A Context Sensitive Solutions (CSS) Webinar

MnDOT's Move to Greater Flexibility in Design

MN Trunk Highway 1 Southeast of Ely

MN CSAH 3 – Excelsior Blvd in St. Louis Park

Tuesday, December 11, 2012 – 9:30 am to 11:30 am – U of MN CECC

Your Destination...Our Priority

Webinar Presenters / Panelists

- **Scott Bradley –** FASLA, Director of CSS, MnDOT
- **Jim Rosenow –** P.E., Design Flexibility Engineer, MnDOT
- **Mike Elle –** P.E., Design Standards Engineer, MnDOT
- **Julie Skallman –** P.E., State Aid Division Director, MnDOT
- **Amr Jabr –** P.E., Asst. Engineering Services Division Director, MnDOT

Thanks to the University of Minnesota Center for Transportation Studies and their Continuing Education Conference Center for supporting this MnDOT Webinar

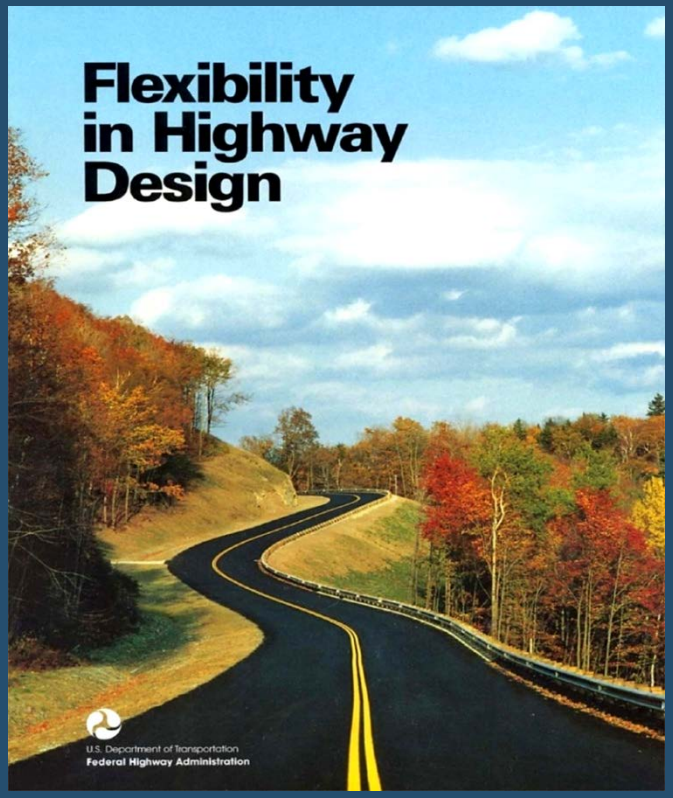
FHWA Advocacy and Guidance in 1997

Provocation to Think and Act Differently

Growing out of ISTEA 1991 and NHSDA 1995, this 1997 FHWA Guide explored and illustrated flexibilities and opportunities that already exist to balance community, environmental, safety, and mobility objectives in our transportation projects.

Sufficient flexibility permitted to encourage independent designs tailored to particular situations

(Consistent with AASHTO Green Book)



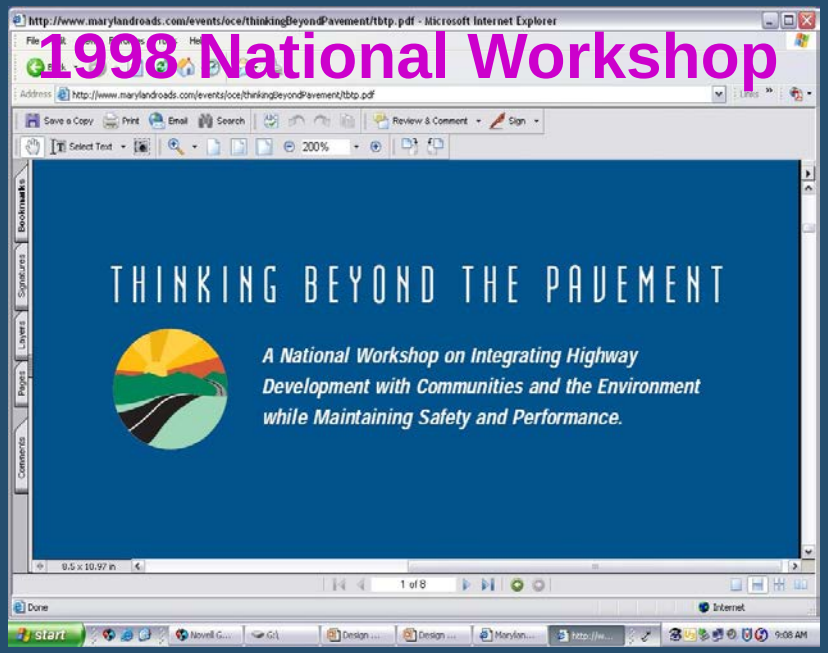
Provoked Birth of CSS

Birth of Context Sensitive Design & Solutions

Since a 1998 Thinking Beyond The Pavement Workshop, FHWA and AASHTO have promoted Context Sensitive Design … now Context Sensitive Solutions … as a desired national transportation approach

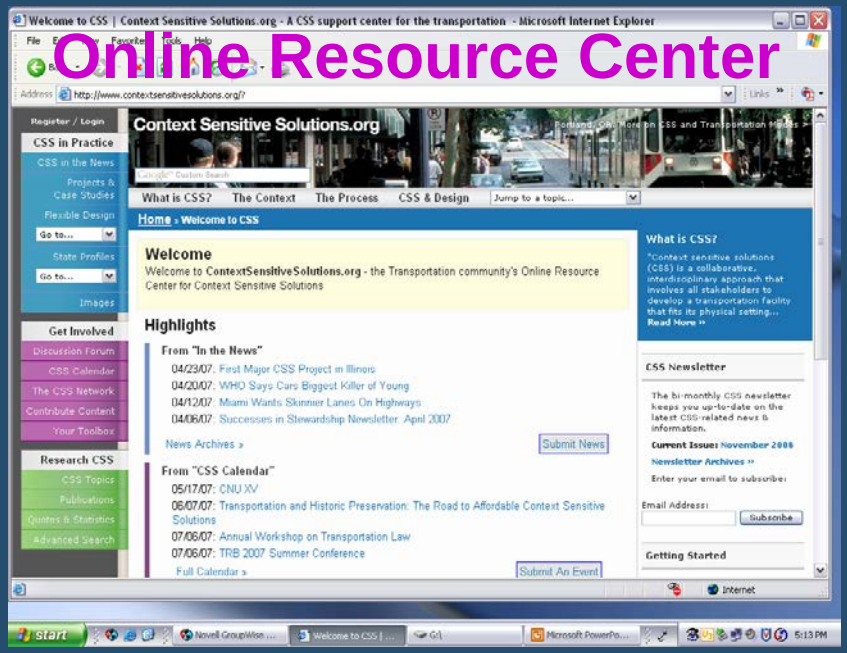
(Designation of 5 Pilot States to Advance the Effort … MN, KY, UT, MD, CT)

1998 National Workshop



Articulated 15 CSD / CSS Principles

Online Resource Center



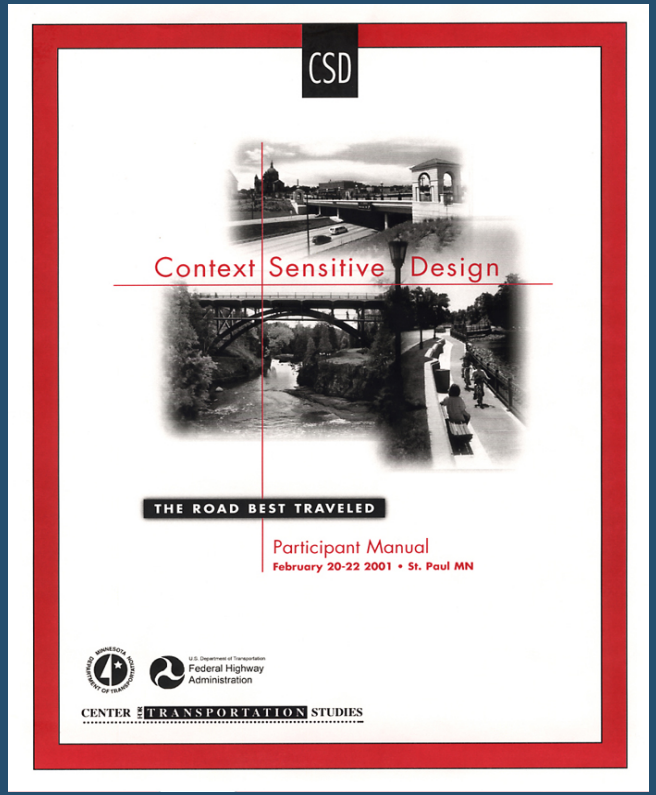
www.contextsensitivesolutions.org

MnDOT Was Positioned for Leadership in CSS

Initial MnDOT "Pilot State" Effort (1999 & 2000)

As a "pilot state", MnDOT partnered with FHWA's MN Division & U of MN Center for Transportation Studies in advancing our CSD / CSS approach.

Assembled steering team & advisory group that guided a Principle-Based Approach, Training Development and Deployment, Development of Policy (Tech Memo) and Marketing with an emphasis on (6) Core Principles that were deemed critically important … **many deemed Flexibility in Design as the most important principle.**



www.dot.state.mn.us (Search A to Z for Context Sensitive Solutions)

Supporting the MnDOT Strategic Vision & Plan

Strategic Directions:

- Safety
- Mobility
- Innovation
- Leadership
- Transparency

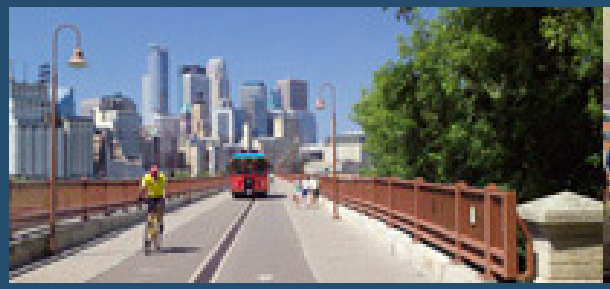
Strategic Vision:

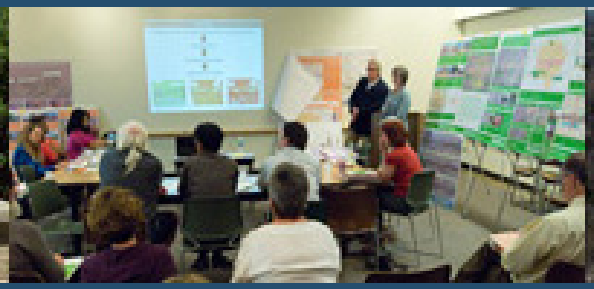
Global leader in transportation committed to upholding public needs & collaboration with internal & external partners to create a safe, efficient & sustainable transportation system for the future.

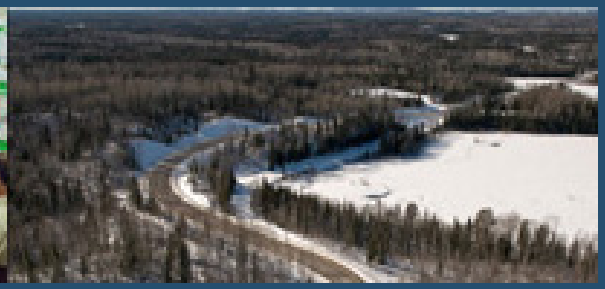
CSS & MnDOT's Strategic Vision & Plan

CSS Designated as a Flagship Initiative in December 2009

- To integrate CSS as a business model
- To build customer relationships & trust
- To improve processes & decision-making
- To balance competing objectives
- To seek collaborative & right-sized solutions
- To improve return on investments
- To achieve 20+ CSS-correlated benefits

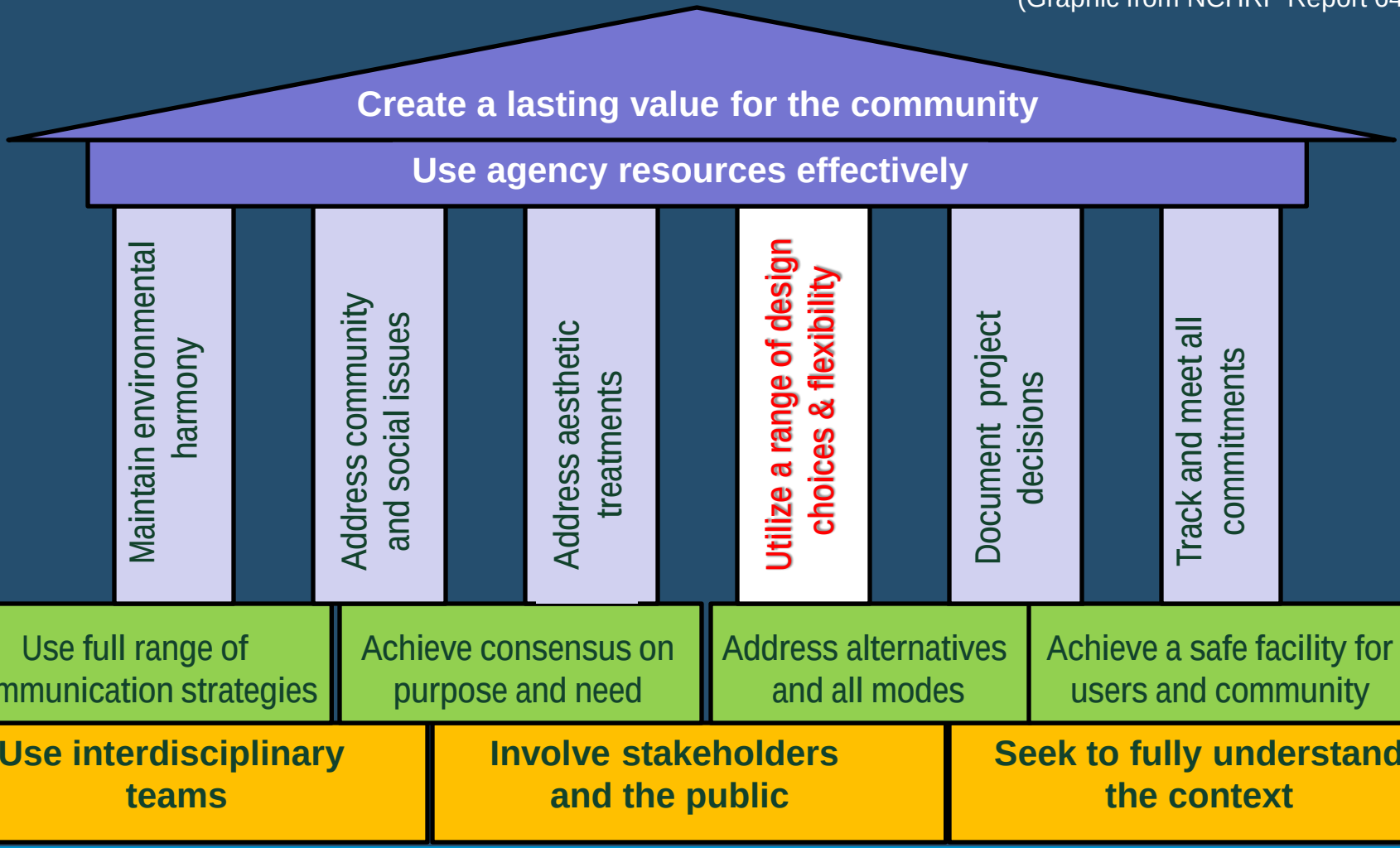






Applying CSS Principles As The Foundation

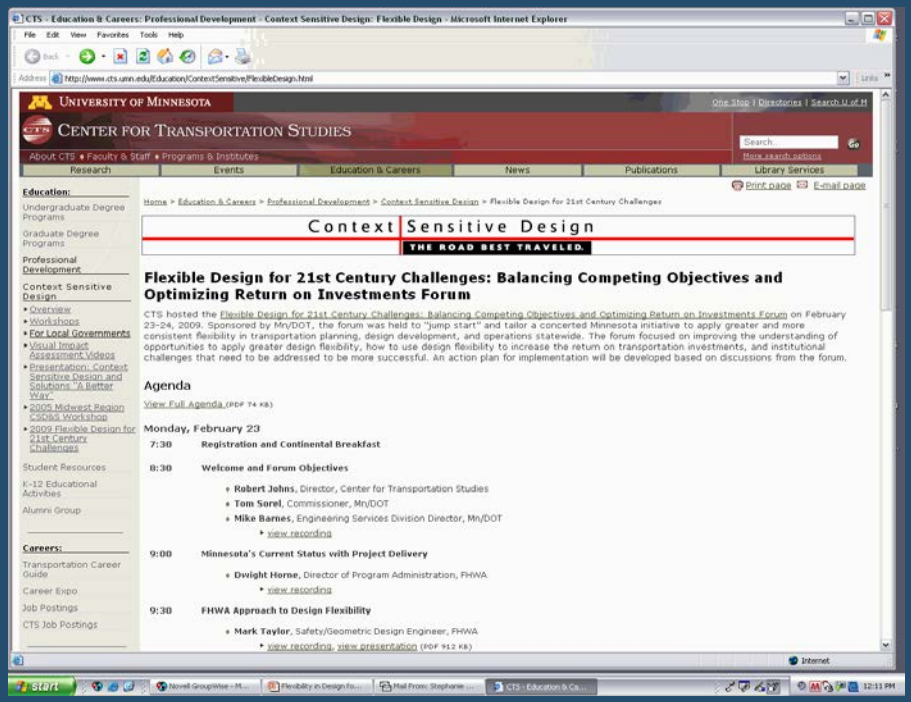
(Graphic from NCHRP Report 642)



MnDOT's Flexibility in Design Forum

Learning From Ourselves and Others - February, 2009

(Maryland, Massachusetts, Pennsylvania, Kentucky, Missouri, Washington, FHWA)



www.dot.state.mn.us (Search A to Z for Context Sensitive Solutions)

MnDOT's Flexibility in Design Forum

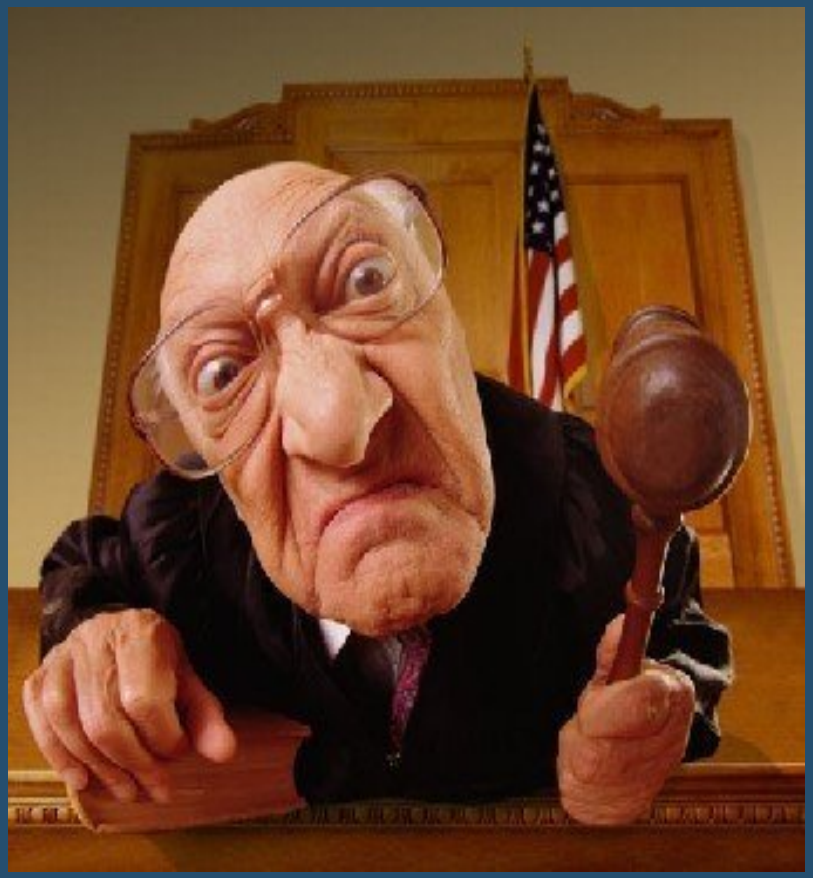
Learning From Ourselves and Others - February, 2009

The Forum brought together leaders in the application of flexibility in design to share knowledge and experiences in helping to inform MnDOT's next steps and action planning in tailoring development and implementation of a strategic and performance based Flexibility in Design Initiative.

Why Flexibility in Design is Important

Born Out of Necessity:

- Revenue Limitations
- Increasing Needs
- Increasing Costs
- Deteriorating Infrastructure
- Diminishing Resources
- Complete Streets
- Socio-Economic Concerns
- Environmental Concerns
- Quality of Life Concerns …



A Couple of Thoughts to Take Away Today

Even if you're on the right track, you'll get run over if you sit there.

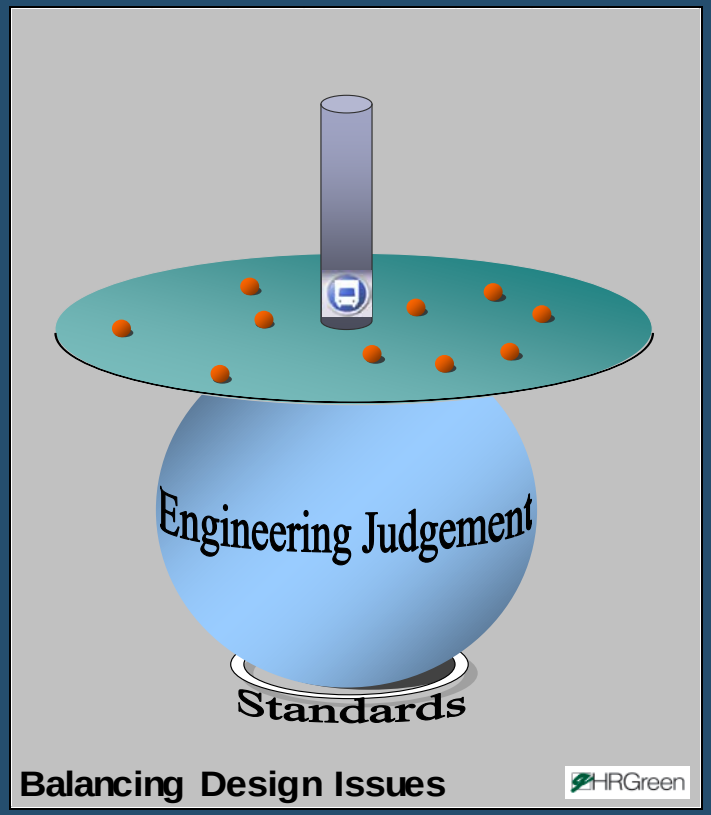
(Will Rogers)

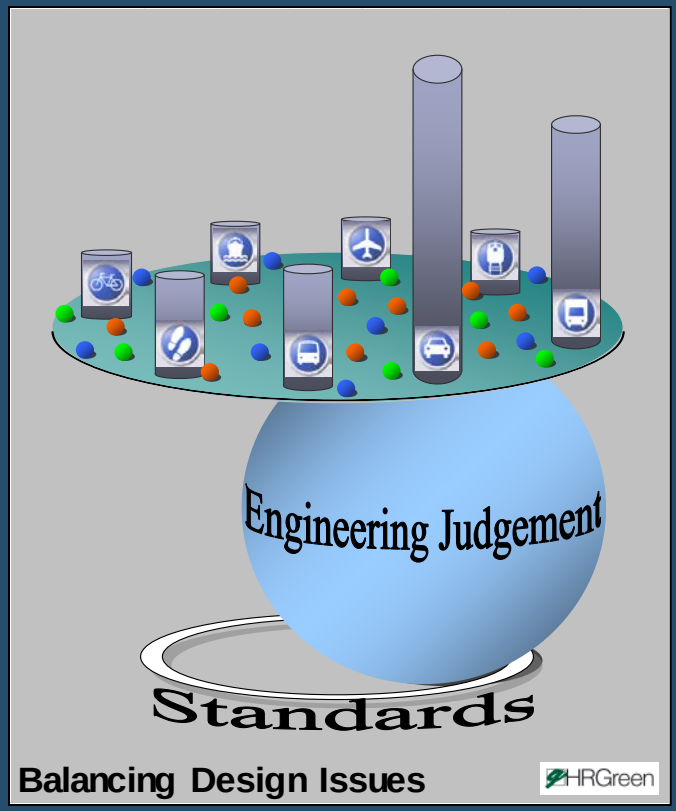
A lesson is truly learned if we modify our actions to reflect what we now know.

(Vernon LaPlante)

Some Themes – Balancing Competing Objectives

Community / Regulatory / Transportation Issues & Objectives Across Multiple Modes





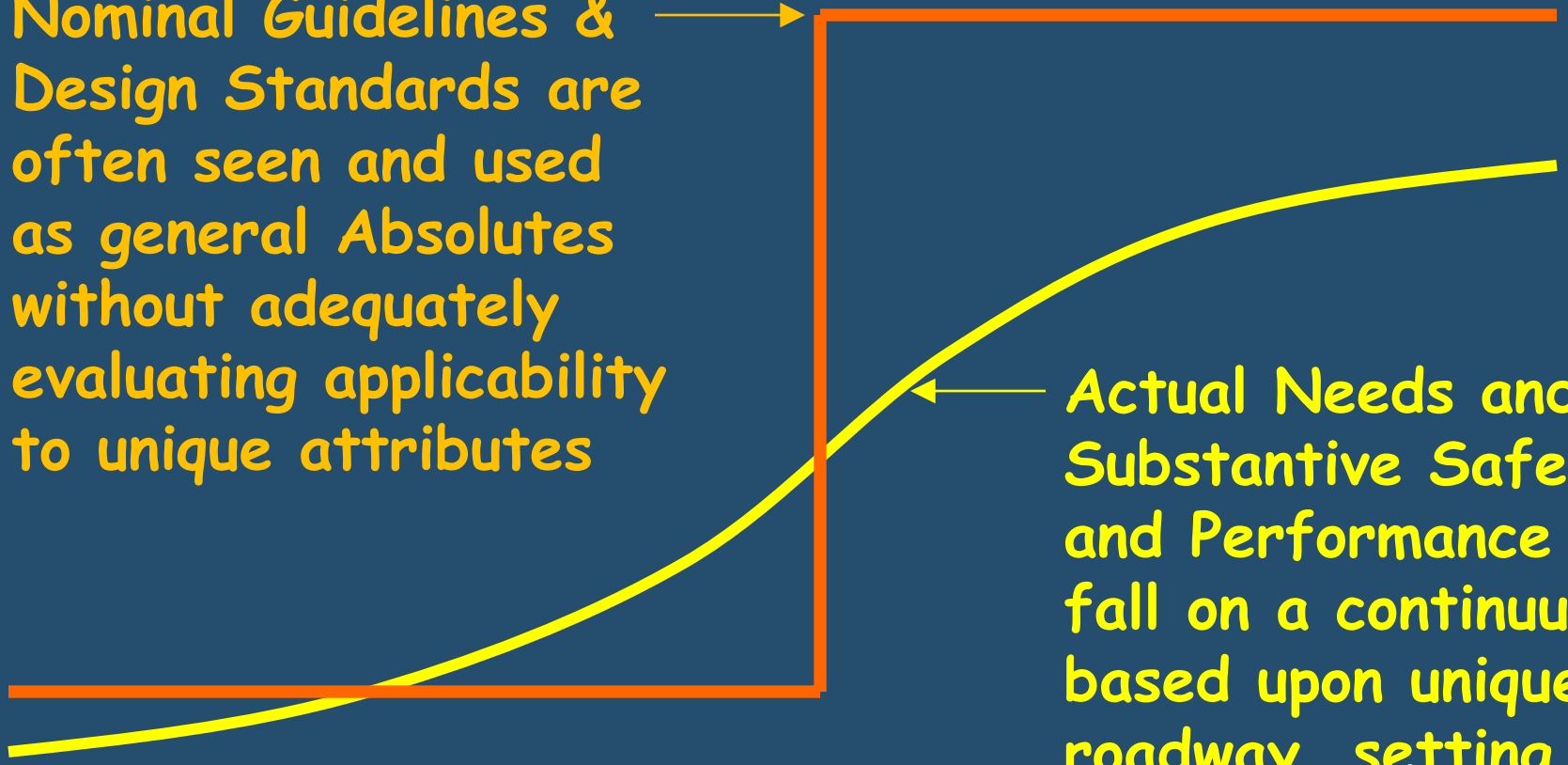
It's Difficult To Balance Competing Objectives Within Overly Conservative Design Approaches & Standards

Some Themes - Reallocating Cross-Section Space

How Much Space Do You Really Need and For What ?

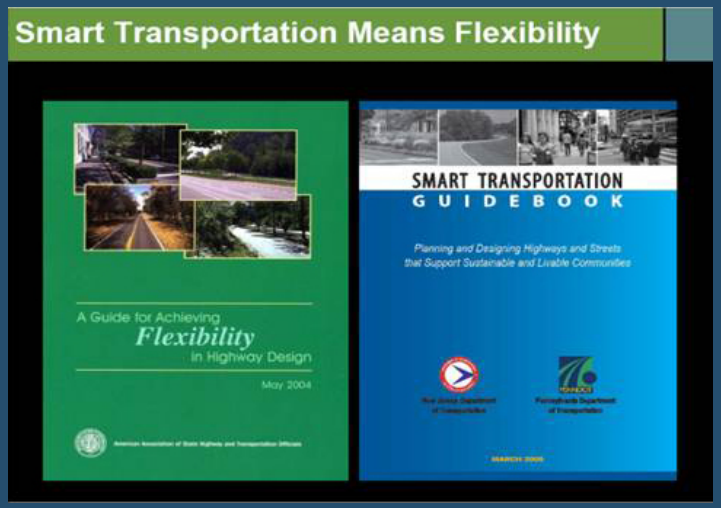
Some Themes - Substantive vs. Nominal Safety

Nominal Guidelines & Design Standards are often seen and used as general Absolutes without adequately evaluating applicability to unique attributes

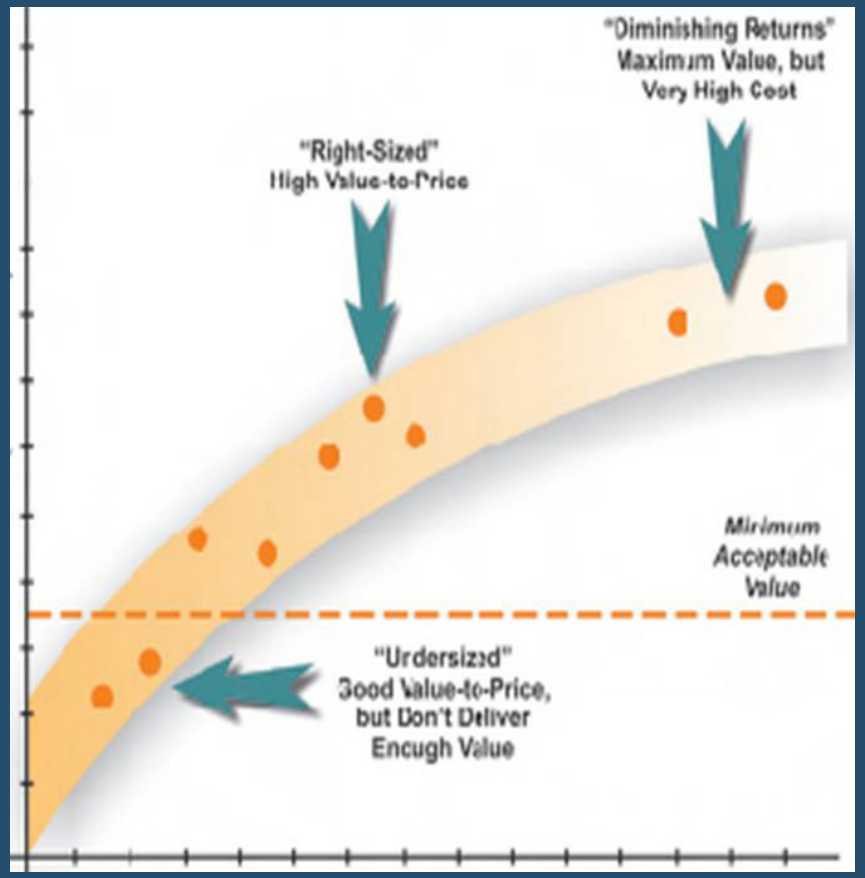


Actual Needs and Substantive Safety and Performance fall on a continuum based upon unique roadway, setting, and user attributes

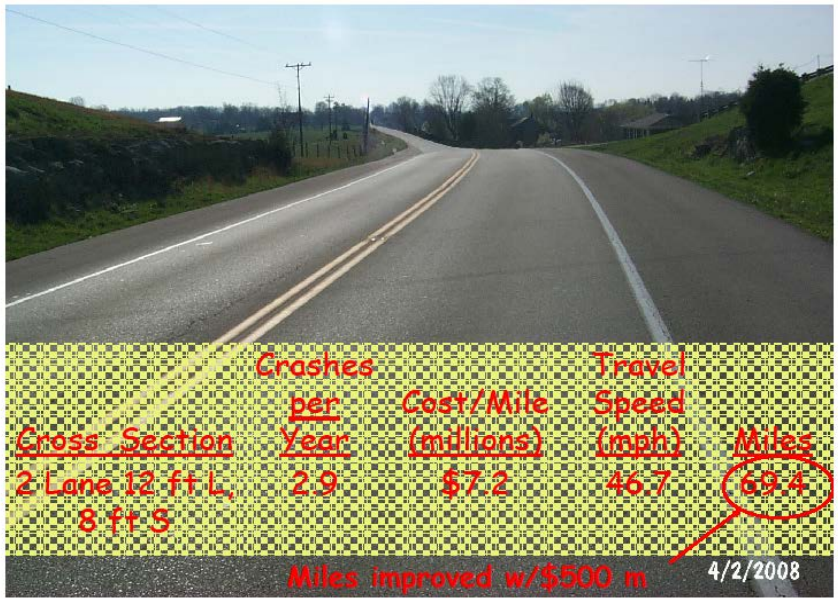
Some Themes - Optimizing Return on Investments



Right-Sizing design elements to the point of diminishing returns for Higher Benefit to Cost Ratios and the capability to achieve greater public benefits without greater cost



Learning From Others - KY Practical Solutions



Options for improving mobility and safety on their existing system of two-lane highways

Learning From Others - KY Practical Solutions

The Improved 2 Lane Cross Section has Higher Return on Investment as compared to the 4 Lane Cross Section

At a System Level you get a 200% increase in miles you improve, a 150% increase in total crash reductions and a 9% increase in total travel time reductions ... therefor, a more Practical Solution with a $500 million budget

Road Improvement Example

Available budget $500 m to improve 2 lane roads

Cross Section	Crashes per Year	Cost (millions)	Speed (mph)	Miles	Total Reductions	
					Crashes	Travel
2 Lane, 10 ft/2 ft	5.4	--	41.4	--	--	--
2 Lane, 12 ft/8 ft	2.9	$7.2	46.7	69.4	173.5	367.8
4 Lane, 12 ft/8 ft	2.4	$21.5	55.9	23.3	69.9	337.9

More miles, fewer crashes and fewer delays for same budget!

Learning From Others - MODOT

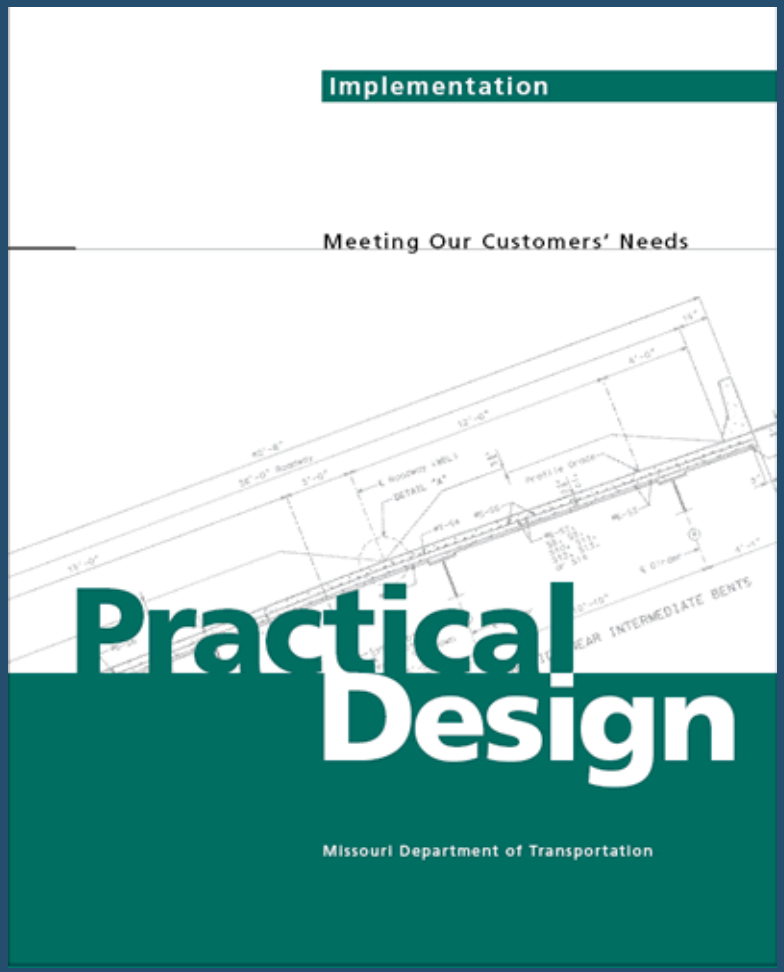
Ensuring Projects as Good Solutions for the Context … "Right Sizing"

- Improvements considered based on their contribution to the system instead of their individual perfection

- Each District was challenged to cut the budget of their STIP by 10% while still delivering the Program

- Engineers were told to put their design manuals on the shelf and follow 3 rules:
  1) Every project must get safer
  2) Collaboration is needed in every solution
  3) Practical solutions must function properly without leaving maintenance challenges

Learning From Others - MODOT



- The challenge resulted in savings of $400 Million across a 5-year STIP
- Missouri demonstrated the largest drop in traffic fatalities in 2006 and the downward trend continued
- 5-year STIP delivered under budget
- Pavement condition went from 3rd worst to 9th best
- 83% of MODOT's major roads were elevated to good condition (up 47%)
- Customer satisfaction with MODOT rose to 78% in 2008 and 90% of the newspaper editorials were positive
- 95% of customers believed MODOT projects were the right solutions

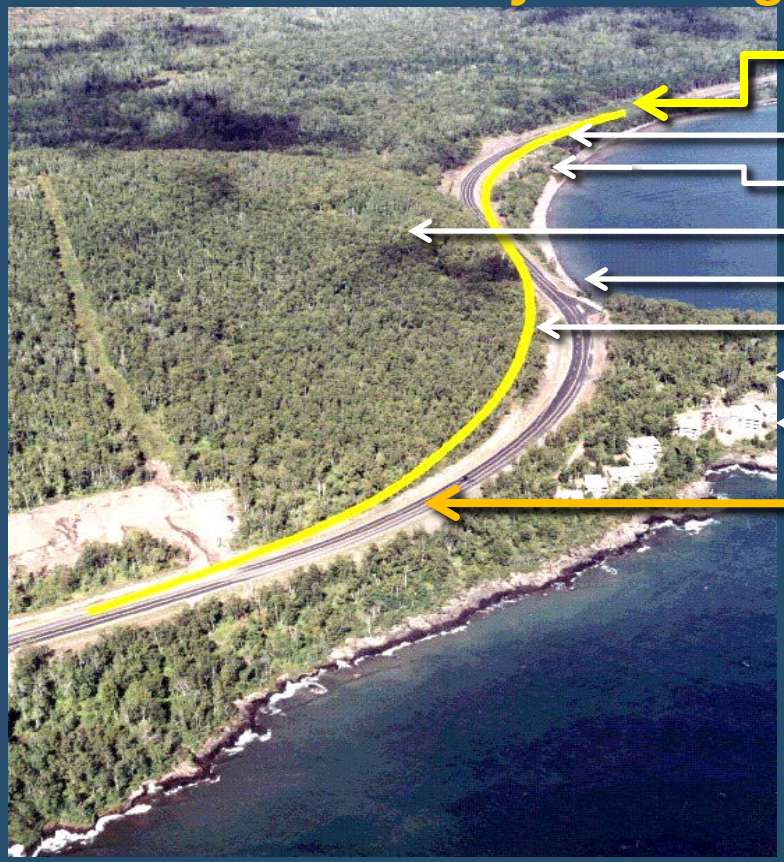
MN TH 100 Retrofit - St. Louis Park Case Study

Narrowed Lanes & Shoulders to Add 3rd Lane Each Direction

Reduced Congestion & Crashes (13:1 Benefit To Cost Ratio)

MN TH 61 North Shore Hwy Reconstruction Case Studies

Flexibility in Design Along Good Harbor Bay



Reduced Design Speed Maximized Geometric Flexibility to Balance Competing Objectives and Reduced Costs & Annual Crashes (56%)

MN TH 61 North Shore Hwy Reconstruction Case Studies

Influencing Driver Behavior Through Schroeder, MN

Vehicle Simulator Evaluation of Potential Traffic Calming Options

Contrasting Pavement Colors had the Most Pronounced Influence

More than a 70% Decrease in the Annual Average of Post-Reconstruction Crashes

MN TH 38 Reconstruction Case Study

2005 AASHTO Best CSS Project Award - National Best Practices in CSS Competition

Flexibility in Design:

- Reduced design speed (50 mph) provided greater geometric flexibility to address constraints and balance the competing objectives
- Upgraded to 10-ton road but maintaining much of the existing horizontal & vertical alignments … balanced with strategic spot and intersection improvements where accident frequency was documented
- 12’ lanes, 4’ paved shoulders with 2’ of added reinforced soft shoulder, rumble stripes, steeper back slopes and variable ditch cross-sections to minimize adverse environmental impacts and costs

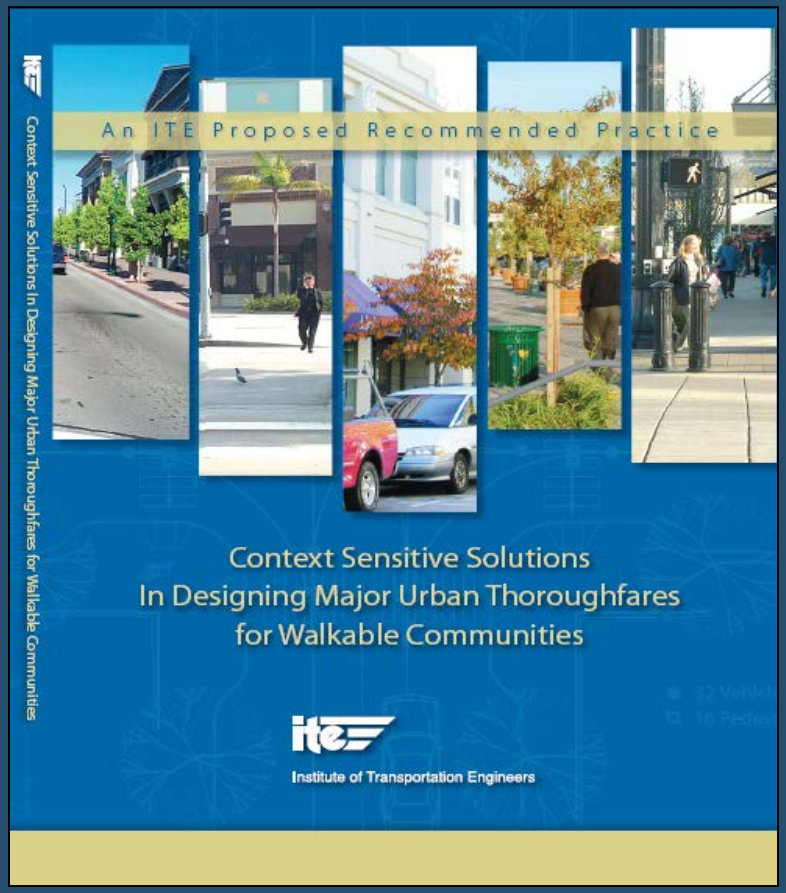
MN TH 38 Reconstruction Case Study

Some Lessons Learned:

- Reconstruction was advanced 10 years ahead of schedule
- Reduced adverse impacts dramatically and costs by more than 40%
- Non-conformance with nominal standards and geometric design guidelines, does not mean a highway will be “substantively” unsafe … it all depends on the unique combinations of circumstances / attributes
- Total accidents were reduced 55% + in the 5-year analysis after completion of the first reconstruction segment … even more so in the second reconstruction segment

MN CSAH 3 Excelsior Blvd Case Study

Flexibility in Design - St. Louis Park , MN



Case Study in ITE's 2006 Proposed Recommended Practice Publication

MN CSAH 3 Excelsior Blvd Case Study

- Reduced design speed and flexibility in design (narrowed lanes, shortened turn lanes, etc.) reallocated space to balance stakeholder needs and objectives while also calming traffic and improving safety for all modes and users
- Other improvements include on street and off street parking in shared mid-block structures, pedestrian safety and comfort amenities, off route bicycle accommodation, near and far side transit stops, public seating and green spaces to create integrated & mutually supportive transportation and land use
- Crashes were reduced over 60 % in the first segment of reconstruction

MnDOT Advanced Flexibility in Design Workshops

Piloted in 2009 and Typically Offered Twice a Year

2.5 Day "Roll Up Your Sleeves" Workshop Focus Includes:

- Rationale for Using Design Flexibility
- Introduction to a Performance Based Approach & Tools
- Using Traffic Data
- Serving All Modes / Users of Transportation
- Risk Management & Safety
- Selecting Design Speed
- Allocating Space in Confined Cross-Sections & Intersections
- Designing Horizontal & Vertical Alignments
- Designing Freeway Interchanges
- Minimizing Construction Impacts
- Classroom Exercises & ADA Field Walk

www.dot.state.mn.us (Search A to Z for Context Sensitive Solutions)

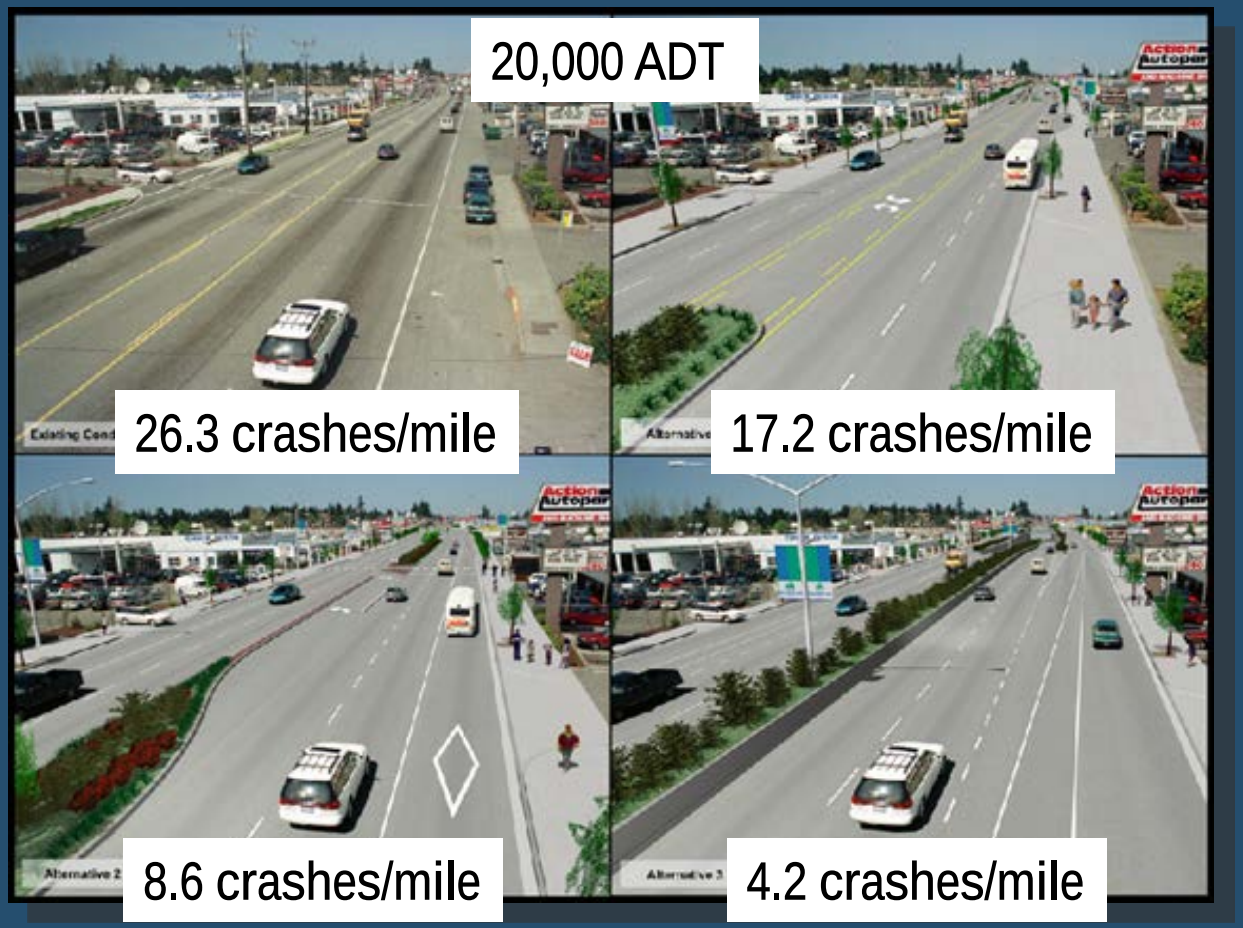
New Tools for Performance Based Flexibility in Design

New AASHTO Highway Safety Manual "Predictive Modeling" Tools

Existing

20,000 ADT

Option 1

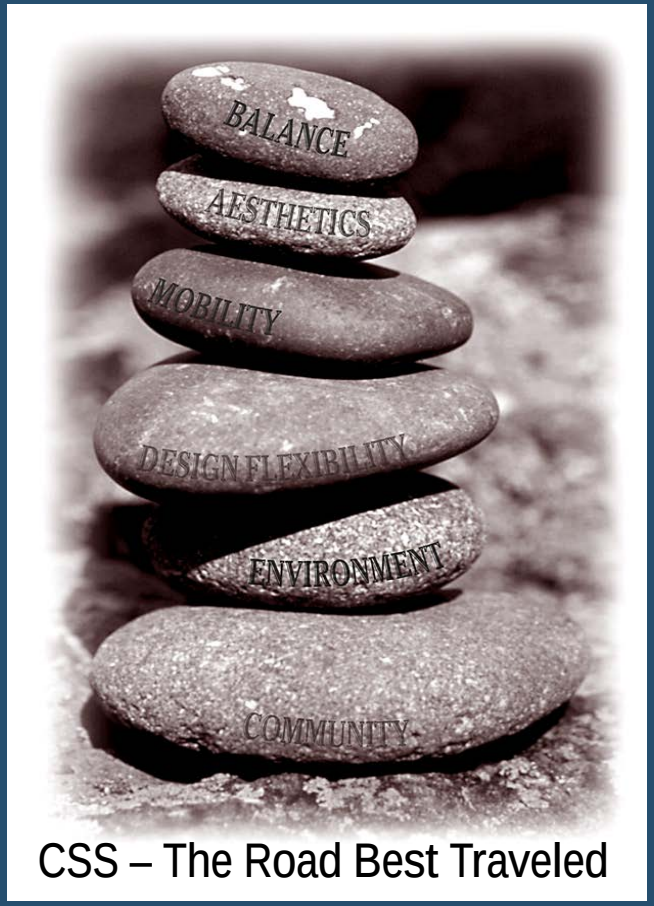


Option 2

Option 3

For Questions and More Info:

Scott Bradley – Mn/DOT Director of CSS
scott.bradley@state.mn.us



CSS – The Road Best Traveled

Your Destination...Our Priority

2009 Flexible Design Forum

Breakout Sessions:

1) Institutional challenges
2) Performance objectives
3) Design flexibility

http://www.cts.umn.edu/contextsensitive/workshops/flexible/documents/whitepaper.pdf

2009 Flexible Design Forum

Breakout Sessions – highest-voted institutional challenges:

1. Culture, silos, authority and discretion
2. Project versus system perspective
3. Overly conservative and rigid standards
4. Perception that flexibility defeats safety
5. Competing performance measures

2009 Flexible Design Forum

Breakout Sessions – highest-voted institutional challenges:

6. Lack of technical knowledge, data and understanding
7. Multimodal priorities and perspectives
8. Purpose and need issues / lack of clarity
9. Design speed, speed management
10. Liability and design exception concerns

2009 Flexible Design Forum

Breakout Sessions – other noteworthy concerns:

- Inconsistent application – district to district, project to project, person to person
- No common philosophy on design exceptions
- FHWA rigid and inconsistent
- Perfect being the enemy of good
- Lack of agreement on what's good enough

2009 Flexible Design Forum

Highest Voted Next Steps:

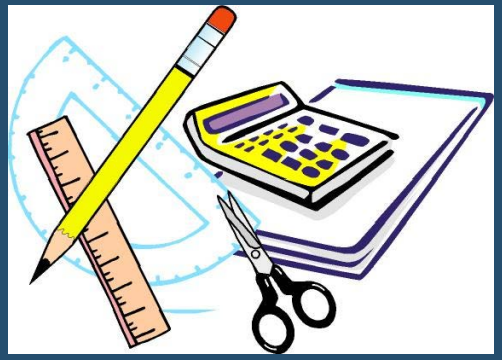
1. Emphasize purpose & need and scoping process
2. Expand training and resources
3. Review and update trunk highway design standards
   - Flexibility
   - Alignment with AASHTO criteria
4. Develop and define the vision

2009 Flexible Design Forum

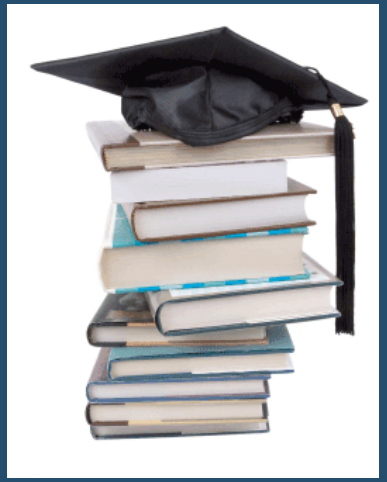
Highest Voted Next Steps:

5. Involve the right people and perspectives
6. Develop policy and guidelines
7. Research, document and disseminate case studies
8. State Aid rules and standards should also be addressed

Advanced Flexibility in Design Curriculum



- Piloted four months after the Flexible Design Forum (June 2009)
- Latest offering was last month
- Seeks to give design practitioners the expertise they need to apply flexibility
  - …or at least orient them to the flexible design mindset and teach them how to learn more



Advanced Flexibility in Design Curriculum

Correlates to Next Steps:

1. Emphasize purpose & need and scoping process
2. Expand training and resources
7. Research, document and disseminate case studies

Re-think of Trunk Highway Road Design Policies

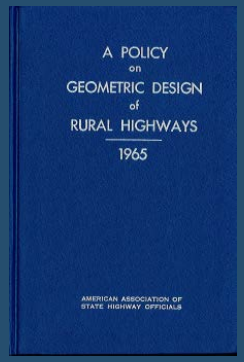
Correlates to Next Steps:

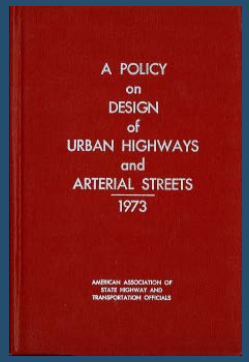
3. Review and update trunk highway design standards
   - Flexibility
   - Alignment with AASHTO criteria
5. Involve the right people and perspectives
6. Develop policy and guidelines

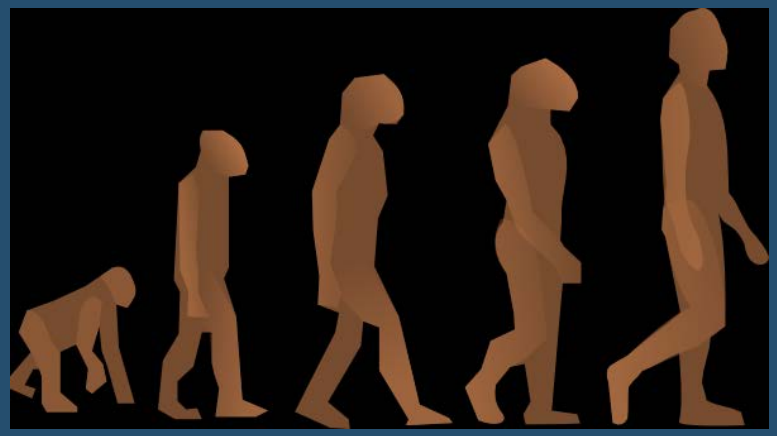
Re-think of Trunk Highway Road Design Policies

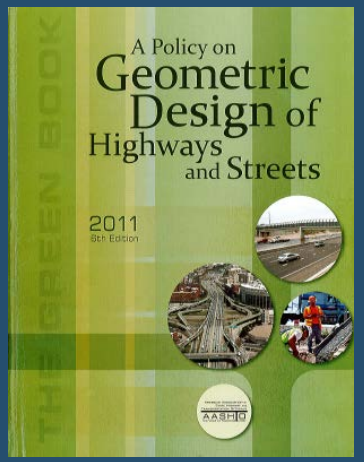
Root problem:

AASHTO





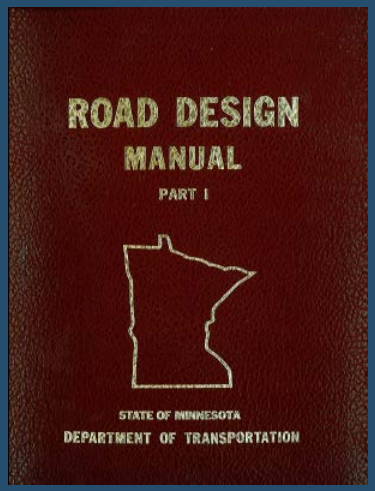


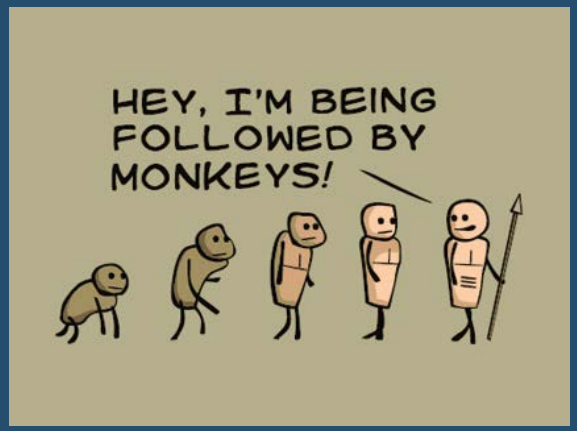


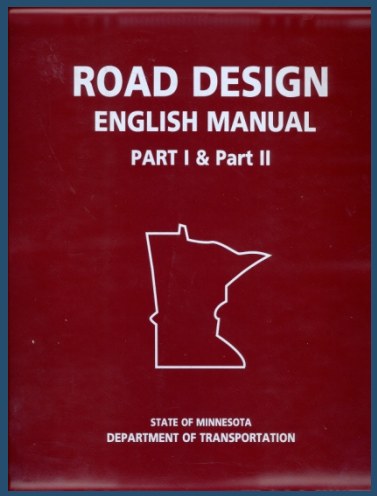
Re-think of Trunk Highway Road Design Policies

Root problem:

Minnesota







Re-think of Trunk Highway Road Design Policies

Additional/related institutional issues:

- Culture has the same inertia as written word
- ‘Bigger is better’ mentality
- Association of spending with benefit
- Oversimplification – i.e. one size fits all
- ‘Perfect project’ mentality
- Confusion with need, problem and scope

Design Standards,
Changes to the 13 Controlling Criteria

A Move Towards Greater Design Flexibility

Mike Elle

December, 2012

- “Standard” Does Not Mean “Best”

►“Unfortunate that the word "standards" should have been chosen. Strictly interpreted, the meaning would indicate that the standard design was the best design.

►Standards are merely recommended designs which are to be adhered to unless conditions indicate that a variation in the design would meet them better.

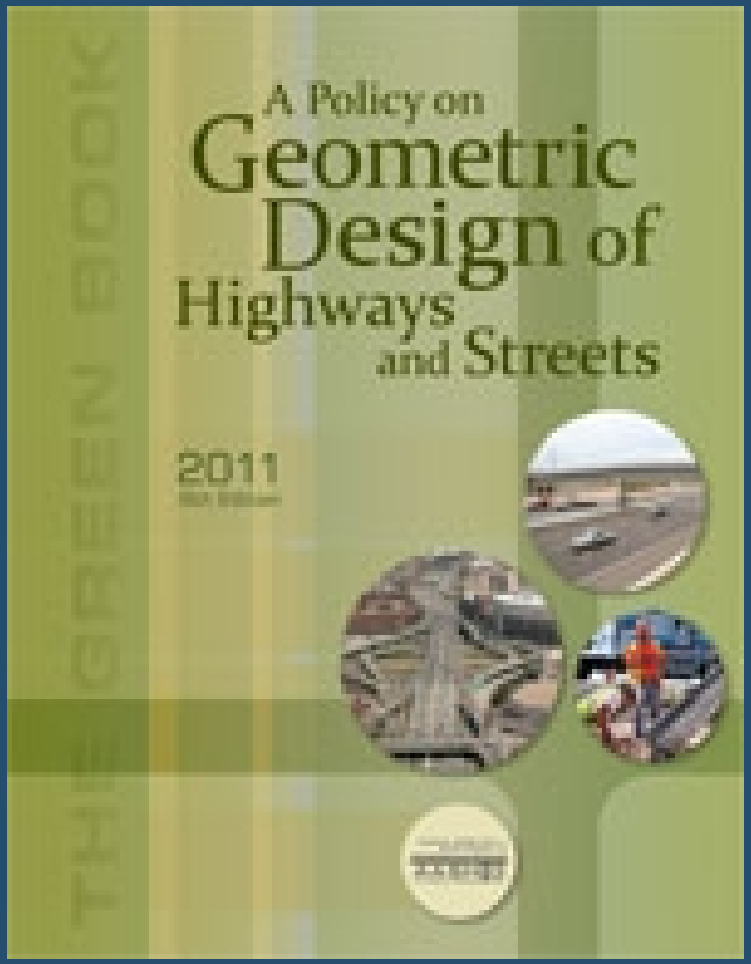
►To neglect the detailed study of local conditions often results not only in an unwarranted increase in cost, but may result in a type of construction which fits poorly the location where used”.

SOURCE: "The Use and Abuse of Road Standards", Engineering and Contracting, Vol. 42, No. 7, (page 145), August 1914

AASHTO

A Policy on Geometric Design of Highways and Streets.

“GREEN BOOK” 2011



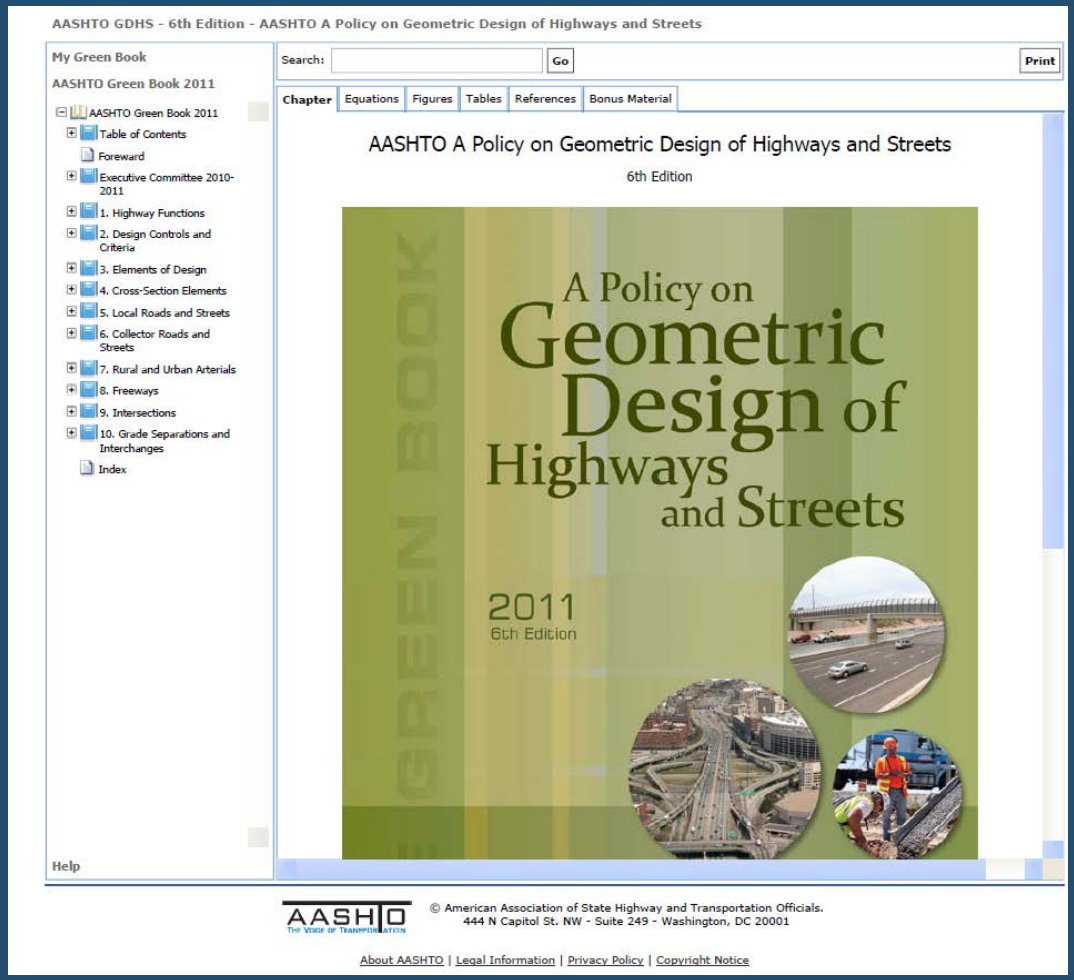
“GREEN BOOK”

Single Print ($200)

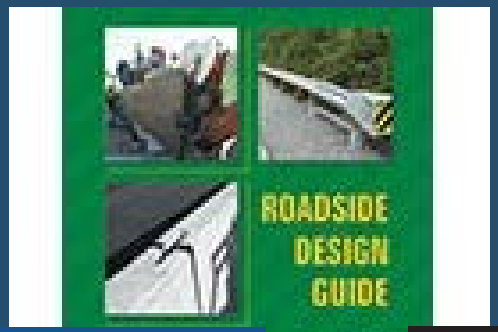
Web Single user ($164)

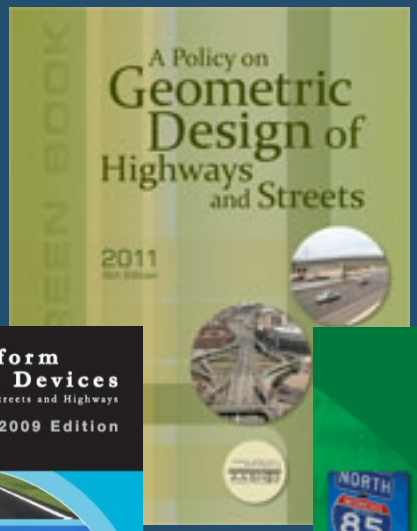
Web 5-user ($720)

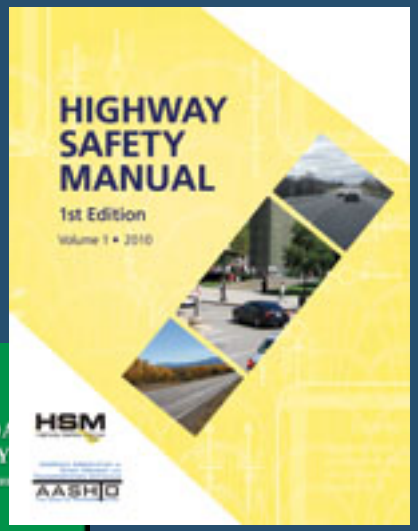
Web 10-user ($1,280)

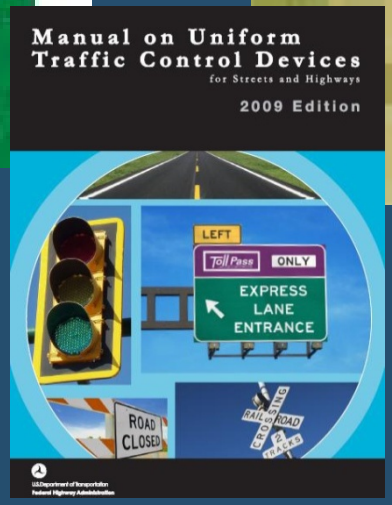


Roadway Design Standards, Guides, and References.



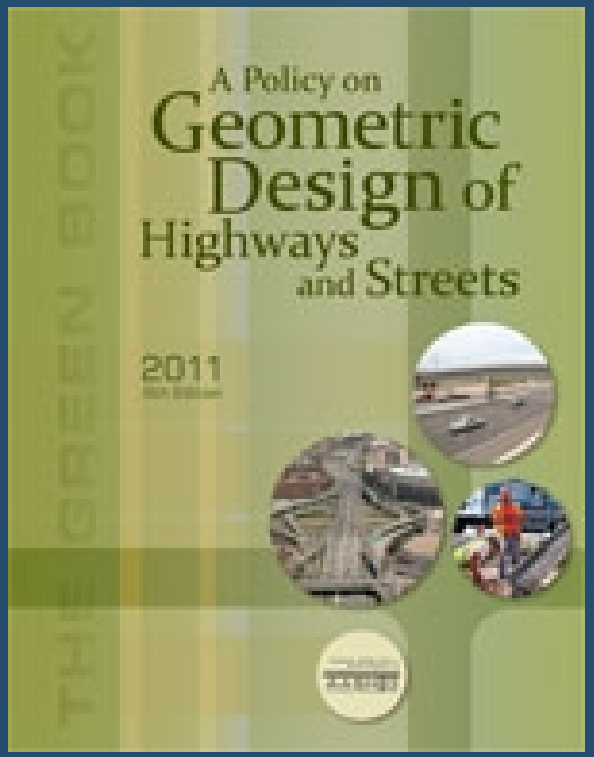






The *Green Book* covers a wide range of geometric elements and design dimensions.

- Thirteen criteria, commonly referred to as the:
  13 controlling criteria.
- Identified by FHWA as having substantial importance to the operational and safety performance of any highway. Such that special attention should be paid to them in design decisions.



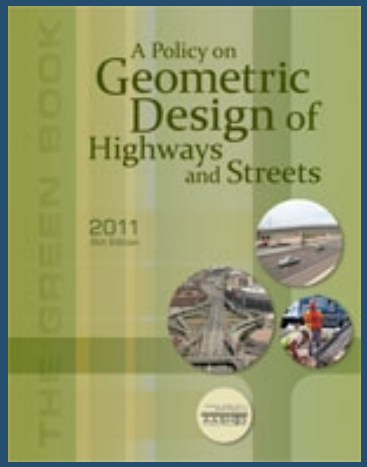
Standards / Policy

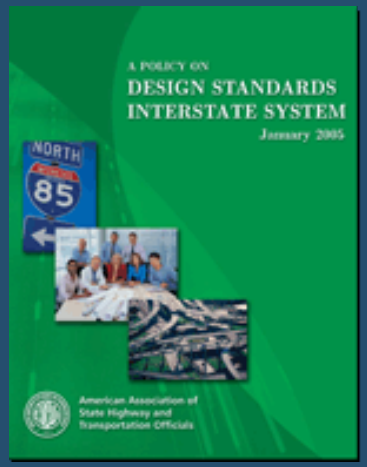
Federal Highway Administration

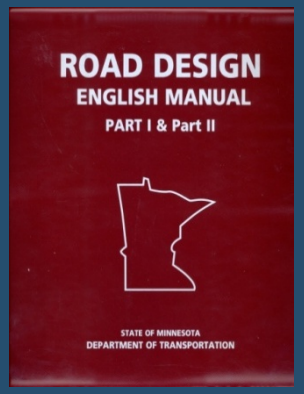
Adopts AASHTO for the NHS

Green Book	Interstate Design Standards

State Standards Must Meet Green Book Values as a Minimum







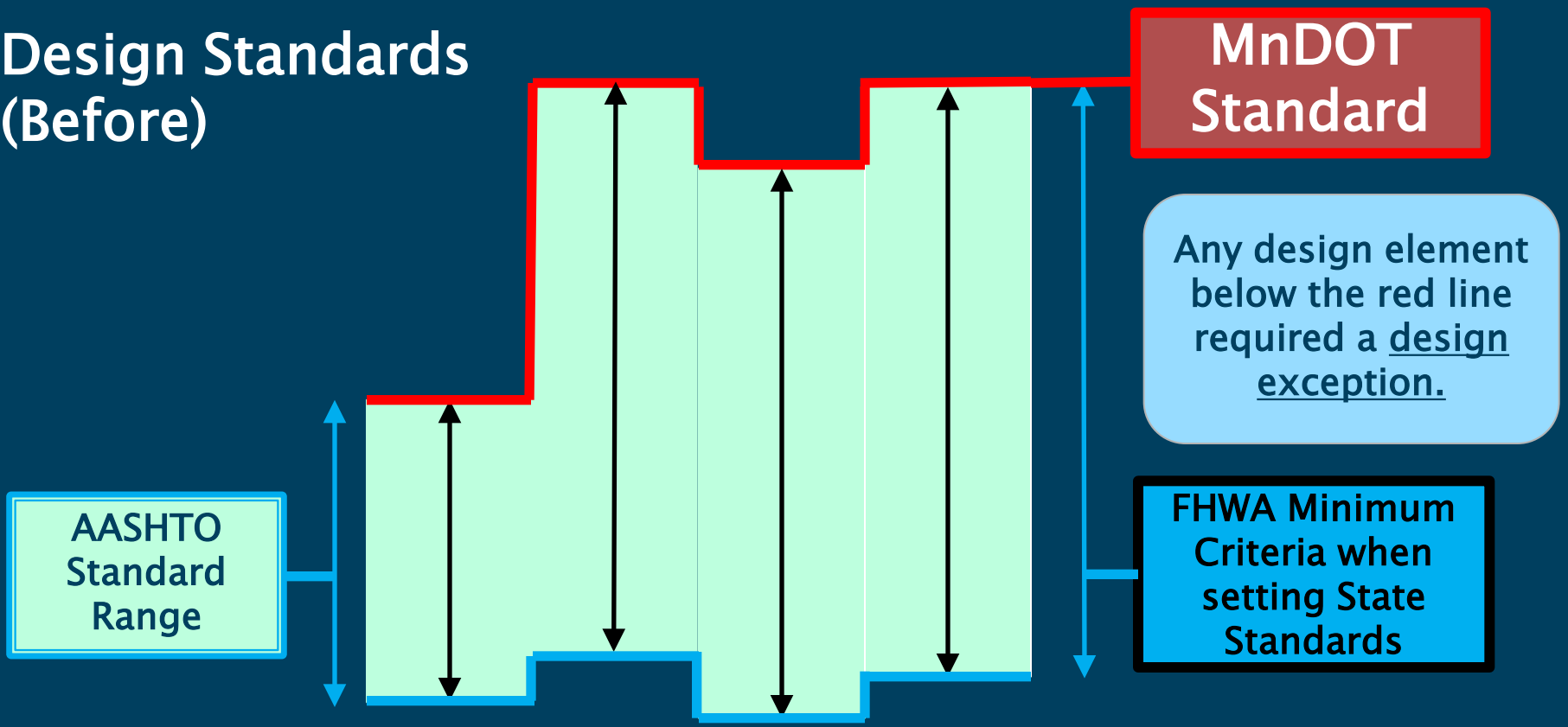
- 13 Controlling Criteria

1. Design speed
2. Lane width
3. Shoulder width
4. Bridge width
5. Horizontal alignment
6. Super-elevation
7. Vertical alignment
8. Grade
9. Stopping sight distance
10. Cross slope
11. Vertical clearance
12. Lateral offset to obstruction
13. Structural capacity

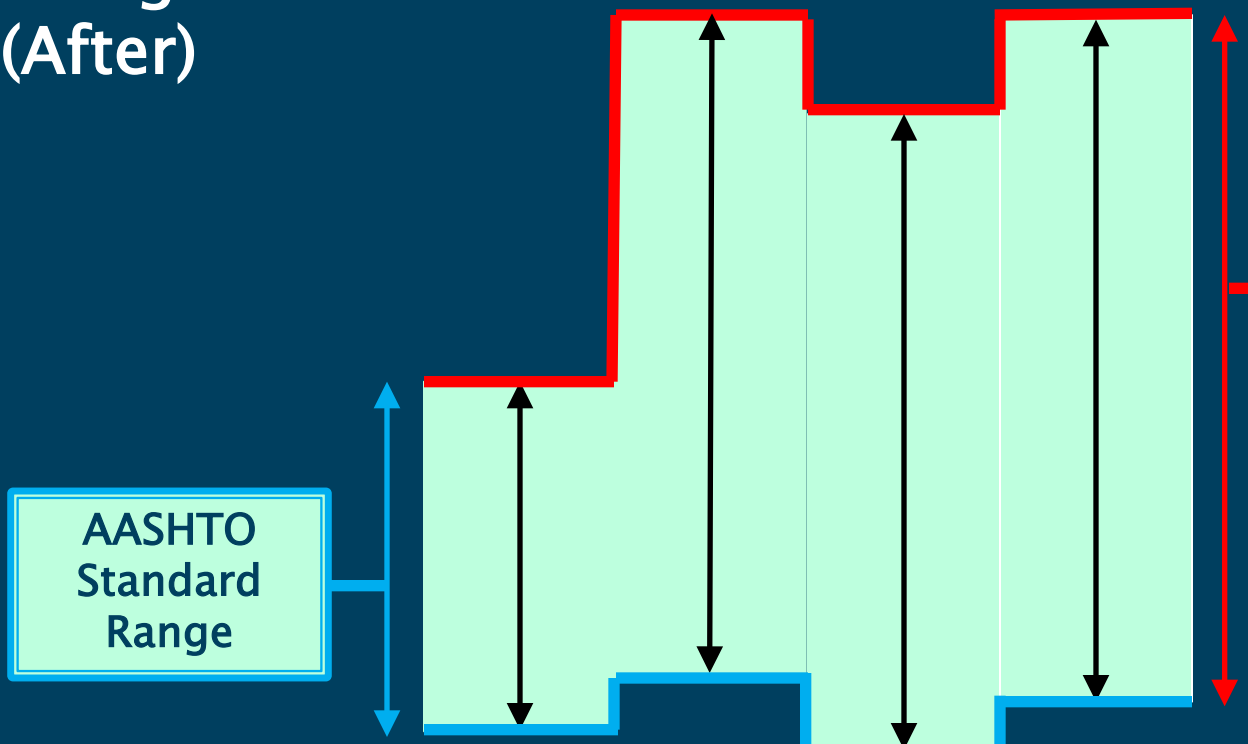
- 13 Controlling Criteria

1. Design speed (TM)
2. Lane width (TM)
3. Shoulder width (TM)
4. Bridge width (TM)
5. Horizontal alignment (TM)
6. Super-elevation (TM)
7. Vertical alignment (RDM)
8. Grade (TM)
9. Stopping sight distance (RDM)
10. Cross slope (TM)
11. Vertical clearance (TM)
12. Lateral offset to obstruction (RDM)
13. Structural capacity (ongoing)

Design Standards (Before)



Design Standards (After)



Range of available standards are now available.

MnDOT Standard Range

Very project & corridor specific.

Documentation !!

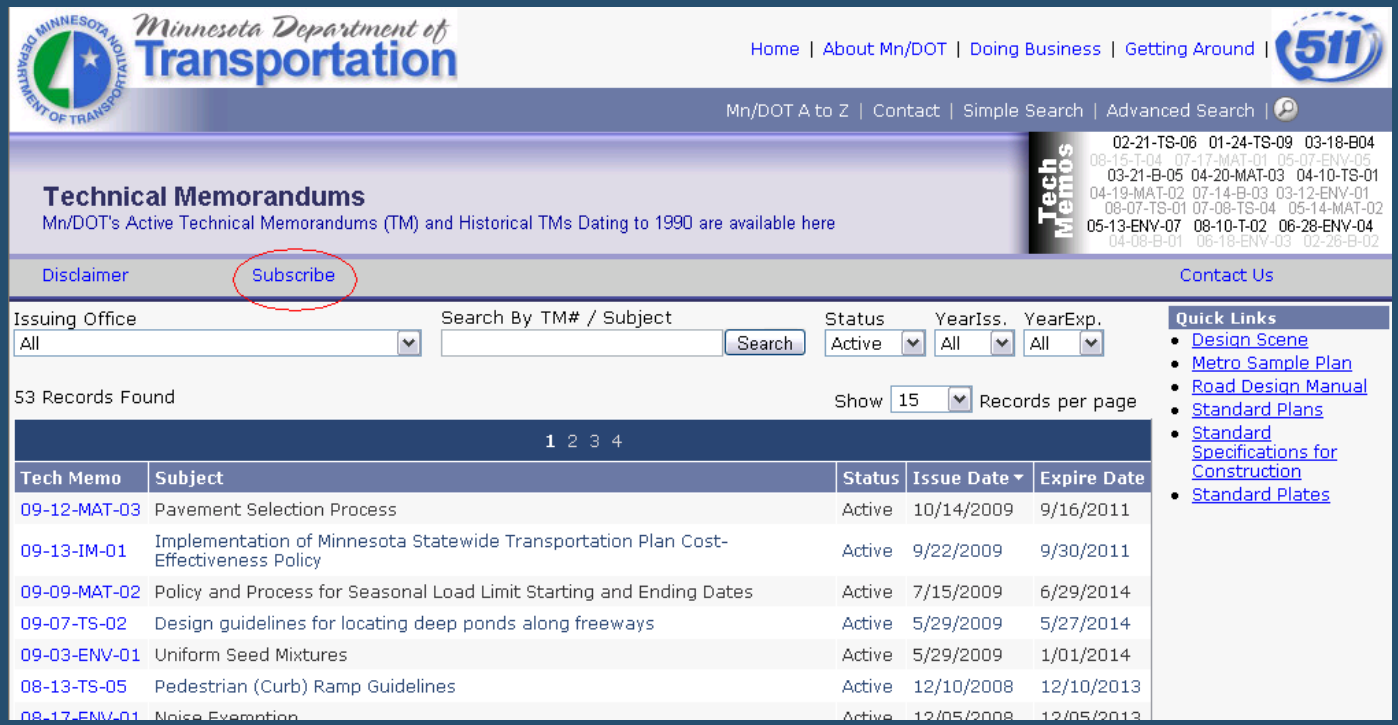
Your Destination...Our Priority

- 13 Controlling Criteria

1. Design speed (TM)
2. Lane width (TM)
3. Shoulder width (TM)
4. Bridge width (TM)
5. Horizontal alignment (TM)
6. Super-elevation (TM)
7. Vertical alignment (RDM)
8. Grade (TM)
9. Stopping sight distance (RDM)
10. Cross slope (TM)
11. Vertical clearance (TM)
12. Lateral offset to obstruction (RDM)
13. Structural capacity (ongoing)

MnDOT Tech Memo Web Page

http://techmemos.dot.state.mn.us/



2. Lane Width

Tech Memo 12-07-TS-02

Traveled Lane Width Standards for State Highways

- Final selection of the traveled lane width should be thoroughly documented
- Two tables; one for Rural and the other for Urban/Suburban
- Both based on Functional Classification and design speeds, Rural adds ADT.
- Values follow Green Book, and range from 9’ – 12’

3. Shoulder Width

Tech Memo 12-12-TS-06

Shoulder Width Standards for State Highways

- Final selection of the shoulder width should be thoroughly documented
- Three tables; one for Collectors, Arterials, and Interstates/Freeways
- Based on Rural and Urban/Suburban, ADT, # of Lanes and configuration, Left and Right, usable and paved
- Numerous qualifying notes and design guidance

10. Cross Slope

Tech Memo 10-05-TS-02

Traveled Way Pavement Cross-Slopes

- Final selection of the cross-slope should be thoroughly documented.
- One Table; Pavement Cross Slope on Tangent Sections.
- Based on Functional Classification, Rural and Urban
- Numerous qualifying notes

10. Vertical Clearance

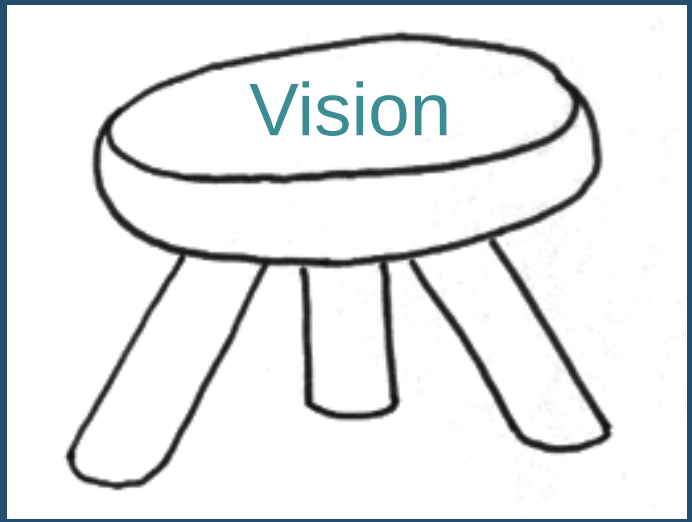
Tech Memo 11-16-B-07

Vertical Clearance Requirements for New Construction

- Final selection of the vertical clearance should be thoroughly documented.
- One Table; Vertical Clearance for Underpasses.
- Based on structure type, new bridges, and new pavement under existing bridges.
- Numerous qualifying notes and design guidance.
- Super Load OSOW corridor guidance included.

Contact: Mike Elle
Office of Project Management
and Technical Support
Michael.elle@state.mn.us
(651) 366-4622

So, where do we go from here?



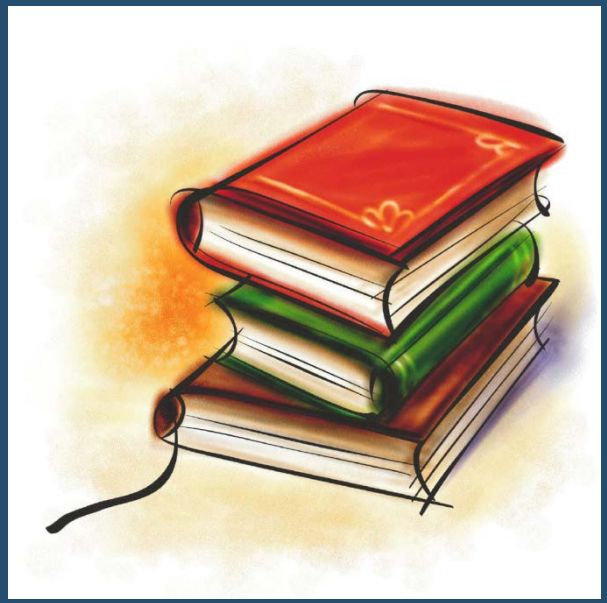
Policy

Projects

Education & Outreach

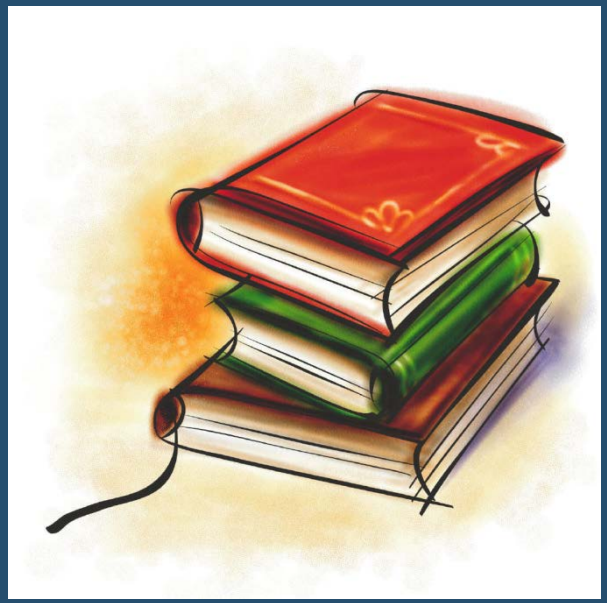
Education and Outreach

- **Continued offerings and continuous improvement of advanced flexibility class**
- **Development of more courses?**
- **Rollout of 13 Controlling Criteria changes**



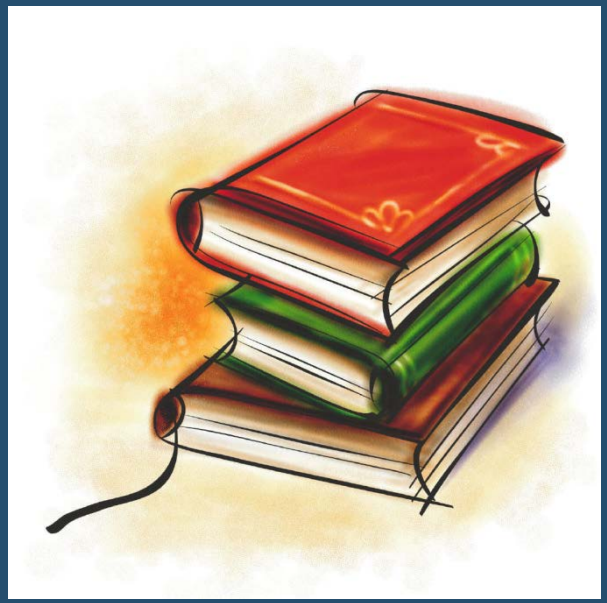
Education and Outreach

- **13cc rollout**
  - In-person sessions at design offices
  - Ongoing customer support
- **Additional informal sessions & seminars**

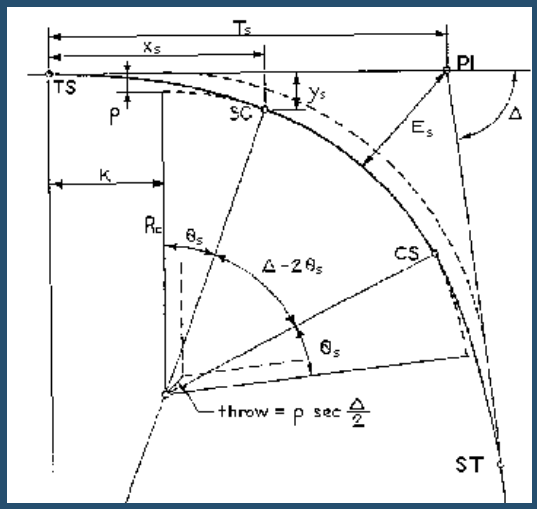


Education and Outreach

- **Goals:**
  - Broad statewide expertise
  - Everyone on board and rowing in the same direction
  - Continuous and ongoing communication
  - Feedback loop into policy refinements



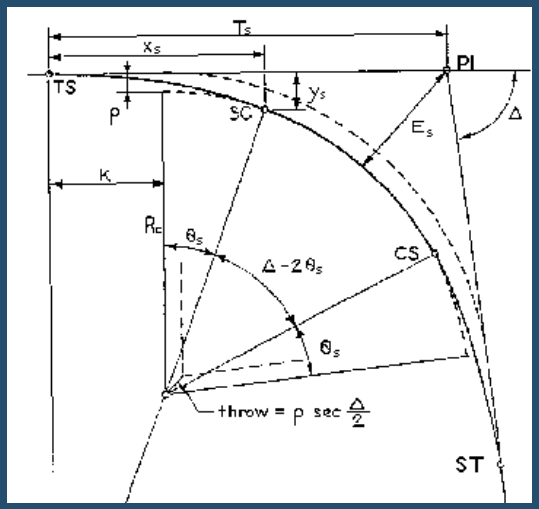
Policy



(Specifically, road design policy and criteria)

- **Incorporation of 13cc revisions**
  - Each on their own time frame
- **'Flexible-ization' and selective relaxation of the general design elements**

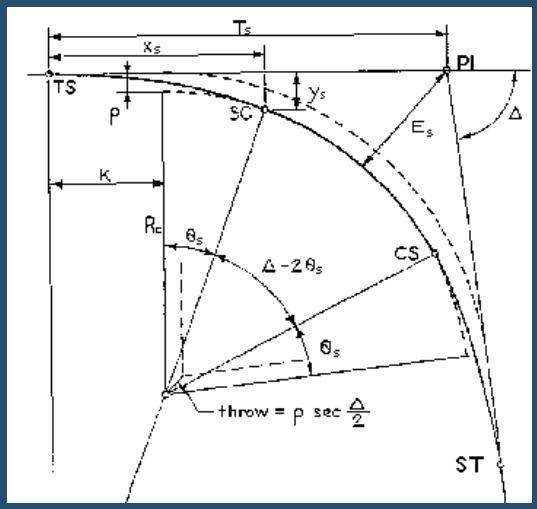
Policy



MnDOT Design Policies:

- **Right-sizing and alignment with AASHTO**
- **Exploration of flexibility**
- **Innovative methods and approaches**
  - Integration with the HSM
  - Other performance-based strategies

Policy

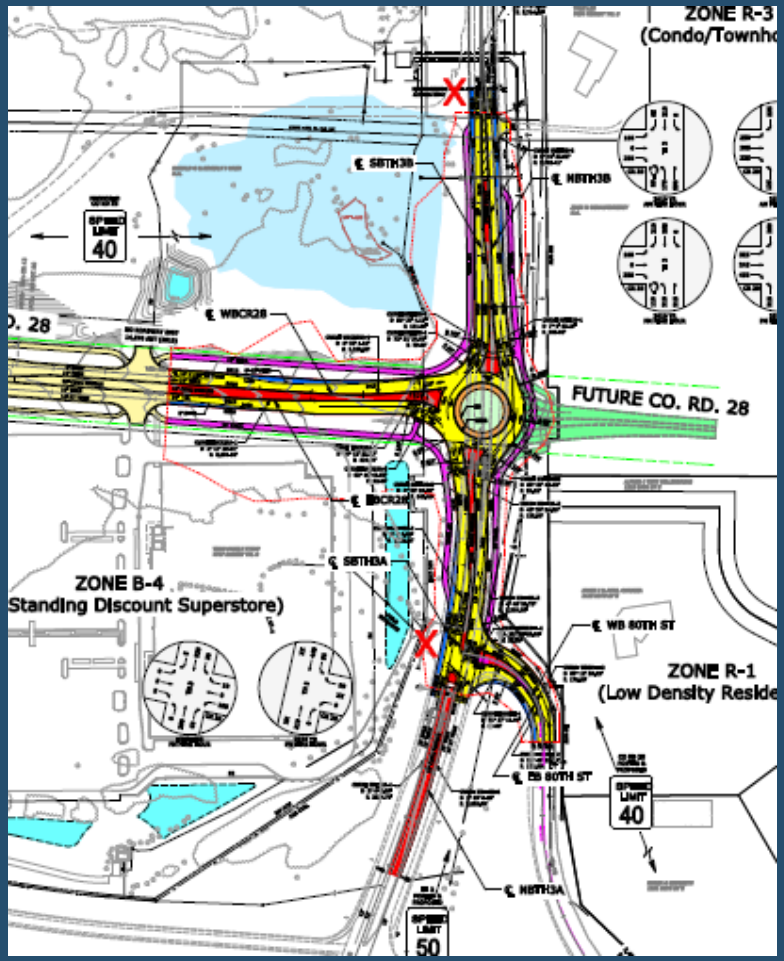


The National Scene:

- **Green Book visioning**
  - HSM integration
  - Distinguishing between new construction and reconstruction
- **Pushing for more practical and sustainable ways of doing things**

Projects

- **Early and continuous involvement**
- **New methods, tools, procedures for right-sizing designs?**

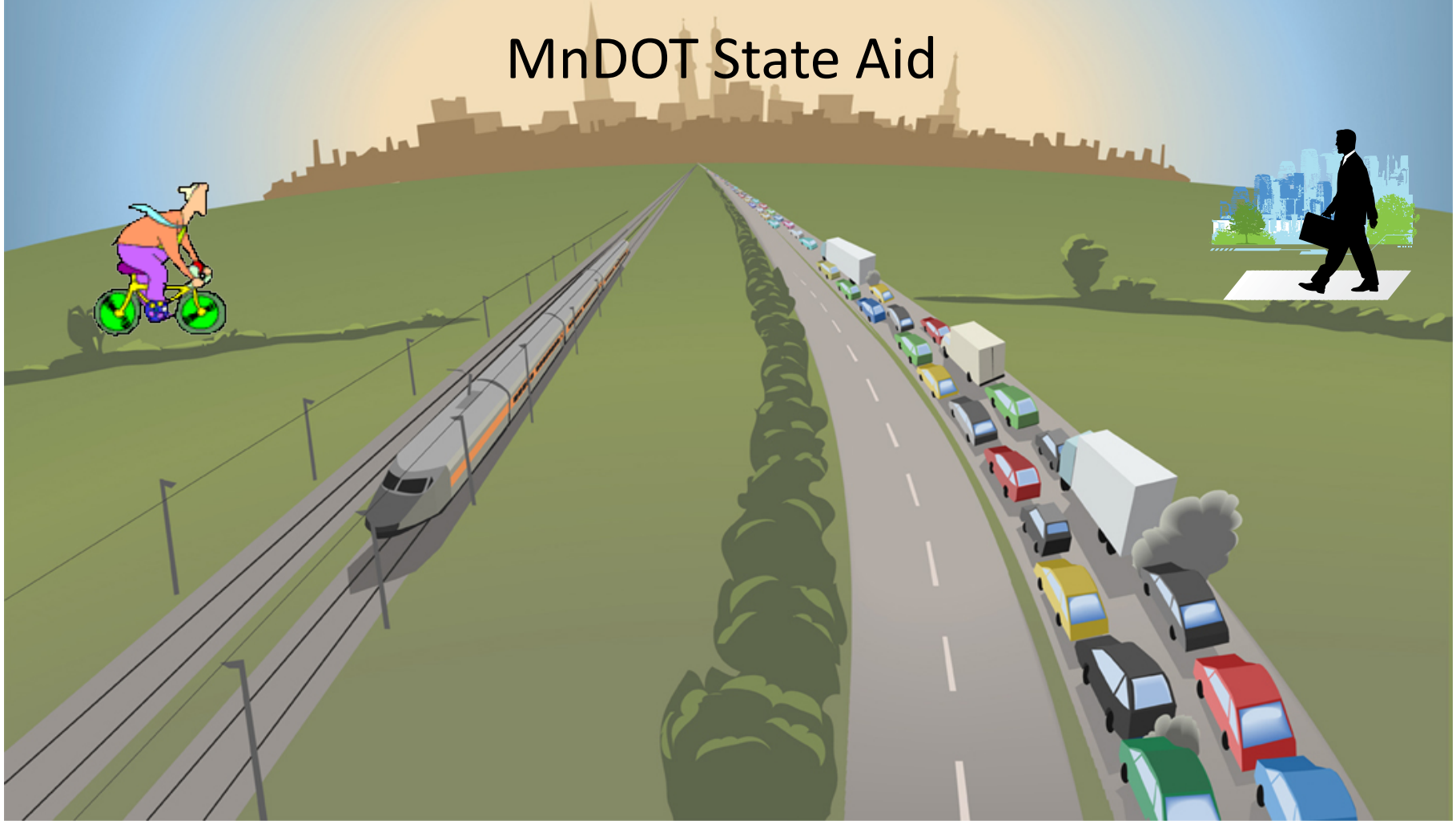


Flexibility in Design Webinar

December 11, 2012

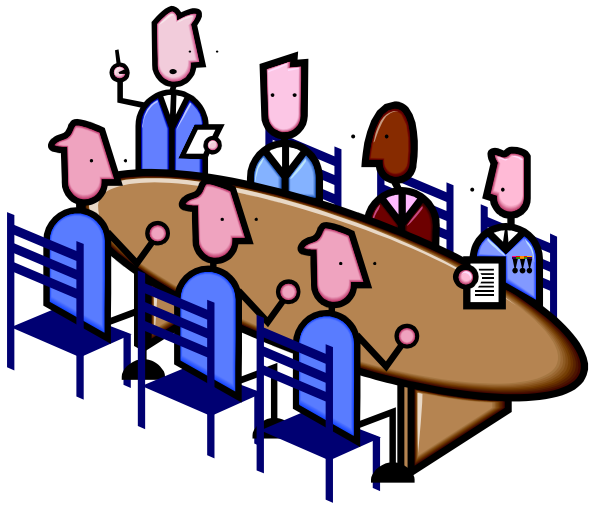
Julie Skallman

MnDOT State Aid



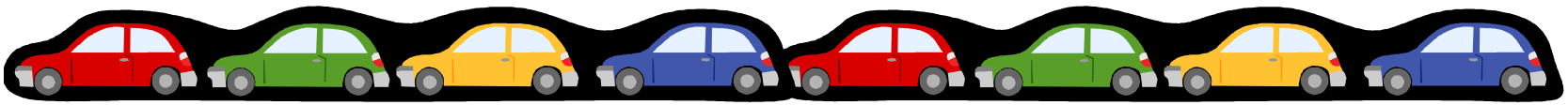
Complete Streets External Advisory Group

- Meeting since July, 2010
- Advise us on implementation on trunk highways
- Suggested more progress could be made with flexibility on local roads
- Caused us to move more quickly



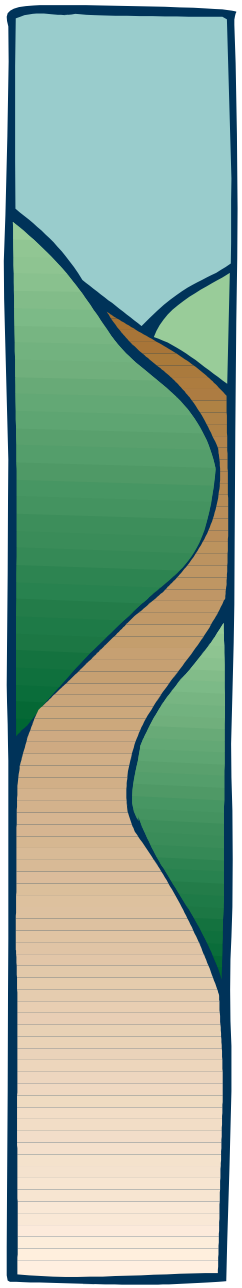
State Aid Rules

- Required by statute
- Force and effect of law
- Variances are allowed by statute
- Apply only to CSAH and MSAS systems
- 30,000 CSAH – 3500 MSAS miles



Local Roads

- Agency determines their own standards
- 16,000 miles of city streets
- 15,000 miles of county roads
- 60,000 miles of township roads



State Aid Standards

- Adopted November 2012
- Allow on-road bike lanes
- Reduced width standards

http://www.dot.state.mn.us/stateaid/BikePathRules/On-Road-BikePath.pdf

State Aid For Local Transportation - Windows Internet Explorer

http://www.dot.state.mn.us/stateaid/

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Minnesota Department of Transportation

511

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State Aid for Local Transportation

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Get Help for SALT Website or Applications

Hot Topics

Project Tracking Mapping

MDSS Reference Guide

LRIP Project List

Best Value Procurement

Design Build for Locals

State Aid Scene

State Aid Flood and Disaster Relief Information

County Roadway Safety Plans

Curb Ramp Guidelines

MnDOT's State Aid for Local Transportation (SALT) Division works closely with local levels of government to ensure the state maintains a safe, effective and coordinated highway network.

In addition to funding support, staff from SALT provides technical assistance in highway and bridge design, construction and maintenance, authorizes grants for bridge construction, coordinates local federally funded projects and provides overall management of the state aid system.

Important State Aid Information

- Bridge Info * Needs Citrix Client and Password
- Bridge Grant Agreement Template
- Bridge Grant Agreement Instructions
- Comprehensive Highway Safety Plan
- EAdvert
- Electronic Communications
- Finance Forms
- FWD Project Files
- Metro State Aid
- Org Chart
- Roundabout List
- Safe Routes to School
- Sample Bond Fund Resolution
- SA Applications
- On-Road Bike Path Rules
- SA Bicycle Path Design
- SA Manual

Local intranet | 125%

Start | State Aid For ... | 2:50 PM

8820.9941 MINIMUM DESIGN STANDARDS: ON-ROAD BICYCLE FACILITY FOR URBAN; NEW OR RECONSTRUCTION PROJECTS.

Functional Classification and Projected Traffic Volume	Design Speed	Lane Width (a)	Curb Reaction Distance (d)	Parking Lane Width (f)	Bikeway Design Roadways with Two Travel Lanes Urban Curb and Gutter		Bikeway Design Roadways with Four or more Travel Lanes Urban Curb and Gutter
	(mph)	(feet)	(feet)	(feet)	(ADT)	(feet)	(feet)
Collectors or Locals with ADT <2,000	25-30	10-12 (e)	2	7-10	<500	SL	N/A
					500-2,000	WOL 4-16 or BL5-6	
	35-40	11-12	2	8-10	<500	SL	BL5-6
					500-2,000	WOL 14-16 or BL5-6	
	over40	12	2	10		BL5-6	BL5-6
	35-40	11-12	2	8-10		BL5-6	BL5-6
	over40	12	2	10		BL-6	BL
Collectors or Locals with ADT 5,000-10,000	25-30	10-12 (e)	2	7-10		BL5-6	BL5-6
	35-40	11-12	2	8-10		BL5-6	BL5-6
	over40	12	2	10		BL6 or PS 8 or SUP	BL6 or PS8 or SUP

8820.9941 MINIMUM DESIGN STANDARDS: ON-ROAD BICYCLE FACILITY FOR URBAN; NEW OR RECONSTRUCTION PROJECTS.

Functional Classification and Projected Traffic Volume	Design Speed	Lane Width (a)	Curb Reaction Distance (d)	Parking Lane Width (f)	Bikeway Design Roadways with Two Travel Lanes Urban Curb and Gutter		Bikeway Design Roadways with Four or more Travel Lanes Urban Curb and Gutter
	(mph)	(feet)	(feet)	(feet)	(ADT)	(feet)	(feet)
Collectors or Locals with ADT 5,000-10,000	25-30	10-12 (e)	2	7-10		BL 5-6	BL 5-6
	35-40	11-12	2	8-10		B: 5-6	Bl 5-6
	Over 40	12	2	10		BL 6 or PS 8 or SUP	BL 6 or PS 8 or SUP
Collectors or Locals with ADT ≥10,000 and Arterials	30-40	11-12	4(b)	10		BL6orPS 8orSUP	BL6orPS8 orSUP
	over40	12	4(b)	10(c)		BL6orPS 8orSUP	PS8orSUP

Next Steps

- Monitor use of the revised standards in designs
- Identify any additional modifications needed

Discussion / Questions