



Complete Streets

Jeremy Klop, AICP

The Rocky Mountain Land Use Institute

Sustainable Community Development Code
Research Monologue Series:
Urban Form, Transportation



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About the Research Monologue Series

The Sustainable Community Development Code, an initiative of the Rocky Mountain Land Use Institute, represents the next generation of local government development codes. Environmental, social, and economic sustainability are the central guiding principles of the code. Supporting research for the code is represented by a series of research monologues commissioned, presented and discussed at a symposium held at the University of Denver in September of 2007. RMLUI and the University of Denver's Sturm College of Law extend its gratitude to the authors of the papers who have provided their talents and work pro bono in the service of the mission of RMLUI and the stewardship of the creation.

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About the Author

Jeremy Klop is an Associate with Fehr & Peers, a transportation planning and engineering consulting firm, in Denver, Colorado. His professional experience includes multimodal transportation planning and forecasting, comprehensive and transportation plan development, transportation impact analysis, and microsimulation. With a strong technical background in both travel demand modeling and traffic operations analysis, he has helped communities translate their vision for long range travel patterns into near term actions with an immediate impact on the transportation system. His project management experience includes large scale, multimodal transportation projects such as the Downtown Multimodal Access Plan in Denver, the Urban Street Standards for TODs and Urban Centers in Aurora, and the Walkability Plan for Kansas City, Missouri. He is also managing all of the travel demand forecasting activities at Stapleton, the largest urban redevelopment project in the country. In addition to project experience, Jeremy has published and presented nationally on bicycle safety issues, modeling transportation and land use interactions, and simulation of transportation alternatives. He is a member of the American Institute of Certified Planners (AICP) and the Institute of Transportation Engineers (ITE) and currently serves as the Vice President of Communications for Colorado APA.

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Complete Streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a complete street.

Completestreets.org

Introduction

The desire for safe streets that function well for all users is a timeless idea. Since the early part of the last century, street design has been an interdisciplinary affair, often occurring in the context of a larger vision for the neighborhood, community, or city. Designs were guided by the uses planned along the street, the needs of pedestrians, horse drawn carriages, bicycles, and even streetcars. In urban environments, conflicts between these street users were commonplace and various design solutions were devised to address these challenges.

With the mid-20th century rise of the automobile, however, the focus on street design shifted; driven by new physical and safety considerations related to the size, weight, and speed of the automobile. Specialists in traffic engineering emerged. A new professional language was created. Roadway standards were developed, and attention was increasingly focused on moving vehicles quickly, minimizing delay for motorists, and increasing the personal freedom, access, and mobility afforded by the automobile.

The sustainability implications of this narrow focus on the automobile are widespread. At the community scale, land uses have become increasingly segregated and separated by larger distances, requiring more time and more energy to meet daily needs. At the neighborhood scale, higher traffic speeds and higher traffic volumes increasingly conflict with pedestrian and bicycle uses that once shared the same streets. At the roadway intersection level, improvements constructed to meet vehicular delay standards have the unintended consequence of also creating wide and unfriendly barriers to pedestrian crossing.

As a result, there is a growing public desire for a return to more walkable and bikable streets that support livable communities. Increasingly, local and regional agencies are working in support of street and transportation network design that encourages walking, bicycling, transit use by all users, including children, seniors, and disabled. The public is calling for a renewed attention to the context

and adjacent land uses, focusing on streets and the access they provide to the destinations they are meant to serve.

The two concepts that have galvanized this growing interest are “Complete Streets,” with an emphasis on routinely designing for all street users, and “Context Sensitive Design,” with an emphasis on an inter-disciplinary approach to design and increased consideration of the surrounding context.

Complete Streets

A complete street is safe, comfortable, and convenient for travel via automobile, foot, bicycle, and transit. This concept was initially championed by cycling advocacy groups seeking increased accommodation of cyclist needs in roadway design. What their initial research revealed was a changing attitude among the majority of Americans. For the first time in decades, surveys are showing a preference for expanding existing public transportation and building new bikeways and sidewalks over expanding existing highways and building new highways.¹

Despite the increasingly segregated land use pattern changes over the last century, the potential for increasing bicycle and walking trips is high and the need is growing:

- There are an estimate 35.3 billion walking trips nationwide every year in the U.S.
- Walking is not just for recreation. Over 50% of all walking trips serve a functional purpose other than exercise and recreation²
- Nearly a third of Americans do not drive, and the non-driving senior population will grow even larger in the near future with the aging Boomer generation
- 55% of Americans say they would rather drive less and walk more³
- The top pedestrian complaint is simply that there are too few sidewalks⁴
- The top bicyclist complaint is simply that there are too few bikeways⁵

Incomplete street design may also result in continued safety problems. Streets designed exclusively for the automobile have been associated with disproportionately high crashes rates and fatalities for pedestrians and bicyclists. While pedestrian and bicycle trips account for roughly 9% of all trips, 13% of all traffic related fatalities involve pedestrians and bicyclists⁶.

States and local jurisdictions are responding to these changes with new policies and changes to internal design processes and transportation planning to

¹ Federal Highway Administration Infrastructure Survey, 2000.

² Natl. Survey of Pedestrian and Bicyclist Attitudes and Behaviors, 2002

³ Surface Transportation Policy Project Survey, 2002

⁴ National Transportation Availability & Use survey, 2002

⁵ National Transportation Availability & Use survey, 2002

⁶ 2005 NHTSA Traffic Safety Facts

routinely accommodate all modes of travel. Examples of agencies with complete streets policies include:

	State	County	Metropolitan Planning Organization	City
Legislative: Legislation, Ordinances, Resolutions	OR,	DuPage, IL	Columbus, OH	Columbia, MO
	FL, RI,	Sacramento, CA	Bay Area, CA	Sacramento, CA
	NC,	CA		Aurora, CO
	SC, MA	San Diego, CA Jackson, MI		Spartanburg, SC
Procedural: Policies, Plans, Manuals	TN,		Cleveland, OH	Chicago, IL
	CA,		Bay Area, CA	Charlotte, NC
	KY,		Knoxville, TN	Aurora, CO
	VA,		Gulf Coast, FL	Boulder, CO
	PA, MA		Austin, TX	Colorado Springs, CO
				Fort Collins, CO
				Santa Barbara, CA
				San Diego, CA
			W. Palm Beach, FL	

Source: Completestreets.org

Context Sensitive Design

Also referred to as Context Sensitive Solutions (CSS), this idea has become an accepted approach to designing or re-designing streets to be more compatible with adjoining uses and more accommodating to all modes of travel. The broader scale design approach often incorporates complete streets concepts into a larger discussion of the street and its function in relationship to land use. There is strong support for CSS at the Federal level. States such as New Jersey, Maryland, Washington, and California have adopted context sensitive design policies that consider the impact of state highway designs decisions on abutting land uses, community character, and the comfort and convenience of pedestrians, cyclists, and transit users as well as automobiles. The design process is also changing with this concept, shifting the focus from the motorist to include consideration of safety, operations, community and aesthetics, natural and built environments, and the jurisdiction interests.

Techniques include more rigorous management of traffic speeds, narrowing the traffic realm while expanding the pedestrian realm, accommodating bikes and transit, using curb parking as a buffer between moving traffic and sidewalk activities, and improving the sidewalk environment and ability of pedestrians to cross the street. Land use related policies include specific policies for transit oriented development locations, urban centers, and pedestrian priority zones such as Downtown area. A compilation of many such techniques can be found in the Context Sensitive Solutions for Major Urban Thoroughfares in Walkable

Communities document, which was jointly prepared by the Institute of Transportation Engineers and the Congress for New Urbanism.

Examples at the local level of context sensitive design are often expressed in flexible street standards or typologies that vary with the type of adjacent land use. Blueprint Denver in Colorado and the Sacramento Area Council of Governments Blueprint in Sacramento, California represent examples where street design considerations were integrated into the larger community land use planning effort.

Sustainability Benefits

In addition to responding to an increasing desire from the traveling public for more walkable and bikable communities, complete streets and context sensitive solutions can provide the following sustainability benefits:

- Increased safety for bicyclists and pedestrians
- Energy savings related to more fuel efficient modes of travel
- Infrastructure cost savings with coordinated land use and transportation planning
- Reduced vehicle miles traveled (VMT) resulting in:
 - CO2 emission reduction
 - Improved traffic flow
 - Decreased maintenance and repair costs
- Improved Public health
 - Increased physical activity levels
 - Improved air quality

Principles for Sustainable Transportation

The body of research and literature surrounding both Complete Streets and Context Sensitive Solutions is growing and focusing attention to design at the street level. This work fits into a larger framework of transportation planning at a range of scales that also considers regional accessibility, network design, and integrated land use and transportation planning to provide a sustainable transportation system.

At the regional scale, highly interconnected vehicle, transit, bicycle, and trail networks increase accessibility and provide a variety of transportation choices. The focus at this scale should be on incorporating all modes into travel modeling and planning, increasing accessibility and mobility through land use and multimodal network planning, and working to minimize the average length of vehicle trips in the region through compact growth and a balanced mix of jobs and housing. Ideally, the roadway, transit, and trail networks should be serving trips throughout the day in both directions to maximize the utility of these investments.

The best work at the local scale or street level should consider the following Principles for Sustainable Transportation Design:

1. **Land Use Context** – sustainable street design reflects and enhances the adjacent land uses and the surrounding context
2. **Multimodal Design** – sustainable street design operates safely at all times for all modes of travel and all users, including the young, old, able and disabled
3. **Aesthetic Quality** – sustainable street design reflects a commitment to aesthetic quality in the public realm and a sense of civic art, increasing economic value and the desire to use the space
4. **Interdisciplinary Approach** – sustainable street design includes consideration of safety, operations, community and aesthetics, natural and built environments, and the agency interests
5. **Community Input** – sustainable street design reflects community values, needs, and ideas

Potential Sustainability Measures:

- Percent of streets with accommodation for all modes
- Regional accessibility
- Quality of transit service
- Percent of population within walking distance of transit
- Percent of jobs within walking distance of transit
- Percent of population served by bicycle facilities
- Percent of jobs served by bicycle facilities
- Average vehicle trip length (shorter is better)
- Increased bicycling mode share
- Increased walking mode share
- Increased transit mode share
- Person throughput (corridor or intersection)
- Energy (fuel) savings due to mode shift
- Safer streets (reduction in bicycle & pedestrian crash severity and frequency)
- Emissions metrics related to vehicle use

Land Use Code Strategies

Removing Obstacles

- Eliminate “one size fits all” approach to roadway design process and standards
- Include all users in safety and design discussions
- Remove or reduce auto-centric peak hour level of service (LOS) standards on certain streets or in certain locations
- Remove or reduce vehicle parking supply requirements

Incentives

- Increased development intensity
- Reduced contribution to development related roadway infrastructure costs
- Provide funding for all elements of the right of way, not just curb to curb vehicular improvements
- Increased maintenance funding for enhanced design treatments
- Allocate a minimum percentage of agency funding for bicycle, pedestrian, and transit improvements
- Link parking pricing to street improvements

Regulations

- Regional Transportation Plans
- Adequate Transportation Facilities Ordinances
- Transportation Demand Management Programs
- Transportation Impact Fees
- Vehicle Miles Traveled Fees
- Context Sensitive Design Standards
- Complete Streets Policies
- Multimodal Level of Service Policies
- LEED ND Standards

Please feel free to contact Jeremy R. Klop, AICP with comments, questions, or suggestions at 303.296.4300 or j.klop@fehrandpeers.com