

14th Edition

Fall 2005

Energy & Sustainable Infrastructure

Greening the Public Right-of-Way

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Sustainability: where the rubber meets the road
New high performance design guidelines for the public right-of-way

By Hillary Brown, AIA, Design Trust Fellow, CIUS Senior Fellow

In October 2005, the nonprofit Design Trust for Public Space and the New York City Department of Design and Construction culminated an unusual collaboration by publishing the nation's first sustainable design guidelines for infrastructure in the public right-of-way.

Development of the *High Performance Infrastructure Guidelines* was driven by some initial questions framed by the author, a current CIUS Senior Fellow, back in 2002. Given the strides today in the green buildings industry, how could lessons learned be put to good use in New York City's other public works?

How might the City transform the way the it conceives, constructs and maintains its largest real estate holding, namely its 20,000 lane-miles of right-of-way, an area in the aggregate bigger than Manhattan!

How could this very taken-for-granted real estate, designed differently, contribute to a healthier environment in an equitable and economical manner? What benefits could be gained from even small improvements made across time and at this considerable scale?

For some answers, our team 'took to the streets,' reconsidering the typical cross

section of a public roadway: the street, utilities, sidewalk, tree planting and other related landscaping. Our goal was to begin to think of the right-of-way as an integrated or whole system, one that must perform in a densely urbanized environment. The resulting *Guidelines*, while written for the City of New York, look also to serve other municipalities and authorities in the region as a road-map for incorporating sustainable practices into this ubiquitous civic space, the public right-of-way.

Background

The *High Performance Infrastructure Guidelines* are yet another visionary and collaborative project involving the Design Trust for Public Space and the New York City Department of Design and Construction (DDC). The *Guidelines* were conceived to complement the 1999 *High Performance Building Guidelines*,

that the author, DDC Assistant Commissioner at the time, helped envision and manage, and the DDC and the Design Trust

collaboratively produced. Since that time, the *Building Guidelines* have served as a framework for DDC to incorporate sustainable practices into more than twenty-five on-going capital projects. The *Building Guidelines* were widely acclaimed throughout the build

"Our goal was to begin to think of the right-of-way as an integrated whole system"

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CUNY Tackles the Energy Challenge

After many years off the policy agenda, the efficiency, reliability, and security of our energy systems are suddenly re-emerging as critical areas of public concern. Across CUNY, several initiatives are promising to make the University a center for innovation on these important issues.

NY Designs Fosters Green Entrepreneurship at LaGuardia Community College

In Spring 2003, CUNY EDC and LaGuardia Community College launched NY Designs, a not-for-profit business incubator. Its mission is to grow New York design firms. NY Designs aids upcoming architects, interior designers, product designers, industrial designers, fashion designers, graphic designers, lighting designers, as well as jewelry and craft artisans. Its services include business courses and one on one business counseling.

In Spring 2006, NY Designs will open its new incubator office space and prototype equipment rental to New York designers.



When NY Designs' founders began discussing their mission with design schools, industry leaders and clients of designers, they found that sustainable and green design was one of the biggest areas of growth in the design field. They decided to pursue green design and renewable energy education as key initiatives of the new center. Their work in this area has been greatly facilitated by a grant from the New York State Energy Research and Development Authority (NYSERDA) to help foster the education of design firms that develop or use renewable energy technologies.

As part of its entrepreneurship education program, NY Designs offers classes granting the first professional credits at LaGuardia Community College. The classes are recognized by the American Institute of Architects. This fall, NY Designs is offering two courses that focus on green design.

The first, "The Power of Sustainable Design," will be offered on November 5th and will grant 6 AIA credits. This class will help up and coming designers learn about strategies in "eco-design," and strategies to reduce the environmental impacts throughout a product's life. The second course is a

workshop entitled "The Business of Green Products" (December 10th), taught by leading expert Jacquie Ottman. Through this workshop, designers will learn the principles of sustainable design, and about how to incorporate recyclable materials and renewable energy into the design of a product. This course provides 4 AIA credits.

For more information about these classes, or NY Designs' other initiatives, visit <http://www.nydesigns.org>.

CUNY Sustainable Building Initiative Proposes Energy Systems Lab

The Sustainable Building Initiative (formerly the Sustainable Construction Initiative) continues its efforts to pull together CUNY's diverse resources to provide education and training to the Sustainable Building Industry, and to serve as a catalyst for the adoption of greener design, construction, and management practices. (See CIUS Newsletter #12 for more on this initiative).

Last spring, CUNY-SBI organized a workshop to explore the possibility of establishing an Energy Systems Lab within the CUNY system. The three-day workshop provided an opportunity for CUNY faculty and administrators to meet with two founders of similar energy labs, Daniel Turner of the University of Nebraska, and Mingsheng Liu of Texas A&M. The participants received encouragement from a lunchtime address by Senior Vice Chancellor Alan Dobrin.



As a result of the workshop, an inter-campus working group was established and Michael Bobker was jointly commissioned by Continuing Education & Public Programs at The Graduate Center and the CUNY Institute for Urban Systems to prepare a "white paper" planning document for establishing a center in New York City. The

CUNY lab would be a center for applied research, undergraduate, and graduate study in support of CUNY's own property asset management as well as furthering the University's mission in relation to broader NYC constituencies.

Please contact Michael Bobker at mbobker@aol.com to learn more about these efforts.

More information on the CUNY Sustainable Building Initiative is available at the CIUS website at <http://www.ccny.cuny.edu/cius/sbi.html>.

CUNY Tackles the Energy Challenge...

The Center for Sustainable Energy at Bronx Community College

In 2003, the Bronx Community College established the Center for Sustainable Energy. The Center's objective is to promote alternative energy development that strengthens the economy and benefits the environment. To achieve this, the Center conducts outreach and education, hosts training programs and conferences, facilitates clean energy projects, and conducts policy research. It is funded by an appropriation secured by Congressman José E. Serrano and administered by the U.S. Department of Energy.

The Center's educational activity targets students of all ages. It works with Bronx Community College's Office of Continuing and Professional Studies to develop training seminars open to the general public; it develops K-12 curricula on alternative fuels and energy in conjunction with math and science teachers; and it is assisting the College to develop two new associate degree programs focusing on sustainable energy technology.

In addition to its educational programs, the Center is also actively engaged in clean energy advocacy and project facilitation. The Center recently helped secure the U.S. Department of Energy's Million Solar Roofs (MSR) Partnership for the City University of New York. The MSR program is a public-private partnership whose goal is to support the deployment of solar energy technologies nationwide. These technologies include photovoltaic (i.e. solar electric) systems, solar water heating, transpired solar collectors, solar space heating and cooling, and solar pool heating. Through the MSR partnership, which was formally launched in Summer 2005, CUNY has committed to a goal of facilitating the installation of 500 solar systems in New York City by 2010. The Center for Sustainable Energy is managing the MSR partnership on CUNY's behalf and has launched an outreach and education campaign focusing on the benefits of solar power and the barriers to solar energy in New York City. The Center is also actively facilitating solar energy installations within the CUNY system and beyond. Facilities on several CUNY campuses are being evaluated as potential hosts for solar systems.

The Center is also conducting an energy conservation study on behalf of CUNY this Fall. The Center is examin-

ing the facilities management practices at the three Bronx campuses and looking for opportunities to save energy and reduce costs. The Center is collaborating with staff at Lehman College, Bronx Community College, and Hostos Community College to identify energy saving strategies.

For those interested in becoming more involved in New York's sustainable energy future, the Center is hosting two major events in the next two months. On October 28th, the Center will host a conference and tradeshow entitled, "Road to Energy Independence: New York City's Alternative Transportation Future" (see p. 8). Beginning November 8th, the Center will host a training series on photovoltaic (solar cell) systems. The five-day, 22-hour workshop will cover cost analysis, building/zoning code issues, and basic photovoltaic system installation with a hands-on lab. (For more information regarding this workshop, please contact the BCC Office of Continuing & Professional Studies at 718-289-5170 or e-mail mail@csebcc.org).

To learn more about the Center for Sustainable Energy please visit the Center's website at <http://csebcc.org> or contact the Center at 718-289-5332.



The Center for Sustainable Energy's Photovoltaics Installation class of Dec. 2004. Photo by Domenica Tantillo. Used by Permission of CSE.

Sustainability: where the rubber meets the road

(Continued from page 1)

ing industry and public sector, and led to the development of comparable guidelines here and in other major U.S. cities.

Founded in 1995, the Design Trust for Public Space is a private non-profit organization dedicated to improving the quality and understanding of New York City’s public realm. One of its primary functions is to commission urban research and design projects, bringing the resources of a design professional or “Fellow” to aid a public agency or community group in undertaking a significant urban challenge. The *Infrastructure Guidelines* were developed by three Design Trust Fellows, Hillary Brown, AIA, Steven Caputo, and Stephen Campbell, R.A., with additional DDC authorship. The DDC and Design Trust team – with landscape architecture consultant and co-author, Signe Nielsen – all worked closely with the various city agencies having jurisdiction over right-of-way infrastructure, including the Departments of Transportation (DOT), Environmental Protection (DEP), Parks and Recreation (DPR), as well as Housing Preservation and Development (HPD). These and other DDC ‘client agencies’ helped inform the scope of research, advise on technical and procedural issues, and conduct a peer review of the *Guidelines*.

Augmenting the team were two CUNY interns whose work was underwritten by CIUS. Marvin Hewitt, a graduate student in civil engineering and Sophia Zuberbuehler, a landscape architect and a graduate of the urban studies program helped conduct research and otherwise support the project.

The team solicited input from a regional advisory panel –infrastructure planning officials invited from northeastern cities and states – and conducted a peer review with local consultants, infrastructure experts, with significant input from the Canadian National Guide to Sustainable Municipal Infrastructure and consultant Steven Winter Associates, Inc.

About the Guidelines

The public right-of-way organizes the massive flow of energy and matter that courses through the city on a daily basis. Each of its components affects our experience of the city in profound ways:

Streets/sidewalks

On its surface, the right-of-way rationalizes the circulation of automobiles, buses, bicycles, and pedestrians – prioritizing , them through roadway and sidewalk geometry, lane markings, crosswalks, and signaling – allowing each to yield to the other in a safe mix. This public real estate supports vital social and economic civic life: streets double as play space and rallying grounds, while sidewalks serve as zones of casual interchange, shopping, dining, and display.

Our streetscape technical strategies build on best practices used in other cities to carve more non-vehicular space using planting strips or planted islands to accommodate and encourage safe biking and walking. Optimized street-lighting and signaling, use of special zones for benches, planters, and bus stops will entice us to stroll, walk to work, or regularly



Sustainability: where the rubber meets the road

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take other forms of exercise outdoors in safety and comfort.

Various alternatives to conventional paving color, composition and porosity are explored, particularly those with synergist environmental performance benefits. For example, lightening the color of asphalt or concrete can significantly reduce its deterioration from heat stress, lower its contribution to higher summertime temperatures, translating into fewer ozone-related respiratory problems. By night, lighter colors may improve visibility, with increased reflected light coming off the pavement. Related to this strategy, lighter-colored concrete can be produced by replacing cement with fly-ash or blast-furnace slag, both industrial waste products. Here, using one waste product helps us avoid another kind of waste, namely, the large amounts of energy that would otherwise go into cement manufacturing. Finally, pavement happens to be an excellent medium for recycling a variety of wastes: old concrete, glass, rubber, and waste rock, reducing burden on landfill.

Stormwater management infrastructure

The *Guidelines* recommend numerous strategies to reduce, control, and treat stormwater runoff as close to its source as possible. Versatile strategies such as the use of landscaped or “bioengineered” structures can capture runoff, encourage infiltration and return cleaner water to its natural hydrologic pathways. Related soil and vegetation strategies are also cost-effective and environmentally beneficial sinks for stormwater pollutants.

Utilities

Below grade, the right-of-way houses a vital network of utility infrastructure. Among many best practices, the *Guidelines* recommend organizing this complex piping and cabling into trenches with removable lids for easy repairs. Considered as well are techniques such as using radar/sonar to test pipes, or drilling them with lasers, (a practice called micro-tunneling). In this way, workmen

can make repairs without digging, avoiding traffic congestion and noise.

Landscaping

Finally, the right-of-way is host to nature and natural processes. Trees, vegetation, and soil interspersed throughout the streetscape offset the sharp edges and hard surfaces of the built environment. They remove airborne dirt, produce oxygen, absorb and treat stormwater and dampen street noise. Practices address health planting and plant maintenance to increase the density and diversity of greenery.

Putting it all together

Coordinated, sustainable practices can be applied to each of the above right-of-way components in all phases of design, construction, operation and maintenance – and at several scales of intervention, from the individual component level to the entire roadway system. Such resource-efficient and -effective infrastructure will improve public health, comfort and well-being, reduce detrimental impacts of air, soil and water pollution, and instruct citizens about functional and aesthetic connections between the city and the natural resources that sustain it. As the emerging field of ‘urban ecology’ increases our understanding of how urban environments involve complex interactions between constructed and natural systems, we must increase our accountability to the integrity of both.

By weaving together broad principles of sustainability and proven best management practices, the *Guidelines* will help diverse stakeholders make coordinated, incremental infrastructure improvements according to a long-term shared vision, one in which natural systems function as an integrating framework for policy development. With better air and water, healthier natural systems, and a more active population, high performance infrastructure is a long-term investment in the City’s quality of life.

To view an electronic version of the Guidelines, please visit the Design Trust website at <http://www.designtrust.org>. The Guidelines will also be made available this winter on NYC’s Department of Design and Construction website and in hardcopy for purchase. For more immediate information, please contact Chelsea Mauldin at 212 695-2432 x 14

CUNY Applicants Selected for NYMTC Sept. 11th Memorial Program

The New York Metropolitan Transportation Council (NYMTC) established the September 11th Memorial Program for Regional Transportation Planning to honor its three colleagues lost in the attack on the World Trade Center, Ignatius Adanga, Charles Lesperance, and See Wong Shum. NYMTC designed this program to educate and motivate people interested in transportation technology and planning and to encourage innovations in planning activities throughout the region. It has two main components: and Academic Initiative, which funds student research projects and internships, and a Planning Initiative, which promote projects that promote innovation or public involvement in planning.

The University Transportation Research Center's Director Robert Paaswell and Assistant Director Todd Goldman have worked closely with NYMTC in the design of the overall program, and in administering the Academic Initiative.

On September 8th, 2005, in a ceremony that involved staff members who were 9/11 survivors, as well as family members of the employees being honored, NYMTC announced the first slate of projects to be awarded under this program. Three of the eight award recipients are associated with CUNY.

Planning Initiative

West Harlem Environmental Action (WE ACT), a non-profit, community-based environmental justice organization, is a recipient of one of the grants under the Planning Initiative. Its project, "Harlem in Motion: A People's Plan for an Improved Transportation Network," will work to promote community involvement in the many overlapping transportation planning efforts underway in the area (including the 125th Street Corridor, the Hudson Waterfront, and the new Columbia campus).

To provide technical assistance for this project, WE ACT has enlisted two experts from City College and CIUS. Harry Schwartz, a CIUS

Senior Fellow, will consult with WE ACT on transportation planning and development issues. Ethan Cohen, as Director of the City College Architectural Center and a member of CIUS's Board of Directors, will oversee the involvement of center staff and student interns contributing to WE ACT's efforts.

Two of the four students selected for the first year of the Academic Initiative are students at City College:

Academic Initiative

Li Chen will intern at the New York City Department of Transportation, where she will examine multimodal transportation and land use issues in Manhattan's rapidly evolving West Side. She will be involved in many different aspects of this project, including organizing public outreach meetings and data collection activities, and analyzing changes in the area's demography, traffic, and land uses. Ms. Chen is starting the Ph.D. program in Civil Engineering at City College of New York this fall, having just completed her Masters degree at the University of Alabama.

Wei Li will develop accessibility indicators for the region's aging population. Her research will examine the accessibility of different kinds of activities - including medical services and grocery stores - in neighborhoods throughout the metropolitan region. She will combine neighborhood accessibility indicators with estimates of the mobility constrained population in each area, to provide a tool that can help policymakers identify areas of particularly high need and low access. Ms. Li is a second-year doctoral student in Civil Engineering at the City College of New York. Her research will be supervised by Prof. Cynthia Chen of CCNY, and by Joel Ettinger, Executive Director of NYMTC.



Ethan Cohen



Li Chen



Harry Schwartz



Wei Li

Michael Bobker Joins CIUS as New Senior Fellow

CIUS is delighted to welcome energy engineer Michael Bobker as its newest Senior Fellow. In partnership with CIUS and Planning and Continuing Education and Public Programs, The Graduate Center, CUNY, Bobker will coordinate the CUNY Sustainable Building Initiative. He will also work to help CUNY establish a "Building Performance Lab," a permanent focal center for the study and practice of enhanced building performance. Bobker comes to this activity from a background of twenty five years of work in NYC buildings and energy management organizations, with experience in building equipment evaluation, energy analysis, engineering and construction management, technology application, and technician training.

As an implementer of a "retro-commissioning" pilot for the New York State Energy Research and Development Authority (NYSERDA), he became aware not only of the scope of opportunity in NYC's commercial property sector but also of the fact that leadership nationally has come from a handful of university-based programs that have taken building operations as a serious area for academic research and knowledge application. For example, the Energy Systems Lab at Texas A&M has been developing and applying operations-based techniques for performance improvement, granting numerous engineering degrees (through the Ph.D level) in the process. He believes that, with perhaps the largest, most sophisticated commercial real estate portfolio in the world, NYC would benefit from such a resource based locally.

With this question burning and with support from CIUS's Robert Paaswell and David Levine, Director of Continuing Education and Public Programs at the Graduate Center, Bobker organized a workshop in the spring of 2005 that introduced the Building Performance Lab concept to the CUNY community (see p. 2). Through the Graduate Center, Bobker is also continuing the Sustainable Building Initiative's work under CUNY's Workforce Development Ini-

tiative to define educational and training products for enhanced building operations in terms of their valuation by the marketplace. This work comes at a time when there is heightened interest in the employment potential and implications of new building system technologies.

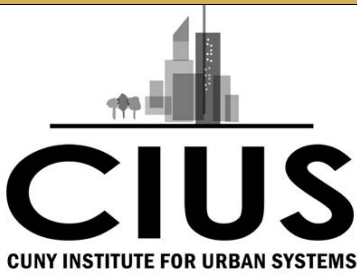
A particular technology area of interest is the advanced use of building automation systems. While digital control of building systems is now common in the commercial sector, there are a variety of functions involving data acquisition and visualization, statistical analysis, and artificial intelligence programming that can greatly extend the value of these systems. Bobker worked with CIUS intern Chris Andrichak to define this area, following work at Texas A&M and at the Lawrence Berkeley National Lab's Commercial Technology Division. A unique aspect of the CIUS work was interviewing local vendors to assess the ability of current systems to add such functionalities. These interviews revealed that a significant level of operator training would be required to make use of such capabilities, a finding that reinforces the importance of CUNY-SBI's efforts.

Bobker enjoys educating and training technicians and has a particular appreciation of hands-on, experience-based learning. Starting from an academic background in social sciences from Oberlin College, he began learning about energy and building systems as a community organizer in neighborhood self-help housing efforts in the South Bronx in the late 1970's. Working with boilers he recognized in himself a connection to fire-tending and apprenticed himself to an oil burner service contractor and then got more direct experience of building systems as an energy auditor while returning to graduate school for a Masters in Energy Management. As a Principal in an energy services company, he needed to master new technologies such as cogeneration, to a level sufficient to complete installations and manage a portfolio of installed systems.

Lena Marvin – New CIUS Intern



Lena Marvin has joined CIUS as its intern for the 2005-06 academic year. She is a second year philosophy major specializing in the history and philosophy of science and technology at the City College of New York. Helena has great interest in sustainability. In her hometown of Lawrence Kansas (population 70,000), she volunteered with sustainability initiatives both inside the Lawrence city government and out. Through her volunteering, she learned about sustainability as applied to city planning, architecture, ecology, and transportation in Kansas. Since being accepted to the CUNY Honors College and relocating to New York City, she has been "awe struck" by the infrastructure that keeps the city going. Through her internship at the CUNY Institute of Urban Systems Helena has already made contact with several CUNY projects from various campuses that are working on new technology involved with a multitude of urban systems. She looks forward to learning about green initiatives that will "revolutionize how the gears of New York City turn."



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Upcoming Events

The Road to Energy Independence: NYC's Alternative Transportation Future

The Center for Sustainable Energy will host a conference and trade show entitled, "The Road to Energy Independence: NYC's Alternative Transportation Future" at Bronx Community College in the Gould Memorial Library from 8:30am - 4:00pm on Oct. 28th.

The goal of the conference is to raise public support and awareness of alternative fuel vehicles (AFV), including hybrids and compressed natural gas vehicles, in light of growing concerns about fuel shortages, rising gas prices, and the effects of automobile emissions on our environment. Michael MacCracken, Chief Climate Scientist at the Climate Institute, will deliver the keynote speech. The conference will feature panels addressing the health impacts of vehicle emissions, AFV technologies and financing strategies, and programs to train the AFV work force.

Those in attendance will include advocates from the city, state, and federal government, academia, community and environmental organizations, businesses, non-profit organizations, and interested members of the general public. A clean car exhibition will take place in tandem with the conference. Vehicles powered by biodiesel, cooking oil, compressed natural gas, electricity, and hybrid electric drives will be on display outside the conference venue.

Conference registration is FREE to the general public and lunch will be provided to those who have registered. For more information, please visit <http://www.bcc.cuny.edu/institutionalDevelopment/cse/events.cfm?page=88>, call 718-289-5332 or e-mail mail@csebcc.org.

Other Events and Classes

"New York City (Steady) State" at CCNY

This fall, the Graduate Urban Design Program at City College is sponsoring a lecture series entitled "New York City (Steady) State: New York's Ecological Footprint and the Prospects for Urban Self-Sufficiency." All talks are free and open to the public, and take place in 550 Shepard Hall (138th Street & Convent Avenue) at 10 am.

Upcoming topics include:

- 11/3 Stuart Gaffin - "Air"
- 11/10 Adam Friedman - "Manufacturing"
- 11/17 Paul Mankiewicz - "Water"
- 12/1 Byron Stigge - "Thermodynamics"
- 12/8 Michael Deane - "Buildings"

Green Design Courses at NY Designs

All classes run at LaGuardia Community College. Registration is required.

Upcoming classes include:

- 11/5 Power of Sustainable Design with ARUP consultants (6 AIA credits)
- 12/10 Business of Green Products with Jacquie Ottman (4 AIA credits)

For more information, please visit: <http://www.NYDesigns.org>.

Upcoming Events at The Graduate Center

Continuing Education and Public Programs, The Graduate Center, CUNY, offers a wide variety of programs on sustainable urban systems. All classes are offered at The Graduate Center, at 365 Fifth Avenue (at 34th Street) in Midtown. Registration is required.

Upcoming classes include:

- 10/26 Mike Bobker, Building Performance Workshop
- 11/11-12 Eco-Metropolis 2005 Conference
- 11/30 & 12/2 Mathis Wackernagel, Ecological Footprints lecture & workshop.

For more information, please visit: <http://web.gc.cuny.edu/cepp>.

CIUS seeks to advance the state of the practice in public infrastructure investment through research, education, policy advisement, and professional development. Its work focuses on three main challenges: how *technology* is reshaping the nature of infrastructure systems; how *institutions* can adapt to manage the next generation of infrastructure effectively; and how the methods and strategies of *public finance* are changing to meet evolving needs and constraints. CIUS seeks to help the region identifying innovative solutions to its changing infrastructure needs, by actively working to bridge the professional and academic realms.