Green Infrastructure in an Urban Environment

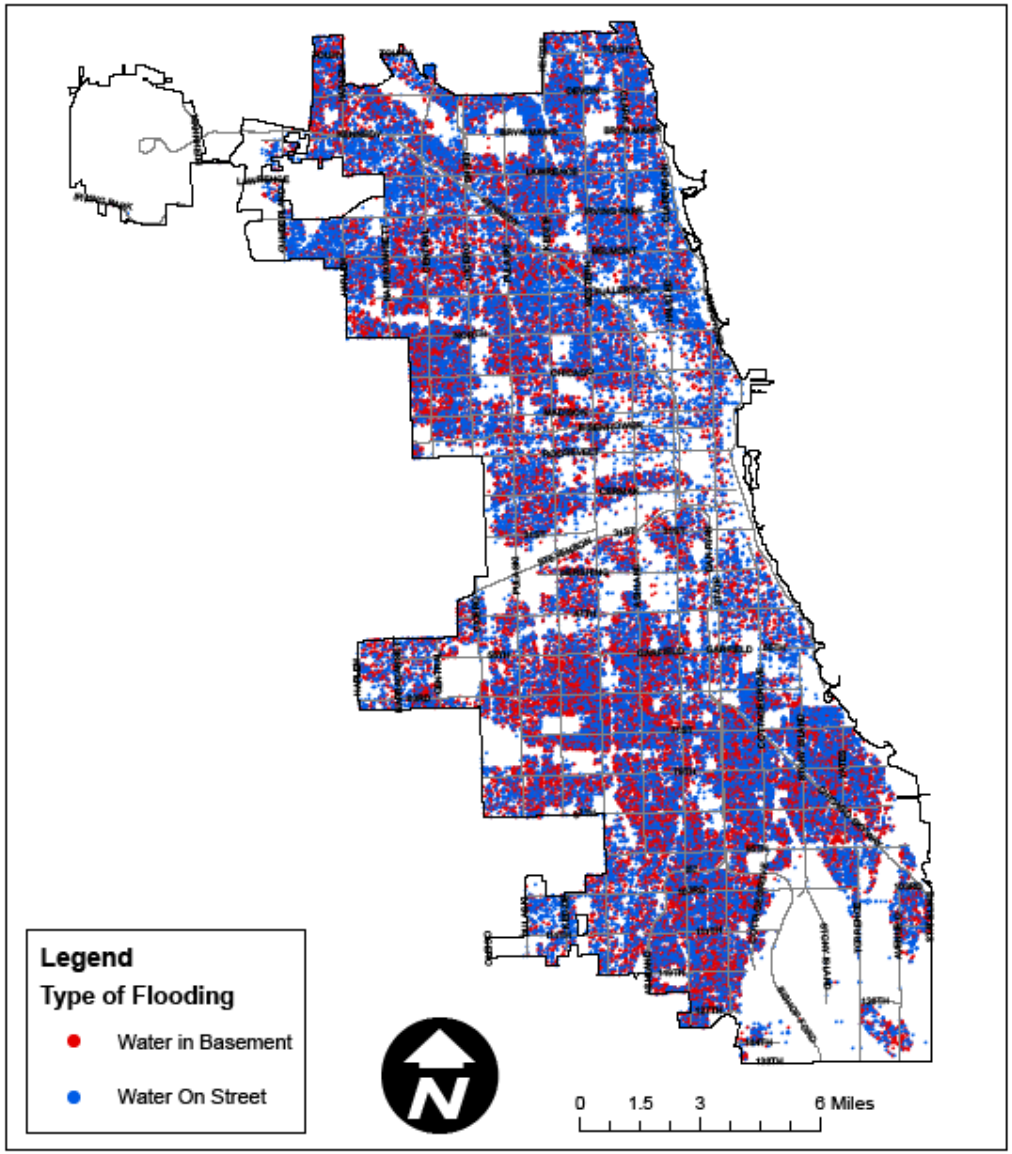
Chicago Department of Environment

Richard M. Daley,

Mayor

Suzanne Malec-McKenna,

Commissioner



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Richard M. Daley
Mayor

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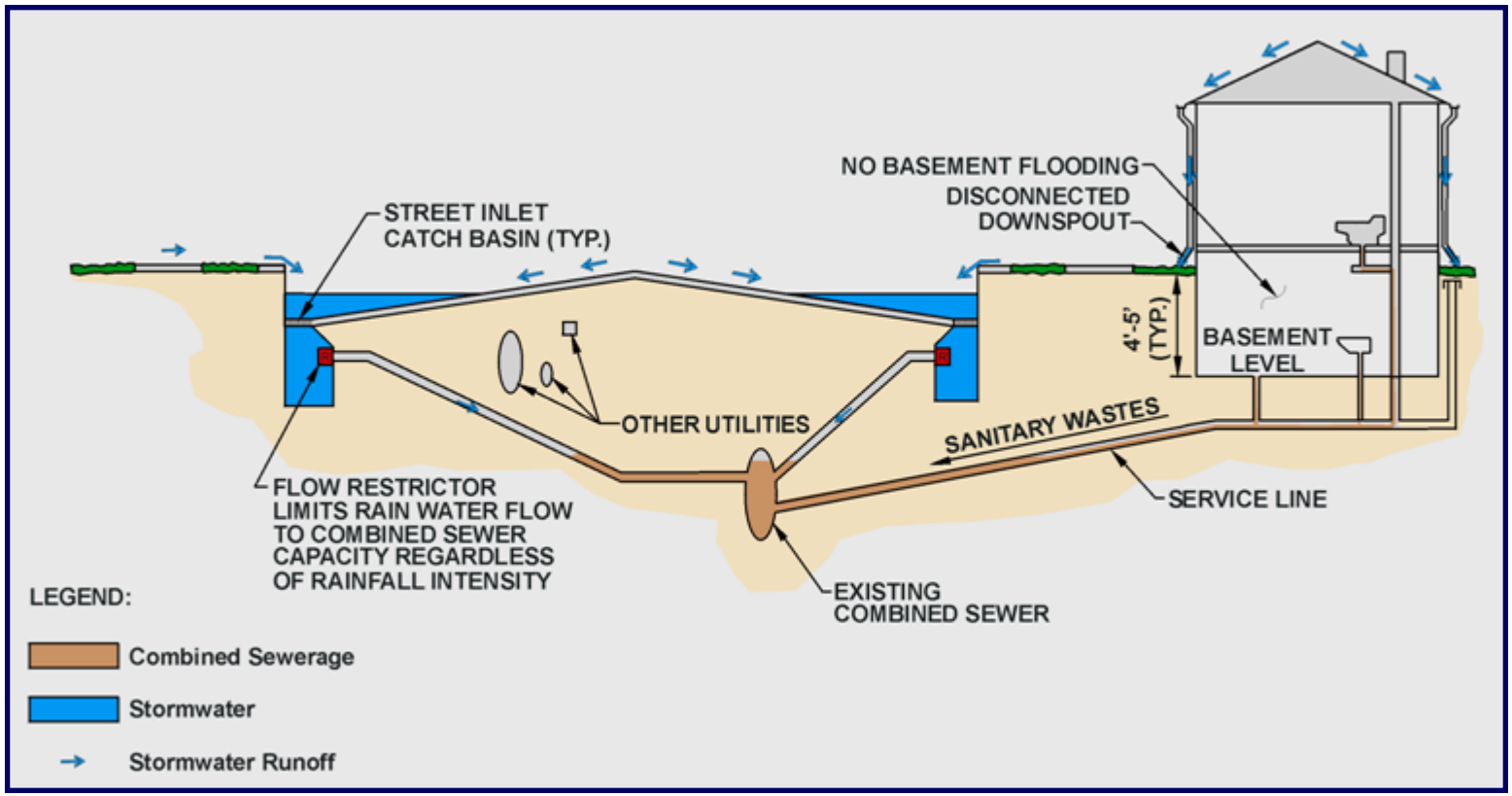
311 FLOODING COMPLAINTS
2000-2004

DOE, JM - June 2006

C:\ArcMap Projects\Flooding\floodcomplaints.pdf

Chicago's Combined Sewer System with Downspout Disconnection and Rain Blockers



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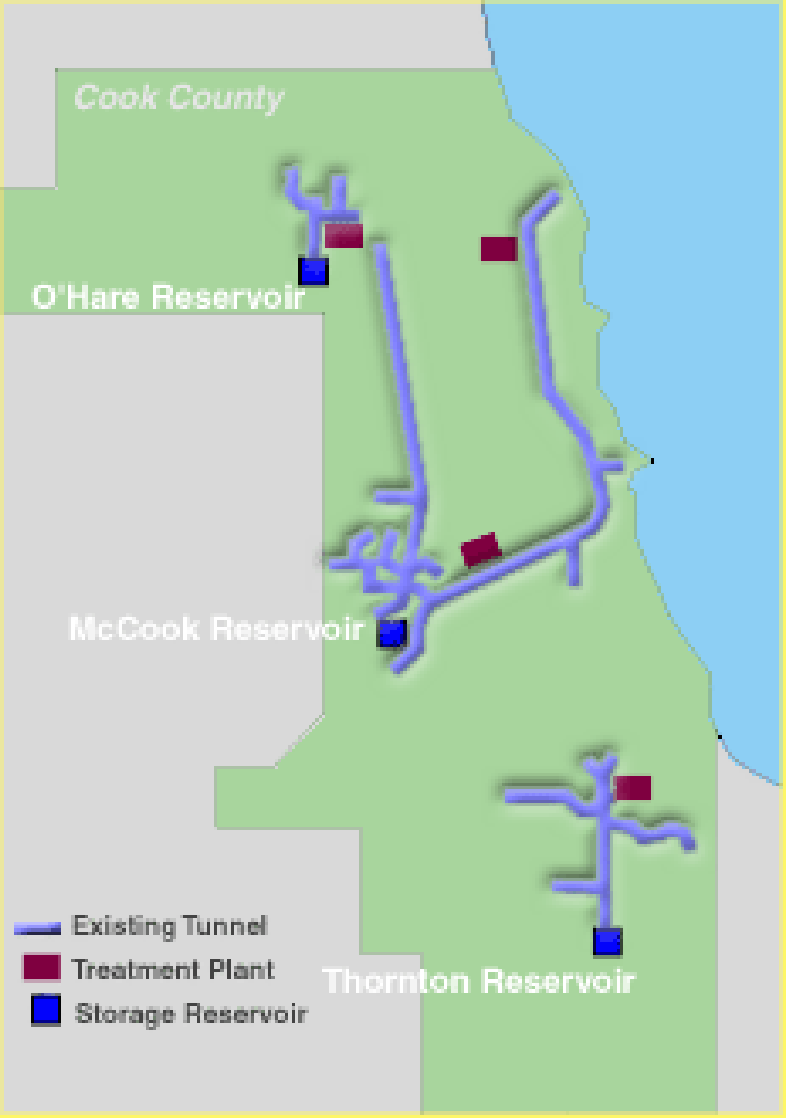


TARP

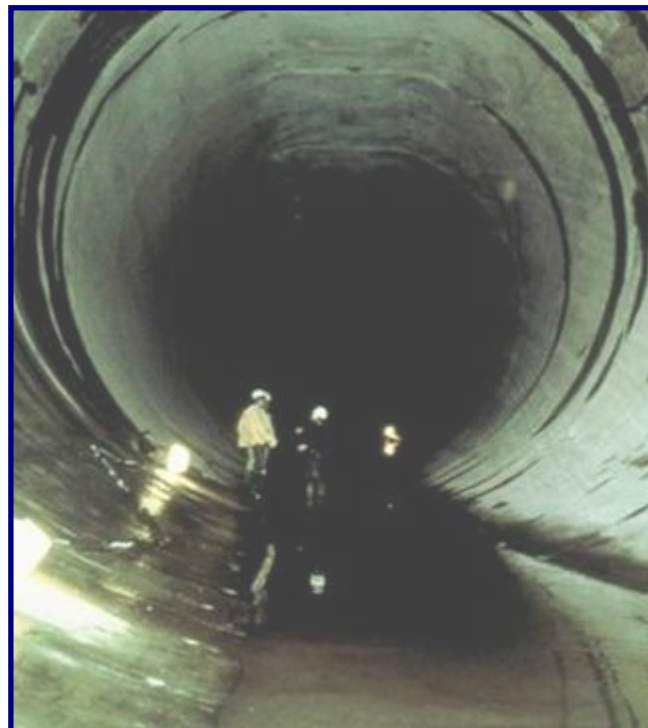
- **Phase I – Tunnel**
  - 109.4 miles, 30'd, ~210 ft deep
  - Completed 2006

Phase II – Reservoirs

ORD – 1996, 350MG

McCook – 2014, 2023 10BG

Thornton – 2003, 3.1BG, 2014, 7.9BG

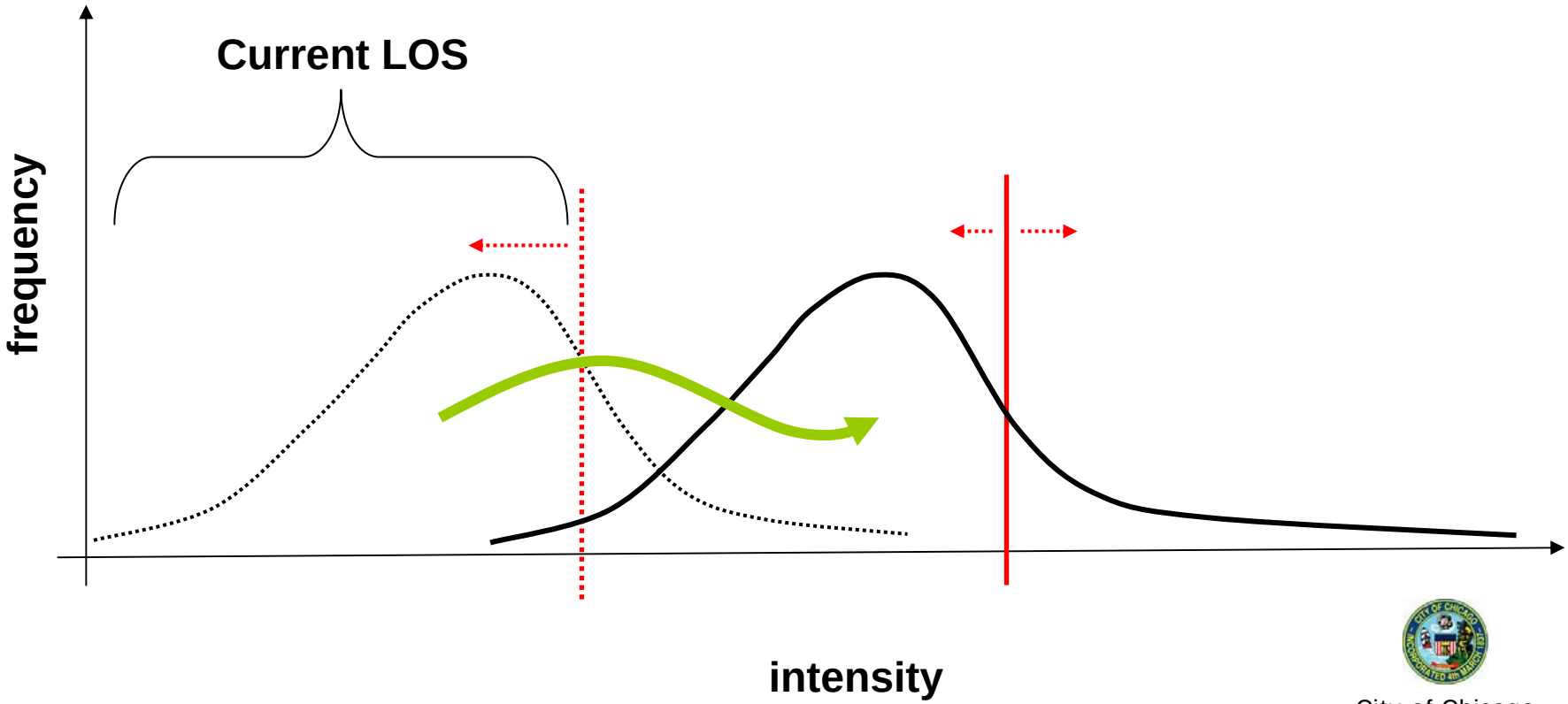


Diagram/concept credit

Pete Mulvaney, DWM

Climate change is shifting the intensity of storms to the right.

How do we fill that gap?



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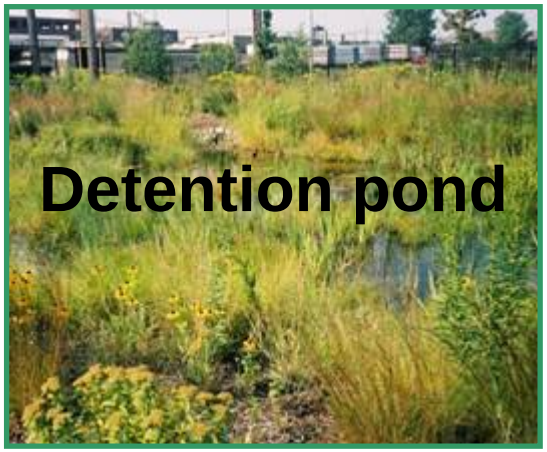

Green Infrastructure: Treating Rainwater like a resource – not a waste

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Green Infrastructure Has Additional Benefits

- **Keeps water as part of natural water cycle**
- **Biodiversity, birds, beneficial insects**
- **Rainwater (vs. tap) good for plants**
- **Reduces Urban Heat Island Effect**
- **Less energy needed to convey, treat water → climate change mitigation**

The Climate Change Connection

Conserving water conserves energy

- **Lots of energy used to pump, treat, and deliver drinking water**
- **Chicago purifies and treats one billion gallons of water every day**
- **Energy required releases over 255,000 metric tons of CO2e/year = adding nearly 85,000 cars to the road every year**

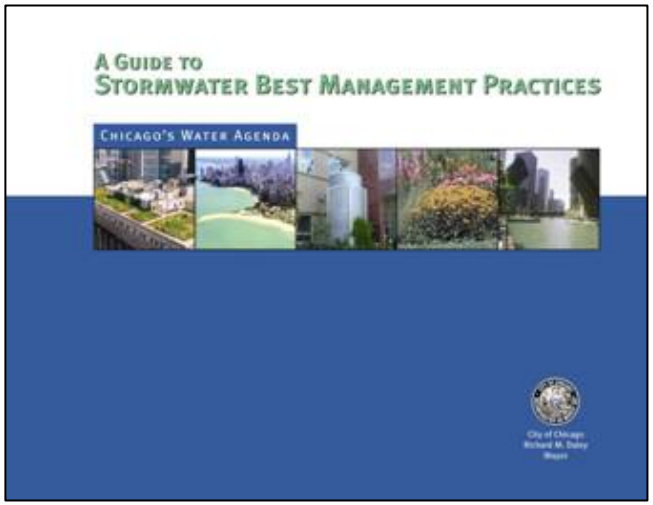
Climate change can have impacts on our water source

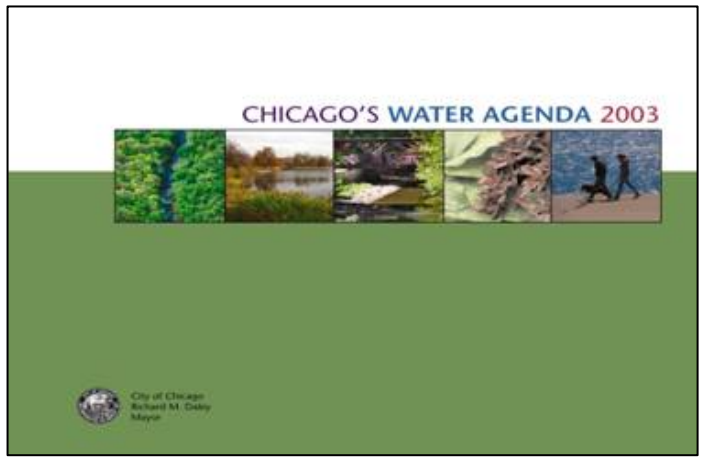
- **Declines in lake-level**
- **Decreases in ground-water level & recharge**
- **Declines in water quality & human health**
- **Reduced hydroproduction; reduced channel depths for shipping**
- **Decreases in lake ice extent – some years without ice cover**
- **Changes in ecosystem & biodiversity**

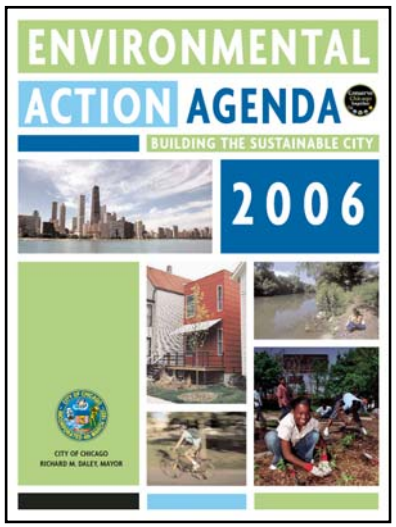
Climate change has impacts on managing stormwater

- **More intense rain events**
- **More frequent drought periods**

City Efforts to Prioritize Stormwater Management via Green Infrastructure







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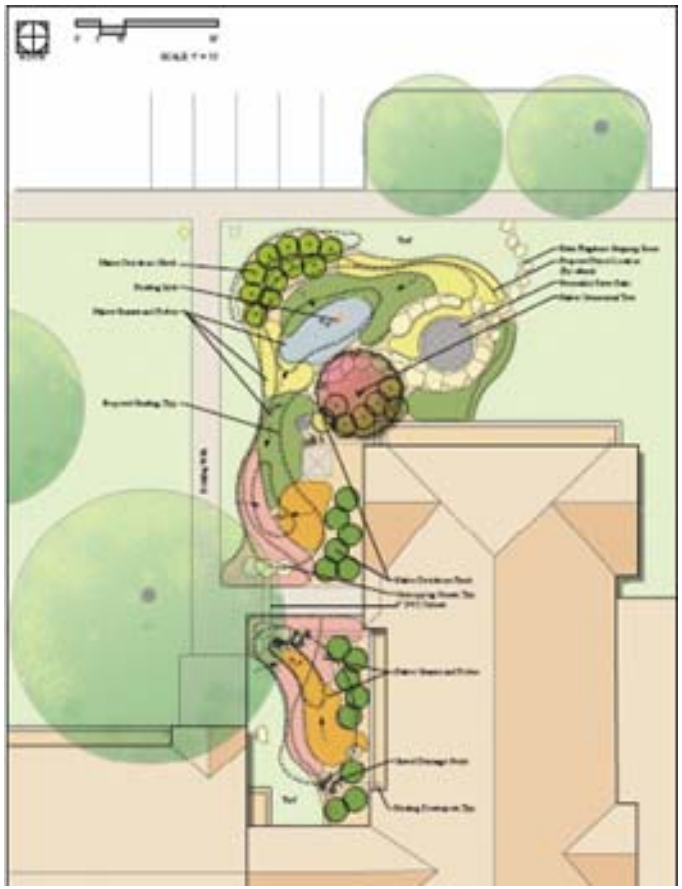
Stormwater Management Ordinance
Effective January 1, 2008

- **Rate control**
  - Based upon the capacity of existing sewer **or**
  - Accept standard vortex restrictors from city
- **Volume control**
  - Capture the first 0.5 inch of a rain event **or**
  - Achieve 15% reduction in impervious surface from baseline conditions
- **Soil erosion and sediment control**
- **Operations and maintenance plan**

Swales, Bio-infiltration, Bio-retention



North Park Village Nature Center Rain garden

Swales at CCGT

Swale at 130th and Torrence in Calumet

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Green Roofs

City Hall Green Roof, started in 2001

Chicago Center for Green Technology

Residential Green Roof, funded through the Green Roof Grants Program

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Department of Planning and Development
Building Green/Green Roof Matrix

Department of Planning and Development
Denis M. Cardoc, Commissioner

Project Type	Public Assistance (RFP/Negotiated Sale w/Land Write Down) (Empowerment Zone Grants) (TIF) (DOH)	Public Assistance (Industrial Dev. Rev. Bonds) (Enterprise Zone Fac. Bonds) (Bank Participation Loans) (Class L) (SBIF) (Class 6b)	No Public Assistance (Planned Developments) (Lakefront Protection Ordinance Developments)
Residential			
Market Rate SF, TH, Multi-units (< 4 units)	Energy Star Certification or LEED Certified Building		
Market Rate (=> 4 units)	50% Green Roof and Energy Star Certification or LEED Certified Building*	50% Green Roof and Energy Star Certification*	25% Green Roof*
> 20% Affordable Units or CPAN	DOH Green Criteria		
Institutional			
Hospitals	50% Green Roof or 25% Green Roof and LEED Certified Building*	25% Green Roof or 10% Green Roof and LEED Certified Building*	25% Green Roof or 10% Green Roof and LEED Certified Building*
Community Centers and Schools**			25% Green Roof or 10% Green Roof and LEED Certified Building*
Industrial	10% Green Roof or Energy Star Roof and LEED Certified Building*	10% Green Roof or Energy Star Roof*	
Commercial			
Retail over 10,000 square feet (footprint)***	75% Green Roof or 50% Green Roof and LEED Certified Building*	50% Green Roof or 25% Green Roof and LEED Certified Building*	50% Green Roof*
Retail under 10,000 square feet (footprint)	25% Green Roof or LEED Certified Building*	Energy Star Roof	
Office over 80 feet	100% Green Roof	75% Green Roof*	50% Green Roof*
Office under 80 feet	50% Green Roof or Energy Star Roof and LEED Certified Building*	Energy Star Roof	

NOTE: All projects being reviewed by the Department of Planning and Development are encouraged to use storm water best management practices, LEED and Energy Star building standards and residential green building standards where applicable.

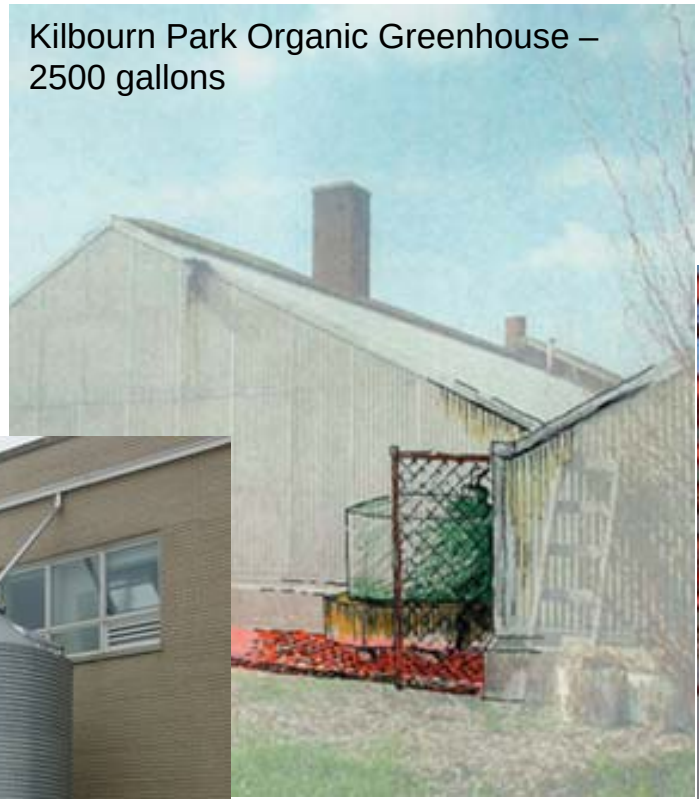
A 50% green roof and LEED certification will be required for all public projects except Community Centers and Schools. LEED certification plus a 10% green roof or a 25% green roof will be required for Public Community Centers and Schools. Community Centers and Schools will also focus on indoor air quality and daylighting.

* Remainder of roof must meet Energy Star level for reflectivity.
** Church buildings serving multiple purposes will be considered a community center.
*** Run-off coefficient value reduction will be required for big-box retail projects over 100,000 square feet.

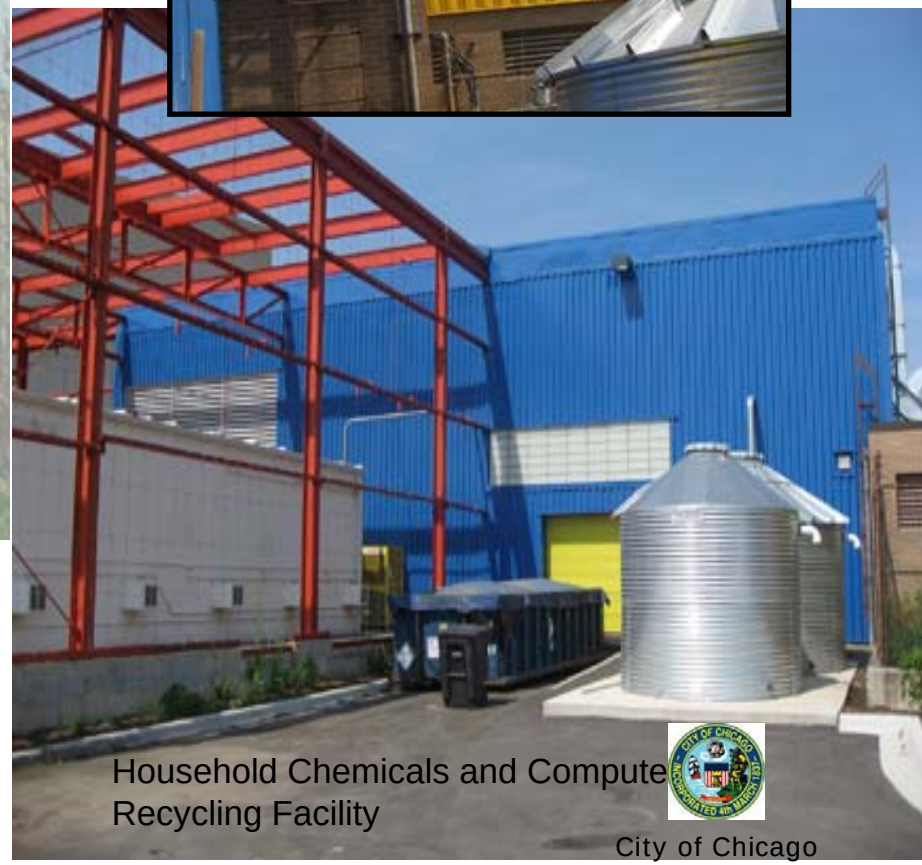
Legend
SF = Single Family
TH = Townhouses
RFP = Request for Proposals
TIF = Tax Increment Financing
SBIF = Small Business Improvement Fund
DOH = Department of Housing
CPAN = Chicago Partnership for Affordable Neighborhoods

LEED

Cisterns


Kilbourn Park Organic Greenhouse – 2500 gallons


Chicago Center for Green Technology


Household Chemicals and Computer Recycling Facility

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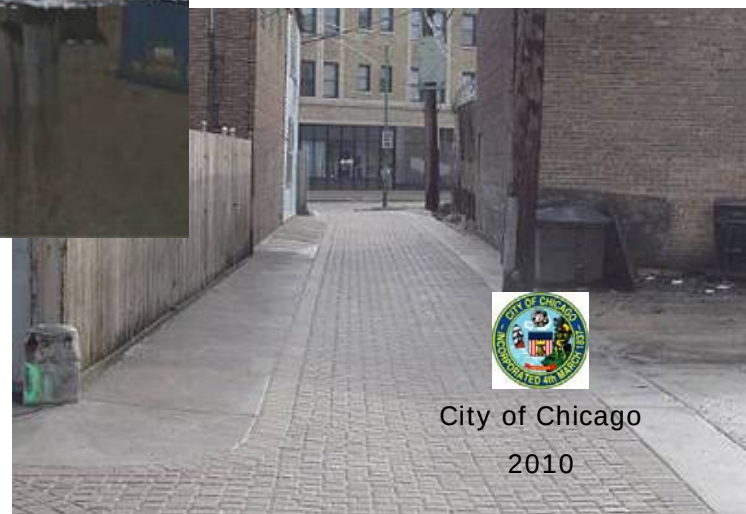
Monitoring

- Chicago Center for Green Technology
- Household Chemicals and Computer Recycling Facility
- Green Alleys



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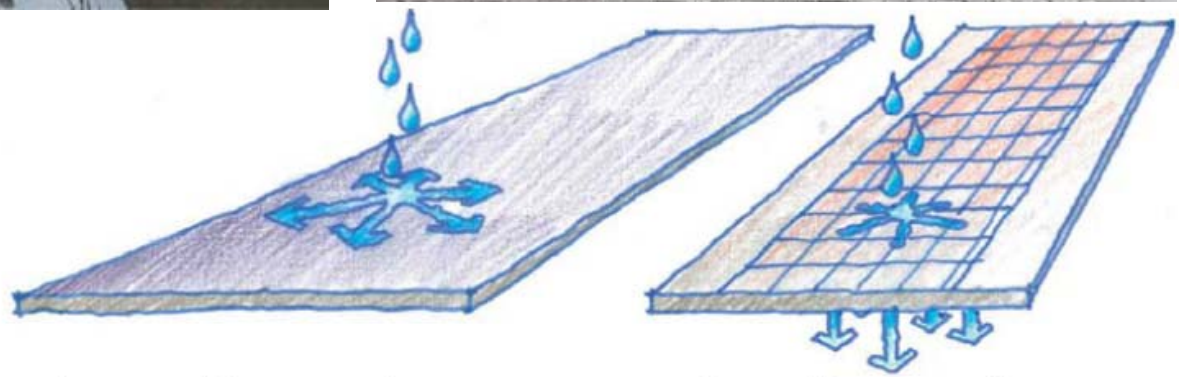
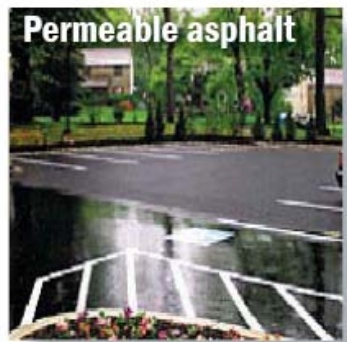
McCormick Place Stormwater Management

- **67 acres of rooftop drainage**
- **3400 foot tunnel to Lake Michigan**
- **Approximately 55 million gallons per year**

Green Alley Program (CDOT)



Six pilot locations 2006, and over forty planned locations citywide



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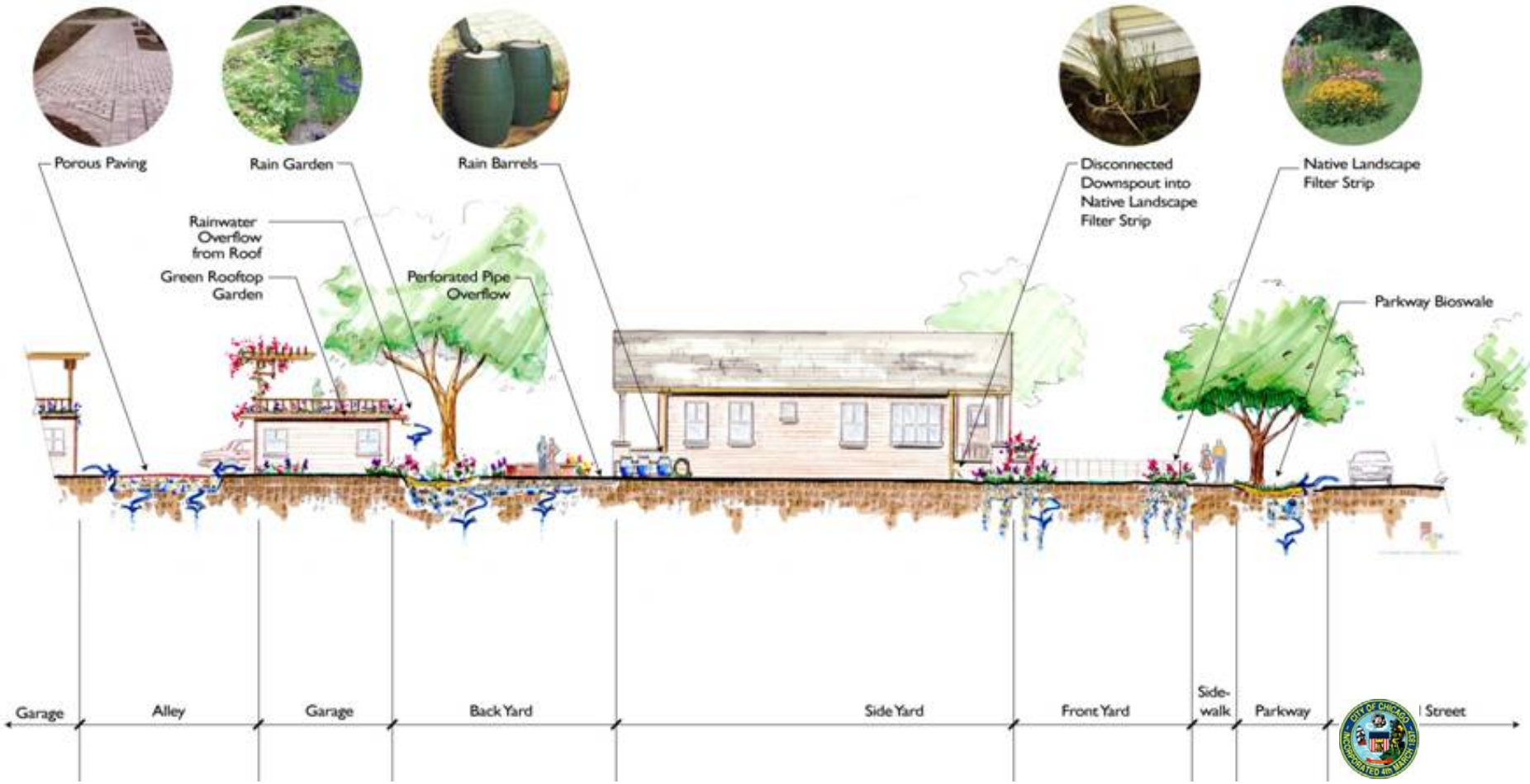
Community Outreach: Rain Barrel, Rain Garden and Downspout Disconnection, Water Conservation

Green Infrastructure Can Happen at Home



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Thank You.

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