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Using Context Sensitive Solutions to Achieve Context Sensitive Design

State of the Practice Assessment

August 2018

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16. Abstract <p>The Federal Highway Administration (FHWA) conducted a state of the practice assessment to gain insight into the status of Context Sensitive Solutions (CSS) implementation to achieve Context Sensitive Design (CSD) at the national level. The assessment informs future strategies for advancing CSS/D and included web research on CSS and CSD-related information available through the websites of FHWA, partner transportation organizations, and all State Departments of Transportation (DOTs). In addition, CSS/D case studies were analyzed to catalog the featured CSS/D best practices. FHWA also held interviews with 12 DOTs to learn how they implement CSS/D in practice and assess capacity building and technical assistance needs. Lastly, FHWA hosted two webinars; the first was focused on FHWA's role in implementing CSS/D at the State level and the second presented findings from the assessment research. This report documents the process and outcomes of the state of the practice assessment. The report appendices provide details from the State DOT web research.</p>			
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Introduction

This report is a summary of a national state of the practice assessment of Context Sensitive Solutions and Design (CSS/D) implementation based on a review of all State DOT websites, technical assistance in 6 States, 4 virtual peer exchanges, and interviews and group discussions with 12 State DOTs. The purpose of these efforts was to demonstrate how a Context Sensitive Solutions (CSS) process can be optimally utilized to implement Context Sensitive Design (CSD) which helps to accelerate project delivery and improve safety. The national assessment identifies current practices among State departments of transportation (DOTs) incorporating CSS/D in their decision-making process and highlights barriers and challenges faced with implementation; including gaps in training, technical assistance, and capacity building needs. The report provides key takeaways and highlights programmatic recommendations for future research and resource development to better integrate CSS/D in planning and project development.

Definitions

Context Sensitive Design (CSD)

A design process that not only considers physical aspects or standard specifications of a transportation facility, but also the economic, social, and environmental resources in the community being served by that facility. A CSD approach helps to ensure projects:

1. Are safe for all users.
2. Use a shared stakeholder vision as a basis for decisions and for solving problems that may arise.
3. Meet or exceed the expectations of both designers and stakeholders, thereby adding lasting value to the community, the environment, and the transportation system.
4. Demonstrate effective and efficient use of resources.

Context Sensitive Solutions (CSS)

A decision-making process that helps accelerate project delivery by establishing “a collaborative, interdisciplinary approach that involves all stakeholders in providing a transportation facility that fits its setting. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions.”¹ The CSS process is guided by the following four principles:

1. A shared stakeholder vision to provide a basis for decisions.
2. A comprehensive understanding of contexts.
3. Continuing communication and collaboration to achieve consensus.
4. Flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments.

Background

The definition and principles of CSS/D are well-aligned with the strategic priorities of the U.S. Department of Transportation (USDOT) for addressing today’s transportation challenges. These priorities include safety, infrastructure, innovation, and accountability, and are further explained below:²

¹ Federal Highway Administration. (2017). “What is CSS?” https://www.fhwa.dot.gov/planning/css/what_is_css/

² U.S. Department of Transportation (2017). “U.S. Department of Transportation Strategic Plan for FY 2018-2022.” <https://www.transportation.gov/dot-strategic-plan>

- Safety: Reduce Transportation-Related Fatalities and Serious Injuries Across the Transportation System
- Infrastructure: Invest in Infrastructure to Ensure Mobility and Accessibility and to Stimulate Economic Growth, Productivity and Competitiveness for American Workers and Businesses
- Innovation: Lead in the Development and Deployment of Innovative Practices and Technologies that Improve the Safety and Performance of the Nation's Transportation System
- Accountability: Serve the Nation with Reduced Regulatory Burden and Greater Efficiency, Effectiveness and Accountability

A CSS/D has evolved from a purely design focused approach to a process that informs transportation decision making overall and emphasizes safety of all users while addressing mobility and accessibility challenges that may impact economic growth. In addition, a CSS/D approach allows for flexibility and creativity, which encourages innovation within transportation agencies. Also, the inclusion of shared stakeholder perspectives in project planning and development increases accountability on behalf of transportation agencies to their customer base, helps gain project support, and ultimately can accelerate project delivery.

The principles of CSS/D have increased in prominence and nature where context-sensitive outcomes are applicable to entirety of the planning and project development process. CSS/D allows agencies to proactively address today's transportation challenges, respond to evolving program demands, and mobilize to meet future needs. Table 1 on page 3 provides information on CSS/D milestones between 1995 and 2015 which highlights how CSS and CSD have evolved over time.

Table 1: CSS/D Milestones, 1995 – 2015

1995	NHS Designation Act allows that projects may need to conform to the particular environmental, scenic, aesthetic, historic, community and multi-modal needs of a locality.
1997	FHWA publishes <i>Flexibility in Highway Design</i> (FHWA-PD-97-062), identifying and explaining opportunities, flexibilities, and constraints facing designers and design teams responsible for the development of transportation facilities.
1998	Five state DOTs (Connecticut, Kentucky, Maryland, and Minnesota) and FHWA Federal Lands Highway pilot the Context Sensitive Design Approach following the "Thinking Beyond the Pavement" workshop hosted by Maryland State Highway Administration and co-sponsored by FHWA and AASHTO. The Transportation Equity Act for the 21 st Century (TEA-21) further strengthens and enhances requirements for public involvement and integration of planning and environmental considerations in the decision-making process.
2002	Transportation Research Board TRB publishes <i>A Guide to Best Practices for Achieving Context Sensitive Solutions</i> (NCHRP Report 480).
2003	FHWA sets the goal of all state DOTs practicing CSS by 2007. Washington State Department of Transportation publishes the <i>Building Projects That Build Communities</i> .
2004	FHWA and partners launch the Context Sensitive Solutions website to serve as a resource for practitioners. AASHTO publishes <i>A Guide for Achieving Flexibility in Highway Design</i> . National Cooperative Highway Research Program publishes the <i>Performance Measures for Context Sensitive Solutions – A Guidebook for State DOTs</i> . TRB publishes the <i>Context-Sensitive Design Around the Country: Some Examples</i> .
2005	The Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU) Section 6008 authorizes the Department of Transportation to consider the characteristics and qualities of CSS in establishing standards to be used on the National Highway System. AASHTO surveys members on CSS practices and hold its first competition <i>Best Practices in Context Sensitive Design Competition</i> . Washington State Department of Transportation publishes the <i>Understanding Flexibility in Transportation Design</i> .
2006	"National CSS Peer Exchange" is held in Baltimore, MD sponsored by FHWA and AASHTO. Over 260 participants from 46 states, the District of Columbia, Puerto Rico and Nova Scotia participate in peer exchanges, and discussions on challenges to implementation. American Society of Civil Engineers (ASCE) hosts "Context Sensitive Solutions in Practice: What You Need to Know," in Atlanta, GA. The Institute of Transportation Engineers (ITE) publishes <i>Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities</i> . This book advances the successful use of CSS in the planning and design of major urban thoroughfares for walkable communities. The publication is superseded by <i>Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (2010)</i> . Center for Environmental Excellence publishes the <i>Best Practices in CSS Competition</i> .
2007	FHWA and AASHTO publish a <i>strategic plan</i> to mainstream CSS practices throughout government agencies that develop transportation projects. FHWA publishes <i>Integrating Context Sensitive Solutions into Transportation Practice</i> .
2008	FHWA sponsors Peer Exchanges in Indiana and Nevada providing CSS Action planning Grants and extensive technical assistance training.
2009	FHWA launches the "National Dialog on Context Sensitive Solutions" to provide CSS technical assistance to communities. TRB publishes <i>Quantifying the Benefits of Context Sensitive Solutions</i> (NCHRP Report 642).
2010	FHWA publishes <i>Going the Distance Together: Context Sensitive Solutions for Better Transportation A Practitioner's Guide</i> for NCHRP Project 8-68. ITE publishes <i>Designing Walkable Urban Thoroughfares: A Context Sensitive Approach</i> . FHWA publishes the <i>CSS National Dialog Final Report</i> summarizing the results of five regional workshops and a national webcast that collectively drew more than one thousand participants.
2011	FHWA initiates the "CSS Champions Program," profiling and providing tactical assistance to four communities in the process of planning, developing and implementing transportation projects using a CSS process. FHWA launches a second "National Dialog on Context Sensitive Solutions" to introduce CSS principles, identify best practices, foster peer support community and link CSS to initiatives such as Livability, Complete Streets, Sustainability and Every Day Counts. Ten regional workshops/webcasts and two national webcasts attract thousands of participants. TRB publishes <i>Going the Distance Together: A Citizen's Guide to Context Sensitive Solutions for Better Transportation</i> (NCHRP 184 web only) for NCHRP Project 8-68.
2013	TRB publishes "Practical Highway Design Solutions: A Synthesis of Highway Practice" (NCHRP Report 443).
2014	FHWA publishes the <i>CSS National Dialog 2 Final Report</i> summarizing the results of the workshops and webcasts.
2015	FHWA introduces "Performance Based Practical Design" (PBPD) as a complement to CSS. PBPD is a tool allowing state DOTs to scope projects to meet an identified core purpose and need. ITE publishes <i>Integration of Safety in the Project Development Process and Beyond: A Context Sensitive Approach</i> .

Source: www.fhwa.dot.gov/planning/css/history/

CSS/D Technical Assistance and State of the Practice Assessment (2016-2018)

FHWA initiated the CSS/D Targeted Technical Assistance effort in 2016. This effort sought to improve and accelerate project delivery by expanding the application of CSS/D principles and building capacity in States requesting assistance with CSS/D implementation. Six States (Delaware, Florida, Idaho, Minnesota, North Dakota, and Washington) received onsite technical assistance to better incorporate CSS/D principles in their respective decision making processes. In addition, FHWA hosted four virtual peer exchanges in collaboration with State and local transportation practitioners regarding the relationship between CSS/D and performance based practical design (PBPD), sustainability, project delivery in rural communities, and multimodal thoroughfares. The virtual peer exchanges provided an opportunity for participants to share experiences and lessons learned on areas relevant to day-to-day project delivery. The CSS/D technical assistance States, and departments of transportation (DOTs) in California, Colorado, Hawaii, Wyoming, Montana, Utah, Vermont, New Jersey, Pennsylvania, as well as the Hillsborough County (FL) MPO participated in the virtual peer exchanges.

To complement the CSS/D Targeted Technical Assistance effort, FHWA conducted a CSS/D state of the practice assessment in 2017 to gain insight on the status of CSS/D implementation and to inform future strategies for advancing CSS/D. Together, the CSS/D Targeted Technical Assistance, virtual peer exchanges, and CSS/D state of the practice assessment helped identify barriers to and solutions for enhancing and accelerating transportation project delivery.

Reports from the Technical Assistance activities are available on FHWA's website at <https://www.fhwa.dot.gov/planning/css/> which features comprehensive information about CSS/D and many useful resources, including a compendium of CSS/D case studies, publications, webinar recordings, and other key references.

2017 State of the Practice Assessment Objectives

The objectives of the CSS/D state of the practice assessment included the following:

- Assess the state of CSS/D practice at a national level;
- Identify best practices and successes being realized by State DOTs;
- Identify barriers and challenges faced by State DOTs;
- Determine training, technical assistance, or capacity building needs to support full integration of CSS/D;
- Gain understanding of where CSS/D is incorporated within the project delivery processes of State DOTs;
- Identify metrics and performance measures being used to quantify CSS/D;
- Evaluate how different States (and/or geographic regions more broadly) approach CSS/D and the terminology they use; and
- Evaluate new and emerging trends and issues that are related to CSS/D and that may require refined techniques or new approaches.

Achieving these objectives required a multifaceted approach. The main steps taken to achieve the objectives were:

- Review FHWA's 2007 and 2014 assessment methodology and results;
- Gather information from pertinent FHWA websites;
- Search partner and other stakeholder websites;

- Gather information from State DOT websites;
- Deliver a webinar targeted to FHWA Divisions;
- Deliver a webinar targeted to State DOT practitioners;
- Conduct interviews with State DOT practitioners; and
- Conduct outreach to the original CSS pilot States.

Previous CSS/D Assessments

FHWA conducted CSS/D assessments at the State level in 2007 and 2014. In 2007, FHWA Headquarters provided each FHWA Division office with a CSS/D performance matrix worksheet to complete in coordination with its State DOT. The worksheet featured the following implementation categories:

- CSS/D commitment and/or policy;
- CSS/D training;
- CSS/D integration into projects and planning studies;
- Stakeholder involvement; and
- Interdisciplinary teams.

Within each category, each State indicated their level of implementation, their expected progress by the end of fiscal year 2007, and the actionable steps needed to achieve that progress. At the end of the worksheet, FHWA inquired about the presence of a CSS/D action plan as well as any technical assistance needs related to CSS/D. Using the responses provided by the States, each was categorized along a spectrum of CSS/D implementation, as shown in Table 2.

Table 2: 2007 CSS/D Assessment Results

	Initiating Progress	Early Implementation	Implementation Progress	Mature Program	Exemplary Program
Number of States	15	15	9	10	3

In 2014, the FHWA Resource Center conducted outreach to all FHWA Division offices as a follow-up to the 2007 assessment to evaluate shifts along the CSS/D implementation spectrum. The outcome of that follow up assessment is summarized in Table 3, below.

Table 3: 2014 CSS/D Assessment Results

	Initiating Progress	Early Implementation	Implementation Progress	Mature Program	Exemplary Program
Number of States	3	8	19	13	9

Both the 2007 and the 2014 assessments informed the 2017 assessment. The implementation categories from the 2007 self-assessments provided examples of key indicators for CSS/D adoption and implementation. Furthermore, narrative responses provided by the States offered examples of areas where technical assistance could help with implementation, and examples of policies, initiatives, or training sessions. Key areas identified for technical assistance included a strong focus on additional training opportunities, as well as assistance with identifying performance measures and developing procedures and documentation for CSS/D integration. This information shaped the research and interviews conducted as part of the 2017 state of the practice assessment.

Report Organization

This report is broken down into the following sections:

- **CSS/D Today: How CSS/D is Framed and Incorporated** – This section describes the ways in which CSS/D is featured on the websites of FHWA, transportation organizations, university transportation centers, and State DOTs.
- **State Department of Transportation Interviews and Pilot State Discussion** – This section provides the takeaways that emerged from individual State DOT interviews and a focus group discussion with the five CSS pilot States.
- **CSS/D Case Study Best Practices** – This section details the results of an analysis conducted on the 143 case studies featured on FHWA’s website.
- **Webinar Outreach** – This section describes the two webinars held as part of the state of the practice assessment.
- **Conclusions** – This section summarizes the findings from the state of the practice assessment.
- **Appendix: CSS/D-Related Initiatives Featured on State DOT Websites** – Contains a table showing CSS/D-related initiatives that appear on State DOT websites.

Key Takeaways

The following key takeaways emerged from the online research, interviews, and webinars conducted as part of the 2017 state of the practice assessment.

- Many DOTs focus on advancing strategies and principles that incorporate a context-sensitive approach in transportation decision making, however not all States use the terms CSS or CSD.
- The ways in which DOTs approach and implement CSS/D is influenced the geography and population density within their States.
- In addition to NCHRP Report 642, *Quantifying the Benefits of Context Sensitive Solutions*, many DOTs indicated a need for updated resources to further CSS/D performance metrics development and tracking outcomes.
- Nearly all DOTs that reference CSS/D on their websites or provide design guidance, also generally implement CSS/D-related initiatives and/or strategies.
- Many DOTs focus on CSS/D during the project planning and design phase of transportation decision making; however, some DOTs incorporate CSS/D considerations early in the transportation planning phase.
- DOTs have worked to integrate CSS/D into their project-delivery processes by specifically including elements of CSS/D into their design manuals, conducting enhanced scoping, or adding sections specific to context within required project initiation documentation.
- While not always referred to as CSS or CSD, CSS/D strategies and principles permeate throughout FHWA initiatives and closely relate to USDOT priority areas – safety, infrastructure, innovation, and accountability. For example, the Community Connections initiative with Every Day Counts-4 focused on connecting and revitalizing urban cores and adjacent communities.
- Partnering with transportation organizations provides an opportunity to disseminate materials to further CSS/D implementation.
- DOTs may benefit from additional technical assistance on design flexibility; CSS/D training for new staff; leveraging funding sources in support of CSS/D; CSS/D policies, procedures, and guidelines; broad-based public involvement; measuring success of CSS/D implementation; PBPD; multimodal accommodations; and effective visioning.

- Existing CSS/D case studies that showcase examples of performance measures, environmental justice, expedited project development and delivery, and enhancing value through shared solutions are available on various FHWA program websites; including but not limited to human and natural environment, project development and environmental review, infrastructure, design, and safety.
- Many DOTs have not conducted CSS/D-specific training in recent years, and could benefit from training to learn of CSS/D implementation strategies as well as new and updated resources.
- Developing additional CSS/D case studies that focus on CSS/D integration with more projects and plans such as rural facilities, corridor planning, Americans with Disabilities Act (ADA) compliance, and resiliency/sustainability to assist DOTs looking to enhance CSS/D implementation.
- Some of the biggest challenges impeding greater CSS/D implementation at the State DOT level include internal resistance to change, the perception of CSS/D as costly or unnecessary, and integration of CSS/D strategies into current project development processes.
- Some of the biggest opportunities for furthering CSS/D implementation include framing CSS/D implementation through a focus on accelerating project delivery, innovative financing, and rural quality of life; leveraging future AASHTO Green Book versions to highlight more focus on context sensitivity and flexibility in design; and incorporating CSS/D benefits metrics conducive to delivering performance-driven results in project development processes.

CSS/D Today: How CSS/D is Framed and Incorporated

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A myriad of CSS/D resources are available throughout various FHWA program websites. FHWA's primary CSS/D webpage at <https://www.fhwa.dot.gov/planning/css/> contains several subpages defining CSS/D, its benefits, applications, features, and the connection between CSS and CSD. The website also features CSS/D project case studies, publications, key references, webinar recordings, and other relevant information. A recurring theme throughout the FHWA website is how CSS/D principles permeate other transportation program areas and initiatives. For instance, the webpage outlines the benefits of CSS/D and includes details on the role of CSS/D in project delivery, PBPD, Complete Streets, and environmental justice. In the project delivery section, the information highlights how CSS/D can help achieve cost-savings, tailored solutions, on-time project delivery, and productive relationships with community members. As discussed previously, the CSS/D in practice brochure is available at <https://www.fhwa.dot.gov/livability/resources/cssbrochure.cfm> and provides additional details on the connections between CSS/D, other transportation initiatives, and FHWA program areas.

In addition to the main CSS/D webpage, many other FHWA webpages reference CSS/D, highlighting the compatibility between CSS/D and other transportation activities. Below are select applicable web resources from various FHWA Offices.

[Office of Project Development and Environmental Review:](#)

- [FHWA's Environmental Review Toolkit](#) – Provides information and updates about transportation and the environment. The Environmental Review Toolkit provides up-to-date information on various environmental resources, CSS/D information, policy guidance, best practices, and training.
- [eNEPA](#) – An online project collaboration and streamlining tool developed by FHWA that supports transportation agencies efforts to comply with NEPA for transportation projects and facilitates the environmental review process through enhanced agency collaboration.

- [Strategic Highway Research Program \(SHRP2\) C19 Product: Expediting Project Delivery](#) – Provides information on strategies to accelerate project delivery, including CSS/D integration.

Office of Human Environment:

- [Environmental Justice](#) – Provides resources and references to help users gain a better understanding of EJ including webinars, training, publications, and information on the relationship between EJ and CSS/D during planning and the project delivery process.
- [Pedestrian and Bicycle Transportation](#) – Provides information on how FHWA supports pedestrian and bicycle transportation through funding, policy guidance, program management, and resource development. Includes information on how CSS/D principles can help improve multimodal connectivity.
- [Livability](#) – Provides resources and references including publications, case studies, and tools that highlight strategies to leverage multimodal transportation investments and CSS/D integration to promote economic revitalization, improve access to jobs, and achieve safer communities through support of accelerated project delivery, technology and design innovation, and public/private partnerships.

Office of Natural Environment:

- [Sustainability](#) – Provides links to publications, webinars, training workshops, peer exchanges, policy and guidance, case studies, administration of pilot programs, and technical assistance to State, regional, and local transportation agencies on sustainability and resiliency.
- [INVEST](#) (Infrastructure Voluntary Evaluation Sustainability Tool) – A web based tool that provides a collection of voluntary best practices and criteria designed to help transportation agencies assess and improve the sustainability of their projects, plans, and programs. INVEST includes a [CSS factsheet](#) within the project development module.

Office of Safety:

- [Traffic Calming ePrimer](#) – Provides information on the relationship between traffic calming and CSS/D.
- [Primer on Integrating Road Safety into NEPA Analysis](#) – Provides information on safety considerations during the NEPA analysis process and how CSS/D can enhance safety without deviating from road design standards.
- [Pedestrian Safety & Bicycle Safety](#) – Provides information on bicycle safety on national scale and highlight resources to help reduce pedestrian and bicyclist fatalities and injuries. Highlights connections between CSS/D, livability, and safety.

Office of Infrastructure:

- [Performance Based Practical Design](#) – Provides overview of Performance Based Practical Design and provides resources just as publications, case studies, and web-based training to help State DOTs address safety, operational performance, context sensitivity, life-cycle costs, long-range corridor goals, livability, and sustainability throughout the project development process.
- [Transportation Performance Management](#) – Provides information on CSS/D principle of improving communications between decision makers, stakeholders, and the traveling public to improve performance of the transportation system.

Office of Innovative Program Delivery:

- [Every Day Counts](#) – this website provides information Every Day Counts Initiative which is a state-based program coordinated by FHWA to facilitate the rapid deployment of proven

strategies and technologies to shorten the project delivery process, enhance roadway safety, reduce congestion and improve environmental outcomes. This resource provides several CSS/D-related innovations to accelerate the delivery of highway projects including community connections, and public engagement.

Although these innovations are not specifically labeled as CSS/D, they include leveraging flexibilities within the right-of-way process, planning and environmental linkages (PEL), stakeholder partnering for Federal-Aid projects, and integrating the National Environmental Policy Act (NEPA) and permitting processes.

Office of Federal Lands Highway:

- [Context Sensitivity](#) – Provides information on how the Federal Lands Highway (FLH) to implements a CSS approach in all aspects of its mission and documents its vision and lessons learned. The FLH's incorporates CSS/D principles in design manuals, program and project guidance.

Office of International Programs:

- [Context-Sensitive Design \(CSD\) and Project Development Procedures and Practices](#) – Provides a questionnaire on context-sensitive design that practitioners may wish to consider during the project scoping, design, and alternatives analysis to address CSS/D principles as it relates to consideration of impacts to the human and natural environment.

To supplement the CSS/D integration with various program areas, FHWA has an ongoing CSS/D virtual working group comprised of staff from multiple FHWA Offices and Divisions who work collaboratively to develop resources, share information, and collectively incorporate CSS/D principles into programmatic activities. Additionally, CSS/D serves as a criterion for some FHWA recognition programs, such as the [Environmental Excellent Awards](#). CSS/D is also included as one of the seven criteria categories for the [Transportation Planning Excellence Awards](#) used to recognize outstanding transportation planning practices.

As emphasized by how CSS/D information is distributed and framed throughout FHWA webpages related to safety, infrastructure, innovation, and exemplary project delivery, CSS/D supports USDOT's strategic goals and objectives that correspond to these priorities. For example, CSS/D supports the infrastructure objective of accelerating the environmental review process to deliver transportation projects, both large and small, more quickly and efficiently to provide timely benefits to users while safeguarding our communities and maintaining a healthy environment.

Transportation Organizations

The amount of CSS/D-related information provided varies among the websites of transportation organizations. The [CSS page](#) for the Center for Environmental Excellence (CEE) by AASHTO includes an overview of CSS; recent publications, new case studies, links to FHWA's CSS/D webinars; and other key resources, including resources from TRB's National Cooperative Highway Research Program (NCHRP). Additionally, FHWA's CSS/D webpage includes a case study repository, which can be filtered by discipline, mode, or State.

The Transportation Research Board (TRB) [CSS Information Resource Center](#) includes publications and research projects related to CSS/D. In addition, the website houses [Going the Distance Together: A Citizen's Guide to Context Sensitive Solutions for Better Transportation](#) and [A Guide to Best Practices for Achieving Context-Sensitive Solutions](#). TRB also has an active subcommittee of the [Design Committee](#) that focuses on CSS/D, formerly a taskforce on CSS/D. The CSS Subcommittee members include

representatives from FHWA, State DOTs, regional planning organizations, universities, and private sector organizations. The Subcommittee works collaboratively to develop resources that increase knowledge of CSS/D implementation and state of the practice as it relates to interdisciplinary project delivery processes, program performance and performance based practical design, meeting facilitation, and coordination of activities among other TRB committees to support research, dissemination of best practices, and implementation of context sensitive solutions principles.

The website for the [Institute of Transportation Engineers](#) (ITE) features a CSS/D page that focuses on designing walkable urban thoroughfares, in addition to emphasizing integrating safety into project development. ITE recently published [Implementing Context Sensitive Design on Multimodal Thoroughfares](#). This resource focuses on implementing context-sensitive design along multimodal corridors in urban and suburban environments. The information in the report can be applied in a way that is tailored to State and local needs. It builds on the recommended practices presented in the 2010 ITE publication, [Designing Walkable Urban Thoroughfares: A Context Sensitive Approach](#), and includes an expanded focus on topic areas such as freight accommodations, speed management, and context-sensitive design in both built out and lower density communities.

The [National Association of Development Organizations](#) (NADO) website does not include CSS/D webpage, however, there are many resources on livability in rural communities and small towns that highlight CSS/D principles in relationship to project delivery processes and economic development strategies.

The [Association of Metropolitan Planning Organizations](#) (AMPO) does not have a dedicated CSS/D webpage; however, AMPO includes a link to the [Context Sensitive Solutions Performance Measures Literature Review](#), a compilation of literature and practices by DOTs related to CSS/D and performance measurement, developed with support from FHWA.

The [National Association of City Transportation Officials](#) (NACTO) does not have a CSS/D page; however, its [Urban Street Design Guide](#) discusses considering context in street design. Websites for the National Association of Development Organizations and National Association of Regional Councils did not have readily available information or resources focused on CSS/D.

The [American Planning Association](#) website has many resources devoted to CSS/D, including continuing education, articles, knowledgebase resources, and webpages. The resources can be filtered by context – urban, suburban, rural, and exurban. Most resources are related to municipalities and counties, though about 20 percent are related to State, regional, or national jurisdictions. In addition, the CSS/D-related materials cover a broad range of topics and subject matters (e.g., floodplains, street design, context-sensitive signage design, and infill developments).

The [American Council of Engineering Companies](#) (ACEC) website includes only a minor mention of CSS/D in the 2010 publication of *Engineering, Inc.* related to the article [“Putting Transportation Design in Context”](#) and the ACEC President testifying on CSS/D; however, it does not provide links to CSS/D-related resources.

University Transportation Centers

University Transportation Centers (UTC) focus on various themes and many emphasize topics on CSS/D and its importance, such as improving mobility of people and goods, preserving the environment, and promoting safety. This assessment effort did not include a comprehensive review of all UTC websites to identify research that may connect with CSS/D principles or strategies; however, below are some noteworthy case examples.

Texas A&M Transportation Institute (TTI) is one of many UTCs across the country. TTI does not have a CSS/D-dedicated page; however, the website houses several CSS/D-related resources, including:

- CSS Training Course – <https://tti.tamu.edu/group/env-planning/professional-development/>
- Designing Context-Sensitive Solutions for Urban Thoroughfares (2011) – <https://tti.tamu.edu/2011/03/01/designing-context-sensitive-solutions-for-urban-thoroughfares/>
- Introducing Smart Growth to Texas (2002, 2003) – <https://static.tti.tamu.edu/tti.tamu.edu/documents/4238-1.pdf> and <https://static.tti.tamu.edu/tti.tamu.edu/documents/4238-S.pdf>
- Making Mobility Improvements a Community Asset: Transportation Improvements Using Context-Sensitive Solutions (2010) – https://utcm.tamu.edu/publications/final_reports/Bochner_08-14-03.pdf

Similarly, the [Center for Transportation Studies at the University of Minnesota](#) in partnership with the Minnesota DOT offers an hour-long web-based course on CSS/D as well as a 2 ½ day instructor-led course on advanced flexibility in design.

Also, the University of Delaware maintains a Complete Communities Toolbox that includes a [CSS](#) page housed under the Complete Streets webpage. It discusses guiding principles of CSS/D and includes the following links:

- Why You Should Consider Using Context-Sensitive Solutions
- Benefits to Community Members
- How is CSS Compatible with Planning for Complete Communities in Delaware?
- How State Departments of Transportation Integrate Context-Sensitive Solutions
- Examples of CSS in Delaware
- CSS Resources (links to FHWA, AASHTO, and DelDOT resources)

In addition, the page includes an interactive “GIS StoryMap” tool to showcase CSS/D as a tool to achieve Complete Streets.

Additionally, the University of Kentucky houses the [Kentucky Transportation Center](#) which supports the Kentucky Transportation Cabinet with resource development and research that aid in accelerating project delivery of State Highway Plan, and includes several resources on incorporating CSS/D principles in the project development process.

In summary, many of the transportation agency and UTC websites refer to FHWA CSS/D-related materials, including case studies and guidance documents, indicating that FHWA’s efforts to develop and disseminate these materials has been successful. However, because many of the materials cited on these websites are outdated, this may indicate that either there has not been a recent emphasis on CSS/D among these organizations or these organizations may view CSS/D as a program that has been implemented rather than a dynamic process. These organizations can serve as strong partners for facilitating CSS/D implementation and reaching key audiences, including future transportation professionals through the UTCs.

State Departments of Transportation

All State DOT websites (i.e., all 50 States, Washington, D.C., and Puerto Rico) were reviewed to identify how State DOTs present and incorporate CSS/D within their programs. Reflecting the results of previous assessment efforts, the prevalence of CSS/D varies among State DOT websites. Based on the web-based

research, 14 DOTs have a CSS/D webpage, 18 DOTs have specific CSS/D guidance, and 33 DOTs mention CSS/D in their project development or design policies, manuals, or guidelines. Of the 14 DOTs with CSS/D webpages, the location of the page varies widely. CSS/D pages are housed within the project development, planning, landscape architecture, congestion management, transportation management, and environment pages.

Nearly all State DOTs (48) reference CSS/D within their websites or guidance or appear to implement CSS/D-related initiatives and/or strategies, although not all are labeled as CSS/D. Examples of such initiatives include Complete Streets (18 DOTs), statewide bicycle and pedestrian initiatives (13 DOTs), design flexibility/practical design (12 DOTs), and public involvement policies that emphasize early and ongoing outreach (30 DOTs). In addition, some State DOTs use unique terms for their CSS/D-related programs, such as context-sensitive amenities or community sensitive solutions. These findings are further documented in the Appendix .

While less than half of the State DOTs have official CSS/D policies, references to CSS/D are present in many project development or design policies, manuals, or guidelines. Among the State DOTs that include CSS/D in their project development or design policies, manuals, or guidelines, the approach is varied. For example, some DOTs include the identification of CSS/D in project initiation checklists or reports, while other DOTs include references to CSS/D as general considerations.

The Idaho Transportation Department (ITD) participated in FHWA's CSS/D Targeted Technical Assistance effort in 2016 to better link CSS/D with its project charter – a running project report meant to serve as a link between planning, design, and construction. ITD developed various policies and guidelines related to CSS/D, such as its *Context Sensitive Solutions Guide; Practical Solutions for Highway Design* publication; and *Guide to Public Involvement for Programs, Planning & Projects*. However, ITD concluded that the most effective way to encourage CSS/D implementation was to incorporate guiding questions throughout the charter since all project managers are required to complete and revisit the charter throughout the project life cycle. By altering the project charter to include CSS/D-related questions and references to CSS/D guidance, ITD enhanced an existing project-tracking mechanism to facilitate CSS/D implementation.

Washington State DOT's (WSDOT) design manual includes a chapter focused on context determination, which was most recently updated in 2017. Prior to the update, WSDOT participated in FHWA's CSS/D Targeted Technical Assistance effort, focusing on creating a process for better applying the principles of context identification and performance metrics to actual project design and construction. WSDOT now uses an Alternatives Comparison Table to assist in evaluating alternatives and identified baseline and contextual performance metrics. Comparing alternatives allows WSDOT to evaluate alternatives against their relative effects on contextual needs.

The Florida Department of Transportation (FDOT) provides an example of how CSS/D complements Complete Streets. FDOT's [Complete Streets Implementation Plan](#) highlights how Complete Streets policy can incorporate context-sensitive approaches into design: "This Complete Streets Implementation Plan lays the foundation for integrating a context-sensitive approach to decision-making into FDOT's practices during visioning, planning, programming, project development, design, operations, and maintenance that considers and balances the needs of all users of Florida's transportation network."³

³ The Florida Department of Transportation (2015). "Complete Streets Implementation Plan. M2D2: Multimodal Development and Delivery." <http://www.flcompletestreets.com/CSIPlan.shtm>

State Department of Transportation Interviews and Pilot State Discussion Overview

Based on the results of the web-based research, several State DOTs were selected to participate in interviews to collect more in-depth information on how CSS/D is implemented in practice. The web research identified indicators of CSS/D implementation, such as:

- Whether the DOT had policies, guidelines, and procedures related to CSS/D;
- Whether the DOT was involved in CSS/D flagship events such as CSS Peer Exchanges or CSS National Dialogs;
- Whether the DOT had produced CSS/D case studies or received CSS/D-related awards; and
- The quantity of memorandums of understanding (MOUs), memorandums of agreement (MOAs), or programmatic agreements (PAs) the DOT committed to, to gauge interdisciplinary collaboration.

State DOTs that developed robust CSS/D policies and procedures, were involved in CSS/D flagship events, earned recognition for CSS/D achievements through case studies and awards, and those who committed to a substantial number of MOUs/MOAs/PAs were excluded since their CSS/D implementation practices are already well documented. State DOTs that received CSS/D Targeted Technical Assistance were not included in interview process. Additionally, the five CSS pilot States were not selected for individual interviews because they were included in a virtual focus group discussion to gather information on CSS/D implementation strategies.

FHWA interviewed 7 State DOTs – Arkansas, Georgia, Maine, Montana, Nevada, Ohio, and Texas; the interviews included both FHWA Division and DOT staff. Additionally, the FHWA Iowa Division provided input on the state of the practice in Iowa.

These states were at different levels CSS/D implementation, and expressed interest in making further progress on incorporating CSS/D in their respective planning and project delivery processes. The selected State DOTs provided CSS/D information on their website but had few or no case studies; had strong initiatives related to CSS/D, such as PBPD or PEL; had CSS/D references located in different documents and webpages; and/or had recently developed CSS/D guidance. Interview selections were also made with an effort to represent geographic diversity.

As noted above, in addition to the individual State DOT interviews, a virtual focus group discussion was convened among the five CSS pilot States – Connecticut, Kentucky, Maryland, Minnesota, and Utah. These were the States selected after the 1998 “Thinking Beyond the Pavement” conference to institutionalize CSS/D principles, establish best practices, and document lessons learned. The virtual focus group discussion was held to understand how CSS/D implementation has evolved over time in these States, and what types of barriers or challenges remain. DOT and FHWA Division staff from these States participated in the discussion. Each State that was interviewed or took part in the focus group discussion faced unique circumstances and was at a different point along the spectrum of CSS/D implementation. Several takeaways emerged through the conversations, which are documented below.

Takeaways from DOT Discussions

Defining CSS/D, Understanding, and Terminology

Many of the States interviewed did not use “CSS” or “CSD” as the primary term to convey the ways they have worked to integrate CSS/D principles and strategies within their project delivery processes. One reason provided for this was to avoid the impression that CSS/D is a temporary program but rather an

integral part of transportation project decision making. Another reason mentioned for not using the CSS/D terminology was the perception within some States that CSS/D had become institutionalized and thus did not require a separate label. Some States used alternate terms such as “performance based project development,” “practical design,” “planning and environment linkages,” “enhanced scoping,” or “integrated transportation.” Some of these terms are specific to one component of CSS/D, while others convey an overarching approach to project delivery. Other States used CSS/D as an umbrella term that encompasses their entire design philosophy. Overall each State has a unique perspective defined by its policy environment, stakeholder interests, project delivery processes and protocols, as well as funding sources and requirements, which shapes the language they use to reflect CSS/D principles and strategies.

Leadership and Responsibility

Within the project delivery process, most States indicated that CSS/D leadership and responsibility resides within project planning or design. In some cases, a specific committee or individual leadership role was created to institutionalize CSS/D and/or CSS/D-related initiatives. Some States expressed that having support for CSS/D from senior DOT leadership or FHWA Division offices was very helpful in facilitating implementation. Relatedly, other States discussed the role their MPOs and local governments play to help DOTs to incorporate elements such as multimodal accommodations into projects. Some States have begun shifting integrating CSS/D strategies prior to the development of individual projects through long-range transportation planning efforts or corridor planning. Utah moved their CSS/D emphasis into a new direction called “Integrated Transportation” which focuses on using new technology to address all user transportation needs as efficiently and effectively as possible.

Integration and Implementation

Project Delivery Processes

DOTs have worked to integrate CSS/D into their project-delivery processes by specifically including CSS/D or elements of CSS/D into their design manuals, conducting enhanced scoping, or adding sections specific to context within required project initiation documentation. Some DOTs are revising their design manuals to allow for flexibility and encourage sound engineering judgement. For example, Ohio DOT recently revised its design manual to recognize that context must be considered during design and to document an approach to project development that provides a priority-based strategy for purpose and need development. Enhanced scoping is another approach to CSS/D integration that involves early engagement with stakeholders to identify the transportation problem and establish purpose and need.

As part of its enhanced scoping process, Maine DOT is collecting all bicycle and pedestrian infrastructure plans and policies from communities across the State. This initiative will help ensure plans at the local level are incorporated into long-range and strategic plans at the State level. Furthermore, Maine has a pedestrian safety outreach education program which takes a proactive approach to problem identification. The program involves facilitating community forums where the Maine DOT solicits information and feedback from community members about locations in their community where they have the greatest concerns. The program is data driven and has garnered considerable interest and participation from community members.

As an example of CSS/D integration within project documentation, Georgia DOT (GDOT) now includes CSS/D-related questions within its project concept report; the report serves as a quality assurance measure to ensure designers are asking the right questions in order to integrate CSS/D into their designs. The CSS/D section in the report refers to GDOT’s *Context Sensitive Design Online Manual* and AASHTO’s *Guide for Achieving Flexibility in Highway Design*. The section requires designers to list potential project impacts and propose how CSS/D may address them. The report also helps with scoping

and coordination with local governments. Throughout the project delivery schedule, GDOT staff refer to the report to ensure the project is being designed in accordance with the project concept.

Early and Continued Collaboration

Several States mentioned holding meetings that facilitate internal and external collaboration, some of which have been recently established. For example, Maine DOT hosts annual meetings to discuss all proposed projects within a specific geographic area. The meetings often reveal opportunities for coordination and ways projects can potentially be delivered concurrently to realize cost savings and reduce impacts to the community. This level of coordination can be particularly helpful for multimodal facilities, which can benefit from economies of scale by being incorporated as part of roadway projects. In Arkansas, project development meetings were driven by designers looking to discuss environmental, utility, and right-of-way issues prior to starting their design.

Some States mentioned interagency collaboration as an approach for integrating CSS/D principles. For example, Texas noted that a project focused on transit-oriented development, walking, and multimodal accommodations was made possible through funding and cooperation with multiple Federal agencies. By leveraging multiple sources of funding, Texas DOT provided transportation solutions while enhancing the local community. The Nevada DOT plays a key role as part of an ongoing partnership between Federal, State, and local agencies; private interests; and a tribe, to protect and enhance Lake Tahoe, a popular destination area within the State. Through collaboration with its partners, the DOT provides transportation infrastructure in the area that encourages tourism and preserves the natural environment. For instance, as part of a recent project in the area, the Nevada DOT restriped a roadway to provide bicycle facilities while also addressing water quality issues.

Some DOTs ensure context is accounted for in project development through early collaboration with the community. For instance, Montana DOT provides technical assistance to local communities as they develop transportation plans and expressed that CSS/D integration begins with stakeholder collaboration during development of its Statewide Transportation Improvement Program.

Training

At least eight of the interviewed States have held CSS/D-specific training sessions. However, most States indicated they had not held one within the past five or more years. In some cases, this was because they believed CSS/D had been fully integrated as a way of doing business, and in other cases, this was because no one within the organization was championing for additional CSS/D training. Furthermore, States also cited limited resources available for training. Relatedly, some States indicated staff turnover was a challenge to continued integration of CSS/D into their day-to-day practices. Some States conduct training on CSS/D-related topics, such as design flexibility, or on the whole project development process, which often integrates CSS/D.

Implementation Focus

The discussions during the interviews indicated that some States still perceive CSS/D as an add-on to projects rather than an overarching approach to project development and delivery. In some cases, CSS/D strategies were viewed as strategies to only be incorporated on high-profile projects or projects deemed environmentally or politically sensitive. In some States, particularly those with a significant tourism industry, CSS/D has historically implied a strong focus on aesthetics and landscaping.

Accountability and Assessment

Although many States indicated CSS/D had been institutionalized within their DOTs, or that there had been a cultural shift in how the DOTs conduct business, these assertions are often not confirmed with

performance measurement. Most States did not have performance measures in place to assess the effectiveness of their CSS/D implementation efforts, and some did not see the value or practicality of establishing such measures. Some States questioned how CSS/D implementation could be measured when it has become an integral part of their project delivery philosophy and processes. Other States expressed doubts that metrics such as project duration or number of change orders could accurately reflect the realities of project delivery. For instance, Nevada DOT noted that projects stall for a variety of reasons, notably lack of funding, and these delays are not necessarily reflective of how well CSS/D was integrated. Furthermore, simply tracking the total number of change orders on a project does not distinguish between those attributed to errors and those that provide value-added project elements based on observations made in the field.

Based on their experiences, some DOTs expressed that incorporating CSS/D and soliciting stakeholder input early helps accelerate project delivery and avoid conflict after project completion. Thus, one qualitative way States convey the value of CSS/D implementation is by showcasing successful examples of projects that adhered to CSS/D principles. Conversely, some States cited less successful projects as lessons on why CSS/D integration is so important. Many States noted that an increase in public involvement has led DOTs to adopt a project delivery approach that is more transparent and responsive to community requests. Legislation at the Federal and State level has trended toward more inclusiveness and collaboration with the public. Concurrently, members of the public have access to more information and have become more educated regarding their ability to influence projects. Several States noted a shift in the dynamic between the DOTs and their communities over the past few decades. Previous approaches of DOTs developing a project and then announcing it to the public have shifted to be more inclusive of public input from the beginning of the process. To address the challenge of not being able to accommodate requests for features that are a priority to the local community, State DOTs often partner with the community through cost-sharing agreements.

In addition to qualitative methods, there were some DOTs that measured performance through quantitative metrics. While most DOTs track safety-related metrics, a small number tracked metrics related to public approval of the DOT, environmental stewardship, or on-time project completion. For example, Maryland DOT (MDOT) has [the MDOT Excellerator Program](#) – a performance management system that includes ten areas ranging from customer service and safety measurements, to user transportation experience and facilitating environmental stewardship. Each of these areas has performance measurements associated with it (e.g., providing customer service includes a measurement of response time). These metrics/measurements are reported quarterly and discussed through a “round-up” meeting with project managers and project drivers. Additionally, GDOT noted that in situations where design variances and exceptions are approved, safety is monitored at the district level through crash rates.

Capacity Building and Technical Assistance Opportunities

Since each State faces unique challenges to CSS/D implementation, each State has different capacity building and technical assistance needs. However, many suggestions from the discussions with States have similar themes. Ideas for the types of strategies that would be helpful for State DOTs to better take advantage of the benefits of CSS/D included:

- **Training for designers on design flexibility.** If designers understand the goals of CSS/D and the rationale behind deviating from design standards, this could help achieve their buy-in. There is also a lingering perception among some designers that requesting a design exception is an immediate barrier to project development. Connecting contextual elements to design choices and features would be of particular interest to designers.

- **Improved communications with stakeholders and communities.** While most DOTs have improved their public outreach processes, many continue to struggle with how to most effectively engage stakeholders, communities, and the public to gain consensus on the best transportation solutions. New social media platforms, advancements in technology, and access to readily available resources have empowered members of the public to provide feedback to DOTs. Improved communication with stakeholders and communities can result in challenges and opportunities when these groups request new, innovative solutions which may diverge from traditional solutions familiar to DOT planners and engineers. This highlights the importance of effective stakeholder and community engagement. Knowing how to effectively incorporate stakeholder and community feedback is an integral part of developing context-sensitive transportation solutions.
- **CSS/D training for new staff.** Many DOTs have experienced significant staff turnover, which has resulted in some loss of institutional knowledge associated with CSS/D. Additionally, new hires often have not received any CSS/D training, because the current focus is on other types of training and/or training is limited due to lack of funding.
- **Success stories from other States.** Examples of successful CSS/D integration in smaller, day-to-day projects rather than large projects in the urban core could serve as useful learning opportunities. Such examples could be developed into publicly-available case studies hosted on the FHWA website and could be integrated as part of CSS/D technical assistance provided to DOTs.
- **Funding availability and requirements.** Many DOTs face restricted budgets and scrutiny over project funding and which aspects should be funded – especially if aspects could be perceived to be outside of the scope of a transportation solution. Relatedly, some funding sources are very limited in their use, suggesting DOTs could benefit from assistance with forging partnerships and leveraging multiple funding sources to develop truly context-sensitive solutions. Furthermore, it is important to foster the implementation of CSS/D in a way that does not appear to be an added aspect of the project. Rather, implementation of CSS/D can accelerate project delivery and/or result in a “right-sized” project, which ultimately saves money.
- **Continuous reinforcement.** CSS/D implementation is a continuous process improvement exercise. Even after conducting training, some DOTs experience a disconnect between staff acceptance and understanding of the philosophy behind CSS/D and carrying out the day-to-day implementation. Additionally, Texas and Nevada mentioned FHWA’s Infrastructure Voluntary Evaluation Sustainability (INVEST) Tool and Every Day Counts initiative respectively as helping them implement CSS/D strategies. These testimonials highlight that stronger integration between CSS/D and existing FHWA tools and initiatives could help other States institutionalize CSS/D. Even if not labeled as CSS/D, embedding CSS/D strategies within tools such as PlanWorks and/or initiatives related to performance management or streamlining project delivery can reinforce CSS/D as an integral part of efficient project development and delivery.

CSS/D Best Practice Case Studies

To gain insights into the CSS/D state of the practice, all 143 CSS/D case studies featured on [FHWA’s website](#) were analyzed. These were selected because they are the most prominent case studies showcasing exemplary CSS/D implementation.

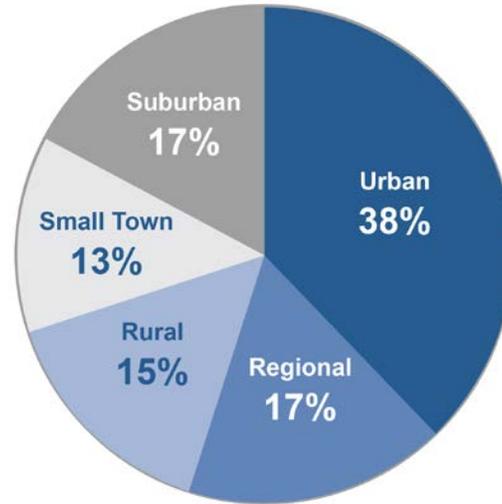


Figure 2: CSS/D Case Study Context

The case studies were also analyzed to determine which CSS/D best practices were featured. FHWA established a list of best practice categories to conduct a systematic review. The best practice categories were informed by the four principles on FHWA's CSS/D website in combination with FHWA's program areas and the principles from [NCHRP Report 642: Quantifying the Benefits of Context Sensitive Solutions](#). The best practice categories are listed and defined below:

- Broad-Based, Inclusive Public Involvement: Engaging and effectively collaborating with public stakeholders continuously throughout the project life cycle in a way that emphasizes consensus-building as decisions are made.
- Effective Visioning/Purpose and Need: A strategic effort to identify project purpose and need in a comprehensive and inclusive way.
- Interagency Collaboration: Effective and streamlined collaboration among Federal and/or State agencies, especially resource agencies with jurisdictional authority and agencies representing multiple disciplines.
- Performance Based Practical Design (Includes Design Flexibility): Using objective data analysis, in combination with design and engineering expertise, to support and validate flexible design decisions that vary from standard guidelines.
- Policies, Procedures, and Guidelines: Broadly applicable policies, procedures, and guidelines that seek to integrate CSS/D principles within the project life cycle.
- Aesthetic Enhancements: Aspects included in the final design of the project that integrate well with the project surroundings and are visually pleasing.
- Measuring Success (Performance Measures Identified): Metrics identified to assess the effectiveness of CSS/D implementation.
- Environmental Stewardship: Strategies undertaken to preserve and enhance natural environment resources.
- Expedited Project Development and Delivery: Strategies undertaken to compress the typical project development and delivery timelines.
- Multimodal Accommodations (Safety for All Users): Strategies undertaken to accommodate for the needs of all current and potential users of a system.

- Improve Community Quality of Life: Supporting social and cultural aspects including such items as community cohesion, sustainability, livability, and other community values which stem from and connect to the [community impact assessment process](#).
- Environmental Justice: Strategies undertaken to avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects (including social and economic effects) on minority and low-income populations. This includes incorporating the principles of Executive Order 12898 in all Federal-aid transportation activities, programs, and projects; ensuring full and fair participation by all potentially affected communities in decision-making; and preventing the denial of, reduction in, or delay in the receipt of benefits for minority and low-income populations.
- Enhanced Value Through Shared Solutions: Leveraging partnerships such that cost savings are achieved or an expanded scope of work is executed using the available funds.

As FHWA reviewed each case study, it was tagged with up to five featured best practices. Enforcing a limit underscored the most prominently showcased best practices. Figure 3 shows the frequency of the best practices within the case studies. This information, while again not a comprehensive look at all CSS/D activities, helps show where gaps exist and highlights prevalent practices. It can also inform priority areas for developing future CSS/D case studies so practitioners have diverse examples of ways the best practices can be applied. The high prevalence of some best practices can also shape conversations on CSS/D implementation. For instance, initiating a conversation with a DOT that excels at broad-based, inclusive public involvement can serve as a starting point to discussing how CSS/D is integrated within its practices and identifying where areas of CSS/D integration excellence can be leveraged to build capacity in other areas.

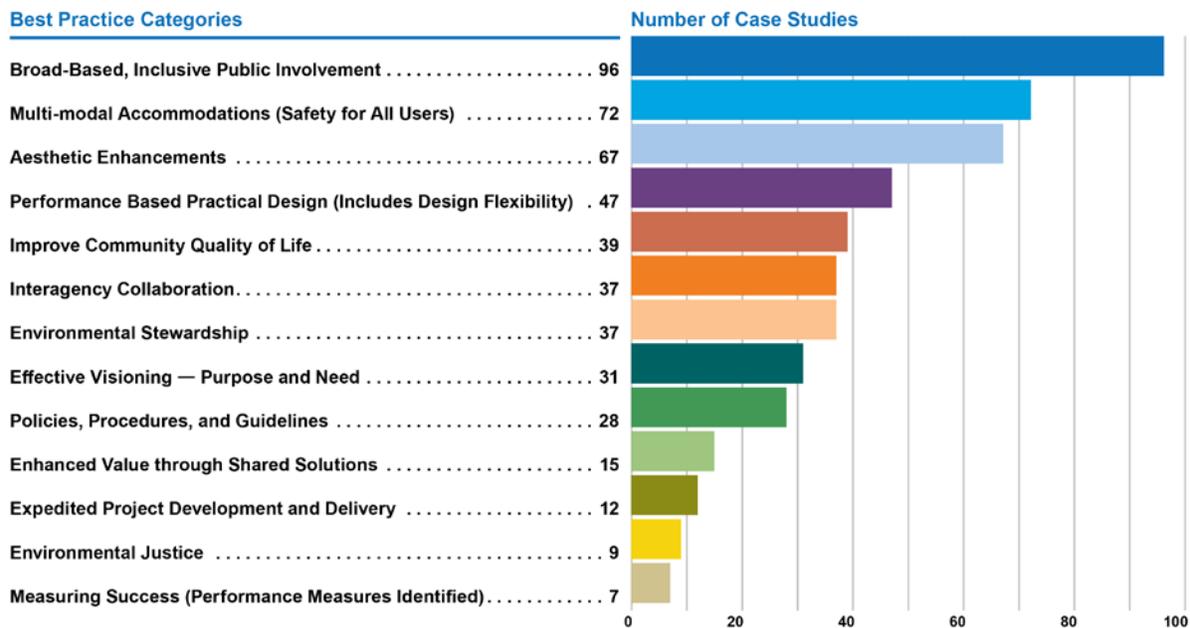


Figure 3: CSS/D Case Study Best Practices

Table 3 below provides more detailed information about the frequency of the best practices in the case studies for each State.

Table 1: Best Practice Categories by State

Best Practice Category	Total													
	Broad-Based, Inclusive Public Involvement													
	Effective Visioning / Purpose and Need													
	Interagency Collaboration													
	Performance Based Practical Design													
	Policies, Procedures, and Guidelines													
	Aesthetic Enhancements													
	Measuring Success													
	Environmental Stewardship													
	Expedited Project Development and Delivery													
	Multimodal Accommodations													
	Improve Community Quality of Life													
	Environmental Justice													
	Enhanced Value Through Shared Solutions													
State														
Arizona				1						1		1	1	1
Arkansas		1	2	1		1				1		1		2
California			1	6	1	3		8	1	1	5	2	6	11
Colorado		1						1	1	1	1	2	2	2
Connecticut				1				2		3		1	3	3
Delaware		1	1					1	1	2	1		1	2
District of Columbia			1	2								1	1	2
Florida	1		2	3	1		1	4	2	3		1	1	6
Hawaii				1					1			1	1	2
Idaho			1	1					1			1	2	2
Illinois			1	2		2		1	1	1	2	2	2	4
Indiana		1	2	1		2		1	1				2	2
Iowa			1	1		1		1		1				1
Kansas								1			1		1	1
Kentucky				1		2		1		2	2		4	4
Maine									1				1	1
Maryland	1		3	4	1	1		2		3	3		4	6
Massachusetts				2	1	1	1	1	1	1			2	3
Michigan	3		2	3	1	1		6	1	1	3		7	8
Minnesota	2			1	1	2	2	1		4	1	3	3	5
Mississippi			1	1				1				1	1	1
Missouri				1				1		1		1	1	1
Montana		1		1		1		3		2			3	3

Best Practice Category	Total													
	Broad-Based, Inclusive Public Involvement													
	Effective Visioning / Purpose and Need													
	Interagency Collaboration													
	Performance Based Practical Design													
	Policies, Procedures, and Guidelines													
	Aesthetic Enhancements													
	Measuring Success													
	Environmental Stewardship													
	Expedited Project Development and Delivery													
	Multimodal Accommodations													
	Improve Community Quality of Life													
	Environmental Justice													
	Enhanced Value Through Shared Solutions													
	State													
Nevada						1		3	1		1	1	3	3
New Hampshire													1	1
New Jersey				1				1			1		1	1
New Mexico	1		1			1	2	3	1	3	2		3	4
New York	1		1	3	1				1				2	3
North Carolina	1	1	2	6		2		2	2	4	2	2	4	8
North Dakota				1				1			1		1	1
Ohio			1	2		1		1	1	1	2		1	3
Oregon			2	3	2	4		1	1	1	2		3	5
Pennsylvania	1			1		1		1	2	1		1	3	5
South Carolina				1	1						1	1	1	1
Tennessee										1	1	1	2	2
Texas	1		3	4	1	3		4	2	2	2	3	6	9
Utah	1	1	1	1	1	1		1				1	2	3
Vermont								1				1	1	1
Virginia			1	1					1	1			1	1
Washington	2	1	6	12		5	1	8	4	5	2	3	8	14
West Virginia			2	3				2		1			3	3
Wisconsin		1	1					1					1	1
Wyoming		1		1		1		1		2	1		1	1
Grand Total	15	9	39	72	12	37	7	67	28	47	37	31	96	143

Webinar Outreach

FHWA held two webinars to provide an update on the CSS/D Targeted Technical Assistance and state of the practice efforts and receive feedback as part of the assessment. The first webinar, titled “FHWA’s

Role in Implementing CSS and Design at the State Level,” targeted an FHWA audience and was held on January 18, 2018. The second webinar, titled “Context Sensitive Solutions and Design, National State of the Practice Assessment” was open to all audiences and was held on February 21, 2018.

Webinar #1: FHWA’s Role in Implementing CSS and Design at the State Level

The featured speakers for this webinar are listed below, in speaking order:

- Fleming El-Amin, Community Planner, FHWA Office of Human Environment, Livability Team
- Damon Fordham, Principal, Sustainable Transportation Practice, The Cadmus Group
- Jason Giard, Operations / Design Engineer, FHWA Idaho Division
- Richard Duran, Environment Program Manager and Planning Specialist, FHWA North Dakota Division
- Leigh Lane, Transportation Planning and Environmental Manager, Louis Berger Group

The webinar began with an FHWA overview of CSS:

- CSS and CSD closely relate to USDOT priorities as they can help to enhance safety for all users, promote a shared stakeholder vision to gain project support and accelerate project delivery, and support community multimodal connectivity.
- FHWA has worked to build capacity on CSS/D through targeted technical assistance to help States better incorporate CSS/D principles into their decision-making processes and business practices. Summary reports from the technical assistance efforts are available online at <https://www.fhwa.dot.gov/planning/css/resources/cssta1617/>.
- FHWA also hosted a series of four virtual peer exchanges that provided a deeper dive into the topics discussed during the technical assistance workshops.
- FHWA developed a new CSS/D website that provides information to help users gain a better understanding of CSS/D, its application, and its connection to quality of life, environmental justice, project delivery, performance based practical design, sustainability, and Complete Streets. The website features webinar recordings, relevant publications, case studies, sections on the history of CSS/D, and key references such as FHWA’s *CSS in Practice* brochure.

This introduction was followed by a summary of activities conducted as part of the national state of the practice assessment, including results from the CSS/D case study analysis. Next, representatives from the Idaho and North Dakota Division Offices provided project-specific examples to highlight their approaches for supporting CSS/D implementation within their States. The Idaho Division presentation highlighted the following:

- The Idaho Transportation Department (ITD) developed a CSS guide in 2006 which conveys ITD’s approach to meet the mobility need, be compatible with the environment, be an asset to the community, and be flexible and responsible.
- The Idaho Division works in cooperation with ITD in design, construction, and maintenance and provides design flexibility for CSS.
- The Complete Streets project in the City of American Falls demonstrates how the Idaho Division worked with ITD to make improvements such as entrances compatible with accessibility standards in the ADA, enhanced pedestrian facilities, landscaping, and better drainage. The changes have stimulated revitalization in the downtown area.

The North Dakota Division presentation highlighted the following:

- A case study of the Watford City bypass project was recently developed to showcase how the North Dakota Department of Transportation (NDDOT) puts CSS/D principles into practice.

- The North Dakota Division is involved in several groups that facilitate interagency and stakeholder collaboration.
 - One group meets through interagency coordination meetings that provide a forum to enhance cooperation, coordination, and dialogue between Federal and State agencies, tribes, and other stakeholders relevant to the administration of the U.S. Army Corps of Engineers Section 10/404 regulatory program.
 - Another group, the North Dakota Interagency Review Team, facilitates the establishment and approval of wetland mitigation banks.
 - North Dakota also has a Tribal Consultation Committee, which hosts biannual meetings between representatives from local Native American tribes, NDDOT, and FHWA's North Dakota Division to discuss transportation projects and programs, as well as cultural resource issues.
- In addition to the Watford City bypass, the North Dakota Division also collaborated with NDDOT to integrate CSS/D principles on the Williston bypass. As an example of the flexibility utilized to preserve cultural stone features in the area, the project alignment was adjusted to avoid these sites.

Webinar #2: Context Sensitive Solutions and Design, National State of the Practice Assessment (Recording Link: www.fhwa.dot.gov/planning/css/webinars/stateofpracticeassessment/)

The featured speakers for this webinar are listed below, in speaking order:

- Fleming El-Amin, Community Planner, FHWA Office of Human Environment, Livability Team
- Damon Fordham, Principal, Sustainable Transportation Practice, The Cadmus Group
- Dave Holstein, Administrator, Office of Roadway Engineering, Ohio Department of Transportation
- Leigh Lane, Transportation Planning and Environmental Manager, Louis Berger Group
- Ivan Ulberg, Traffic Design Engineer, Montana Department of Transportation

The webinar began with an overview of FHWA's CSS/D resources and capacity building efforts. This introduction was followed by a summary of activities conducted as part of the national state of the practice assessment, including highlights from the CSS/D case study analysis and State DOT web research. Next, Dave Holstein from the Ohio DOT (ODOT) presented on how ODOT is implementing CSS/D through a performance based project development approach. The ODOT presentation had the following highlights:

- ODOT traditionally adhered to roadway design criteria based exclusively on functional class and would bring everything within project limits up to the standards as defined by the functional class. This approach did not allow for the design flexibility necessary to take project surroundings into consideration and resulted in very expensive projects.
- ODOT's new performance based project development approach allows project context to be taken into consideration and focuses on making value-added improvements that address safety and operational challenges beyond meeting the standard specifications. The approach emphasizes making balanced decisions based on benefits and costs. Cost savings from the performance based project development approach allows ODOT to commit funding across more projects in the transportation system.
- Performance based project development goes beyond practical design and encompasses other parts of project development such as purpose and need, project scope, and alternatives studies.

- ODOT is working to shift perceptions of design exceptions so that they are not perceived negatively but are instead viewed as thorough documentation of thoughtful design decisions. ODOT's prior process for design exceptions was time consuming and required the completion of a long form; through a new process, design exceptions are processed electronically and are less onerous.
- ODOT's project development process is comprised of five stages: planning, preliminary engineering, environmental engineering, final engineering/right-of-way, and construction.
 - Purpose and need is determined during the planning stage. ODOT introduced the concept of primary and secondary needs; primary needs must be addressed and secondary needs are addressed depending on their impacts and costs. Context is considered during this stage and can either be part of primary or secondary needs.
 - During the next two stages, ODOT determines what is practical and which secondary needs to address.
 - The design exception process is incorporated within the fourth stage.
- The Highway Safety Manual (HSM) has been instrumental to ODOT's performance based project development approach. ODOT uses the HSM to quantify the safety ramifications of deviating from standards.
- ODOT found that the performance based project development approach must satisfy the purpose and the need, and must reflect balanced decisions – factoring in costs, impacts, safety, context, and whether project elements provide an improvement.
- ODOT's performance based project development approach has facilitated closer collaboration between design and environmental staff.
- Some of the challenges associated with performance based project development include the notion that practicality means something different to each individual, overcoming a long-term design and scope paradigm, and adjusting to a process that is not as clear-cut as looking up a design standard.

Following ODOT's presentation, key themes that emerged from the assessment DOT interviews and focus group discussion were highlighted. Afterwards, Ivan Ulberg from the Montana DOT (MDT) described MDT's past, current, and future efforts on CSS/D. The MDT presentation had the following highlights:

- Montana is a very rural State, with 82.4% of the State's land area having two or less people per square mile. There are several multi-State trade corridors that run through Montana; this is an important context to address, such as through designing roads to accommodate large vehicles.
- Historically, MDT has utilized CSS/D strategies without labeling them as such. Examples include making aesthetic enhancements on projects to make them fit the surrounding environment. One large project that embodied CSS/D strategies was along U.S. 93 North.
 - The project affected tribal lands and MDT partnered with tribal representatives throughout the design and construction decision-making process.
 - Some of the elements MDT included in the project were highway alignment to allow road users to focus on significant view sheds, animal crossing structures, and multi-language signage. MDT also avoided areas of significance to the tribes without asking the tribes to prioritize them.
- The Higgins Street cycle track in Missoula is an example of MDT integrating Complete Streets concepts into its designs. The project was a lesson in adapting designs to align with the surrounding area and wishes of the community.

- MDT developed a [CSS guide](#) which is available online and underscores the importance of identifying all stakeholders and understanding what their interests are.
- Enhanced public involvement was codified into law by the Montana legislature in 2017. MDT utilizes a project phase called the OT phase to seek feedback from the public and keep them engaged between the planning and design/environmental phases of projects. The OT phase allows for more robust outreach prior to the scope of work being established.
- Moving into the future, MDT will continue to develop projects that not only serve a purpose, but also create a sense of place. MDT seeks to meet its goals while enhancing Montana's communities.

Conclusions

The assessment summarized in this report provided insight on the CSS/D state of practice at a national level. CSS/D integration varies widely among State DOTs, and many DOTs implement initiatives that fall under the umbrella of CSS/D (e.g., Complete Streets and PBPD) without officially labeling them CSS/D. Each DOT has a unique perspective defined by its policy environment, stakeholder interests, project delivery processes and protocols, as well as funding sources and requirements. These elements shape the language individual DOTs use to reflect CSS/D principles and strategies.

DOTs primarily focus on CSS/D during the project planning and design phase of transportation decision making. However, DOT interviews suggest that CSS/D focus is moving earlier into the decision-making process with increased emphasis on better understanding the context through enhanced scoping and PEL to inform the purpose and need of projects. DOTs have worked to integrate CSS/D into their project-delivery processes by specifically including CSS/D or elements of CSS/D into their design manuals, conducting enhanced scoping, or adding sections specific to context within required project initiation documentation. Information from FHWA's efforts to support CSS/D have been effectively disseminated, as it appears on transportation partner websites, and States have taken advantage of resources and training opportunities FHWA has provided to promote the integration of CSS/D and other related topics.

One key observation from the assessment is how a DOT's CSS/D approach and efforts are influenced by geography and density. For example, DOTs within States with more densely populated urban areas seem to focus heavily on multimodal accommodations, including safety for all users through Complete Streets and optimizing current infrastructure capacity through expanding transit programs. Conversely, DOTs within more rural, less densely populated States appear to focus on preserving landscapes and small town ambiance while minimizing impacts to agricultural operations and other rural economic interests. Future research into unique geographical contextual considerations across the country may provide additional insights into the training and technical assistance needs of State DOTs.

Based on the analysis of CSS/D case studies, many of the highlighted best practices and successes are focused on broad-based, inclusive public involvement; multimodal access (safety for all users); and aesthetics. Many of the case studies focus on high-profile projects in urban environments. Relatively few CSS/D case studies are available that showcase best practices associated with performance measures, environmental justice, expedited project development and delivery, and enhancing value through shared solutions. In addition, during the best practices and successes discussion in the DOT interviews, some of the States mentioned that having examples of implementing CSS/D on "everyday projects" such as bridge rehabilitations and replacement that enhance multimodal connectivity. Several case studies highlighting such projects are available through the [Pedestrian and Bicycle Information Center](#) website. These best practice examples provide insight on how CSS/D can be integrated on all projects to support efficient and effective project delivery. Several States interviewed also mentioned the need to highlight

their own successes in implementing CSS/D within their departments to support further integration into their project delivery programs.

Based on the analysis of case studies, the interviews, and the CSS pilot States discussion, one of the challenges to full integration of CSS/D is the lack of information related to measuring the integration and implementation of CSS/D. This can cause a disconnect between perceived and actual CSS/D integration on a project-by-project basis. Additionally, the lack of CSS-related performance measures can cause DOTs to stagnate or regress in CSS/D integration because of challenges such as staff turnover and perceived impacts of other challenges, such as decreased funding. State DOTs would benefit from the development of a CSS/D accountability framework to better gauge how well they are implementing CSS/D. Other challenges for CSS/D implementation include fully leveraging design flexibility, understanding how to comprehensively define the context through stakeholder and public engagement, funding flexibility, limited DOT budgets, CSS/D integration with existing DOT processes, and a continuously changing workforce.

To more fully integrate CSS/D into project development and build capacity with CSS/D implementation, DOTs would benefit from training and technical assistance in the following topic areas:

- Design flexibility, particularly in light of increased focus on context sensitivity and flexibility in design in future AASHTO Green Book versions;
- Effective communication with stakeholders and communities;
- CSS/D training for new staff;
- Successful CSS/D integration within common projects;
- Leveraging funding sources in support of CSS/D;
- Executing a CSS/D approach within day-to-day activities;
- CSS/D policies, procedures, and guidelines;
- Broad-based, inclusive public involvement;
- PBPD;
- Multimodal accommodations;
- Effective visioning; and
- Identification of performance metrics to measure the implementation of CSS/D.

Finally, States are facing many new and emerging trends and issues that may require refined techniques or new approaches to implementing CSS/D. These emerging issues and trends are related to technological advancements in transportation (including the advent of automated and connected vehicles), increased frequency of disaster events, changing demographics and travel demand needs, shared mobility, the emergence of innovative financing and non-traditional funding solutions, and increased access to information via channels such as mobile applications and social media. Fully integrating CSS/D into their project delivery processes will allow DOTs to identify opportunities to implement refined techniques and new approaches related to CSS/D in these new and emerging contexts. Partnering transportation organizations, such as AASHTO and TRB, can complement FHWA's efforts to support CSS/D implementation and help build capacity within DOTs, especially in these new and emerging project situations.

Appendix: CSS/D-Related Initiatives Featured on State DOT Websites

(This table highlights the results from a scan of State DOT websites for CSS/D content. The CSS/D information discovered fell into one of the four categories identified below).

State	Complete Streets	Statewide bicycle and pedestrian initiatives	Design flexibility/practical design	Public involvement policies emphasizing early and ongoing outreach
Arizona		•		•
Arkansas		•		
California	•	•		•
Colorado				•
Connecticut		•		•
District of Columbia	•			
Florida	•			•
Georgia				•
Hawaii				•
Idaho			•	•
Indiana	•			•
Iowa			•	•
Kansas	•			•
Kentucky			•	
Louisiana	•		•	
Maine	•		•	
Maryland	•	•	•	
Massachusetts	•	•		
Michigan	•		•	
Minnesota	•	•	•	•
Mississippi				•
Missouri			•	•
Montana				•
Nevada				•

State	Complete Streets	Statewide bicycle and pedestrian initiatives	Design flexibility/practical design	Public involvement policies emphasizing early and ongoing outreach
New Hampshire	•			
New Jersey	•			
New Mexico			•	
New York	•			•
North Carolina	•			
North Dakota				•
Ohio				•
Oregon		•	•	
Pennsylvania				•
Puerto Rico	•			•
Rhode Island	•			•
South Carolina		•		•
South Dakota				•
Tennessee		•		•
Texas				•
Utah			•	
Vermont	•	•		•
Virginia		•		•
Washington			•	
West Virginia				•
Wisconsin		•		
Wyoming				•