Sustainable Complete Streets

Complete Streets are designed and operated so they work for all users– pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Communities that adopt complete streets policies are asking transportation planners and engineers to consistently design and alter the right-of-way with all users in mind. Contact the National Complete Streets Coalition (www.completestreets.org) to learn about the diverse groups working together to enact complete streets policies across the country!

Communities across the country are realizing the 'green' potential of their streets. Making our transportation system more sustainable involves many policies and practices that minimize environmental impact and create streets that are safe for everyone, regardless of age, ability, or mode of transportation. Complete streets are a natural complement to sustainability efforts, ensuring benefits for mobility, community, and the environment.

Many elements of street design, construction, and operation can work in favor of achieving both complete streets that work for all travelers and 'green' streets that serve environmental sustainability. Of particular concern are drainage and stormwater runoff issues too common in traditional streets. Optimal stormwater management looks beyond simply removing rainfall as quickly as possible, which risks negative environmental impacts associated with both stormwater quality and quantity, like polluted runoff, sedimentation, and bank erosion. Instead it focuses on efforts to retain and treat – or even eliminate – runoff at the source through cost-effective green infrastructure[1], improving water quality and complementing complete streets efforts.

Photo: Dan Burden

This street is welcoming for pedestrians, bicyclists, and transit; plentiful street trees help to 'green' it.

Pavement

Wide streets are problematic for mobility and ecology – they can be unpleasant or, worse, unsafe, for anyone traveling along or across via foot or bicycle and the large swaths of impervious pavement necessitate expensive drainage and treatment systems that can have harmful effects on water quality and quantity. Drainage facilities can affect pedestrians, bicyclists, and public transportation users in various ways as well. Poorly maintained systems create puddles that splash pedestrians and those waiting in bus shelters and that are hazards for bicyclists, hiding potential cracks that could spell rough spills.

Photo: Brandon Milar, California Asphalt Pavement Association

Porous asphalt application in California.

When a complete streets policy is carefully followed, considering community context and needs, the issues of too-wide streets can be addressed while also increasing access for all travelers. Many communities are narrowing travel lanes, swapping one automobile lane for two bike lanes (a 'road diet'), or taking other measures to provide safe space for bicyclists, pedestrians, and public transportation – without widening roads. In some cases, this can mean including only one sidewalk, as it did on residential 2nd Avenue in Seattle, Washington where a relatively low volume of pedestrians and slow vehicular speeds made this solution possible.[2] Some cities are investing in pervious surfaces, such as pervious asphalt and concrete, pervious pacers, and reinforced gravel pacing, can be used on complete streets once it has been determined the surfaces will not compromise pedestrian and bicyclist access and safety. Furthermore, communities can look to maximize pavement albedo (reflectivity) to reduce the urban heat island effect, improve air quality, increase pavement durability, and improve nighttime illumination.[3]

(over)

Sustainable Complete Streets

Landscaping

Landscaping elements that help curb stormwater runoff – bioswales, planters, rain gardens, and street trees – are mutually beneficial for mobility and ecology. Such green elements are increasingly found to be important deterrents of crashes and injuries, and contribute to a more comfortable and visually interesting environment for all users.[4] When redesigning streets, project managers can include plants and trees (most likely requiring amended soils) to clean runoff and manage stormwater at the site. Traffic-calming elements like chicanes, islands, and curb extensions – all popular in creating complete streets – provide site opportunities for bioswales, street trees, and rain gardens.

Photo: Dan Burden

The streets in Seattle's High Point neighborhood help manage stormwater in a number of ways: narower streets, landscaped buffers with bioswales and street trees, and permeable concrete sidewalks.

Centrally located in Seattle, the Taylor 28 residential mixed-use project included a zero-discharge streetscape with each planting area serving as a rain garden. Curb extensions are home to some of these rain gardens, and also help to slow traffic, allowing bicyclists a safer ride. Numerous trees reduce the heat island effect and offset CO2, while widened sidewalks and increased pedestrian features make the street friendlier to those walking by.[5] Such improvements complement the City's own complete streets policy.

Climate

Of course, complete streets make their most basic contribution to green streets by providing space along the right-of-way for low-emission travel. In the United States, transportation is a significant source of greenhouse gas (GHG) emissions – in fact, it accounted for 28% of total U.S. GHG emissions in 2006. The largest source of transportation GHG emissions is personal cars and trucks.[6] Complete streets policies are an essential tool in providing transportation choices beyond the personal automobile. Walking and bicycling for the shortest trips (less than 1 mile), rather than taking a car, could reduce CO2 emissions – a major GHG – by 12 to 22 million tons per year in the U.S.[7] Replace the car with walking and biking for longer trips (1–3 miles), and the CO2 savings come to 9 to 23 million tons annually. Add in the benefits of access to public transportation ridership – which is already cutting CO2 by 37 million metric tons every year – and the environmental benefits of complete streets are astounding.[8]

Photo: Greg Raisman, flickr.com/photos/gregraisman

A curb extension in Portland, Oregon provided opportunity to better manage stormwater through a vegetated swale.

Complete streets, in conjunction with green infrastructure, is a tremendous opportunity to improve the livability of our communities, both now and for future generations.[9]

Footnotes on following page or online at www.completestreets.org/factsheets

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Sustainable Complete Streets

[1] *Green Infrastructure, as defined by the U.S. Environmental Protection Agency, involves "an array of products, technologies, and practices that use natural systems – or engineered systems that mimic natural processes – to enhance overall environmental quality and provide utility services. As a general principal, Green Infrastructure techniques use soils and vegetation to infiltrate, evapotranspirate, and/or recycle stormwater runoff."*

[2] *"Street Edge Alternatives (SEA Streets) Project: Street Improvements." City of Seattle. http://bit.ly/SEASidewalks*

[3] *"Cool Pavements." The Heat Island Group at the Lawrence Berkeley National Laboratory. http://eetd.lbl.gov/heatisland/pavements/*

[4] *Dumbaugh, Eric. (2005). "Safe Streets, Livable Streets." Journal of the American Planning Association, Volume 71-3 (pp 283-300).*

[5] *To learn more about Taylor 28, visit the project website at http://mithun.com/projects/project_detail/taylor_28/*

[6] *"Transportation's Role in Climate Change." Transportation and Climate Change Clearing House, U.S. Department of Transportation. http://climate.dot.gov/about/transportations-role/overview.html*

[7] *Gotschi, Thomas Ph.D and Kevin Mills, J.D. (2008). Active Transportation for America: The Case for Increased Federal Investment in Bicycling and Walking. Rails-to-Trails Conservancy. http://www.railstotrails.org/ourWork/advocacy/activeTransportation/makingTheCase/index.html*

[8] *Baily, Linda, Patricia L. Mokhtarian, Ph.D, and Andrew Little. (2008). The Broader Connection between Public Transportation, Energy Conservation, and Green House Gas Redution. ICF International for the American Public Transportation Association. http://www.apta.com/research/info/online/land_use.cfm*

[9] *For more information on all things Green Streets, please refer to the U.S. Environmental Protection Agency's "Managing Wet Weather with Green Infrastructure" website at www.epa.gov/greeninfrastructure*

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