RAIN READY COMMUNITY TOOL

For the Calumet Stormwater Collaborative

March 1, 2019

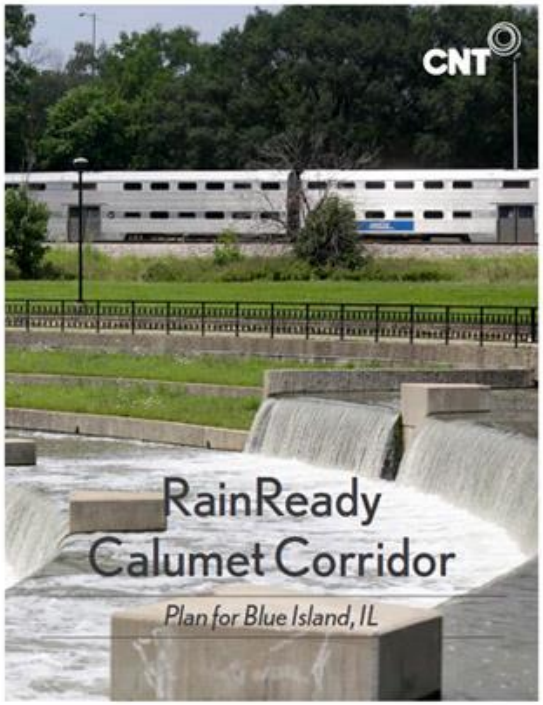
Dawn Walker & Peter Haas

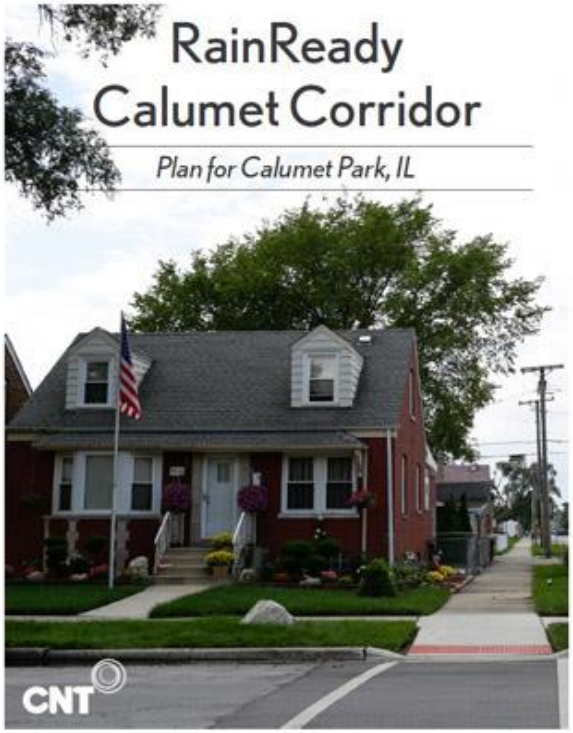
Center for Neighborhood Technology

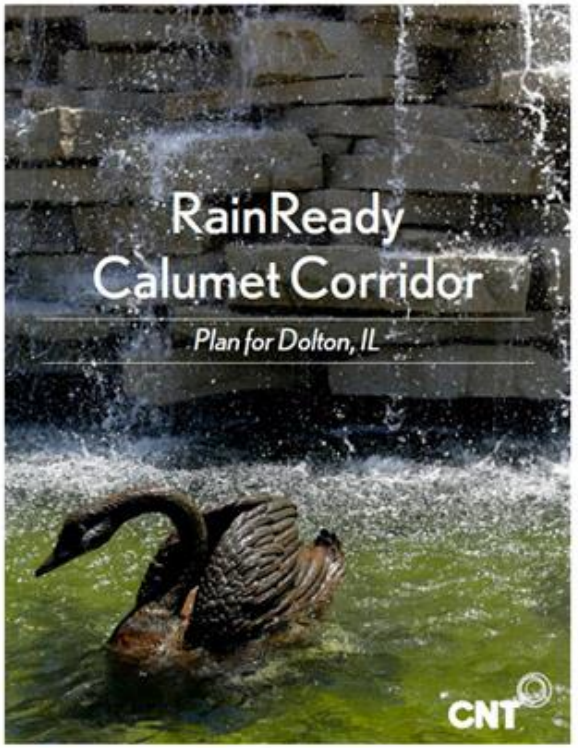
AGENDA

- RainReady Calumet Corridor Planning + Implementation
- Tool Review
- What's Next
- Feedback

CNT

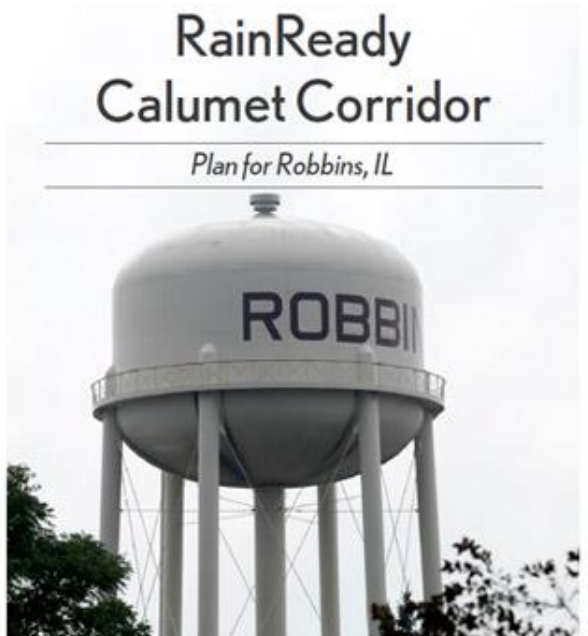

CNT
RainReady
Calumet Corridor
Plan for Blue Island, IL


RainReady
Calumet Corridor
Plan for Calumet Park, IL
CNT


RainReady
Calumet Corridor
Plan for Dolton, IL
CNT

1924
ADMINISTRATION BUILDING
RainReady
Calumet Corridor
Plan for Calumet City, IL

RainReady
Calumet Corridor
Plan for Riverdale, IL
The Citizens of
RIVERDALE


RainReady
Calumet Corridor
Plan for Robbins, IL
ROBBI

PLANNING AND IMPLEMENTATION

Planning + Engagement

- Flood Solutions Community Tool
- Community Meetings
- Survey
- Plan Review
- Steering Committees
- Workshops

Implementation

- Project Cut Sheets
- Grant Proposals
- 625 New Trees
- RainReady Socials
- Stormwater + Drinking Water Cohort

CNT

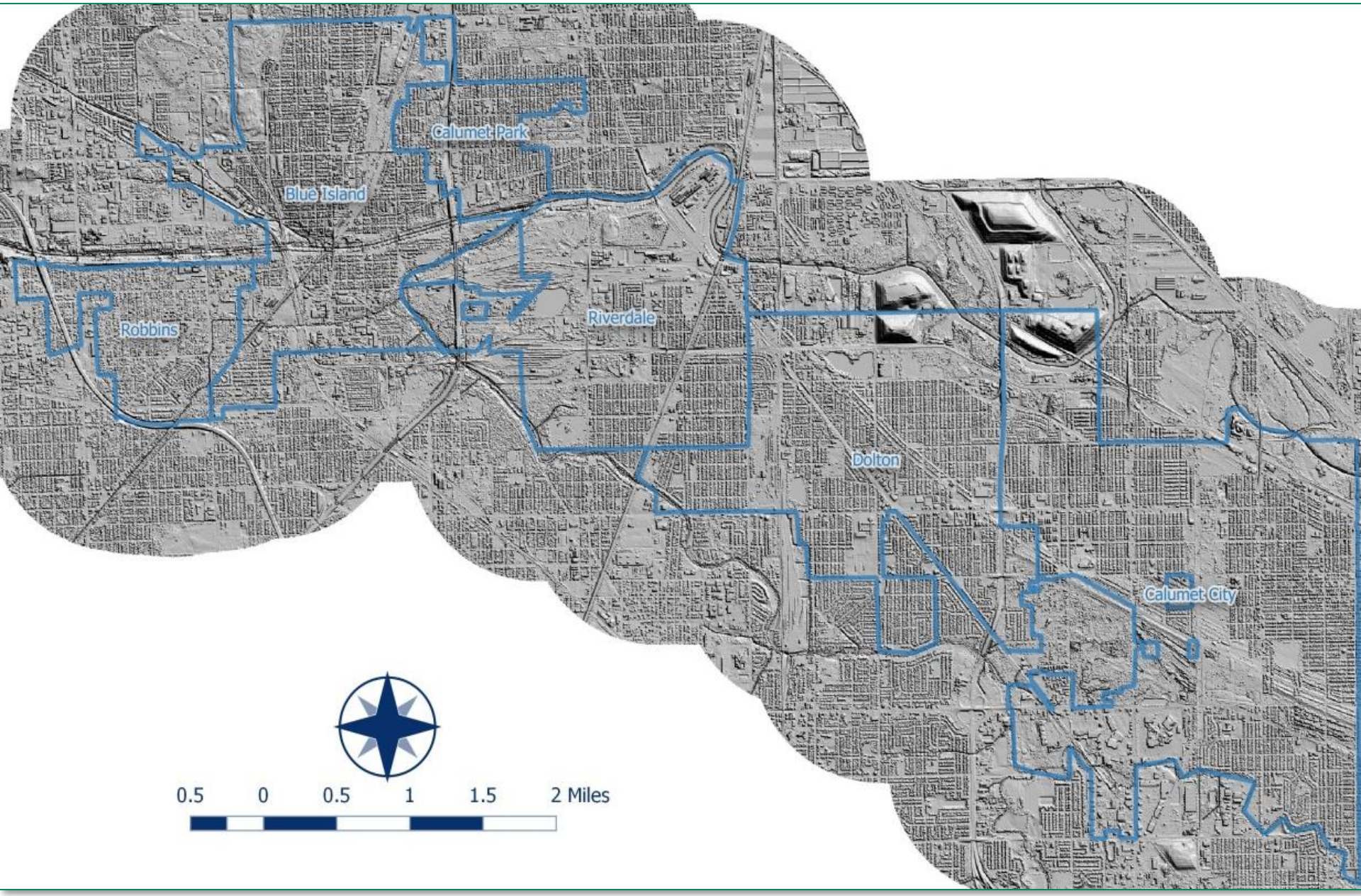
TOOL REVIEW

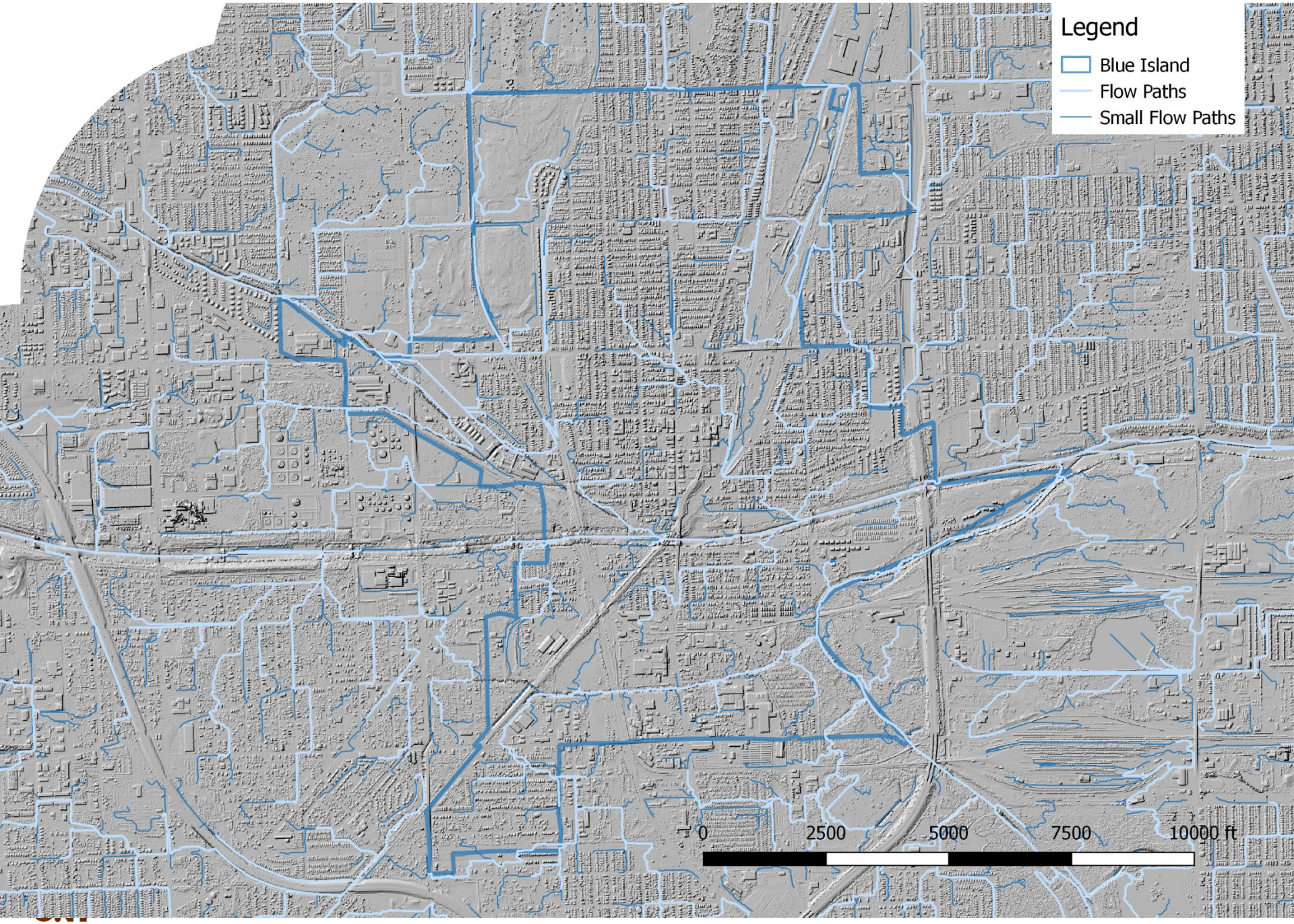
- LiDAR analysis – developing catchments, flow paths and depressions
- Show our planning tool
  - How we identify priority catchments
  - How we estimate green improvement benefits
    - Volume control
    - Runoff

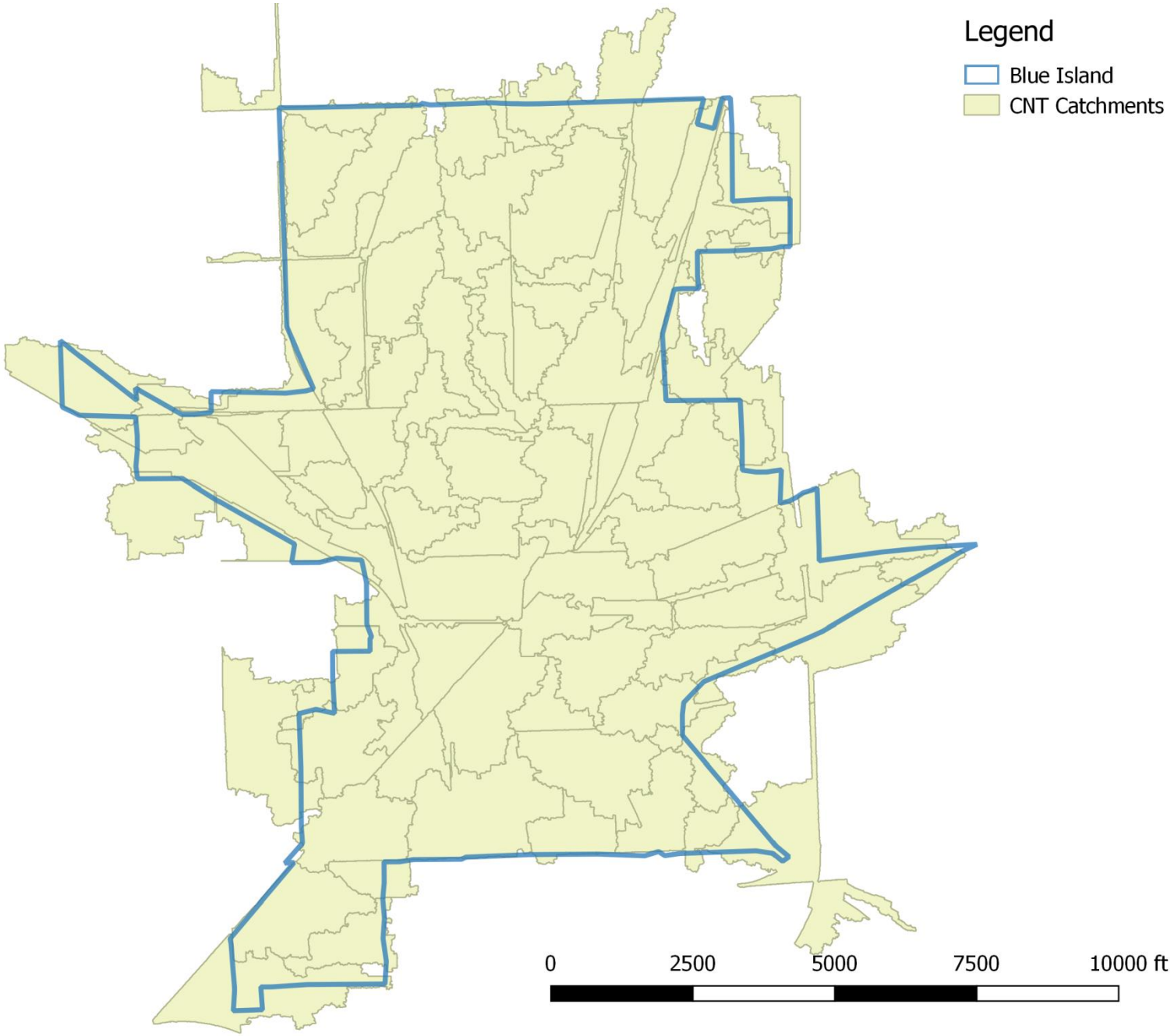
CNT

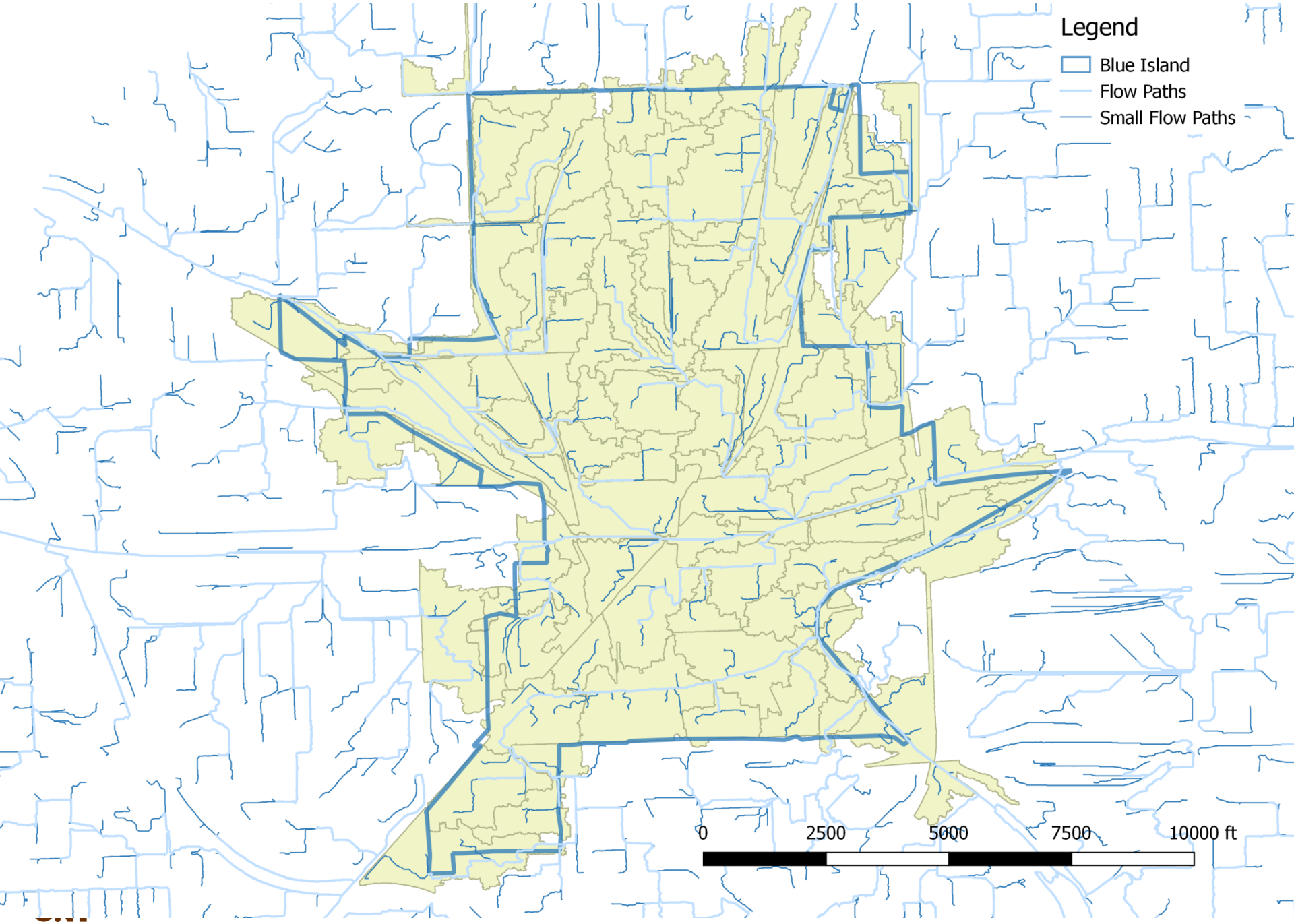
CNT CATCHMENTS FROM LIDAR

- Used HU12 watershed as base geography (clipped 1 Mile buffer around the municipal boundaries)
- Used 7.5 ft. cells
- Used All, last return
- Thus keeping buildings in – we do not have building footprints for all six communities
- Use Cook County hydro layers to level and condition DEM
- Adjusted the accumulated flow to get approximately 30 acres
- Show flow paths
- Built depressions with no adjustment


Calumet Park
Blue Island
Robbins
Riverdale
Dolton
Calumet City
0.5 0 0.5 1 1.5 2 Miles


Legend
Blue Island
Flow Paths
Small Flow Paths
0
2500
5000
7500
10000 ft


Legend
Blue Island
CNT Catchments
0
2500
5000
7500
10000 ft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Flow Paths
Small Flow Paths
0
2500
5000
7500
10000 ft

CNT/RAINREADY RESILIENCE PLANNING TOOL

Aids in identifying high risk areas. Then quantifies the benefits of local green improvements and estimates costs, allowing the RainReady team to plan implementation.

- Shows map of catchment in the six communities
- Ranks them with a flood risk score, and opportunity score
- Allows user to:
  - Use catchment or “sewershed” as base,
  - Understand land cover, land use, and other local characteristics,
  - Set volume control goal,
  - Choose green improvements to meet that goal,
  - See the benefits of plan implementation.

CNT

CNT/RainReady Resilience Planning Tool

Catchment: 82

Priority Score 8

Area: 3,363,243 sqft view data

Print Snapshot
Generate Permalink

FLOOD RISK SCORE: 5 expand
OPPORTUNITY SCORE: 3 expand

AVERAGE ANNUAL RAINFALL

Annual Rainfall (in): 35.8 edit
Design Storm Rainfall (in): 5.5 edit
Design Storm Time (hrs): 24 edit

REDUCTION GOAL

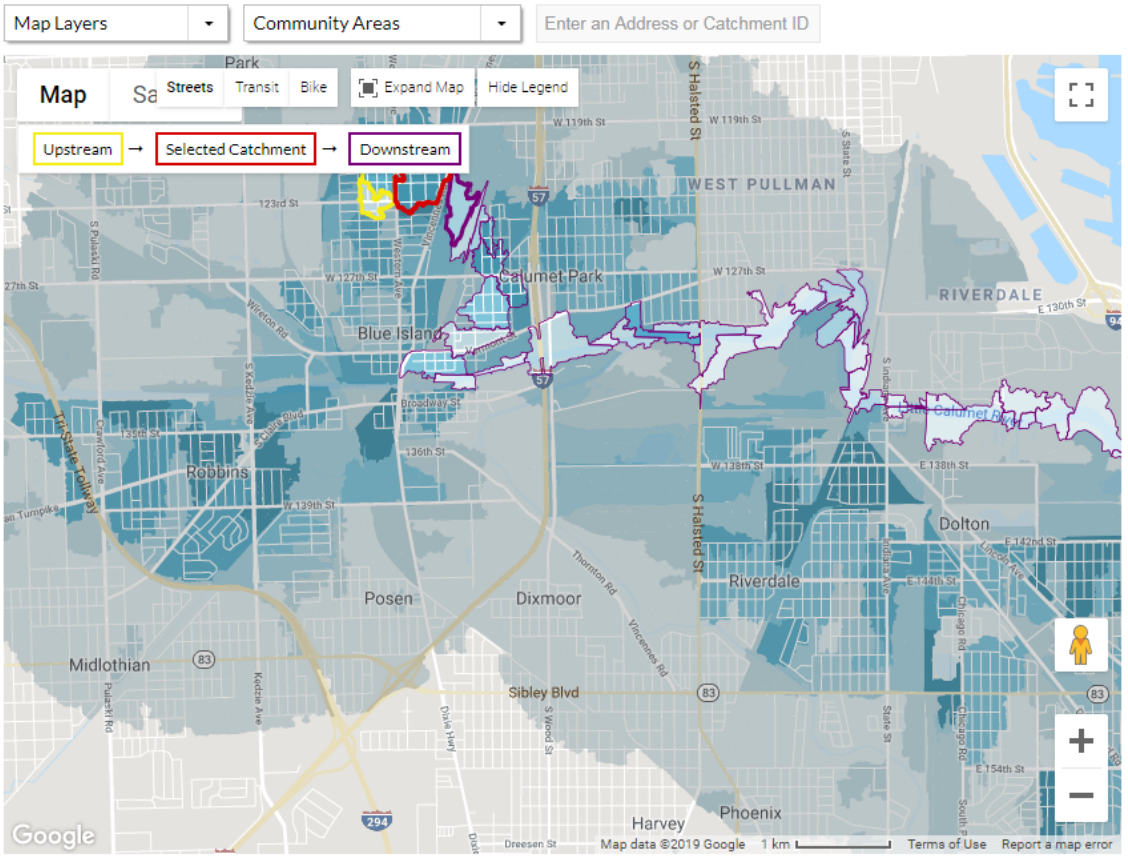
Precipitation Depth Capture (in): 1.0

Volume Needed to Capture:
280,270cuft (2,096,565 gallons)

0.0%
0 Goal Reached 100

Total Cost: $0
show detail

GREEN IMPROVEMENTS	Lifecycle Cost	% Towards Goal
Roof Water Capture		
Green Roof	$0	0%
Roof Water Redirection		
Planter Boxes	$0	0%
Rain Garden	$0	0%
Rain Barrel	$0	0%
Cistern	$0	0%
Landscaping		



FLOOD RISK

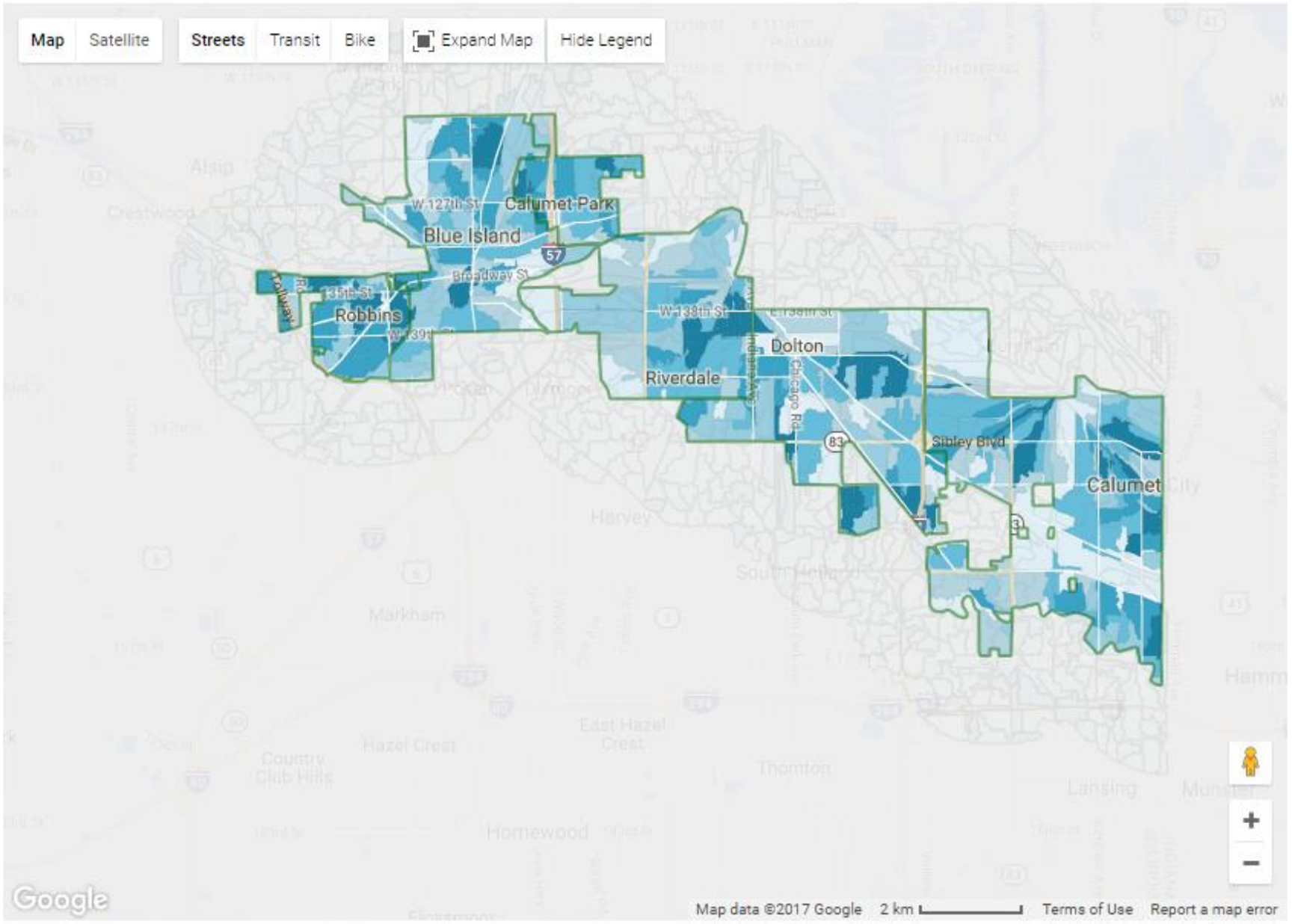
low 0 1 2 3 4 5 high

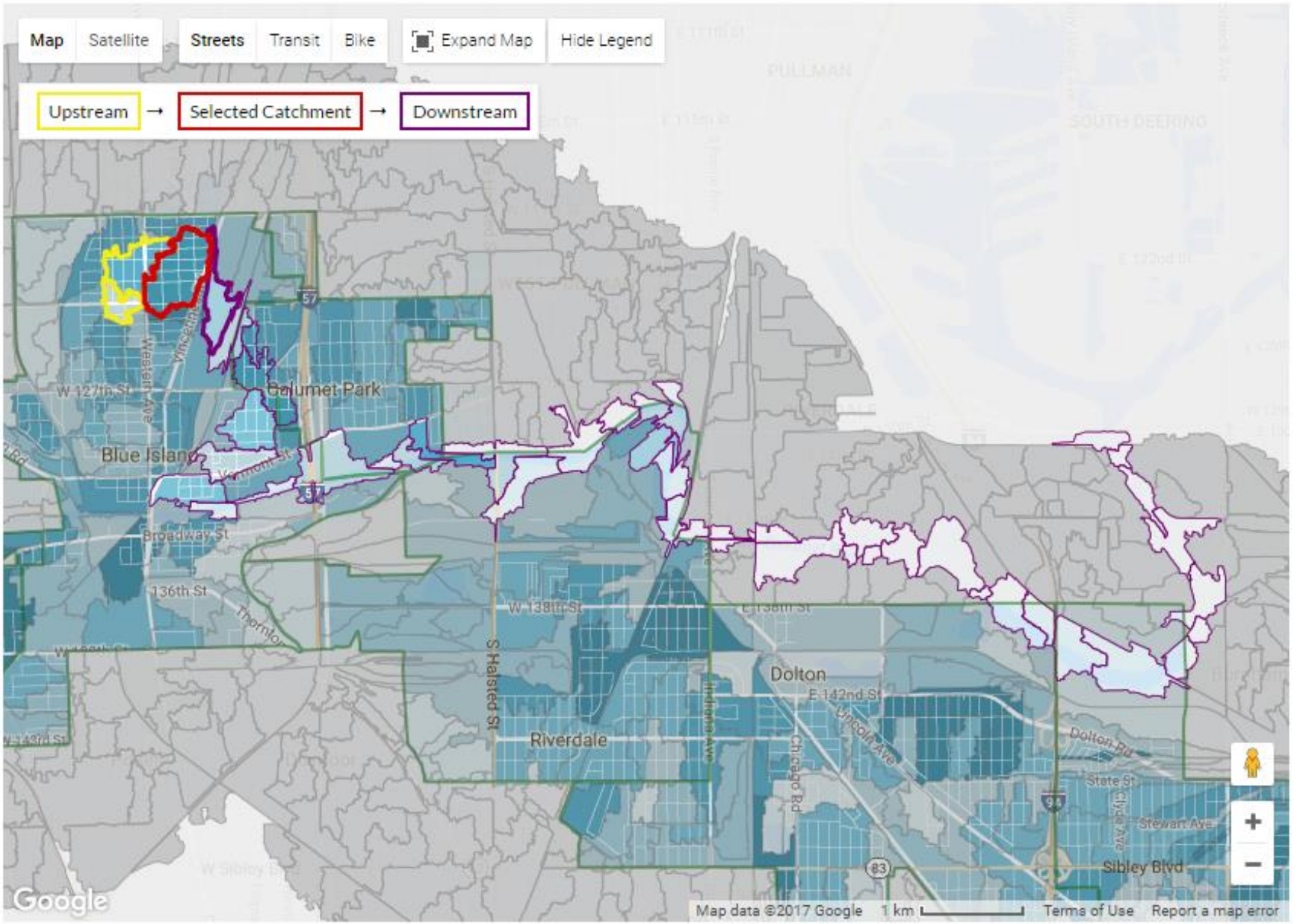
GREEN IMPROVEMENT CO-BENEFITS

0%	$0	0%
Runoff Reduction	Water Treatment Cost Reduction	Volume Capture Increase

Show Details | View Methods

CNT


Map Layers
Community Areas
Enter an Address or Catchment ID
Map
Satellite
Streets
Transit
Bike
Expand Map
Hide Legend
Calumet Park
Blue Island
Robbins
Riverdale
Dolton
Sibley Blvd
Calumet
Google
Map data ©2017 Google
2 km
Terms of Use
Report a map error
FLOOD RISK
low 0 1 2 3 4 5 high



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FLOOD RISK SCORE CALCULATION

CNT/RainReady Resilience Planning Tool

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Problem Area: 91.7%
Impervious Area: 44.7%
Depression Area: 5.1%
Surveyed for Flooding: 75.0% (6/8)

OPPORTUNITY SCORE: 3 expand

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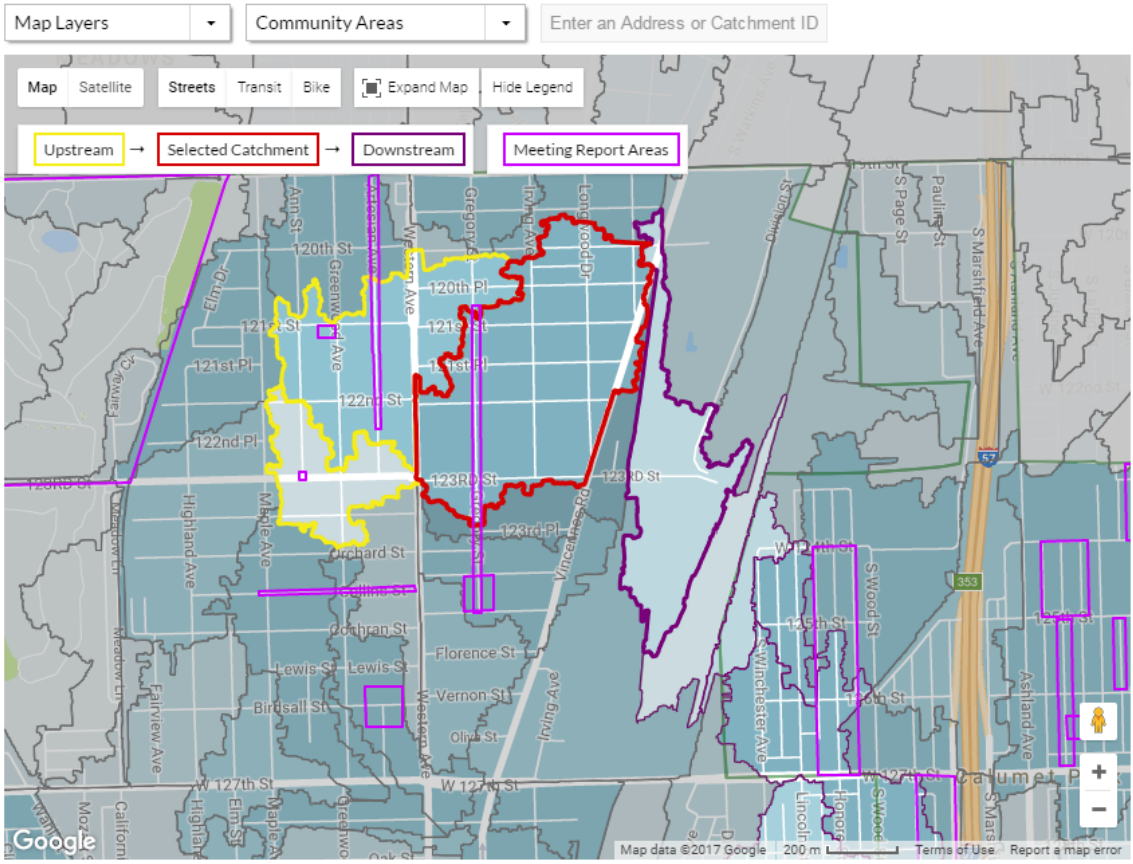

FLOOD RISK

low 0 1 2 3 4 5 high

Map Overlays: Comunity Meeting Report Areas x

CNT

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CNT/RainReady Resilience Planning Tool

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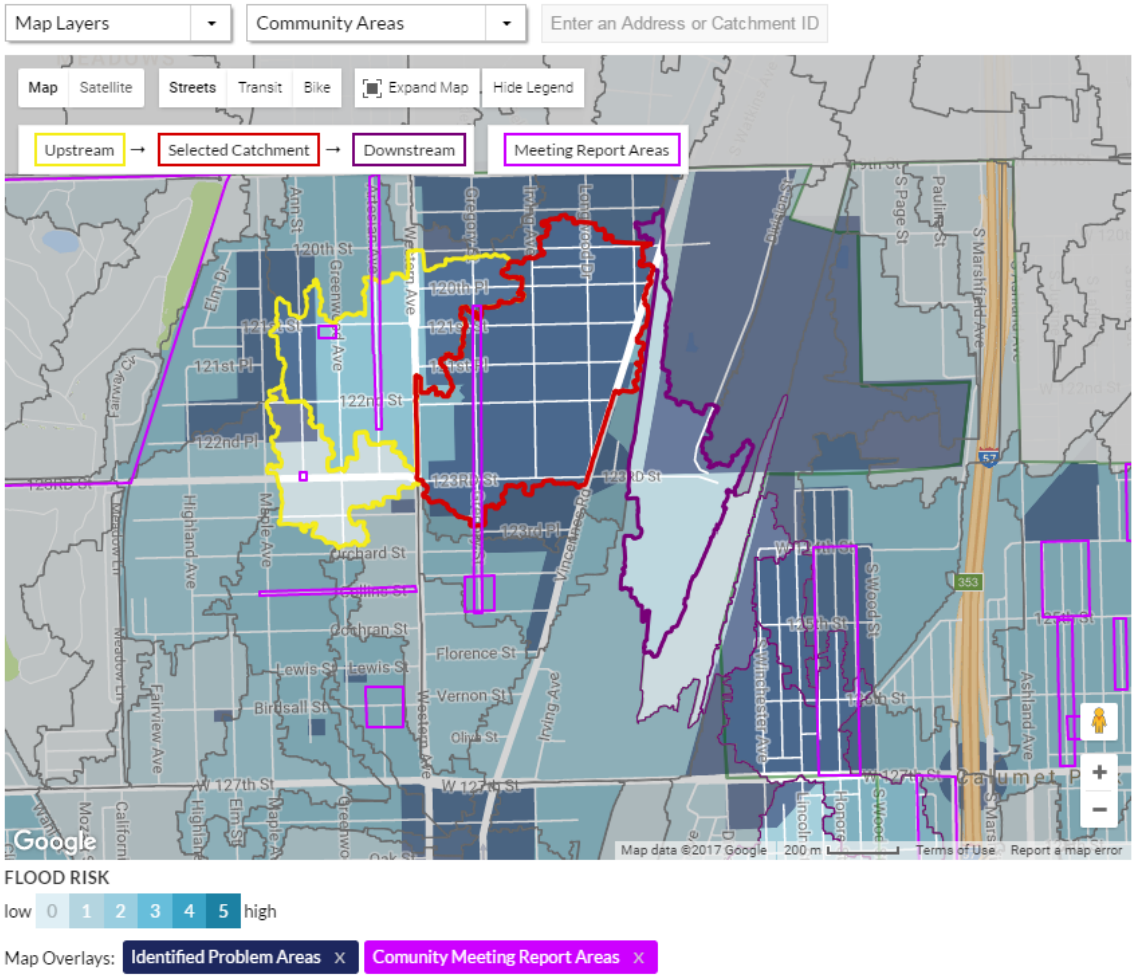

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Map Overlays: Identified Problem Areas x Comunity Meeting Report Areas x

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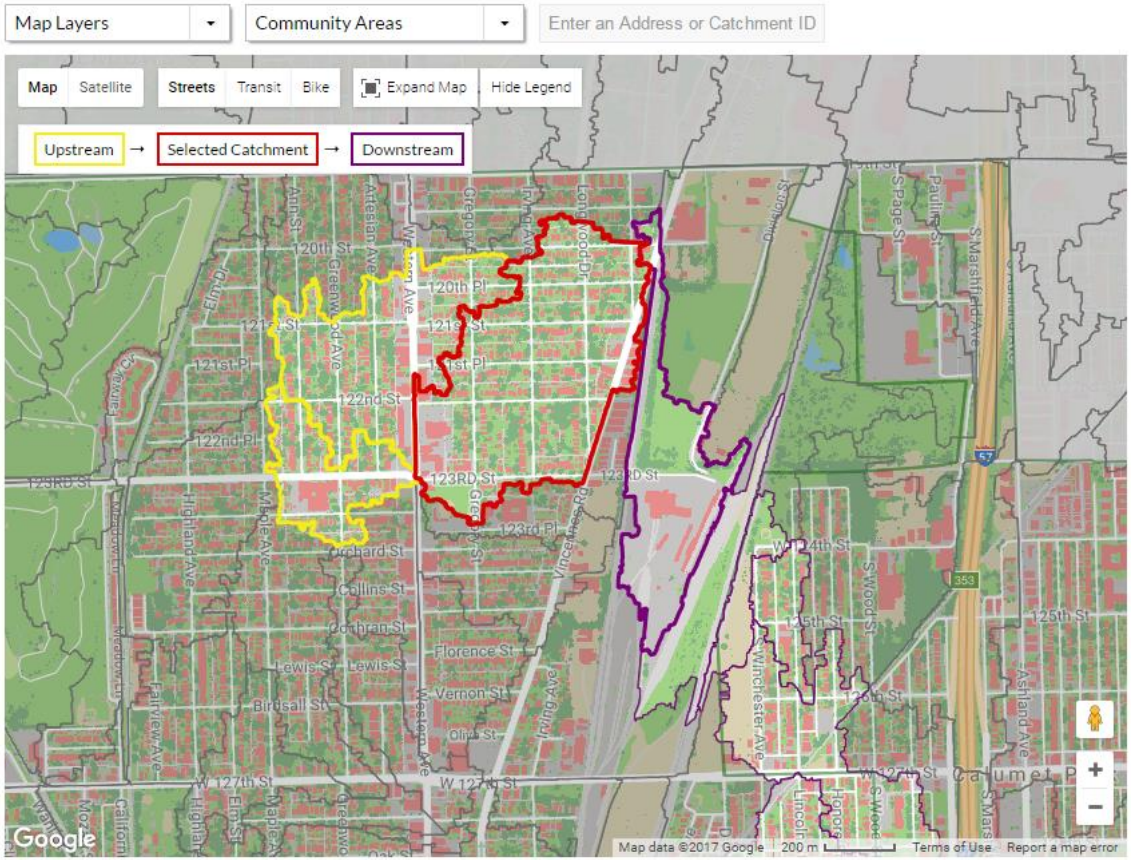

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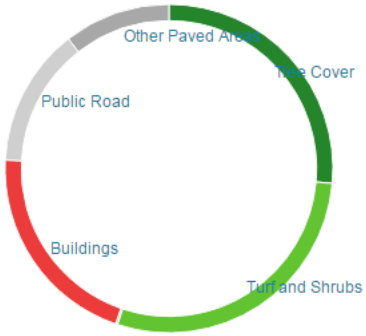
Map Layers | Community Areas | Enter an Address or Catchment ID

CATCHMENT DATA
close

Open Space, Primarily Recreation: 81,620 sqft (2.4 %)
Non-Parcel Right-of-Way: 1,206,018 sqft (35.9 %)

Land Cover

- Tree Cover: 889,241 sqft (26.4 %)
- Turf and Shrubs: 962,843 sqft (28.6 %)
- Bare Earth: 6,496 sqft (0.2 %)
- Water: 0 sqft (0 %)
- Buildings: 691,200 sqft (20.6 %)
- Public Road: 459,752 sqft (13.7 %)
- Other Paved Areas: 353,712 sqft (10.5 %)



LAND COVER
Tree Canopy | Grass/Shrub | Bare Soil | Water | Buildings | Roads/Railroads | Other Paved Surfaces

FLOOD RISK SCORE CALCULATION

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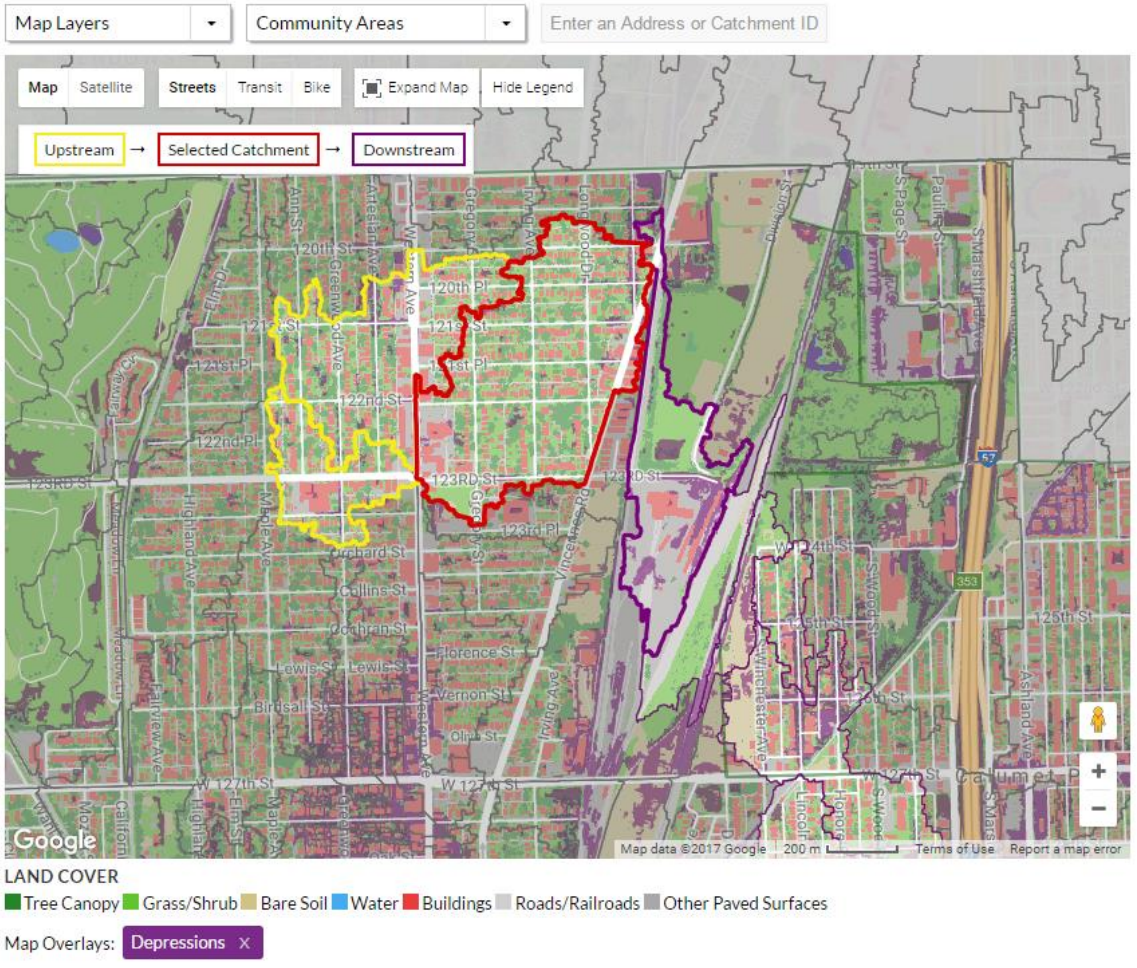

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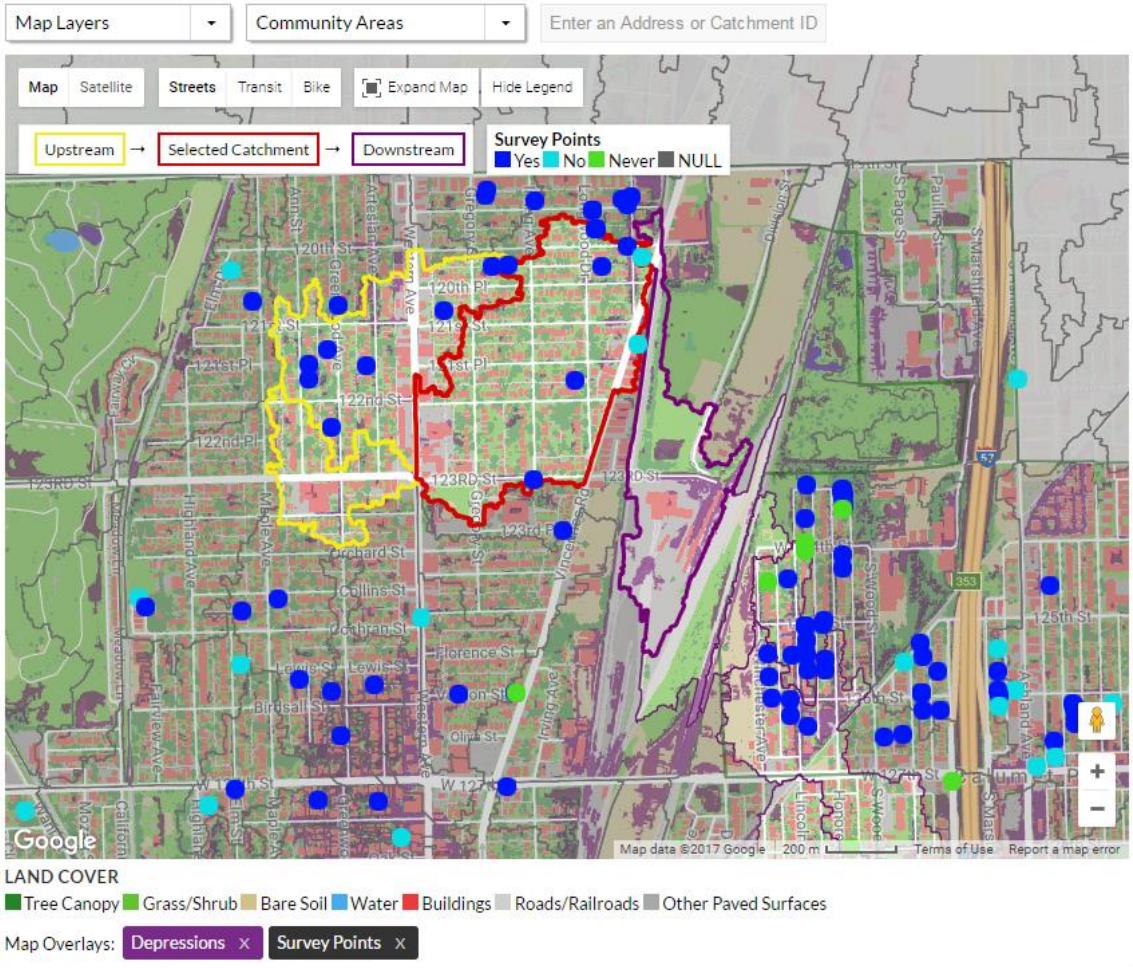

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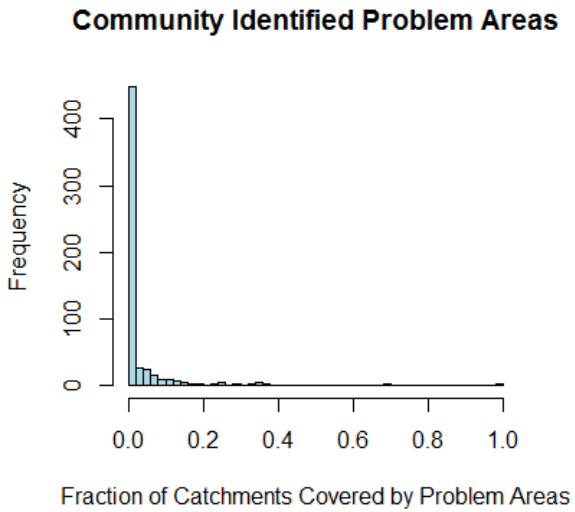
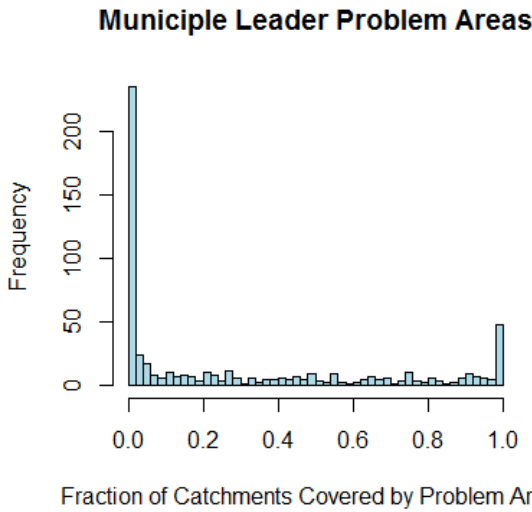
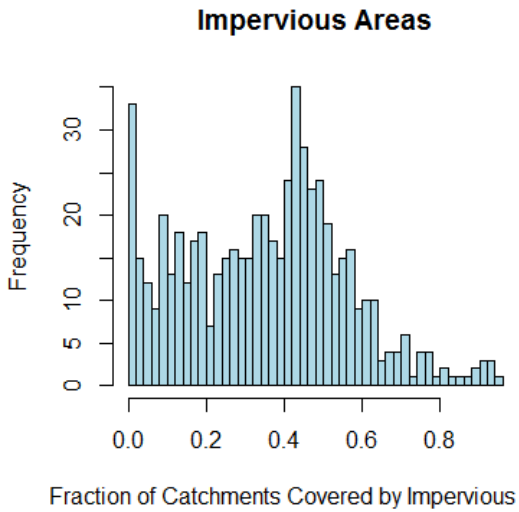
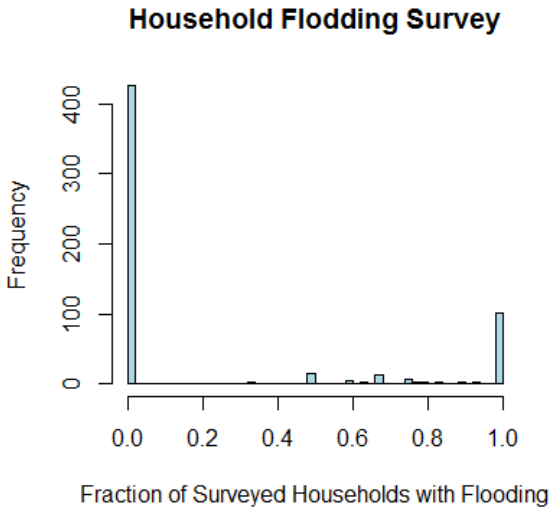
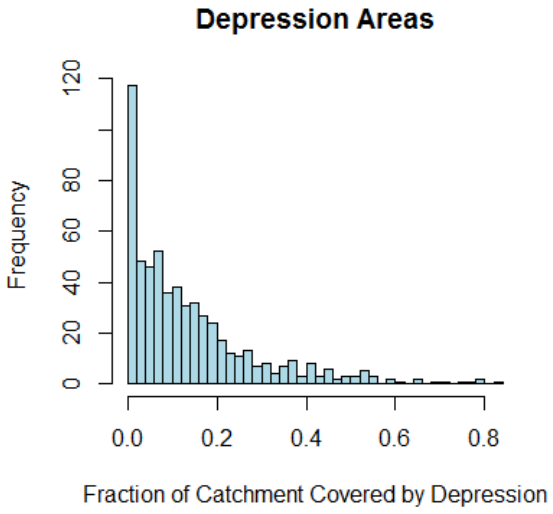








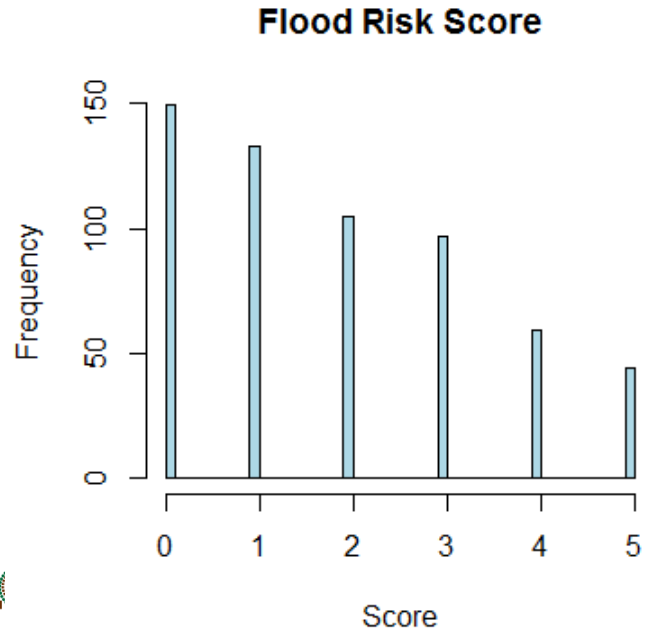


CNT

FLOOD RISK SCORE CALCULATION

$$x^2 = \sum_{i=0}^{5} \left(\frac{x_i - m_i}{\sigma_i} \times w_i \right)^2$$

Then this x^2 is normalized from 0-5



Var (X_i)	Weight (W_i)
Community Prob. Area	1
Municipal Prob. Area	6
Fraction Impervious	2
Flooding Survey	3.5
Fraction Depressions	1

CNT

OPPORTUNITY SCORE

CNT/RainReady Resilience Planning Tool

Catchment: 82 Priority Score 8

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Generate Permalink

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OPPORTUNITY SCORE: 3 hide

Land Based Assets

Vacant Land: 0.0%	Streets: 14.7%	Parks: 2.4%
Public Land: 0.0%	Alleys: 3.6%	Trees: 26.4%
Schools: 0.6%	Utilities: 0.0%	Large Residential: 9.2%

Capital Projects
IDOT Improvements

- VINCENNES AVE (0.2 Miles) Routes: VINCENNES AVE | Location: 119th St to 127th St | Est. Cost: $910,000 | Total Length: MILES = 1.07 | Improvements: Resurfacing (3P), ADA Improvements

Planned Priorities
Millennium Reserve Opportunity Areas

- M.R. Opportunity Letter TT (66.7 Acres) intersect this catchment out of the total area of 111.1 acres. | Type: Green Neighborhood

NDRC Project Areas

- NDRC No. 54 (70.3 Acres) intersect this catchment out of the total area of 134.7 acres. | Type: flooding in area affected by Phase II project

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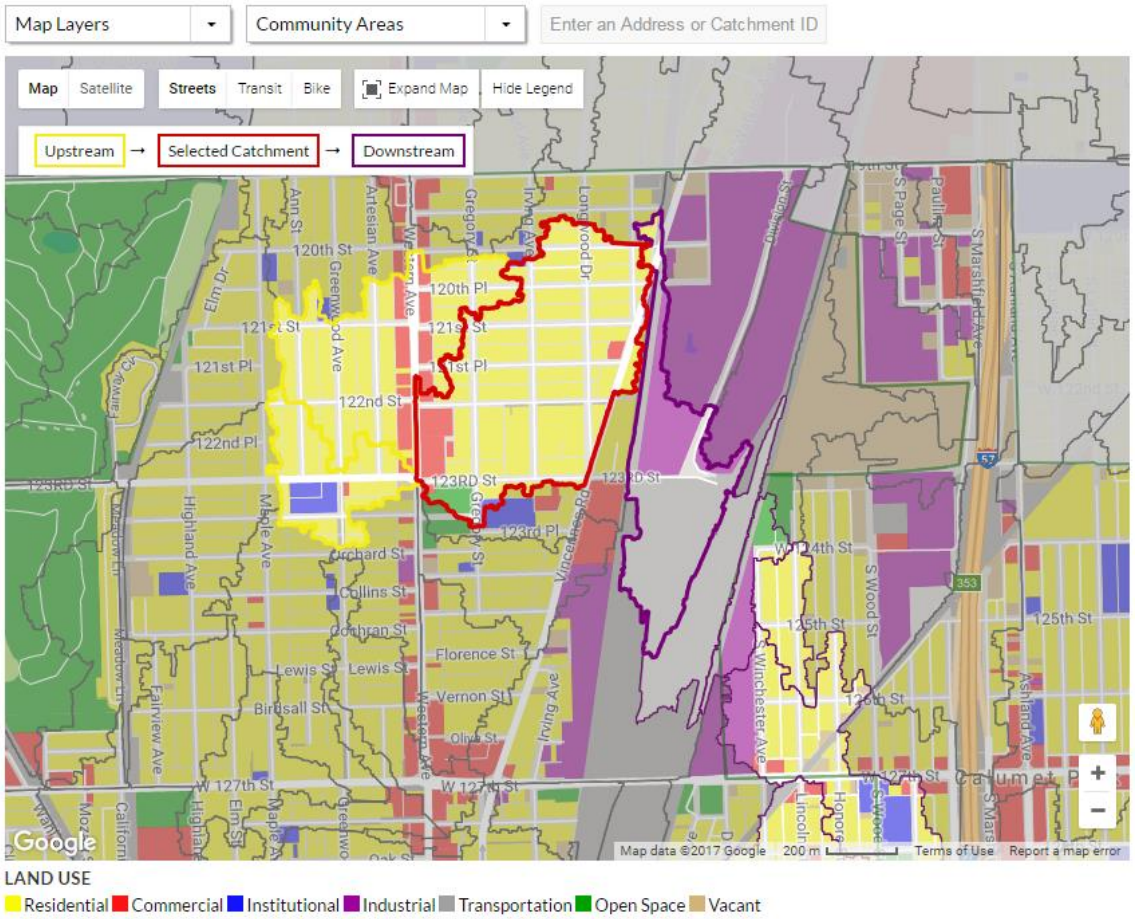

LAND USE

Residential Commercial Institutional Industrial Transportation Open Space Vacant

CNT

OPPORTUNITY SCORE

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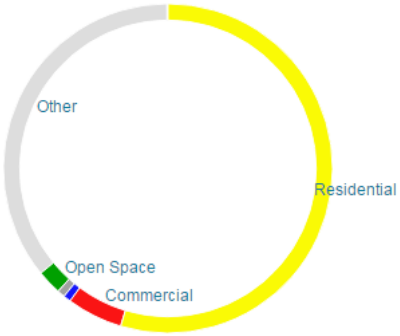
Map Layers | Community Areas | Enter an Address or Catchment ID

CATCHMENT DATA
close

Land Use (high level)

- Residential: 1,837,516 sqft (54.6 %)
- Commercial: 184,827 sqft (5.5 %)
- Institutional: 24,662 sqft (0.7 %)
- Industrial: 3,557 sqft (0.1 %)
- Transportation: 25,070 sqft (0.7 %)
- Open Space: 81,620 sqft (2.4 %)
- Vacant: 0 sqft (0 %)
- Other: 1,205,991 sqft (35.9 %)



Land Use (detail)

Single-Family Detached: 1,650,565 sqft (49.1 %)
Multi-family: 182,034 sqft (5.4 %)
Common Open Space in a Residential Development: 4,917 sqft (0.1 %)

Roads

Street: 494,891 sqft
Alley: 120,367 sqft

LAND USE

Residential Commercial Institutional Industrial Transportation Open Space Vacant

CNT

SEWERSHED

Sewershed: 57 Priority Score 3

Area: 21,189,677 sqft view data

Print Snapshot
Generate Permalink

FLOOD RISK SCORE: expand
OPPORTUNITY SCORE: 3 hide

Land Based Assets

Vacant Land: 4.7%	Streets: 9.6%	Parks: 1.6%
Public Land: 0.0%	Alleys: 2.2%	Trees: 18.0%
Schools: 1.1%	Utilities: 0.0%	Large Residential: 0.0%

Capital Projects
Greenways and Trails Plan

- Rock Island Trail (1.1 Miles) | Path | Connector to proposed CDOT route 2007 Update | Status: Planned

IDOT Improvements

- VINCENNES AVE (1.1 Miles) Routes: VINCENNES AVE | Location: 119th St to 127th St | Est. Cost: $910,000 | Total Length: MILES = 1.07 | Improvements: Resurfacing (3P), ADA Improvements

Planned Priorities
COD Sites

- Blue Island Green City Park Project (94.5 Acres) Of the total area of 113.4 acres.

Millennium Reserve Opportunity Areas

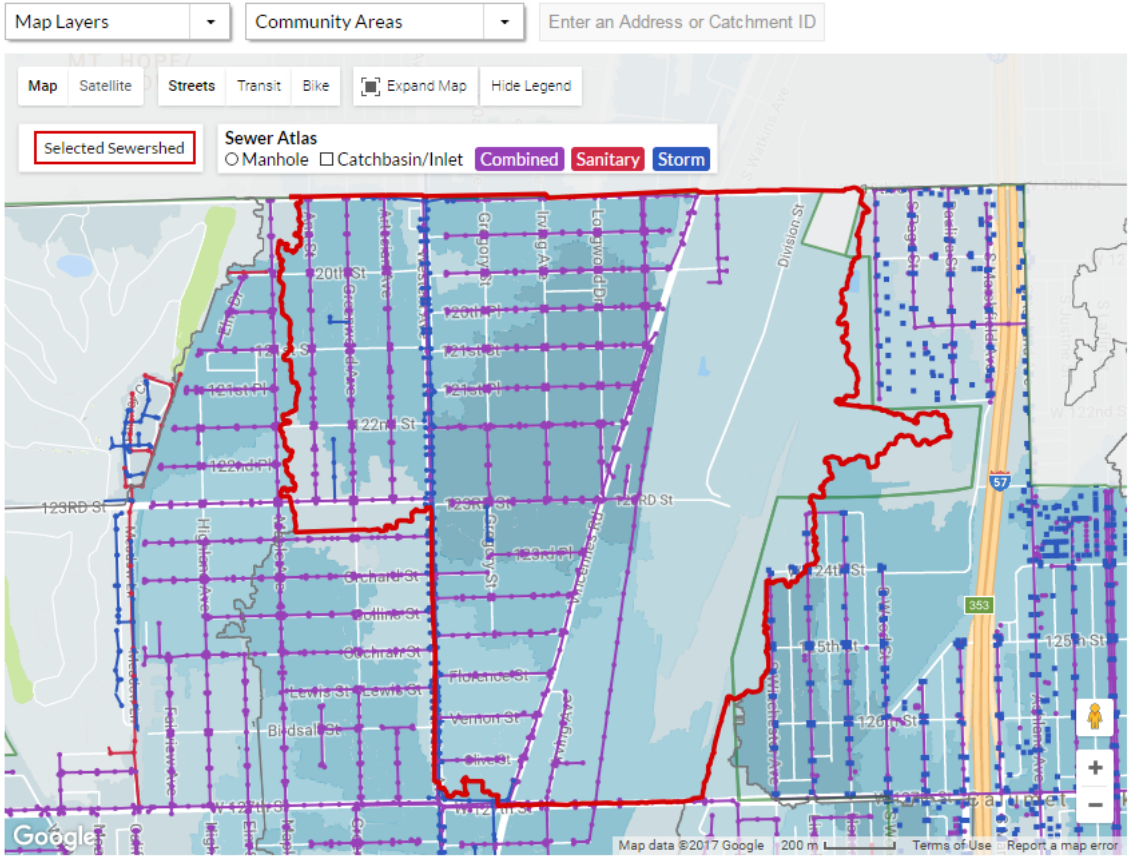
- M.R. Opportunity Letter SS (79.4 Acres) intersect this catchment out of the total area of 90.9 acres. | Type: SW Park
- M.R. Opportunity Letter TT (111.1 Acres) intersect this catchment out of the total area of 111.1 acres. | Type: Green Neighborhood

NDRC Project Areas

- NDRC No. 2 (89.8 Acres) intersect this catchment out of the total area of 111.8 acres. | Type: not affected by Phase II project
- NDRC No. 54 (134.7 Acres) intersect this catchment out of the total area of 134.7 acres. | Type: flooding in area affected by Phase II project
- NDRC No. 7 (14.5 Acres) intersect this catchment out of the total area of 104.1 acres. | Type: not affected by Phase II project

TOD Sites

- 119th St METRA Station - Blue Island (1.0 Acres) intersect this catchment out of the total area of 1 acres.



FLOOD RISK
low 0 1 2 3 4 5 high

Map Overlays: Sewer Atlas x

GREEN IMPROVEMENT CO-BENEFITS

0%	$0	0%
Runoff Reduction	Water Treatment Cost Reduction	Volume Capture Increase

Show Details

MAPS – GOAL SETTING

CNT/RainReady Resilience Planning Tool

Sewershed: 57 | Priority Score 3

Area: 21,189,677 sqft view data

Print Snapshot
Generate Permalink

FLOOD RISK SCORE: expand
OPPORTUNITY SCORE: 3 expand

AVERAGE ANNUAL RAINFALL

Annual Rainfall (in): 35.8 edit
Design Storm Rainfall (in): 5.5 save
Design Storm Time (hrs): 24 edit

REDUCTION GOAL

Precipitation Depth Capture (in): 2

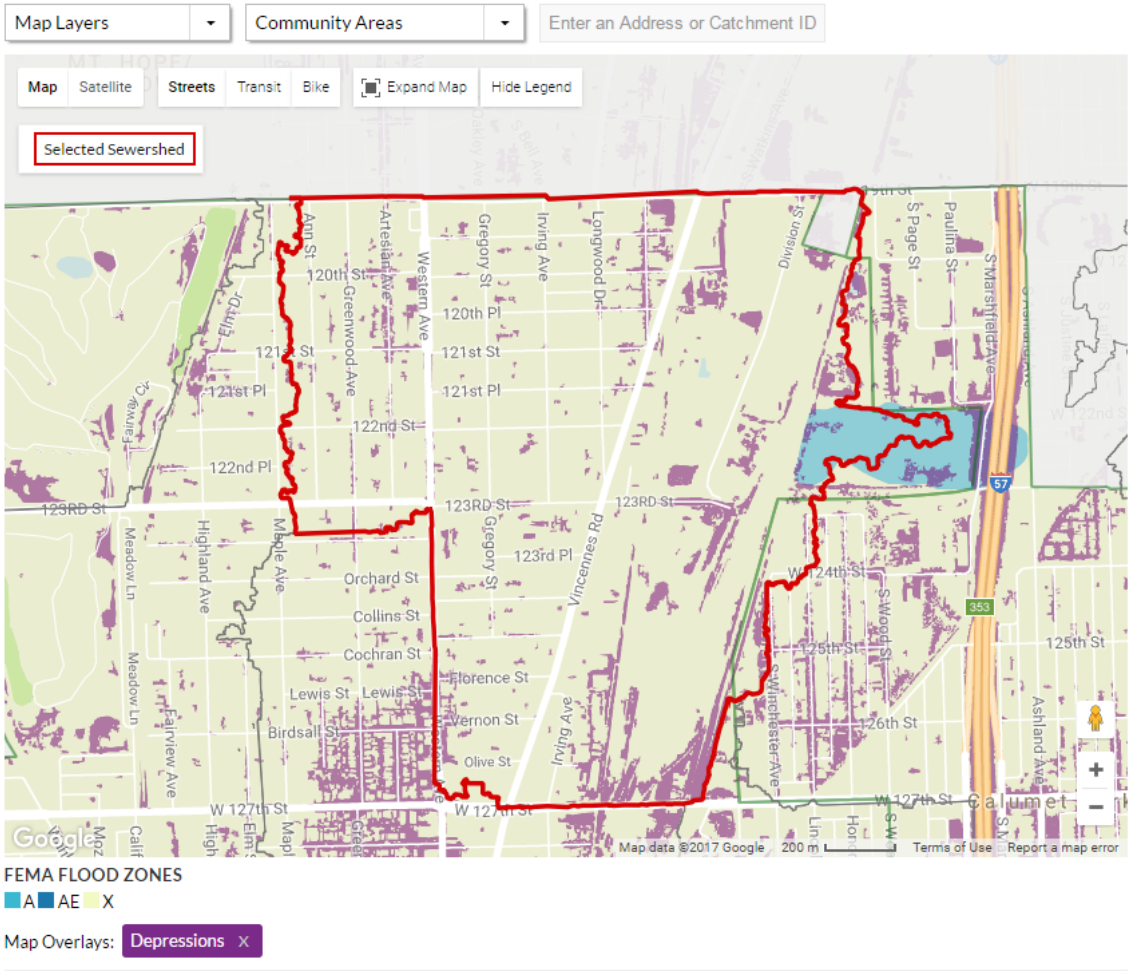
Volume Needed to Capture:
3,531,613cuft (26,418,302 gallons)

0.0%
0 Goal Reached 100

Total Cost: $0
show detail

GREEN IMPROVEMENTS

	Lifecycle Cost	% Towards Goal
Roof Water Capture:		
Green Roof	$0	0%
Roof Water Redirection:		
Planter Boxes	$0	0%
Rain Garden	$0	0%
Rain Barrel	$0	0%

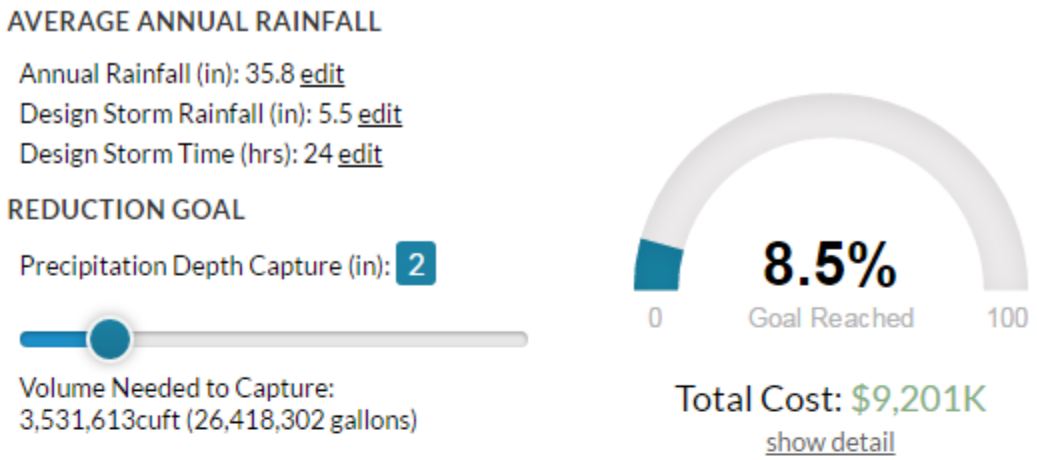


FEMA FLOOD ZONES
A AE X

Map Overlays: Depressions x

CNT

VOLUME CONTROL CALCULATIONS…



CNT

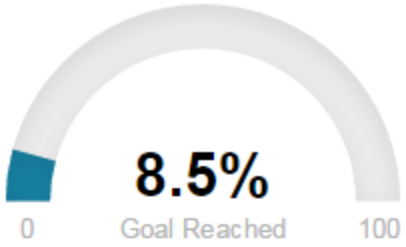
VOLUME

Annual Rainfall (in): 33.8 edit
Design Storm Rainfall (in): 5.5 edit
Design Storm Time (hrs): 24 edit

REDUCTION GOAL

Precipitation Depth Capture (in): 2

Volume Needed to Capture:
3,531,613cuft (26,418,302 gallons)



Total Cost: $9,201K

Total cost is a Net Present Value assuming the following cost parameters:
Discount Rate: 3.1 %
Life Cycle: 30 Years

hide detail

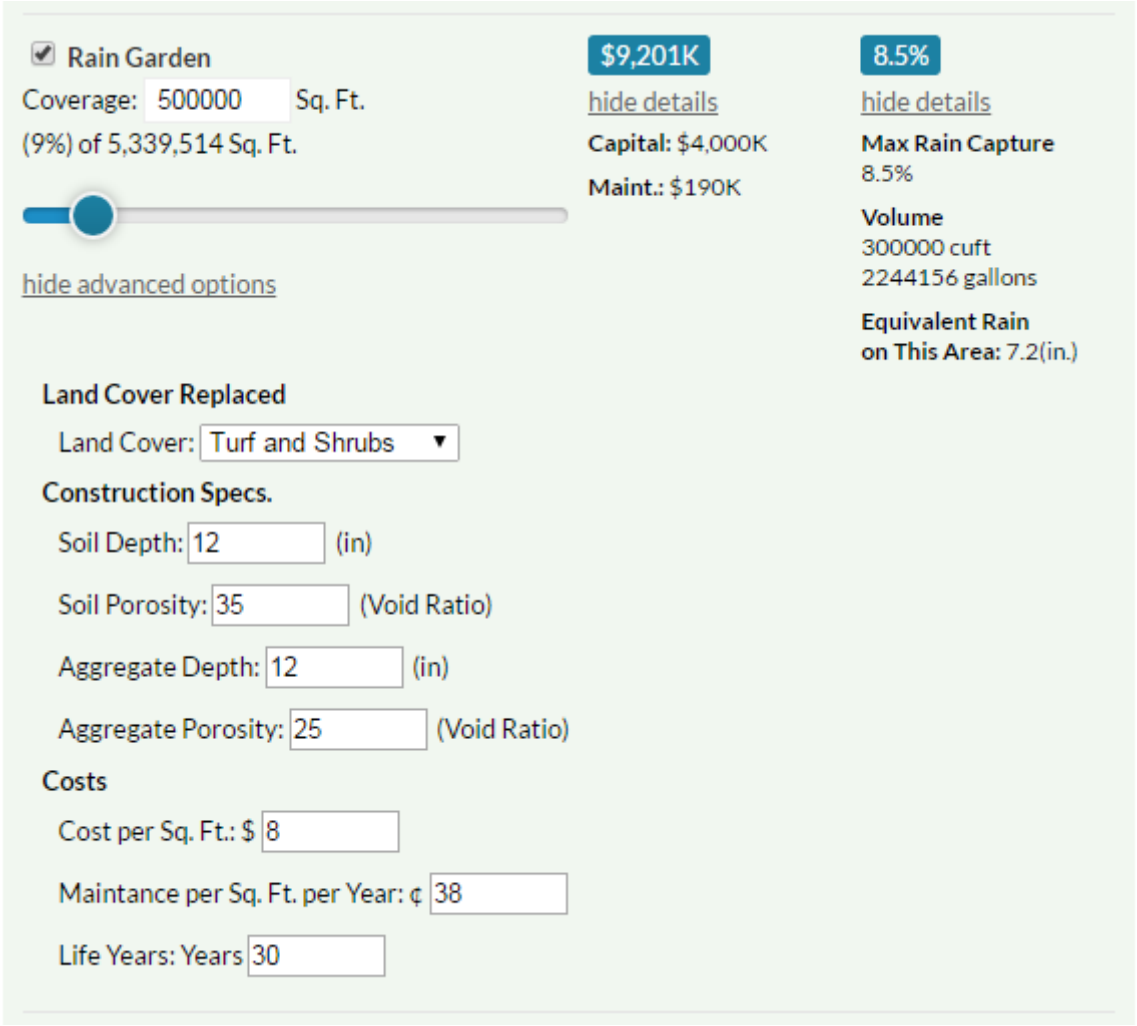
GREEN IMPROVEMENTS

	Lifecycle Cost	% Towards Goal
Roof Water Capture:		
☐ Green Roof	$0	0%
Roof Water Redirection:		
☐ Planter Boxes	$0	0%
☑ Rain Garden Coverage: 500000 Sq. Ft. (9%) of 5,339,514 Sq. Ft.	$9,201K hide details **Capital:** $4,000K **Maint.:** $190K	8.5% show details

show advanced options

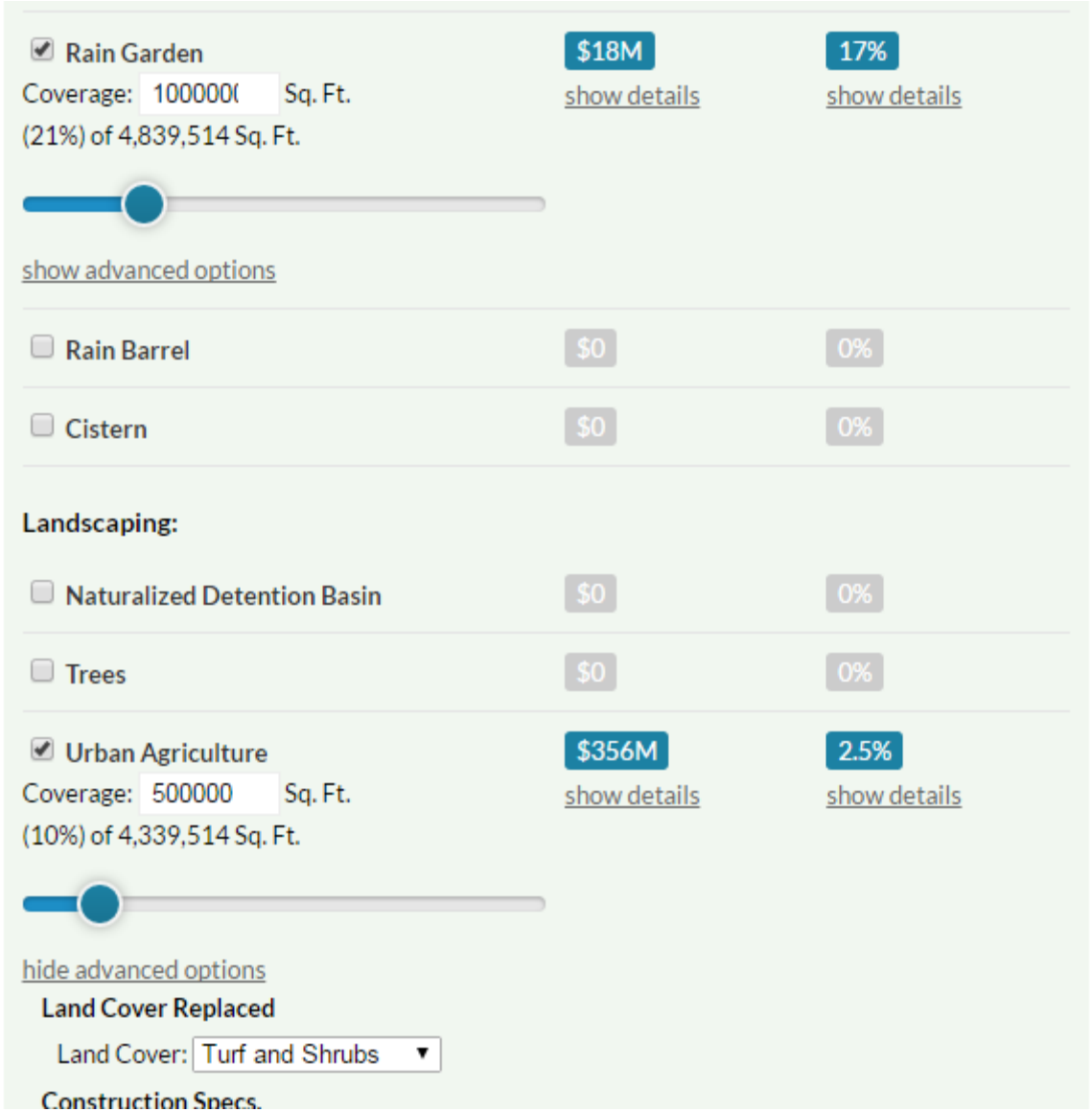
CNT

VOLUME CONTROL CALCULATIONS…



CNT

LAND COVER CONSTRAINTS



CNT

RUNOFF CALCULATIONS…

CNT/RainReady Resilience Planning Tool

Sewershed: 57

Priority Score 3

Area: 21,189,677 sqft view data

Print Snapshot
Generate Permalink

FLOOD RISK SCORE: expand
OPPORTUNITY SCORE: 3 expand

AVERAGE ANNUAL RAINFALL

Annual Rainfall (in): 35.8 edit
Design Storm Rainfall (in): 5.5 edit
Design Storm Time (hrs): 24 edit

REDUCTION GOAL

Precipitation Depth Capture (in): 2

Volume Needed to Capture:
3,531,613cuft (26,418,302 gallons)

8.5%
0 Goal Reached 100

Total Cost: $9,201K
show detail

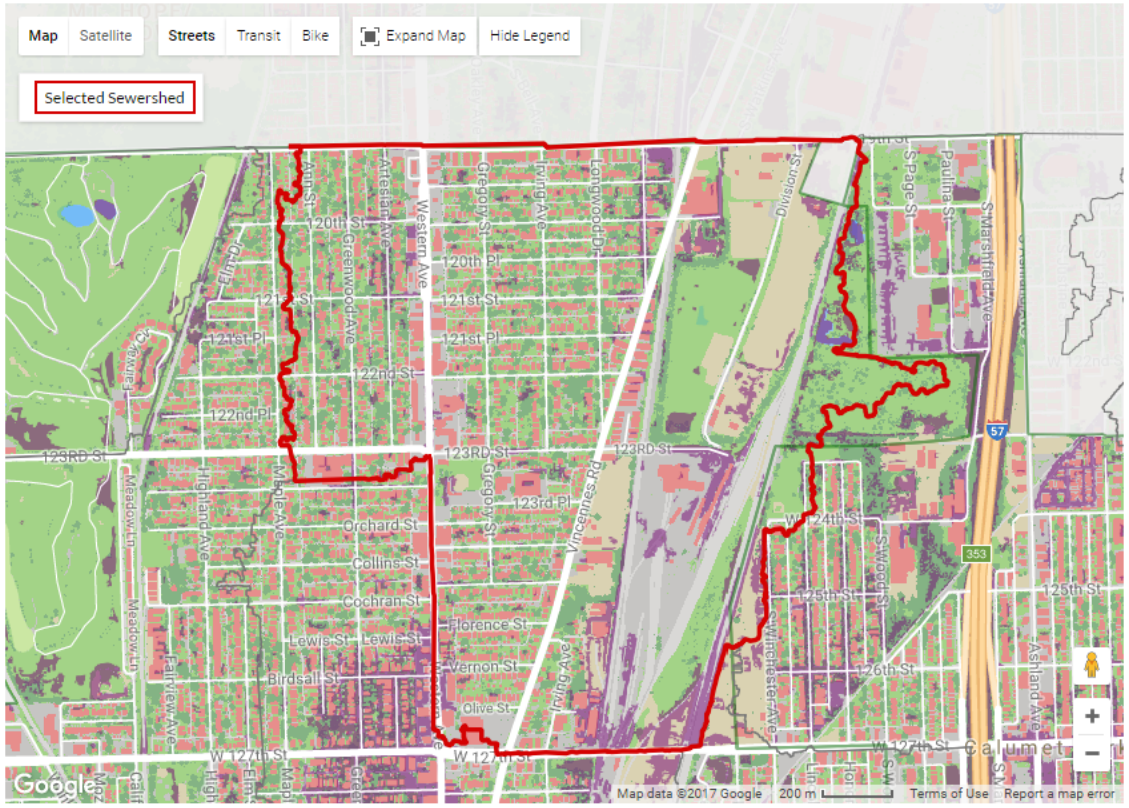
GREEN IMPROVEMENTS

	Lifecycle Cost	% Towards Goal
Roof Water Capture:		
☐ Green Roof	$0	0%
Roof Water Redirection:		
☐ Planter Boxes	$0	0%
☑ Rain Garden Coverage: 500000 Sq. Ft. (9%) of 5,339,514 Sq. Ft.	$9,201K show details	8.5% show details
show advanced options		
☐ Rain Barrel	$0	0%

Map Layers | Community Areas | Enter an Address or Catchment ID

Map | Satellite | Streets | Transit | Bike | Expand Map | Hide Legend

Selected Sewershed



LAND COVER

Tree Canopy | Grass/Shrub | Bare Soil | Water | Buildings | Roads/Railroads | Other Paved Surfaces

Map Overlays: Depressions ×

GREEN IMPROVEMENT CO-BENEFITS

0.8%	$43	2.9%
Runoff Reduction	Water Treatment Cost Reduction	Volume Capture Increase

Show Details

RUNOFF CALCULATIONS…

AVERAGE ANNUAL RAINFALL

Annual Rainfall (in): 35.8 edit
Design Storm Rainfall (in): 5.5 edit
Design Storm Time (hrs): 24 edit

REDUCTION GOAL

Precipitation Depth Capture (in): 2

Volume Needed to Capture:
3,531,613cuft (26,418,302 gallons)

8.5%
0 Goal Reached 100

Total Cost: $9,201K
show detail

GREEN IMPROVEMENTS

	Lifecycle Cost	% Towards Goal
Roof Water Capture:		
☐ Green Roof	$0	0%
Roof Water Redirection:		
☐ Planter Boxes	$0	0%
☑ Rain Garden Coverage: 500000 Sq. Ft. (9%) of 5,339,514 Sq. Ft.	$9,201K show details	8.5% show details
show advanced options		
☐ Rain Barrel	$0	0%
☐ Cistern	$0	0%

Map Layers | Community Areas | Enter an Address or Catchment ID

GREEN IMPROVEMENT CO-BENEFITS

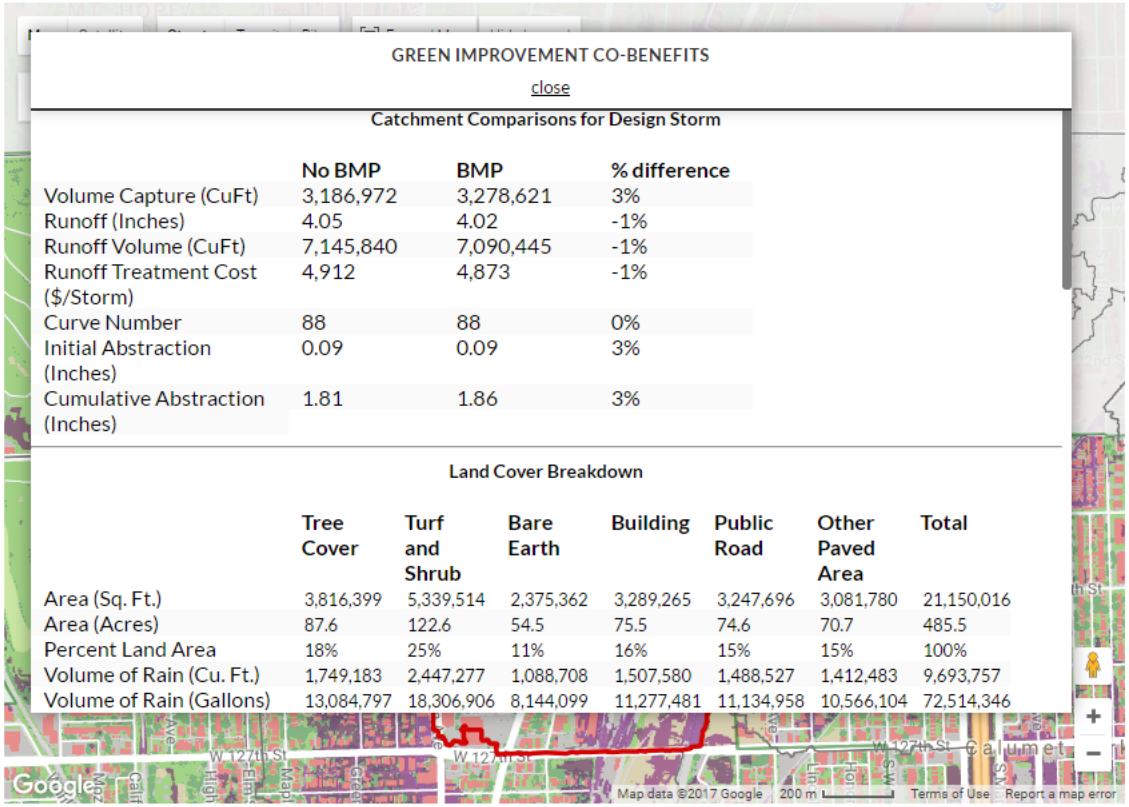
close

Catchment Comparisons for Design Storm

	No BMP	BMP	% difference
Volume Capture (CuFt)	3,186,972	3,278,621	3%
Runoff (Inches)	4.05	4.02	-1%
Runoff Volume (CuFt)	7,145,840	7,090,445	-1%
Runoff Treatment Cost ($/Storm)	4,912	4,873	-1%
Curve Number	88	88	0%
Initial Abstraction (Inches)	0.09	0.09	3%
Cumulative Abstraction (Inches)	1.81	1.86	3%

Land Cover Breakdown

	Tree Cover	Turf and Shrub	Bare Earth	Building	Public Road	Other Paved Area	Total
Area (Sq. Ft.)	3,816,399	5,339,514	2,375,362	3,289,265	3,247,696	3,081,780	21,150,016
Area (Acres)	87.6	122.6	54.5	75.5	74.6	70.7	485.5
Percent Land Area	18%	25%	11%	16%	15%	15%	100%
Volume of Rain (Cu. Ft.)	1,749,183	2,447,277	1,088,708	1,507,580	1,488,527	1,412,483	9,693,757
Volume of Rain (Gallons)	13,084,797	18,306,906	8,144,099	11,277,481	11,134,958	10,566,104	72,514,346



LAND COVER
Tree Canopy | Grass/Shrub | Bare Soil | Water | Buildings | Roads/Railroads | Other Paved Surfaces

Map Overlays: Depressions x

CNT

CAN WE CATCH ½ INCH OF RAIN?

REDUCTION GOAL

Precipitation Depth Capture (in): 0.5

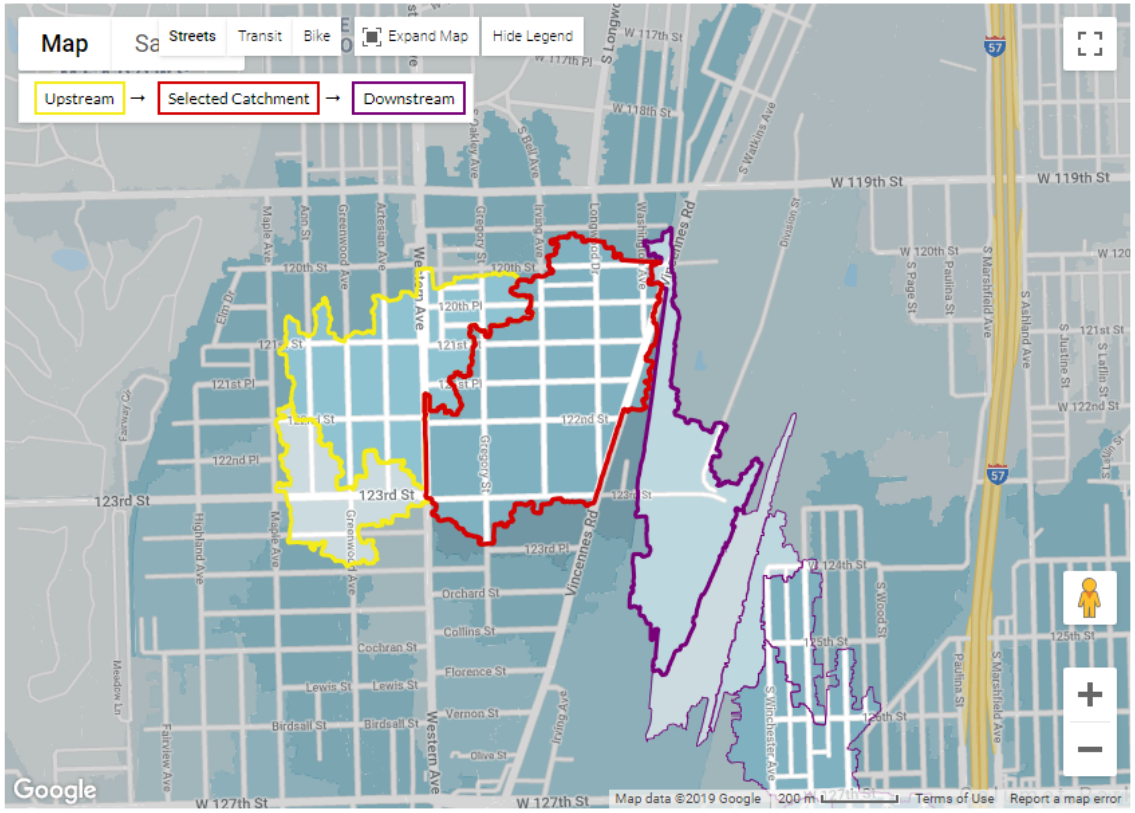
Volume Needed to Capture:
140,135cuft (1,048,283 gallons)

100.0%
0 Goal Reached 100

Total Cost: $1,362K
show detail

GREEN IMPROVEMENTS	Lifecycle Cost	% Towards Goal
Roof Water Redirection		
☐ Planter Boxes	$0	0%
☑ Rain Garden Coverage: 56677 Sq. Ft. (7%) of 762,843 Sq. Ft. show advanced options	$1,043K show details	24.3% show details
☑ Rain Barrel Coverage: 70 Possible Barrels (6%) of 1,194 Possible Barrels show advanced options	$5,941 show details	0.4% show details
☐ Cistern	$0	0%
Landscaping		
☐ Naturalized Detention Basin	$0	0%
☑ Trees Coverage: 1000 Possible Trees (22%) of 4,531 Possible Trees	$313K show details	75.3% show details

Map Layers | Community Areas | Enter an Address or Catchment ID



FLOOD RISK

low 0 1 2 3 4 5 high

GREEN IMPROVEMENT CO-BENEFITS

1.9%	$16	6.1%
Runoff Reduction	Water Treatment Cost Reduction	Volume Capture Increase

Show Details | View Methods

CNT