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Assessing Potential Opportunity Areas for Developing Stormwater Management Facilities in suburban Cook County:

TRANTS SUSTERS!

Nothing fancy, just meat-and-potatoes GIS

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Project Team

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What is Storm Store?

- Provide flexibility in meeting stormwater requirements
- Bolster detention capacity and/or green infrastructure in optimal locations for maximum benefit





What is Storm Store?

- A potential stormwater credit trading market in Cook County
- Developed by the Metropolitan Planning Council (MPC) and The Nature Conservancy (TNC) working in cooperation with the Metropolitan Water Reclamation District of Greater Chicago (MWRD)







StormStore Feasibility Study







Hey and Associates, Inc. Engineering, Ecology and Landscape Architecture

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 trading market in Cook County



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 \$47,400,000 with an average economic benefit per project of \$240,000.

Note that this was a high level review of the 197 projects. A further detailed analysis to confirm 'no adverse impact' test would be part any trade under the permitting process.



- 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





What was our role?

- Land and Hydrologic Analysis
- identify and quantify opportunity areas favorable for stormwater detention or volume control
- determine geographic distribution of opportunity areas





11 Opportunity Criteria

- IDOT Road Right of Ways
- Public Conservation Areas and Nature Preserves
- Topographic Wetness Index
- MWRDGC GIS data based on past development/redevelopment permit records from 2012-2016
- Flooding claims
- Chicago Wilderness Green Infrastructure Vision
- Riverine Flooding Areas
- Soil Type
- Greenways and Trails plan
- Stack-Unit Mapping of Geologic Materials to a Depth of 15 meters
- CMAP Land Use Inventory



























Layers not shown

• NFIP claims and MWRDGC problem areas not shown on maps (not visible at this scale)





CMAP Land use Classifications (positive)

- Agriculture
- Common Open Space
- Golf Course
- Independent Automobile Parking
- Intermodal Facility(RR)
- K-12 Educational Facilities
- Mineral Extraction
- Non-Parcel Open Space
- Non-Parcel Right-of-Way
- Non-Public Open Space
- Open Space, Primarily Conservation
- Other Institutional
- Other Linear Transportation w/ Asoc.Facilities
- Other Utility/Waste
- Other Vacant
- Post-Secondary Educational Facilities
- Primarily Recreation

- Prison and Correctional Facilities
- Shopping Malls
- Single Large-Site Retail
- Storage
- Stormwater Management
- Trail or Greenway
- Utility Right-of-Way
- Vacant Commercial Land
- Vacant Industrial Land
- Vacant Residential Land
- Warehousing/Distribution >= 100,000 sq. ft.





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CMAP Land use Classifications (neutral)

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- Aircraft Transportation •
- Communication
- Cultural/Entertainment •
- Flex or Indeterminate >= 100,000 sq. ft ٠
- General Industrial < 100,000 sq. ft. •
- **Government Administration and Services** •
- Hotel/Motel •
- Manufacturing/Processing <100k •
- **Medical Facilities** •
- Mobile Home ٠
- Multi-family •
- **Non-Parcel NEC** ٠
- **Non-Parcel Water** ٠
- Office ٠
- **Regional & Community Retail Centers** •
- **Religious Facilities** ٠
- Roadway ٠
- Single-Family Attached •

- Under Construction, Residential ٠ Urban Mix •
 - Urban Mix w/Residential Component

Under Construction, Commercial

Under Construction, Other or Unknown

Under Construction, Industrial

Single-Family Detached

Water





Landuse Subset Benefits for GI



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GIS processing

- Positive attributes from each layer assigned a "score" = 1
- Negative or neutral attributes from each layer assigned a "score" = 0
- Each layer converted into a raster
- 11 layers added together to create composite rasters





GIS processing (round 2)

- Each raster layer converted back into polygons
- 11 polygon layers combined into a composite layer
- Allows for user to identify which layers contribute to any area's composite score





11 Opportunity Criteria Matching





















How might criteria layer be used?

Local Example









Value









Demand Side Example







School Retrofit

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

Post-Project Features:

- Improved features for students, including multipurpose 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





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







Questions?

- Thank You!
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