Austin Sustainable Infrastructure Group

Our group, formed in 2008, is comprised of civil and transportation engineers, ecologists, social and environmental scientists, architects, landscape designers, public health and green building consultants:

RS&H Public Infrastructure & Transportation Engineering

Jim Etherton, PE, Austin Program Leader
Andrew Cooper, PE
Christopher Moore, LEED AP, Environmental Planner
John Windlow, PE, Transportation Engineer
Valerie Kaiser, Project Coordinator

TheRightenvironment Environmental Impact & Life Cycle Analysis

Joep Meijer, M.Sc., President, Analyst

Aide Fitch, Inc Building Analysis & Design (Energy, Financial, Environmental)

Aide Fitch, AIA, LEED AP, President

Adele Houghton Consulting Sustainability Consulting Improving Public Health

Adele Houghton, AIA, LEED AP, President, Consultant

Who We Are

Mission: To energize a movement in sustainable infrastructure planning, design, construction, maintenance and operation embracing benefits for the environment, economy, and social health and well being.

Who We Are

Recent activities have included:

Fall 2008: developed a rough framework for measuring and tracking quantifiable sustainability impacts of roadway and other infrastructure projects

Early 2009: applied for an EPA CARE grant with the Public Works Department of the City of Austin, and Ridgetop and Windsor Park neighborhood associations, to understand and prioritize the environmental and public health impacts of increased development around their neighborhoods, and chart a course for positively addressing these concerns through better public infrastructure design.

What is Infrastructure?

The purpose of infrastructure is to serve the community: to help citizens get around, to improve the flow of commerce, to provide basic services for living such as clean water and energy.

What is Sustainable Infrastructure?

Sustainable infrastructure should serve practical needs while also going beyond to reflect the greater goals of communities to provide economic stability, protection of environmental resources for future generations, human health, and social equity.

What is Sustainable Infrastructure?

What are the major areas of concern?

- Economics
- Environment
- Social Equity & Community
- Health

What is Sustainable Infrastructure?

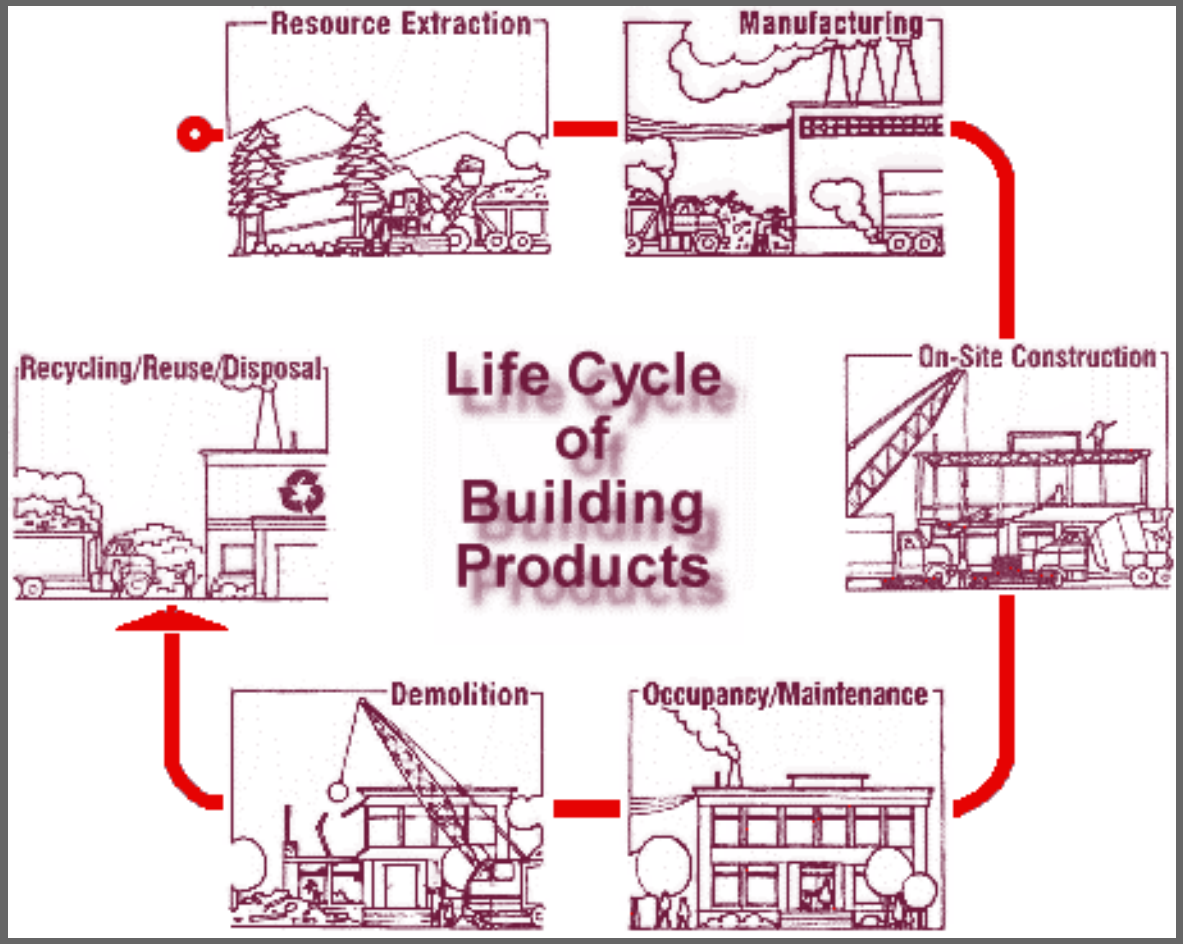
Economics

- Life cycle cost
- Risk exposure
- Cost for society due to delays, or limited availability due to maintenance and /or replacement
- Commerce and tax income, economic growth and/or stability
- Jobs >> social equity

What is Sustainable Infrastructure?

Economics

- Life cycle cost



What is Sustainable Infrastructure?

Environment

- Air quality > health
- Water quality & availability: storm-water > drinking water > health
- Biodiversity
- Nuisance: noise, light pollution > health, biodiversity
- Heat island effect > air quality, biodiversity, health
- Density, land conservation > biodiversity, air quality, community, social equity
- Landfill & toxic waste impacts > biodiversity, health, social equity, density/land conservation
- Local & Global Resource footprint > economics
- Global CO2 impact > social equity, biodiversity, economics
- Other global pollution impacts (eutrophication, acidification, etc.) > social equity, biodiversity, economics

What is Sustainable Infrastructure?

Health

- Air, water, and vector-borne diseases
- Obesity
- Malnutrition
- Physical fitness
- Quality of life, emotional well-being

What is Sustainable Infrastructure?

Environment

- Air quality > health

For every 1.2 kilometers a child lives closer to a freeway, his/her risk of developing asthma increases by 89%.

Gauderman, W. The Lancet, Jan. 26, 2007; online edition. Sanstrom, T. The Lancet, Jan. 26, 2007; online edition.

In Texas, asthma ranks as the number one chronic disease among children and a leading cause of child hospitalization. Health care costs associated with asthma hospitalizations in Texas reached $391.5 million in 2006.

Texas Department of State Health Services, Adult Health and Chronic Disease Group. Texas Asthma Burden Report: A Report From the Texas Asthma Control Program. April 2007. p. 1

What is Sustainable Infrastructure?

Social Equity & Community

- Disadvantaged or underrepresented groups:
  - Low income citizens
  - Elderly
  - Ethnic minorities
  - Social minorities
  - Handicapped
  - Children
  - Future generations
- Community social interaction > health, economic stability
- Democracy, access & participation in government
- Access to basic services
- Knowledge resources: internet, libraries
- Cultural identity and art
- Crime

What is Sustainable Infrastructure?

Social Equity & Community

- Community social interaction > health, economic stability

One study of three US cities found that, in areas with a relatively high share of drive-alone commuters, residents are less likely to have close social ties within their own neighborhoods.

Lance Freeman, "The Effects of Sprawl on Neighborhood Social Ties: An Explanatory Analysis," Journal of the American Planning Association, Winter 2001, v.67, n.1, pp 69-77.

For each 10 additional minutes spent in a daily commute, community involvement falls by 10 percent.

Robert Putnam, Bowling Alone, (New York: Simon & Schuster, 2000); and Avery M. Guest and Susan K. Wierzbicki, "Social ties at the neighborhood level: Two decades of GSS evidence," Urban Affairs Review, September 1, 1999; v35, n1, pp 92-111.

What is Sustainable Infrastructure?

Strategies

Your ideas…

What is Sustainable Infrastructure?

- Designing roadways to **improve traffic flow**
- **integrated planning** and construction of roads, public transit lines, utilities, bike lanes, sidewalks, and street lighting: to reduce waste due to poor planning and poorly sequenced projects
- Planning for **communication infrastructure,** internet availability
- enabling sustainable strategies on **private property**: greywater distribution, smart grid, development density, district cooling or CHP (combined heat & power)

What is Sustainable Infrastructure?

- “tuning” traffic lights or using smart technologies to improve traffic flow

What is Sustainable Infrastructure?

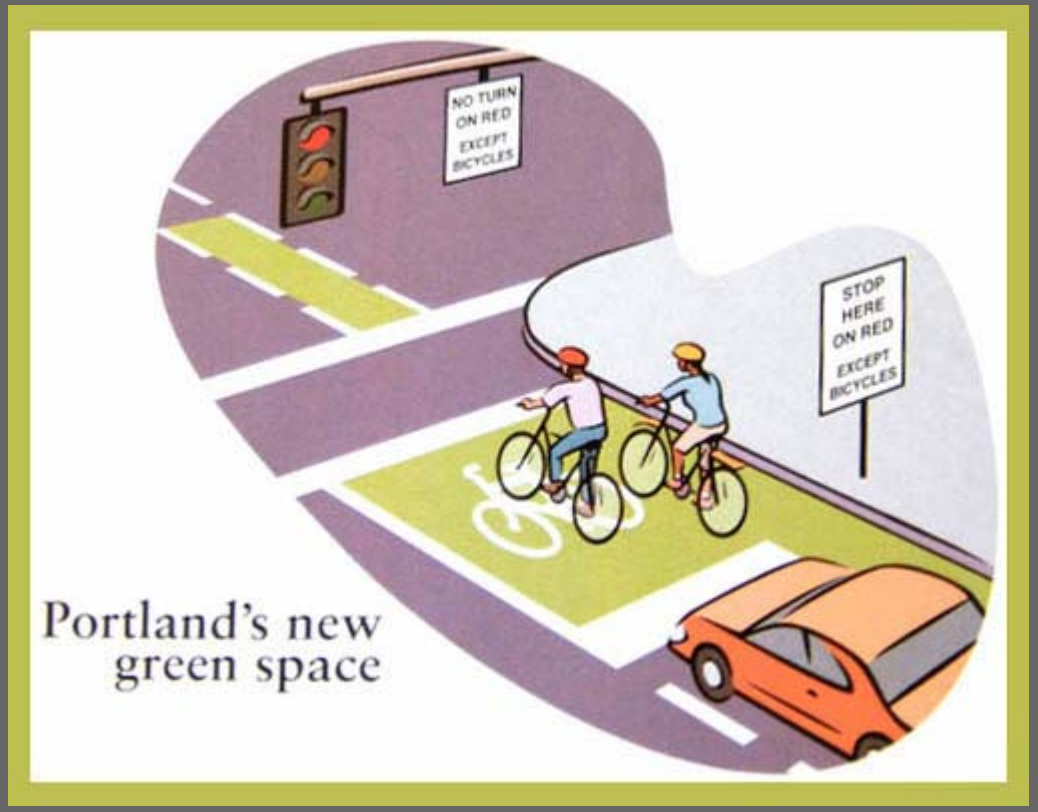
- storm-water controls: swales, filter strips, permeable paving

What is Sustainable Infrastructure?

- efficient, effective mass transit, buses, and other public transportation
- other alternative modes such as “Carshare”
- dedicated lanes for HOV’s, buses, 2-wheel vehicles, etc.
- street furniture and other pedestrian amenities
- bus shelters and other amenities for public transportation

What is Sustainable Infrastructure?

- bike lane & sidewalk continuity
- bike storage & shower depots and other amenities for bicyclists
- well-marked bike areas at intersections (as in Portland's "green box")



What is Sustainable Infrastructure?

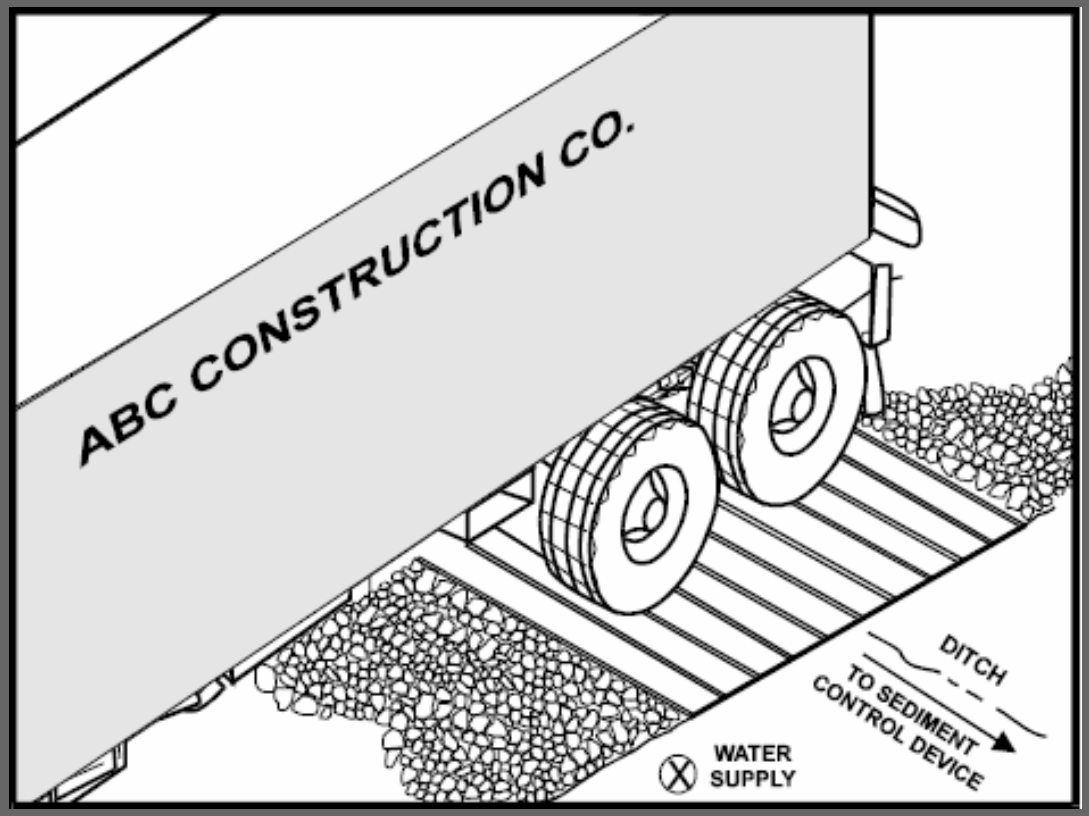
- public art
- aesthetic codes for roadways (such as “Great Streets)
- respecting places of community importance through traffic calming devices, enhanced landscaping, shading, and enhanced attention to pedestrian, bike, and public transit access.
- routing truck traffic away from dense areas, schools, etc.
- school zones: reduced speed, no idling, etc.

What is Sustainable Infrastructure?

- reflective surfaces to reduce heat island, increase energy efficiency
- planting more trees, vegetation, & flowers to provide comfortable shade, reduce heat island, promote biodiversity, and beautify
- well-designed green space, parks, and open space amenities

What is Sustainable Infrastructure?

- materials: local, recycled, rapidly renewable, non-toxic, recyclable
- construction best practices: controlling noise, dust, oil leaks, using low-emitting vehicles & equipment, managing community feedback



How can we measure infrastructure sustainability?

Safety	# of accidents / mile
Chronic Respiratory Diseases	annual number / population
Cardiovascular disease	annual number / population
Obesity	Adult Obesity: annual number / population
	Childhood Obesity: annual number / population
Waterborne disease	annual number / population
Vector-borne disease	annual number / population
Health amenities	# of amenities (from menu: exercise, local produce (farmers market, community garden, etc.), clinic, etc.)

How can we measure infrastructure sustainability?

Example:

- Measure air pollution contribution of a roadway expansion:
  - Take baseline measurements before construction, using trip counters and a visual assessment of typical types/sizes of vehicles (passenger vehicles vs. diesel trucks). Apply standard statistics of pollutant load per mile * average trip distance for each vehicle type.
  - Take same measurements annually after construction.

How can we measure infrastructure sustainability?

Strategy

Repair and improve access to locally-owned and established businesses by funneling traffic toward commercial arteries and slowing traffic along residential streets.

Green Benefits

Local tax income & jobs, community stability, affordability

Implementation

Analysis & design by professional traffic engineer AND urban planner, with consideration of best practices for urban density and dialogue with the community

Performance Measurements

Shop-owner surveys, business tax generation, employment rates at locally-owned shops

Next Steps

- *Applying sustainable strategies to real projects*
- *Gauging effectiveness through measurements*