

**USING PRACTICAL DESIGN AND  
CONTEXT SENSITIVE SOLUTIONS  
IN DEVELOPING SURFACE  
TRANSPORTATION PROJECTS**

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(111-118)

**HEARING**  
BEFORE THE  
SUBCOMMITTEE ON  
HIGHWAYS AND TRANSIT  
OF THE  
COMMITTEE ON  
TRANSPORTATION AND  
INFRASTRUCTURE  
HOUSE OF REPRESENTATIVES  
ONE HUNDRED ELEVENTH CONGRESS  
SECOND SESSION

June 10, 2010

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**U.S. House of Representatives**  
**Committee on Transportation and Infrastructure**  
Washington, DC 20515

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June 9, 2010

**SUMMARY OF SUBJECT MATTER**

**TO:** Members of the Subcommittee on Highways and Transit  
**FROM:** Subcommittee on Highways and Transit Staff  
**SUBJECT:** Hearing on “Using Practical Design and Context Sensitive Solutions in Developing Surface Transportation Projects”

**PURPOSE OF THE HEARING**

The Subcommittee on Highways and Transit is scheduled to meet on Thursday, June 10, 2010, at 10:00 a.m., in room 2167 of the Rayburn House Office Building to receive testimony on the use of Practical Design and Context Sensitive Solutions to develop highway and road projects. This hearing is part of the Subcommittee’s effort to reauthorize Federal surface transportation programs under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (P.L. 109-59), which expired on September 30, 2009, but has been extended through December 31, 2010. The Subcommittee will hear from the Federal Highway Administration (FHWA); the Massachusetts Department of Transportation; the Chair of the Clackamas County, Oregon Board of Commissioners; a professor of civil engineering at the University of Kentucky; and transportation consultants with the American Council of Engineering Companies and the Institute of Transportation Engineers.

**BACKGROUND**

The Federal Government and State and local governments make significant annual investments in highways and bridges. In 2006, all levels of government spent \$161.1 billion on our nation’s highways.<sup>1</sup> The safety and efficiency of travel along these highways is directly impacted by the standards to which they are designed and constructed. Highway design has substantial mobility and safety implications, and can significantly impact the surrounding physical environment and

<sup>1</sup> FHWA, *2008 Status of the Nation’s Highways, Bridges, and Transit: Conditions & Performance Report to Congress*, <http://www.fhwa.dot.gov/policy/2008repr/pdfs/cp2008.pdf>.

associated quality of life. A well-planned and designed highway can support and improve safe travel, mobility, accessibility, economic development, and enhance quality of life. A poorly-planned and designed highway, in contrast, can create congested bottlenecks and cause accidents, limit transportation options, or can bisect a community, changing the character of that neighborhood. Over many decades the Federal Government – in partnership with the States – has established highway design standards to address these concerns.

## **I. Current Highway Design Guidelines**

Federal law establishes design standards for highway projects on the National Highway System (NHS), which includes the Interstate system as well as other primary routes. Specifically, 23 U.S.C. § 109 provides that design standards for projects on the NHS must be approved by the Secretary of the U.S. Department of Transportation (U.S. DOT) in cooperation with the State Departments of Transportation (DOT). The Secretary has delegated this approval responsibility to the Administrator of the FHWA. While 23 U.S.C. § 109 applies to the NHS, it also provides that Federal-aid highway projects not located on the NHS shall be designed, constructed, operated, and maintained in accordance with State laws, regulations, directives, safety standards, design standards, and construction standards.

State DOTs, working through the American Association of State Highway and Transportation Officials (AASHTO), each develop and adopt their own design standards. FHWA contributes to the development of the design standards through membership on AASHTO committees and taskforces, sponsoring and participating in research efforts, and other initiatives. FHWA uses a formal rulemaking process to adopt those State design standards it considers suitable for application on the NHS.

The design standards currently adopted by FHWA can be found at 23 CFR 625, which does not include the standards themselves, but rather a list of publications that contain the standards. The standards publication most frequently used by both FHWA and State DOTs is “A Policy on Geometric Design of Highway and Streets,” more commonly referred to as the “Green Book” because of the color of its cover. The Green Book has been published by AASHTO in some form since the 1930s and contains a general set of guidelines on road design. The most recent edition was published in 2004. While often considered to be a set of national standards, the Green Book is really a series of guidelines on geometric design within which a highway designer has a range of flexibility, though the degree to which State DOTs exercise flexibility within the guidelines is often debated.

## **II. Context Sensitive Solutions**

According to FHWA, the Context Sensitive Solutions (CSS) process is generally considered to be an approach to designing and delivering projects that “considers the total context within which a transportation improvement project will exist.”<sup>2</sup> Traditionally, transportation design has placed principal importance on vehicular throughput, i.e. moving traffic. The CSS process emphasizes that transportation facilities should fit their physical settings and preserve scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. In other words, CSS is an approach

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<sup>2</sup> CSS, *About this Site*, <http://www.contextsensitivesolutions.org/content/topics/misc/about/>.

to transportation decision-making and design that takes into consideration the communities and lands through which roads pass.

In 1997, the FHWA Office of Program Administration and Office of Environment and Planning published “Flexibility in Highway Design,” which recommended flexibility in application of the Green Book guidelines, particularly when considering impacts on the community. It identified and explained opportunities to use “flexible design” as a tool to help “sustain community interests in projects without compromising safety.”<sup>3</sup> To accomplish this goal, the guide stressed “the need to identify and discuss those flexibilities and to continue breaking down barriers that sometimes make it difficult for highway designers to be aware of local concerns of interested organizations and citizens.”<sup>4</sup>

Building upon this recommendation, the guiding principles of CSS were developed and refined in 1998 at a conference, entitled *Thinking Beyond the Pavement: A National Workshop on Integrating Highway Development with Communities and the Environment while Maintaining Safety and Performance (Thinking Beyond the Pavement)*, hosted by the Highway Administration of the Maryland DOT, AASHTO, and FHWA. At *Thinking Beyond the Pavement*, participants from 39 States and the District of Columbia came together to develop a new vision for highway design. The goals of the conference were to:

- “Find and publicize the best ways of integrating highways with their communities and the environment while maintaining safety and performance;
- Encourage continuous improvement in design of transportation projects across the nation, balancing all of our customers' concerns, whether transportation related or not; and,
- Achieve flexible, context-sensitive design in all projects.”<sup>5</sup>

Since *Thinking Beyond the Pavement*, FHWA, AASHTO, the Transportation Research Board, and others have continued to add to the CSS dialogue by hosting workshops and training sessions, funding research, and issuing reports on best practices for CSS. Through these collaborative efforts, in March 2007 AASHTO and FHWA released a *Context Sensitive Solutions Strategic Planning Process Summary Report*, which established a definition for CSS as well as core principles, qualities, and outcomes.<sup>6</sup> In that report CSS was officially defined as follows:

Context sensitive solutions is 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.

CSS has been adopted by some States, including Pennsylvania, Maryland and Washington State. Other States have adopted approaches that are similar to CSS or integrate some of its principles. While FHWA and AASHTO continue to promote CSS as one way to design and deliver

<sup>3</sup> FHWA, *Flexibility in Highway Design*, <http://www.fhwa.dot.gov/environment/flex/index.htm>.

<sup>4</sup> *Id.*

<sup>5</sup> Maryland DOT, *Highway Brochure for Thinking Beyond the Pavement: A National Workshop on Integrating Highway Development with Communities and the Environment while Maintaining Safety and Performance*, <http://www.sba.maryland.gov/occe/tbtp.pdf>.

<sup>6</sup> See Appendix A for list of core principles, qualities, and outcomes of CSS.

transportation projects, some CSS proponents argue there is not enough being done to educate State DOTs about the benefits of using CSS and the flexibility that currently exists within the Green Book and State design standards.

Some in the transportation community argue that accepting the premise of CSS means that more exceptions to design standards<sup>7</sup> will occur, undermining proven engineering approaches. Examples of design exceptions that may be pursued for a highway project include the use of a narrower shoulder, a curve with radius smaller than the minimum for the selected design speed, or a crest vertical curve that does not provide the minimum stopping sight distance for the selected design speed.<sup>8</sup> According to FHWA, no study has shown the implementation of CSS to lead to more design exceptions.<sup>9</sup> As FHWA explains, “a commitment to CSS by an agency does not mean abandonment of design standards. Professional engineers are ethically and legally required to follow the accepted practices of the profession.”<sup>10</sup>

There are also those that argue that CSS may make a project sponsor more susceptible to tort liability claims.<sup>11</sup> Any time a sponsor designs a highway facility – with or without the use of CSS – there is a possibility of a tort lawsuit. The AASHTO Green Book, other State-adopted highway standards, and Federal and State regulations and guidelines are often used in tort cases to educate the jury about the standard level of practice for design.<sup>12</sup> As FHWA explains in the Flexibility in Highway Design guide, “this does not mean that adherence to accepted standard practices, such as the AASHTO Green Book guidelines, automatically establishes that reasonable care was exercised. Conversely, deviation from the guidelines, through the use of a design exception, does not automatically establish negligence.”<sup>13</sup> The Flexibility in Highway Design guide further states that designers may be tempted to be conservative in their approach to highway design and to avoid innovative and creative solutions to design problems in order to avoid lawsuits, but that “avoiding unique solutions is not the answer.”<sup>14</sup> Instead, “with reliance on complete and sound documentation, tort liability concerns need not be an impediment to achieving good road design.”<sup>15</sup>

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<sup>7</sup> According to FHWA, a design exception is a “documented decision to design a highway element or segment of highway to a design criterion or value that does not meet the minimum value that has been established for that highway or project.” FHWA has designated 13 controlling criteria as being of sufficient importance to warrant a formal design exception. Those 13 controlling criteria are: design speed, land width, shoulder width, normal cross slope, horizontal curvature, super-elevation, tangent curve, vertical curvature, vertical clearance, stopping sight distance, bridge width, horizontal clearance, and structural capacity. Source: FHWA, *CSS Quick Facts – Design Exceptions*, [http://www.contextsensitivesolutions.org/content/reading/design\\_exceptions\\_css\\_quick\\_facts/resources/Design\\_Exceptions\\_Quick\\_Facts.pdf/](http://www.contextsensitivesolutions.org/content/reading/design_exceptions_css_quick_facts/resources/Design_Exceptions_Quick_Facts.pdf/).

<sup>8</sup> *Id.*

<sup>9</sup> *Id.*

<sup>10</sup> *Id.*

<sup>11</sup> According to the FHWA, “Tort is a legal term that refers to a civil wrong that has been committed, in this case by highway agencies. Liability is the responsibility to make restitution to the damaged party through an action or payment determined by the court.” Source: FHWA, *Flexibility in Highway Design* (1997), at 39-40.

<sup>12</sup> *Id.*

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

### III. Practical Design

Another innovative aspect of delivering highway projects is practical design. While some consider practical design to be similar to CSS, and practical design can be part of a context sensitive approach, practical design is more about planning and designing projects to more effectively reach desired objectives with cost-efficiency as a principal concern. Utilizing a practical design approach focuses on “right-sizing” projects to more appropriately reflect financial constraints, therefore allowing the delivery of a greater number of transportation projects.

Missouri adopted this approach in 2005 and the Missouri DOT (MoDOT) Practical Design Implementation Manual states that “MoDOT’s goal of practical design is to build ‘good’ projects, not ‘great’ projects, to achieve a great system.” MoDOT is responsible for more than 32,000 miles of highways, which includes more than 10,000 bridges. With declining revenues and increasing construction costs, MoDOT made the decision to look for cost savings in every highway project by adopting practical design. For example, this meant that a highway through the mountains might have a thinner bed of concrete where it rests on bedrock; or instead of widening a deteriorating bridge and making nearby highway improvements, as would have been done before practical design, MoDOT will now simply repair the bridge to make it safe to cross again and use the cost savings to repair additional bridges. As a result, after the first five years of implementing practical design, 83 percent of Missouri’s highways were rated in 2009 to be in good condition, versus 44 percent in 2003, and MoDOT estimates it has saved 13 percent on project costs.<sup>16</sup>

Using Missouri’s success as an example, other States have since adopted their own variations of practical design. In Kentucky, the Kentucky DOT has adopted a process called “practical solutions” that focuses on building right-sized projects that still make substantial improvements to a transportation facility and meet mobility, safety, community, and environmental goals.

#### **PRIOR LEGISLATIVE AND OVERSIGHT ACTIVITY**

##### *ISTEA*

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) (P.L. 102-240) expanded the Federal transportation focus from constructing roads to providing diverse surface transportation options with consideration of environmental enhancements and focus on community issues and livability initiatives.

##### *National Highway System Designation Act*

The National Highway System Designation Act of 1995 (P.L. 104-59) designated the NHS within the United States. Section 304 of the Act also required that the construction or rehabilitation of a highway on the NHS (other than a highway also on the Interstate system) should take into account the “constructed and natural environment of the area; the environmental, science, aesthetic, historic, community, and preservation impacts of the activity; and access for other modes of transportation.”

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<sup>16</sup> Joseph Jones, “Practical Design.” *Public Roads*, Vol. 73 No. 4 (Jan/Feb 2010).

*SAFETEA-LU*

Enacted in 2005, SAFETEA-LU amended 23 U.S.C. § 109 to require the Secretary when approving Federal-aid highway projects to consider identified documents and materials that define the core principles of CSS.<sup>17</sup>

*Surface Transportation Authorization Act of 2009*

The Surface Transportation Authorization Act of 2009 (STAA) further amends 23 U.S.C. § 109 to require the consideration of CSS for all Federal-aid highway projects. The STAA Committee Print was marked up by the Subcommittee on Highways and Transit on June 24, 2009. To date, no further legislative action on the STAA has been taken.

WITNESSES

**Mr. King Gee**

Associate Administrator for Infrastructure  
Federal Highway Administration

**Ms. Luisa M. Paiewonsky**

Administrator, Highway Division  
Massachusetts Department of Transportation

**The Honorable Lynn Peterson**

Chair  
Clackamas County Board of County Commissioners

**Mr. Steven B. Bolt, P.E., PTOE**

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**Mr. Hal Kassoff**

Senior Vice President  
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**Dr. Nikiforos Stamatiadis, Ph.D., P.E.**

Professor of Civil Engineering/Transportation  
University of Kentucky

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<sup>17</sup> Section 6008 of SAFETEA-LU added to 23 U.S.C. § 109(e)(2) consideration of “the publication entitled ‘Flexibility in Highway Design’ of the Federal Highway Administration” as well as “‘Eight Characteristics of Process to Yield Excellence and the Seven Qualities of Excellence in Transportation Design’ developed by the conference held during 1998 entitled ‘Thinking Beyond the Pavement National Workshop on Integrating Highway Development with Communities and the Environment while Maintaining Safety and Performance.’”

**Appendix A: Principles, Qualities, and Outcomes of Context Sensitive Solutions<sup>18</sup>**

**Core Principles of CSS** – These core CSS principles apply to transportation processes, outcomes, and decision-making.

1. Strive towards a shared stakeholder vision to provide a basis for decisions.
2. Demonstrate a comprehensive understanding of contexts.
3. Foster continuing communication and collaboration to achieve consensus.
4. Exercise flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments.

**CSS Qualities** – Context sensitive solutions is guided by a process which:

- Establishes an interdisciplinary team early, including a full range of stakeholders, with skills based on the needs of the transportation activity;
- Seeks to understand the landscape, the community, valued resources, and the role of all appropriate modes of transportation in each unique context before developing engineering solutions;
- Communicates early and continuously with all stakeholders in an open, honest, and respectful manner, and tailors public involvement to the context and phase;
- Utilizes a clearly defined decision-making process;
- Tracks and honors commitments through the life cycle of projects;
- Involves a full range of stakeholders (including transportation officials) in all phases of a transportation program;
- Clearly defines the purpose and seeks consensus on the shared stakeholder vision and scope of projects and activities, while incorporating transportation, community, and environmental elements;
- Secures commitments to the process from local leaders;
- Tailors the transportation development process to the circumstances and uses a process that examines multiple alternatives, including all appropriate modes of transportation, and results in consensus;
- Encourages agency and stakeholder participants to jointly monitor how well the agreed-upon process is working, to improve it as needed, and when completed, to identify any lessons learned;
- Encourages mutually supportive and coordinated multimodal transportation and land-use decisions; and
- Draws upon a full range of communication and visualization tools to better inform stakeholders, encourage dialogue, and increase credibility of the process.

**CSS Outcomes** – Context sensitive solutions leads to outcomes that:

- Are in harmony with the community and preserve the environmental, scenic, aesthetic, historic, and natural resource values of the area;
- Are safe for all users;
- Solve problems that are agreed upon by a full range of stakeholders;
- Meet or exceed the expectations of both designers and stakeholders, thereby adding lasting value to the community, the environment, and the transportation system; and
- Demonstrate effective and efficient use of resources (people, time, budget,) among all parties.

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<sup>18</sup> The contents of this Appendix are taken from *Results of Joint AASHTO/FHWA Context Sensitive Solutions Strategic Planning Process Summary Report* (March 2007), [http://www.contextsensitivesolutions.org/content/topics/what\\_is\\_css/core-principles/](http://www.contextsensitivesolutions.org/content/topics/what_is_css/core-principles/).



**HEARING ON USING PRACTICAL DESIGN AND  
CONTEXT SENSITIVE SOLUTIONS IN DEVEL-  
OPING SURFACE TRANSPORTATION  
PROJECTS**

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**Thursday, June 10, 2010**

HOUSE OF REPRESENTATIVES,  
SUBCOMMITTEE ON HIGHWAYS AND TRANSIT,  
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,  
*Washington, DC.*

The Committee met, pursuant to call, at 10:00 a.m., in room 2167, Rayburn House Office Building, the Honorable Peter DeFazio [Chairman of the Subcommittee] presiding.

Mr. DEFAZIO. The Committee will come to order.

Ranking Member Duncan observed that our witnesses are eager and ready to provide testimony. That is good.

We are here today, in the context of the continuing hearings on the authorization and reauthorization of the Surface Transportation Act, whenever that might happen. The Obama Administration has not been particularly helpful. So we are continuing to work on the bill and hope in the near future to have an opportunity to move it.

Within the draft bill itself, we have included some language that Federal Aid Highway projects should look at, this has an unfortunate name, but should look at what we call practical design. But within the community of engineers and works out there, practical design and context sensitive solutions are very different things.

But what we are talking about is essentially a combination of those two things. We want State DOTs to recognize that they don't develop projects in isolation. A number of States have actually adopted these sorts of policies of context sensitive design or practical design solutions. There are a number of good success stories out there, where projects were designed outside of the normal parameters of optimal engineering solutions to design projects that were more appropriate for their communities, fully met the needs of the community, actually cost less and were delivered with less controversy.

So we want to further examine that topic here today with this panel. I look forward to your testimony.

With that, I will turn to the Ranking Member, Mr. Duncan.

Mr. DUNCAN. Thank you, Mr. Chairman. I want to thank the witnesses for being here.

This title, Context Sensitive Solutions, I had an English teacher who would have called that a very high-falutin' title. Some long-time bureaucrat must have come up with that.

But anyway, the objectives behind that and practical design are certainly commendable. Most people agree that State and local transportation officials should adopt strategies that minimize the potential adverse effects associated with a transportation project. It is important that engineers consider the location and surrounding community when designing a road or highway. And it is also important to make sure that a road should be designed to accommodate the full range of highway users and also to take into consideration if there is a heavy pedestrian presence in the area and all the factors. Also, I think it is important to consider the impact on the surrounding community.

So these are laudable, commendable goals and I am sure we are going to hear some important testimony today about what is being done in that regard and in addition, to consider ways that we can do more with less. Because that is certainly something that is going to have to be done. We are going to have to get more bang for the buck. And I know that some of the testimony this morning will be helpful in that regard, as well.

So I want to place my full statement into the record and I look forward to hearing from the witnesses. I thank you for calling this hearing.

Mr. DEFAZIO. I thank the Ranking Member for that.

We will proceed to testimony. We have received and read your written testimony, so I would urge members of the panel to do their best to summarize their most cogent points, address what they consider to be the most critical problems and/or attributes of context sensitive solutions. And if anybody here can come up with a better name, you will get a special reward, something that would make more sense to more people than context sensitive solutions.

[Laughter.]

Mr. DEFAZIO. So with that, we will turn first to Mr. Gee.

**TESTIMONY OF KING W. GEE, ASSOCIATE ADMINISTRATOR FOR INFRASTRUCTURE, FEDERAL HIGHWAY ADMINISTRATION; LUISA M. PAIEWONSKY, ADMINISTRATOR, HIGHWAY DIVISION, MASSACHUSETTS DEPARTMENT OF TRANSPORTATION; LYNN PETERSON, CHAIR, BOARD OF COUNTY COMMISSIONERS, CLACKAMAS COUNTY, OREGON; STEVEN B. BOLT, PE, PTOE, PRESIDENT, ORTH-RODGERS & ASSOCIATES, INC.; HAL KASSOFF, SENIOR VICE PRESIDENT, PARSONS BRINCKERHOFF; NIKIFOROS STAMATIADIS, PH.D., P.E., PROFESSOR OF CIVIL ENGINEERING/TRANSPORTATION, UNIVERSITY OF KENTUCKY**

Mr. GEE. Chairman DeFazio, Ranking Member Duncan and Members of the Subcommittee, thank you for this opportunity to discuss how the Federal Highway Administration is advancing context sensitive solutions to ensure that Federal transportation investments fit well within communities.

Context sensitive solutions encompass four core principles: striving toward a shared stakeholder vision as a basis for decisions; demonstrating a comprehensive understanding of contexts; fos-

tering communication and collaboration to achieve consensus; and exercising flexibility and creativity to shape effective transportation solutions while preserving and enhancing community and natural environments.

There is a clear linkage between these CSS principles and livability, which is a key part of the Administration's agenda. In addition to livability, these principles support cross-cutting issues of sustainability, energy conservation and climate change. CSS can be applied to all aspects of project development, from planning and design to construction, operation and maintenance. FHWA has been a leader in the CSS area, advocating and advancing the practice, supporting partners with research funds and documenting and sharing success stories to give practitioners a wide variety of examples from which to learn and model.

I would like to highlight a few of our recent efforts. First, the CSS clearinghouse website serves as the definitive source to access CSS information and resources. In addition, FHWA was a sponsor and contributor to a nationally accepted CSS design guide. We recently held five national dialogue workshops to review case studies, discuss trends in CSS and identify actions for moving forward.

These illustrate how FHWA is promoting the use of context sensitive solutions nationwide to fashion 21st century solutions to emerging infrastructure challenges. Mr. Chairman, this concludes the summary of my written statement. I would be happy to answer your questions.

Mr. DEFAZIO. Thank you, Mr. Gee.

Ms. Luisa M. Paiewonsky, Administrator of the Highway Division, MDOT. Go ahead.

Ms. PAIEWONSKY. Thank you, Chairman DeFazio, Ranking Member Duncan and Members of the Subcommittee. I am Luisa Paiewonsky, I am the Highway Division Administrator for the Massachusetts Department of Transportation. And I am speaking today on behalf of the American Association of State Highway and Transportation Officials, which represents the State departments of transportation in 50 States, in addition to Washington, D.C. and Puerto Rico.

In May of 1998, 325 engineers, planners, designers, local government officials and citizens groups came together at the University of Maryland for a national workshop called Thinking Beyond the Pavement. The discussion and follow-up actions by AASHTO, the Federal Highway Administration and the State DOTs marked the beginning of a transformation in the way that we deliver transportation projects in a collaborative, interdisciplinary way that engages the community and stakeholders in crafting appropriate transportation solutions.

As a result of that workshop, AASHTO went back to the drawing board and developed a companion guide to the AASHTO green book, the highway design guide, to address flexibility, safety, liability and community involvement. In addition, the highway community has sponsored significant research, numerous workshops and peer exchanges over the past decade to further the knowledge base that used the principles of context sensitive solutions. These actions have helped expand the use of context sensitive solutions

among the State DOTs from fewer than a dozen back then to the vast majority of States using CSS principles.

In Massachusetts, we are very proud of our project development and design guide, which enables us to collaborate with our communities in designing flexible, multi-modal transportation solutions that are safe, attractive and sensitive to the environment. Most recently, June 2nd, our Governor Deval Patrick launched a new initiative called GreenDOT, a comprehensive environmental responsibility and sustainability initiative designed to make us the greenest DOT in the Nation and a national leader in greening the State transportation system. We will incorporate sustainability in all of our activities, from planning to design to maintenance, operation and construction, in advancement of three goals: reducing greenhouse gas emissions, promoting healthy transportation options, such as walking and bicycling, and supporting smart growth development.

Finally, I would like to address practical design. The States are facing the tightest budgets that we have faced in the last 50 years. Because of this, most of us have to right-size projects, simply scaling back projects to levels that we can afford. The States are not sacrificing safety or durability. But we are rethinking the scale and scope of the work to get the best value for the least cost, including life cycle cost.

Mr. Chairman, the States have made tremendous progress over the past 12 to 15 years by working in collaboration with our community partners to deliver and maintain safe, affordable and environmentally sensitive transportation systems. I believe that we will continue to rise and meet the challenges addressing our mobility, social, economic, environmental and energy needs.

Thank you for the opportunity to testify, and I look forward to taking your questions.

Mr. DEFAZIO. Thank you.

The Honorable Lynn Peterson, Chair, Clackamas County Board of County Commissioners. Ms. Peterson.

Ms. PETERSON. Good morning, Mr. Chairman and Members of the Committee. My name is Lynn Peterson. I am the Chair of the Clackamas County Commission, one of the three counties in the Portland Metro region.

I am here because I am a former highway design and construction engineer and a traffic engineer transportation planner within the Portland region and also formerly of Wisconsin DOT.

The reason that I turned into a transportation planner and then an elected official is that I wanted to get out of the profession. It was becoming more of a profession of plug and chug than it was about actual problem-solving and allowing the engineers the flexibility to do the types of projects that the communities desired.

What I found is that we need to re-educate our workforce. We need a culture and system that promotes an application of guidelines, not of blindly following the standards. And while the AASHTO guidelines for highway design and construction, roadway design and construction are just that, guidelines, they are promoted within the industry as standards. And so we need to really look at how we apply those standards and what kind of fiscal impacts that they are having to the state of transportation today.

I am very excited that there are a handful of States that are moving in this direction and that they can say, we can do better than this. But they need support from all the political levels, including the Federal. They need the flexibility to go through a process with the community to better define the purpose of the project. They need flexibility in looking at the entire transportation system and the management of that system. They need flexibility and mobility in roadway design standards.

And they need more than just encouragement. They need an adoption of flexible mobility in roadway design guidelines, adoption of incentives to save time and resources and adoption of education requirements and more money to educate a new workforce. And they need examples of successes. We have two projects in Clackamas County I would be happy to talk about, one where we actually exited the Federal process because we could not give the community what they needed because of the Federal process; and also one that we were in the Federal process and had to work within that process to deliver our project.

I have also talked to the assistant chief of counsel of Missouri DOT about liability issues, if you would like to discuss that.

Finally, I just want to end by saying, engineers are making policy decisions. And we at this point and this time in our Country need to question whether those are the policies we want by default, or if we need to actively engage with what kind of policies we want for our Country to save money in the future.

Thank you.

Mr. DEFAZIO. Thank you for an excellent summary.

Mr. Steven Bolt, President of Orth-Rodgers & Associates, Inc. Sir?

Mr. BOLT. Good morning, Mr. Chairman, honorable Members of Congress. Thank you for the opportunity.

My name is Steve Bolt. I am the President of the American Council of Engineering Companies of Pennsylvania. I am also the President of the Pennsylvania-based consulting firm, Orth-Rodgers & Associates.

I would like to lobby that instead of context sensitive solutions or context sensitive design that your new nomenclature be smart transportation. That is what I would like to talk about this morning. The municipal planning organization in our region, the Delaware Valley Regional Planning Commission, or DVRPC, hired my firm back in 2004 to develop a smart transportation guide book, which was referenced in the written testimony.

Working closely with our partners at both PennDOT and New Jersey DOT, we developed a guide book which we completed in March of 2008. Since publication, we have been on an active tour of both States, but principally in Pennsylvania, to educate engineers, municipalities and planners what smart transportation means, because it is a wholesale change in the way that PennDOT designs and develops transportation projects.

So broadly, and I'm going to read this quote: "smart transportation is partnering to build great communities for future generations by linking transportation investments and land use planning in transportation decision-making." And from that, ten themes have emerged from those general principles. First, money counts.

Choose projects with a high price to value ratio, enhance the local roadway network, look beyond just level of service, safety first and maybe safety only, we accommodate all modes of transportation, leverage and preserve existing investments, build towns and not sprawl, develop local governments as strong land use partners and understand the context and plan and design within that context.

That sounds fairly simple. So really, the question might be, what is the change from past practice that the planning level, previously the DOT, did not involve the municipalities in implementation of the transportation improvement program, or TIP? Now, the municipalities filter those projects before they make it onto the TIP.

At the design or the engineering level, like Lynn just mentioned, the smart transportation guide book gives the engineer greater flexibility in design which in turn makes the money go a little bit further. Within Pennsylvania, we have two recent examples, the slides of which are contained in the written testimony. One is Route 202, which was initially designed as a limited access expressway with a classic 300-foot right of way, and a price tag in excess of \$456 million. By the time we applied smart transportation principles, we reduced the footprint, improved the local roadway network and saved \$265 million.

The Marshalls Creek Bypass, which was initially designed as a four-lane limited access highway and a \$70 million price tag, subsequent to the application of smart transportation and value engineering, we reduced the project and its limits and saved \$45 million.

Both of those jobs would be done differently today, and were rescued principally due to fiscal constraints. We have a better process in place and do better planning with our municipal partners. So again, you might ask, why is that not a national practice? I think at the planning level, some States may be concerned about facilitating their role with the municipalities and the change in the way that they do business in their traditional role.

And at the design or engineering level, engineers, as Lynn just noted, tend to be conservative folks. Now, when we build roads, dams and bridges, we like them to be conservative. But I think that by default, tort liability has replaced sound engineering judgment by designers, and smart transportation provides us the flexibility to begin to exercise sound engineering judgment once again.

Mr. Chairman, I would ask the Subcommittee to develop a comprehensive and sustainable long-term funding solution that embraces those principles. And I would like just on a personal note to leave you with one thought. It has been said that our transportation infrastructure is a litmus test of where we will be in 10 years as a Nation. Currently, China spends 12 percent of its GDP on transportation and infrastructure, Europe 5 percent, and the United States a mere 2 percent.

Thank you again for the opportunity.

Mr. DEFAZIO. Thank you.

Mr. Hal Kassoff, Senior Vice President of Parsons Brinckerhoff.

Mr. KASSOFF. Mr. Chairman and Members of the Committee, thank you for the opportunity to testify. I am Hal Kassoff. I am a longstanding member of ITE and in addition to my work at Par-

sons Brinckerhoff, I also served for 12 years as Maryland's highway administrator.

Today I have the privilege of representing the Institute of Transportation Engineers' 18,000 members around the world. I am proud of the leading role that ITE has played in advancing the ability of transportation professionals everywhere to address transportation needs in a much broader context of sustainability and livability goals.

Just three months ago at our international meeting in Savannah, Georgia, ITE released a remarkable document that was prepared through a unique partnership of transportation engineers and urban planners, representing ITE and the Congress for the New Urbanism, and supported by FHWA and EPA. Traditionally, these groups have had different philosophies, different goals and expectations, and even different languages to describe the same things.

After nearly a decade of determined effort to cooperatively work at both the policy and technical levels, the group produced what is already being viewed as a landmark publication. The recommended practice, which I am holding in my hand here, is called *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*. The recommended practice is a triumph, not only in perseverance, but in its range of coverage from philosophical to practical. It gets right down into the details: widths of sidewalks, travel lanes, target speeds for different types of thoroughfares. And yet it does so in a way that encourages the careful consideration of the context from a community and land use, as well as a transportation perspective.

Context sensitivity is the key to this recommended practice. So what is context sensitivity? What do we mean by context sensitive solutions? I like to say that if sustainability and livability are the goals we seek, context sensitive solutions, or CSS, provides the way to get there. Compared to the traditional processes, CSS is much more collaborative, more creative, more flexible. The results of this process can actually save money and shorten project development times.

To sum up, ITE supports the contextual approach to addressing transportation and community needs. We would welcome action at the Federal level that would encourage the awareness and application of ITE's new recommended practice. But not as a mandate, but in conjunction with other very worthy, well-established design documents and manuals which often, in fact almost always have more flexibility in them than are used by practitioners.

Finally, we recognize that not all contexts and not all liveable communities are urban. But if sustainability and livability goals are what we seek to improve transportation in all areas, then CSS, context sensitive solutions, and ITE's recommended practice represent a major leap forward in that regard.

Thank you, Mr. Chairman.

Mr. DEFAZIO. Thank you.

Dr. Nikiforos Stamatiadis, Professor of Civil Engineering and Transportation, University of Kentucky. Go ahead, sir.

Mr. STAMATIADIS. Mr. Chairman and Members of the Committee, thank you very much for your time to testify. My name is Nick Stamatiadis, and if you pronounce all vowels, it is very easy to pro-

nounce. I am, as you identified, a professor of civil engineering at the University of Kentucky.

I don't represent a particular agency or organization. But probably I am one of the people that has been involved in the CSS since its conception in 1998.

What I would like to talk about for a few minutes is that every project that we undertake has a development and delivery process that starts at the planning phases and goes all the way to the operations and maintenance. Context sensitive solutions is simply a systematic, comprehensive, principle-driven approach that we can follow that accomplishes those kinds of steps. It is a rational process that considers all phases of the project development and uses a set of principles to achieve it. The goal, therefore, of CSS, is to follow that process, and provide an outcome harmonizing transportation requirements with community needs and values.

Practical design and solutions, as we shared earlier, were born from the recent emphasis on budgetary constraints. The goal that we have is to provide a customized solution while considering a system-wide approach. Some practitioners of these points are considering, should we abandon CSS in light of practical solutions. In my opinion, practical solutions and design is not a substitute for CSS, since all it does is emphasize a few of the CSS principles that we have in place, namely, the importance of purpose and need and using the agency resources effectively.

The basic idea that we have here is to develop a process that can be duplicated time after time that can lead to the appropriate results without using a set of standards and develop a contextual solution in this case. We have heard a number of different names. A few minutes ago, Mr. Bolt talked about value engineering. We have heard practical design, practical solutions. What we actually need is a project development process that will deliver the best fit transportation solution for the context, meeting the expectations of the agency, the stakeholders and the community, taking into account all relevant factors from the beginning to the end. CSS can do that for us in a very systematic process.

Thank you, and I would be glad to answer any questions that you might have.

Mr. DEFAZIO. Thank you, and I want to thank all the witnesses for providing cogent summaries of their opinions. We will move forward now with questions.

It appears there is some disagreement on the panel. There doesn't seem to be much disagreement over the merits or the potential for CSS and/or CSS mated with practical design as having a lot of advantages and benefits. But there is some disagreement over whether or not this should be a mandated process. I guess I would first turn to Commissioner Peterson, who most definitively states that she believes that we need a mandate or this won't move forward in short order over a large area. Then we will hear from other people who disagree.

So will you tell us why you believe we would need some sort of a mandate, more than just an encouragement that States should look at it?

Ms. PETERSON. I think from an engineer's standpoint and a policy decision-maker standpoint, it comes down to having clear direc-

tion on which way the Country wants to go in terms of its ability to provide these projects. We have had successful implementation of projects, maybe a second or third time around through a Federal process, when we have actually learned what the actual problem was, maybe hearing it a second or third time through the process, maybe not have been listening as closely as we could have, and needing to figure out a different way to do it, and then asking for exceptions and variances, depending on which State you are on. And then the time line to get those design acceptances and variances is very long.

In order to make for clear direction that this is the way to go, an ounce of prevention up front, we do need the Federal Government to say, this is what our expectation is, both on the process and on the design guidelines and mobility guidelines or standards. It would save money, but it would also allow for the engineers to understand that there is a Federal backing to all of this and there is no place to go and point to say, we can't do this. Because normally what we hear at the local level is, we can't do this because the Federal Government won't allow us. Even though I believe FHWA has been doing their very best to encourage, things are still very much in the culture that believe that the standards are very narrow and they can't do anything beyond those, and that there is no innovation encouraged. So we need to be more clear than just encouraging.

The second part is the liability issue and giving clear direction on what the process would entail in terms of the documentation of sound engineering judgment based on flexible standards. I have a small paragraph I could read from the Missouri DOT legal counsel if that would be OK, that really, I think summarizes it very well.

Missouri DOT has implemented now for over five years practical design. And in those five years, they have managed to get more projects out on the road and decrease fatalities on their roadway system by 25 percent over five years. In other words, they are not chasing fatalities, they are actually making the system more safe. He says, "it is too early to show results from tort suits against States using practical design. That is probably still seven to ten years out to see enough to make any kind of prediction. However, the pluses to consider are: practical design means more money to improve more roads; more improved roads means safer roads; safer roads means less accidents; less accidents means less lawsuits; less lawsuits means more money to improve more roads. Repeat cycle.

The defense of practical design tort claims should be survivable, so long as the decisions considered and made are documented in the project file. This is real engineering judgment that is presumably defensible. However, following applicable green book guidelines do not hold the same imprimatur in my opinion. We have seen for the past 15 or so years an attack on the old way of doing it. Following guidelines does not mean that it was the right decision. Practical design should provide more explainable defenses."

So I think that kind of helps give you the idea of the culture we are working in and the clear direction that is needed.

Ms. DEFAZIO. OK. Ms. Paiewonsky, representing AASHTO. AASHTO had good things to say, and you had good things to say about the concept. But you oppose a mandate. If it is so good and

there are so many advantages to it, why wouldn't we want everyone to go through this process.

Ms. PAIEWONSKY. I think because we have found that the most effective way to truly change DOT cultures and approaches to design, as we found in Massachusetts, is to have it come organically from within. There were conditions, for example, in Massachusetts where we were finding it difficult to get projects out the door, running up against a lot of opposition from communities whom we had traditionally worked with as partners. It became self-evident that we needed to change.

But we needed to change it in a way that was specific to our State. We have an enormous number of historic resources. So our design guide very much stressed the preservation of historic resources. We have a large number of coastal resources, which may not be applicable to other States.

So we found that by getting at the States' design manual, or design guide, and working with our engineers and having our engineers train one another, that was the most effective way to really internalize context sensitive solutions within our own agency culture in a way that was appropriate and a good fit for our State.

And then because State DOTs have a culture of sharing best practices with one another encouraged by Federal Highway and AASHTO, we have sent our own engineers out to share the benefits of CSS with other State DOTs. As I mentioned, we have numerous workshops. It has really become much more the norm than the exception.

But I think that each State needs to develop a set of solutions that is appropriate for that State, so that it is a good fit, and it becomes a success that builds upon success.

Mr. DEFAZIO. I am a bit puzzled, because it is a process, and it uses the word context. And context would go to historic resources or coastal resources or other things to put the design process within the context of the attributes or concerns. So it seems to me you have just sort of re-defined context. So I am still not sure of the objective. I have to say, my observation, and this would go to my own State department of transportation in part and others I have dealt with, that they are not open to change unless you hit them over the head with a baseball bat. They are just sort of going down the path that they have been going down for the last 50 years, and maybe there will be a new generation of engineers and people will come along.

But I don't know that we need to wait. So I guess I still don't understand your objection. Does anyone have a more concrete objection here, not to make a bad pun. Mr. Kassoff?

Mr. KASSOFF. Having worked for the Federal Government and State government for a combined 30 years and now in the private sector, I have kind of seen it from all sides. Beyond saying that NEPA, the spirit of NEPA, the language in the NHS legislation in the late 1990's, which set the foundation which said we had to consider culture, historic, societal. Very, very major step forward.

With that in mind, I think if Congress endorsed but didn't mandate this approach, building on existing tools, it would lead toward striving for the high ground. On the other hand, if you mandate, my experience is, we will standardize, we will homogenize, we will

bureaucratize, we will seek to fulfill minimum standards and we will race to the low ground instead of the high ground. And that is the inevitable result.

So I think as a matter of policy, saying that projects should be contextual, and I think that word contextual is important, with all due respect to all the other labels. I have never seen, in my years, in the past 12 years since 1998, the word "context" take off. Not all States have bought in totally. But in my travels around the Country, you have a critical mass out there of States that are practicing it.

And the unifying word is context. There is a little bit of pushback on terminology. I think if you endorse what I would call a contextual approach, building on NEPA, the spirit of NEPA, the spirit of the NHS legislation, you would see an amazing response as opposed to, "how can I get away with fulfilling the minimum requirements?"

Mr. DEFAZIO. OK. Interesting observation. I am particularly sensitive to the bureaucratization and standardization. Basically you are saying we could ruin it by mandating it.

Mr. KASSOFF. Right. It would be the antithesis.

Mr. DEFAZIO. And I know bureaucracy also. So that is interesting.

Does anybody else want to opine? Mr. Gee?

Mr. GEE. Thank you, Mr. Chairman. I would agree with Mr. Kassoff. The example I would bring up is NEPA, in terms of how it has become so mechanized. The documents that we get for highway projects are voluminous. And it is because it has evolved into something that was never really intended. What we really wanted to get to is the spirit of the context sensitive approach. It is an approach. It is a mind set. And in order to change a mind set, I think it is an institutional, cultural change that we have been fostering for the last 10 to 15 years. Congress has provided consistent guidance since NEPA, as Mr. Kassoff says, with ISTEA of 1991 and subsequent legislation that has really provided definition but not provided the mandate.

So I think we have been making some good progress in the last 10 years. I would share the same thing that Mr. Kassoff said, that if you were to mandate it, it would become, as he said, a race to the bottom.

Mr. DEFAZIO. So maybe endorsement and incentives or something along those lines. Anyone else?

Mr. BOLT. We would prefer, ACEC would prefer that you incentivize that, instead of hitting people, like you mentioned, Mr. Chairman, with a baseball bat, that you incentivize it. I think that we are all in agreement, the panel, that it just, if there is a Federal mandate for a new set of standards, then folks are just simply going to adopt those standards and aren't going to embrace that culture change that is so necessary.

Mr. DEFAZIO. OK. Doctor?

Mr. STAMATIADIS. Thank you. In principle, I tend to agree with Mr. Kassoff. But I think that we need a little bit of a stronger language than simply encouraging people. The reason why I am saying this is we have been in this process for the last 12, 13 years. If you look around the Country, there is a handful of States that

fully embrace this process. There are other States that are trying to find different ways of doing things.

And we have this lack of uniformity, if you will, along the level of the States that have accepted the principles of CSS. If we let this thing take its natural course, it may be another 50 years. Neither you nor I will be here debating this issue. So I think there is time that we can accelerate the process in order for all States to get at least a minimum common denominator, whether that will be called CSS, or any other name that you will have in place.

Mr. DEFAZIO. I will turn now to the Ranking Member, Mr. Duncan.

Mr. DUNCAN. Thank you, Mr. Chairman. I too was very impressed with Mr. Kassoff's remarks about homogenizing the process and making it a race to the bottom. Certainly, I have been one that has been very critical of and skeptical of one size fits all solutions for all kinds of things that we have a tendency to get into from the Federal level.

But, let me ask Mr. Gee and Ms. Paiewonsky, CSS proposals sometimes talk about increasing the livability of projects and also encouraging more involvement by community groups and so forth. What I am wondering about is, how do you figure in the cost benefit analysis? Livability probably means something different to almost everybody.

I would like to see more people involved in projects, but on the other hand, when you have some of these public meetings, I have noticed that sometimes the turnout is very low. And the people who come are usually the most unreasonable, demanding, radical, whatever you want to call it. And how do you find out, do you make efforts to try to find out how the silent majority feels about some of these projects? I would like your comments on some of those things.

Mr. GEE. Thank you. I think the overall notion, ideally, is that you identify who the stakeholders are, or the interest holders are, for a given project. In the past, because of the way we have been practicing it, a lot of people see it as a supporter and an anti kind of a situation when they get to a public hearing. The way we are trying to change this whole process is that it is not coming up with a preferred alternative and then defending why it is the preferred alternative, but actually setting it up so there are values placed on different interests that people can agree on, that there are boundaries for the discussion, so that as you say, the extremes don't dominate the discussion.

So it is setting a level playing ground for everyone to talk about their interests and then having a process that can evaluate the various interests and come to a consensus about what is in the project and what is not in the project.

Mr. DUNCAN. Ms. Paiewonsky.

Ms. PAIEWONSKY. The largest chapter in our design guide, by far, is project development, the portion of it going from the very concept of it and getting it through the design. And when we were creating our design guide, our big insight was that it is important for people who are critics to be accountable to one another. For example, in setting up this task force to create a design guide, we invited bicycle and pedestrian groups who wanted a little more pavement, with conservation and environmental groups who wanted a little bit

less, versus municipalities and chief elected officials and advocates for the disabled.

It is one thing for an advocacy group to come and get in our ear and tell us what they want. But when you put them around the table and make them accountable to one another for their opinions, people tend to look for common ground. Because somebody saying, I need more pavement, and saying it to somebody else who is trying to preserve wetlands has to account for that.

I will give you an example where we recently made a decision. The Longfellow Bridge in Boston, connecting Boston and Cambridge, is an iconic structure for both communities, and in fact, for the State. It is more than a century old. It is a historic structure that lands on either side in the Charles River Esplanade, with bicycle, pedestrian, vehicular and the Red Line MBTA service running over it every day.

We filed our environmental assessment in accordance with the project development process and found that everyone had a different idea for what the bridge should look like. Had we followed our process according to our own design guides, our own procedures, we would have continued, and we would have probably ended up at an impasse. We decided to stop the process entirely and create a task force of all these different user groups and institutions, hire a neutral outside expert to chair it, bring in a facilitator, and have everyone be accountable for one another's opinions.

We think that while this may initially appear to slow the process down, ultimately we will get a consensus agreement on what to do, and we will save ourselves all kinds of time and money.

The last thing I would say is, by starting early with people rather than presenting preferred alternatives and telling them to respond to it, asking them what they think the purpose and need of the project should be is a much less contentious and ultimately a much faster and more efficient approach.

Mr. DUNCAN. You have touched on a lot of things that are exactly what I was getting at. Because in your initial testimony, you talked about how your State had had to scale back on some projects. Yet you have groups that would want more work done toward beautification of the project, you have groups that would want more space for bike trails or pedestrian walkways. And then you talk about, it is a problem, because when we are all trying to do more with less, and as I said in my opening statement, get more bang for the buck. On the other hand, when you try to make everybody happy, you can reach an impasse and never get anything done, I suppose. So, it is a real problem.

Ms. Peterson, what did you mean by your frustration that all you were doing was plug and chug work? What is the chug?

[Laughter.]

Ms. PETERSON. It has been some time. But when you are working inside the agency you have a series, basically, of worksheets based on the standards. And you don't really look at the context necessarily of the community that you are designing for. You have been told that you have a congestion problem, go solve it. You go to the worksheets, you go to the basic standards, and you come up with a intersection design based on the fact that there is a lot of

congestion. Suddenly you need double left turn lane or a double right turn lane. You lay that basic concept of an intersection down on the context, and you have just wiped out a small downtown.

That is basically plug and chug. Without taking it to the next step and saying, wow, that is maybe what the standards or the guidelines say is the optimal for traffic flow. But if I went into that community and talked to them about how they are actually using the system, I might find out that there are different markets. Just like Coca-Cola markets to different markets, there are different ways that users are using that system. If I talk to them, and have them sit down and say, when you have a delivery with that truck, how are you accessing that intersection and how do you make that turn? If we just moved something a little bit, would you actually have the ability to turn and not hold up all that traffic causing the congestion?

So instead of just blindly putting down a standard and saying this is it, and walking away and saying, this is all we can build, and it being too expensive and not actually accomplishing what the purpose of the project was for the community. So that is really what it means.

Mr. DUNCAN. We have other Members, so I will just ask one more question. Mr. Bolt, you mentioned that the American Council of Engineering Companies has concerns about the mandate, and you heard several others express their opinion about making this a mandated process. You say that additional Federal mandates and bureaucratic red tape will certainly not help deliver projects faster. Do you have any specific examples or do you have any estimates as to how much delay you are talking about? And also, Ms. Peterson touched on it, but do you think this could potentially increase tort liability in some ways? Some people have mentioned that.

Mr. BOLT. I will do the last first, if I could. We are not concerned about tort liability, simply because of the broad range of flexibility that currently exists within the AASHTO green book and the subsequent flexible design standards. So we are not terribly concerned about that. When you look at CSS, it is a rational application of those principles. And again, as I noted in my earlier testimony, it means that the engineer doesn't automatically default to the highest end of the spectrum for a range of values, whether it is a lane width or whatever.

Mr. DUNCAN. All right.

Mr. BOLT. We are concerned about a Federal mandate, and the notion about the preference for incentivizing as opposed to the Chair's notion of a baseball bat. Though it is as simple, as Hal noted, the cultural change that takes place, we witnessed that within Pennsylvania, has taken something like four years. Which isn't that long in an institutions life cycle. But that is only four years worth of work.

Mr. DUNCAN. In most developed nations, they are doing all these projects that we deal with in this Committee two or three times faster than we do in this country. It is something we really need to work on.

Thank you very, very much.

Mr. DEFAZIO. We will recognize Members in the order in which they arrived. Ms. Richardson?

Ms. RICHARDSON. Thank you, Mr. Chairman.

When we are listening to some of the things that have been said so far, I have found it particularly interesting. Ms. Paiewonsky, are you here speaking on behalf of AASHTO? OK. We were reading in the notes that the green book is a little overdue, and it was last produced in 2004. And there are references in the memo to it. Do you anticipate bringing that back out again for a new revision?

Ms. PAIEWONSKY. It is coming out this year.

Ms. RICHARDSON. Great, OK.

Mr. Kassoff, why do you think in the last SAFETEA-LU authorization there was the opportunity for States to participate in a pilot program that would allow the States, once a project had met, for example, in California, if we met the State requirements of CEQA, then the States could be more involved in helping eliminate some of the paperwork and the delay of NEPA requirements.

Why do you think more States haven't taken on and participated in that program?

Mr. KASSOFF. Some have. California, I believe, has and I think one or two others. There was a limited number of pilot States.

I think there was a lot of concern about the cost that the States would incur at a time when States were losing positions, which is unfortunate. But I think offering the option was the key. So we have seen a handful of States take advantage of that opportunity. I think over the long run, more may well do that.

Ms. RICHARDSON. So is there anything we could do as we look forward to the new authorization to encourage that?

Mr. KASSOFF. Well, I think particularly on more local type roads that use Federal aid, I think again, statements of policy coming out of Congress, I referred to that NHS language. It came after ISTEA. And it was hugely powerful language. Because it was the intent of Congress.

So I think the intent of Congress being kind of delegating authority where States are ready to pick up that authority would be a constructive step.

Ms. RICHARDSON. Thank you.

Mr. Gee, the President recently announced the goal of increasing exports by 200 percent. When you look at my district, which has 45 percent of the entire Nation's cargo going through it, I don't see how our roads and infrastructure are prepared to do that. What are you suggesting to do to get ready for that goal, and do you even think it is possible for us to meet that demand?

Mr. GEE. I think the position is that we need to look at a more balanced transportation system and investments, so that everything isn't just reliant on trucks on roads. I know that from a highway standpoint, that sounds contradictory, but the Department has taken a much more multi-modal approach to looking ahead to what we need to do.

Ms. RICHARDSON. So how do you intend upon doing that? Because also in my district is the Alameda Corridor. And a lot of the goods do go through rail utilizing the corridor. But when we can't even get our authorization dealt with and put off for a couple of years, how are you suggesting, or what is the Administration thinking of, how are you going to fund this to get it done?

Mr. GEE. I think the American Reinvestment and Recovery Act provided a direction that we might want to go in with the TIGER grants, where it was truly a multi-modal competition for discretionary grants, rather than siloed. That, I think, is a direction that we are looking at seriously.

Ms. RICHARDSON. And I think the TIGER grants were successful, but part of the problem was, I think you probably received almost ten times of the amount of applications than what we were able to fund.

So I will come back to my same question. If the Administration has come out with a goal of increasing it 200 percent, it is one thing to have a goal. But how are we going to get there?

Mr. GEE. We will have to get back to you on that. I am not prepared to speak to that issue.

Ms. RICHARDSON. OK. I will look forward to it. I yield back the balance of my time. Thank you, Mr. Chairman.

[The information follows:]

**Rep. Richardson**

**Can the US transportation system handle a 200 percent increase in exports?**

In 2008, the US transportation system carried 21.5 billion tons of freight, of which 4 percent (868 million tons) was exports. Exports included 618 million tons by intermodal combinations, 114 million tons by truck, 61 million tons by rail, 62 million tons by water, 8 million tons by pipeline, and 5 million tons by air.

A doubling of exports (measured by volume), as proposed by President Obama, would increase the number of intermodal (including air/truck), truck only, rail only, and other movements on the domestic transportation system, likely adding to congestion at ports and major border crossings. The ability of the domestic system to absorb growth of exports will depend on what commodities and with which trading partners the increase is concentrated. Logistical requirements for moving grain and coal are substantially different than for construction and farming equipment, containerized cargo, or electronics. If the increase goes through ports where exports are substantially less than imports, improved balances between exports and imports could make better use of existing capacity and accommodate much of the desired growth. Exports are significantly less than imports in tonnage in Los Angeles, Long Beach, the Gulf ports in Texas, Philadelphia, and New York. Exports are substantially less than imports in container traffic in Seattle, Tacoma, Oakland, Los Angeles, Long Beach, Baltimore, Philadelphia, and New York.

Achieving the growth in exports may require new investments to strengthen our highway and port infrastructure and to provide for more efficient operations at U.S. ports and the intermodal connections. It will also require a nationally focused freight policy and funding mechanism that will provide for targeted investments on freight projects that are most effective in allowing our domestic industries to compete globally, create jobs and economic growth, reduce energy usage and carbon emissions, and improve the livability of affected communities.

Developing an effective freight transportation policy has been hampered by the stovepiped approach to transportation funding that is written into our transportation authorizing statutes. Expenditures for each transportation mode are generally dependent upon their particular funding sources. The result is that a truly outcome-oriented transportation investment policy – where the outcomes include national strategic goals – has been difficult to achieve, because investments have been dictated by where the funding originated, rather than where the investments could have the greatest impact on the desired outcomes. This has resulted in an inability to target funding toward investments that will be most effective in achieving national goals, such as a doubling of the Nation's exports.

Mr. DEFAZIO. I thank the gentlelady.

Mr. Schauer?

Mr. SCHAUER. Thank you, Mr. Chairman, and to the panelists. I am a co-sponsor of the Complete Streets bill. I wonder if you could talk about that within the context, no pun intended, of context sensitive solutions. What is the overlap between those concepts?

Mr. KASSOFF. I would like to take a crack at it, because we actually have been doing seminars around the Country on what we call contextually complete streets. So the spirit and intent behind Complete Streets, of providing opportunities for walking and bicycling and transit-friendly streets, makes all the sense in the world.

The danger is that we think of every street in the same way, and we lose this idea of context. There are inherent qualities that each street might have in terms of its traffic-carrying function, and also in terms of the adjacent land use. The street that may have commercial vehicles or heavy bus traffic may not be the best street to put the bike lane on. So I think we need to look at Complete Streets in a complete network concept, looking at all streets in a more comprehensive way and having the solution fit on a network basis as well as the individual street.

So I think the two fit perfectly together.

Mr. SCHAUER. Anyone else? Mr. Bolt, and then we will go down to the end.

Mr. BOLT. I agree again with Hal. We are just going to agree all day long.

[Laughter.]

Mr. BOLT. One of the principles for Pennsylvania's smart transportation is, right after money counts, but it is to accommodate all modes of travel. And it is to build out the local roadway network. And all modes of travel means looking beyond the simple degree of level of service and the old school. And let me refer to that again, the old school, it is all about throughput for cars, period. And the new approach that PennDOT has adopted within Pennsylvania, and this applies to all projects, is to say, when we do a project, we are going to look at the local roadway network in a combination of all modes.

Mr. GEE. I think that the current regulations and laws actually allow and support Complete Streets. The Secretary has come out in favor of livability, as you know. That does involve walking and biking and all the other modes, besides cars. We have been a strong supporter of Complete Streets, and did underwrite the manual. But we also believe that it is not necessary to mandate that.

Mr. SCHAUER. Go ahead.

Ms. PETERSON. Let me just go a little deeper, and maybe I will get a little geeky on you. Context sensitive solutions is the process by which you start that conversation with the community about the tradeoffs, the values within the community, so that you can do a Complete Streets design. When you take that design to the engineers, where we need the clear direction is that they can actually go and figure it out with the flexibility to accommodate all of what the community has just said that they want to do. If you just go to a rigid design standard, they will come back and say, the only design we can give you is this, and it doesn't meet what you just

designed and you just spend two years working on with the community.

So that is the disconnect. We can, if you actually get the context sensitive solutions process started, you need the engineers to be completely in sync all the way through with the flexibility at the end to give the community the project that they want and can afford. At this point, you either have a project that you don't want, or that you can't afford. It becomes an all or nothing scenario, and we get caught up for another 10 years in how do we actually get this project implemented.

So it is the design standards and the mobility standards. Those two things are extremely important to remember.

Mr. SCHAUER. Professor?

Mr. STAMATIADIS. I will expand a little bit more on what Ms. Peterson just said, and I will emphasize that she has said she has a set of principles. I will run quickly through some of those, which is using the interdisciplinary team. So you know who has to be involved as far as design aspects is concerned. Involving the stakeholders, bringing the locals and also whatever agencies. Seeking a broad-based public involvement, another component in achieving Complete Streets. Use a full range of communication methods, addressing alternatives and all modes. Here is all the pedestrian, the bicycle, the public transportation. Considering a safe facility for all users and addressing community and social issues.

Finally, utilizing a full range of design choices addresses what Ms. Peterson was talking about, coming up with a proper design for that particular facility. And finally concluding, too, which I find the most important principles of CSS, is delivering a project that the community wants and desires. The second, maintaining a balance between the resources that you have available.

Mr. SCHAUER. I know my time has expired, Mr. Chairman. This is a very fascinating concept to me. I began my career as an urban planner and served in local government, which had a strong orientation toward citizen participation. I think balance is the key.

What I am interested in, and I represent a district where there is an Amish community, so we see horse-drawn buggies. I represent some small and mid-size urban communities, suburban communities, pretty much everything. I think the commonality, and I think this is unsaid here, is job creation, helping to create vibrant communities, regardless of the type of community, that attracts the type of business and industry that is appropriate and relevant for that community. It is going to be very different in each community.

So this is a very intriguing concept, and I expect we will discuss it when we move our surface transportation bill. Thank you.

Mr. DEFAZIO. OK, Mr. Boccieri.

Mr. BOCCIERI. Thank you, Mr. Chairman.

Just reading through some of the testimony that I have heard, I just want to either confirm or refute this from the panelists. The context sensitive solutions has been suggested as an approach to transportation decision-making and design that takes into consideration the communities and lands through which they pass. Is there an assumption that the local communities do not do that?

Ms. PAIEWONSKY. I think the communities are often the best advocates for those contextual aspects of it.

Mr. BOCCIERI. I just wanted that to be confirmed, thank you.

Mr. Gee, in your testimony, you indicated the Administration's strong support for the context sensitive solutions and practical design. Is the Administration likely to address practical design or any related provisions to this in the upcoming authorization proposals?

Mr. GEE. As the Chairman noted earlier, there is a use of practical design which is one of the contexts for overall solutions. For example, in Missouri, the practice is to really look at how much money is available and what you can buy with that much money on a project. We submit that the funding constraints is one context. The others have been testified to by this panel.

We do not expect that there will be a push for practical design in that context. Certainly on the larger notion of context sensitive solutions, we are very much behind that.

Mr. BOCCIERI. How much input can we realistically evaluate would come from the local communities? Do you have an idea?

Mr. GEE. How much?

Mr. BOCCIERI. Yes. All of it? Some of it?

Mr. GEE. As Ms. Paiewonsky said, it is a matter of balancing competing interests. I think the key thing about going through a process like context sensitive approaches is that it is documented, so that anybody who is disgruntled, can always bring a lawsuit. The issue is whether they will prevail. I think the context sensitive solutions approach, make sure that all the different issues are weighed and valued, and the decisions are soundly based, so that it is actually a good one for the consensus of the community.

Mr. BOCCIERI. In Ohio, we have what is called a track process, where some of the local communities get to weigh in to the State department of transportation based upon traffic mitigation, safety, congestion and the like. Very small weight is given to economic development. Do you anticipate this superseding that or adjoining those types of decisions?

Mr. GEE. As the Ranking Member said earlier, one size doesn't fit all. We certainly believe that very strongly. Whether Ohio's process has everything that we think it should have is something that I am not prepared to weigh in on. But I think that economic development is one of the issues that is very high on the Secretary's issues.

Mr. BOCCIERI. Do you anticipate any difficulty trying to win over Congressmen and Congresswomen who have used this, in the State legislature they have used this for years, decades. If this now supersedes it, I think there might be some concern that we are pushing the local folks out of the way.

Mr. GEE. I don't think superseding it is the issue. I think it is a balancing of all of the interests and the priorities.

Mr. BOCCIERI. OK. Commissioner Peterson, you said it was your opinion that it would take a lot of education of our civil engineering workforce and students to apply common sense engineering. Can you expand upon that?

Ms. PETERSON. They have been taught in one type of expectation, and that is to meet what was considered a liability issue. Reduce the liability issue by narrowing the number of decisions that can be made. Out in the field and the design of the project, narrow the amount of decisions made by a giant workforce, so that you stand-

ardize not only everything that is out in the field for the driving public, but you have also standardized it internally to reduce that liability.

I think there are a lot of good engineers. And I think they are waiting to be freed from these narrow interpretations of myths and legends from 1950 on. I think the most interesting thing I have heard, Minnesota is working through this right now. And what they have found is, there is a general thing that is beat into you in engineering school, especially when you are a civil engineer, is that you want to over-design by 20 percent. In general, you want to over-design by 20 percent. Generation after generation has now over-designed by 20 percent.

So at some point, we have to actually go back and look at, is this really more safe? Is wider, straighter, faster killing more people or less people? And that research is just starting to go on now, in the last five to ten years. So with more research, we know that wider, straighter, faster does kill more people in certain instances, but doesn't in others.

Being able to narrow that down and look at the context, if you look at roads up on the mountains in Oregon, 70 percent of the fatalities, because of speeding and ice. Well, how does wider, straighter, faster help accomplish that? You actually have to go out in the field and you have to have been trained to say, OK, how do I make this safer within the context of the budget, within the context of the values of the community? And then come up with a bunch of different options, not just one. And really, we are only provided one option in most cases.

Mr. BOCCIERI. Thank you for that answer.

Thank you, Mr. Chairman.

Mr. DEFAZIO. Thank you.

Ms. Markey?

Ms. MARKEY. Thank you, Mr. Chairman.

Last week, I visited a transportation project in my district, and I hadn't heard of the CSS concept yet. But I think it is a good example of it. We were constructing a new bridge over the Big Thompson River, which leads into Rocky Mountain National Park. And in designing the project, the Colorado Department of Transportation worked extensively with the community there, because the alternative route was over the other side of the mountain.

The bridge, which had been deemed structurally deficient, had steel trusses that were from the mid-century. They are now being used as part of the pedestrian bike path within the community.

In addition, they gave the company financial incentives to complete the job sooner. It was supposed to be done in two weeks and they actually got it done in eight days. And they had to go ahead of schedule, but still, even with the financial incentives, they did it within cost. So it seems it was a good example.

Can you tell me, the first question, and anyone can really answer it, do you think getting community input slows down the project at all? Are you concerned about that? And then Mr. Kassoff, you mentioned in your testimony that it takes time to change old habits in relation to traditional highway approaches. How can we speed that up? And really, what can Congress do to really change these old habits?

Mr. KASSOFF. First let me remark that the first great example of context sensitive solutions certainly for a major interstate type highway is in your State. And it was before the term context sensitive solutions was ever invented. It is the Glenwood Canyon I-70. And the essence of that project, which was stalled for 30 years, they recently had a rockslide in that area, which pointed out what would have occurred if I-70 through Glenwood Canyon had not been built. There was a 200 mile detour. So we would have had a major disconnect.

What they found was that by reaching out, and this is a good example of the difference between, say, what would happen under a mandate versus striving for the heights, so to speak. They didn't just do normal public involvement, or even stakeholder involvement. They went out and reached out, the Governor himself, to make sure everyone affected by the project was going to be at the table. They didn't just put a collection of engineers and planners together and call it an interdisciplinary team. They said to that team, unless you engage with those stakeholders, and they had to adhere to interstate standards, which were demanding.

The net result was an improvement over what was there before, old Route 6, and a breathtaking example of transportation efficiency and environmental enhancement and environmental stewardship. So I think it can go a lot faster, and I think what Congress needs to do is show examples like that and say, a contextual approach to transportation solutions, such as we have seen in the best examples from rural interstates to some wonderful complete street examples in urban areas, that is what we are striving to achieve.

I think the message will be out there, if you don't get this taking the high road, then we will have to consider other means to get it. The choice should not be, should we be contextual. The question is how we get there. And I think the high road is the best road, because it is an acculturation process, rather than just the lowest common denominator.

Ms. MARKEY. Ms. Peterson?

Ms. PETERSON. I think the mandatory versus incentives, I think a lot of the incentives you could be looking at are increased funding percentage levels for projects that actually use this, or for States that adopt and move in this direction. You could also look at putting more money into the transportation centers, for getting actual education out there to the existing workforce, as well as the new upcoming students.

In that context, your State is also moving forward with a lot of roundabouts, leading the way. And I am very jealous. But the point being, a roundabout has to be designed within the context, or you do have a safety issue. You have to understand, you have to have that knowledge in the field of how things are working. And that is how every intersection works.

But we are just learning about roundabouts. And we are putting a lot of time and energy into doing that. But we haven't done that for every part of civil engineering. So we really need to look at that.

And then we need to ask our States to look at different funding levels for different project solutions. So don't just come with one project that can't be built because there is not enough revenue.

Come to us with a different set of alternatives that would actually meet different funding levels, and you are going to have a really different discussion about the tradeoffs within the community. And you are going to really start thinking about, what are those innovative ways that we can meet all those needs without spending a ton of money.

Ms. MARKEY. Thank you.

Ms. PAIEWONSKY. To answer your question about whether a community process slows down a project or not, I think quite the opposite. The quickest way to slow down a project is by keeping information from the public and trying to force a solution on them. If you invest the time at the beginning of the project, at the conceptual stage, and ask them to help identify goals and needs and why we are all here in the first place, and then allow them to develop alternatives with you, that is the best way to get a project sailing through the process and into construction.

Mr. GEE. I think on your question about how do we shorten the project development process time, Federal Highway Administrator Victor Mendez has an initiative that he just launched called Every Day Counts. Part of that involves doing a lot of the NEPA processes concurrently rather than sequentially, and then combining some of the planning and NEPA requirements, doing it together instead of sequentially dragging it out. So we're looking at how we can shorten that process.

Ms. MARKEY. Thank you.

Mr. STAMATIADIS. I will address your last part of the question, which dealt with how do we get people to the level that we want to through education. Being an educator in an academic environment, I will strongly advocate what Ms. Peterson suggested a few minutes ago. We need to improve and enhance our education of undergraduate students, so once they come out to the workforce, they are ready to address these kinds of issues with the open mind and try to help them through that process.

I think that the existing structure of the university transportation centers addresses some of those issues. But we need one standard that actually will be able to deal with CSS and how we can advance that through academia and eventually also through the workforce.

Ms. MARKEY. Thank you very much. Mr. Kassoff, I am glad you recognized the Glenwood Canyon project. As you mention, it is 200 miles to go an alternative route. It really is, I think, one of the most stunningly beautiful highways in the Country.

Thank you very much, Mr. Chairman.

Mr. DEFAZIO. Thank you for the questions.

We can quickly have a second round, if people wish. Commissioner Peterson, you said something in passing. You said that your County actually walked away from a Federal project. Do you want to expand on that?

Ms. PETERSON. The first project we walked away from the Federal process, from the IS process because of the need to meet mobility standards and design roadway standards. Or at least the interpretation at the local level that we had to meet certain standards.

So what was happening is based on population, traffic forecasts, without looking at the entire system, just looking at that project

area, we were going to be building a five-lane cross section, part of a new road through an area that was environmentally sensitive and would have impacts on the neighborhood, taking it and putting it and directing it right at the neighborhood where there is not a road today.

When we looked at the bigger perspective of how we could manage the system, the entire network, we figured out a way that if we left the Federal process and just based it on what we felt our needs were and what we could give ourselves exceptions and variances, we only needed a two-lane roadway, managing the system differently but still meeting the ability to grow that part of the region into high density office, schools, and commercial retail.

We have found a way to meet the needs, but we are not going to put it all in one project, which is what tends to happen with these things, is that you tend to focus on project, and the project gets giant, because you are trying to accommodate all the needs, when actually the system can actually accommodate all those needs. So that is the one we walked away from, and we are into 30 percent engineering on a two-lane roadway that we will be funding ourselves.

The other one is the Sunrise Corridor, which has been a, it is a four-mile road segment that will bypass an industrial district that has already gone through most of the Federal process. It is close to FEIS adoption. But we had to kind of tear it apart when we, instead of getting \$1.6 billion for four miles of an eight-lane roadway, we really only need in the next 20 years two lanes. So when the State was able to give us \$100 million and an earmark, and with the Federal approps that we have had, we had \$130 million, we were able to use the practical design concept to actually design what we needed at \$130 million within the existing FEIS right of way.

So it can be done. It is more difficult to do it at the back end after you haven't used it, when you really don't need eight lanes ever in the future. But according to the models, according to the mobility standards, according to the road design guidelines, we need eight lanes. But in practical terms, we can't ever afford \$1.6 billion in our State for four miles.

So those are the two examples within Clackamas County. Another example is using the Federal process in a good way, but doing practical design up front, instead of building a four-lane or moving towards a four-lane interstate style connection between an interstate and a local State highway, called the I-5-99W connector, we have decided to move in a direction of arterial connectivity within that portion of the region.

So we will not be building a highway, we will be building a series of arterials instead. Because again, the market, the users, the uses that were needing roadway capacity were not high speed. They were local, regional trips that needed access to different parts of the region. That can be accommodated on an arterial network that can be built over time instead of a \$3 billion to \$5 billion investment.

Mr. DEFAZIO. Doctor, when you talked about Kentucky's practical solutions initiative, what is the difference between what we have been talking about in terms of context sensitive solutions and

practical design and practical solutions? Or is it some sort of combination of the two?

Mr. STAMATIADIS. The biggest difference is the departure from the practical design, because our understanding from practical design has been that we developed a new set of guidelines that they need to be followed to a new set of standards. In our perspective, we need to not have any specific standards, but we need to start looking at projects and guidelines and address them in a more complete or systematic way. Practical solutions is pretty much the same, in our opinion, as CSS, with a added emphasis on figuring out a system-wide approach, so we can stretch our dollars in a more effective way.

So in reality, practical solutions simply exemplifies two principles of the ones that we had established. We tried to understand the purpose and needs statements in a more appropriate way so we can target our solutions, very similar to what Ms. Peterson was talking a few minutes ago, and then at the same time we emphasize that we need to look at a system-wide approach, so our resources will be more effectively used.

Mr. DEFAZIO. Thank you.

Ms. Richardson, do you have any other questions? No? OK.

Well, does anybody on the panel have any last words of wisdom for us? Anyone come up with a way to rename this?

[Laughter.]

Mr. DEFAZIO. We will hold the contest open. Yes?

Mr. STAMATIADIS. One final thought. I don't think that we need to rename the process. What we need to recognize is that we need a process, a systematic process that will allow us to move through the project delivery and development in a way that we always can repeat. Hence, we need to have those principles, and we need to eventually develop a set of metrics that would allow us to be accountable on the things that we do.

So whether we call it CSS, whether we call it practical design, practical solutions, smart transportation, you pick the name. But it is always one and the same thing, it is a process that we can do to deliver projects in the right way.

Mr. DEFAZIO. OK. Yes?

Ms. PETERSON. Just one final thought, and that is that obviously, the Administration is looking to try and make housing and environment and transportation work together. We are all trying to do that at the State level. We have always been doing that at the local level, as many of you know who have come from local elected officialism. That is what you have to do at the local level.

Getting the State and Federal in line with what the local needs are and housing, and economic development and the environment, transportation is the implementation tool. If we don't have the flexibility based on the context of each and every different sub-area of every part of region of our entire Country, we are going toward that one size fits all. And we have done that. And every one of us that has traveled everywhere says, oh, look, another interchange with some big box retail.

But I think if we want to get to that ability to meet those economic needs, transportation is that tool. It has to be used appropriately. It can't be that one size fits all. So I think it fits com-

pletely within where the Administration has been heading in trying to get these things knitted together and allowing the flexibility at the Federal level with that clear direction allows it on the ground to actually start knitting together. That is where I would say thank you for having this hearing.

Mr. DEFAZIO. Thank you. I want to thank all the members of the panel. I appreciate your giving us your time and your attention and knowledge on this issue.

With that, the Subcommittee is adjourned.

[Whereupon, at 11:24 a.m., the Subcommittee was adjourned.]



STATEMENT OF THE HONORABLE PETER A. DEFAZIO  
 CHAIRMAN  
 SUBCOMMITTEE ON HIGHWAYS AND TRANSIT  
 COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

HEARING ON  
 Using Practical Design and Context Sensitive Solutions  
 in Developing Surface Transportation Projects

June 10, 2010

States are facing declining revenues and increasing construction costs. At the same time, lack of infrastructure investment has led to thousands of back-logged projects nationwide and a surface transportation system that is falling into disrepair. When choosing where to make investments, State DOTs and local governments are often left with tough decisions to choose to fund one priority project over another. A well-designed highway project has the ability to support and improve safe travel, mobility, economic development and community quality of life. In order to maximize the impact of scarce dollars, it's important that States make wise decisions that are developed through consensus and deliver solutions that meet the needs of all users.

While faced with tough budget decisions, some States are still over-building projects in the name of meeting standards, when in reality existing Federal and State design standards actually offer a range of guidelines with significant flexibility. Building to the maximum possible standard often leads to over-built highways that exceed what the local community can afford when a scaled-down project can be just as safe and fit within financial constraints. Too many designers try to solve an entire region's traffic problems with one project. However, there are tools out there to help States build better projects that meet the needs of a community while maintaining safety and reducing costs.

One of those tools has an unfortunate name, but it leads to improved projects. Context Sensitive Solutions (CSS) is an approach to designing and delivering projects that considers the total context within which a transportation project will exist. Instead of the primary concern for a project being how many cars can be moved through a facility in one hour, CSS calls for a balanced decision-making process that takes into account the communities and lands through which roads pass. As we will hear from our witnesses today, using CSS reduces project delivery time by minimizing redesigns, reduces costs and overall leads to a better value. In other words, CSS saves time and money. Many states have adopted a CSS approach to delivering projects, including Pennsylvania, Maryland and Washington State.

Another innovative way to design and deliver highways projects is practical design. The focus of practical design is to build "right-sized" projects – to design and construct just what is needed, with the goal of getting the best value for the least cost. States like Missouri have adopted this approach and have found tremendous success in being able to stretch their dollars to improve more bridges and lane miles. In fact, after five years of using its Practical Design Implementation Manual, 83 percent of Missouri's highways were rated in 2009 to be in good condition, versus 44 percent in 2003, and the Missouri DOT has estimated it has saved 13 percent on project costs.

While cost-efficiency is the primary concern of practical design, it can include elements of CSS by taking into account community needs and values. I'm very interested in where these two concepts intersect – building right-sized projects while also taking into account the needs of a community. Kentucky has adopted what it calls “Practical Solutions” while my own State of Oregon has developed a Practical Design Guide that aims to deliver the broadest benefits to the transportation system while still considering safety, economic development, communities, the environment and the overall transportation system (i.e. not just highways).

While Federal law currently requires the Transportation Secretary when approving Federal-aid highway projects to consider identified documents and materials that define the core principles of CSS, there is no requirement that States use a CSS-type process. We change that in the Surface Transportation Authorization Act (STAA). Chairman Oberstar and I include a provision in the STAA to require States to consider CSS in all Federal-aid highway projects. While we call it “practical design standards” in the bill, it has a very similar definition to CSS. Specifically, we define practical design standards as: “a collaborative, interdisciplinary approach that involves interested entities to develop a transportation facility that fits its physical setting, balances costs with the necessary scope of the project, and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility.”

CSS and practical design are proven approaches to delivering better transportation projects for less money. While I prefer to call it a different name, I firmly believe every State DOT should be using CSS to deliver better projects for communities.

I thank our witnesses for being here today and look forward to your testimony. Thank you.

A handwritten signature in black ink that reads "John J. Duncan, Jr." in a cursive style.

STATEMENT OF THE HONORABLE JOHN J. DUNCAN, JR.

HIGHWAYS AND TRANSIT SUBCOMMITTEE

HEARING ON

**Using Practical Design and Context-Sensitive Solutions in**

**Developing Surface Transportation Projects**

June 10, 2010

Thank you, Chairman DeFazio, for  
holding this hearing on using Practical Design  
and Context Sensitive Solutions in developing  
surface transportation projects.

## The objectives behind Context

Sensitive Solutions and Practical Design are commendable. Most people agree that state and local transportation officials should adopt strategies that minimize the potential adverse effects associated with a transportation project.

It is important that engineers consider the location and surrounding community when designing a road or highway.

It is also easy to concede that a road should be designed to accommodate the full range of “highway users” that we anticipate will use the facility. If we expect trucks and motorcycles to use a road, it should be designed appropriately. If there is a heavy pedestrian presence in an area, the road design should take that into account.

But I am concerned that some of these new design standards may have an impact on highway safety and may expose state and local transportation agencies to additional liability.

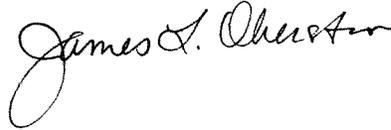
Traditional highway design standards are focused on vehicle through-put and safety. When these new design standards began to gain momentum in the 1990s, some engineers believed they contradicted proven engineering approaches.

Attorneys working for state and local governments feared that these new design standards exposed them to lawsuits if it could be proven that the project sponsor did not select the design that provided the highest level of safety.

The Federal Highway Administration and the State Departments of Transportation have worked hard over the past 15 years trying to address these concerns.

I would like to thank our witnesses for attending this hearing and I am specifically interested in their opinions on the safety and liability issues associated with these design alternatives.

Thank you and I yield back the balance of my time.



STATEMENT OF  
THE HONORABLE JAMES L. OBERSTAR  
HEARING ON "USING PRACTICAL DESIGN AND CONTEXT SENSITIVE SOLUTIONS IN  
DEVELOPING SURFACE TRANSPORTATION PROJECTS"  
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE  
SUBCOMMITTEE ON HIGHWAYS AND TRANSIT  
JUNE 10, 2010

- I want to thank Chairman DeFazio and Ranking Member Duncan for holding this important hearing today.
  
- For the past three years, the Subcommittee on Highways and Transit has been holding hearings on the future of surface transportation. This effort has resulted in the Surface Transportation Authorization Act (STAA), which the Subcommittee reported to the Full Committee last June. STAA transforms surface transportation programs and provides a national transportation policy designed to develop a surface transportation system that meets the needs of the 21<sup>st</sup> century.
  
- Following the recommendations of two congressionally established Commissions, STAA puts in place programs and policies designed to ensure that Federal surface transportation investments are used in the most efficient and targeted manner possible, with clear objectives and goals designed to produce the greatest return on investment for taxpayers.

- This legislation also addresses the lack of transparency and mechanisms to ensure accountability from States and other recipients of Federal transportation funds because the status quo is not sustainable on either policy or political grounds. The public's trust in surface transportation must be restored.
  
- Restoring public trust can be achieved through processes that develop consensus, deliver transportation facilities and solutions that meets the needs of all users, and improve the quality of life and character of communities that they serve.
  
- The design of a highway facility has substantial mobility and safety implications, and can significantly impact the users of facilities, the surrounding physical environment and the quality of life of communities.
  
- We need to rethink how we plan and design projects to ensure that the focus is not just on the importance of moving cars. This would require designing and delivering surface transportation projects that consider the context within which a transportation improvement project is being constructed, ensuring that transportation facilities fit their physical settings, while maintaining safety and mobility.

- STAA provides state and local governments with tools to take a more collaborative, systematic approach toward developing surface transportation projects. These tools will foster consensus and innovative solutions to addressing and meeting both transportation and community needs, and result in greater efficiency in delivering projects — and ultimately better projects.
  
- STAA allows states and local governments to utilize planning and design approaches that focus on “right-sizing” surface transportation projects to more appropriately reflect financial constraints and realities facing all transportation agencies.
  
- This will allow project sponsors to more effectively achieve desired results by providing more “bang for the buck,” and will allow for the delivery of a greater number of transportation projects.
  
- Right-sizing projects can provide substantial improvements to a transportation facility by meeting mobility, safety, community and environmental goals, while more effectively meeting the needs of the entire surface transportation system.

- Innovative project delivery techniques such as context sensitive solutions and practical design will provide states and local agencies the tools and methods that result in well-planned and designed transportation facilities that support and improve safe travel, mobility, accessibility, economic development, and enhance quality of life.
  
- These innovative approaches are a major aspect of the policies that will transform the planning, design and delivery of surface transportation programs and projects.
  
- I want to welcome and thank all of our witnesses for being here today. I look forward to hearing your testimony on this important issue.



Congresswoman Laura Richardson

**Statement at Committee on Transportation and Infrastructure  
Committee, Subcommittee on Highways and Transit  
"USING PRACTICAL DESIGN AND CONTEXT SENSITIVE SOLUTIONS IN DEVELOPING  
SURFACE TRANSPORTATION PROJECTS"**

**2167 Rayburn House Office Building**

**Thursday, June 10, 2010**

**10:00A.M.**

Mr. Chairman, I'd like to thank you for calling this hearing to look at transportation planning and specifically context sensitive solutions. Representing a district so heavily impacted by transportation issues, with the largest ports in the country, three airports, major freight rail lines, and 40% of the nation's goods moving along our rails and four major interstate highways, I know how important it is to design transportation projects taking into account the surrounding area and the secondary and tertiary effects of a project design.

While reducing congestion and increasing capacity is of course important, we must look at factors beyond just the throughput of cars and trucks. The materials and manner in which we build these projects

can impact a wide variety of performance measures. From the way these projects come into and out of our community, to the capacity they bring, to the way they incentivize the diversion of traffic, to the materials they use, a multitude of factors must be weighed and considered when designing these projects.

For instance, the substance used for the coating of a road can significantly impact the fuel performance of the cars and trucks that travel on the road. This simple and relatively inexpensive difference affects the environment, our dependence on foreign oil, and the longevity of the road. When making decisions about investing in our infrastructure, we must make sure we are factoring in all the impacts of the design decisions we are making and take into account the long term affect of a project design, not just the current year's budget impact.

We must also ensure the proper guidelines and legal framework is in place to incentivize innovative and unique solutions to transportation projects, while of course at the same time maintaining safety. It is important that designers know that merely by being innovative they are not necessarily exposing themselves to increased liability as long as they adhere to strict safety principles.

Goods movement creates thousands of jobs in my district and as my colleagues know I work tirelessly to ensure the future sustainability

of the Ports of Long Beach and Los Angeles and their respective neighborhoods.

The impacts to the community must be taken into account when planning future transportation projects of any scale. Our transportation decisions are more complex than simply maximizing how many cars and trucks can move through a certain area or ensuring that a bridge is in a state of good repair.

I'd like to thank the Chairman again for calling this timely hearing and thank the witnesses for appearing before us today and I look forward to hearing their statements.

Thank you, Mr. Chairman



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610.407.9700

Representing the American Council of Engineering Companies

Before the House Committee on Transportation and Infrastructure  
Subcommittee on Highways and Transit  
Hearing on Practical Design and Context-Sensitive Solutions  
in Developing Surface Transportation Projects

June 10, 2010

Good morning Mr. Chairman and Honorable Members of the Subcommittee. Thank you for the opportunity to provide testimony at this hearing. My name is Steve Bolt, and I am the President of the Pennsylvania-based consulting engineering firm Orth-Rodgers & Associates. We have 85 engineers at offices in Pennsylvania, New Jersey and Nevada, providing transportation engineering, planning and environmental services for a broad range of clients, including state departments of transportation, municipal and county governments, utility companies and planning organizations.

I also currently serve as the President of the American Council of Engineering Companies (ACEC) of Pennsylvania. ACEC – the voice of America’s engineering industry – is a national federation of 51 state and regional councils representing the great breadth of America’s engineering industry. Member firms employ hundreds of thousands of engineers, architects, land surveyors, scientists, and other specialists, responsible for more than \$200 billion of private and public works annually.

This morning I’d like to speak briefly about Smart Transportation in Pennsylvania – known elsewhere as Context Sensitive Solutions or CSS. Broadly speaking, Smart Transportation is partnering to build great communities for future generations by linking transportation investments and land use planning and decision making. The municipal planning organization in our region, the Delaware Valley Regional Planning Commission, hired Orth-Rodgers & Associates in 2004 to develop the Smart Transportation Guidebook. Working closely with our partners at PennDOT and NJDOT, we completed the Guidebook in March 2008. The Guidebook provides assistance in project planning on state and local roadways, including understanding land use and transportation system contexts, as well as outlining specific factors for design

considerations, such as travel lane widths, parking, shoulders, medians, intersections, bicycle and pedestrian facilities, transit accommodation, and streetscaping.

I am very proud that the Federal Highway Administration awarded the Smart Transportation Guidebook its 2008 Transportation Planning Excellence Award, and has endorsed the processes outlined in the Guidebook.

For more information and detail, the link to PennDOT's website is:  
[www.smart-transportation.com](http://www.smart-transportation.com)

Since publication, PennDOT and Orth-Rodgers have been actively campaigning with engineers, municipalities and planners to conduct familiarization and training sessions across the Commonwealth. As Smart Transportation represents a change in the way that PennDOT develops and designs transportation projects, training is an important tool in delivering the message. The goal is to integrate planning and design of transportation projects that foster the development of sustainable communities, working within the realities of financial constraints, community aspirations, land use and environmental considerations.

While PennDOT has coined the term "smart transportation", I don't believe this should be construed as meaning what we were doing before was "less than smart". It does mean that we're taking a larger, perhaps more "holistic" view of the transportation planning and design process that takes into consideration the broader range of factors necessary to deliver a successful project to the public.

Ten themes have emerged as we turn these principles into how we develop transportation projects:

- Money counts
- Choose projects with high value/price ratio
- Enhance the local network
- Look beyond level-of-service
- Safety first and maybe safety only
- Accommodate all modes
- Leverage and preserve existing investments
- Build towns not sprawl
- Develop local governments as strong land use partners
- Understand the context; plan and design within the context

Ostensibly, this all makes sense and sounds simple enough. So what is the change from past practice? At the planning level, previously the DOT developed projects that were on the TIP (or Transportation Improvement Program) with little or no input at the municipal level. Now, the municipalities filter the projects that make it onto the TIP as part of their comprehensive land use planning efforts. At the design or engineering level, the Guidebook gives greater flexibility in design which, in turn, lets us do more within the budgets we have. And this applies to every single project we do now.

In Pennsylvania, we have two examples of Smart Transportation implementation I would like to highlight:

- US Route 202, Section 700 – This project was initially designed as a limited access expressway with a 300 foot wide right-of-way and a price tag of \$465 million. Smart Transportation principles reduced the footprint of the roadway, expanded the roadway network and saved \$265 million.
- Marshalls Creek Bypass – This project was initially designed as a four lane limited access highway with a full interchange with a \$70 million price tag. Application of Smart Transportation principles and subsequent value engineering reduced the project and saved \$45 million.

I have included slides that further highlight these projects, both of which would be done differently today and were rescued due to fiscal constraints. We have a better process in place now and do better planning with our municipal partners.

A number of states, together with Pennsylvania, are making significant strides by following a Smart Transportation model to how they plan and design their infrastructure. Among the states leading this effort are New Jersey, Massachusetts, Vermont, Missouri, Washington, and your home state, Mr. Chairman, Oregon with its CS3 process. Working through our industry organization, other stakeholders, and AASHTO, we should work to educate the remaining states on the value of this approach and encourage them to adopt Smart Transportation or similar CSS principles for project delivery.

At the planning level some states may be concerned about facilitating change with their municipal partners or be concerned about a loss of their traditional role. At the design level, while AASHTO guidelines provide flexibility in design, we engineers are a conservative group. When we build bridges and dams and highways, the public prizes that conservatism. However, I think that a fear of tort liability has replaced sound engineering judgment by some designers. Smart Transportation's use of flexibility in design standards promotes sound engineering judgment within the context of the community.

I note that the draft surface transportation authorization bill that this subcommittee approved last summer mandates consideration of "practical design standards" which you defined as a collaborative, interdisciplinary approach that involves interested entities to develop a facility that fits the physical setting, balances costs with scope, maintains safety and mobility, and preserves the scenic, aesthetic, historic and environmental resources.

Those matters are generally issues that any engineer should consider in planning and design and would be the subject of negotiations with the agency/owner over the scope of the project. But, let me make you aware that ACEC is concerned that new federal mandates could be used to delay a project, e.g. lawsuits or regulatory challenges over failure to consider a certain aspect of a project. We would prefer that the bill provide incentives for states to adopt these CSS strategies and practices, rather than a hard-and-fast mandate. Flexibility is key, and despite good intentions, legislative language can often have unintended consequences that stifle the intent.

As you are well aware, it takes far too long for projects to move through the many stages of project delivery from conception to construction. The subcommittee bill makes efforts to

facilitate project delivery, and CSS principles can be used to help alleviate some of those environmental and community-based concerns that often slow projects down. If applied early, it can decrease the delivery time by reducing re-work. Since Smart Transportation emphasizes collaboration with the community and the examination of a wide range of alternatives, it will better avoid the need to revisit a project if it encounters community opposition or is deemed to be unaffordable. Additional federal mandates and bureaucratic red tape will certainly not help deliver projects faster. To the extent that you can clarify or protect against those possibilities, we would encourage you to do so.

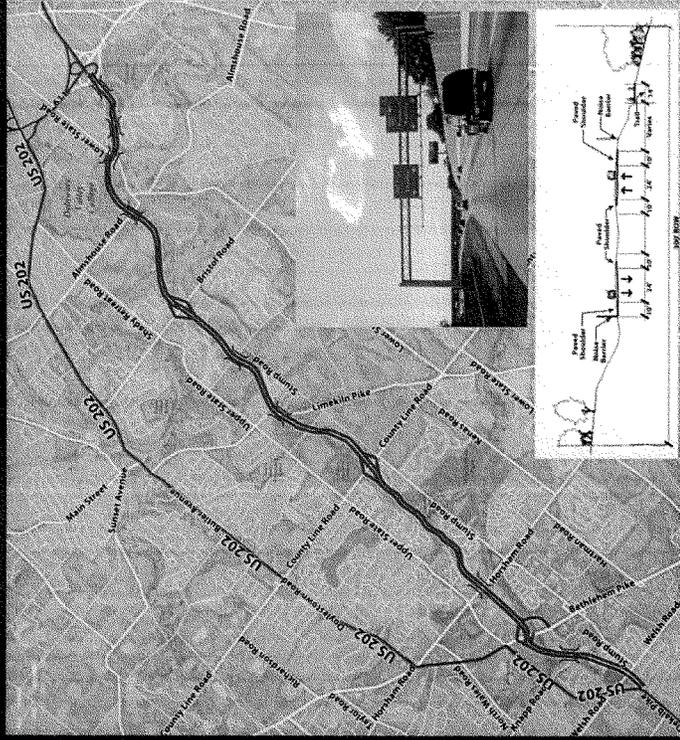
Let me make one final point about the interaction of funding with Smart Transportation processes. With unlimited funds, we could build our way out of congestion, but we should ask ourselves how that balances against a complete street and roadway network that accommodates all users. The Smart Transportation approach helps us strike that balance.

Mr. Chairman, I would ask the subcommittee to develop a comprehensive, sustainable long-term funding solution that embraces the principles I've outlined today. I would be remiss if I did not encourage you and the rest of the subcommittee to continue your fight to find the revenues necessary to fund the maintenance and improvement of our transportation network. Resource constraints certainly force us to be smarter in how to develop and design projects, but at the end of the day, these projects need money to proceed. Our transportation infrastructure is a litmus test of where the nation will be in ten years. China spends 12% of its GDP on its transportation infrastructure, European countries spend 5% of their GDP and the United States a mere 2% of GDP. We are in grave danger of falling behind and frittering away our economic competitiveness by not investing the necessary resources to maintain and improve our system.

Thank you again for the opportunity to testify. I would be happy to answer any questions the subcommittee may have.

## US Route 202 – Section 700

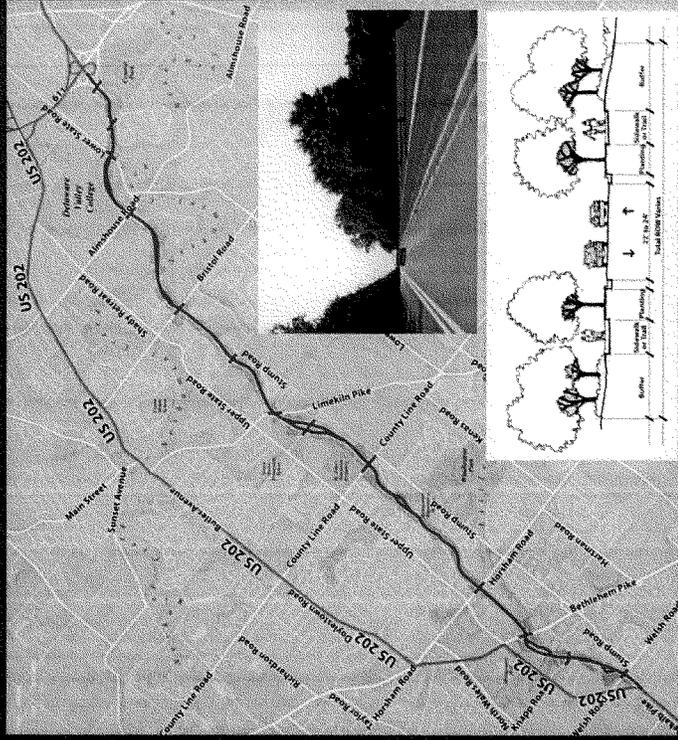
- Initially designed as a full limited-access expressway with an estimated cost of \$465 million
- Encountered community opposition, funding limitations



US 202 Parkway, Montgomery/Bucks Counties, District 6

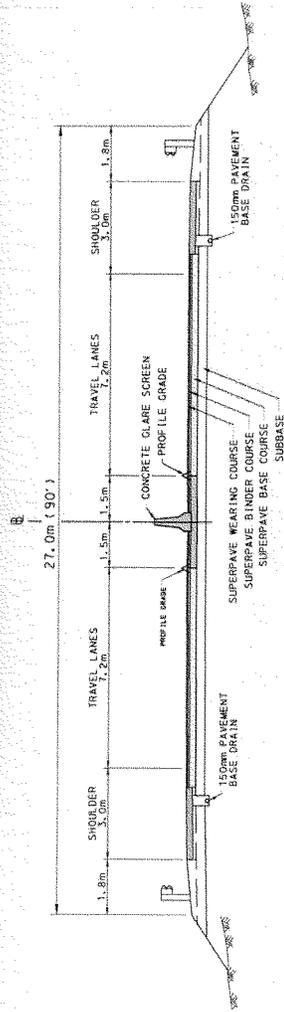
## US Route 202 – Section 700

- Redesigned as an at-grade parkway with community collaboration
- Also includes parallel multi-use trail
- Operating Speeds of 30-40 mph
- Cost Savings \$265 million

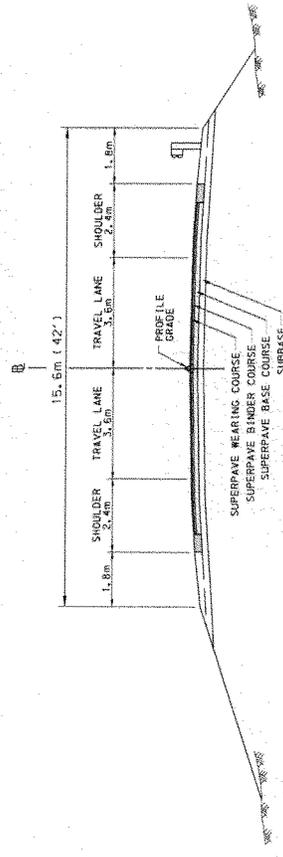


US 202 Parkway, Montgomery/Bucks Counties, District 6

# Marshall's Creek Traffic Relief Project



TYPICAL TANGENT SECTION  
OLD DESIGN

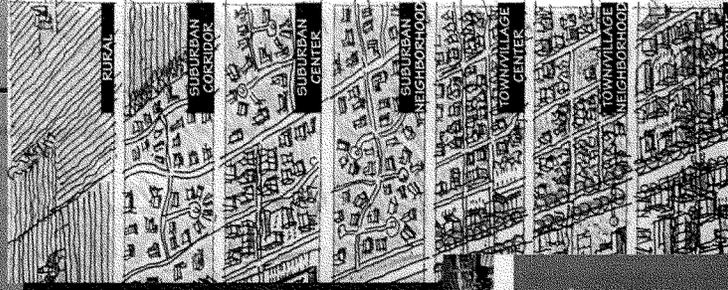
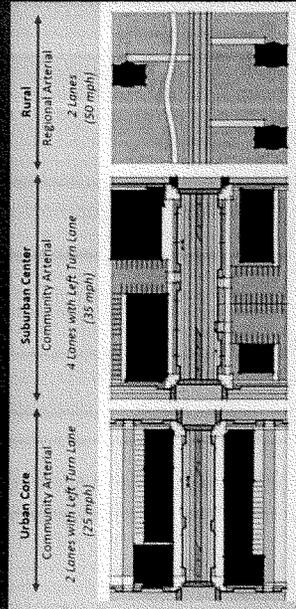


TYPICAL TANGENT SECTION  
NEW DESIGN

## Changing the Rules in PA

### Smart Transportation Guidebook (incorporated with PennDOT's Design Manual)

- Use flexible design on all projects
- Increase coordination with local municipalities
- Link existing and future land use contexts and roadway design values
- Design to a desired operating speed



## Changing the Decision-Making Process

### Revised Project Delivery Process at PennDOT

- Including partners in the development of new process- Municipalities, MPOs/RPOs, Resource Agencies
- Emphasis on planning
- Organizational changes to respond to new focus
- Link Mobility Plan, LRTPs and TIPs – and reduce delivery times
- Develop Smart Transportation selection criteria for TIPs & LRTPs



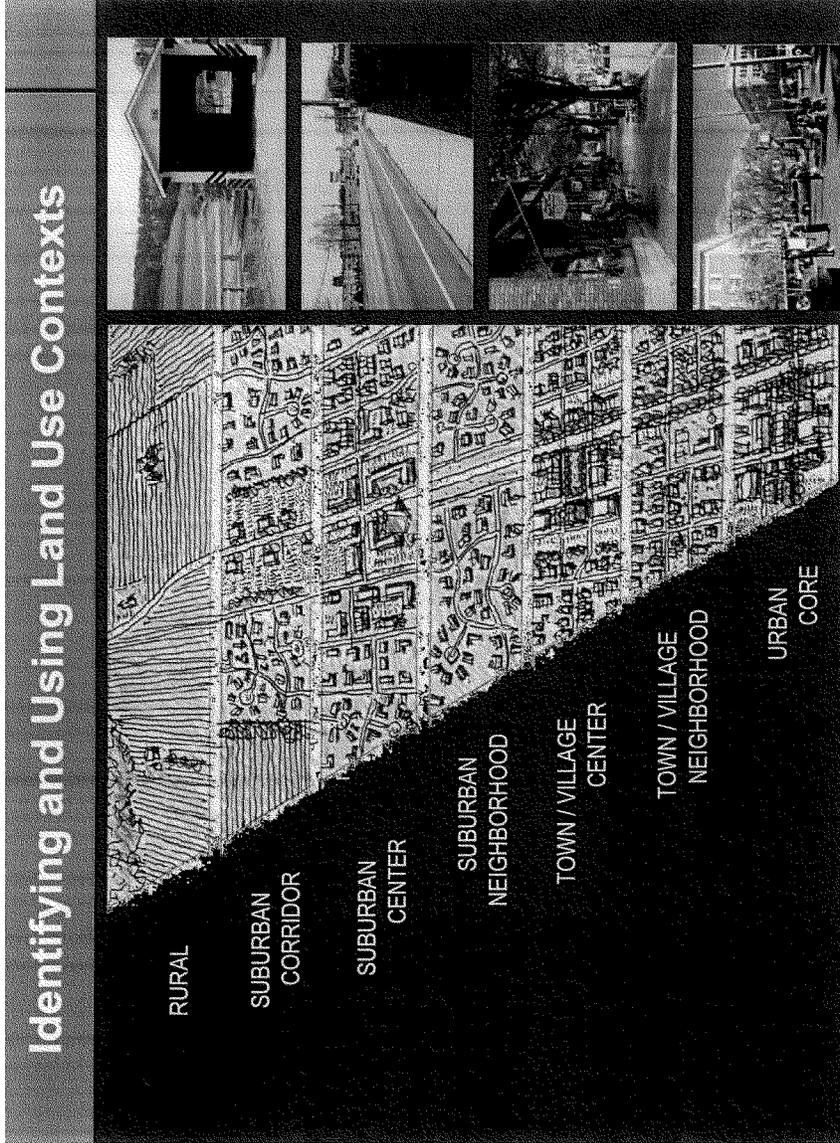
## Partnering Actions

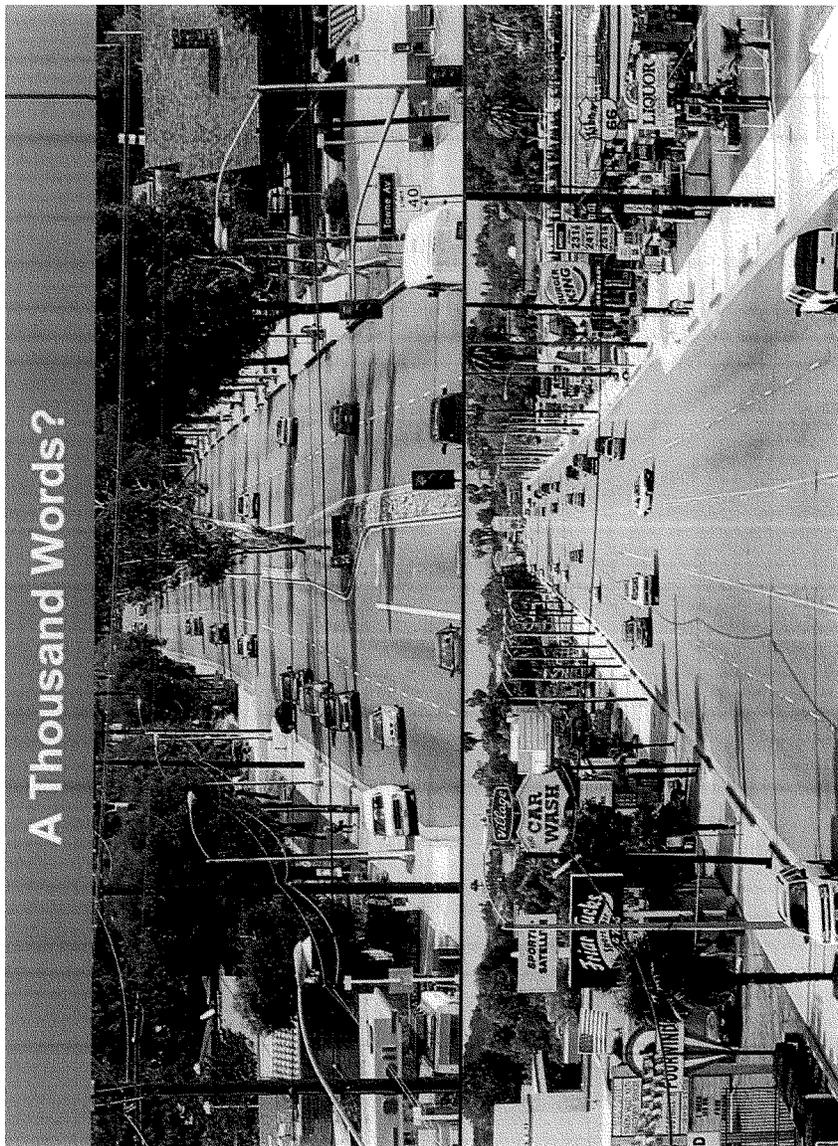
### PennDOT and Planning Partners

- Work with municipalities to understand land development decisions and limitations
- Work together to understand how to manage and maintain existing transportation assets
- Understand local planning and transportation goals and align project alternatives with these goals

### Municipalities

- Make land use decisions based on understanding of long-term transportation impacts and fiscal realities
- Improve local network connectivity
- Adopt ordinances that promote smart transportation (access management, mixed-use, TOD, etc.)
- Promote alternative modes of transportation
- Plan regionally and work with all levels of government





Commonwealth of Pennsylvania  
Smart Transportation  
FAQ

**1. What is Smart Transportation?**

Smart Transportation is partnering to build great communities for future generations of Pennsylvanians by linking transportation investments and land use planning and decision-making.

The ultimate goal of Smart Transportation is to create transportation facilities that are safe and affordable, responsive to the needs of all users, and support community planning goals.

**2. Why are we doing this?**

Our historic pattern of land development and transportation investments is no longer sustainable for a variety of financial, environmental, and social reasons. In Pennsylvania, as in other states, public funding is very limited for all transportation improvements. Costs are soaring, as global demand for raw materials has made new infrastructure exorbitantly expensive. Gas prices are higher than ever before, and concerns about global warming are at the forefront of the political agenda. Public funding for transportation projects is also very limited, and we need to use our limited resources more efficiently than before. **We must rethink how we plan, build, and manage our transportation systems if we are going to maintain Pennsylvania's economy and improve our quality of life.**

**3. How is Smart Transportation different from what PennDOT is already doing?**

Smart Transportation is not a totally new concept. Various projects that the Department is working on or has done in the past already exemplify principles of Smart Transportation. What PennDOT's Smart Transportation effort aims to accomplish is to ensure that these principles are consistently and consciously applied to ALL projects and that Smart Transportation become the standard approach for PennDOT's day-to-day operations.

**4. Will Smart Transportation address safety?**

Yes. Safety must not be compromised in any project, and "safety first" is a key Smart Transportation theme. Some of the major ideas in the Smart Transportation Guidebook are intended to enhance safety. For example, the concept of "desired operating speed" encourages motorists to travel at a speed compatible with the surrounding community.

**5. Will Smart Transportation address traffic congestion?**

Yes. Smart Transportation's goal is to address our transportation system's ability to meet regional and local mobility needs, and balance these needs with other project and community objectives. Transportation projects will continue to address congestion, and project teams are encouraged to consider creative means of doing so. Rather than focus solely on intersection or mainline widening, projects should also consider strengthening the overall roadway network. Bicycling, walking, and transit should be feasible options for more residents in a community. Techniques such as access management and signal coordination could be widely used.

**6. Will Smart Transportation cost more than what we do today?**

When Smart Transportation strategies are done early and consistently throughout the planning, design, and implementation stages of a project, Smart Transportation will cost less than most conventional transportation solutions. The key is to identify opportunities for cost savings by making sure that existing infrastructure investments are taken care of, that project needs are clearly understood and defined, that we use flexible design, that high-value/low-cost projects are prioritized, and that opportunities for sharing resources (across jurisdictions and across agencies) are used.

In some select instances, the upfront costs of Smart Transportation projects might seem to be slightly more expensive than short-term quick fixes, but the longer term cost savings and quality of life returns of a comprehensively thought-out Smart Transportation solution will be far more substantial.

**7. Is Pennsylvania the only state doing Smart Transportation?**

No. Together with Pennsylvania, many states (more than 25%) are already making significant strides by following a Smart Transportation model to how they plan and design their infrastructure. Among the states leading this effort are Massachusetts, Washington, Missouri, Oregon and Vermont. In fact, New Jersey DOT jointly developed the Smart Transportation Guidebook with PennDOT and the Delaware Valley Regional Planning Commission.

**Questions for Mr. Steven B. Bolt, P.E., PTOE  
President  
Orth-Rodgers & Associates, Inc.  
Highways and Transit Subcommittee Hearing  
June 10, 2010**

Questions from Chairman DeFazio

1. Critics of Context Sensitive Solutions (CSS) have historically raised concerns that the use of CSS may leave States more open to liability lawsuits and that CSS projects are more likely to need design exceptions, making them less safe. According to the CSS Clearinghouse website, no study has shown CSS to lead to more design exceptions. In Mr. Gee's written testimony he stated that FHWA believes CSS can reduce the risk of delays from litigation and Ms. Paiewonsky stated in her testimony that research has found liability concerns to be "unfounded" and that a CSS consensus-building approach actually results in less litigation.
  - What impact – if any – does the use of CSS have on a designer's susceptibility to liability challenges?
  - Does using CSS lead to more design exceptions? Are design exceptions inherently less safe?
2. In her written testimony, Commissioner Peterson stated that over-designed Federal projects that make a facility "bigger, wider and straighter" compel more drivers to use the Federal facility, which forces the Federal highway system to "almost always take the brunt of all trips – local regional and interstate." She believes this approach leads to continued congestion on the Federal system and a "lack of analysis about ways that lower cost improvements off the federal system might actually resolve many mobility and congestion problems in a way that would be more readily embraced by the community."
  - Do you share this concern that by over-designing Federal projects we are creating incentives for drivers to use the Federal system, thereby undermining the operations and performance of those facilities? Do you agree with Commissioner Peterson there are times when lower-cost projects on the local and State road system might do more to relieve congestion?
3. It was clear from your written testimony that Pennsylvania has benefitted from its use of Context Sensitive Solutions (CSS). You acknowledged that some States may be concerned about changes in their traditional role, and hence be reluctant to follow the lead of States such as Pennsylvania. You've suggested that we provide incentives for these States to adopt CSS. In the current heavily budget-constrained environment, how would you suggest that we provide or structure these incentives?
4. Mr. Bolt, you stated in your written testimony that fear of tort liability has replaced "sound engineering judgment" by some designers. A complaint we have heard about Context Sensitive Solutions (CSS) is that it opens up a designer to tort liability. You said that Smart Transportation's "use of flexibility in design standards promotes sound engineering within the

context of the community.” How do the designers of a Smart Transportation project protect themselves against tort liability?

5. In your written testimony you referenced a project, US Route 202 Section 700, as an example of how the Smart Transportation Guidebook reduced the footprint of the roadway, expanded the roadway network and cut the cost of the project almost in half. You also said this project “would have been done differently today” and was rescued due to “fiscal constraints.” Can you please elaborate on this project and what you mean by “would have been done differently today”?



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Responses to written questions for the hearing record

House Committee on Transportation and Infrastructure  
Subcommittee on Highways and Transit  
Hearing on Practical Design and Context-Sensitive Solutions  
in Developing Surface Transportation Projects

July 8, 2010

1. *What impact – if any – does the use of CSS have on a designer's susceptibility to liability challenges?*

Risk management has always been a significant concern of the engineering industry, including within the field of highway design and transportation engineering. The fundamental principle is that an engineer should be held to the standard of care and skill ordinarily used by engineers practicing under similar conditions at the same time and in the same locality.

If structured and utilized properly, the use of CSS principles should have no impact on the designer's susceptibility to liability challenges. As noted during the hearing, AASHTO already provides a broad range of design parameters from which the engineer can choose. The range of flexibility that currently exists within the AASHTO Green Book, coupled with the federal guidance on flexible design standards, is consistent with that ordinary standard of care. Engineers should be empowered to use their best professional judgment when designing transportation projects. CSS is a rational application of those principles.

The unfortunate reality is that in practice, our current tort system still exposes engineers to liability above and beyond what is reasonable. As noted during the hearing, although AASHTO currently provides a wide range of design values available to the transportation engineer – and even promotes flexibility in design values in its literature – most engineers default to the upper range of design values (the most conservative) when doing their work in order to attempt to protect themselves against liability risk. We would encourage the subcommittee to consider possible ways to ensure that the ordinary standard of care is all that is required and that the utilization of CSS principles does not expose engineers to unreasonable

liability.

Finally, I would reiterate what I indicated in my written testimony – CSS can often reduce the lawsuits and other regulatory challenges to transportation projects because of the inclusion and consultation with communities and stakeholders that takes place early and throughout the process.

*Does using CSS lead to more design exceptions? Are design exceptions inherently less safe?*

One of the fundamental principles of Smart Transportation is the use of sound professional judgment. In some cases, that means seeking an exception to standard design specifications, but using CSS does not necessarily lead to more exceptions.

As stated in the Smart Transportation Guidebook:

All recommendations should be filtered through the best judgment of the project team after considering the specific circumstances of each project. There is no one-size-fits-all approach to good decision-making. The smart solution on some projects may be to seek design exceptions or waivers to allow for true context-based design.

In every circumstance, safety must not be compromised on any project. Design exceptions are not inherently less safe. It is important to note that not all of the criteria in the AASHTO Green Book are based on safety, and in many cases, design exceptions enhance the overall safety of the project.

State DOTs should have a process in place for the documentation and approval of design exceptions. Following a carefully thought out design exception approval process ensures safety and reduces the engineer's liability. The application of CSS principles may increase the number of design exceptions, but an exception to a design standard does not infer a reduction in safety to the travelling public.

2. *Do you share this concern that by over-designing Federal projects we are creating incentives for drivers to use the Federal system, thereby undermining the operations and performance of those facilities? Do you agree with Commissioner Peterson there are times when lower-cost projects on the local and State road system might do more to relieve congestion?*

The broad concern about new design is not limited to the Federal system; CSS principles should be applied to every highway and bridge project across the board. The approach to solving transportation problems must always consider the entire transportation network – local, state and federal as a whole network. This includes consideration for local and regional transportation needs across all modes.

Further to Ms. Peterson's comments about "bigger, wider and straighter", the common mindset of CSS practitioners today is that the contextual approach, in conjunction with complete streets design, also leads to traffic calming along the local roadway network. Traffic calming, by design, provides a transportation network that

is safer for all users of the network (motorist, pedestrian, and bicyclist).

In my written testimony, I highlighted the ten themes adopted by PennDOT as part of its commitment to applying Smart Transportation principles. I would highlight two of those themes here: enhancing the local network and looking beyond level of service during project development and delivery.

The development of a well-connected local network is critical when identifying transportation solutions, such as the best way to address congestion. A dense network of local roadways outperforms the same number of lanes on a few larger roads. It provides a framework for new development, rather than promoting sprawl, and usually better serves the need of bicycles and pedestrians. A well-designed local network preserves and leverages investments in major (typically NHS) roads by limiting travel on those roads to through travel. When a well-connected local network is in place, motorists have more options for traveling from one place to another. This alleviates congestion for through-traffic.

3. *In the current heavily budget-constrained environment, how would you suggest that we provide or structure incentives for States to adopt CSS?*

The Committee can promote the adoption of CSS by providing enhanced flexibility of federal highway funding to states that have embraced CSS principles. This would be consistent with the Committee's draft transportation reauthorization proposal, which strives to remove funding "silos" and promote performance-based outcomes. The Committee could give more flexibility in the use of federal funds to those states that have adopted CSS principles in their planning and design standards.

Secondarily, the simple act of employing CSS has a marked tendency to prevent project scope creep and enforce a narrower focus on the project's core needs. When this is done, coupled with smaller roadway cross sections etc., money is saved and available for future projects by the DOTs.

4. *How do the designers of a Smart Transportation project protect themselves against tort liability?*

To my experience, the engineer exposes him/herself to tort liability risk when conducting design that does not consider applicable standards and guidelines, does not utilize sound engineering judgment and does not exercise the same standard of care that another would given a similar set of circumstances.

This should be applied consistently when negotiating a contract for services. It is critical that lawmakers, regulators and judges must also adhere to this standard when writing laws and regulations and when adjudicating disputes in court. Otherwise, engineers will continue to default to the most conservative possible design in order to attempt to protect themselves against what is unreasonable liability exposure.

With the AASHTO Flexible Design Guide (in print since 2004), a state-adopted guideline such as Pennsylvania's Smart Transportation Guidebook, and a rigorous

process for design exception approval in place – the engineer applies CSS principles (or Smart Transportation) and is in conformance with promulgated regulations and guidance – and consequently should be shielded from liability exposure.

5. *Can you please elaborate on the US Route 202 Section 700 project and what you mean by “would have been done differently today”?*

US Route 202 Section 700 was initially designed as a limited access expressway to interstate design standards – with typical 300-foot wide right-of-way; two wide lanes/shoulders in each direction and a wide median. That initial design did not take the local transportation network into consideration, nor was is cognizant of the financial impact of the project's full scope (\$465M). The “rescue” driven by fiscal constraints (the money counts theme) forced PennDOT to coordinate more closely with the local community engineers and planners, redevelop the project and enhance the local transportation network at the same time.

If we were to start the project today, the first step of the project would be a proactive public involvement effort to determine the community's needs, followed by close coordination with local government to enhance the local network. While cost effectiveness has always been a project consideration; the difference today is that we approach projects asking what is it we must do to provide safe effective and affordable transportation solutions, rather than asking what we would like to do to solve safety and mobility problems.

**STATEMENT OF  
KING W. GEE  
ASSOCIATE ADMINISTRATOR FOR INFRASTRUCTURE  
FEDERAL HIGHWAY ADMINISTRATION  
U.S. DEPARTMENT OF TRANSPORTATION**

**BEFORE THE**

**COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE  
SUBCOMMITTEE ON HIGHWAYS AND TRANSIT  
UNITED STATES HOUSE OF REPRESENTATIVES**

June 10, 2010

Chairman DeFazio, Ranking Member Duncan, and Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss using practical design and context sensitive solutions (CSS) in developing surface transportation projects. Today I want to share with you how the Federal Highway Administration (FHWA) is advancing CSS to help ensure that Federal investments in transportation fit well within communities. Our work regarding CSS includes an extensive history of partnering with many groups and individuals in the CSS community, including the other panelists here today and the entities they represent. FHWA recognizes the important linkage between reliable transportation, economic prosperity, and quality of life. CSS help maintain that linkage.

**LIVABLE COMMUNITIES INITIATIVE**

Before I specifically address the issue of CSS, I would like to briefly mention the Administration's Livable Communities Initiative. How a community is designed—including the layout of the roads, transit systems, and walkways—has a considerable impact on its residents.

Making America's communities more livable is a key part of the President's agenda, and Secretary LaHood and FHWA Administrator Mendez are working hard to make important advancements in this area. In June 2009, the Department of Transportation (DOT) joined forces with the Department of Housing and Urban Development (HUD) and the Environmental Protection Agency (EPA) to stimulate comprehensive regional and community planning efforts that integrate transportation, housing, energy and other critical investments. Together, we will help State and local governments make smarter investments in their transportation infrastructure in order to better leverage that investment and to advance sustainable development.

DOT, HUD, and EPA have developed six guiding principles to promote livability:

- providing more transportation choices;
- expanding access to affordable housing, particularly housing located close to transit;
- enhancing economic competitiveness—giving people access to jobs, education, and services, as well as giving businesses access to markets;

- targeting Federal funds toward existing communities to spur revitalization and protect rural landscapes;
- increasing collaboration among Federal, State, and local governments to better target investments and improve accountability; and
- valuing the unique qualities of all communities—whether urban, suburban, or rural.

In most communities, jobs, homes, and other destinations are located apart from one another, necessitating a separate car ride for every errand. Coordinating transportation and land-use decisions and investments increases the efficiency of Federal transportation spending. Strategies that support mixed-use development, mixed-income communities and multiple transportation options help to reduce traffic congestion, pollution, and energy use.

Transportation can play an enhanced role in creating safer, healthier communities with the strong economies needed to support our families. As the population increases, we must identify new strategies to move people and goods within communities and throughout the Nation. Integrating transportation planning with community development and expanding transportation options will not only improve connectivity and influence how people choose to travel, but also lower transportation costs, reduce dependence on oil, and decrease emissions.

Livable communities are mixed-use neighborhoods with highly-connected streets promoting mobility for all users, whether they are children walking or biking to school or commuters riding transit or driving motor vehicles. Benefits include improved traffic flow, shorter trip lengths, safer streets for pedestrians and cyclists, increased trip-chaining, and independence for those who prefer not to or are unable to drive. In addition, investing in a “complete street” concept stimulates private-sector economic activity by increasing the viability of street-level retail small businesses and professional services, creating housing opportunities, and expanding the usefulness of school and transit facilities. A complete street is designed and operated for pedestrians, bicyclists, motorists, and transit riders of all ages and abilities to move safely along and across the street.

Given the clear linkage between livability concepts and CSS, FHWA is already utilizing CSS to improve livability, considering the unique qualities of communities, actively engaging stakeholders in decision-making, and using multidisciplinary approaches. CSS projects consider community characteristics and visions, new and emerging technologies, bicycle and pedestrian facilities, transit and multimodal connections, stormwater management, and use of recycled materials.

#### **CSS DEFINED**

Applying CSS involves a collaborative, interdisciplinary approach that includes 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. “Context sensitive solutions” have evolved from a concept known as “context sensitive design.” The difference is much more than semantics. “Design” assumed, as engineers always had, that transportation

problems required some sort of construction to fix them. “Solutions” implies a broader, more objective view—one that may result in a multi-modal solution or may not result in any road construction at all. It also suggests that community stakeholders might have innovative ideas for how to address transportation issues.

CSS encompass four core principles for integration into decision-making in the planning and development of surface transportation system projects:

- striving toward a shared stakeholder vision to provide a basis for decisions;
- demonstrating a comprehensive understanding of contexts;
- fostering continuing communication and collaboration to achieve consensus; and
- exercising flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments.

CSS help transportation agencies meet their mission of delivering good value in transportation facilities to the public through the timely delivery of high quality projects that are within budget and have widespread support from stakeholders and users. Cost savings can be achieved through effective establishment of a project’s scope, scale, and expectations prior to public agencies’ completion of a significant amount of work on a project, and before other stakeholders and individuals become involved in the process to plan or develop a project. This “right sizing” of projects relates directly to providing opportunities to leverage a wider range of alternatives, solutions, and approaches to complete the project as well as a wider range of resources and funding, including non-traditional sources or cost-sharing approaches. Additionally, projects that follow this process tend to develop informed consent within the community and significantly reduce the risk of resource agency actions or delays resulting from litigation.

#### **EVOLUTION OF CSS**

The enactment of the National Environmental Policy Act of 1969 (NEPA) provided a foundation for CSS. A project purpose and needs statement should include discussion of transportation problems to be addressed, but also should reflect a full range of public values identified through scoping and public involvement, including community issues and constraints, sensitive environmental resources, and appropriate consideration of other factors. The statement should be based on input from all interested parties, and consensus should be achieved before proceeding. The purpose and needs statement subsequently provides the basis for stakeholders to develop criteria to evaluate alternatives and creative solutions. Developing a statement to articulate desired characteristics of a place at a future time that addresses transportation needs, community values or aspirations and environmental values provides a forum for communication and helps build a common understanding and expectations about project outcomes.

CSS have evolved over the past 20 years through several key events and publications and through surface transportation legislation placing additional emphasis on the importance of good design that is sensitive to its surroundings. The Intermodal Surface Transportation Efficiency Act of 1991 and the National Highway System Designation Act of 1995, without requiring the development of new standards or criteria, encouraged greater flexibility in highway design. The FHWA publication of *Flexibility in Highway Design* in 1997 built upon and highlighted the flexibility that already existed in current laws, regulations, and guidance, and the American Association of State Highway and Transportation Officials' "Green Book." The impetus for the Context Sensitive Design/Context Sensitive Solutions national initiative was a 1998 national "Thinking Beyond the Pavement" workshop in Maryland. Although the Transportation Equity Act for the 21<sup>st</sup> Century did not specifically address CSS, it did advance streamlining and stewardship concepts, and the application of CSS can lead to streamlining and stewardship outcomes. In 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), required consideration of CSS in establishing new design standards.

#### **FHWA and CSS**

Throughout this period of CSS evolution, FHWA has worked with partners to advance initiatives for expanding the practice of CSS among transportation professionals. FHWA continues to be a leader in promoting CSS through research and publications; training and technical assistance; action planning grants; conferences and peer exchanges; guidance documents and supportive legislative concepts; and fostering a community of practice by developing the CSS clearinghouse website to serve as the definitive source to access CSS information and resources. For example, FHWA delivers CSS training through the National Highway Institute and FHWA Resource Centers; integrates CSS concepts into university curricula; supports and sponsors research projects, technical guidance handbooks, competitions, and conferences; and manages and coordinates contracts and internal and external partnerships to link CSS with planning and project development. Three recent program activities highlight FHWA efforts to continue advancing CSS nationwide: the CSS clearinghouse website, a nationally accepted CSS design guide, and a five-city CSS national dialogue effort.

FHWA has focused on working with partners to document and share success stories and give practitioners a wide variety of examples from which to learn and model. Through the clearinghouse website, we are supporting a broader spectrum of transportation stakeholders such as: municipal governments, public works departments, non-government organizations, environmental and community organizations, professional associations for planners and engineers, and universities. The site is intended to increase the visibility and understanding of CSS by aggressively marketing the concepts and creating multiple opportunities for learning and information exchange. The CSS clearinghouse will reflect trends in building, operating, and

maintaining the national transportation system, including innovative finance, climate change, asset management, project delivery, accelerated construction, sustainability, and performance measurement and will use economic, social, and environmental indicators. It contains hundreds of case studies, hosts a popular webinar series, conducts broad outreach activities, and serves a growing Community of Practice.

FHWA was a sponsor and contributor to the recent publication: *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities*. This publication illustrates how standards and guidelines may be applied to ensure that urban thoroughfare improvement projects can be compatible with their urban context by supporting community objectives, walkable communities, compact development, mixed land uses, and pedestrians and bicyclists. We will continue our partnership with the Institute of Transportation Engineers, the Center for New Urbanism, and EPA to promote this publication and track case studies.

This fiscal year, FHWA held five national dialogue workshops in Austin, Texas; Portland, Oregon; Minneapolis, Minnesota; Charlotte, North Carolina; and New Brunswick, New Jersey. A national solicitation of projects to highlight in these workshops yielded 90 case studies. Regional participants and the web-viewing audience reviewed case studies; discussed trends in CSS relative to local, State, and Federal initiatives such as livability and sustainability; and identified actions for moving forward. These events met our goals to strengthen and broaden interest in CSS, discover new opportunities for partnerships, and define how CSS support the Administration's Livable Communities Initiative and the FHWA Administrator's Every Day Counts initiative, which is focused on expediting project delivery and enhancing the quality of projects and the surrounding environment.

#### **INTEGRATING CSS INTO PLANNING AND PROJECT DELIVERY**

CSS can be applied to all aspects of project development—from planning and design to construction, operation, and maintenance. CSS have been utilized most frequently for difficult and complex projects with major impacts, often as an intervention to get a project moving when absence of stakeholder agreement has halted the project. Increasingly, however, State Departments of Transportation (State DOTs) are appropriately seeking to use CSS from the onset of project planning and in more routine projects. CSS do not represent a philosophy to be selectively applied to certain categories of projects, but an approach to transportation planning, design, construction, and maintenance that is scalable to use on every transportation project.

The application of CSS principles within the transportation planning process assists regions and communities in reaching their transportation goals by encouraging the consideration of land-use, transportation, and infrastructure needs in an integrated manner. When transportation planning reflects community input and takes into consideration the impacts on both natural and human environments, it also promotes partnerships that lead to more balanced decision-making.

While construction, maintenance, and operations functions seem straightforward, a CSS approach can reduce adverse community impacts related to when and how the work is conducted. For example, in some locations, it may make sense to overlay an asphalt surface in increments while leaving the roadway partially open to traffic. In other situations, it may be preferable to completely close a roadway and get the overlay work done more quickly.

Accommodating business access is often an issue during construction and maintenance activities. Collaborating with local businesses and economic development interests provides useful information about access requirements, alternate access locations, detour routes, and signage. Collaboration with these stakeholders can also result in construction schedules that avoid conflict with local holiday gatherings, festivals, fairs, and sporting events.

Considering impacts to adjacent areas in determining the time of day for construction operations can also be important. Mobility may be improved by conducting work at night, but night-time construction light and noise could negatively affect adjacent residential neighborhoods. Communication with stakeholders can result in better understanding and resolution of potential trade-offs.

At the organizational level, CSS training is important, particularly in areas of project management, communications, public involvement, and design flexibility. Institutionalizing the CSS approach involves State DOT reviews of policies and procedures to identify barriers to using the CSS principles for project delivery, and then modifying policies and procedures as needed to mitigate or remove barriers and to allow and encourage flexible decision-making tailored to specific projects. Some State DOTs have also established CSS training programs for contractors and construction and maintenance staff.

Through State pilot efforts (like those in Maryland, Utah, Kentucky, Connecticut, and Minnesota), case study compilation, and recent National Cooperative Highway Research Program research efforts on CSS benefits, the transportation community has observed how CSS can help create projects that meet or exceed the expectations of both designers and stakeholders. The use of CSS can lead to better value in the form of reduced costs, on-time delivery, improved community relationships, and opportunities to leverage a wider range of funding options (non-traditional funding sources or cost-sharing approaches).

#### How to “Right Size” Projects

Variations of CSS have evolved to incorporate greater financial feasibility and benefits analyses and to respond to perceived problems of “over design” and “over sizing.” States have coined terms and initiatives such as “Common Sense Solutions,” “Community-based Solutions,”

“Flexible Design,” “Practical Design,” “Practical Solutions,” “Smart Transportation,” and just recently we heard the term “Design Suitability” associated with Caltrans’ new “Smart Mobility 2010” framework. Common to these efforts is a system-sensitive approach where reasonable solutions are sought to address more complicated areas with constrained financial resources. This can be achieved by applying the concept of diminishing returns and viewing a project as an investment. At some point in the design process, larger cross sections and wider rights-of-way may not return significant improvements for the investment to be made. The current budgetary constraints and limitations necessitate such an approach for addressing more problem areas with limited resources. The right answer does not come just from an engineering manual but from creative thinking that reflects, among other things, good, safe engineering and the context of the community.

If a transportation agency is faced with a change in available resources and it is necessary to down-scope the project, the CSS process can be continued or reactivated to take into account the new fiscal reality. The agency can pose the situation of reduced funds to stakeholders and collaborate to determine what features a shorter-term or smaller-scoped project should include and the cost tradeoffs of not accommodating future projected demands if that is an issue. Openly discussing issues related to priorities and phasing, and examining short-term options that do not preclude the preferred long-term solution, helps stakeholders accept changed conditions and support a revised project scope.

Many FHWA national initiatives have paralleled this “right sizing” trend at the State level. Through our scenario planning efforts, we have helped communities develop a shared vision for the future by analyzing various forces (e.g., health, transportation, economic, environmental, land use) that affect growth. Our fiscal constraint guidance has helped States and communities determine reasonable assumptions for revenue sources available in the years when they are needed for project development and implementation. Through our corridor planning guidance and efforts to link planning and NEPA, we have helped create a seamless decision-making process that minimizes duplication of effort, promotes environmental stewardship, and reduces delay between planning and project implementation. Section 6002 of SAFETEA-LU provided an environmental review process that emphasizes interagency collaboration and participation, supporting the concept of early consideration of environmental concerns in transportation planning. It builds upon NEPA requirements, allowing decision makers to use a systematic and interdisciplinary approach that considers environmental, economic, and technical factors. Value engineering can be applied at any point in the project development process as long as the approved purpose and need is preserved.

## EXAMPLES OF CSS OUTCOMES

Working with stakeholders, designers have many choices, including the type of facility, lane and shoulder widths, clear zone design, level of service, design speed, design vehicles, location and type of bicycle and pedestrian facilities, medians, on-street parking, intersections, channelization features, roadside treatments, and access control. Examples from the national dialogue workshops highlight the range of CSS practice and outcomes.

### Central Texas Greenprint

To help identify valuable green infrastructure for Central Texas, Envision Central Texas formed a partnership with the Capital Area Council of Governments and the Trust for Public Land to complete a *Greenprint for Growth* for the region. The Greenprinting process engages community leaders in a collaborative effort to define conservation priorities and establish criteria that reflect locally distinctive resources and objectives. Using state-of-the-art geographic information systems models, the Greenprint analyzes this community-based data and generates maps and reports that provide unique insights for formulating conservation acquisition strategies or development goals. These integrated, interactive green infrastructure maps are invaluable tools to identify and preserve critical open space for trails, parks, and habitats as well as understand which land is most appropriate for development. The regional nature of this Greenprint helps to identify synergies between jurisdictions and develop strategies to support collective and individual county land protection plans.

### Skyway Corridor in Paradise, California

The Skyway serves as the Town of Paradise's "Main Street" and primary connection to jobs and shopping in Butte County's largest community, Chico. Traffic volumes, speed and the roadway's existing geometrics had shifted the Skyway away from a "Main Street" to more of an expressway, limiting the ability for the downtown area to flourish. A collaborative, community-supported plan was created to address traffic safety and operations, circulation, pedestrian, and aesthetic deficiencies within the existing corridor.

The plan includes reducing the four-lane roadway to three lanes in the downtown area, adding bicycle lanes, enhancing pedestrian crossing facilities, creating wider sidewalks, and maintaining traffic flow through targeted intersection improvements and coordination of traffic signals. Following a large wildfire near the community that occurred during the process, the plan was modified to eliminate any landscaped medians in the three-lane section, and to include decorative pavement in the center lane to be used as a second evacuation lane in the event of future fires. The plan also includes a new parking lot and public gathering space near the core of downtown to further support the economic revitalization of the downtown area. Subsequent to this effort, the Town of Paradise embarked on a Downtown Capital Improvements Master Plan for other streets in the downtown area.

High Point Redevelopment in Seattle, Washington

The High Point Redevelopment in Seattle represents a unique sustainable development that is garnering local, national, and international attention. The project uses CSS principles to achieve its successes and is serving as a model for how low-impact development methods can be incorporated into an urban streetscape. The key CSS element included intense collaboration with both the public and the multiple government agencies. From this process, the team realized that there was a strong public desire to restore the street grid in order to re-integrate the High Point community with the surrounding neighborhoods. The other community goal was to slow down traffic and provide equitable access to transit for the low-income neighbors at High Point. By using the Complete Streets concept and using natural drainage to manage stormwater, the street network appears to be functioning in a safe manner and has been woven back into the typical grid of the city.

**CONCLUSION**

Context sensitive solutions are the culmination of a change from a “decide, announce, and defend” way of doing business to a collaborative problem-solving model where transportation agencies consider and build upon ideas generated by stakeholders. FHWA views the nationwide use of CSS as an essential way to fashion 21<sup>st</sup> Century solutions to emerging infrastructure challenges. We will continue to promote the use of context sensitive philosophies and approaches during project development to improve project decision-making; expedite project delivery; and enhance mobility, safety, livability, and environmental sustainability.

Mr. Chairman, Members, thank you again for this opportunity to testify. I will be pleased to answer any questions you may have.

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Questions for Mr. King Gee  
Associate Administrator for Infrastructure  
Federal Highway Administration  
United States Department of Transportation

Highways and Transit Subcommittee Hearing  
June 10, 2010

Questions from Chairman DeFazio

1. Critics of Context Sensitive Solutions (CSS) have historically raised concerns that the use of CSS may leave States more open to liability lawsuits and that CSS projects are more likely to need design exceptions, making them less safe. According to the CSS Clearinghouse website, no study has shown CSS to lead to more design exceptions. In your written testimony you stated FHWA believes CSS can reduce the risk of delays from litigation and Ms. Paiewonsky stated that research has found liability concerns to be “unfounded” and that a CSS consensus-building approach actually results in less litigation.
  - What impact – if any – does the use of CSS have on a designer’s susceptibility to liability challenges?
  - Does using CSS lead to more design exceptions? Are design exceptions inherently less safe?
2. In her written testimony, Commissioner Peterson stated that over-designed Federal projects that make a facility “bigger, wider and straighter” compel more drivers to use the Federal facility, which forces the Federal highway system to “almost always take the brunt of all trips – local regional and interstate.” She believes this approach leads to continued congestion on the Federal system and a “lack of analysis about ways that lower cost improvements off the federal system might actually resolve many mobility and congestion problems in a way that would be more readily embraced by the community.”
  - Does FHWA share this concern that by over-designing Federal projects we are creating incentives for drivers to use the Federal system, thereby undermining the operations and performance of those facilities? Do you agree with Commissioner Peterson that there are times when lower-cost projects on the local and State road system might do more to relieve congestion?
3. SAFETEA-LU (P.L. 109-59) authorized States to consider CSS for projects on the National Highway System (NHS). In your written testimony you stated that CSS should not be selectively applied to certain categories of projects, but is instead scalable to use on every transportation project. Given this, wouldn’t it make sense to expand the consideration of CSS to projects on all Federal-aid highways, rather than just projects on the NHS?
4. In your written testimony you stated FHWA’s belief that “the nationwide use of CSS is an essential way to fashion 21<sup>st</sup> century solutions to emerging infrastructure challenges.” This sounds to me to be an endorsement of mainstreaming CSS far more than has been done to date.

Would FHWA support requiring, rather than just allowing, States to use CSS on all highway projects?

5. During the hearing you were asked about the Department's position regarding "Complete Streets" policy. Please elaborate on the Administration's position regarding the accommodation of all users in the design and construction of transportation facilities.
6. Mr. Gee, in her written testimony Commissioner Peterson stated that today project engineers typically over-design and over-build projects far beyond what the local community may be able to afford or what they might need or want. She also said that over designing projects has been shown to actually encourage faster speeds and less safe driving. Do you agree?

**QFRs for CSS T&I hearing June 10, 2010**

**1. Critics of Context Sensitive Solutions (CSS) have historically raised concerns that the use of CSS may leave States more open to liability lawsuits and that CSS projects are more likely to need design exceptions, making them less safe. According to the CSS Clearinghouse website, no study has shown CSS to lead to more design exceptions. In your written testimony you stated FHWA believes CSS can reduce the risk of delays from litigation and Ms. Paiewonsky stated that research has found liability concerns to be “unfounded” and that a CSS consensus-building approach actually results in less litigation.**

**-What impact – if any – does the use of CSS have on a designer’s susceptibility to liability challenges?**

The use of CSS makes it no more or less likely that a design exception will be used on a project. CSS principles help State DOTs, local agencies and interested project stakeholders work through project issues to reach a transportation solution that meets both transportation and community needs.

The use of a design exception does not mean a project is unsafe. A designer’s potential liability depends on many factors. Tort laws vary from state to state, but by and large are consistent in distinguishing between discretionary and ministerial duties.

Generally speaking, ministerial duties are those actions taken to implement discretionary decisions. They are mandatory actions, and do not involve the exercise of discretion about whether to carry out the act. Failure to perform ministerial actions with due care or in a timely manner may leave an agency open to a tort claim. For transportation agencies, ministerial duties include actions required to maintain and operate a public highway.

Actions by a public agency involving choices are discretionary. In transportation, planning and design decisions are generally considered discretionary and immune from tort actions by outside parties as long as the person taking action takes due care to follow applicable standards.

AASHTO and State DOTs have not identified any agency or project-specific concerns regarding tort liability or claims resulting from the approval of design exceptions or from the use of CSS principles.

**-Does using CSS lead to more design exceptions? Are design exceptions inherently less safe?**

Design exceptions are not the result of using CSS principles. Generally, design exceptions are expected to occur on all projects. FHWA is not aware of any national research or study that indicates CSS leads to more design exceptions, or addresses whether such exceptions have a positive or negative influence on the project. A misconception exists that design standards are fixed requirements that offer no

flexibility. That is not the case, and design exceptions are a useful tool for achieving a successful project whether or not CSS principles are in use. Design exceptions are decisions to employ a value less than the minimum criteria established for an application of a specific design element. Design decisions, and exceptions to standards, are made based on conditions unique to a particular project.

Effective designers understand that design standards reflect a range of considerations and factors. The degree to which a specific project reflects that same range of conditions will vary, meaning that a designer appropriately should consider how the standard fits the situation at hand and whether deviation from the standard is warranted. Transportation agencies have established policies and procedures governing the evaluation, review, and approval of exceptions to design standards for specific projects.

In July 2007 FHWA produced a publication to assist designers in assessing and addressing design exceptions called “Mitigation Strategies for Design Exceptions.”

**2. In her written testimony, Commissioner Peterson stated that over-designed Federal projects that make a facility “bigger, wider and straighter” compel more drivers to use the Federal facility, which forces the Federal highway system to “almost always take the brunt of all trips – local regional and interstate.” She believes this approach leads to continued congestion on the Federal system and a “lack of analysis about ways that lower cost improvements off the federal system might actually resolve many mobility and congestion problems in a way that would be more readily embraced by the community.”**

**-Does FHWA share this concern that by over-designing Federal projects we are creating incentives for drivers to use the Federal system, thereby undermining the operations and performance of those facilities? Do you agree with Commissioner Peterson that there are times when lower-cost projects on the local and State road system might do more to relieve congestion?**

FHWA does not believe that state and local agencies over-design projects that utilize Federal-aid highway program funding or projects that are located on the Federal-aid highway system. Projects are generally designed to meet identified needs and support a desired performance level into the future.

Consistent with the CSS principles, we do support system efficiencies that can be achieved by adequately considering performance on the local network. Through scenario planning, area wide planning, and corridor planning, communities can evaluate solutions to congestion by modifying the local network to support short trips and peak hour diversions. In addition, the purpose of alternative analysis under NEPA is to look at a variety of options for meeting a purpose and need taking into account cost and benefits.

Our support of CSS and Livability has included promoting the need to consider, analyze and pursue alternatives which reconnect neighborhoods with the local street network. CSS ensures the appropriate community interests and stakeholders are involved in the process of developing projects. Additionally, CSS helps ensure the purpose, scope and design of projects align with neighborhood plans, transportation corridor and facility plans, strategic and transportation plans of local communities, the transportation plans of metropolitan areas or regions, and state transportation plans.

**3. SAFETEA-LU (P.L. 109-59) authorized States to consider CSS for projects on the National Highway System (NHS). In your written testimony you stated that CSS should not be selectively applied to certain categories of projects, but is instead scalable to use on every transportation project. Given this, wouldn't it make sense to expand the consideration of CSS projects on all Federal-aid highways, rather than just projects on the NHS?**

FHWA recognizes that the Standards Section, specifically 23 USC 109(a)(2), does state, in part, that Federal-aid projects “be designed and constructed in accordance with criteria best suited to accomplish the objectives,” and “to conform to the particular needs of each locality.” Conforming to the needs of each locality is in effect saying that projects should be developed so as to assure that projects are context specific. Also, this phrase suggests that those elements be considered when project decisions are being made. FHWA works with State DOTs to develop design criteria for the NHS (as specified in 23 USC 109(c)). For non-NHS projects, we defer to State laws, regulations, directives, and standards (as specified in 23 USC 109(o)).

However, we encourage State DOTs to consider the use of CSS to help improve the timeliness of delivery, effectiveness of the process, and the quality of the transportation improvements in all transportation projects. CSS has proven to be a significant enhancement to the planning and project development processes. CSS also can help ensure consideration of other important factors such as livability and sustainability, whether for an intersection improvement or a major highway upgrade. FHWA does believe that the application of CSS can be helpful for all projects on the NHS, and can be scaled appropriately for use on projects not on the NHS.

**4. In your written testimony you stated FHWA's belief that “the nationwide use of CSS is an essential way to fashion 21<sup>st</sup> century solutions emerging infrastructure challenges.” This sounds to me to be an endorsement of mainstreaming CSS far more than has been done to date. Would FHWA support requiring, rather than just allowing, States to use CSS on all highway projects?**

FHWA has sought to mainstream CSS as a collection of excellent principles for the planning and development of projects. We have a robust set of learning and resource materials available to practitioners nationwide. We will continue to assist local

agencies and State DOTs in seeing the benefits of committing to an agency strategy of utilizing those basic principles for improving their relationships with their citizens and stakeholders. As described above, the application of CSS can be helpful for all projects.

**5. During the hearing you were asked about the Department’s position regarding “Complete Streets” policy. Please elaborate on the Administration’s position regarding the accommodation of all users in the design and construction of transportation facilities.**

The DOT and FHWA support the accommodation of all users in the planning, design and construction of transportation facilities. We believe the consideration of all users, along with the other concepts and principles of “Complete Streets,” are already within the ambit of existing laws and regulations. The needs of all users are required to be considered in the long range transportation plans that are developed for metropolitan areas, in the statewide transportation improvement programs of State DOTs, in the planning of future improvements within a transportation corridor, and in the planning and development of specific projects.

In order to accelerate changes in practice, FHWA has developed resources and information to raise awareness of “Complete Streets” policies and relevant legal requirements, and to help States and localities learn from their peers. For example, FHWA:

- Provided funding support for the recent *Complete Streets: Best Policy and Implementation Practices* report from the American Planning Association.
- Conducted an international scan and released a report entitled *Pedestrian and Bicyclist Safety and Mobility in Europe* which identified best practices from overseas to improve conditions for walking and bicycling.
- Released a 15 year status report on the *National Bicycling and Walking Study* which includes an overview of the growth in “Complete Streets” policies.
- Continues to conduct outreach, including webinars, to educate stakeholders about “Complete Streets” policies.

The July/August 2010 issue of *Public Roads* will include an article on existing FHWA programs and policies in the areas of planning and CSS that support “complete streets” concepts and principles.

In March 2010, the US DOT released its *Policy Statement on Bicycle and Pedestrian Accommodation* which states that, “The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems.” In addition, the draft Fiscal Year 2010 to 2015 *DOT Strategic Plan: Transportation for a New Generation* states an objective to

“Increase the number of States and localities that adopt ‘complete streets’ policies and ‘safe routes to schools’ policies” as a performance measure.

**6. Mr. Gee, in her written testimony Commissioner Peterson stated that today project engineers typically over-design and over-build projects far beyond what the local community may be able to afford or what they might need or want. She also said that over designing projects has been shown to actually encourage faster speeds and less safe driving. Do you agree?**

No. FHWA is not aware of any national studies or research that show highway planners and designers over-design and over-build projects, or that current design practices encourage inappropriate speeds or unsafe driving. The concept of “over-designed” or “over-built” projects is subjective, and may arise when a stakeholder with a vested interest in a project does not agree with specific design decisions on a project. This is an issue where CSS can prove particularly helpful. The application of CSS principles when planning and developing projects assists state DOTs, regional authorities, planning organizations, local agencies, stakeholders, and the public with identifying and balancing their respective needs and concerns. CSS can help those parties determine the best transportation solution in an integrated and collaborative manner.



TESTIMONY

*Practical Design Guidance for Achieving Context Sensitive Solutions*

U.S. HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE  
SUBCOMMITTEE ON HIGHWAYS AND TRANSIT

June 10, 2010

Mr. Hal Kassoff  
Senior Vice President  
Parsons Brinckerhoff  
1401 K St, NW, Suite 701  
Washington, DC 20005  
on behalf of  
Institute of Transportation Engineers

The Institute of Transportation Engineers (ITE) appreciates the opportunity to address the Subcommittee on Highways and Transit on the active role we are playing in advancing the concepts of context sensitive solutions (CSS) in developing and managing transportation facilities that better serve the needs of users while enhancing the communities we serve.

Founded in 1930, ITE is an organization of approximately 18,000 traffic engineers, transportation planners and academicians devoted to the advancement of the transportation profession. It serves as a conduit to its members for the exchange of information, technical training and overall professional development.

ITE has been in the forefront of transportation/traffic engineering organizations working on context sensitivity issues. In that vein, ITE partnered with the Congress for the New Urbanism (CNU) on behalf of the US Department of Transportation-Federal Highway Administration and the Environmental Protection Agency. We are pleased and proud to inform the Committee that the product of this collaboration was released at our March 2010 meeting in Savannah, Georgia. The new *ITE Recommended Practice-Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (RP)* is intended to serve as a guide for ITE members and other transportation professionals throughout the country on how to integrate context sensitivity with the application of traffic engineering and design principles in our nation's urban areas. It is truly

a landmark work that was several years in the making, and represents a triumph in establishing mutually supported goals as well as detailed recommended practices among transportation and urban planning and design professionals.

#### What is Context Sensitive Solutions?

CSS uses innovative and inclusive approaches that integrate and balance community, aesthetic, historic and environmental values with transportation safety and efficiency performance goals. It is simultaneously a philosophy and a set of practices in which transportation solutions are developed through the combined efforts of interdisciplinary teams working interactively with the stakeholders they serve. In concert with this definition, a transportation project that is context sensitive is based on a common set of tenets:

- Balances safety and mobility with community and environmental goals, while striving for win-win outcomes;
- Engages stakeholders early and continuously;
- Uses interdisciplinary teams tailored to project requirements and context;
- Addresses all modes of travel, including walking and bicycling, and the critically important relationship between transportation and land use;
- Applies flexibility inherent in design standards and guidelines; and
- Incorporates aesthetics as an integral part of the design.

CSS is reflective of sound traffic engineering judgment in meeting access and mobility needs for all users in a safe manner, while respecting and where possible, enhancing the characteristics of surrounding communities and the environment. The end product is a function of the collaborative planning process.

#### How is CSS Different from Conventional Design?

There are fundamental differences in the approaches to design that can result in different outcomes. Conventional design is typically driven primarily by traffic demand and level of traffic service considerations. This mobility-focused approach does not encourage a balancing of transportation and stakeholder objectives in determining the most effective street or roadway design. CSS, on the other hand, begins the process with identifying community values and contextual factors before establishing design criteria. This process suggests that level of service criteria need to be balanced with environmental, historic preservation, or economic development objectives. The CSS process is a more inclusive and interactive process, which improves the likelihood of consensus between interdisciplinary teams and stakeholders.

#### What are the benefits of CSS?

There are numerous important benefits that can be attributed to CSS:

- Develops consensus solutions by listening to and learning from stakeholders prior to the onset of the design process;
- Protects environmental and community assets;

- Saves time and money as it ultimately shortens project development processes by minimizing redesign;
- Helps prioritize the allocation of transportation resources;
- Builds partnerships and positive relationships with the stakeholders; and
- Serves the needs of transportation while building better communities and protecting the environment.<sup>1</sup>

Use of CSS principles should begin in long range transportation and land use planning processes, and continue throughout the entire project life cycle.

#### Goal/Purpose of the ITE RP

The ITE Recommended Practice, *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*, was developed in response to widespread interest for improving both mobility choices and community character through a commitment to creating and enhancing communities. The ITE RP is intended to advance the successful use of context sensitive solutions in the planning and design of major urban thoroughfares for walkable communities. It provides specific guidance and demonstrates for practitioners how CSS concepts and principles may be applied in roadway improvement projects that are consistent with their physical settings. The report's chapters are focused on applying the principles of CSS in transportation planning and in the design of roadway improvement projects in places where community objectives support walkable communities, compact development, mixed land uses and support for pedestrians and bicyclists, whether it already exists or is a goal for the future.

#### How Can CSS be Advanced?

The development of the RP is viewed as a milestone. It is the first of its generation produced jointly by two professional organizations with historically differing perspectives—traffic movement versus urbanism—but with mutual goals of improving the overall quality of life for all people. This was achieved by first identifying the common ground for both groups, particularly in serving places that function well from a livability and a transportation perspective. Secondly, parameters were established for both traffic engineers and urban planners within the sphere of accepted state and national design criteria that can be applied when designing any transportation infrastructure. Thirdly, the RP was developed for use by all stakeholders such as community planners, architects, developers, zoning boards, and political representatives in order to enable grass roots engagement from concept and design to construction and operations.

There has been considerable demand for this new resource. Since the release of the RP in March of this year, ITE has had nearly 2,000 purchases and free downloads of the RP and more than 300 participants in a Web briefing focusing on its contents. Although much has been accomplished to date with the enthusiastic acceptance of this RP, it will take much more than

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<sup>1</sup> Source: [www.contextsensitivesolutions.org](http://www.contextsensitivesolutions.org)

three months to assess its impact. Though the trends are encouraging, old “habits” in the form of more traditional and less contextual approaches to streets and highways will take some time to change. However, it does seem that the pace of positive change is advancing.

To sustain movement toward contextual approaches to developing streets and roadways, Congress may find it useful to encourage awareness and application of the ITE RP that was developed with the collaboration of FHWA and EPA and guided by policy and technical groups from state and local governments as well as national organizations involved in transportation and urban development. National endorsement of the RP can help to ensure that state and local governments as well as communities and stakeholders have at their disposal a rational framework and specific information to address their needs. However, we do not believe this should be a mandate prescribed at the national level. By encouraging awareness and supporting the voluntary use of the RP, in conjunction with other established design documents and manuals, transportation agencies and professionals will be more likely to reach for this new and potentially powerful resource that can lead to contextual street and highway facilities that contribute to enhanced livability and sustainability.

**Questions for Mr. Hal Kassoff  
Senior Vice President  
Parsons Brinckerhoff**

**Highways and Transit Subcommittee Hearing  
June 10, 2010**

Questions from Chairman DeFazio

1. Critics of Context Sensitive Solutions (CSS) have historically raised concerns that the use of CSS may leave States more open to liability lawsuits and that CSS projects are more likely to need design exceptions, making them less safe. According to the CSS Clearinghouse website no study has shown CSS to lead to more design exceptions. In Mr. Gee's written testimony he stated FHWA believes CSS can reduce the risk of delays from litigation and Ms. Paiewonsky stated in her testimony that research has found liability concerns to be "unfounded" and that a CSS consensus-building approach actually results in less litigation.
  - What impact – if any – does the use of CSS have on a designer's susceptibility to liability challenges?
  - Does using CSS lead to more design exceptions? Are design exceptions inherently less safe?
2. In her written testimony, Commissioner Peterson stated that over-designed Federal projects that make a facility "bigger, wider and straighter" compel more drivers to use the Federal facility, which forces the Federal highway system to "almost always take the brunt of all trips – local regional and interstate." She believes this approach leads to continued congestion on the Federal system and a "lack of analysis about ways that lower cost improvements off the federal system might actually resolve many mobility and congestion problems in a way that would be more readily embraced by the community."
  - Do you share this concern that by over-designing Federal projects we are creating incentives for drivers to use the Federal system, thereby undermining the operations and performance of those facilities? Do you agree with Commissioner Peterson there are times when lower-cost projects on the local and State road system might do more to relieve congestion?
3. In your written testimony you described the "recommended practice" report on Context Sensitive Solutions (CSS) that was recently released by the Institute of Transportation Engineers (ITE). While this report obviously focuses on the use of CSS in urban areas, the general CSS approach you've described seems equally applicable in suburban and rural areas. Is ITE planning to do any related work – or to publish a comparable report – on CSS in non-urbanized areas?
4. You stated in your written testimony it will take time to change "old habits" in relation to more traditional highway design approaches. How would you suggest that we speed up the process of changing old habits? What additional steps would you suggest that Congress take to encourage the use of Context Sensitive Solutions and/or practical design?

RESPONSES TO HIGHWAYS AND TRANSIT SUBCOMMITTEE HEARING—JUNE 10, 2010

QUESTIONS ADDRESSED TO HAL KASSOFF ON BEHALF OF ITE

1. **Critics of Context Sensitive Solutions (CSS) have historically raised concerns that the use of CSS may leave States more open to liability lawsuits and that CSS projects are more likely to need design exceptions, making them less safe. According to the CSS Clearinghouse website no study has shown CSS to lead to more design exceptions. In Mr. Gee’s written testimony he stated FHWA believes CSS can reduce the risk of delays from litigation and Ms. Paiewonsky stated in her testimony that research has found liability concerns to be “unfounded” and that a CSS consensus-building approach actually results in less litigation.**

**1A: What impact – if any – does the use of CSS have on a designer’s susceptibility to liability challenges?**

**Response:** The 2004 AASHTO publication on flexibility in highway design, produced by AASHTO’s Subcommittee on Design, and carefully reviewed by attorneys, clearly states that liability issues should not be a barrier to CSS.

The essence of CSS is the requirement to fit the solution to the context. The context is not only defined by environmental, cultural, historical, aesthetic and other characteristics related to the community and surrounding land use, it is also defined by the transportation system and the need to provide for the movement of people and goods. Excellence in CSS means striking the right balance in meeting the needs of both transportation as well as broader contextual factors. This usually means refusing to apply “cook-book” solutions without a thoughtful critical review. There are times when the cook-book solution may work well in relation to the broader context. There are many times when it does not, since no set of design guidelines or standards can cover all contingencies.

Relying on the cook-book in contexts that don’t result in a “good fit” can result in “lose-lose” situations that can degrade (rather than enhance) safety while also degrading the context. It is not difficult to find standards-driven solutions that result in an overdesigned road intended primarily to foster higher speeds (to reduce travel times.) Such solutions, albeit unintentionally, can exacerbate rather than relieve safety problems.

There is a tendency in the road design business, fostered in the design of rural and suburban Interstate highways where it is more understandable, toward wider, straighter and faster as opposed to narrow, winding, and slower designs. When freeway target speeds range from 55 in an urban setting to 75 miles per hour in rural areas, the laws of physics as well as driver

expectancy are supportive of this tendency. However, when this approach is applied to urban and suburban arterials or thoroughfares, or collector and local streets it can result in design features (such as wide cross sections, generous turning radii, and super-elevation - or banking - on curves) that may induce higher than targeted speeds, often at the expense of pedestrians and bicyclists as well as vehicular safety.

If there is a question of liability, it seems that such a question would apply as readily, if not more so, to so-called "standards-driven" design solutions that are not as cogent or as carefully reviewed as those solutions that come from context sensitive variations that are well thought out, that are deliberated and reviewed among peers, and—most importantly—whose logic and proper fit in terms of both transportation as well as the broader context are carefully explained. The key, as attorneys will point out, is the need for the designer to provide clear and thorough documentation that draws upon their knowledge and experience as they consider and modify the cook-book solution. This documentation is essential to defending against those who might challenge the engineer, which is an undeniable risk in our litigious society, a risk that certainly is not confined to the application of CSS. With such documentation, particularly if reviewed by qualified peers, liability should not be a barrier to CSS.

**1B: Does using CSS lead to more design exceptions? Are design exceptions inherently less safe?**

**Response:** There is no reason why contextual solutions that consider transportation requirements as part of the context and strike a balance between serving the safety and mobility needs of vehicular traffic and serving the needs of a much broader context should require a greater frequency of design solutions.

Historically, the application of design standards has tended to create solutions that minimize travel time and maximize speed, and because of a practice of using design speeds that exceed target speeds (the anticipated posted speed limit) to provide a "margin of safety," there does seem to be a tendency to conclude that "design exceptions" are inevitable when CSS is used.

It is ironic that the need for design exceptions is often increased by a process which produces a better design solution for both transportation and the broader context. Often the answer may simply be in starting with a lower and more appropriate design speed from the outset. FHWA has championed CSS and should be asked to work with AASHTO and technical representatives of localities to identify possible ways to reduce the need for design exceptions. In particular where such CSS design processes and solutions are well-documented and reviewed by knowledgeable and experienced engineers.

2. In her written testimony, Commissioner Peterson stated that over-designed Federal projects that make a facility “bigger, wider and straighter” compel more drivers to use the Federal facility, which forces the Federal highway system to “almost always take the brunt of all trips – local regional and interstate.” She believes this approach leads to continued congestion on the Federal system and a “lack of analysis about ways that lower cost improvements off the federal system might actually resolve many mobility and congestion problems in a way that would be more readily embraced by the community.”

**Do you share the concern that by over-designing Federal projects we are creating incentives for drivers to use the Federal system, thereby undermining the operations and performance of those facilities? Do you agree with Commissioner Peterson there are times when lower-cost projects on the local and State system might do more to relieve congestion?**

**Response:** Let’s begin by looking at Interstate highways and imagine the extreme – a nation without an interconnected system of high-volume routes serving long-distance traffic, much of which seeks to go around rather than through communities. European countries, that have had less undeveloped land but not much less of an expanse to cover, have recognized the need for their versions of Interstate highways.

Highways have become somewhat unique enterprises that are considered failures when users line up to use them. Clearly a congested Interstate highway system is failing to meet the expectations of users, but an important question to ponder is whether we would be better off if the vehicles they serve – tractor trailers, buses, RVs, cars, and motor cycles – were compelled to make more use of local streets and roads that are less suitable in terms of capacity and which would intrude on communities and environmentally sensitive areas? Most of us would agree that if traffic does not begin or end within a neighborhood, or an entire city, it is typically better to divert that traffic around rather than right through that neighborhood or city.

To succeed in siphoning traffic from more local streets and roads where it does not belong requires well-designed high capacity highways that accommodate maximum safe speeds for the alignments they can appropriately achieve within the context through which they occur. While most highway officials will agree that shifting the heavy demand on their facilities to other modes is most desirable, let us not allow our support for CSS to encourage the naïve idea that the need for Interstate highways and other freeways can be wished away. That is not to say that every last mile of freeway has been well planned, or even essential. It is to say that the interests of most communities and the more local streets and roads that are intended to meet their needs are better served by the presence of Interstate highway alternatives for the high volumes of through traffic.

Having said that, when looking at “intra-area” traffic, or as it is often called by transportation planners, traffic that is “internal” to any defined area, large or small, the presence of a grid system with many routes sharing the burden of traffic rather than just a few which invariably become bottlenecks, is clearly a better solution. Bearing in mind that a “grid” need only be a network of highly interconnected and redundant routes - it does not need to consist of straight, parallel roads that intersect only at right angles - the virtues of a grid to share the burdens of traffic have been recognized by advocates for the New Urbanism as well as by transportation planners. With the virtues of a grid in mind, Commissioner Peterson does have a valid point that there are times when lower-cost projects on the local and State system might do more to relieve congestion than a larger-scale project.

**3. In your written testimony you described the “recommended practice” report on Context Sensitive Solutions (CSS) that was recently released by the Institute of Transportation Engineers (ITE). While this report obviously focuses on the use of CSS in urban areas, the general CSS approach you’ve described seems equally applicable in suburban and rural areas. Is ITE planning to do any related work – or to publish a comparable report – on CSS in non-urbanized areas?**

**Response:** We agree that CSS is fully applicable in all areas including suburban and rural areas. The scope of the current effort was limited by available resources primarily to walkable urban thoroughfares since this is where the greatest interest was focused, and this is where we perceived the greatest potential for immediate and visible advances to the state of the practice.

Several partnering transportation organizations have developed resources that begin to address CSS in rural areas. Several years ago, the FHWA published a document entitled “Flexibility in Highway Design” <http://www.fhwa.dot.gov/environment/flex/> and AASHTO has also published “A Guide for Achieving Flexibility in Highway Design” to encourage professionals to use flexibility and to recognize options for the best solution to fit a particular context. These publications do include rural highways and both of these represent excellent starting points for CSS in rural areas.

CSS is also particularly critical in suburban areas. Unfortunately, guidance relative to CSS is lacking in suburban areas. Two issues of immediate concern that need to be addressed in suburban areas are (1) connectivity of the street network and (2) retrofit design guidance for existing suburbs. Suburban areas are particularly challenging as they are often fully built out and may offer little or no opportunity for multi-modal travel in these auto-dominated, moderate to low density environments. An additional suburban condition that needs to be addressed is at the fringes of built-up suburban areas that are still growing or where a new town center is being planned adjacent to a built suburban area. Here guidance on street connectivity is extremely important.

ITE has recently initiated a project to address the lack of guidance for suburban areas from a network level. An ITE committee just completed the first draft of a street design guidance document, "Planning Urban Roadway Systems" that addresses network connectivity and the planning of roadway systems that allow access to all road users. The draft report is currently in the ITE balloting process with hopes of publishing a Proposed Recommended Practice before the end of 2010. With this report underway, and the recent completion of the ITE CSS urban street design guidance document, ITE intends to move forward and seek additional resources to continue addressing the gap in CSS design information for suburban areas.

**4. You stated in your written testimony that it will take time to change "old habits" in relation to more traditional highway design approaches. How would you suggest that we speed up the process of changing old habits? What additional steps would you suggest that Congress take to encourage the use of Context Sensitive Solutions and/or practical design?**

**Response:** Congress can clearly state as a matter of national policy that transportation projects that use federal funds should be planned, designed, built, managed and maintained using processes that take into full account not only transportation requirements, but the broader context as well. But it should be clear that how this is achieved cannot be through the replacement of one cook-book process with another. Therefore, DOT should be directed to implement this congressional intent, not by issuing prescriptive regulations, but rather by:

- Cooperating with states, and through the states with regional and local planning and transportation agencies in defining and reporting on how this intent of Congress will be carried out in their area
- Asking state, regions and localities to collaborate in explaining how proactive stakeholder engagement and the creative use of interdisciplinary teams interacting with stakeholders fit within the process
- Recognizing and sharing best practices with respect to CSS and practical design nationally, and fostering the same within and among states, regions, and local areas
- Requiring colleges and universities with programs in planning and transportation, and which receive federal support to submit plans for incorporation of the principles and practices of CSS in their undergraduate as well as graduate curricula.
- Providing the resources to the National Academy of Sciences, Transportation Research Board to do an independent interim (within 2 years) and final (within 4 years) assessment of successes and shortcomings among states, regions and locales in fulfilling congressional policy with respect to implementing CSS, along

with recommended actions that Congress, FHWA, and the states, regions and localities should consider.

Finally, it is important to clearly understand and address the inferences that some are drawing with respect to practical design vis-à-vis CSS.

There are some who advocate practical design as an alternative to CSS because they perceive CSS as “window dressing” and fail to recognize the importance of all contexts, and not just aesthetics.

There are others who advocate CSS and perceive practical design as simply the lowest cost approach to transportation solutions, and fail to adequately account for budget limitations as an important part of the context.

Congress should fund a study and report on how the principles and activities inherent in CSS and practical design may be at cross purposes in actual practice, and most importantly, how such conflicting perceptions and interpretations can be addressed so that these approaches can be reconciled and harmonized.

AMERICAN ASSOCIATION OF  
STATE HIGHWAY AND  
TRANSPORTATION OFFICIALS



**TESTIMONY OF**

**LUISA M. PAIEWONSKY**

**ADMINISTRATOR  
HIGHWAY DIVISION  
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION**

**ON BEHALF OF**

**THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND  
TRANSPORTATION OFFICIALS**

**REGARDING**

**USING PRACTICAL DESIGN AND CONTEXT-SENSITIVE  
SOLUTIONS IN DEVELOPING SURFACE TRANSPORTATION  
PROJECTS**

**BEFORE THE**

**COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE  
Subcommittee on Highways and Transit  
U.S. HOUSE OF REPRESENTATIVES**

**JUNE 10, 2010**

Chairman DeFazio and Members of the Subcommittee, thank you for the opportunity to testify on the experience of state departments of transportation (DOTs) in using Practical Design and Context Sensitive Solutions in developing surface transportation projects. My name is Luisa Paiewonsky. I am the Highway Division Administrator of the Massachusetts Department of Transportation, and am speaking today on behalf of the American Association of State Highway and Transportation Officials (AASHTO) which represents the state departments of transportation (DOTs) of all 50 states, Washington, D.C. and Puerto Rico.

First, on behalf of AASHTO, I want to express our gratitude to you, Chairman DeFazio for your continuing commitment to transportation, including the enactment earlier this year of the Hiring Incentives to Restore Employment Act, or HIRE. The bill's provisions extend highway and transit programs through December 31, 2010 at the 2009 SAFETEA-LU levels and transfer \$19.5 billion in foregone interest from the General Fund of the U.S. Treasury to the Highway Trust Fund (HTF). These changes will ensure continuity of the federal-aid highway and transit programs, and enable states to accelerate contract lettings for the upcoming summer construction season. This also means that Congress can now turn its attention to work on enactment of a comprehensive, multi-year reauthorization measure for the federal-aid surface transportation programs. Thank you.

In my testimony I want to cover three points:

- Offer definitions of what the state DOTs mean by practical design and context sensitive solutions (CSS).
- Discuss some of the perceived challenges and barriers to adopting CSS, and dispel some of the myths regarding the inflexibility of AASHTO's "A Policy on Geometric Design of Highways and Street," commonly known as the AASHTO Green Book.
- Share with you what we are doing in Massachusetts as well as other State DOT examples of incorporating Practical Design and CSS in transportation projects.

#### **Context Sensitive Solutions (CSS) and Practical Design: Definitions**

Context Sensitive Solutions (CSS) refers to an approach to project development that considers each project's specific context, involves a full range of stakeholders in the development of the project, uses a process that fosters continuous communication and collaboration with the community, and demonstrates the efficient use of resources. This approach results in a project that is safe, in harmony with the community, and preserves the environmental, scenic, aesthetic, historic and natural resource values of the area where it is located.

CSS is defined as "*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.”*

Practical Design is a process in which design decisions are made with cost-efficiency as a primary concern, without sacrificing safety. While it is based on sound engineering principles, the focus of practical design is to design and construct just what is needed, with the goal of building the most efficient solution to the transportation need identified in order to spread money to more projects. The goal is to get the best value for the least cost, including consideration of life cycle costs.

While it does not specifically focus on community input, Practical Design can certainly be part of a context sensitive approach. Both CSS and Practical Design consider traditional geometric, traffic, safety and financial aspects of projects. Community needs and values, which are always considered when using the CSS approach, may also be part of a Practical Design solution. Both approaches consider the unique context of each project and flexibility is often necessary with both.

#### **Challenges and Barriers to adopting CSS by State Departments of Transportation**

The origin of Context Sensitive Solutions (CSS) approaches can be traced to a conference, *“Thinking Beyond the Pavement,”* organized in 1998 by the Maryland State Highway Administration, the Federal Highway Administration and AASHTO. The conference brought together 325 invited participants from 39 states and the District of Columbia to develop a vision of excellence in highway design for the 21st Century. Participants included chief engineers, senior designers, and planners from 29 state departments of transportation, representatives of national transportation organizations, and a variety of stakeholders from government, the private sector, and citizens' organizations.

Since that conference, the CSS philosophy has been embraced by many State Departments of Transportation, and implementation has varied from state to state. Several barriers to adopting the CSS approach have been addressed along the way, including liability and safety concerns. Amendments to the AASHTO *Policy on Geometric Design of Highways and Streets* – the Green Book – were adopted several years ago to address those issues. Nevertheless, some concerns remain, which are more perception than reality.

- **Cost:** CSS is perceived to cost more, but case studies have shown that implementing CSS early in the process can often save time and money and reduce project delays.
- **Safety and Liability:** When sound engineering judgments are made and they are well documented, concerns over liability can be minimized. Research has found liability concerns to be unfounded; with a CSS approach, consensus-building actually results in less litigation. Careful evaluation of alternatives, establishing

clear procedures for addressing safety procedures and thorough documentation of all decisions should be integral parts of any good process – and offer protections against lawsuits.

- CSS is perceived as being about aesthetic treatments: Aesthetics may be important to one community while in another they may not be a consideration. Communication is the key to reaching consensus on project features acceptable to all parties.

While perceptions take time to change, AASHTO, FHWA, and the State DOTs all continue to conduct research, develop tools, and provide education on CSS practices and principles and how they can assist in the development of transportation projects.

#### **Flexibility in the AASHTO Green Book**

*A Policy on Geometric Design of Highways and Streets*, more commonly known as the AASHTO Green Book, includes considerable flexibility to accommodate Context Sensitive Solutions as well as safety goals. The authors make this clear in its foreword to users. A few excerpts from the 2004 edition:

“The intent of this policy is to provide guidance to the designer.... It is not intended to be a detailed design manual that could supersede the need for the application of sound principles by the knowledgeable design professional. Specific flexibility is permitted to encourage independent designs tailored to particular situations.”

“Emphasis has been placed on the joint use of transportation corridors by pedestrians, cyclists, and public transit vehicles. Designers should recognize the implications of this sharing of the transportation corridors and are encouraged to consider not only vehicular movement, but also movement of people, distribution of goods, and provision of essential services. A more comprehensive transportation program is thereby emphasized.”

“The traditional procedure of comparing highway user benefits with costs has been expanded to reflect the needs of non-users and the environment.”

“The effects of various environmental impacts can and should be mitigated by thoughtful design processes. This principle coupled with that of aesthetic consistency with the surrounding terrain and urban setting, is intended to produce highways that are safe and efficient for users, acceptable to non-users, and in harmony with the environment.”

In addition, the 2010 edition of the AASHTO Green Book, which will be published later this year, will include expanded discussions of the options and trade-offs that must be considered as part of a context-sensitive project design.

### **Context Sensitive Solutions in Massachusetts**

In 2003, the Executive Office of Transportation and Massachusetts Highway Department (now MassDOT) launched a three-year initiative to make sweeping changes to its project development and design process and incorporate context sensitive solutions into its day-to-day decision-making process.

The Design Guide, which in 2006 formally replaced the agency's 1997 design manual, is designed to make highway projects more compatible with the state's rich historic, environmental, community and cultural resources. The Design Guide has significantly more flexible design standards, is strongly multi-modal, explicitly incorporates community setting as a design factor, dramatically re-shapes the project development process, and supports early planning and coordination with all stakeholders to create safe, attractive roads.

The Design Guide was a collaborative effort among MassDOT and more than twenty-five organizations, agencies and advocacy groups representing bicycle and pedestrian interests, municipal governments, historic preservation agencies, resource conservation groups, disabled and elderly citizens, engineering and construction trades, and regulatory agencies. By soliciting and responding to input from a broad range of stakeholders, Massachusetts DOT was able to forge a statewide consensus on a number of challenging issues, such as flexibility in lane and shoulder widths; accommodation of bicyclists and pedestrians; the classification of community settings; design treatments in historic areas; traffic calming versus traffic throughput; and transportation measures of effectiveness. Massachusetts DOT followed a CSS approach in the review of its guide, providing an opportunity for public review of the document in communities around the state. MassDOT has trained hundreds of its employees in CSS principles and the components of the new Design Guide, and sponsored additional training for local officials and design consultants. Our own engineers, many of whom were initially skeptical, have become the strongest proponents of the CSS approach, because it encourages them to use their creativity and problem solving skills.

#### **What is the process?**

Context Sensitive Design (CSD): A collaborative, interdisciplinary approach that involves all stakeholders to develop a facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources. CSD is an approach that considers the total context within which a project will exist.

A guiding principle of the Design Guide is that roadway projects should be planned and designed in a context-sensitive manner. The Design Guide was developed to ensure that projects intended to improve the roadway network in the Commonwealth are implemented in such a way that the character of the project area, the values of the

community, and the needs of the users are fully considered. At MassDOT, we like to say that the Design Guide represents a toolbox for collaborative decisionmaking.

An important concept in planning and design is that every project is unique. Whether the project is a modest safety improvement, or a ten-mile upgrade of an arterial street, there are no generic solutions. Each project requires designers to address the needed roadway improvements while safely integrating the design into the surrounding natural and built environment. Several characteristics of context-sensitive projects have been identified through Federal Highway Administration (FHWA) research and workshops. Among these concepts, the following are adopted by this Guide:

- The project satisfies its purpose and needs as agreed to by a wide range of constituents. This agreement is forged in the earliest phase of the project and amended as warranted as the project develops.
- The project is a safe facility for users of all ages and abilities as well as for the surrounding community.
- The project meets minimum design standards for accessibility for people with disabilities and gives attention to universal design principles.
- The project is in harmony with the community and preserves environmental, scenic, aesthetic, historic, and built and natural resources of the area.
- The project is well managed and involves efficient and effective use of the resources (time, budget, community) of all involved.
- The project is designed and built with the least possible disruption to the community.
- The project is seen as having added lasting value to the community.

The Design Guide draws from the state-of-the-art in roadway design. Design guidelines are consistent with those described in the 2004 Edition of the AASHTO "Green Book." The Guidebook also incorporates the additional guidance contained in AASHTO's *A Guide for Achieving Flexibility in Highway Design* (2004), *Guide for the Planning and Design of Pedestrian Facilities* (2004), and *Guide for the Planning and Design of Bicycle Facilities* (1999), as well as the U.S. Access Board's *Draft Guidelines for Accessible Right-of-Way* (2002), the Massachusetts Architectural Access Board's *Rules and Regulations* (2005), and the USDA Forest Service's *Outdoor Recreation Accessibility Guidelines* (2005).

In addition, research conducted under the auspices of the *Transportation Research Board* (TRB) and other organizations was considered and incorporated into the Guidebook, as appropriate. Finally, best-practices found in the manuals of other states and communities, as well as design guidance formulated specifically for this Guide, are included throughout.

Thank you for this opportunity to testify on behalf of AASHTO. I look forward to your questions.

## Appendix A

### Additional Case Studies

#### **Maryland State Highway Administration (SHA) Community Safety and Enhancement Program**

SHA's Community Safety and Enhancement Program has partnered SHA staff with citizens, communities, businesses, elected officials and a host of engineering professionals as an investment in the infrastructure needs and long sought revitalization elements in 152 communities, in 22 Counties. These partnerships have brought to completion 93 projects, with an additional 6 projects currently under construction or nearing completion and a further 53 projects in the concept development or design phase.

Through innovative design and methodology we provide the citizens of Maryland with balanced, holistic projects that respect technical functionality while incorporating the needs and sensitivities of the community in union with the traffic and safety elements vital to an effective State roadway. By easing the flow of traffic we help provide a safer, more pedestrian friendly environment that enhances the area's appearance as a viable heart of the community, while at the same time facilitating economic revitalization, redevelopment opportunities and creating a more convenient, liveable and enjoyable community.

Projects are initiated by a community requesting assistance addressing traffic issues concerning pedestrians, transit riders, bicyclists and motorists. Projects are selected on technical criteria and ranked by technical need, but part of the eligibility criteria is in the hands of the community as well.

The representatives of the various parts of the community are always in the vanguard of the decision making process. Rather than SHA being the driving force asking for input, the community, as a major stakeholder, is asked to be a part of the decision making process. Representatives from the community and professional design teams from SHA form a partnership in developing mutually respected solutions. As each community is unique, so too this process is adapted to each community's unique need for a unique solution. However, we consistently respect the time and commitment of the community volunteers as we work towards a solution by means of an orderly progression of events.

Working together, citizens and design professionals build an understanding of the existing roadway conditions, plans and how the community functions. The project's scope is defined by gathering information, defining the opportunities and creating alternatives. This information influences what specific analysis is needed. This analysis can be of a technical nature and be performed by SHA staff. Community representatives can perform other analysis such as development plans and parking

studies. This process allows SHA the opportunity to determine the extent of the community's transportation needs and the desire to enhance the quality of life and economic viability of the neighborhood.

With the information from the combination of these analyses, alternative solutions are developed and tested for engineering feasibility and community support. These design efforts can include geometric and safety improvements, including pedestrian and bicycle accommodation and safety. Other areas may include improvements to the existing storm drain design, traffic signing, signalization and streetscape design. Where feasible, local infrastructure designs for water and sewer improvements are also included. Finally all agreements are executed and all permits and necessary right-of-way are secured and we move forward with transforming the concept into reality.

### **Minnesota**

The Minnesota Department of Transportation views Context Sensitive Design (CSD) as the art of creating public works projects that meet the needs of the users, the neighboring communities, and the environment. It integrates projects into the context or setting in a sensitive manner through careful planning, consideration of different perspectives, and tailoring designs to particular project circumstances.

Context Sensitive Design uses a collaborative, interdisciplinary approach that includes early involvement of key stakeholders to ensure that transportation projects are not only "Moving Minnesota" safely and efficiently, but are also in harmony with the natural, social, economic, and cultural environment. Early involvement of stakeholders may help reduce expensive and time-consuming rework later on and thus contributes to more efficient project development.

The use of CSD principles to create transportation solutions supports a new vision for the future. Consistent with that vision, each project should reflect a sense of the place where it is built and should fit physically and visually within the surrounding environment and community.

Transportation professionals play a key role in making this new vision a reality. It is a vision that includes citizen participation, innovative design solutions, and safe roadways that improve mobility and enhance community beauty and the qualities of a place.

#### ***Minnesota Project: I-35W St. Anthony Bridge replacement project***

The I-35W St. Anthony Bridge replacement project was offered as a CSS National Dialog submission case study because it demonstrates a unique and amazing local and national story. More surprising to some is that under extreme duress, constraints, and timelines, the CSS philosophy and principles could and would still be applied in the case of a major state and federal disaster and transportation emergency public works replacement project. This non-traditional project design and construction case study

not only addresses all aspects of CSS, but also all 15 of the original Principles that guide CSS in transportation (8 Characteristics of Process to Yield Excellence and 7 Qualities of Excellence).

On August 1, 2007, the incomprehensible and tragic collapse of the Interstate 35W Bridge over the Mississippi River in Minneapolis, Minnesota was front page news across the country and the world. Remarkably, 13 months later on September 18, 2008 and several months ahead of schedule, in spite of tremendous and controversial physical, emotional, social, and economic challenges and obstacles, the new and context sensitive I-35W Bridge over the Mississippi River had been designed, constructed, and opened to traffic, within budget and ahead of schedule, as a remarkable public works feat.

While the challenge in moving forward to rebuild the I-35W Bridge was daunting and complex, the Minnesota Department of Transportation (Mn/DOT) worked closely, rapidly, collaboratively and successfully with all stakeholders and the public to define the scope of the replacement reconstruction project (sufficient to meet anticipated future needs and demands) and to obtain nearly all of the regulatory clearances and permits that would be required within a matter of days and weeks after the bridge collapse. The new bridge was to be reconstructed as two paired bridges with five traffic lanes in each direction, standard width shoulders and accommodation for a future light rail transit system. New ramps were also to be constructed at the interchanges on both sides of the bridge to correct geometric deficiencies. Among the many daunting project challenges: 1) sensitive emergency recovery, removal, investigative, and clean-up operations were taking place, 2) large areas of the site contained contaminated materials from past industrial uses (including a superfund site), 3) the roadway approaches did not meet current capacity and geometric design standards, 4) citizen groups and stakeholders had divergent views on how bridge design should be approached in terms of sensitivity to context, multimodal functions, and visual quality, 5) presence of historic properties, an adjacent historic district and the Army Corps of Engineers lock and dam with adjacent properties and operations, 6) units of the National Park Service (Mississippi River National Recreation Area), Minneapolis Parkway system, the designated Great River Road, the designated Mississippi River Trail, a National Scenic Byway and the state designated Mississippi River Critical Area all passing through the project area, 7) six railroad tracks passing under the bridge along with major utilities, and 8) severe topography and limited right of way adjacent to the bridge and approaches.

Within days after the bridge collapse, Mn/DOT began the process of rebuilding this vital area and interstate transportation link across the Mississippi River in downtown Minneapolis and began scheduling and facilitating public open house meetings to inform the process and expectations. To expedite project development and delivery of the reconstruction project, Mn/DOT chose the non-traditional design-build approach, rather than the traditional design-bid-build approach, to advance and expedite design and construction simultaneously, but Mn/DOT still structured the Statement of Qualifications (SOQ), Request for Proposals (RFP), and the RFP evaluation and

scoring criteria to emphasize the importance and requirements for a CSS approach with particular emphasis on effective public involvement and visual quality management. In a traditional process, Mn/DOT's CSS approaches, public involvement and visual quality management efforts would have been thoroughly addressed in project planning and design development prior to a project's letting for construction. However, in this design-build case, all processes had to occur and evolve simultaneously. Prior to development of the RFP, Mn/DOT assembled a diverse internal and external Visual Quality Advisory (VQA) Team, composed of experienced interdisciplinary professionals and interested stakeholders who were willing to meet weekly, and whenever necessary on short notice, to address visual quality management and CSS issues, concerns and design recommendations throughout the design-build project development process. The VQA Team reviewed and informed development of the design-build RFP (the contract documents) and the RFP evaluation and scoring criteria related to CSS, public involvement, and visual quality management (approximately 35% of the evaluation score) and the design-build RFP was issued on August 23, 2007 (just 3 weeks after the bridge collapse). Once the design-build team of Flatiron-Manson (a joint venture with FIGG Engineering as the designer of record) was selected as the successful design-build contractor and a Contract was executed (October 8, 2007), the FIGG President and CEO (Linda Figg) became the team's designated day-to-day visual quality manager. Linda Figg and the VQA Team immediately planned for a special full-day public involvement Bridge Design Charette meeting. The Bridge Design Charette brought together 88 interested local stakeholder and community members and worked them through a systematic, facilitated and highly visual and interactive process of developing consensus in choosing from among alternative design options and preferences to inform an array of design decisions that could be appropriately made in this manner. The Charette participants chose the pier shape for the bridge, the open see-through railing style, the bridge color (white), the aesthetic bridge lighting concept (using LED lighting), the local stone retaining wall and abutment concept, and set the tone for preference in regards to the general project site and landscape treatment approaches.

Looking forward, the I-35W Bridge was designed to be flexible so the usefulness of the bridge can accommodate needs throughout its life of 100 years or more. The I-35W Bridge is mass transit ready with expansion space for light rail, bus or HOV lanes. It is also designed to allow the load for a future pedestrian bridge to be suspended from the underside of the new bridge connecting existing & future trail systems on both sides of the river.

### **Tennessee**

Tennessee started using the practice of CSS in 2003. Following the election of a new Governor, TDOT became a focus for improvement as it was a large item of the winning platform. CSS began as a way to address 15 "problem" projects and to get them on track and successfully completed. Since then the philosophy and the lessons learned

have been widely adopted and used although TDOT has fallen out of the habit of actually classifying projects as incorporating CSS.

*What is the CSS Process?*

The Tennessee Department of Transportation (TDOT) uses Context Sensitive Solutions (CSS) as a process to plan, design, construct, maintain and operate its transportation system in order to establish and achieve transportation, community, and environmental goals. Context Sensitive Solutions balances safety and mobility and the preservation of scenic, aesthetic, historic, environmental and other community values. CSS is a philosophy of doing business that impacts both the project development process and project outcomes.

***Tennessee Project: SR 73/US 321 Gateway Project***

The purpose of this project was to retrofit a five-lane section of roadway with extensive retaining walls into a context sensitive "gateway" approach into Gatlinburg, Tennessee. This retrofit was in response to a public discontent for a reconstruction project that did not blend into the natural setting of area near a national park.

**Project Team**

The project team was led by representatives of the Tennessee DOT, with support services provided by consultants to provide facilitation with the citizens' resource team and to develop context sensitive solutions for the project after consensus was reached between the DOT and the resource team. Landscape architects developed numerous renderings of the proposed project revisions as part of the public meeting presentation. A muralist painted example concrete panels to demonstrate the view expected for the retaining walls after project completion.

**Stakeholders**

A 15-member multi-disciplinary citizen's Community Based Resource Team was established to provide guidance to TDOT and design specialists to insure a parkway theme that blended into the scenic surroundings, and not compete with the natural environment. The team operated through a consensus process and the consultant facilitation did an excellent job of managing the process and developing a "team spirit" throughout. The team collected information for their own decision-making through design and landscape experts, provided by TDOT and the consultant. The team also held meetings to inform and gather information from the public to assist them in the design concept.

**Public involvement**

Eight team meetings were held by the Tennessee DOT in conjunction with the Community Based Resource Team, with the assistance of design specialists. In addition, a public workshop was held to present the resource team findings and preliminary recommendations to the public.

**Design solution (process, modes and alternatives examined)**

Flexibility in the design process resulted in transportation needs being addressed with the recommended modifications without any design exceptions. Safety was not compromised with the new design, and was expected to be enhanced with the adoption of the median boulevard concept with turn lanes at major intersections. Some limited number of right-of-way tracts have only right in, right out access, but the impacts to these parcels was not significant.

#### **CSS concepts**

The project was initiated to retrofit a five-lane roadway section, with extensive retaining walls deemed to be inconsistent with the context of the project area. Final recommendations included integration of themed signage, strategic placement and use of native plant species, and creative treatment of the retaining wall and parapet wall surfaces. To create a parkway experience, the addition of a landscaped median coupled with reduced lane widths and a reduced speed limit. Naturalized plantings of native grasses and shrubs in the median and along the walls provided a framework for a contextual solution.

#### **Overall level of success**

Flexibility in the design process resulted in transportation needs (increased safety and capacity, etc.) being addressed with the recommended modifications without any design exceptions. All parties to the CSS process viewed the end result to be a very efficient use of time and resources. Use of the CSS process had the effect of reducing project development time and cost on adjacent and other future projects, resulting in a net savings in cost and time to the Tennessee Department of Transportation (TDOT). It was determined that although the CSS process was used to retrofit a project considered unacceptable by the community, the final product truly enhanced the reconstructed roadway entering into a national park area and was embraced by the community.

## **Utah**

#### **How long has the state used these approaches?**

**2000** - UDOT's CSS program initialized as one of five pilot states nationwide.

**2002** - Internal organizational changes made to begin UDOT's CSS movement (including creating CSS director and region public involvement coordinator positions).

**2003** - UDOT's CSS program was fully established.

**2004** - Refined and finalized UDOT's definition of CSS to incorporate into the overall strategic direction.

**Present** - UDOT is incorporating our CSS philosophy statewide from Planning through Maintenance. 1,000 UDOT employees have had formal training in CSS philosophy.

#### **How many projects have they used the approach on?**

In Utah CSS was developed as a philosophy for all programs. It has been fully integrated into all processes and is no longer regarded as CSS.

*UDOT's CSS Philosophy*

"Context Sensitive Solutions (CSS) is a philosophy that guides UDOT wherein safe transportation solutions are planned, designed, constructed, and maintained in harmony with the community and the environment."

CSS addresses the need, purpose, safety and service of a transportation project, as well as the protection of scenic, aesthetic, historic, environmental and other community values. CSS is an approach to transportation solutions that find, recognize and incorporate issues/factors that are part of the larger context such as the physical, social, economic, political and cultural impacts.

"Context Sensitive Solutions is more than an initiative; it is a fundamental change in the way we do business. As each of us come to understand the elements of CSS, it will be woven into the way we do our work and become an integral part of the UDOT culture," said John Njord, UDOT Executive Director.

*What CSS is Not*

- A separate set of processes or standards
- Aesthetic add-ons
- Cookie cutter solutions
- An open checkbook to gold plate a project

*UDOT's Strategic Direction*

UDOT applies our CSS philosophy to projects to help reach the department's four strategic goals:

1. Take care of what we have
2. Make the system work better
3. Improve safety
4. Increase capacity

These goals are achieved through strong interdisciplinary/interagency collaboration and proactive stakeholder involvement discussions throughout the planning, design, construction, and maintenance project phases.

*CSS Outcomes*

- Connects communities
- Improves quality of life
- Understands values, perspectives and context
- Provides the right solution for the problem
- Allows for community-based decision making
- Creates balance between transportation, community and environmental contexts

**What is the process?**

*CSS Principles and Guidelines:*

*The intent of CSS is to offer transportation solutions that help connect communities and improve quality of life. The challenge for UDOT staff, its consultants, and contractors is to understand the larger context and seek solutions that will find a balance between the three guiding CSS principles.*

The guiding UDOT CSS principles are:

- A. Address the transportation need
- B. Be an asset to the community
- C. Be compatible with the natural and built environment

*A. Address the Transportation Need*

The objective of this principle is to seek a solution that is:

- Safe for users
- Technically credible
- Financially feasible
- Able to implement

Achievement criteria for this objective will vary, however some examples could be:

- The practice of common sense and the flexible application of design standards
- Exercising a level of effort appropriate to the scale, complexity, and breadth of project issues
- Fiscally responsible use of resources

*B. Be an Asset to the Community*

The objective of this principle is to seek a solution that:

- Upholds the values of the community
- Helps improve the quality of life in the community
- Connects communities

Achievement criteria for this objective would involve:

- Early, continuous, proactive community involvement
- Inclusion of all stakeholders (even the "silent" ones)
- Community-based decision making
- Sensitivity to environmental justice issues
- Compatibility with the community's social and livability values

*C. Be Compatible with the Natural and Built Environment*

The objective of this principle is to seek a solution that:

- Is based on an understanding of the consequences to natural, human-made and social environments

- Protects and enhances environmental conditions, aesthetics, and quality of life

Achievement criteria for this objective could include:

- Environmental stewardship - being accountable for the natural and built environment
- Minimum intrusion (e.g., space, noise, compatibility with other modes)
- Aesthetically appropriate
- Minimal "taking" of other natural resources

#### **Why did the state initiate the process?**

Utah developed CSS as a means of broadening the design perspective. It was believed that other aspects were needed to be considered while making design decisions, and based on the findings of a focus group the principles and practices of CSS were developed.

#### ***Utah Project: 12300 South Design Build***

##### *Issue*

The Utah State Legislature challenged UDOT to construct a project that would stimulate the Utah economy. Several projects were reviewed but the 12300 South Project had the best potential to provide economic stimulus, benefit the citizens and traveling public, and involve the community throughout the design and construction. UDOT chose to deliver the 12300 South Project using the Design-Build delivery system with the spirit of Context Sensitive Solutions from the beginning.

##### *Solution*

UDOT set the tone for the project team that fostered teamwork, attention to detail, and a commitment to take every opportunity to meet the needs of the community. The 12300 South Design Build project addressed the following transportation needs of the community:

- The urban arterial was at or near capacity in most areas. The reconstruction provided two additional lanes in each direction relieving congestion considerably and adding appropriate access control for safety and efficiency.
- The I-15/12300 South Interchange (simple diamond) was severely congested with ramps backing up onto mainline I-15 traffic. The interchange was redesigned to a modern urban Single-point Urban Interchange (SPUI).
- The UP Railroad crossed at-grade causing serious delay and safety issues at the I-15/12300 South Interchange. Traffic would back up through the freeway interchange any time a freight train crossed. UDOT worked out a Context Sensitive solution with UP that carried the railroad over 12300 South.
- A pedestrian overpass was constructed to provide safer pedestrian travel for children at the elementary school at 12300 South and 2700 West. Artwork from the local school was incorporated into the bridge abutments and railing.

*Results*

The involvement of the community was instrumental in incorporating all landscape and aesthetic treatments that highlighted the natural, historical, and present characteristics of Draper and Riverton Cities.

The project cost was approximately \$115 million and was constructed from 2002-2004, 3 years ahead of the original schedule. The user cost savings estimate was approximately \$10 million. Since the completion of the project, the communities have been able to benefit from new commercial development.

**California**

For California's Department of Transportation (Caltrans), context sensitive solutions has become the agency's way of doing business, incorporating smart growth concepts into the agency's mission. Beginning with leadership from top state transportation officials, Caltrans is "changing the culture" through a collection of policies, directives, guidance documents, funding mechanisms, and training programs, all representing an agency-wide commitment to context-sensitive solutions. All of these efforts are initiating a host of impressive transportation planning and design features seen in communities across the state. California's CSS initiative fosters early and continuous collaboration with stakeholders, balances transportation needs and community values, and promotes interconnected, multi-modal transportation systems. Some of the many tools Caltrans is using to "change the culture" include the following:

- The state policy on context-sensitive solutions, which establishes CSS as an official agency policy and outlines roles and responsibilities of top Caltrans officials in its implementation;
- The CSS Implementation Plan, which lists specific tasks and objectives and how they will be achieved;
- Directives on Accommodating Non-Motorized Travel and on Project Purpose and Need;
- Main Streets: Flexibility in Design and Operations, which provides guidelines that may be considered in developing "livable" communities within existing design standards;
- A statewide transit-oriented development study;
- Special funding for CSS activities; and
- Numerous initiatives to promote public participation and community involvement.

The Highway Design Manual philosophy mirrors the concepts of Context Sensitive Solutions. This philosophy for the project development process seeks to provide a degree of mobility to users of the transportation system that is in balance with other values. Caltrans policies, practices, or mandatory design standards provides a guide for highway designers to exercise sound judgment in applying the policies, practices, or standards consistent with this philosophy. This flexibility is the foundation of highway

design and highway designers must strive to provide for the needs of all highway users in balance with the needs of the local community and the context of the project. Caltrans policies, practices or mandatory design standards allows sufficient flexibility in order to encourage independent designs that fit the needs of each situation.

#### *Intended Results*

In towns and cities across California, the State highway may be the only through street or may function as a local street. These communities desire that their main street be an economic, social, and cultural asset as well as provide for the safe and efficient movement of people and goods. In urban areas, communities want transportation projects to provide opportunities for enhanced non-motorized travel and visual quality. In natural areas, projects can fit aesthetically into the surroundings by including contour grading, aesthetic bridge railings, and special architectural and structural elements. Addressing these needs will assure that transportation solutions meet more than transportation objectives.

Caltrans is proud of the many contributions it has made to improve highways that are main streets and the aesthetics of its highways and structures; however, there is a strongly expressed desire across California for this concept to be the norm. Context sensitive solutions meet transportation goals in harmony with community goals and natural environments. They require careful, imaginative, and early planning, and continuous community involvement. The Department's *Highway Design Manual*, Federal Highway Administration (FHWA) regulations, FHWA's *Flexibility in Highway Design* publication, and the American Association of State Highway and Transportation Officials' *A Policy on Geometric Design of Highways and Streets* all share a philosophy that explicitly allows flexibility in applying design standards and approving exceptions to design standards where validated by applying sound engineering judgment. This design philosophy seeks transportation solutions that improve mobility and safety while complementing and enhancing community values and objectives.

#### ***California Project: Big Bear Bridge***

##### **Project Overview**

This project originated as a replacement for the 1923 road topping the Big Bear Lake dam. The engineering quickly became overshadowed by issues of visual impacts, an adjacent historic site, and community identity. Visual Impact Analysis with simulations and programmed public outreach developed a solution of the single arch bridge located just below the dam. The single arch and unique staging of construction will leave the canyon nearly untouched. Retaining walls will recreate the original scenic rocks lost by the new alignment. Other bridge walls are treated with similar rock-work to meld into the surrounding forest. The bridges integral color is specific to this canyon. The bridge also addresses community values. The sidewalk includes a wide belvedere for pedestrians to stop, linger and admire the mid-span views. The railing is designed to ensure views of the dam face and the canyon for crossing motorists. This railing also includes concealed lighting as an additional amenity for pedestrians. Construction is phased in windows coordinated with nesting and other habitat issues. The undercarriage of the

bridge includes detailing which specifically provides bat habitat. Hours of construction and necessary road closures have been tailored to the residents specific commute patterns.

**CSS Qualities: Process**

This project required numerous public information meetings, along with Caltrans Civil Engineering, Environmental, and Public Information, Landscape Architecture was a integral part of seeing that stakeholder issues were addressed and resolved within the constructed project. The bridge's construction will interrupt commutes to major employment areas for three years.

Through public outreach, Traffic learned that local commuters were more concerned with arriving at work on time, than getting home on time. Construction and road closures have been shifted to later than usual times to minimize the 'to-work' commute. Restoration of construction footprint was determined by collaborative effort between the San Bernardino National Forest Service and Caltrans Environmental and Landscape departments. Construction also includes paving an adjacent informal vista point. This paving, plus barrier elements that mimic historic railing on the mountain road, will encourage pedestrian activity.

**CSS Qualities: Outcome**

This project provides traveling public with improved road alignment, and improved bicycle and pedestrian access. Communities' values have been included in maintained recreational access (parking) and preservation of historic features (dam-keeper's house). Visual elements of community identity (scenic rock formations) are preserved, or, where lost to new construction, have been recreated. Big Bear communities see this as being 'their' bridge, and support their belief that Big Bear is a beautiful place to live and visit. Careful interfacing with the community has minimized construction inconveniences. Officials/planners of the San Bernardino National Forest see this bridge as a well crafted response to a rich native habitat.

**Missouri**

Missouri's "Practical Design" process challenges traditional standards to develop efficient solutions to solve transportation project needs. MoDOT's goal of Practical Design is to build "good" projects, not "great" projects, to achieve a great system. Innovation and creativity are necessary to accomplish Practical Design. For that reason, a Practical Design manual was prepared to effectively begin implementing Practical Design. It is purposely written to allow flexibility for project specific locations.

Practical Design starts with properly defining the scope by focusing on achieving the project purpose and need while considering the surroundings of each project. Designers must be sensitive to where the project is located, whether it is an interstate or a letter route. The surrounding context helps determine the design criteria. The goal is to get

the best value for the least cost. Life cycle costs must be considered – the goal is not to shift the burden to maintenance.

Early in 2005, MoDOT began implementing Practical Design. The first step was developing best practices. These examples were intended to encourage the staff to “think outside the box” as they designed future improvement projects to provide the best value for the taxpayers.

The next step in implementing Practical Design is adopting new policies in areas most affecting their improvement costs. These areas are known as “cost drivers”. Reducing costs in these key areas, while still serving motorists’ needs, will enable MoDOT to construct more projects, thus better serving the taxpayer. MoDOT senior managers developed these new policies in October 2005. They represent a significant change in MoDOT direction. Each policy supersedes the current direction contained in the Project Development Manual (PDM). However, information contained in the PDM not affected by these policies will continue to be used in the development of improvement projects.

These policies will form the foundation of a new guidance document that will go into effect in the near future. This guidance document will describe engineering policies throughout MoDOT. It will be the “one-stop shop” for design, right of way, bridge, construction, traffic, and maintenance activities. It will represent completion of the next step in the Practical Design effort.

These new policies will guide the project decisions that all must make – building the most efficient solution to the transportation need identified in order to spread money to more projects across the state. MoDOT is following three ground rules:

- Safety will not be compromised. Every project will make the facility safer after its completion.
- MoDOT will collaborate on the solution.
- The design speed will equal the posted speed. For example, MoDOT will not design a road for 70 mph when it will be posted 60 mph.

It will take time to fully change design processes, but in the end, the Practical Design method, practiced by all areas of MoDOT, will allow delivery safer roadways, of great value, in a faster manner.

**Questions for Ms. Luisa M. Paiewonsky  
Administrator  
Highway Division  
Massachusetts Department of Transportation  
Highways and Transit Subcommittee Hearing  
June 10, 2010**

Questions from Chairman DeFazio

1. Critics of Context Sensitive Solutions (CSS) have historically raised concerns that the use of CSS may leave States more open to liability lawsuits and that CSS projects are more likely to need design exceptions, making them less safe. According to the CSS Clearinghouse website, no study has shown CSS to lead to more design exceptions. In Mr. Gee's written testimony he stated that FHWA believes CSS can reduce the risk of delays from litigation, and you stated that research has found liability concerns to be "unfounded" and that a CSS consensus-building approach actually results in less litigation.
  - What impact – if any – does the use of CSS have on a designer's susceptibility to liability challenges?
  - Does using CSS lead to more design exceptions? Are design exceptions inherently less safe?
2. In her written testimony, Commissioner Peterson stated that over-designed Federal projects that make a facility "bigger, wider and straighter" compel more drivers to use the Federal facility, which forces the Federal highway system to "almost always take the brunt of all trips – local regional and interstate." She believes this approach leads to continued congestion on the Federal system and a "lack of analysis about ways that lower cost improvements off the federal system might actually resolve many mobility and congestion problems in a way that would be more readily embraced by the community."
  - Does AASHTO share this concern that by over-designing Federal projects we are creating incentives for drivers to use the Federal system, thereby undermining the operations and performance of those facilities? Do you agree with Commissioner Peterson that there are times when lower-cost projects on the local and State road system might do more to relieve congestion?
3. Ms. Paiewonsky, in your written testimony you stated that "practical design can certainly be part of a context sensitive approach" and that community needs and values may also be part of a practical design solution. What states have adopted an approach that combines Context Sensitive Solutions and practical design? Would Kentucky's Practical Solutions model qualify?
4. Ms. Paiewonsky, from the way you describe context sensitive solutions (CSS) and practical design, they sound common sense: design projects that fit within their settings, and design them cost-effectively without sacrificing on safety. Your testimony described how an increasing number of States have started using CSS and practical design processes. Why hasn't every State started doing so? Are there impediments to States using these processes?

5. You mentioned in your written testimony that later this year AASHTO will publish an updated 2010 edition of its "Green Book" on highway design, and that this updated edition will include an expanded discussion of context-sensitive design. Will the 2010 Green Book mainstream this concept even more? If so, how?

**Answers to Questions Submitted by Chairman Peter DeFazio to  
Ms. Luisa M. Paiewonsky, Administrator, Highway Division, Massachusetts  
Department of Transportation**

**Subcommittee on Highways and Transit  
Committee on Transportation and Infrastructure  
U.S. House of Representatives**

**June 10, 2010**

**Question # 1.** Critics of Context Sensitive Solutions (CSS) have historically raised concerns that the use of CSS may leave States more open to liability lawsuits and that CSS projects are more likely to need design exceptions, making them less safe. According to the CSS Clearinghouse website, no study has shown CSS to lead to more design exceptions. In Mr. Gee's written testimony he stated that FHWA believes CSS can reduce the risk of delays from litigation, and you stated that research has found liability concerns to be "unfounded" and that a CSS consensus-building approach actually results in less litigation.

- What impact – if any – does the use of CSS have on a designer's susceptibility to liability challenges?
- Does using CSS lead to more design exceptions? Are design exceptions inherently less safe?

**Answer #1.**

A highway designer's susceptibility to liability, whether using a traditional design approach or a CSS approach, is reduced when engineering judgment is used and decisions are well documented. Liability concerns as they relate to highway design are addressed in the AASHTO publication, *Guide for Achieving Flexibility in Highway Design*. CSS does not necessarily lead to more design exceptions than a traditional design approach, but it may. The current AASHTO *Policy on Geometric Design of Highways and Streets*, more commonly known as the AASHTO Green Book, provides a great deal of flexibility to designers within the street and highway design process; thus, many "context sensitive" aspects of a project's design can be accommodated within a DOT's standard processes by more carefully considering a wider range of needs and desires that the project could or should address.

Engineering judgment needs to be exercised throughout the design process, regardless of whether or not a particular design manual is followed, and whether or not design exceptions are involved. There are numerous possible combinations of factors and features within a given project – such as horizontal alignment, vertical alignment, width of roadway, width of shoulder, design speed, clear area along the roadside, radius of curves, superelevation (i.e., the banking of the curves), sight distance, and anticipated traffic volumes – which make highway design a very complex process. Sometimes when these factors are combined into a single project to fit within a given landscape, one or more design features falls outside the traditional range of values, and this is what is called a "design exception." When these design exceptions are carefully evaluated by a professional engineer for safety and for their interaction with the other features and factors on a project, they can be used with a sufficient level of comfort.

**Question #2.** In her written testimony, Commissioner Peterson stated that over-designed Federal projects that make a facility “bigger, wider and straighter” compel more drivers to use the Federal facility, which forces the Federal highway system to “almost always take the brunt of all trips – local regional and interstate.” She believes this approach leads to continued congestion on the Federal system and a “lack of analysis about ways that lower cost improvements off the federal system might actually resolve many mobility and congestion problems in a way that would be more readily embraced by the community.”

- Does AASHTO share this concern that by over-designing Federal projects we are creating incentives for drivers to use the Federal system, thereby undermining the operations and performance of those facilities? Do you agree with Commissioner Peterson that there are times when lower-cost projects on the local and State road system might do more to relieve congestion?

**Answer #2.**

AASHTO does not agree with the premise in the question. The Federal-aid highway system is not comprised of a single type of road, and in fact can range from urban Interstates to lower volume collectors. The system has been an extremely successful tool in the development and economic advancement of the United States. For example, the Interstate highway system, which makes up 1% of the highway miles in the US, carries approximately 24% of the traffic, along with the next-level National Highway System (NHS), which includes the Interstate System, and carries 40% of the nation’s travel and 70% of the nation’s combination-truck travel on only 4% of the roads. The NHS makes up the backbone of our country’s long-distance transportation system. Increased funding is needed to ensure that this system is maintained and expanded to ensure the continued development of our country—our future economic growth depends upon it.

In addition to the federal-aid system (the NHS), there are federal-aid eligible routes – approximately 800,000 miles of roadways that are eligible for surface transportation program funds and also bridge funds. Additionally, there are 4 million miles of public roads that are eligible for federal safety funds. These other arterial highways, collector roads, and local streets also need funding to ensure that they provide the transportation function needed within our rural and metropolitan areas. In certain situations within highly-urbanized areas, improved connections within a city’s street grid system, or improvements to particular suburban-to-urban arterial routes, for example, can provide much-needed congestion relief within those urban areas – particularly for traffic that has destinations within that urban area. However, for longer distance travelers, such as truckers on cross-state or interstate travel, improvements to and expansions of the Interstate System and the NHS are key to relieving congestion.

Finally, roadways on the federal-aid system are not necessarily designed to be “bigger, faster, and straighter.” The design is carefully tailored to individual project needs and surrounding features, such as historic and natural resources, the presence of residential or business-related buildings along the roadway, and community preferences. Most state DOTs are well past the notion that delivering a motor vehicle to its destination as quickly as possible is the sole purpose of a road.

**Question #3.** Ms. Paiewonsky, in your written testimony you stated that “practical design can certainly be part of a context sensitive approach” and that community needs and values may also be part of a practical design solution. What states have adopted an approach that combines Context Sensitive Solutions and practical design? Would Kentucky’s Practical Solutions model qualify?

**Answer #3.**

There are many versions and variations on the theme of CSS and “practical design” used by state and local DOTs across the country, as well as many methods for achieving community-based design solutions that stretch our limited transportation dollars. “Practical Design,” as used by Missouri DOT and others, focuses on the very real issue of funding shortfalls by spreading the funding (and the transportation solutions) around to the greatest number of potential projects to achieve good, solid solutions to transportation needs. The primary goal of practical design has been to save money – without sacrificing safety – on individual projects in order to spread transportation improvements around to more communities. These projects are selected in a collaborative process through the Transportation Improvement Program (TIP) process by the local communities, regional planning agencies, and state DOTs. The primary focus of the CSS approach is to consider and incorporate community desires and features into transportation solutions while staying within a reasonable budget. With both of these approaches, trade-offs are made both within projects (weighing factors such as safety, mobility, and community desires) as well as between projects (weighing the costs to build a few “maximized” projects or a greater number of “basic” projects). Community input is essential in both processes.

It appears that Kentucky’s Practical Solutions model shares many common aspects with Missouri’s Practical Design concept, in that its primary goal is aimed at reducing costs throughout the project development process while still delivering needed transportation projects to communities across the state. Kentucky’s model also utilizes flexibility in the design of a transportation project by looking at a wide range of possible solutions that deliver varying levels of improvement.

**Question #4.** Ms. Paiewonsky, from the way you describe context sensitive solutions (CSS) and practical design, they sound like common sense: design projects that fit within their settings, and design them cost-effectively without sacrificing on safety. Your testimony described how an increasing number of States have started using CSS and practical design processes. Why hasn’t every State started doing so? Are there impediments to States using these processes?

**Answer #4.**

Just as there is no single design “recipe” that is appropriate for all roadways, there is also no single CSS approach that fits every state DOT. CSS takes time and money to implement, and change in large organizations such as State DOTs takes both leadership and a funding commitment to educate the staff and to make the change happen. During the Interstate Era, with strict standards and requirements for highway design and construction, an assembly-line or “cookbook” approach was ingrained in engineers to ensure the design and construction of safe and effective projects quickly and economically. However, with the assembly line eventually came legitimate concerns that some local voices and considerations were not being heard or addressed. The CSS process can address the varying needs and desires of local communities, but it takes a good deal of up-front time, resources, and training to develop an effective CSS program. An advantage of CSS is that it can ultimately reduce the number of slow-downs and legal battles that can result when public buy-in is not achieved early in project development.

Many DOTs are working to obtain the knowledge and worker skill-sets to conduct project development under this new framework, and several, such as Massachusetts and Maryland, have adopted CSS to help get projects with heavy community opposition re-started using this collaborative decision-making process – then, following its successful application, began to incorporate CSS on a statewide basis. In other states, typically the more rural states, the traditional methods of developing and designing highway projects may be more publicly acceptable where more basic highway projects are viewed as necessary to promote economic development. Thus, in many ways, public needs and desires in the various states across the country drive the approaches the DOTs take to developing their transportation projects. FHWA and AASHTO continue to provide information and education on CSS and practical design, through such sites as the CSS section of AASHTO's Center for Environmental Excellence web site: [http://environment.transportation.org/environmental\\_issues/context\\_sens\\_sol/](http://environment.transportation.org/environmental_issues/context_sens_sol/); FHWA's National Dialog on CSS: <http://www.cssnationaldialog.org/index.asp>; and Context Sensitive Solutions.org: <http://www.contextsensitivesolutions.org/>. The state DOTs then determine what approaches are most appropriate for their projects.

**Question #5.** You mentioned in your written testimony that later this year AASHTO will publish an updated 2010 edition of its “Green Book” on highway design, and that this updated edition will include an expanded discussion of context-sensitive design. Will the 2010 Green Book mainstream this concept even more? If so, how?

**Answer #5.**

The AASHTO Policy on Geometric Design of Highways and Streets, more commonly known as the AASHTO Green Book, has always been very flexible in its approach to road and highway design, providing ranges of values for the various design elements that must be considered within a highway project, such as horizontal alignment, vertical alignment, roadway width, shoulder width, design speed, curve radii, superelevation, etc. Additional discussions of flexibility and community-based approaches to design are being incorporated into the 2010 edition of the Green Book. In addition, companion AASHTO publications – including the Guide for Achieving Flexibility in Highway Design and the Guide for Design of Very Low Volume Local Roads – have introduced additional concepts and flexibilities for consideration by highway designers and engineers.

Thus, CSS is not restricted by current AASHTO or federal design guidelines. The need is to educate users of the Green Book and other design manuals so they are more aware of the flexibility already inherent within these design manuals. This need was the focus of a recent AASHTO webinar geared toward highway designers entitled Understanding Flexibility in the AASHTO Green Book: A Webinar on Geometric Design, which is still posted online at: [http://environment.transportation.org/center/products\\_programs/understanding\\_flexibility\\_green\\_book.aspx](http://environment.transportation.org/center/products_programs/understanding_flexibility_green_book.aspx). This webinar provides transportation planners and designers with the tools to understand the underlying research and principles behind the AASHTO Green Book, the inherent flexibility within the design criteria, what is meant by “flexibility in design,” and why flexibility is important. Training, technical assistance, and peer exchanges, will be far more effective than mandates in ensuring long lasting organizational change. Education is also the focus of the web sites mentioned in the response to Question 4 above.

*Adopting  
Practical Design Solutions, Incentives and Education  
to  
Reduce Projects Costs and Negative Community Impacts  
of  
Surface Transportation Projects*

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**Testimony of Lynn Peterson  
Chair, Board of County Commissioners  
Clackamas County, Oregon**

**Presented to the  
House Committee on Transportation and Infrastructure  
Subcommittee on Highways and Transit**

**June 10, 2010  
hearing on**

*Using Practical Design and Context-Sensitive Solutions in  
Developing Surface Transportation Projects*

Good morning Mr. Chairman and Members of the Committee. My name is Lynn Peterson. I am the Chair of Clackamas County Board of County Commissioners. Clackamas County is a large suburban/rural county and is one of three counties making up the greater Portland, Oregon metropolitan area. I am honored to be here and thank you for the invitation.

I come to you today as both an elected official and former practicing civil engineer. I have worked for the Wisconsin DOT as a highway design and construction engineer and a traffic engineer in both the public and private sectors. I have also worked for the Portland MPO as a travel demand forecaster and as the strategic planning manager for the Portland transit agency.

Originally, I went into engineering because I wanted to solve problems and design and build projects that made sense in the communities in which they were to be built. I did not go into engineering to “plug and chug” numbers into design worksheets. Yet, to my surprise, in the name of safety and liability protection, I was taught to be conservative in estimation and design. I soon discovered that engineers are told that it is better to over engineer a project than to be placed in a position where the agency could be liable for a potential accident. The threat of liability is beaten into you starting day one in civil engineering school. *The cost of a project is never considered as part of the equation. And, the cost to the community is never discussed as a cost, but seen as an inevitable impact.*

Obviously, while safety can never be compromised, unfortunately, we have passed from generation of engineer to generation of engineer an overbuilding mentality that “more is better and safer”. We have done this without a solid foundation of research upon which to base this conclusion. Fortunately, research on traffic safety is growing and showing that smaller projects are not less safe. In the meantime, it is becoming painfully clear that we can no longer afford to over design or build projects with little consideration of the project’s cost or its impact on the community.

Congress can do two things to make significant improvements in project delivery and reduce project costs.

First, Congress needs to do more than “encourage” flexible project design. With all due respect, unless directed to do so, FHWA’s encouragement to adopt practical design guidelines will have little impact on project design or delivery. Changing the culture of how public works projects are developed and designed in this country will require clear policy direction from Congress, not encouragement from FHWA.

Second, the process for public decision making – particularly around a project’s purpose and needs statement, needs to be rethought.

## PROBLEM STATEMENT

Since the passage of ISTEA in 1991 and three subsequent national transportation bills, our nation has had time to review the successes, which are many, and document where the system for project delivery could be improved. Good policies have resulted in increased modal use in our metropolitan areas as they have flexed transportation dollars among modes and mitigated some environmental impacts.

While we have introduced many exceptional national policies, many road projects from throughout the U.S. still have difficulty making it successfully through the transportation planning process because the design of the facility is either too costly or generates too many negative community or environmental impacts.

Urban mobility and congestion is the number one transportation problem facing many of our Nation's urbanized areas. One of the most important factors to be considered when addressing urban mobility and congestion is the *design* of the transportation system off the interstate facility. All too often the supporting urban or suburban network to our interstates is either overlooked, or in the name of congestion relief, attempts are made to "upgrade" non-interstate corridors to interstate-type standards.

Today, if a non-interstate project is designed within the constraints of most state design and mobility standards - it is likely that project engineers will not be able to consider system-wide roadway solutions because the project definition is usually limited to one corridor. While the public may want to consider system-wide solutions, consideration of the public is often left to the end – after the project purpose and need has been defined. Some states are coming to the conclusion that including the public up-front, actually saves time, reduces project costs, and leads to project designs that better fit the community.

Unfortunately, with the exception of a small number of states attempting to adopt Practical Design Solutions -- states that include Missouri (MODOT) and Pennsylvania (PENNDOT), in the name of congestion relief and driver safety, project engineers typically over-design and over-build projects far beyond what the local community may be able to afford or what they might need or want.

Over designing projects has been shown time and again to actually encourage faster speeds and less safe driving. By making a project bigger, wider and straighter, more drivers are typically drawn to the facility and they are encouraged to speed up. And, by focusing on one corridor as opposed to a system-wide approach to solving congestion problems, the federal highway system almost always takes the brunt of *all* trips – local, regional and interstate. This approach tends to lead to continued congestion on the federal system and a lack of analysis about ways that lower cost improvements off the federal system might actually resolve many mobility and congestion problems in a way that would be more readily embraced by the community and thus, could be accomplished in a shorter time frame – further lowering project costs.

A transformational change in the way project investment decisions are made, and roadway projects are designed is needed if future roadway projects are “*right-sized*” to a community’s needs, reflect a system-wide approach to transportation investments that actually takes into account investments across all transportation modes, and is built to enhance mobility across a region as opposed to relying on a single corridor to try and solve an entire region’s congestion problems.

Such transformational change cannot happen until roadway designs are governed by “*Practical Design Solutions*” that are interpreted to reflect system-wide realities and mobility goals, rather than highway “standards” that result in over-designed and over-built roadway corridors. Over-built corridors are expensive to build, increase the amount of right-of-way needed for the roadway, which in turn, increases potential negative environmental impacts, and tends to take years of effort to clear community opposition, further increasing project costs.

*What is Practical Design?*

Practical Design is a process that has been recently adopted and is being implemented in a hand full of states. At the local level, it has been practiced for a much longer period of time. Practical Design:

- Tries to do more with less money,
- Tailors solutions to the project purpose and needs,
- Considers, but is not focus on long term needs,
- Provides flexibility on design solutions, and
- Leads to “good” projects that are actually completed, rather than “great” projects that are designed and never built.
- Practical Design is suitable for state highways, arterials, collectors and local streets. The only place of overlap with the Interstate System is where a non-interstate roadway intersects with the interstate.

Practical Design is NOT:

- “Value Engineering” on Steroids. In order words, Practical Design is not designing a project to the maximum standards and then chopping it back to meet the budget;
- Does not neglect long term needs and considerations, but is not driven by them either;
- Does not discard fundamental operations, design and safety principles just to be “practical.”

As an elected official I need to move goods and people as efficiently and as cost effectively as possible. I need to balance community values, limited financial resources and safety, while being squeezed by constituents impatient with a process that often requires going through EIS’s multiple times in order to get a project right – only to find out in the end, that the project is no longer affordable.

Better defining projects upfront, and then creatively engineering them saves money in both design and construction. We can and should expect more from our public investments in our transportation infrastructure.

#### **HOUSE TRANSPORTATION AND INFRASTRUCTURE COMMITTEE RESPONSE**

To address the reality that there isn't enough funding to keep overbuilding our surface transportation projects – and that overbuilt projects usually adversely affect community livability, the House Transportation and Infrastructure Committee included in its draft reauthorization bill, new language that requires states to consider “Practical Design Standards” when making project design decisions. I commend the Chairman and the Committee for including this language.

If fully adopted, the implementation of Practical Design Standards would truly be transformational in terms of project development and costs, and result in projects that are both less costly to construct and have fewer negative impacts on community livability.

The draft Surface Transportation Assistance Act (STAA) now pending in the House Transportation and Infrastructure Committee amends title 23 to clarify that Practical Design Standards shall be “taken into account” in the design for new construction, reconstruction, resurfacing (except for maintenance resurfacing), restoration or rehabilitation of any federal aid highway. Requiring that Practical Design be “taken into account” in the design of surface transportation projects is an important step in the right direction, but the language does not yet go far enough to *ensure* that Practical Design solutions - sometimes previously referred to as Context Sensitive Solutions (CSS)<sup>1</sup> - are actually institutionalized within project decision making.

While the STAA includes references to Practical Design and calls upon states to take into account Practical Design solutions when making project design decisions, the language is not yet expansive enough to fully explain the Practical Design concept. Language should be added both in bill and in report language clarifying that references to Practical Design included in the STAA are intended to describe a collaborative, interdisciplinary approach to transportation facility design that involves all stakeholders affected by that transportation facility. The collaborative process is intended to insure that the facility fits the physical setting, strives to adopt least-cost flexible design solutions that minimize right of way requirements necessary for the scope of the project, considers the proposed project within the context of a community's overall transportation system, and preserves scenic aesthetic, historic, and environmental resources, while improving or maintaining safety, mobility and access to the transportation facility by all users.

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<sup>1</sup> For a brief history of how CSS developed, see “CSS Quick Fact – How CSS Developed” available through the FHWA Resource Center: [KLynn.Berry@fhwa.dot.gov](mailto:KLynn.Berry@fhwa.dot.gov)

*Flexible Engineering Design*

A core principle of Practical Design Solutions emphasizes flexible engineering design. AASHTO, in their policy document *A Guide to Achieving Flexibility in Highway Design* provides practical guidance on what the term flexibility means for highway design professionals. The AASHTO document emphasizes that highway design, like many technical professions, is rule-based in nature. Important assumptions and inputs to a design that occur early in project development can have a profound effect on the outcome, as they establish the framework around which design proceeds. The most significant of these inputs for highway engineers are design speed, design level of service and design vehicle. Integration of community values and environmental concerns with engineering means that these factors should influence the design choices. Project designers have choices. Design speed, design level of service and design vehicles are all choices, not mandates.<sup>2</sup>

Use of Practical Design Solutions at the beginning of the project development phase of any project should result in a shared stakeholder vision for the project that provides the basis for facility design decision making that:

- demonstrates a comprehensive understanding of place and contexts;
- fosters continuing communication and collaboration to achieve consensus;
- exercises flexibility and creativity to shape effective transportation solutions that might involve multiple modes and projects within a regional transportation system; and,
- is done in a manner that preserves and enhances the community and natural environment.

**ENCOURAGING THE ADOPTION OF PRACTICAL, LEAST-COST DESIGN SOLUTIONS**

While FHWA has in the past encouraged States to consider the Context Sensitive Solutions (CSS) methodology to encourage design solutions that are both responsive to community needs and mobility concerns, the use of CSS has seen limited implementation. Attempts have been made across the country to combine CSS with value engineering or least cost planning. But, in the end, the “right-sizing” of a project has remained difficult to do because variables that lead to a larger footprint such as higher design speeds, oversized outside lanes, the use of clear zones in urban areas, and the desire to “fix” a region’s congestion problems with one roadway, continue to be the driving forces behind most highway design decisions. Further, it is often easier to just keep doing things – and designing projects -- the way they have been done in the past – and then pointing to “AASHTO Design Standards” or the feds as the reason for not considering lower cost, smaller footprint design options.

Today, the advent of neo-traditional development or smart growth, has introduced more flexibility into local land use codes. Following this model, it is now time that

<sup>2</sup> “CSS Quick Fact – Project Development,” FHWA Resource Center, [KLynn.Berry@fhwa.dot.gov](mailto:KLynn.Berry@fhwa.dot.gov)

federal transportation policy creates a seamless transportation system that integrates flexibility in roadway design and mode choices and better serves the variety of contexts found in our communities.

The federal government can play a role in both rewriting existing federal requirements and by providing incentives to the states that encourage them to pursue innovative cost effective road types and design methods. As a trained civil engineer, I know that highway engineers are taught to employ standard design solutions. Integrating Practical Design Solutions in a DOT does not mean abandoning the tools and assets that have proven their value over the years. It does mean placing them in their proper context and understanding their reasons and value.

Creativity in highway engineering and design simply means not routinely applying the same solutions or approaches everywhere. There are many opportunities for creativity within the boundaries of the technical standards, policies and guidelines already in use. Creativity can also be fostered by re-directing attention of designers and decision-makers to thinking of *performance-based* solutions rather than physical or infrastructure descriptors.

Merely reframing how a problem is described can help achieve creative solutions. When traffic volumes increase and congestion occurs, highway engineers may describe the problem as “insufficient capacity” – a characterization that inevitably leads to solutions focused on adding lanes or their equivalent. If engineers and planners describe the problems as “person-trip demand exceeds the capacity of the facility during x hours of the day” the change in description can lead to additional solutions beyond increasing capacity. Solutions may include peak hour HOV or HOT lanes, signal synchronization or other IT strategies, congestion pricing, reduced design speed to shift and spread demand to other facilities or modes, parking management, and so forth.<sup>3</sup>

#### *Outcomes*

The outcomes associated with implementing Practical Design Solutions include the design of transportation facilities that are viewed as part of an overall transportation *system*, that are safe for all users, fit with the community, preserve the environmental, scenic, aesthetic, historic and natural resource values of an area, solve problems that are agreed upon by a full range of stakeholders, and facilitate the development of flexible least-cost design solutions that minimize public investments while enhancing mobility and access.

#### **Can Congress Do More?**

The House Transportation and Infrastructure Committee has taken an important first step in calling for the adoption of Practical Design Standards in project decision making and design. However, merely changing federal statute from “may” to “shall” won’t necessarily result in the full implementation of Practical Design Standards. Congress is also encouraged to adopt a variety of additional responses which will help to

<sup>3</sup> “CSS Quick Fact – Project Development,” FHWA Resource Center, [KLynn.Berry@fhwa.dot.gov](mailto:KLynn.Berry@fhwa.dot.gov)

advance the implementation of Practical Design Solutions. Recommended responses outlined briefly below include a combination of regulations, incentives and education/research initiatives all designed to institutionalize Practical Design Solutions and ensure their application in all future transportation project decision making.

#### **I. RECOMMENDED REGULATORY CHANGES**

**Goal: Ensure that Practical Design Solutions are part of the process for every capacity-added federal project. Regulatory steps should include:**

- **Requiring that Practical Design Standards** be used for every federally funded capacity-added project (any mode), right-of-way purchase, or major reconstruction project.
- **Requiring Performance Based Design/Performance Effectiveness** - The dimensions of roadway geometric design elements and operation of our roadway system is evolving from the “age old” application of design standards based on design speed to “performance based design”. Performance measures for facilities are moving away from criteria established for passenger car capacities to multi-modal performance measures that focus on the quality of moving “people and things” on a variety of roadway types intended to provide greater mobility and access to development. The design criteria for each roadway should be compatible with the function each roadway serves in the system and its desired performance related to all users. Performance of a facility must consider the quality of experience and service for all users and look beyond traditional measures focused solely on the passenger car.
- **Require project to meet AASHTO design and mobility guidelines, but increase design flexibility by:**
  - holding agencies harmless for not using state and local design standards;
  - overriding the use of state and local design standards from being used on federally aided projects if they limit design flexibility more than AASHTO policy and guidelines.

#### **II. RECOMMENDED INCENTIVES TO STATES**

**Goal: Authorize \$80 million to provide financial incentives to design and construct cost-effective demonstration projects that maximize DOT and FHWA flexibility and minimize costs and liability.**

- **Use \$20 million in incentive funding to support a Flexible Design Solutions Pilot Program** which would provide states with up to \$500,000 maximum per state in federal incentives (requiring a 50% state match) to encourage State DOTs to open their design standards to review from a multi-disciplinary stakeholder team with internal and external participants (modal experts, landscape architects, architects, planners, citizens, business owners, etc.). The intended outcome would

be to increase the number of states that adopt flexibility into their design and mobility guidelines by 75%.

- **Use \$40 million in incentive funding to support a “Systems Approach Demonstration Program” for New Facilities.** -- Funding level: \$40M, \$500,000 for planning and up to \$5M per project for construction. These incentive funds are intended to encourage projects that add capacity through a variety of modes that balance high mobility needs with community livability and financial constraints in metropolitan settings. The goal should be to “right-size” new capacity road projects. While \$5 million is not enough to fund most projects, \$5M is intended to construct a definable phase of a project.
- **Use \$20 million in incentive funding to support “Self-Enforcing Roadway Design Demonstration Program for Retrofitting Existing Facilities –** Funding level: \$20M, \$250,000 for planning and up to \$3M per project. These incentives funds are intended to encourage projects that focus on adding self-enforcing design elements into a roadway that has a design and posted speed of 35 mph or less. Funding is intended to be for a project phase(s) rather than an entire project. Project funding recipients would be required to complete an evaluation of the effectiveness of the self-enforcing design features. These projects would help inform states that are willing to transform previously rigid standards to flexible Practice Design Solutions. A proposed process would include but not be limited to the following elements of decision-making. Manage design speeds to match final posted (35-45 mph posted speeds) through project design by using features to encourage drivers to drive at or below the target speed.
- **On a sliding scale, provide Federal “Over-Match Incentives” to states that** *adopt* Practical Design Standards on federally aid projects. It has been shown that projects that are “right-sized” and designed to meet the livability targets outlined above, are more cost-effective to build ... which in turn saves federal funds typically used to provide the 80% share of most federal aid highway projects. Using these cost savings, USDOT should be authorized to provide over-match to right-sized projects. The rate of overmatch should depend on the level of commitment each state makes to applying their newly adopted guidelines to highway projects. For example, if a state adopted Practical Design Standards for all non-interstate roads, it would then receive the highest overmatch. If the Practical Design Standards apply only in MPOs or specific corridors in urban areas, the State would receive a decreasing level of federal overmatch.

### III. RECOMMENDED INCENTIVES FOR EDUCATIONAL AND RESEARCH CENTERS

**Goal: Authorize \$20 million in funding for educational training of state DOT and local agency staff how to productively use Practical Design Standards to achieve better project outcomes without incurring undue liability, and provide funding for research into the effectiveness of the Practical Design Standards.**

- Provide Centers for Transportation Research additional monies to create and teach courses that provide real-world decision-making, research and documentation skills to our next generation of transportation planners, engineers and attorneys.

**BACKGROUND INFORMATION  
CONTEXT SENSITIVE SOLUTIONS (CSS)**

**CSS DEFINITION, PRINCIPLES, QUALITIES, OUTCOMES** (From Results of Joint AASHTO/FHWA Context Sensitive Solutions Strategic Planning Process, March 2007.)

**CSS Definition.** Context sensitive solutions (CSS) is 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.

**CSS Principles.** These core CSS principles apply to transportation processes, outcomes, and decision making.

- Strive toward a shared stakeholder vision to provide a basis for decisions.
- Demonstrate a comprehensive understanding of contexts.
- Foster continuing communication and collaboration to achieve consensus.
- Exercise flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments.

**CSS Qualities.** Context sensitive solutions is guided by a process which:

- Establishes an interdisciplinary team early, including a full range of stakeholders, with skills based on the needs of the transportation activity.
- Seeks to understand the landscape, the community, valued resources, and the role of all appropriate modes of transportation in each unique context before developing engineering solutions.
- Communicates early and continuously with all stakeholders in an open, honest, and respectful manner, and tailors public involvement to the context and phase.
- Utilizes a clearly defined decision-making process.
- Tracks and honors commitments through the life cycle of projects.
- Involves a full range of stakeholders (including transportation officials) in all phases of a transportation program.
- Clearly defines the purpose and seeks consensus on the shared stakeholder vision and scope of projects and activities, while incorporating transportation, community, and environmental elements.
- Secures commitments to the process from local leaders.
- Tailors the transportation development process to the circumstances and uses a process that examines multiple alternatives, including all appropriate modes of transportation, and results in consensus.
- Encourages agency and stakeholder participants to jointly monitor how well the agreed-upon process is working, to improve it as needed, and when completed, to identify any lessons learned.

- Encourages mutually supportive and coordinated multimodal transportation and land-use decisions.
- Draws upon a full range of communication and visualization tools to better inform stakeholders, encourage dialogue, and increase credibility of the process.

**CSS Outcomes.** Context sensitive solutions leads to outcomes that:

- Are in harmony with the community and preserve the environmental, scenic, aesthetic, historic, and natural resource values of the area.
- Are safe for all users.
- Solve problems that are agreed upon by a full range of stakeholders
- Meet or exceed the expectations of both designers and stakeholders, thereby adding lasting value to the community, the environment, and the transportation system.
- Demonstrate effective and efficient use of resources (people, time, budget,) among all parties.

**LEGISLATIVE HISTORY:**

CSS has been recommended in the past and its foundations can be traced to the National Environmental Policy Act (NEPA) of 1969, then to ISTEA, TEA-21 and SAFETEA-LU.\*

In 1995, the Senate reauthorization bill included the language "shall" instead of "may" in terms of requiring states to adopt Context Sensitive Design (CSD) into common transportation agency practice and as part of normal state DOT procedures. Despite the fact that the "shall" language was a consensus position of AASHTO, FHWA, and the STPP coalition, "shall" language was changed to "may" during conference committee consideration of SAFETEA-LU.

**\* CSS ORIGINALLY INCLUDED IN THE SENATE VERSION OF SAFETEA-LU**

23 USC Sec. 109  
TITLE 23 - HIGHWAYS  
CHAPTER 1 - FEDERAL-AID HIGHWAYS  
Sec. 109. Standards

(c) Design Criteria for National Highway System. -

(1) In general. - A design for new construction, reconstruction, resurfacing (except for maintenance resurfacing), restoration, or rehabilitation of a highway on the National Highway System (other than a highway also on the Interstate System) [SHALL] *may* take into account, in addition to the criteria described in subsection (a) -

(A) the constructed and natural environment of the area;

(B) the environmental, scenic, aesthetic, historic, community, and preservation impacts of the activity; and

(C) access for other modes of transportation.

(2) Development of criteria. - The Secretary, in cooperation with State transportation departments, [SHALL] *may* develop criteria to implement paragraph (1). In developing criteria under this paragraph, the Secretary shall consider -

(A) the results of the committee process of the American Association of State Highway and Transportation Officials as used in adopting and publishing "A Policy on Geometric Design of Highways and Streets", including comments submitted by interested parties as part of such process;

(B) the publication entitled "Flexibility in Highway Design" of the Federal Highway Administration;

(C) "Eight Characteristics of Process to Yield Excellence and the Seven Qualities of Excellence in Transportation Design" developed by the conference held during 1998 entitled "Thinking Beyond the Pavement National Workshop on Integrating Highway Development with Communities and the Environment while Maintaining Safety and Performance"; and

(D) any other material that the Secretary determines to be appropriate.

**Questions for the Honorable Lynn Peterson  
Chair  
Clackamas County Board of County Commissioners  
Highways and Transit Subcommittee Hearing  
June 10, 2010**

Questions from Chairman DeFazio

1. Commissioner Peterson, in your written testimony, you stated that “Today, if a non-interstate project is designed within the constraints of most state design and mobility standards – it is likely that project engineers will not be able to consider system-wide roadway solutions because the project definition is usually limited to one corridor. While the public may want to consider system-wide solutions, consideration of the public is often left to the end – after the project purpose and need has been defined.” Please explain what you mean by “system-wide roadway solutions” and how such an approach could be implemented.
2. You seemed to say in your written testimony that many transportation designers currently try to solve an entire region’s traffic problems with one project. Is that an accurate assessment of your opinion? How does this approach undermine or limit the effectiveness of the surface transportation network? Can you please give examples of projects where this has occurred?
3. In your written testimony you recommended that Congress consider statutory or regulatory changes to require “performance-based design” or “performance effectiveness” in the design of transportation facilities. Could you please explain in more detail what you mean by that, and give us a few specific examples of how this might work for a highway project?
4. Commissioner Peterson, you stated in your written testimony that there are many opportunities for creativity and flexibility within current design standards, policies, and guidelines. If that’s the case, then why do states need incentives to be creative in their design process?
5. Commissioner Peterson, can you give a successful example of how Context Sensitive Solutions and practical design can reduce project costs?
6. What are the important design variables where designers and engineers need to have more flexibility to build cost-effective projects that the community accepts?
7. Commissioner Peterson, in your opinion what would it take to educate our civil engineering workforce and students to apply common sense engineering?

**Responses to Questions for the Honorable Lynn Peterson  
Chair  
Clackamas County Board of County Commissioners  
Highways and Transit Subcommittee Hearing  
June 10, 2010**

Questions from Chairman DeFazio

1. *Commissioner Peterson, in your written testimony, you stated that “Today, if a non-interstate project is designed within the constraints of most state design and mobility standards – it is likely that project engineers will not be able to consider system-wide roadway solutions because the project definition is usually limited to one corridor. While the public may want to consider system-wide solutions, consideration of the public is often left to the end – after the project purpose and need has been defined.” Please explain what you mean by “system-wide roadway solutions” and how such an approach could be implemented.*

It has been my experience as a civil engineer, a planner, and now as an elected official, that project definitions are often narrowly defined and possible solutions are usually confined to a single corridor. For instance, if “congestion” is the problem, solutions tend to focus on ways to address congestion on the congested roadway – perhaps by widening the roadway, signaling or metering entrance ramps, adding HOV lanes, etc., but primarily responses are all focused within the congested corridor. By considering “system-wide roadway solutions,” the problem of congestion would be considered in a manner that includes solutions that could include both transportation improvements to the existing congested corridor and also transportation improvements that are outside of the congested corridor. System wide solutions might direct some traffic to parallel roadways, and rather than focusing all of the federal funding on expanding the existing congested corridor from say a two lane to a four lane divided roadway, funding might also allow for improving adjacent roadways in a manner that makes them viable alternate routes. System-wide solutions might also consider development of multimodal transportation options that enable drivers to choose non-vehicle transportation options. By considering solutions within a broader definition of “the transportation system,” more creative – and often less expensive solutions can be considered.

Currently, consideration of “system-wide” roadway solutions is discouraged by federal law which largely restricts the use of federal transportation dollars within specific funding silos and specifically to federally aided highways. As a result, engineers and planners are often limited in their ability to consider comprehensive transportation solutions that might include improvements to both federal and non-federal roadways, and/or a combination of improvements that might include both roadway and non-roadway transportation improvements.

Concerning project definitions, it is my experience that all too often “the public” is consulted after various project options have already been defined – i.e. “which of these 3 corridor-specific solutions do you support – slight modification to the existing corridor, significant widening of the existing corridor, or no-action.” In this instance, while the public is consulted, it is provided with options that fail to consider system-wide solutions which might be multi-modal in nature, be implemented at less cost and with less negative impact on the community.

*2. You seemed to say in your written testimony that many transportation designers currently try to solve an entire region's traffic problems with one project. Is that an accurate assessment of your opinion? How does this approach undermine or limit the effectiveness of the surface transportation network? Can you please give examples of projects where this has occurred?*

Yes, in spite of the funding flexibility that has been introduced over the past decade, most highway engineers still try to solve regional transportation problems with large corridor-specific federal projects. Over-designing corridor-specific highway projects may address congestion in the short term, but in the longer term, bigger, wider and straighter highway projects actually attract more drivers to the facility which in turn, results in more congestion, necessitating yet another widening and expansion of the corridor. By focusing on one corridor as opposed to a system-wide approach to solving congestion problems, the federal highway system almost always takes the brunt of all trips – local, regional and interstate. Since the federal system is the system that gets the most investment, that's the system that attracts most drivers – at least until they are once again stuck in traffic and search for alternate parallel routes off the federal system. This approach tends to undermine or limit the effectiveness of the entire surface transportation network by leading to continued congestion on the federal system, disinvestment in non-federal highways that might be able to help solve the problem, and a lack of analysis about ways that lower-cost improvements off the federal system might actually resolve many mobility and congestion problems in a way that would be more readily embraced by the community and thus, could be accomplished in a shorter time frame – further lowering project costs.

A local example of this approach is the Columbia River Crossing Project – a proposed \$4 billion investment in a new I-5 bridge over the Columbia River between Portland, Oregon and Vancouver, Washington. Without a doubt, a new I-5 bridge is vitally needed and critically important to national freight mobility and reducing regional/local traffic congestion. But, after years of studies which have cost some \$100 million dollars, it has now become clear that trying to solve multiple local, regional and interstate traffic congestion problems with a single project, won't solve all the regional congestion problems that need to be addressed, *even* if the project was affordable. To the credit of project proponents, the proposed bridge does include a new light rail line which will increase transportation choice, but even with that, building a bridge that solves existing traffic congestion on the bridge, does little if anything, to solve the traffic congestion that occurs two miles south of the bridge. While traffic engineers propose further widening of Interstate-5 south of the new bridge, that project will cost additional billions of dollars – billions that do not currently exist. By focusing solutions primarily on the I-5 corridor, the proposed project has grown in size and cost, yet traffic engineers acknowledge that congestion will likely continue until all project segments are built, but there is little likelihood that the funding necessary to complete all project segments can be found. If a more comprehensive system-wide approach was considered – one that funded a wider variety of transportation improvements, both within the existing I-5 Corridor and on parallel roadways, project goals of reduced congestion and enhancement regional mobility might be addressed with a smaller less costly bridge.

*3. In your written testimony you recommended that Congress consider statutory or regulatory changes to require "performance-based design" or "performance effectiveness" in the design of transportation facilities. Could you please explain in more detail what you*

*mean by that, and give us a few specific examples of how this might work for a highway project?*

I recommend in my written testimony that Congress consider statutory or regulatory changes that will ensure that Practical Design Solutions become part of the design process for every capacity-added federal transportation project. I made this recommendation because I see that the dimensions of roadway geometric design elements and operation of our roadway system is evolving from the “age old” application of one-sized-fits-all design standards based on design speed to a “performance based” design standard intended to address a wider variety of objectives. Performance measurements for facilities are moving away from criteria established primarily for passenger car capacity to multi-modal performance measurements that focus on the quality of moving “people and goods” on a variety of roadway types intended to provide greater mobility and access to development.

We are coming to recognize that the design criteria for each roadway should be compatible with the function that roadway serves within a region’s transportation system and its desired performance related to the users of that system. Performance of a facility must consider the quality of experience and service for all users and look beyond traditional measures focused solely on the passenger car.

As a trained civil engineer, I know that highway engineers are taught to employ the same standard design solutions whenever possible. Requiring that Practical Design Standards be used for every federally funded capacity-added project (any mode), right-of-way purchase, or major reconstruction project would give highway engineers the opportunity to do what they are capable of doing – i.e. “designing site specific projects” as opposed to employing standard design solutions across the board.

By making statutory or regulatory changes that ensure that Practical Design Solutions become part of the design process, Congress would not be asking state DOTs to abandon the tools and assets that have proven their value over the years. Instead, it would require state DOTs and their engineers to place them in their proper context and understand their reasons and value.

Creativity in highway engineering and design simply means not routinely applying the same solutions or approaches everywhere. There are many opportunities for creativity within the boundaries of the technical standards, policies and guidelines already in use. Creativity can also be fostered by re-directing attention of designers and decision-makers to thinking of performance-based solutions rather than physical or infrastructure descriptors.

Merely reframing how a problem is described can help achieve creative solutions. When traffic volumes increase and congestion occurs, highway engineers may describe the problem as “insufficient capacity” – a characterization that inevitably leads to solutions focused on adding lanes or their equivalent. If engineers and planners describe the problems as “person-trip demand exceeds the capacity of the facility during X hours of the day” the change in description can lead to additional solutions beyond increasing capacity. Solutions may include peak hour HOV or HOT lanes, signal synchronization or other IT strategies, congestion pricing, reduced design speed to shift and spread demand to other facilities or modes, parking management, and so forth.

The federal government can play a role in both rewriting existing federal requirements and by providing incentives to the states that encourage them to pursue innovative cost effective context sensitive design methods.

A specific example of how a performance based design as opposed to a standard based design has led to a more context appropriate solution can be found in a project initially known in Oregon as the Sunrise Corridor. First proposed by state transportation engineers and local elected officials in the early 1988, this project proposed a new highway facility paralleling an existing state route to serve as the primary freight and passenger link between Interstate 205 and US Hwy 26. When initially proposed, this project was envisioned as a divided four lane facility. The DEIS was prepared in 1993 but the project was eventually shelved due to community opposition to its size and cost. The expansion of the Portland metro region's urban growth boundary (UGB) by 12,000 acres in Clackamas County in 2002 added new urgency to development of new transportation facilities in the County. The expansion of the UGB called for 60,000 new residents and 50,000 new jobs to be located in the area originally proposed to be served by the Sunrise Corridor. A supplemental DEIS was begun in 2004 – once again primarily focused on development of one project within the Sunrise Corridor. Changes in leadership since 2004, both at the local and state level, and changes in connectivity needs of the business and military community that will be served by the new facility however, enabled project planners and engineers to begin exploring alternate ways to address the existing and growing congestion in this area. By thinking more systematically about the needs of the community and the ways to address those needs, the Sunrise Corridor Project has now evolved into the Sunrise System Project, which includes a series of local connector improvements, a new limited access Sunrise Parkway which can be constructed at significantly less cost than a new divided highway, and other local transportation improvements that can be implemented at significantly reduced costs.

***4. Commissioner Peterson, you stated in your written testimony that there are many opportunities for creativity and flexibility within current design standards, policies, and guidelines. If that's the case, then why do States need incentives to be creative in their design process?***

While FHWA has in the past encouraged states to consider the Context Sensitive Solutions (CSS) methodology to encourage design solutions that are both responsive to community needs and mobility concerns, the use of CSS has seen limited implementation. Attempts have been made across the country to combine CSS with value engineering or least cost planning. But, in the end, the “right-sizing” of a project has remained difficult to do because variables that lead to a larger footprint such as higher design speeds, oversized outside lanes, the use of clear zones in urban areas, and the desire to “fix” a region's congestion problems with one roadway, continue to be the driving forces behind most highway design decisions. Further, it is often easier to just keep doing things – and designing projects -- the way they have been done in the past – and then pointing to “AASHTO Design Standards” or “the feds” as the reason for not considering lower cost, smaller footprint design options.

Congress and USDOT can however, provide incentives that will help to overcome the natural inertia described above. Today, the advent of neo-traditional development or smart growth, has introduced more flexibility into local land use codes. Following this local model, it is now time that federal transportation policy be updated to support a seamless transportation system that integrates

flexibility in roadway design and mode choices and better serves the variety of contexts found within our communities.

The House Transportation and Infrastructure Committee has taken an important first step in calling for the adoption of Practical Design Standards in project decision making and design. However, merely changing federal statute from “may” to “shall” won’t necessarily result in the full implementation of Practical Design Standards. Congress is also encouraged to adopt a variety of additional responses which will help to advance the implementation of Practical Design Solutions. Recommended responses described in more detail in my testimony include:

- 1) requiring that Practical Design Standards be used for every federal funded capacity-added project (any mode), right-of-way purchase, or major reconstruction project, including holding agencies harmless for not using state and local design standards, and overriding the use of state and local design standards from being used on federal aided projects if they limit design flexibility more than AASHTO policy and guidelines;
- 2) providing limited financial incentives to design and construct cost-effective demonstration projects that maximize DOT and FHWA flexibility and minimize project costs and liability; and,
- 3) providing incentives for educational and research centers training civil engineers in the use of Context Sensitive Solutions.

***5. Commissioner Peterson, can you give a successful example of how Context Sensitive Solutions and practical design can reduce project costs?***

Two overarching but illustrative examples of how Context Sensitive Solutions and practical design can reduce project costs come from the states of Missouri and Pennsylvania, as reported by Earl Swift.

When just 44% of Missouri’s highways were rated in good condition, MDOT Director Pete Rahn knew that the state needed to act – but like almost every other state, Missouri was faced with a tight budget. To stretch the state’s transportation dollars, Director Rahn instructed Missouri engineers to design “good projects” that give the citizen of Missouri a good system, rather than to build “perfect projects” that the state could not really afford. By instructing engineers to design projects that meet the need, but don’t go beyond that, project costs have been contained.

According to Swift’s reporting, on some projects, Missouri’s new Practical Design approach has given engineers new found flexibility to actually “design” projects. On some projects, the new approach has achieved identical standards with the old. But on others, while the differences might be invisible to motorists, the costs of construction have been reduced. For example, a highway through mountains might have a thinner bed of concrete where it rests on bedrock.

Since implementing this new approach, Missouri’s road dollars have been stretched considerably and now, 83% of the state’s roadways are rated in good condition. Following Missouri’s lead, Kentucky, Idaho, Pennsylvania, Minnesota, and Oregon have initiated or are exploring practical design programs.

In Pennsylvania, State DOT Secretary Allen D. Biehler has reported that the state’s Smart Transportation initiative called on engineers to re-examine all of their assumptions about highway

design. Biehler has said “The old style was that if we had a road that was congested, we’d project the traffic out 25 years and add lanes. Well, guess what? We don’t have enough money for that anymore.”

When Pennsylvania couldn’t afford a long-planned, \$465 million freeway north of Philadelphia, the State DOT brainstormed with communities along the 8.4-mile route and found a cheaper alternative: a parkway bordered with trees and bike trails. By following the principles of Context Sensitive Solutions, the community embraced a slimmed down project that cost \$200 million, rather than the \$465 million initially proposed.

Penn DOT is now also rethinking its practice of replacing worn-out country bridges with large concrete decks—which tend to be about 20 feet wider than the bridges. According to Swift’s reporting Biehler says, “You don’t need an extra 18 or 20 feet. What are you really getting for that additional spending? Multiplied by hundreds of bridges, that adds up to a lot of money.”

Expanding on the PennDOT experience, on April 15, 2010, Brian Ray, from Kittelson & Associates, Inc. and Dr. John M. Mason, PhD, from Auburn University, co-presented a workshop that focused on how industry trends in performance based analysis can support practical design-based project solutions for planning and design projects. Ray and Mason provided a summary of current and emerging tools that can aid professionals in evaluating, screening, and selecting project alternative concepts. One slide from the presentation emphasizes how PennDOT engineers are following Practical Design Solutions to consider lower cost but high value projects even if they are not the “ultimate fix.” The entire presentation can be viewed at <http://www.slideshare.net/kaiblog/performance-based-practical-design>

*7. Commissioner Peterson, in your opinion what would it take to educate our civil engineering workforce and students to apply common sense engineering?*

I believe that a number of modest steps and investments could be initiated to help educate our civil engineering workforce and students. Initially, I would recommend that Congress authorize \$20 million in funding for educational training of state DOT and local agency staff on how to productively use Practical Design Standards to achieve better project outcomes without incurring undue liability, and provide funding for research into the effectiveness of the Practical Design Standards. In addition, similar amounts of funding should be provided to our Centers for Transportation Research to create and teach courses that provide real world decision-making, research and documents skills to our next generation of transportation planners, engineers and attorneys.

**USING PRACTICAL DESIGN AND CONTEXT-SENSITIVE SOLUTIONS IN  
DEVELOPING SURFACE TRANSPORTATION PROJECTS**

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In recent years, Context Sensitive Solutions (CSS) has been promoted by both AASHTO and FHWA as a best practice for project development. CSS provides a systematic and comprehensive approach to project development from inception and planning through operations and maintenance. Its goal is to achieve a project development process that provides an outcome harmonizing transportation requirements with community needs and values. CSS aims to address the question "How do people in this community want to live" while investigating mobility and access solutions.

Over the past decade, Context Sensitive Solutions (CSS) has been given a number of different names that have created confusion as to its objective and goals. The basic notion that should be emphasized here is that CSS now provides a systematic and comprehensive approach to project development from inception and planning through operations and maintenance. Originally the emphasis was on planning and design, in an effort to promote projects that were acceptable to the public and resource agencies focusing on public involvement and flexible design. In the early 2000s, the term **Context Sensitive Design** began to be commonly replaced with a new one: **Context Sensitive Solutions**. The reason for this change was that the original parties that had coined "Context Sensitive Design" were focused on the early phases of project development (i.e. planning and design) and that other context sensitive activities occurred within the project development process that were vital and needed to be recognized. Context Sensitive Solutions was the term used to indicate that the process had become more inclusive to address that initial shortcoming.

The key concept is that under any name the objective of the project development process should be to develop a "best-fit" transportation solution for the **context** that meets the expectations of the **agency, the stakeholders, and the community** taking into account all relevant factors from inception through operation.

Recently, the economic constraints that several state DOTs have faced, have created a new emphasis on financial issues as they relate to project development. As a result the concepts of **Practical Design** and **Practical Solutions** have seemingly clashed. Practitioners may have interpreted this as meaning, "We don't do Context Sensitive anymore." However, examining the cornerstone of both CSS and Practical Design, reveals they both strive to find the "best fit" solution. In reality Practical Solutions takes this concept further to address system-wide operations and performance. Yet on the project level, it emphasizes the development of a targeted solution to the agreed upon values of the purpose and need. This is very similar to the concepts promoted by CSS and therefore there is little difference between these two seemingly different approaches. CSS strives to incorporate all relevant factors in the project development



process while Practical Solutions focuses on limiting financial outlay for a given project in order to stretch funding available for the betterment of other shortcomings in the system. This element is easily accommodated within the modern CSS oriented project development process.

A key factor in understanding the importance of CSS is the recognition that transportation projects are unique in terms of the nature, scope and importance of issues addressed. Those impact project purpose and need, community and environmental concerns, topographic and geometric conditions, traffic, safety history, and other public priorities. Moreover, there are guiding principles for CSS and a core of essential elements common to most projects. Those should be always considered, since such principles are the cornerstone of the unique project solutions to be developed. A range of measures must be examined to determine those most appropriate for assessing various types of project results and benefits.

Agencies involved in transportation project development usually seek to create a safe facility and system that provide adequate transportation choice, mobility and access, that is financially feasible and contributes to community economic development. Other outcomes are not addressed for a variety of reasons including the lack of appropriate measures and systematic means to collect needed data. In an era where many governmental decisions are viewed from a results-oriented business perspective, measures need to be established to evaluate the final product. That requires the identification and evaluation of metrics that can address the entire project development process. Quantifiable and semi-quantitative metrics can demonstrate the utility and value-added potential of CSS principles to improve the entire process. That includes action principles, such as bringing together the transportation agency with the project's stakeholders in the early phases of project development not commonly considered in benefits analysis for transportation projects.

#### **A BRIEF HISTORY**

Since the early days, highway design and construction has been viewed as the domain of transportation professionals (highway and traffic engineers). Design decisions were often made based on providing the highest quality service at the lowest cost and these solutions reflected a concept that "bigger is better". The increased use of the automobiles and trucks in the middle of the 20<sup>th</sup> century fueled roadway design and construction resulting in policy decisions for more and better roadways. However, in the 1960's the general public became concerned with the adverse environmental impacts of various human activities including (but not limited to) the expansion of the roadway network. This resulted in the passing of the National Environmental Policy Act (NEPA) in 1969 which had significant implications on roadway design

and construction. This act required that engineers consider the natural and social environment of the roadway project and develop solutions that address these issues. The public also became more aware of roadway design issues and impacts while requesting to have their opinion heard. However, this created a conflict between the highway design community and the public especially when projects were viewed as having negative impacts to the quality of life of their community. The traditional benefits from roadway projects, such as reduced delays and improved safety, now have to be balanced against the long-term intrusion of the facility and their impacts on the community.

Over the past 30 years, Congress has passed a number of policy acts and regulations that have emphasized, strengthened and refocused the commitment to addressing the impacts of roadways. Central to this is the need for flexibility in highway design, an aspect that has been long recognized in the Policy of Geometric Design of Highways and Streets (Green Book) by the American Association of State Highway Transportation Officials (AASHTO). However, some designers have viewed the suggested values of the Green Book as rigid standards instead of guidelines to be used in roadway design to achieve a reasonable degree of flexibility based on the roadway surroundings. Moreover, some designers adhere to the notion that the highest values of the Green Book have to be firmly applied irrespective of the project characteristics and requirements. Such an approach typically leads to roadways that put less emphasis on the impact of the design on the human and natural environment and create wide swaths of pavement cutting through communities and natural resources. This approach has been typically justified by stating that it results in a design with increased safety but this may not always be the case. The public and elected officials have also become more involved and aware of the issues that roadway projects may generate and have begun questioning the basis for the resulting designs. The conflict between the engineers and the community has often resulted in delaying or stopping projects due to the antithetical views between these two parties.

It became apparent that there was a need to reconsider the current approach in addressing highway design and identify new means and directions for solving such conflicts. The Federal Highway Administration attempted the first step by publishing the Flexibility in Highway Design Guide in 1997 emphasizing the need for flexibility and encouraging highway designers to consider non-traditional approaches and review how they apply the Green Book values for solving highway design problems. The guide also underscored the need for balancing mobility, safety, human and natural issues while developing contextual solutions. This is conceptually captured the notion of CSS.

The next step was a key workshop held in Baltimore, MD in 1998 titled "Thinking Beyond the Pavement". The objective of that workshop was to bring together all of the beneficial practices employed by transportation agencies to make transportation projects fit better into communities and the natural environment. Context Sensitive Design grew out of this workshop. The then-current focus was related to project development actions in Planning and Design in an effort to promote projects that were acceptable to the public and resource agencies focusing on public involvement and flexible design.

In the early 2000s, the term Context Sensitive Design began to be commonly replaced with a new one: Context Sensitive Solutions. The reasoning for this change was that the original parties that had coined "Context Sensitive Design" were focused on the early phases of project development (i.e. planning and design) and that other context sensitive activities occurred within the project development process that were vital and needed to be recognized. Context Sensitive Solutions was termed to address that perceived shortcoming. The basic concept for CSS is to develop a project that balances the mobility, safety, environmental, and social needs. Its goal is to achieve a project development process that provides an outcome harmonizing transportation requirements with community needs and values. The solution to be developed will address the agency expectations to deliver an on-time and within budget project along with the stakeholders' expectations of addressing natural and human environment and community expectations of delivering a project that will improve the quality of life. CSS considers the total context within which a transportation improvement project will exist.

An aspect that should be emphasized from the outset is that CSS is a systematic approach for a project development and delivery process. There are distinct steps taken during the development and delivery of a project and CSS simply provides a systematic, principle-driven approach. It is a rational process that considers all phases of the project development and delivery process, and uses a set of principles to achieve it. It is therefore imperative to understand that CSS is simply a name for a systematic project development and delivery process and therefore "a rose by any other name will smell as sweet".

#### **CONTEXT SENSITIVE SOLUTIONS**

Context Sensitive Design was an early term used within the transportation community to define a "context sensitive" project, because emphasis was placed on roadway design. To address the wider spectrum of context sensitive issues that exist from planning through construction (and beyond), the terminology has evolved into Context Sensitive Solutions. Context Sensitive Solutions, therefore, should address the entire project development process

across all disciplines ultimately involved in bringing a transportation project to life. As such, we move beyond answering the question, "How should we design this project?" and include "What should we design? Where should we design it?" and most fundamentally, "Should we design this project?" Only by examining the multiple facets of transportation solutions and examining the wide ranging impacts of such decisions can we answer these questions.

While some suggest that CSS is a "process" it is more appropriate to view it as a set of principles to be applied during project development and delivery processes that DOTs and MPOs already have in existence. As such, CSS typically does not require the creation of major actions beyond those normally employed in the project development process. Some principles may already be included in processes as standard procedures; while others may be part of other processes that are applied from time to time to meet the requirements of NEPA, Community Impact Assessments, etc.

CSS may, however, require significant changes in the focus and extent of some project development process actions. For example, adherence to CSS principles requires transportation agencies to solicit meaningful input from the public and stakeholders so that potential issues and concerns can be identified and resolved early in a project. In order to achieve this, all stakeholders must be identified and involved from the outset of a project, which may require improvement in the public involvement process. By viewing Context Sensitive Solutions as a set of principles, any agency can readily incorporate these principles into their existing project development process to bring about significant change and benefits to their organization.

The ultimate goal of a Context Sensitive Solution is to deliver a project that balances the needs of safety, capacity, environment, cost, community and other project needs, resulting in a facility that is sustainable and creates a lasting value for the community. A CSS enlightened professional might say that it is **simply a matter of doing the right thing, in the right place**. In order to assist in knowing what the "right thing" is, 15 distinct and actionable principles of CSS projects have been identified<sup>1</sup>. The goal of these principles is to achieve a project development process that provides an outcome harmonizing transportation requirements with community needs and values.

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<sup>1</sup> Stamatiadis, N., Kirk, A., Hartman D., and Pigman, J. *Quantifying the Benefits of Context Sensitive Solutions Projects*, NCHRP Report 642, Transportation Research Board, Washington, DC (2009)

**Principles of Context Sensitive Solutions**

1. Use interdisciplinary teams: An interdisciplinary project development team is established early, based on the needs of the specific project, and is utilized appropriately throughout the project planning, design and construction phases.
2. Involve stakeholders: A full range of stakeholders is involved with transportation officials as deemed appropriate and preferably during the early stages of the project. Stakeholders to be included are: resource agencies, elected officials, citizen/neighborhood organizations, business, and community group representatives.
3. Seek broad-based public involvement: Public input is sought throughout the project development process utilizing a variety of means to solicit input beyond any required public hearings.
4. Use full range of communication methods: A variety of means necessary to perform adequate communication are employed to engage the general public and stakeholder organizations/groups in the project development process and to solicit their input.
5. Achieve consensus on purpose and need: The purpose and need of the project has been agreed to (informed consent) by the full range of interested stakeholders and the public at the earliest phases of the project.
6. Address alternatives and all modes: All appropriate modes (auto, bus, train, transit, pedestrian, and bicycles) are considered in the evaluation of alternatives and addressed as appropriate given the project's purpose and need.
7. Consider a safe facility for users and community: The resulting project creates a safe facility for the project users and the community by addressing any safety issues identified throughout the project development process.
8. Maintain environmental harmony: The resulting project is in harmony with its physical and social environment and does not disrupt the surrounding area.
9. Address community and social issues: The resulting project addresses the issues as were discovered through stakeholder and public involvement and provides a solution that preserves the community's resources and values.
10. Address aesthetic treatments and enhancements: The resulting project develops aesthetically pleasing solutions and results in an improved environment compatible to desired needs.
11. Utilize full range of design choices: All appropriate design options are considered and evaluated by the project team based on agreed criteria and input of the stakeholders and the public.

12. Document project decisions: All project decisions throughout the various phases of the project's development are documented to create a clear and open record of the decisions made, assure the continuity through all project development phases, and provide a basic framework for measuring results.
13. Track and meet all commitments: All commitments made in the various phases of the project development to the public and/or stakeholders are documented and tracked to assure that they were met in the final product in order to build trust in the transportation agency and work cooperatively and enthusiastically in the future on other projects.
14. Use agency resources effectively: The project has used time and budget in an effective way that resulted in reduced time and costs for overall project delivery and conserved resources.
15. Create a lasting value for the community: The resulting project becomes an asset to the community and all involved parties (agency, stakeholders, and public) agree that the project meets purpose and need, exceeds expectations, and is compatible with and serves as a model in the community to set the stage for future projects leading toward a livable and prosperous community.

Some principles build on each other and have what appear to be hierarchal, cause-effect relationships. For example, principles 2 (involve stakeholders) and 3 (seek broad-based public involvement) will have a significant influence on principle 5 (achieve consensus on purpose and need) as well as shaping principle 4 (use full range of communication methods). Understanding the principles and their interaction promotes knowledge of CSS fundamentals and process relations and comprehension of how CSS projects are developed.

A good representation of these relationships is provided in the figure below showing the dependencies among principles as a building. The foundation of the building consists of the three Fundamental Principles of CSS. The floor is comprised of the four Basic Transportation Agency Principles that exist for every project. The six pillars of the CSS building are the six Agency Enabling Principles and Context-Sensitivity Enablers that provide for and ensure context-sensitivity:

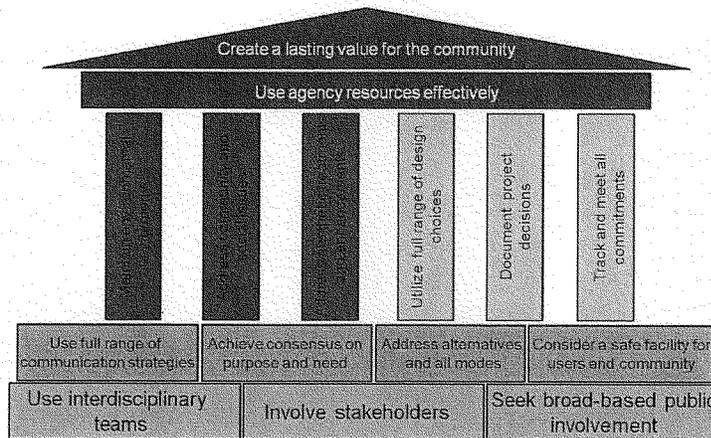
Context-Sensitivity Enablers

- Maintain environmental harmony
- Address community and social issues
- Address aesthetic treatments and enhancements

Agency Action Enablers

- Utilize full range of design choices
- Document project decisions
- Track and meet all commitments

The lintel and roof of the building of CSS are the Long-Range Project Principles (Goals).



The three Fundamental Principles must be applied to have a CSS project development process. The four Basic Transportation Agency Principles are present regardless of whether or not a project employs CSS. The six enabling principles are the tools that enable a project team to create a lasting value for the community and use agency resources effectively, which should be the aim of all projects. While all principles will be present on any project, their relative intensity (as applied) will vary between projects. Similarly all benefits will be present; however, resulting benefits will vary accordingly.

#### Why be Context Sensitive?

Transportation agencies are becoming aware of the need to develop more business-like practices to improve customer satisfaction and to reduce product delivery time and costs. Regardless of how all such business-like initiatives are viewed, they provide agency measures which can be used to assess performance and develop goals/actions that can improve performance.

Traditionally, transportation agencies have focused on the mechanics of CSS, considering it to be unique to the transportation sector. They have overlooked analogous practices that predate CSS and have existed in government and other sectors. They have sufficient similarity and function to be studied and, where applicable, adopted by transportation

agencies for CSS applications. Prior to the introduction of CSS, roadway design was typically left to the state transportation agency that was responsible for all aspects of a road including its size, alignment, appearance, construction, and maintenance. Primary factors governing design were safety, mobility, cost, and available funds. This was not unusual in private industry where design decisions were made by design and production engineers independent of any customer input. A famous example of this is Ford providing Model Ts only painted black (which dried more quickly than other colors). Fixation on simplifying production and reducing cost opened the door to competitors such as General Motors. For many years the design process and function of any manufactured item was solely left to the province of the engineer, and customer input was not sought. If the customer was dissatisfied with a product, the problem was addressed after production, if at all. CSS entails early contact with the public and other stakeholders to get input. It also incorporates a flexible design to provide solutions that meet public/stakeholder requirements. The "voice of the public/stakeholder" has become as important in CSS as the "voice of the engineer."

Although it can appear to be a public relations policy, the decision to adopt CSS is a sound business decision, which can significantly aid in meeting project goals. As seen above, this is brought about by understanding the needs and desires of the "customer." Agencies led by CSS principles will benefit from improved efficiency and effectiveness as that contributes to trust and accountability. These benefits will accrue via better project scheduling, reduced project delivery times, improved public image, and better relations with resource agencies.

#### **BENEFITS OF CSS**

Over the years, a number of anecdotal statements have been made that support the benefits accrued by following the CSS process in projects. However, these statements often lack the support required by data to quantify the benefits accrued. Another issue regarding difficulties with benefit quantification is the fact that benefits are relative to the project scope, size and goals. It is reasonable to assume that the magnitude of the benefits will be smaller for projects with limited scope or small size; this does not lessen the importance of achieving these benefits for a project. The fact that goals vary by project create an obstacle for comparison of benefits across projects or developing a "complete" picture of the benefits from CSS.

There is an array of benefits that could be achieved through the use of CSS and the following are a select few that can demonstrate the range and variety of accrued benefits:

1. **Improved predictability of project delivery:** This benefit relates to the ability of a transportation agency to reliably program and deliver projects within set time limits. Projects

may have elements of controversy including potential environmental and community impacts. Stakeholder/public concerns can also exist due to the depredations of previous projects. These can result in vocal opposition, political pressure and/or litigation that can stall or stop project development. Short delays can extend project development. Long delays may impact agency project programming. CSS can effectively ameliorate opposition/concerns allowing project development to proceed within predictable time limits.

2. **Improved project scoping and budgeting:** CSS projects properly address all transportation, environmental and community issues in a thorough, balanced manner. All vital concerns are effectively identified, appropriate actions incorporated and project costs estimated prior to lettings. This results in minimal construction change orders and projects that are completed on budget.
3. **Increased risk management protection:** Context sensitive design and resulting solutions can be achieved in many cases with the application of flexible design or through the introduction of "lower than typical" design values commonly shown in the Green Book or other design guidelines. When using this approach, nearly every aspect of the geometric design can be adjusted or modified to meet specific conditions or desired limits specific to a roadway. Typically, a formalized process is required to document the deliberations and justification to deviate from the recommended design. Written justification is a significant part of the process of insuring that designers limit their liability when using flexible design and varying from adopted guidelines. The documentation of design exceptions provides the means for the designer to go on record regarding a recommended context-sensitive design solution. In addition, the necessary information is recorded in sufficient detail to support the transportation agency's decision and deviate from the typical design.
4. **Decreased costs for overall project delivery:** This benefit relates to reduced total agency costs for transportation project development compared to conventional non-CSS projects. This can be direct cost savings (elimination of expensive features such as grade separated interchanges). It can also be derived by CSS-related right-sizing of facilities (reduction in the number of lanes or in the ROW footprint). Other savings can be achieved by avoidance actions (reducing the environmental clearance from an EIS to an EA/FONSI). Other savings can be estimated from avoidance of opposition (historic project cost information due to litigation/delays). Oftentimes, transportation agency officials believe that CSS projects are expensive when they actually avoid higher agency costs due to opposition/litigation/delays.
5. **Increased stakeholder/public participation, ownership, and trust:** This benefit relates to a high degree of stakeholder/public involvement in the transportation project development

process that results in consensus approval of transportation agency decision making. It entails stakeholders/public having a significant role in project development that results in a feeling of project ownership/identification. Stakeholders/public must not only believe that they have significant project input, but also they must trust the final decisions/resulting actions of the transportation agency. When this occurs, stakeholder/public opinion about the transportation agency improves creating a reservoir of goodwill and trust for future transportation projects.

6. **Minimized overall impact to human and natural environment:** This benefit results from a project that has limited intrusion on natural resource and existing communities. Direct effects include takings of various types. For example, they may include choosing a corridor and/or design that minimizes the project footprint causing fewer household/business relocations or reducing acreage of land disturbed. They can be permanent or occur only during construction. Indirect impacts include avoidance and mitigation actions. They may also include cumulative impacts that occur over time (e.g. sprawl growth). That can be minimized by a combination of access control and zoning. In the past, new roads have seriously impacted communities and their environments. This benefit accrues when an interdisciplinary project team focuses on transportation solutions that include addressing community/social issues and maintaining environmental harmony.
7. **Improved safety for users:** The benefit is improved safety for vehicles, pedestrians and bikes as appropriate to a project. While safety is not pre-eminent among the considerations that must be balanced in a successful transportation project, it is always important. A project's major needs may include improving safety. No solution would be acceptable that reduced safety or had the prospect of creating untenable conflicts among vehicles-pedestrians-bikes. Considering a safe facility for users and the community through planning and design can achieve this benefit. When employed along with other applicable principles, it can result in a successful CSS project
8. **Improved community satisfaction:** A successful CSS project will provide a community with a high level of satisfaction. A CSS project will be integrated into the community and, over time, it will be perceived as an enhancement. Community satisfaction may be achieved by delivering what the community wants and needs or, at a minimum, what it will accept. In some cases, the level of community satisfaction with a CSS project can be assessed by the level of community dissatisfaction with proposed alternatives.
9. **Improved quality of life for community:** A successful CSS project improves the overall quality of life for members of a community. This benefit may be primarily transportation-

related: by decreasing delays, providing new mobility options, and/or improving safety for roadway users, pedestrians, residents and others. Special enhancements may be applied to a project that contributes to a multitude of other life aspects including recreation, education, shopping and work.

**10. Design features appropriate to context:** Obtaining a facility that matches the context of the area in which it is placed is a fundamental benefit of CS&S. Each project has unique requirements that must be aligned with the setting in which it resides in terms of community, environmental resources, topography etc. To achieve this, tradeoffs are necessary between project/facility requirements and the environs in which it is placed. A key element of designing to the appropriate context is an understanding that the context may change along a project and a design needs to be flexible to meet the changing needs of the community and context. Ultimately this approach may lead to varying cross-sections, design speeds, and differing alignments.

**11. Improved mobility for users:** This benefit addresses improving mobility for transportation facility users and providing a balanced mobility for all users according to the purpose and need of the project. This entails addressing the practical range of transportation options that can be practically applied on a project and that can materially enhance mobility for all potential users including the economically disadvantaged. The need to allow for and encourage the various modes can be identified through applying principles of CSS in the early stages of project development. While there may be macro issues involving the accommodation and even substitution of transit there are other concerns that may have a minor impact on the project, but result in a major improvement for the mobility of individuals in a community. Concern for modal connectivity can also be an important goal in considering achieving improved mobility.

A recent effort<sup>1</sup> to quantify these and other benefits has been completed and some examples of such projects throughout the country are presented here.

Mandela Pkwy Corridor Improvement, Oakland, CA: The project involved the reconstruction and improvement of the Mandela parkway in Oakland, CA. Caltrans initially wanted to rebuild the freeway in the same alignment following the earthquake and collapse. The community strongly opposed this since the freeway viaduct had effectively divided the West Oakland neighborhood. In response, Caltrans realigned the freeway further west leaving the Mandela Parkway as excess land. Then the process began on determining the development plans for the vacant land. Several ideas arose, including developing the land for housing and buildings, and turning it

into a park for art and recreation. The parkway idea with collections of plants was settled on. The project was completed within the allocated budget (\$13.6 million) and time and there were no scope or budget change orders. The project resulted in the development and upgrade of 1.3 miles of sidewalks, multi-use path, and new bicycle lanes. A new BART station was included to improve multi-modal connections. The project is a successful application of CSS processes. Without the close cooperation of the project team with the City of Oakland the project would not have been completed. The use of extensive public involvement was instrumental in defining appropriate solutions. The cooperation with the City resulted in more flexible designs because the right of way was relinquished to the City.

US 285 (Foxton Road to Bailey), near Denver, CO: The purpose of this project was improve the safety and capacity of US 285 by eliminating inconsistent lane configurations, deficient roadway geometry and speed variations on the existing road while addressing issues posed by mountain terrain, winter weather and frequent access points. In general, the Project Team was very favorable towards the use of CSS. They felt it increased public interest, ownership and consensus and improved communication and understanding of project goals. It also created an overall well balanced project. The Project Team believed that early recognition/action on issues facilitated project development. That could be achieved by listening to stakeholder/public concerns. They involved the resource agencies and public to develop solutions and sought creative methods to address project challenges. Opponents could be swayed by involving them in the project development process. This project demonstrates that CSS can provide real project cost savings if agencies focus on providing facilities that meet the needs/desires of communities. The total claimed project savings exceeds \$50 million using a contextually customized design approach. Significant reductions in environmental impacts/mitigation costs were obtained by judicious selection of the project corridor. This approach also saved 8 months of project development time by completing an Environmental Assessment instead of an Environmental Impact Statement. Additional benefits included fewer wetland impacts (reduced from 4.0 to 0.7 acres) and improved safety (fewer conflict points).

Kentucky-Cemetery Road Reconstruction-Bowling Green, KY: The need existed to provide improved and additional access into the Bowling Green Central Business District from a new interchange on I-65. The project was also intended to relieve traffic congestion and improve safety on Cemetery Road by constructing a 4-lane facility and to accommodate future growth in the community by providing additional capacity sufficient to handle projected traffic volumes.

The project reported a reduction in crashes based on a before and after comparison. Over a period of three years, the study showed a reduction of 20 injury crashes, one fatality, and 51 property damage crashes. The benefits converted in dollars can be estimated based on the available values for the various crashes by FHWA and using these values, the total gains are estimated to be \$7,110,000 over a three-year period (or \$3,000,000 if one excludes the fatality due to rarity of such events). This project was a successful use of CSS. Without close cooperation of local stakeholder agencies (who provided significant interfacing with the public), this project would have faced strong opposition. Previous attempts to use conventional project development to reconstruct KY 234 had stalled due to local opposition.

Bridgeport Way Reconstruction, University Place, WA: The purpose of this project was to address the safety concerns due to the high number of crashes over the past years. At the same time it was viewed essential to the vision statement of the City Council that aimed at improving the quality of life in the community by creating a town center. The goal of the project was to develop Bridgeport Way as a corridor that would improve traffic safety, increase the mobility and cohesiveness of the community, enhance the appearance of the corridor, and control traffic growth. A major emphasis of the project was public involvement and solicitation of comments from all stakeholders throughout the entire process. The strong commitment by the City Council to develop a town center and sense of community played an important role in completing this project. The flexibility and open mindedness of the Council to develop a demonstration project for roundabouts indicated to the public and the stakeholders that their opinion is valued and is seriously considered. This level of trust between the government and the public helped the more efficient completion and acceptance of other transportation related projects. The involvement of the area business owners from the outset of the project was beneficial. The project was completed within the anticipated time and budget and resulting in increased satisfaction by the business community and residents. Safety along the corridor was improved by more than 50 percent (from 19 to 8 per year) and multi-modal options (new sidewalk and bike lanes) were provided.

The results from the NCHRP 642 study<sup>1</sup> indicate that agencies do not systematically collect data to evaluate project performance and develop benefit-cost information for projects. It is apparent that data was collected only when individual project teams consider it appropriate for documenting their actions to possibly avoid future difficulties with either stakeholders or the community. This approach does not allow for the development of a systematic data collection

effort across all projects for an agency nor for the establishment of a database that could be accessible to any interested party. Data from 35 case studies indicated that very few agencies and teams routinely document project decisions and actions and maintain a project file that includes data to be used for quantification of the potential project related benefits once the project is completed. Several projects are typically completed over a long period of time and during their lifetime there may be a turnover of project personnel. Even though transportation agencies may bring new personnel up to speed internally, the need for developing project documents is essential for retaining the knowledge developed and commitments made in the project. This will address the issue where project team members noted the potential for benefit accrual but were not capable of presenting the appropriate documentation to validate and quantify these benefits.

#### **PRACTICAL SOLUTIONS**

Due to the increasing age of our nation's transportation infrastructure, in conjunction with the increasing demand for travel, the need for ongoing road preservation, safety and mobility projects has continually increased. However, due to the present economic conditions of states, the relative availability of funds for such improvements continues to diminish. In order to meet the challenge of increasing demands with limited financial resources, the planning, prioritization and design of transportation infrastructure must be critically examined to deliver the most effective transportation system to the system users.

Typical planning and design approaches may prioritize projects at the planning and programming stage in order to best address system needs; however, infrastructure designs are then developed with the intent to deliver the best or optimum project. While some general financial bounds may be used, this design approach can often result in an over-designed roadway. As an example, a study of Kentucky's roadway system identified over 600 miles of rural four-lane roadways with an ADT of less than 10,000 vehicles per day (vpd) among the 1,690 miles of rural four-lane roads. Moreover, over 125 miles were on roads with an ADT of less than 5,000 vpd. Such projects reduce the effectiveness of available funds. In order to fully address the needs of a city, state or national transportation system, the current roadway design approach must be reexamined with the intent, not to optimize the individual project, but instead to allow increased optimization of the entire transportation system. This approach should aim to achieve up to the maximum rate of return on the individual project and not the maximum margin of return possible.

As a result of this change in thinking, a few states have initiatives that would result in the design of more appropriately sized roadways. Most notably, the Missouri DOT has initiated a process that critically reviews projects resulting in more right-sized roadways. They have stated that they want fewer great roads and more good roads that make a great system. This approach will also allow for addressing more roadway needs in a shorter time period. To implement their approach, called "Practical Design", they reviewed the existing design standards and revised them in a way that addresses their concept in a new design manual.

The Kentucky Transportation Cabinet has approached this from a different perspective, through their "Practical Solutions" initiative, where the philosophy of building right-sized projects is emphasized without developing a specific set of standards (or design element guidelines) for designers. In place of minimum standards, the existing condition is established as the baseline design which creates a positive outcome when the project results in improvements beyond the existing conditions. This approach underscores the importance of understanding the specific needs and goals of the project and develops a customized solution that will address them while considering all project issues and constraints. The result is a disciplined planning and design approach not encumbered by arbitrary design guidelines that allows a project to achieve up to the maximum rate of return on investment; freeing remaining resources to meet additional needs across the state.

The most critical component of Practical Solutions in planning and design is the definition and clarification of the initial project concept, since it will be the corner stone of the project and used to significantly contain or reduce the cost and impact of a project. It is more appropriate to develop an efficient solution by focusing on the project needs (specific goals/objectives) rather than stripping down components of a typical design. The concept should be developed with a clear understanding of the objectives of the project, and designed to address those objectives while balancing project factors and elements. This approach allows for a complete examination and resolution of issues instead of simply identifying elements in piecemeal fashion for cost reduction. For a roadway project the most practical solution would be to maintain the existing cross section if minor improvements are capable of achieving the project's safety and/or capacity goals. This option would be far superior to providing a widened section or total reconstruction that attempts to address cost by reducing pavement depth, pipe materials or similar individual design elements or features. By providing a practical concept from the outset, all individual design elements, from pavement area and drainage requirements to long term maintenance needs will be "practical".

A fundamental issue that must be addressed from the outset is the reexamination of how design element guidelines are viewed. There are two concepts that require attention. First, some designers view the lower end of the range of current guideline values as minimum thresholds that must be exceeded by the final design. This typically results in developing solutions that are not reflective of the needs of the project and often result in over-designed projects. Second, there is a belief that a linear relationship exists between the increased magnitude of these minimum values and the project "quality". Such an approach relies on the assumption that bigger is better and safer: which is not always true and also may result in an inappropriately sized project at higher cost and impact than necessary. This same misguided assumption had to be countered within the CSS approach.

Traditional design practices aim at providing as high a design speed as is practical and equating such a choice as a measure for design quality. The basic premise for such designs is the desire to reduce travel times and these designs are often viewed as the best or safest possible approach. The desirable level of service values suggested in the Green Book should be viewed as starting reference points and not as absolute values to be achieved at the expense of other issues. It is reasonable to assume that striving to achieve a certain level of service often requires more lanes than may be needed if a roadway was designed in a manner that enforces lower operating speeds. An additional benefit of lower speeds is the potential reduction in the severity level for crashes, as is frequently the case for roundabouts which have demonstrated lower crash rates.

Safety is extremely important, but is not paramount. Roadway design involves a dynamic interplay of several concerns as mandated by law and regulations. Designers have always had to contend with some cost restrictions and this has potential effects on safety. Nevertheless, proper designs should assess all competing issues and constraints and create a solution that meets the project's mobility and safety objectives. This was a primary issue that was also encountered in the early attempts to pursue the CSS principles.

A recent review of the safety<sup>2</sup> in geometric design standards critically examined the belief that adherence to design standards is directly linked to safe roadways. This review indicated that design guidelines have an inherent safety level, but little is known about the impacts of using flexibility in applying them in roadway design. Another issue that was identified by Hauer was the notion that there are two different kinds of safety. One could be called

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<sup>2</sup> Hauer, E. (2000) "Safety in Geometric Design Standards I and II," in *Conference Proceedings of 2<sup>nd</sup> International Symposium on Highway Geometric Design*, Mainz, Germany.

nominal safety and is measured “in reference to compliance with standards, warrants, guidelines, and sanctioned design procedures”<sup>2</sup>. Substantive safety is another kind based on the roadway’s actual safety performance—i.e. crash frequency and severity. Designing nominally safe roads does not ensure substantive safe roadways, since adherence to values of each guideline does not necessarily produce a safe design.

Another focal point is the development of solutions that achieve the targeted goals without significant cost increases. Each project should be viewed as an investment and as such requires an understanding of the returns to be realized. As in any financial situation, there is always a point of diminishing returns, i.e. greater investment will have no or little effect on increasing the return. The same is true for transportation projects. Once the target is reached, increasing the investment (i.e. over-designing a project) will accrue little or no additional benefits. Moreover, the funds expended in such over-designed projects could have been used in other projects with a far greater return on investment. Applying practical solutions not only improves specific projects with a reasonable solution but they also allow for greater system-wide distribution of the limited available funds, i.e. more projects are completed resulting in the total improvement return being greater.

#### **Practical Solution Issues**

As with any project development process, the ultimate objective is to develop a project that addresses mobility, safety, community and environmental goals. Roadway projects that address and balance these goals are considered by DOTs on a daily basis. Budgetary constraints however create a reality that designers have to deal with and use innovative approaches and think “outside the box.” The concept of Practical Solutions has been introduced in order to encourage developing more appropriate solutions without unduly compromising safety or mobility. This approach encourages the designer to use creative design and move away from the “typical cross section” concept, where a standard “oversized” template is traditionally used. Designers are frequently called upon to develop a solution that will consider and address conflicting elements by designing a roadway that balances these elements and constraints. The development of a new set of standards or guidelines for design element values is not advisable if Practical Solutions are to be successful in reaching their potential benefit. What is required is a procedure that assures that project goals/objectives are targeted with an accepted solution that balances all issues and constraints and considers the points of diminishing returns for the project’s elements.

The underlying idea of Practical Solutions is to equally consider and address all relevant issues including safety, environment, community, capacity, mobility, and budget. Planners and designers are therefore asked to develop an appropriate solution and design that establishes a dynamic balance. This implies that a planner/designer after receiving all appropriate input should consider all suitable designs and elements in their development and evaluation of alternatives. Identifying all possible design options and properly evaluating them through objective measures of effectiveness is imperative for delivering an appropriate and practical project with a reasonable cost. This may indeed necessitate the consideration of alternatives that could initially not be viewed as appropriate. The basic notion of Practical Solutions is the need to examine non-typical approaches and determine how each of the roadway-shaping issues can be addressed in the final design.

Central to this is the definition and proper development of the purpose and need statement that guides and substantiates the transportation need in specific terms and establishes the purpose of the project. This statement must serve as the foundation of the project against which all improvements and solutions will be evaluated. In order to deliver a truly "practical" solution, the purpose and need statement should serve as the target, not the lowest threshold of acceptable performance. Achieving consensus on this document by the stakeholders and design team is essential in delivering the contextually appropriate project. Often a purpose and need statement will identify the need to "improve mobility." Alternatives are then evaluated to determine which improves mobility the most. This approach can easily lead to overbuilt projects as alternatives are increased and improved to the point of achieving high, and often unneeded, levels of performance as they are "better." In order to deliver a practical solution, the purpose and need statement should be refined to better understand the specific project needs and set a specific target design, such as "improve intersection delay to less than 50 seconds per vehicle during the typical peak hour." The target of the alternatives should then be to achieve an improved delay of 50 seconds and not any other higher values. This will require that all alternatives evaluated result in similar improvements and then the most efficient at achieving the design goal can be implemented. While targeting performance values can contain designs and possibly reduce cost, this can never be achieved by the desire to continually exceed design goals. It is therefore imperative that the scope of the project is clearly defined in order for the design team to develop a practical solution. The team should strive to meet the goals of the purpose and need and should not attempt to exceed them just because it can be done. This takes design discipline.

Another issue relative to operating and design speeds is the underlying concept of mobility and how is measured. The concept of Level of Service (LOS), as established in 1950 with the first edition of the Highway Capacity Manual, measures roadway user acceptance of roadway performance on a grade scale (A through F representing free flow travel to congested conditions, respectively). LOS is effective in that it provides a simple way of relating complex issues readily to the public in terms everyone can understand. However, due to the ingrained sense of grading, it is obvious that a higher grade is always better than a lower one and especially when LOS of F is considered. Based on this a priori concept, roadways that are designed to operate at LOS D for example are often viewed as inappropriate by the public and local representatives. This preconception remains even when such designs provide adequate capacity and low delays and may actually serve the community needs better than a high speed roadway designed to LOS A. The fact that LOS is measured differently for each roadway facility type creates an additional concern when alternatives are evaluated. In fact, eight different LOS definitions are provided in the Highway Capacity Manual for various facility types. This does not allow for comparisons to be made using a similar scale and creates inconsistencies when evaluating alternatives. For example, the LOS for four-lane roadways is measured on vehicle density while that of two-lane roads is measured on percent time spent following another vehicle. This difference in the criteria does not allow for a consistent comparison between these alternatives. While LOS is a good measure for understanding the operation level of a given design, it is poor in directing the evaluation of alternatives. It should also be noted that the LOS measure does not evaluate roadway capacity but reflects some derivative of capacity often impacted by additional factors, such as traffic signal timing, roadway speed limit, number of passing zones etc. In order to truly develop an efficient solution the capacity of the provided solution should be measured to assure that the right size design is provided. The use of capacity allows for the utilization of a consistent measure of effectiveness across all alternatives. Once a design is selected, LOS can then be used to further refine the design to ensure that the chosen alternative works as efficiently as possible.

It is apparent that a proposed solution's safety should be evaluated to determine the impact of the design on the safety levels. However, an issue that is often overlooked is that safety evaluations are comparing alternatives among each other and not as the incremental gains from the existing conditions. Therefore, designs are often selected because the solution is judged safer than any of the other alternatives. This could easily lead to over-designed and overbuilt projects, simply because of the erroneous belief that safety improves with the selected design. This approach fails to consider that each alternative is an improvement over the existing

conditions and misses the opportunity to evaluate the safety gains based on the marginal rate of return. Considering such incremental safety gains allows for creating savings on a project by increasing safety, but only up to the point of diminishing returns and thus allowing any additional funds to be used for other projects. This approach provides a system-wide approach, where the net improvement to the system is greater.

Each project should also consider its issues and constraints and develop a design with a combination of elements that address these. This is a key component of implementing Practical Solutions and achieving improvements. These constraints could be varied in nature including topographical, environmental, historical, existing infrastructure, and budgetary. To meet such constraints designers are encouraged to use innovative designs. By designing projects around these elements, through innovative designs or adjusted operational/safety definitions, it is possible to significantly decrease project costs while providing greater benefits to the roadway system.

Operational considerations should also be viewed in terms of diminishing returns. For instance, projects are typically designed to accommodate 20 year traffic forecasts. The practice of estimating traffic volumes 20 years into the future is a difficult task and subject to many factors that may influence the prediction. Recent traffic monitoring has shown a trend in volumes that indicate a decrease in vehicle miles traveled. If this pattern continues, it could significantly affect the need for projects based on the need to increase capacity. While the practice of forecasting 20 years into the future insures that facilities are not under-built, it also tends to assure that facilities are overbuilt. The design life issue needs to be revisited in order to provide the most practical solution. As roadway capacity can only be added in large increments by adding additional lanes, widening to add another lane will always lead to a diminished return unless that lane is 100 percent utilized. In instances when a 20-year forecast requires significant improvement such as from a two- to four-lane or a four- to six-lane cross section, it may be appropriate to develop intermediate forecasts, such as 10 to 15 years, to determine if widening or other improvements are still warranted. This approach will eliminate significant construction costs that may only be used 15-20 years out and then only during peak periods. However, other improvements can be made that will be beneficial beginning immediately. Also half-steps can be taken such as the purchase of ROW to accommodate the longer term forecast, but for now building and maintaining substantially less roadway.

Projects are financial investments that accrue a variety of benefits. However, there is always a point where the return remains virtually unchanged with increasing investment. This is the point of diminishing returns and when this occurs it is not reasonable to continue investing.

An aspect that is critical here is that the designer needs to consider all these elements and their associated points of diminishing returns to determine the most appropriate solution. These elements may often lead to conflicting scenarios and procedures for resolving them should be developed.

Practical Solutions should not be confused with or viewed as Value Engineering. The latter concept is typically applied as a cost-cutting approach to a project that has been designed aiming to reduce the cost of the accepted design and its various features. Practical Solutions aims to develop appropriate and contextual solutions for projects considering the entire spectrum of options and balancing the various project requirements during the planning and design phase. Moreover, Practical Solutions is a system sensitive approach where reasonable project solutions are sought in order to address more problem areas of the system within constrained financial resources. This can be achieved by applying the concept of diminishing returns and viewing the project as having various investment components. The idea is that at some point in the design process, larger cross sections and wider right of way does not "return" significant improvements for the investment to be made. The current budgetary constraints and limitations necessitate such an approach for addressing more problem areas with limited resources. This approach calls for just meeting specific project goals and objectives, not significantly exceeding them.

#### **CSS AND PRACTICAL SOLUTIONS**

As noted before, CSS provides a systematic and comprehensive approach to project development and delivery from inception and planning through operations and maintenance. Practical Solutions emphasizes the recent budgetary constraints by providing a targeted, customized solution while considering a system-wide approach. Practical Solutions expands the limited approach of Practical Design (as was applied by Missouri DOT), by focusing on the need to develop a purpose and need statement that will be reflective of the project and develop specific goals (specific targets) to be met. This entails that the appropriate public involvement is developed, input is solicited, goals are defined, metrics to measure success are determined, and a plan to follow is prepared: all aspects of the CSS process. This will ensure that the project is developed in a contextual manner, while achieving the goals set forth by the project team and at the same time including public and stakeholder input.

The idea of CSS is to define a proper solution for a project through public consultation, team interaction, and stakeholder involvement in order to effectively utilize available resources and deliver a project that improves the quality of life. This implies that solutions are to be sought

through innovative approaches and often require moving away from standards and tables. Project teams need to be able to see what they are trying to achieve and customize the project to the specific needs (hence the need for a properly defined and well written purpose and need) in order to maximize benefits. Practical Design (i.e., the Missouri approach) supports the use of standardized designs that may provide a cost-reducing project but does not answer the basic question: is this the right project for the situation?

The implementation of CSS has faced several roadblocks from state DOTs for a variety of reasons. Those included lack of understanding the need to improve project delivery, fear of increased risk and liability by designing roads with "lower" standards, apprehension from changing the status quo, and unease of interacting with stakeholders and public. Several projects completed thus far have contested (if not refuted) these issues and demonstrated that CSS can deliver projects that are safe, completed within the allocated time and budget, and create a long-lasting value for the community. Moreover, such projects have the potential to improve the image of state DOTs and increase cooperation and trust of stakeholders and public. It therefore will be a mistake if we move away from CSS principles in the project development process and move towards myopic Practical Design. Even though it is understood that there are money savings through Practical Design, it should be strongly emphasized that this approach may represent moving the project development process backwards because it can encourage the disregard of important factors in the name of saving funds and lower costs. Practical Design is nothing more than an advanced value engineering process where cost-saving measures are applied early to an improper solution that should have been designed right from the beginning.

An issue that CSS has not considered is the need for system-wide optimization of funds. This is the new twist that Practical Solutions (i.e. the Kentucky approach) introduces where the needs and benefits for one project are considered as part of the overall state "improvement" or budget. What Practical Solutions does at best is provide two improved principles (relating to purpose and need, and using agency resources effectively) and one new principle (regarding the system-wide context) to the extensive CSS list and at worst provides an excuse to ignore several very important CSS principles for project development. If the latter prevails then some important context issues will be ignored and over time the public trust will be compromised.

**Questions for Dr. Nikiforos Stamatiadis, Ph.D., P.E.  
Professor of Civil Engineering/Transportation  
University of Kentucky**

**Highways and Transit Subcommittee Hearing  
June 10, 2010**

Questions from Chairman DeFazio

1. Dr. Stamatiadis, in your written testimony you described Kentucky's Practical Solutions Initiative as not relying upon a specific set of standards or design guidelines. Could you explain how this might work for a sample project? Aren't design standards or guidelines useful tools – even if only as points of reference?
2. In your written testimony you discussed the importance of identifying all possible design options – even those that “could initially not be viewed as appropriate.” Could you give an example of what this might mean in practice?
3. What actions do you believe Congress should take to encourage, facilitate, or advance the use of Context Sensitive Solutions and practical design?
4. Dr. Stamatiadis, in their written testimony both Mr. Gee and Ms. Paiewonsky asserted that FHWA and AASHTO have embraced Context Sensitive Solutions and are actively promoting its adoption by States. Do you agree? If not, what more should be done to promote utilization of these processes?
5. Do you agree with Ms. Paiewonsky's assessment that the “vast majority” of States have adopted a Context Sensitive Solutions approach?
6. Dr. Stamatiadis, is there a generally agreed-upon definition for Practical Solutions like there is for Context Sensitive Solutions?

### Response to Questions

1. Dr. Stamatiadis, in your written testimony you described Kentucky's Practical Solutions Initiative as not relying upon a specific set of standards or design guidelines. Could you explain how this might work for a sample project? Aren't design standards or guidelines useful tools – even if only as points of reference?

This statement is due to our effort to separate the concepts of Practical Design (as applied by Missouri) and Practical Solutions (as Kentucky defined it). We indeed value the use of guidelines. However, we need to be mindful of the potential misuse of such guidelines when they are viewed as absolute standards not to be varied from. Most frequently practicing engineers tend to focus on the high end values of these guidelines and effectively make them standards (i.e. single value to be used). Our intent was to avoid using a new set of standards, as Missouri defined in their Practical Design, where specific values were defined for design elements. For example, Missouri stated that lane width for major urban and rural roads should be no less than 12 feet. This creates a standard that cannot be adjusted to fit the context of the project (where sometimes we may need to build roads with narrower lanes). In our approach, we tried to move away from such specifics and we focused on the need to develop a customized solution based on the goals of the purpose and need. We did not advocate abandoning design guidelines but rather use them to develop a customized and contextually appropriate solution. In addition, we emphasize the use of guidelines (i.e. recommended values to be used as starting point for designs) instead of standards (i.e. mandatory values not be altered) in order to allow for more flexible designs that are addressing the context of the project. We do believe that there is a need for background guidelines that are flexible enough to allow for customized solutions.

2. In your written testimony you discussed the importance of identifying all possible design options – even those that "could initially not be viewed as appropriate." Could you give an example of what this might mean in practice?

Often times, design engineers have preconceived notions of what a project should look like based on their prior experience and past projects completed. As a consequence, design options are limited to what was required to address a similar prior situation and the particulars of the specific new site are thus ignored. For example, when considering the upgrading of a two-lane rural facility for either safety or mobility reasons, the concept of simply retaining the two-lane cross section and improving it by widening the lanes and shoulders is often not considered an optional solution. The following two cases are examples of this issue.

- a. A four-lane urban arterial was reviewed to improve mobility issues. One of the concerns was the lack of a two-way left-turn lane to facilitate left turns into adjacent residential and commercial properties. The first solution considered was to convert the road to a five lane facility, with two lanes for through traffic and a middle lane for two-way left turns. The notion of reducing the number of lanes (i.e. using a road diet concept) was not considered appropriate because it was viewed as a solution that will not improve mobility. However, detailed analyses showed that the three lane section (one lane per direction and a two-way left-turn lane) accompanied by bicycle lanes was capable of addressing the issues and provide an equally acceptable mobility improvement.

Therefore, the initially inappropriate five-lane solution was not implemented due to the lack of support of the public and the need for providing a bicycle facility.

- b. A new facility was designed to extend a four-lane divided road and connect it to a limited access facility. The forecasted traffic was relatively low (less than 10,000 vehicles per day) and such a volume could be easily accommodated by a two-lane facility. However, this option was considered inappropriate and was never properly evaluated. Constructing the two-lane facility would have addressed the connectivity issue and delivered a project at a fourth of the cost.

These two cases demonstrate the lack of detailed review of the problem at hand and the development of solutions considered a priori appropriate based on past experiences or insufficient examination of the solution. This often can lead to overbuilt projects and thus inappropriate use of available funds.

3. What actions do you believe Congress should take to encourage, facilitate, or advance the use of Context Sensitive Solutions and practical design?

Congress could act on two fronts in order to advance and promote CSS as a project development process by addressing some of the existing impediments for its application.

The first deals with efforts required to change the mindset of the professionals involved in the project development process. Emphasis on training and dissemination of information is essential to demonstrate the benefits of CSS and encourage professionals to embrace the principles that guide CSS. A central component in this educational activity is the permeation of these concepts in academic curricula through a systematic effort of including CSS components in engineering and other disciplines related to project development. Placing an emphasis in undergraduate and graduate education will provide the background for affecting change in the workforce and developing professionals versed in CSS principles and understanding the value of CSS. The creation of a University Transportation Center with a CSS theme that will develop academic curricula and assist in training professionals is an action that Congress can support in order to facilitate the use of CSS. The objective of this Center would be to provide this missing link in undergraduate and graduate education and to merge existing research and experiential knowledge together with the findings of rigorous case study analyses to develop model discipline-specific courses to be adopted in undergraduate and graduate curricula. The courses would identify the CSS process, delineate participant roles, provide direction on interaction throughout the project development process and address challenges to collaborative CSS implementation.

The second deals with mandating the use of CSS as the project development process for all projects. Even though each state has its own processes in place, a common approach could be defined which each project can follow. This process can be based on agreed upon principles that define the required actions to be taken and ensure that project goals are met. CSS should be viewed as a set of principles to be applied during project development and delivery processes. Most agencies have such processes in place and therefore will require little effort to

implement CSS. Creating an incentive (award) program for implementing CSS could also facilitate a wider use of CSS. A critical aspect of this activity is the establishment of performance metrics that can assess progress towards CSS implementation and allow for a continued improvement of the project development process. This will not only facilitate and advance CSS but it will strongly encourage states to participate in the process. New working concepts, such as Practical Design, can be easily incorporated into a principle-driven CSS approach.

4. Dr. Stamatiadis, in their written testimony both Mr. Gee and Ms. Paiewonsky asserted that FHWA and AASHTO have embraced Context Sensitive Solutions and are actively promoting its adoption by States. Do you agree? If not, what more should be done to promote utilization of these processes?

In general I agree with their view. However, FHWA is more active in their support of CSS as it is apparent from their sustained efforts to disseminate information and provide assistance for implementation. On the other hand, AASHTO has seemed as less active recently especially since eliminating the CSS Task Force that had in place in the past. In my opinion, AASHTO needs to commit to the use of CSS as the project development process that all states need to follow and embrace. Using mechanisms that award states with CSS efforts utilizing performance measures tied to CSS is the only way that such an effort will move forward and become more acceptable by states.

Additional activities include the development of a large database of case studies that will catalog CSS applications, the continuation of research in CSS concepts, and the promotion of demonstration projects. The case study database should utilize benefit metrics to assess the project's success, provide the foundation for demonstrating the benefits of CSS, and include lessons learned. Current efforts through FHWA provide a list of such case studies but lack the benefit evaluation and the systematic format for illustrating the benefits and special aspects. A significant research effort was recently completed (NCHRP Report 642) that developed a process for assessing benefits for projects following a CSS process. Additional research is needed to evaluate the proposed process through longitudinal case studies that could allow for a systematic evaluation of the proposed benefit quantification approach. Issues dealing with data collection to be used in benefit assessment also need to be explored and solutions for systematic data collection need to be addressed and resolved. Identification of demonstration projects is also a key aspect in promoting CSS. Such projects should include a variety of scope, scale and context in order to demonstrate that the approach could be used at all levels and project types. This will allow for promoting the concept that CSS is a systematic principle-driven approach that could be the process followed for any project development and delivery.

5. Do you agree with Ms. Paiewonsky's assessment that the "vast majority" of States have adopted a Context Sensitive Solutions approach?

In general, I do not agree with her statement. There are several states that have embraced CSS but I would not call that number the "vast majority." There is a fair number of states that still do

not see the value of CSS and also several that only apply CSS processes on select, high-profile, projects. In my opinion, what needs to be emphasized is the need to accept CSS as the principle-driven project development process that will allow us to improve delivery, save money, and provide projects that are in sync with community needs and desires. Applying CSS to select projects does not mean that a state has accepted CSS but rather is using a technique to more effectively deal with issues and problems for the particular project.

6. Dr. Stamatiadis, is there a generally agreed-upon definition of Practical Solutions like there is for Context Sensitive Solutions?

Unfortunately, there is no congruent definition of Practical Solutions or Practical Design. Each state that has embarked on this activity defines the process as it considers it appropriate for their needs and thus a variety of definitions exist. While developing a common definition may be a desirable outcome, in my opinion our efforts should concentrate in emphasizing the need for a principle-driven, systematic project development process that is repeatable for every project and provides measurable outcomes. CSS provides this concept, since it is a rational process that considers all phases of the project development and delivery process, and uses a set of principles to achieve its results. It is therefore imperative to understand that CSS is simply a name for a systematic project development and delivery process and therefore "a rose by any other name will smell as sweet". We may have reached the point in time when we need to forget the names and focus on the actual issue which is the refinement of the project development and delivery process in order to provide the appropriate transportation solutions. The use of new names every few years can only distort the picture and provide naysayers with the opportunity to do nothing and find excuses for maintaining the status quo. Emphasizing the need for a well organized project development and delivery processes will allow us to move forward and avoid continuous confusion with naming the process whether we call it CSS, Practical Design, Practical Solutions or Smart Transportation. All these names seem to create turfs that need to be defended and detract for the main objective which is to improve the project development and delivery process. The CSS approach as most recently defined in an operation sense with specific and measurable principles of application provides a substantial project development and delivery process framework.

U.S. House of Representatives  
Committee on Transportation and Infrastructure  
Subcommittee on Highways and Transit

Using Practical Design and a Context-Sensitive Solutions Approach in Developing  
Surface Transportation Projects

**Testimony of John Norquist, President and CEO  
Congress for the New Urbanism  
140 S. Dearborn Street, Suite 310  
Chicago, IL 60603  
312.551.7300**

June 10, 2010

Mr. Chairman and members of the committee, thank you for providing me with the opportunity to testify on behalf of the Congress for the New Urbanism ([www.cnu.org](http://www.cnu.org)).

I appreciate the opportunity to present ideas for a new more effective and efficient approach to federal investment in urban thoroughfares. With federal transportation funds scarce and with many backlogged projects, including some very expensive ones, the time is right to look at ways to maximize our return on limited investment dollars.

We need to ask ourselves as community leaders and citizens the following questions:

- Are we adding value to the US, state and local economies with our investments in the National Highway System?
- Is the goal of reducing congestion the right goal in urban contexts or should other benefits be sought when the US government devotes money to improving urban thoroughfares?

#### **Thoroughfares and Context Sensitive Solutions**

Traditionally through thousands of years of human settlement, urban streets have performed multiple functions. Mobility was one, but economic and social functions were important as well. Retail transactions and social interaction have long occurred along main streets and other urban thoroughfares. It is only in the twentieth century that streets were designed to separate the mobility function from the economic and social functions. To help transportation designers learn again to create livable streets that excel at all three of these integrated functions, the Congress for the New Urbanism (CNU) has worked closely with the Institute of Transportation Engineers (ITE) to produce a manual called "**Designing Walkable Urban Thoroughfares: a Context Sensitive Approach.**"

Context-Sensitive Solutions (CSS) are generally defined as a process for community leaders and other stakeholders to engage in transportation design approaches that achieve multiple objectives, such as accommodating the needs of a community's businesses, drivers, bicyclists and pedestrians, while preserving a community's history, aesthetics and safety. CSS can be used during the planning process for large and small communities. Context-Sensitive Design uses these approaches in the design of a community.

To this general approach, the CNU-ITE guide for designing walkable thoroughfares adds professional rigor. Well-defined metrics concerning issues such as street widths, the configuration of corners (rounded corners lead to faster turns while squared corners yield slower turning and are friendlier to pedestrians) and the positioning of buildings along the street edge help create high-performance streets that support valuable, sustainable neighborhood development. These design metrics also vary in prescribed ways to match urban context ranging from small towns to garden suburbs and dense urban cores.

This enhanced version of Context Sensitive Design should be useful in further defining the useful concept of Practical Design, utilized by you, Chairman DeFazio, Chairman Oberstar and others on this committee. In fact, the "PRACTICAL DESIGN STANDARDS" addressed in the House version of the Transportation Reauthorization bill offers statutory guidance on standards that in many ways correspond with CSS. For example, the legislation encourages adoption of "comprehensive street design policies..., the development and dissemination of information or best practices relating to comprehensive street design policies and principles..., and practical design standards to States, metropolitan planning organizations, and other appropriate governmental entities...." Many communities will benefit by adopting CSS, or developing similar "Practical Design" standards. Semantics are less important than encouraging large and small cities to consider multiple factors to retain the character of their communities, while improving movement, business and safety. For this reason, I would like to thank the Committee for taking the initiative of encouraging local transportation planning.

#### **About CNU**

Founded in 1993, the Congress for the New Urbanism (CNU) is a nonprofit membership organization comprised of more than 2700 architects, urban planners, developers, engineers, and public officials. CNU is the leading organization promoting walkable, mixed-use neighborhood development, sustainable communities and healthier living conditions.

For nearly twenty years, CNU members have used the principles in CNU's Charter to promote the hallmarks of New Urbanism, including:

- Livable streets arranged in compact, walkable blocks.
- A range of housing choices to serve people of diverse ages and income levels.
- Schools, stores and other nearby destinations reachable by walking, bicycling or transit service.
- An affirming, human-scaled public realm where appropriately designed buildings define and enliven streets and other public spaces.

Established by co-founders Andres Duany, Peter Calthorpe, Elizabeth Moule, Elizabeth Plater-Zyberk, Stefanos Polyzoides and Dan Solomon and supported today by distinguished board members and other thought-leaders from the worlds of urban design, development and government policy, CNU works to deliver these hallmarks to communities across North America and overseas on multiple scales. Settings where new urbanists are active include both emerging growth areas and brownfields, suburbs and small towns where New Urbanism can either reinforce the character of existing walkable areas or help to "retrofit" automobile-oriented malls and office parks to become walkable communities. The principles of New Urbanism are also central to making whole regions more livable, coherent and sustainable. With a history of forming productive alliances, CNU has been at the forefront of efforts to reform how we design and build communities and their infrastructure.

**Our partners have included:**

- US Department of Housing and Urban Development on Hope VI
- US Environmental Protection Agency on Smart Growth
- Institute of Transportation Engineers and the Federal Highway Administration on the new guide for Context-Sensitive Urban Thoroughfares
- A lead partner with Natural Resources Defense Council and the US Green Building Council in creating the nation's first rating system for green neighborhoods, the newly released LEED for Neighborhood Development (LEED-ND)
- Our founding Charter is a source for the Sustainable Communities partnership of the HUD, EPA and the US Department of Transportation.

CNU's 2010 Congress was developed with assistance from the Centers for Disease Control on the theme of "New Urbanism: Rx for Healthy Places," reflecting growing scientific evidence that walkable neighborhoods enjoy significant health advantages over automobile dominated sprawl.

**Removing Barriers to Creating Great Streets**

Interconnected street systems are the basic building component of cities and towns. Where and how to construct major urban thoroughfares is a decisive factor in the shape and character of the urban space. A design must balance the interests of travelers, businesspeople, neighbors and community stakeholders. With many competing interests, arriving at mutually agreeable and functional solutions can be a challenge.

Without collaboration and forethought, a singular interest can trump other interests producing a less than ideal space. For example, communities solely built to facilitate vehicle movement can place pedestrians at risk, blight the surrounding built environment and destroy local community character.

The Congress for the New Urbanism (CNU) has worked closely with the Institute of Transportation Engineers to produce "Designing Walkable Urban Thoroughfares: a Context Sensitive Approach" (available for free download at [cnu.org](http://cnu.org)). The guide demonstrates how context-sensitive design principles and techniques may be applied where community objectives support New Urbanism and smart growth. After years of concern for vehicle movement dominating street design, this manual is the first guide for engineers that balances the automobile interest with other community needs.

The manual is also intended for elected officials, developers, and citizens concerned about road design and its effects. With the manual emphasizing a collaborative and multidisciplinary approach, CNU and ITE's goal is to educate practitioners to create and preserve urban spaces that:

- Balance safety, mobility, community and environmental goals
- Involve the public and stakeholders early and continuously
- Use an interdisciplinary design team approach
- Address all modes of travel
- Apply flexibility inherent in design standards and guidelines, and
- Incorporate aesthetics.

Research shows that besides excelling at meeting mobility goals, networks of context-sensitive major streets such as avenues and boulevards achieve far greater traffic safety than the high-volume arterial streets that prevail in most conventional transportation design. Dr. Eric Dumbaugh, Assistant Professor, Dept. of Landscape Architecture and Urban Planning at Texas A&M University, has recently completed research that shows the following safety differences:

- Arterial roads are associated with increased crash risks for all users, regardless of mode, e.g.,
  - 14% increase in multiple-vehicle crashes,
  - 10% increase in pedestrian crashes, and
  - 8.4% increase in bicyclist crashes.
- Per vehicle mile traveled, livable context-sensitive streets reported
  - 40% fewer mid-block crashes than roadway averages, and
  - 67% fewer roadside crashes than roadway averages.

The CNU and ITE manual is unique in that it brought together transportation engineers, planners, architects and government officials to create and offer a new coordinated approach to urban design while ensuring that local roads meet transportation engineering and safety requirements. For example, the manual encourages the use of interconnected street grids to improve traffic flow while facilitating traffic distribution and flow in major business districts and corridors. It offers guidance for the use of the boulevard, the avenue, and the street to establish community development priorities. It establishes guidelines for residential neighborhoods, to reduce travel distances to retail and employment corridors and to allow fire and emergency vehicles to move safely and effectively through neighborhoods. Finally, the manual addresses the dimensions of main streets to emphasize safer speeds, parking needs, and crosswalks. We urge this committee to consider a reference to "Designing Walkable Urban Thoroughfares: a Context Sensitive Approach" as part of the Transportation Reauthorization so that public officials, engineers, planners and other stakeholders consider these options as they work to improve their communities.

#### **Accomplishments to Date**

After identifying major urban thoroughfare design as a decisive issue in place making within communities, CNU partnered with ITE to find a workable solution, and have since:

- Solicited and received sponsorship from the Environmental Protection Agency and The Federal Highway Administration
- Developed a new standard for recommended practice that describes the importance of integrating Context Sensitive Solutions in urban highway and road projects; how these principles can be used in transportation planning and project development processes; and outlines specific guidelines on thoroughfare cross section and intersection design
- Held a series of workshops across the country to acquaint local officials with the new manual and the principles of context-sensitive design. These workshops have been extremely popular, with attendance requests at or above capacity.
- Worked with fire professionals and other emergency responders to demonstrate how well connected street networks improve response time and efficiency.

#### **Next Steps**

Under current Federal law, 23 USC 103(b)(6)(C), the National Highway System funds can be spent on a non-NHS highway if:

- The other road is a federal-aid highway
- It is in the same corridor as a fully access-controlled NHS highway
- The project on the non-NHS highway improves level of service on the NHS access controlled highway
- The project is more cost-effective than working on the NHS highway
- The project on the non-NHS highway improves level of service on the NHS access-controlled highway, or
- The project is more cost-effective than working on the NHS highway.

CNU suggests that 23 USC 103(b)(6)(C) be amended to allow expenditure on streets that are not federal aid highways, but meet the other conditions. This would allow addition of parallel through-streets that could, if better connected, relieve traffic on main NHS routes by giving travelers additional route choices.

CNU also requests that in corridors in urban contexts, defined as communities with intersection density of 90 intersections per square mile or greater, that the NHS allow federal funds to be expended on street network enhancement.

By allowing federal transportation funds to be used for local road projects, we can add value to large cities and small communities alike by improving access to business corridors, and multi-modal transportation, while improving pedestrian access and safety. I urge the Committee to consider this position as you work to complete the next major Transportation Reauthorization.

I thank you Mr. Chairman for the opportunity to testify.

3 June 2010



Peter A. DeFazio, Chairman, Subcommittee on Highways and Transit  
 US House of Representatives  
 Committee on Transportation and Infrastructure  
 Washington DC 20515

Re: In support of John O. Norquist, President & CEO, Congress for the New Urbanism (CNU), testifying before the Subcommittee on Highways and Transit, 9 June 2010 Hearing entitled "Using Practical Design and a Context Sensitive Solutions Approach in Developing Surface Transportation Projects"

Dear Representative DeFazio:

Current federal design of and funding for roadways is at odds with the future of our country, and our shared objectives for sustainable, livable communities that equitably serve our society.

Current road funding prioritizes highways, arterials, and collectors. Priority for safety and mobility is almost exclusively provided to the automobile, ignoring the safety and mobility needs of other roadway users, including transit users, bicyclists and pedestrians. Current funding and policy prioritizes the goal of reducing congestion, at the expense of neighborhood livability and walkability, local economies and land values. Most federal funding for roads goes toward streets that are built for one purpose only: moving traffic. These practices both create and support the land use pattern of sprawl.

Through these transportation funding priorities, the federal government has systematically subsidized sprawl for more than a half century. Subsidized freeway construction to far-flung suburbs, along with lending practices that rewarded "drive 'til you qualify" homeownership, has contributed to the national economic crisis. Many Americans who opted for homeownership were crushed by high transportation costs that weren't factored into their housing costs, and are now are now trapped in foreclosed neighborhoods, or locked out of the housing market altogether.

While the federal government continues to incentivize sprawl, a demographic shift has been taking place, as many Americans rejected the oil- and auto-dependent suburbs and voted with their feet, choosing urban neighborhoods where they could find a range of transportation options. For more than a decade demographers have tracked these trends, citing consumer preferences showing that people were eager to live in complete, convenient and walkable neighborhoods, and countering the myth that Americans wanted sprawl. Homebuilders ignored these facts, as did the federal government's policies on transportation. Now, it is clear that we have been building suburban neighborhoods that may never be utilized, as entire generations are choosing to live and work in urban environments over the suburbs. By 2030 a majority of Americans will live in urban areas. The federal government should no longer be incentivizing the suburbs and encouraging sprawl. Instead, transportation investments should go where the people are going.

Since 1993, the Congress for the New Urbanism (CNU) has understood that the future is in well-designed urban environments that range from neighborhoods to towns, cities and metropolises. The CNU's vision of the future is articulated in the CNU Charter principles. The Congress for the New Urbanism is the nation's leading inter-disciplinary organization dedicated to building, preserving and redeveloping sustainable, pedestrian-friendly communities as alternatives to sprawl.

Under Mr. Norquist's leadership, CNU has leveraged its national influence, combined with the on-the-ground local experience of its members (members that represent every region and state of the US) to initiate several major efforts to reform the national policies that drive our current unsustainable transportation planning and funding system. These include the CNU/EPA Emergency Response and Street Design (<http://www.cnu.org/emergencyresponse>), CNU's partnership with the United States Green Building Council and the Natural Resources Defense Council, to create the first certification system for neighborhood-scale green development (LEED-ND), and the Networks Initiative (<http://www.cnu.org/networks>).

And in a landmark achievement of this year, CNU and the Institute of Transportation Engineers (ITE) produced "Designing Walkable Urban Thoroughfares: a Context Sensitive Approach." In cooperation with FHWA and EPA they developed a manual that provides design guidelines to resurrect the street, avenue and boulevard. These are road types that Federal and State departments of transportation should allow and encourage.

As a former mayor, Mr. Norquist understands the need for a context sensitive solutions approach to street design and street networks. Investment in context sensitive designs for local streets and networks provides greater returns for lower costs than investment in grade-separated highways. He and CNU understand the numerous benefits: improved street network connectivity has been demonstrated to increase pedestrian safety, increase vehicular capacity, promote the use of transit, reduce emergency response time, create higher land values, promote economic viability of cities, towns and main streets and contribute to a sense of place. And because vehicle miles traveled is dramatically reduced, greenhouse gas emissions are reduced. Federal transportation investments should build on rather than undermine the efficiency and environmental performance of walkable, mixed-use neighborhoods.

It's time for a change. The federal government should no longer be incentivizing the suburbs and encouraging sprawl. I would like to add my voice and my ideas to those presented to you by Mr. Norquist. I hope that we can count upon your strong support for more effective federal leadership.

Sincerely,



Marcy McInelly, AIA, Associate Principal, SARA Architects  
Co-chair, CNU Project for Transportation Reform