in this section include the following:

1. **Encourage planning for complete and connected multimodal networks at the Statewide and regional level.** Support the design and implementation of safer streets in all communities via new discretionary grant programs, funding increases to the Highway Safety Improvement Program, and Complete Streets planning funds.

[111] American Association of State Highway and Transportation Officials. "Guide for Geometric Design of Transit Facilities on Highways and Streets." 2014.
[112] National Association of City Transportation Officials. "Transit Street Design Guide." 2016.

2. **Provide professional capacity building and training to FHWA personnel and other practitioners on the imperative to provide safety for all users.** Develop and provide training and capacity building for Federal, State DOTs, MPOs, local and Tribal practitioners on implementing a Complete Streets design model and considerations to select appropriate designs for a project context.

3. **Increase interagency coordination on Complete Streets.** Involve transit providers in Complete Streets implementation activities to support appropriate inclusion of transit service and to prioritize safe walking, bicycling, and rolling to stops and stations. Work with other Federal agencies to address gaps. Provide additional technical assistance to State DOTs, MPOs, and local governments related to planning for and designing on-road transit.

E. **Make Complete Streets FHWA's default approach** for funding and designing non-access controlled roadways

An important aspect of supporting consistent prioritization of the safety of all users is to make funding and designing Complete Streets the easiest option for stakeholders. If safety for all users can be incentivized in definitions, guidance, grant awards, and review processes, it would make it easier for agencies to take action. Controlled access freeways are primarily designed to serve high volume, long-distance motor-vehicle travel. Almost 70 percent of the mileage of the National Highway System is not access-controlled and these roads serve a wide variety of road users[113] and purposes beyond rapid mobility. This includes most arterials in urban areas and many small town main streets, where the demands for throughput and local access creates a challenging safety environment. These roadways are the focus of FHWA's complete streets initiative.

Selected Resources That Relate to These Issues

- United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, 2010
- 49 U.S.C. 5303: Metropolitan transportation Planning
- 49 U.S.C. Subtitle IX: Multimodal Freight
- 23 U.S.C. 134 Metropolitan Transportation Planning
- 23 U.S.C. 217 (g): Bicycle Transportation and Pedestrian Walkways: Planning and Design
- Pedestrian and Bicycle Funding Opportunities (2021)
- Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts, 2016
- Health in Transportation Corridor Planning Framework (2014)

Ongoing Challenges

9. *Current DOT guidance provides insufficient detail on statutory requirements to consider all modes*

- **Current guidance is not clear on what counts as sufficient "consideration" of all modes.**

  There are several sections of United States Code that require Federal-aid recipients to consider how to incorporate safe travel for all modes when developing roadway projects:

  - The Planning and Design section of 23 U.S.C. 217, which addresses bicycle and pedestrian facilities, states that "bicyclists and pedestrians shall be given due consideration in the comprehensive transportation plans" except where bicycle and pedestrian facilities are not permitted.[114]
  - The Metropolitan Transportation Planning requirements under §134 and Statewide Transportation Planning requirements under §135 both require

[113] Federal Highway Administration. "Highway Statistics 2019 Table HM-18." Accessed October 2021.
[114] 23 U.S.C. 217(g): Bicycle Transportation and Pedestrian Walkways, Planning and Design

"consideration of all modes of transportation" in a way that is continuing, cooperative, and comprehensive.

- The Federal standards codified in 23 U.S.C. 109 set design criteria for improvements to the National Highway System, including new construction, reconstruction, resurfacing (except for maintenance), restoration, and rehabilitation. Such designs shall provide for future traffic in a way that is conducive to safety and "shall consider… access for other modes of transportation." This section also requires consideration of context, and requires that projects will not be approved if they "have a significant adverse impact on the safety for nonmotorized transportation traffic and light motorcycles," unless "such project or regulatory action provides for a reasonable alternate route or such a route exists."

A review of current Federal guidance documents finds they do not clarify what consideration of all modes entails in these sections, or what would satisfy the requirement for such "consideration." For example, it is not clear whether a State or MPO would need to engage in a formal evaluation of all modes, collect data on all modes, or review networks for different modes that might be impacted by a project. Such clarity is important because roadway projects might impact the viability of broader networks and might limit the ability to build connections for modes that already exist nearby.

It is also not clear what analysis or justification is necessary when *not* including accommodations for all modes. Interviewees pointed out that, currently, the administrative burden for a multi-modal project is often higher in practice than for a single-use vehicular roadway. This creates a disincentive to pursue such projects.

Clarifying how modes other than motor vehicles should be considered in the planning and design process could bring the administrative burden for both types of projects closer to parity. The Commonwealth of Massachusetts provides a relevant example of how to consider all modes; the State DOT has prioritized Complete Streets and accommodation of all modes in its *Project Development and Design Guide* and its 2013 *Healthy Transportation Policy Directive,* which ensures that projects are "designed and implemented in a way that all…customers have access to safe and comfortable healthy transportation options."[115,116] Massachusetts has also clarified its requirements for the design of pedestrian and bicycle projects and that design exceptions are required when the criteria cannot be met.[117]

- **Current guidance and technical assistance can do more to support communities in creating Complete Networks and resolving multimodal conflicts.**

  For people traveling outside of automobiles, continuous facilities appropriate to their non-automotive mode are essential to ensuring safety for their entire trip. Interviewees noted that practitioners should consider individual projects as part of larger scale

[115] Massachusetts Highway Department. "Project Development and Design Guide." 2006.
[116] Massachusetts Department of Transportation. "Healthy Transportation Policy Directive." September 2013.
[117] Massachusetts Highway Department. Design Criteria for MassHighway Projects and Bicycle and Pedestrian Accommodation Requirements

networks. For example, while 23 U.S.C. §134 and 23 U.S.C. §135 both require "consideration of all modes of transportation" in statewide and metropolitan planning, existing resources do not provide clear guidance on how to achieve connected networks that accommodate all modes and all users.

An example of a network-related provision is Section 11133 in the new Bipartisan Infrastructure Law.[118] This expands an existing provision to ensure that bridge deck replacements or rehabilitations provide safe accommodation of bicycles and pedestrians if the project planning process determines that with current or planned future network accommodations, bicycle and pedestrian travel are allowed on both ends of the bridge, the accommodation will be safe for all users, and can be provided at a reasonable cost. FHWA developed the 2016 guide, *Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts* to help State and local entities connect and expand multimodal networks.[119]

However, interviewees indicated there are not yet sufficient resources to help practitioners address multimodal streets that include transit and freight networks, or how to address conflicts between modes when there is not sufficient right-of-way to accommodate all uses in a single street. FHWA is encouraging States and other recipients of the wide variety of discretionary and formula programs under the Bipartisan Infrastructure Law to invest these funds to create a transportation network that is safe and accessible for all users,[120] and will be providing additional information in updated and new guidance and notices of funding opportunities. FHWA recently published a report summarizing results from a *Multimodal Network Connectivity Pilot Grant Program*, which provided eight communities with grants to analyze their walking, rolling, and bicycling facility networks and identify opportunities to fill gaps.[121]

10. Agencies should systematically change policies, rules and procedures to fully implement a Complete Streets design model.

- **A full transition to a Complete Streets design model requires leadership, identification and elimination of barriers, and development of new policies, rules, and procedures to prioritize safety.**

  Not all jurisdictions have taken the actions necessary to adopt a context-sensitive or a complete streets design model to govern the project-delivery system in their own projects or for projects they oversee. Full adoption requires a leadership commitment, and work to transform many policies, rules, and procedures to avoid some of the issues identified in this report. These include data collection and analysis, planning, project selection, design

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[118] Pub.L. 117–58. *See* U.S. Congress. "H.R.3684 - Infrastructure Investment and Jobs Act." Accessed November 2021.
[119] Federal Highway Administration. "Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts." August 2016.
[120] Federal Highway Administration, "Policy on Using BIL to Build a Better America," December 16, 2021
[121] Federal Highway Administration. "Measuring Multimodal Network Connectivity Pilot Grant Program Final Report." October 2021.

manuals, approval procedures, and performance measures. For example, in some States, strict interpretations of guidance documents, such as the AASHTO Green Book, have been adopted as State law and have not yet been updated. One interviewee noted that even though FHWA updated the guidance around controlling criteria for design in 2016 to remove 8 of 10 criteria in design of lower speed (<50mph) non-freeway roadways, not all State DOTs have updated their highway design manuals to allow more appropriate designs for lower-speed roadways. This is just one of many changes necessary to help make a Complete Streets design model the default approach.

- **States, MPOs, and local governments may need technical support earlier in and throughout the process to consistently plan and develop multimodal projects.**

  Though DOT already provides numerous technical materials and professional capacity building resources to assist State and local agencies with elements of Compete Streets implementation, agencies may need support at more phases of the project life cycle and may need resources to assist with policy and procedural changes that help make Complete Streets their default design model. Some interviewees expressed a need for more data and for support with developing their own data collection systems. Agencies also expressed needs for support with the formal design process, including with the initial design and cost estimating to get a multimodal project to a level of readiness for funding eligibility. For example, interviewees mentioned that communities may encounter challenges with developing appropriate strategies for incorporating signalization and drainage into project plans and may need additional support with funding applications and with identifying or collecting appropriate data to support project development.

  Technical assistance needs will vary from jurisdiction to jurisdiction. While several interviewees noted they would like more technical support with early design and review milestones and with developing successful grant applications for Federal funding, several other interviewees also described a need for support in overseeing funding for local projects. One interviewee noted their State DOT was not willing to act as a fiscal agent for the community's projects to provide facilities for all users since it was a burden to State DOT staff time. Another community shared that their State DOT would only administer projects over a certain size, leaving communities with smaller projects seeking another fiscal agent, like an MPO or another Federal Agency, to administer project funding.

Make Complete Streets the Default Approach - Potential Solutions

1. **Provide more guidance on process and requirements to consider all modes.** Consider issuing FHWA guidance to strengthen implementation of 23 USC 109 and 23 U.S.C. 217 to clarify what constitutes sufficient consideration of bicycles and pedestrians, including the necessity of complete multi-modal networks. Study opportunities to clarify the criteria necessary to justify not including accommodations for all modes in planning and project design processes (e.g., topography, right-of-way, presence of facilities on nearby parallel routes, etc.).

2. **Provide additional technical support and guidance focused on promoting safety for all users.** Create a Complete Streets web portal to consolidate key FHWA and other resources for practitioners. Develop resources that provide examples of ways to transform arterials to provide safe, connected access for all users.
3. **Continue to evaluate aspects of Complete Streets and document progress and needed policy, guidance, and program improvements.** Several new programs established through the Bipartisan Infrastructure Law include Complete Streets elements and require periodic reporting to Congress. These include the Reconnecting Communities Pilot Program (Section 11509), and the Transportation Access Pilot Program (Section 13010). These future reports will provide an opportunity to evaluate, supplement, and refine the activities recommended in this report.
4. **Make statutory, regulatory, guidance and/or process changes that eliminate barriers as outlined in this report**. Launch a comprehensive Complete Streets Initiative and provide technical assistance to communities of all sizes to implement policies that prioritize the safety of all users in transportation network planning, design, construction, and operations, including small towns and rural areas. Incorporate Complete Streets criteria in Federal grant opportunities.

IV. What's Next?

FHWA established a Complete Streets initiative that seeks to ensure that agency policies, procedures, standards, communications, and people prioritize safety and connectivity for all users of the transportation system. Through this initiative, FHWA seeks to increase the proportion of transportation projects that Federal-aid highway funding recipients routinely plan, design, build, and operate that are safe and accessible for all users. Based on the findings of this Report, the FHWA Complete Streets team will focus its upcoming efforts in four primary areas:

1) Assessing and revising FHWA policies, regulations, processes, and practices to make it easier for State and local agencies to advance and build Complete Streets that accommodate all users. This Complete Streets design model encompasses practices in safety, planning, design, construction, operations, and maintenance to improve safety for all users. This Report provides a roadmap for this strategy.
2) Providing support through leadership, technical assistance, peer learning, and other means, to make implementation of Complete Streets the standard of practice among local and State agencies for non-access controlled roadways eligible for Federal aid.
3) Improving data collection capabilities and practices and developing performance measures using those data to support the implementation and operation of Complete Streets.
4) Expeditiously implementing new program eligibilities and other provisions in the Bipartisan Infrastructure Law that support Complete Streets and safety for all roadway users.

V. Conclusions

Safety is DOT's top priority, and the successful implementation of a Safe System approach, including safe accommodations for all modes and all users on roadways throughout the Nation, is central to the efforts that DOT is making to meet roadway safety goals.

Although FHWA has made substantial progress in recent years in developing materials, revising design guidance, providing training, and supporting the needs of States and local agencies working to implement Complete Streets initiatives on the ground, additional work is needed to accelerate widespread adoption of the Complete Streets design model as a critical safety improvement strategy. The need to improve safety for all users is pressing as roadway fatality numbers, particularly for pedestrians and bicyclists, continued to rise over the last decade, and particularly since the COVID-19 pandemic drastically shifted travel patterns for many travelers.[122] Road design will need to continue evolving in order to accommodate a range of future operational needs that include changes to use of curb space, different peak travel times, new mobility options (automation, charging areas, e-bikes), and speed management.

The Bipartisan Infrastructure Law will also advance State and local adoption of a Complete Streets design model. Issues of both Complete Streets and safety for all but particularly vulnerable users are strongly reflected in the BIL, in provisions including a new Safe Streets and Roads for All Users grant program, an increase in Highway Safety Improvement Program funding and requirement for State preparation of vulnerable road user assessments and Complete Streets Planning funds. The Bipartisan Infrastructure Law also requires DOT to reexamine the Manual of Uniform Traffic Control Devices through the lens of safety for all users, a requirement FHWA embraces and has already begun working on.

Building on nearly a year's worth of work by the FHWA Complete Streets team and the thorough review of Federal regulations, rules, policies, and guidance undertaken for this Report, along with the insights and feedback from interviews conducted with State, regional, and local stakeholders as well as with professional organizations, FHWA has identified both opportunities and challenges that will inform our Complete Streets efforts. FHWA is committed to capitalizing on all five major areas of opportunity, which are improving data collection and analysis, supporting rigorous safety assessment during project development and design, accelerating adoption of revised standards and guidance, reinforcing the primacy of safety for all users and making Complete Streets FHWA's default approach to non-access controlled roadways.

The FHWA Complete Streets initiative is already advancing specific efforts addressing all five areas of opportunity and the associated challenges identified in this Report. And the Bipartisan Infrastructure Law creates new funding opportunities to support safety projects, requires States and MPOs to use a portion of their funding to develop and adopt Complete Streets policies, and brings safety for all users into clearer focus in the eligible uses for formula funding programs. Guided by these identified opportunities and challenges, and with the funding and other tools

[122] Pedestrian and Bicycle Information Center. "Shifting Streets" COVID-19 Mobility Dataset." Accessed October 2021.

provided in the Bipartisan Infrastructure Law, both DOT and FHWA leadership are committed to using the Complete Streets design model to have a positive impact on the safety of all roadway users – reversing the trend of increasing fatal and serious injuries and creating a healthier, greener, and more equitable surface transportation system

Appendix 1: List of Interviewees

The following are the organizations and individuals who were interviewed for this report. Please note that to comply with the Paperwork Reduction Act, separate interview protocols were developed for the State, regional, and local interviews and a distinct set of protocols were developed for the interviews with professional organizations.

State, regional, and local interviews

- District Department of Transportation (DDOT), Washington, District of Columbia
- Washington State DOT
- Minnesota DOT
- New York State DOT
- Des Moines Area MPO, Des Moines, Iowa
- Broward MPO, Broward County, Florida
- City of Phoenix, Arizona
- City of Detroit, Michigan

Professional and Non-Profit Organizations

- AASHTO
- Institute of Transportation Engineers (ITE)
- National Association of City Transportation Officials (NACTO)
- American Society of Landscape Architects (ASLA)
- American Council of Engineering Companies (ACEC)
- Pedestrian and Bicycle Information Center (PBIC)

Department of Transportation Offices

- Federal Transit Administration
- FHWA Intelligent Transportation Systems/Joint Program Office
- FHWA Office of Civil Rights
- FHWA Office of Federal Lands Highway
- FHWA Office of Infrastructure
- FHWA Office of Operations
- FHWA Office of Planning, Environment, and Realty
- FHWA Office of Policy and Government Affairs

FHWA Office of Safety

Appendix 2: Key Resources and References

Title	Category
16 U.S.C. 470: Section 106 of the National Historic Preservation Act	Legislation
23 U.S.C. 109(c): Design Criteria for the National Highway System	Legislation
23 U.S.C. 134: Metropolitan Transportation Planning	Legislation

Title	Category
23 U.S.C. 217 (g): Bicycle Transportation and Pedestrian Walkways: Planning and Design	Legislation
23 U.S.C. 106: Project approval and oversight	Legislation
49 U.S.C. 5303: Metropolitan transportation Planning	Legislation
49 U.S.C. Subtitle IX: Multimodal Freight	Legislation
Accelerating Project Delivery (23 U.S.C. 138, 139, 168, 169, 330; 49 U.S.C. 304)	Legislation
Environmental Protection Agency Clean Air Act Text and Overview	Legislation
Sec. 2 42 U.S.C. 4321: NEPA	Legislation
23 CFR 450.206: Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning; Final Rule	Regulation
23 CFR 450.322: Congestion Management Process	Regulation
23 CFR 490: National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program	Regulation
23 CFR 625.4: Standards, Policies, and Standard Specifications	Regulation
23 CFR 655.603: Traffic Control Device Standards (Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition, 2012 Rev)	Regulation
23 CFR 924.9: Highway Safety Improvement Program: Planning	Regulation
23 CFR 771: Environmental Impact and Related Procedures	Regulation
28 CFR 35.151 and 36 CFR part 1191 (2004 AADAG): ADA Standards for Accessible Design (2010)	Regulation
49 CFR 27: Section 504 of the Rehabilitation Act of 1973 Implementing Regulation	Regulation
Apportionment of Federal-Aid Highway Program Funds for Fiscal Year (FY) 2021	Regulation
Safety Performance Measures Rule (PM1): National Performance Management Measures; HSIP	Regulation
US DOJ 2010 ADA Standards for Accessible Design (2010)	Regulation
Benefit-Cost Analysis Guidance for Discretionary Grant Programs (2021)	Guidance
Bicycle and Pedestrian Facility Design Flexibility (2013)	Guidance
Bicycle and Pedestrian Funding, Design, and Environmental Review: Addressing Common Misconceptions (2015)	Guidance

Title	Category
Department of Justice/Department of Transportation Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing (USDOJ, Updated 2019)	Guidance
Q and As Supplement to the 2013 DOJ/DOT Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing	Guidance
DRAFT Public Rights of Way Accessibility Guidelines (PROWAG) – U.S. Access Board (2011)	Guidance
FHWA Bicycle and Pedestrian Planning, Program, and Project Development Guidance (2019)	Resource
FHWA Civil Rights ADA Program Guidance	Guidance
FHWA Memorandum on Design Standards (2016)	Guidance
Guidance on NHS Design Standards and Design Exceptions (2019)	Guidance
Level of Service on the National Highway System Memo (2016)	Guidance
National Highway Performance Program Guidance (2016)	Guidance
Relationship between Design Speed and Posted Speed (2015)	Guidance
Revisions to the Controlling Criteria for Design Exceptions (2016)	Guidance
Shared Use Paths Along or Near Freeways and Bicycles on Freeways (2011)	Guidance
AASHTO: A Policy on Geometric Design of Highways and Streets (2018)	Policy
United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations (2010)	Policy
Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts (2016)	Resource
Bicycle-Pedestrian Count Technology Pilot Project (2016)	Resource
Bikeway Selection Guide (2019)	Resource
Federal Aid Program Overview	Resource
FHWA Curbside Inventory Report (2021)	Resource
FHWA Metropolitan Pedestrian and Bicycle Planning Handbook (2017)	Resource
Guidebook for Developing Pedestrian and Bicycle Performance Measures (2016)	Resource
Guidebook for Measuring Multimodal Network Connectivity (2018)	Resource

Title	Category
Improving Pedestrian and Bicycle Connectivity During Rehabilitation of Existing Bridges (2016)	Resource
Incorporating On-Road Bicycle Networks into Resurfacing Projects (2015)	Resource
Level of Service Case Studies (2017)	Resource
Manual on Pedestrian and Bicycle Connections to Transit (FTA, 2017)	Resource
Measuring Multimodal Network Connectivity Pilot Grant Program Final Report (2021)	Resource
Mitigation Strategies for Design Exceptions (2014)	Resource
PBIC Design Resource Index (2018)	Resource
Pedestrian and Bicycle Funding Opportunities (last updated 2021)	Resource
Pedestrian Safety Guide and Countermeasure Selection System (2013)	Resource
Pedestrian Safety Guide for Transit Agencies (2008)	Resource
Pedestrians and Accessible Design (2017)	Resource
Regional Cooperation and Bike/Ped and Transit Connections (2016)	Resource
Separated Bike Lane Planning and Design Guide (2015)	Resource
Signalized Intersections Informational Guide, Second Edition (2013)	Resource
Small Town and Rural Multimodal Networks Guide (2016)	Resource
State DOT Transition Plan Attributes Review Guide	Resource
The Transportation Planning Process Briefing Book (FHWA/FTA)	Resource
Traffic Analysis and Intersection Considerations to Inform Bikeway Selection (2021)	Resource
Transit Oriented Development Resources (FTA)	Resource
Transportation Alternatives Program Performance Management Guidebook (2016)	Resource
Transportation Planning Capacity Building Program	Resource