



# STORMSTORE UPDATE

*CALUMET STORMWATER COLLABORATIVE NOVEMBER 2017*

# StormStore Feasibility Study

- Real Estate Demand Analysis
  - Identify situations where developers would have benefitted from or would have utilized offsite mitigation if it were available
- Land and Hydrological Analysis (“*Opportunities Map*”)
  - Identify where there are sites well-suited for detention or volume control
- Policy Analysis
  - Identify key features of other successful trading programs and primary issues to consider for an offsite stormwater control market in Cook County

# Feasibility Study Team

- Metropolitan Planning Council, The Nature Conservancy, Metropolitan Water Reclamation District
  - Real Estate Analysis Consultants: Orion Planning + Design, Teska Associates, Hey & Associates
  - Land & Hydrologic Analysis Consultant: Illinois State Water Survey

# Preliminary Findings: demand analysis

- Analysis of past development projects indicates there would be substantial potential demand for offsite alternatives
  - **roughly 17%** of all projects permitted between 2006 and 2016 on sites under ten acres (132 of 764) could have used offsite to realize a net economic benefit of at least \$20,000 or more
  - **approximately 21%** of all projects (197 of 928) would have benefitted if all sites including those over ten acres were able to make use of an off-site option
- The total economic benefit for the 197 projects that had a positive net benefit (> \$20,000) was estimated in the model to be **\$47,407,095**, with an average economic benefit per project of **\$240,645**.

# Demand for Offsite Options

Potential demand for offsite capacity was spread across the six watersheds in Cook County

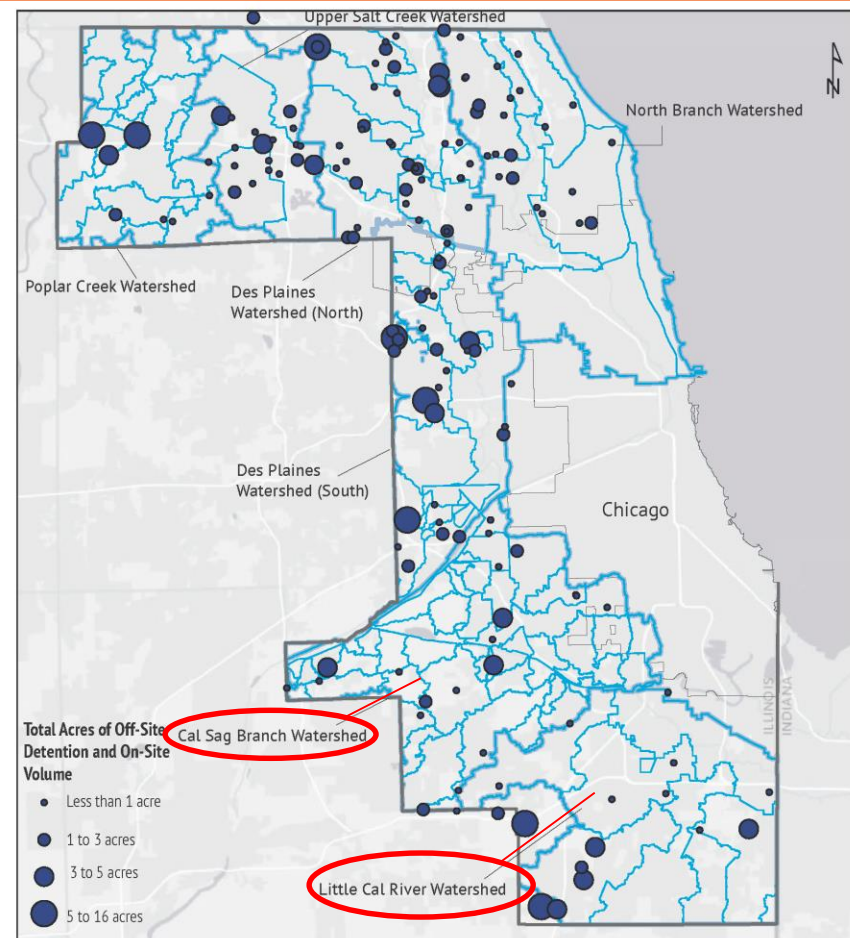
Cal-Sag Channel Watershed

14% of permits (< 10 acre sites)

Little Calumet River Watershed

17% of permits (< 10 acre sites)

Offsite area for stormwater mgt. (in each watershed): approximately 11 acres



StormStore

August 24, 2017

Detention Off-Site and Volume On-Site

for All Permits

Watersheds & Subwatersheds

# Preliminary Findings: supply analysis

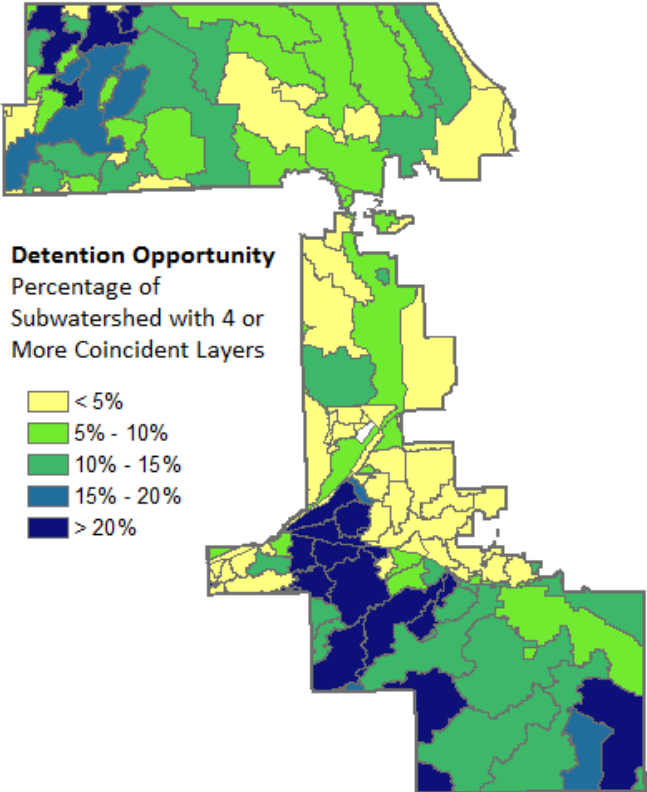
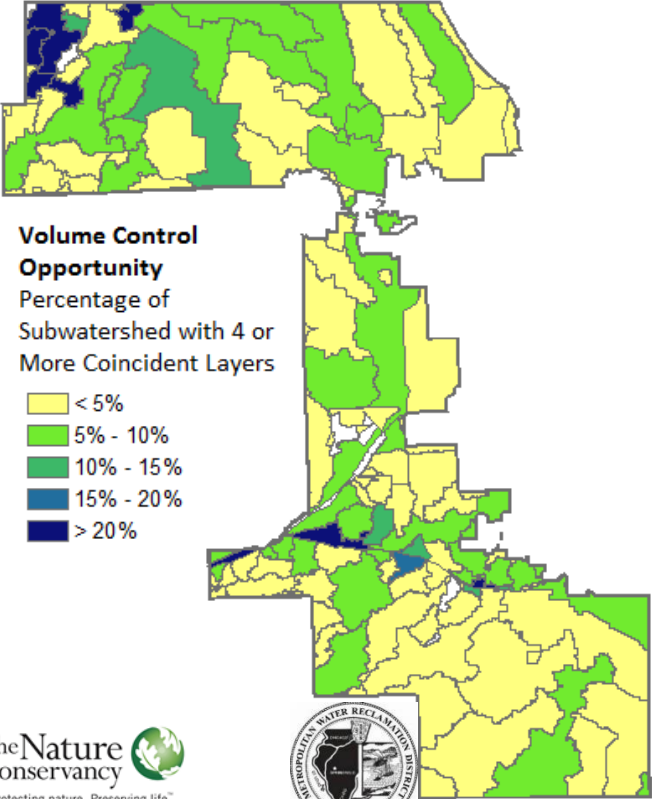
- Analysis of various land use, topography, and soil characteristics throughout Cook County
- Adequate surface area of potential sites to meet the potential demand
  - Potential sites in all the watersheds in Cook County
- Supply site types vary and are widely distributed at the 3+acre scale





# Sites with Characteristics for Stormwater Controls

Potential supply sites were found in all the watersheds in Cook County



# Results: Favorable Characteristics Well Distributed Across Study Area

Summary statistics showing area (acres) and volume (acre-feet) for a threshold of four or more coincident favorable layers.

Total supply potential for detention was 197,572 acre-feet

Total supply potential for volume control was 101,056 acre-feet

Watershed	total acres	Detention			Volume Control		
		acres	acre-feet	%	acres	acre-feet	%
Calumet Sag Channel	96135	12103	48412	13%	5788	23152	6%
Lower Des Plaines River	120847	7614	30456	6%	5748	22992	5%
Little Calumet River	91403	14015	56060	15%	3388	13552	4%
North Branch Chicago River	90526	3548	14192	4%	1856	7424	2%
Poplar Creek	51580	8075	32300	16%	5215	20860	10%
Upper Salt Creek	35387	4038	16152	11%	3269	13076	9%
Total	485877	49393	197572	10%	25264	101056	5%



# Policy Analysis

## Research Plan

- Stormwater ordinance review of the following key factors:
  - Detention requirements; Volume control requirements
  - Off-site mitigation; Credit programs
  - Fee in lieu provisions
  - Climate change considerations
- Review of existing credit programs (Chattanooga, TN and Washington, D.C.) and relevant case studies noting the above factors as well as:
  - Policy driver(s)
  - Approval process of mitigation sites/credit sites
  - Length of credit & associated site life
  - Trading mechanism
- Assess other trading systems, wetland mitigation banking and carbon trading, to identify features that could provide insights for a stormwater credit system

# Policy Analysis

## *Notable Issues, many for Further Investigation*

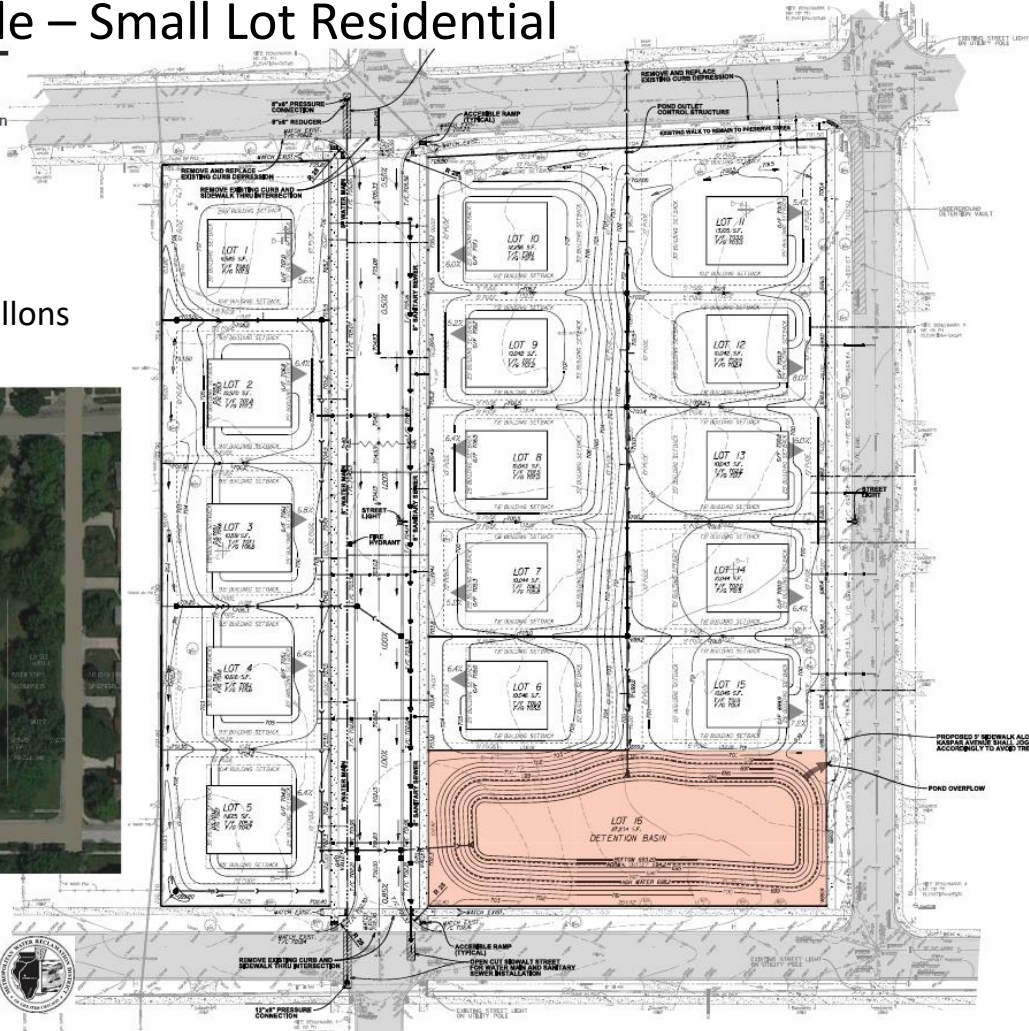
- **No Adverse Impact**
- **Spatial Proximity**
- Criteria for credit sites
  - how a site earns/is awarded credits, and how credits are re-confirmed over time
- Timing considerations
  - initiation of operations at the development and credit site
  - timing of decision to use credits; timing of when supply credits are available
  - **duration of credits**
- The role of municipalities in a credits market in Cook County
- How to spark creation of credit sites to establish the market
- Equity considerations, e.g. how costs and benefits of the market would be distributed

# HYPOTHETICAL DEMAND SCENARIOS

# Demand Side Example – Small Lot Residential

Type of Land Use	Residential
Watershed	Des Plaines River (North)
SPO or WMO	New Plaines Residential Subdivision
Site Area	5.1 acres
Number of Units	15
Building Square Feet	74,918 sq ft
Impervious Surface Area	2.39 acres
Type of Detention	Wet pond
Detention Volume	1.3 ac ft
Type of Green Infrastructure	Infiltration Basin
GI Volume	.24 ac ft

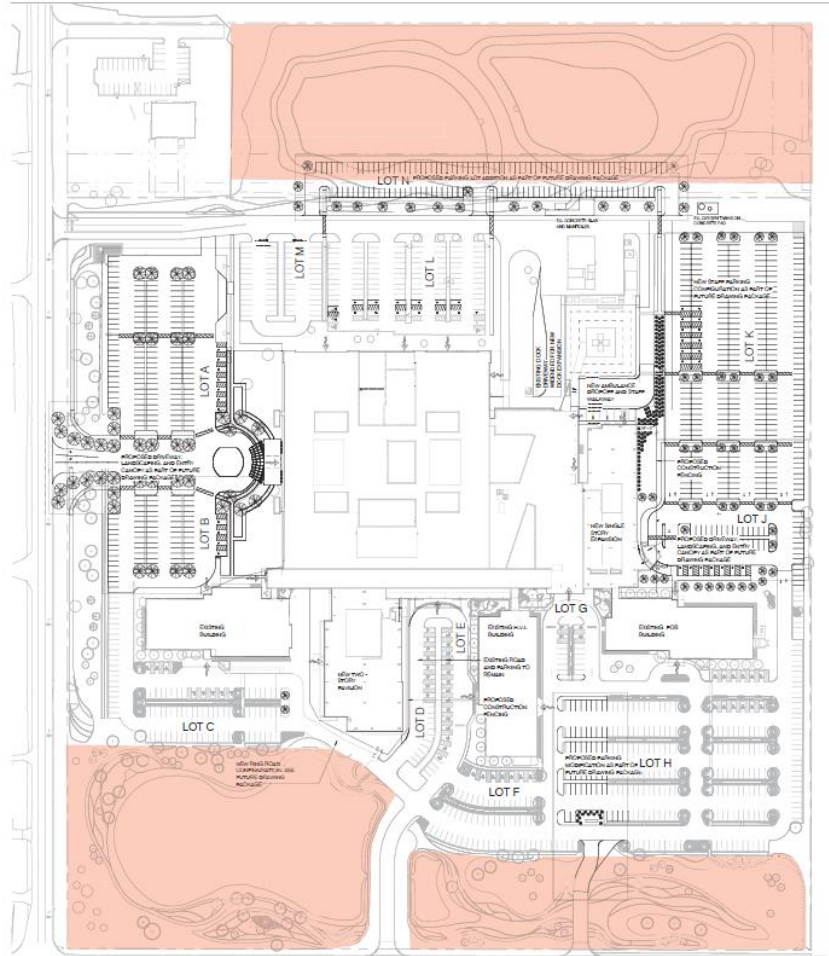
Detention Requirement 423,600 gallons



# Demand Side Example – Institutional (hospital)

## INSTITUTIONAL

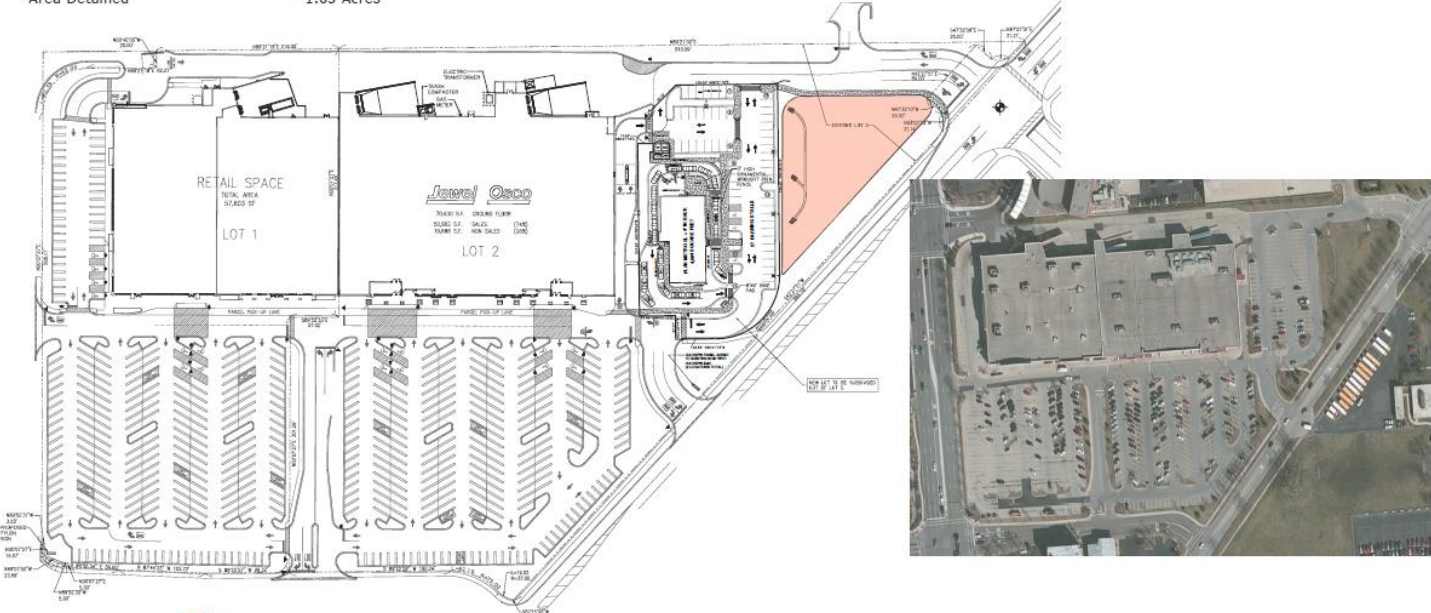
Type of Land Use	Hospital Addition
Watershed	Little Calumet River
Site Area	16.68 acres
Development Area	15.84 acres
Building Square Feet	54,136 sq ft
Impervious Surface Area Before Development	5.40 acres
Impervious Surface Area After Development	9.19 acres
Type of Detention	Pond
Detention Volume	16.58 ac ft
Type of Green Infrastructure	Sediment Basin
GI Volume	0.89 ac ft





# Demand Side Example – Retail

Type of Land Use	New Retail in Existing Shopping Center
Watershed	North Branch Chicago River
SPO or WMO	WMO
Combined or Separate	Combined
Site Area	1.05 Acres
Building Square Feet	5,000 SQ FT
New Impervious Surface Area	0.73 Acres
Existing Impervious Surface Area	.99 Acres
Type of Detention	Existing Pond
Detention Volume	NA
Type of Green Infrastructure	Pipe
GI Volume	.08 Ac Ft
Area Detained	1.05 Acres





# Supply Side Example – School Retrofit

Site Type: Elementary School on South Side

Pre-Project Condition: Almost 100% impervious surfaces. Very little storage or infiltration

Post-Project Features:

- Improved features **for students**, including multi-purpose turf field, jogging track, two half-court basketball courts, play equipment for younger and older students
- Improved features **for teachers**: outdoor classroom areas, potential curriculum material about native plants and water
- Improved **stormwater management**: a cistern capturing roof runoff, a rain garden which provides volume control. Also a subsurface aggregate-filled storage area holding stormwater for gradual release to the combined sewer (i.e., detention)

**Stormwater retention (volume control):**

130,000 gallons

Approximate capital cost: \$1.5 million

Cost shared equally between the three capital partners: CDWM, MWRD and CPS

Before



After



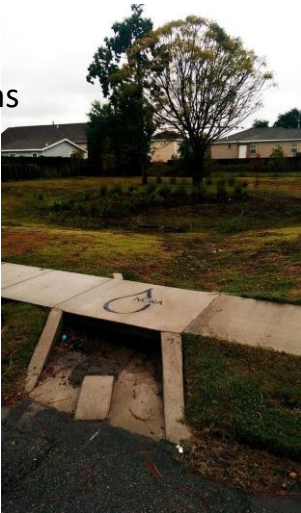
# Supply Side Example – Vacant Lot Retrofit - Detention

Site Type: Vacant Lot (owned by the Land Bank)  
Pre-Project Condition: Mix of gravel and poor quality turf.  
Very little storage or infiltration

Post-Project Features:

- Park-like setting
- Unlined detention basin with flat slopes
- Trees and other vegetation
- Site will manage street runoff

**Stormwater detention:** 150,600 gallons  
Estimated installation cost  
(excluding land): \$20,000  
(no engineered outlet)





# Supply Side Example – Volume Control on Vacant Lots

Site Type: Vacant Lot

Pre-Project Condition: Mix of poor quality turf. Very little storage or infiltration

Post-Project Features:

- Garden-like setting
- Landscaped bioretention cell
- Trees and other vegetation
- Site will manage street runoff

**Stormwater retention:** 165,000 gallons

Estimated installation cost  
(excluding land): \$30,000

*(Garden will have a 30-inch-thick layer of engineered soil and a 2-foot-thick layer of gravel beneath the soil.*

*Garden is designed to capture stormwater from the street and allow it to soak into the ground slowly over 24-72 hours)*

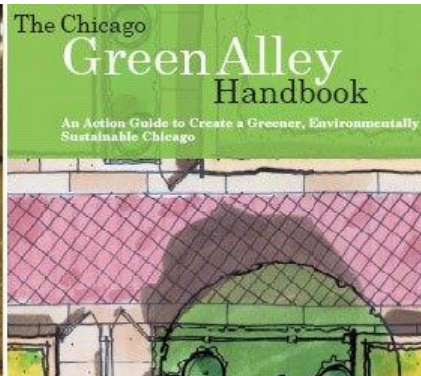


# Supply Side Example – GI ROW Rehab Program

Site Type: Right-of Way (ROW) Improvement Project

- Municipal ongoing program to rehab residential streets
- Road Rehab Program's already in place:
  - Partially funded from Motor Fuel Taxes (MFT)
  - Aging infrastructure: Sewers, water mains and utilities
- Enhance program to incorporate surplus detention and GI volume at intersections, alleys, or other GI streetscapes.
- Simple and substantial impervious runoff capture opportunity
- Clear and straightforward O&M when compared to private?

**Stormwater retention (volume control):** 34,000 gallons



# Discussion Questions

- How do you see this opportunity playing out in the Calumet region?
- Do you know of any projects that could be candidates for supply or demand sites?
- Do you see a role for your organization participating in this market?
- What barriers do you foresee? What strategies might be suitable to overcome them?