Workshop on Advanced Flexibility in Design

May 5-7, 2010

Hosted by:
Center for Transportation Studies
University of Minnesota

Sponsored by:
Minnesota Department of Transportation
Federal Highway Administration

With assistance from:
Zan Associates
Howard R. Green Company

Workshop Participant Manual

Advanced Flexibility in Design Workshop: Curriculum Overview

May 2010

Day One

	Activity	Objective	Presenters
	7:30 – 8:30 **Registration**		
1	**8:30 - 9:00** **Introductions and Welcome**	Participants will understand workshop goals and expectations for workshop. Participants will learn why and how design flexibility is related to Mn/DOT's mission.	Mike Barnes, Mn/DOT Scott Bradley, Mn/DOT Jim Rosenow, Mn/DOT
1A	**9: 00– 9:30** **Ice Breaking Exercise**	Participants will introduce themselves and instructors will present case study examples for discussion.	Charleen Zimmer, Zan Associates Jack Broz, HR Green
2	**9:30 -10:00** **Why Design Flexibility?**	Participants will learn why design flexibility is an important tool in addressing contextual challenges and in achieving high return on investment.	Charleen Zimmer, Zan Associates
2A	**10:00– 10:15**	Teams will practice calculating and comparing the rate of return for different types of investments	Jack Broz, HR Green Charleen Zimmer, Zan Associates
	10:15 – 10:30 **Break**		
3	**10:30 - 11:15** **Risk Management and Safety**	Participants will learn the difference between substantive and nominal safety.	Jack Broz, HR Green
3A	**11:15– 11:45** **Exercise**	Teams will practice assessing the level of risk using a case study project.	Jack Broz, HR Green Charleen Zimmer, Zan Associates
	11:45 – 12:30 **Lunch**		
4	**12:30 – 1:15** **Using Traffic Data**	Participants will learn how to use the details of traffic operations, crashes and traffic forecasts to apply design flexibility.	Jack Broz, HR Green
4A	**1:15 – 2:15** **Exercise**	Teams will practice assessing traffic needs for a case study project.	Jack Broz, HR Green Charleen Zimmer, Zan Associates
5	**2:15 – 3:00** **Serving All Modes of Transportation**	Participants will learn how to serve pedestrians, bicycles and transit and will learn the principles of universal design. Participants will learn about ADA design requirements	Charleen Zimmer, Zan Associates Todd Grugel, Mn/DOT
	3:00 – 3:15 **Break**		
5A	**3:15 – 5:00** **Field Exercise**	Participants will experience the challenges of navigating with mobility impairments – outside field exercise. Participants return to classroom for follow-up discussion.	Todd Grugel, Mn/DOT Jaime Taylor Meg Stautz

Day Two

	Topic	Objective	Presenters
5B	8:00 – 9:00 Exercise	Teams will develop recommended bicycle and pedestrian improvements for a case study problem.	Jack Broz, HR Green Charleen Zimmer, Zan Associates
6	9:-00 – 9:45 Selecting Design Speed	Participants will learn how to select design speeds that are consistent with various contextual settings, targeted operating and posted speeds.	Jack Broz, HR Green
	9:45 – 10:00 Break		
6A	10:00 – 10:45 Exercise	Teams will begin work on a design case study problem by selecting targeted operating speeds and identifying speed transition areas.	Jack Broz, HR Green Charleen Zimmer, Zan Associates
7	10:45 – 11:45 Allocating Space in Confined Cross-Sections and Intersections	Participants will explore the competition for street space in confined environments addressing issues such as lane widths, shoulder widths, reaction distance, recovery area, turn lanes, parking and utilities.	Charleen Zimmer, Zan Associates
	11:45– 12:30 Lunch		
7A	12:30 – 1:30 Exercise	Teams will apply space allocation principles to the case study problems.	Jack Broz, HR Green Charleen Zimmer, Zan Associates
8	1:30 – 2:15 Designing Horizontal Alignment	Participants will learn the factors involved in horizontal alignment including stopping sight distance.	Jack Broz, HR Green
8A	2:15 – 2:45 Exercise	Participants will apply principles of design flexibility to a horizontal alignment case study.	Jack Broz, HR Green Jim Rosenow, Mn/DOT
	2:45-3:00 Break		
9	3:00 – 3:45 Designing Vertical Alignment	Participants will learn the factors involved in vertical alignment including stopping sign distance.	Jim Rosenow, Mn/DOT
9A	3:45 – 4:15 Exercise	Participations will apply principles of design flexibility to a vertical alignment case study.	Jack Broz, HR Green Jim Rosenow, Mn/DOT
10	4:15 – 5:00 Minimizing Construction Impacts	Participants will learn about new legislative requirements for addressing business impacts during construction and how construction staging and other construction factors need to be address during design.	Charleen Zimmer, Zan Associates

Day Three

11	8:00 – 9:30 **Designing Freeway Interchanges**	Participants will learn how to apply design flexibility when creating retrofit solutions to remove bottlenecks at freeway interchanges.	Jack Broz, HR Green
11A	9:00 – 10:00 **Exercise**	Teams will solve a design problem for a freeway bottleneck case study applying flexibility in design.	Jack Broz, HR Green Charleen Zimmer, Zan Associates
	10:30– 10:45 **Break**		
12	10:45 – 11:30 **Wrap-up Discussion and Key "Take Homes"**	Teams will provide feedback on the workshop and discuss key messages about design flexibility that can be incorporated into day-to-day work.	Jack Broz, HR Green Charleen Zimmer, Zan Associates
11A	11:30 – 12:00 **Closing Comments**	Mn/DOT representatives make closing comments, receive feedback. Participants receive certificates for completion of workshop	Mike Barnes, Mn/DOT Scott Bradley, Mn/DOT Jim Rosenow, Mn/DOT

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Workshop Participant Manual

Table of Contents

Acknowledgements

The materials in this Participant Manual were prepared for the University of Minnesota Center for Transportation Studies and Mn/DOT by Zan Associates and Howard R. Green Company, with assistance from the Minnesota Department of Transportation and the Federal Highway Administration.

The University of Minnesota Center for Transportation Studies would like to thank the following individuals who contributed their expertise and experiences as well as their time to this project:

Steering Committee

Scott Bradley, Landscape Architecture Chief, Mn/DOT
Jack Broz, Howard R. Green Company
Jim Grothaus, UM Center for Transportation Studies
Jim Rosenow, State Geometrics Engineer, Mn/DOT
Charleen Zimmer, Zan Associates

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Instructors/Speakers

Mike Barnes, Director of Engineering Services, Mn/DOT
Jack Broz, Howard R. Green Company
Jim Rosenow, State Geometrics Engineer, Mn/DOT
Charleen Zimmer, Zan Associates

Use of Materials

We would like to thank the following organizations for use of their materials:

Keith Harrison, P.E., FHWA, for use of numerous slides and content from "*Geometric Design: Applying Flexibility and Risk Management*", December 2008 National Highway Institute
City of Minneapolis for the use of photographs and materials from their DRAFT Pedestrian Design Guidelines.
Howard R. Green Company for case study materials.
Mn/DOT for case study materials.
Pedestrian and Bicycle Information Center (www.pedbikeimages.org) for the use of photographs.

Workshop Participant Manual

Introduction

"***Advanced Flexibility in Design Workshop***" is a 2 ½ -day workshop designed for transportation planners and engineers by the University of Minnesota Center for Transportation Studies (CTS) for the Minnesota Department of Transportation (Mn/DOT) with assistance by Zan Associates and Howard R. Green Company. This reference manual is intended to orient you to the workshop, to provide you with the information you need regarding schedule and activities, and to provide you with session materials for use during the workshop and reference materials for your use after the workshop.

Workshop Objective

This workshop is designed to enhance the existing experience and skills of participants so they are more able to apply risk management and use design flexibility in their daily problem solving and design projects. Participants will:

- Learn how to use design flexibility to achieve solutions that are more context sensitive.
- Learn how to use design flexibility to achieve solutions that provide a higher return on investment.
- Learn how to use design flexibility to achieve solutions that better serve multiple modes of transportation, including persons with disabilities.
- Become more effective practitioners by learning how to apply the flexibility inherent in design guidelines.

Workshop Goal

The overall goal of the workshop is, through the application of risk assessment and design flexibility, to improve Mn/DOT's return on investment and design and build transportation projects that better fit their physical, cultural, social and environmental settings and better accommodate multiple modes of transportation and meet ADA requirements.

Background

The National Highway System Designation Act, which was enacted in 1995, emphasized and broadened consideration of flexibility in design for non-interstate facilities. Additionally, for federal-aid projects off the National Highway System, Congress provided that states have the flexibility to develop and apply design criteria that they deem appropriate. The Federal Highway Administration (FHWA) has provided leadership in encouraging context sensitive solutions and design flexibility through their 1997 publication, "Flexibility in Highway Design". Developed in collaboration with AASHTO, Scenic America, and the National Trust for Historic Preservation and the Bicycle Federation, the publication "identifies and explains the opportunities, flexibilities, and constraints facing designers and design teams responsible for the development of transportation facilities." (p. iii).

Building on this effort, FHWA conducted a national working conference, "Thinking Beyond the Pavement" in 1998 where 325 people from 39 states (transportation professionals and stakeholders representing public agencies, elected officials, private businesses and citizen perspectives) worked together to identify the common qualities of successful transportation projects and articulate principles to achieve more flexible design. The conference also articulated goals for encouraging the use of context sensitive solutions and implementing training programs for engineers nationwide. Mn/DOT was one of five pilot states selected by FHWA in 1999 to help introduce and advance the concept and implementation of context sensitive solutions. Since that time, Mn/DOT has continued to assess CSS implementation challenges while continuing to further develop and deploy periodic training and initiatives in applying CSS philosophy and principles inclusive of hosting a 2005 Midwest Region CSS Workshop with over 200 participants representing more than 30 states.

The Federal Highway Administration (FHWA), the Transportation Research Board (TRB), the Institute of Transportation Engineers (ITE) and the American Association of State Highway and Transportation Officials (AASHTO) have all published recent documents recommending greater flexibility in design and the flexible application of design standards including:

2001 – FHWA, *Geometric Design Practices for European Roads*
2004 – AASHTO, *AASHTO Green Book updated*
2002 – NCHRP Report 480, *Guide to Best Practices for Achieving Context Sensitive Solutions*
2004 – FHWA, *www.contextsensitivesolutions.org*
2004 – AASHTO, *A Guide for Achieving Flexibility in Highway Design*
2006 – ITE, *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities*
2007 – AASHTO/FHWA, proposed *Context Sensitive Solutions Strategic Plan: Mainstreaming CSS*

All of these documents have been used as reference materials for preparing the curriculum for the ***Advanced Flexibility in Design Workshop***. Additional training in design flexibility was one of the recommendations that surfaced as part of AASHTO/FHWA CSS Strategic Planning in 2007.

In February 2009, Mn/DOT held a forum on "Flexible Design for 21st Century Challenges: Balancing Competing Objectives and Optimizing Return on Investments" (see the Toolbox section of this manual for more information) to learn from other states that have undertaken initiatives to apply greater design flexibility. The forum was a first step in a Mn/DOT initiative to apply greater flexibility in transportation planning, design development and operations statewide. This workshop supports this future direction.

Evaluation

Evaluation is a critical part of this workshop. It is important to have your feedback about what worked and what could be made to work better. An evaluation form will be provided at the beginning of the workshop. Please take the time to fill out the evaluation form and make notes about the curriculum content throughout the workshop and turn in your evaluation form and notes at the end of the class. Your comments and suggestions will be an important component for revising the curriculum and presenting future versions of this workshop.

About the Instructors and Speakers

Michael Barnes, P.E., is the Director of Mn/DOT's Engineering Services Division and is an advocate and management champion for the department's renewed efforts in context sensitive solutions. He has been with the Department for the past 23 years in various technician, engineering, technology, and management positions. During his career, he has managed a wide range of projects from small to large, and from road construction to technology projects which has helped him gain a strong appreciation for stakeholder involvement and the need for innovation.

Scott Bradley is the Mn/DOT Director of Context Sensitive Solutions. Scott has a Bachelor's Degree in Landscape Architecture and a Master's Degree in Business Administration and 30 years of varied private and public experience in landscape architecture practice. Scott has Mn/DOT's administrative responsibility for several statewide programs and manages landscape architectural planning, design, construction and maintenance support for multi-modal corridor development projects. Scott is Mn/DOT's first point of contact and champion for Context Sensitive Solutions.

As Secretary of the TRB Committee on Landscape and Environmental Design, for the past 9 years, and Chair of the TRB Context Sensitive Design and Solutions Task Force, for the past 6 years, Scott has been an active organizer and presenter for many state, regional, national, and international conferences and workshops. Scott is a Fellow in the American Society of Landscape Architects and active in the ASLA Professional Practice Network for Context Sensitive Solutions in Transportation. Scott also serves on the National Park Service Development Advisory Board, as an external advisor to the Director of the NPS; on the Planning and Environment Research Council for the University of Minnesota's Center for Transportation Studies; and on the Federal Highway Administration's Context Sensitive Solutions Advisory Board.

Jack Broz, P.E., is the Transportation Group Leader for Howard R. Green Company. He has a B.S. degree in Civil Engineering from the University of Illinois and has 30 years of experience in highway design. His transportation project experience includes projects ranging from mega Interstate highway projects to alley restorations. These projects have been located throughout the Midwest as well as in Florida, Maryland, Utah and California. His projects include a diversification of transportation modes including aviation, freight rail, commuter rail, bicycles, pedestrians and even horseback trails in Utah. In the past year, his work resulted in the opening of 26 miles of new freeway and nearly 10 miles of new streets with a cumulative construction value of about $600 million. He has professional affiliations with American Society of Civil Engineers (ASCE), American Planning Association (APA) and American Council of Engineering Companies (ACEC).

Jack is known as an innovative designer who successfully applies CSS principles to his projects and works effectively with local communities. He recently completed design of Highway 10 through Detroit Lakes. The project includes significant technical, social and regulator challenges. The project involved working with the railroad to realign tracks with up to 60 trains per day. The end result included a new underpass for a major city street under the railroad and Highway 10, new frontage roads, significant water quality improvements along with an expanded downtown development.

Charleen Zimmer, AICP, is President of Zan Associates, which she formed in 2001. She has a Bachelor of Arts degree from the University of Michigan and has over 30 years of experience providing services in planning, public participation, consensus building and training with a focus on better integration of transportation, environmental and community planning decisions and designs. Current and recent projects include: (1) public affairs coordination for the Highway 212, ROC 52 and Hwy 169 Saint Peter design-build projects; (2) work for for the City of Minneapolis related to the MARQ2 street and transit reconstruction project, the conversion of Hennepin and 1st Avenue North from one-way to two-way, the implementation of a coordinated street furniture program, changes to service and facilities on Nicollet Mall; and (3) project oversight for the City of Minneapolis on a ten-year transportation action plan (citywide and downtown), a streetcar feasibility study, a pedestrian master plan, and new sidewalk and street design guidelines. She was the 1998 recipient of the Ray Laapagaard Distinguished Service Award given by the UM Center for Transportation Studies for leadership and mentorship in transportation.

Charleen was the lead consultant and instructor for the development of Mn/DOT's initial training program for Context Sensitive Solutions and she has been involved in CSS training for UM-CTS and Mn/DOT for the past ten years. In addition to the two-day Mn/DOT CSS training program, she has taught several one-day CTS T^2 workshops on Context Sensitive Design for Local Units of Government, and was part of a team that developed and taught a Mn/DOT workshop on CSS and Public Participation.

Workshop Introduction

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