Green Infrastructure for Great Cities

FHWA Ecological Webinar

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Mayor

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Sustainable Streets

The Cermak / Blue Island Streetscape

Ecological Approach: A project-specific mitigation effort to demonstrate how sustainable infrastructure can support the urban ecosystem
The urban form, with its density, public transit and walkable neighborhoods, is a sustainable way for humans to live. Its enhancement and maintenance for the safety and convenience of all users, is fundamental to creating a world where all humans can anticipate a good quality of life without depleting the world’s natural resources.
Old Fashioned and New Fashioned Sustainability

Minimize impact on land, air and water resources

Accommodate the needs of ALL users in a limited amount of space
<table>
<thead>
<tr>
<th>Project Sustainable Goals</th>
<th>Details</th>
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<tbody>
<tr>
<td><strong>Stormwater Management</strong></td>
<td>Divert 80% of the typical average annual rainfall and at least 2/3 of rainwater falling within catchment area into stormwater best management practices.</td>
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<td><strong>Water Efficiency</strong></td>
<td>Eliminate use of potable water for irrigation, specify native or climate adapted, drought tolerant plants for all landscape material.</td>
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<td><strong>Transportation</strong></td>
<td>Improve bus stops with signage, shelters and lighting where possible, promote cycling with new bike lanes, improve pedestrian mobility with accessible sidewalks.</td>
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<tr>
<td><strong>Energy Efficiency</strong></td>
<td>Reduce energy use by min. 40% below a typical streetscape baseline, use reflective surfaces on roads/sidewalks, use dark sky-friendly fixtures. Min. 40% of total materials will be extracted, harvested, recovered, and/or manufactured within 500 miles of the project site.</td>
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<tr>
<td><strong>Recycling</strong></td>
<td>Recycle at least 90% of construction waste based on LEED NC criteria, Post/Pre- Consumer recycled content must be min. 10% of total materials value.</td>
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<tr>
<td><strong>Urban Heat Island, Air Quality</strong></td>
<td>Reduce ambient summer temperatures on streets and sidewalks through use of high albedo pavements, roadway coatings, landscaping, and permeable pavements. Require ultra low sulfur diesel and anti-idling.</td>
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<tr>
<td><strong>Education, Beauty &amp; Community</strong></td>
<td>Provide public outreach materials/self-guided tour brochure to highlight innovative, sustainable design features of streetscape. Create places that celebrate community, provide gathering space, allow for interaction and observation of people and the natural world.</td>
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<tr>
<td><strong>Commissioning</strong></td>
<td>Model Stormwater BMP’s in Infoworks to analyze and refine design. Monitor stormwater BMP’s to ensure predicted performance and determine maintenance practices.</td>
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Cermak/Blue Island Sustainable Streetscape

**Legend**
- **Recycled content**: Divert 100% of Construction Waste from Landfills. Specify new materials with a minimum 20% Recycled Content.
- **Energy conservation**: Meet an energy reduction baseline below the streetscape baseline; select optimal street lights for energy efficiency; use reflective surfaces on sidewalks/roadways to improve lighting; use renewable energy on designated future.
- **Storm-water management**: Divert 100% of two-year storm event from city storm systems through the use of pervious pavements, bioswales, and refuge of Chicago River through existing outfall.
- **Urban heat island mitigation**: Reduce ambient summer temperatures on streets and sidewalks through use of reflective pavements, street trees, and increased use of green for shading.
- **Public transportation**: Improve bus stops with signage, shelters where possible, and lighting; facilitate use of bikes with lanes along Blue Island, and strategically located bike racks.
- **Water efficiency**: Limit or eliminate use of potable water sources for irrigation. Specify native or climate-adapted, drought-tolerant plants for all plantings.
- **Education**: Provide public outreach materials/ self-guided tour brochure to highlight innovative, sustainable design features of streetscape.
- **Monitoring**: CDOT GIS partnership with 450 organizations (Metropolitan Water Restoration District).

**Streetscape Along Blue Island Avenue**

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**CDOT**

Wight & Company
Soodan & Associates, INC.
Phoenix Architects
Mactec
Sidewalk Planter

Permeable Parking/Bike Lane

Stormwater Storage Extends to Planted Area
North Side of Cermak Road
BENITO JUAREZ HIGH SCHOOL WATER FEATURE
Cermak Streetscape Infiltration Planter Detail
Integrated Infrastructure Design Example: Parkway Bioswale

- Stormwater Management
- Pedestrian Buffer
- Landscaped beautification
- Urban Heat Island Reduction
- Water quality
- Reduction in potable water use
Additional Project Elements

- Concrete with 30% recycled aggregate, recycled wash water and slag – actual 50% recycled aggregate

- N90 Warm mix asphalt with 15% RAP + 10% GTR with high albedo micro-thin concrete overlay - actual 10% FRAP, 20% Course FRAP, 5% RAS and GTR

- Recycled glass in soil mix
Beauty and Community
Human Scale
Allow for interaction and observation of both people and the natural world
Celebrate culture, history, spirit and place
Ecological Process and Grant Deliverables

Sustainable Streetscape Education Materials

Sustainable Streetscape Design Manual
Education: Lightpole Banners Corresponding with Sustainability Goals
Education: Informational kiosks/identifiers with interpretive graphics
**Sustainable Streetscape Technologies**

Our streetscapes use cutting-edge technologies to create a cleaner, more sustainable city. You can find out more about the inventions we're using in this section.

**HYBRID LIGHT FIXTURES**

Hybrid light fixtures are designed to show how we can harness solar and wind energy. A south-facing solar panel at the top of this device collects energy from sunlight, while a turbine captures energy from the wind. Unlike fossil fuels, these “clean” sources of energy are constantly renewed by nature and release no harmful emissions into the air. This energy powers an LED light – a long-lasting, highly efficient electronic light.

**Benefits**
- Uses renewable energy
- Reduces air pollution
- Conserves energy with a long-lasting, energy efficient LED light
- Increases awareness of alternative energy sources

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**SUSTAINABLE STREETSCAPE DOS AND DON’TS**

**Do:**
- Keep the streetscape clean and free of trash and litter
- Use sustainable practices on your property and in your home to increase the benefits of the sustainable streetscape
- Contact your alderman's office or the city if there seems to be a problem with the sustainable streetscape
- Enjoy the streetscape! This streetscape was built to improve your quality of life

**Don’t:**
- Dump chemicals or toxic materials on or near the sustainable streetscape
- Spread sand or dirt on or near permeable pavement
- Remove stone from between permeable pavers
- Pick flowers from the bioswales or planters

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**ENERGY CONSERVATION**

NW corner of Blue Island Ave. and Wood St.

On this corner, you can take a look at the technologies that help conserve energy on our streetscape. Efficient streetlights use less energy to light up the street, while permeable pavers help reduce the amount of energy that the streetlights use by reflecting and strengthening their light. The bus stop and hybrid light fixture here use solar and wind energy, rather than fossil fuels, to power energy efficient lights.

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**ALTERNATIVE TRANSPORTATION**

SW corner of Blue Island Ave. and Ashland Ave.

Check out the ways we’ve made taking alternative transportation easy, safe, and fun at this stop. A bus stop and a new bike lane connect the neighborhood to the rest of the city. White light street lamps and beautiful planters along the sidewalk make the street safe and enjoyable. Permeable pavers break down smog and reduce flooding, making your walk or ride even more enjoyable.
Commissioning – Sustainable Design Manual

- Design, Construction, and Commissioning Performance Report
- Details the Implementation of Sustainable Goals, Including Ideas Not Selected.
- Living Document to Include Construction and Commissioning Reports
Commissioning – Stormwater Monitoring Plan

• Scope
  – To assess the performance, effectiveness, and efficiency of individual and sequential BMPs relative to stormwater flow and pollutant load reduction.

• This evaluation will include
  – Determining pollutant load and flow control of the BMP(s) under typical operating conditions relative to current background conditions
  – Determining the BMP(s) response to varying storm characteristics and antecedent weather conditions
  – Determining BMP integrity over the course of the study
  – Air quality testing for depolluting pavers
# Commissioning – Construction Goals

As of August 2010 – 10% Project Completion

<table>
<thead>
<tr>
<th>Category</th>
<th>Overall Project Goal</th>
<th>Percent of Materials Installed as of Aug 2010</th>
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<tbody>
<tr>
<td>Regional Materials</td>
<td>40%</td>
<td>29.94%</td>
</tr>
<tr>
<td>Recycled Content</td>
<td>10%</td>
<td>2.00%</td>
</tr>
<tr>
<td>Construction Waste</td>
<td>90%</td>
<td>90.03%</td>
</tr>
</tbody>
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Fuel Tracking: 825.55 gallons of ULSD fuel used to date
Lessons Learned from Eco-Logical / Sustainable Streetscape Implementation

• Integrated design requires new roles within interdisciplinary design teams.

• Technology availability may not always coincide with project schedules.

• Changing “business as usual” within the public right of way requires contact with all public and provide users of the public way.

• Monitoring information of local pilot projects is critical in order to accurately compare grey vs. green infrastructure alternatives.

• Addressing livability issues within the public way involves inherently sustainable practices.