

# Old Fashioned and New Fashioned Sustainability

Accommodate the needs of ALL users in a limited amount of space

Minimize impact on land, air and water resources

### Leadership: Chicago Climate Action Plan



Permeable Pavement

Adaptation (Infiltration)

Mitigation (Energy use)

### Green Alley Program



- •Six pilot locations, and over 130 locations citywide
- •Program includes use of permeable pavements, recycled materials, highalbedo pavements, and dark-sky lighting.
- •Improves stormwater management and energy use through infrastructure improvements





### Waste Management: Green Alley Program

# Development of Permeable Asphalt and Concrete:

- Best Practices
- Material Testing
- Trial Batches
- Recycled Content- Slag/GTR

# The Ground Tire Rubber Solution:

- Approx 600 tires recycled per alley
- Solved cohesion problem





# Maintenance and Commissioning



May 2008 Green Alleys Mon				
Description	Albedo	Cores	Infiltration	Sweep?
Pervious HMA alley	Y	Y	Y	3 methods
Pervious concrete alley	Y	Y	Y	3 methods
Block pavers	Y	И	Y	Y
Pervious concrete strip w/high-albedo panels	Y	Y	Y	Power-wash
High-albedo pavement	Y	И	И	И

- Owner Needs
- Level of Service
- Life Cycle Costs

# Belmont Alley - Installation Innovation



28-day compressive strength: 2757 psi (core)

Permeability: 19.5 gpm/sq ft

Aggregate Mix CM11: 2076 lbs. CM13: 425 lbs.





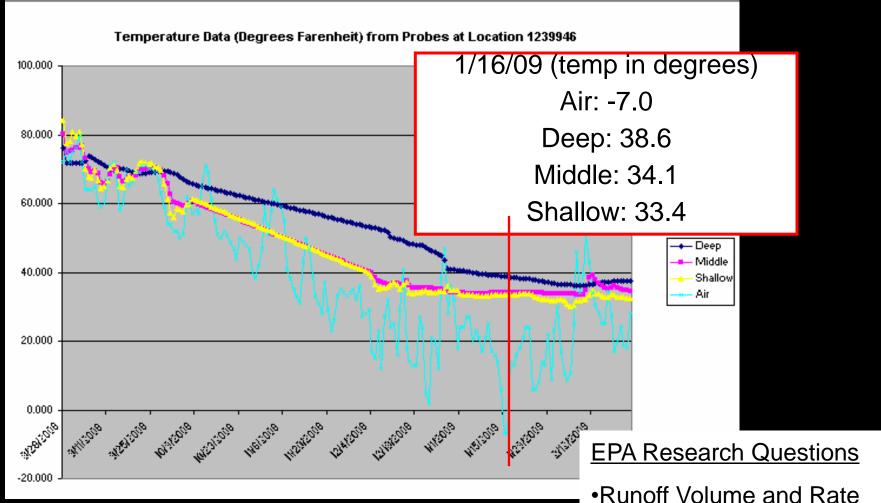
### Maxwell Street Permeable Market Plaza





- •.89 acres of permeable, high albedo pavers
- •Pavers have initial SRI of .30 or 32%

### Market Plaza: Preliminary Monitoring Results



Sept 2008- Feb 2009

- Runoff Volume and Rate
- Surface Water Quality
- Ground Water Quality
- Freeze/Thaw Performance





Plazas

Parking lanes



# Sustainable Streets



### Cermak/Blue Island Sustainable Streetscape

Stormwater Management

Divert 80% of the typical average annual rainfall and at least 2/3 of rainwater falling within catchment area into stormwater best management practices.

Water Efficiency

Eliminate use of potable water for irrigation, specify native or climate adapted, drought tolerant plants for all landscape material.

Transportation

Improve bus stops with signage, shelters and lighting where possible, promote cycling with new bike lanes, improve pedestrian mobility with accessible sidewalks.

Energy Efficiency

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.

Recycling

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.

Urban Heat Island, Air Quality

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.

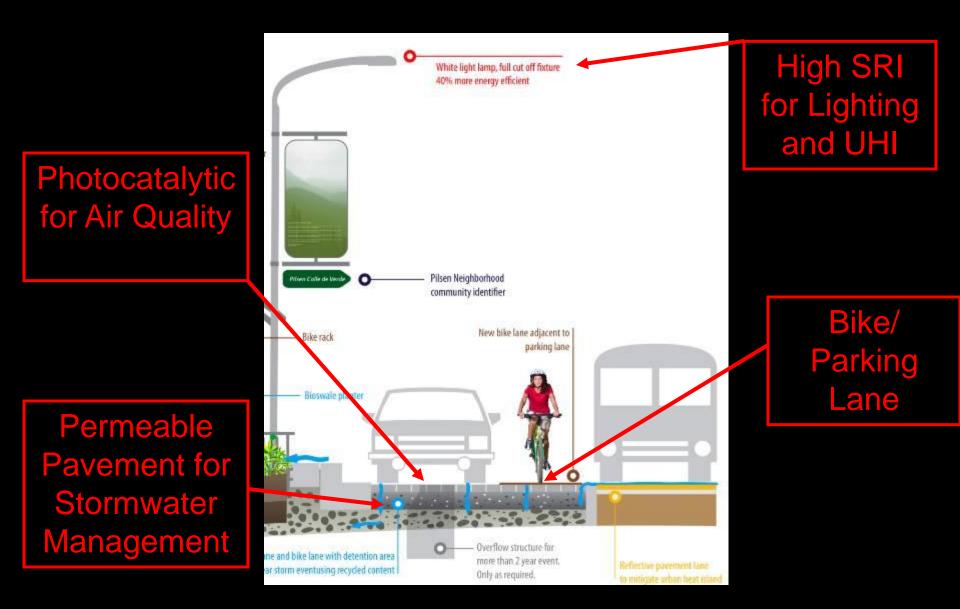
Education,
Beauty &
Community

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.

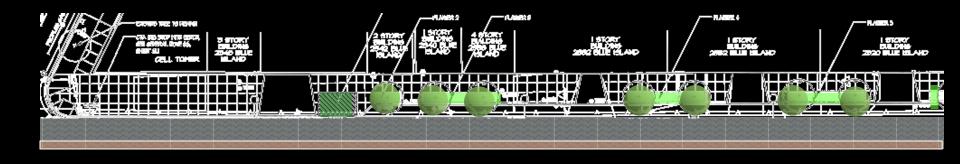
Commissioning

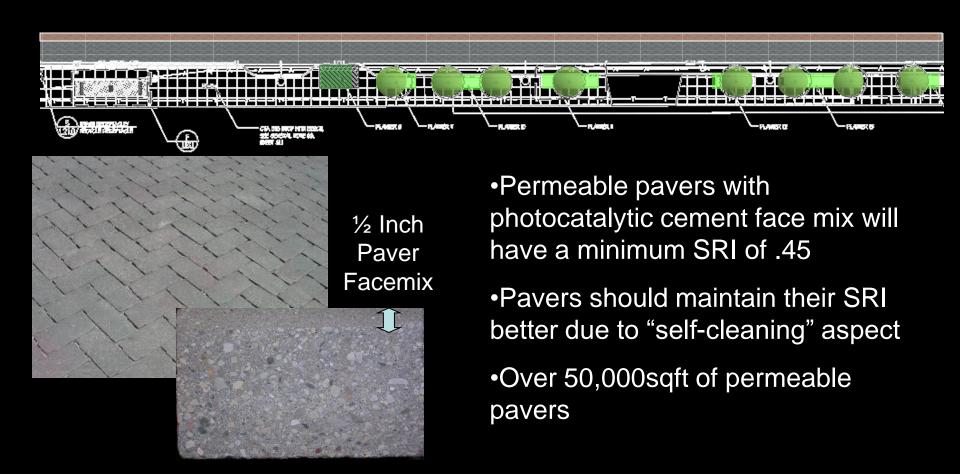
Model Stormwater BMP's in Infoworks to analyze and refine design. Monitor stormwater BMP's to ensure predicted performance and determine maintenance practices.

# Integrated Infrastructure Design Example: Blue Island Cross-section



### Photocatalytic Permeable Pavers







### BENITO JUAREZ HIGH SCHOOL WATER FEATURE



# BENITO JUAREZ HIGH SCHOOL WATER FEATURE









### Asphalt

- •Pre-2006: Max RAP allowable within IDOT Specification, N30
- •2006: Pilot use of N30LC, using 45% RAP + 15% Recycled Concrete + 10% GTR in the AC Liquid
- •2006: Permeable asphalt with GTR
- •2007: Pilot use GTR in N90 arterial application
- **1008**: Pilot 4.75 binder course with GTR with SMA surface
- •2008: Piloted two Evotherm warm mix asphalt projects
- •2009: Pilot use of 5% post-consumer asphalt shingles + 23% RAP, N30, reducing amount of virgin asphalt concrete
- •2011: N90 Warm mix asphalt with 10% FRAP, 20% Course FRAP, 5% RAS and GTR with high albedo micro-thin concrete overlay

### Concrete

- •2006: Permeable Concrete with slag
- •2006: High Albedo Concrete with slag
- •2009: Concrete with recycled wash water
- •2009: Refined permeable concrete mix design to accommodate new maintenance protocol and tested asphalt paver installation method
- •2010: Concrete with 30% recycled aggregate, recycled wash water and 10% slag





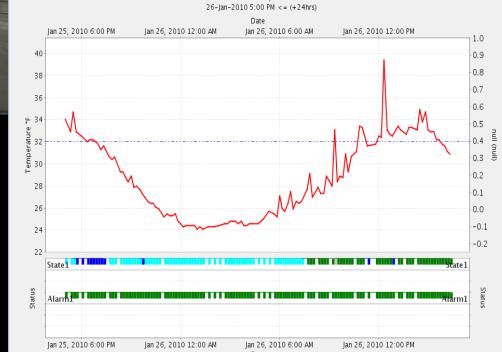
# Meteorological Station

Cermak Road



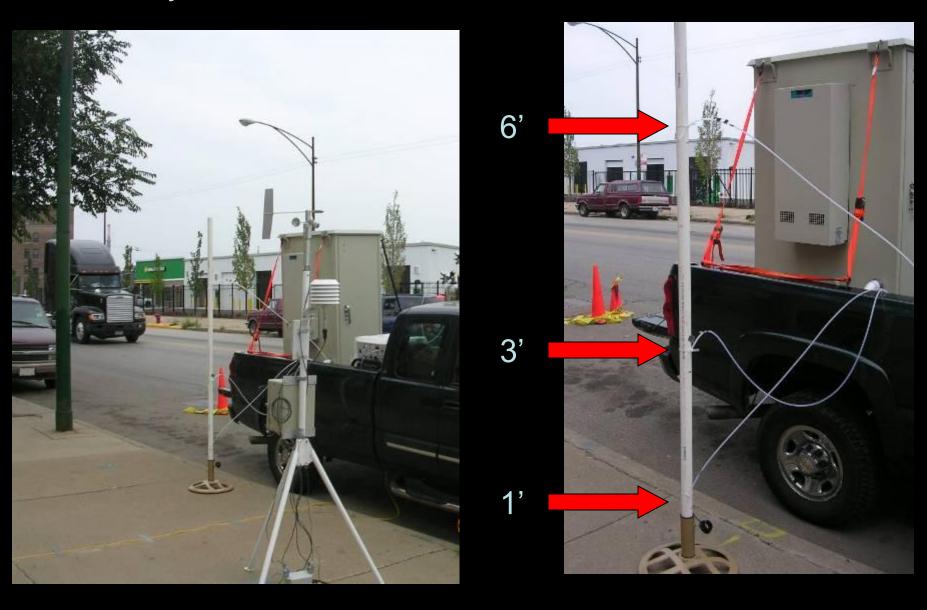
Observation @ 26.01.2010 16:20 Air Temp 21.9 °F **Dew Point Temp** 12.7 °F Rel Humidity 67 % Surf Temp 30.9 °F Surf State none Grip Level 0.82 Water Layer 0.0 in Ice Layer 0.0 in Snow Layer 0.0 in Can compare air temperature and surface temperature in real time

Intersection of Cermak Raod, Blue Island Avenue and Ashland Avenue will be coated with microthin concrete overlay



IceNet Observation Graph™: Cermak Road

### Air Quality Pre-Data Collection



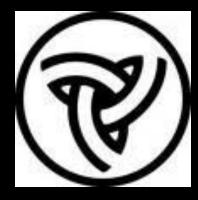
Data Points Include: NO, NO2, NOx, Wind Speed, UV

### **Get Points!**

- •LEED-NC
- Stormwater Design
  - Quantity
  - Quality
- Heat Island Effect: Non-Roof
- Recycled Content
- Regional Materials
- Innovation
- •LEED- ND
- The Sustainable Sites Initiative
- •I-LAST, IDOT rating system
- Greenroads









# National and Local Rating Systems

CATEGORY	Design Strategy		Rating System						
			I-LAST Rating System (IDOT)	Green Roads Rating System	Sustainable Sites Initiative	LEED-ND			
	Identify Stakeholders and develop Stakeholders Involvement Plan		2						
Planning	Engage Stakeholders to conduct Context Audit and develop project purpose		2						
anr	Involve Stakeholders to develop and evaluate alternatives		2		4	2			
Pis	Employ Stakeholder involvement techniques to achieve consensus for Preferred Project Alternative		2						
	Plan for Context Sensitive Solutions (CSS)	, ,		5					
TOTAL POINTS EARNED:			130	79	100	32			
	POINTS POSSIBLE:		228	118	250	100			
	Percentage % of possible points:		57%	67%	40%	32%			
	, Ranking:		N/A	Evergreen (>60% of total)	One Star (Four Star possible)	(need 8 more Points to become "Certified")			

### Sustainable Streets are Cost Effective

