Green LTCP – EZ and National SW Modeling Tool

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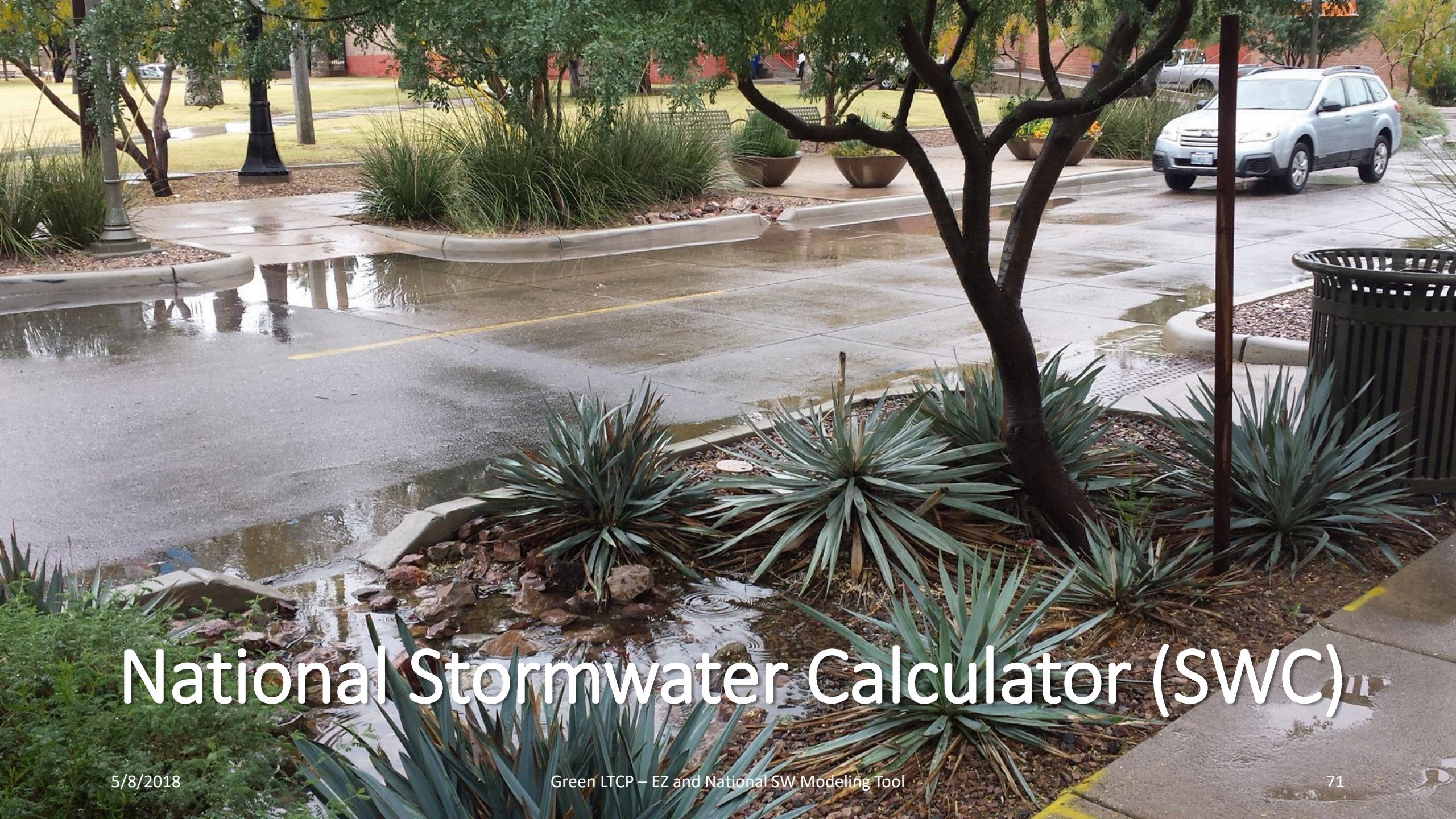

National Stormwater Calculator (SWC)

EPA United States Environmental Protection Agency

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National Stormwater Calculator

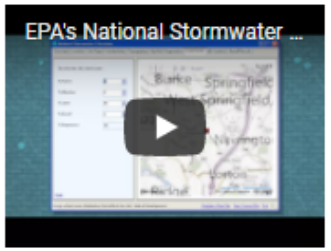
Register now for a free webinar on January 31, 2018 that will provide a demonstration and introduce new features.

Tool to help control runoff and promote the natural movement of water

EPA's National Stormwater Calculator (SWC) is a software application that estimates the annual amount of rainwater and frequency of runoff from a specific site. Estimates are based on local soil conditions, land cover, and historic rainfall records. It is designed to be used by anyone interested in reducing runoff from a property, including site developers, landscape architects, urban planners, and homeowners.

The SWC accesses several national databases that provide soil, topography, rainfall, and evaporation information for a chosen site. The user supplies information about the site's land cover and selects low impact development (LID) controls they would like to use. The LID controls include seven green infrastructure practices.

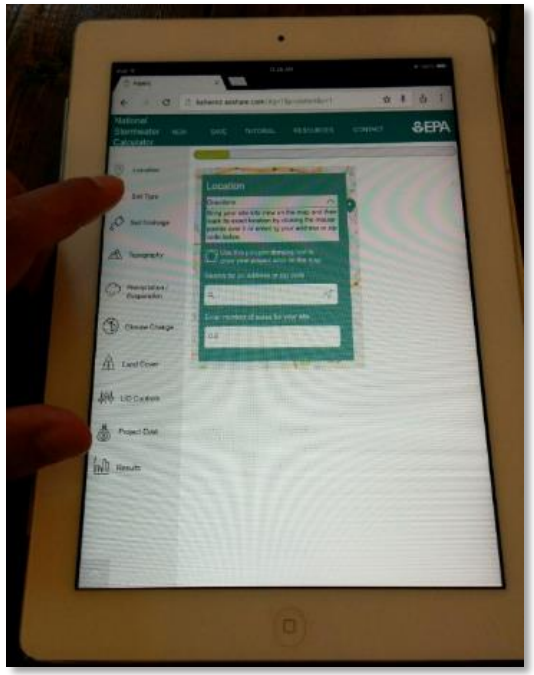
Additional Information



Access the Mobile Web App

- Green Infrastructure as Low Impact Development Controls +
- Capabilities +
- Real-World Applications +
- Software and Documentation +

Desktop and Mobile Versions Available

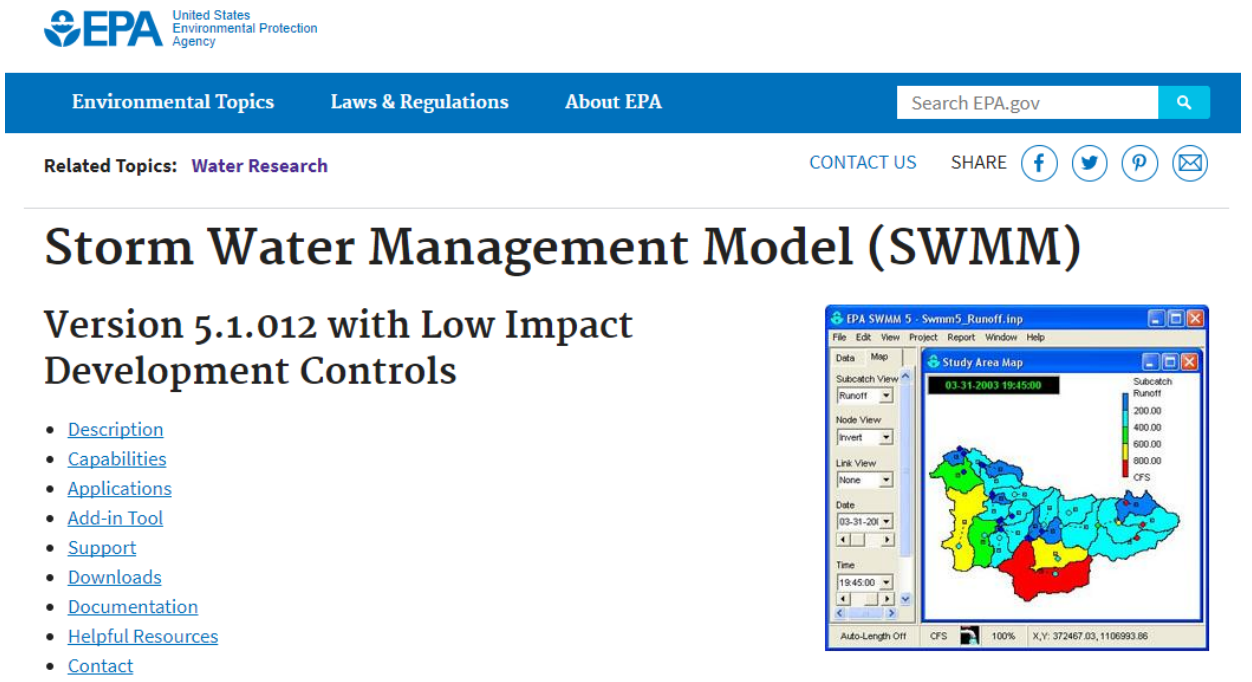


5/8/2018 http://www2.epa.gov/water-research/national-stormwater-calculator

What the SWC Provides:

- Screening-level post construction stormwater runoff reduction and cost analyses of various green infrastructure/low impact development (LID) practices, including:
  - Green roofs, rain gardens, cisterns, etc. throughout the U.S.
- Allow non-modelers (planners, landscape architects, developers, home owners, students, etc.) to conduct screening level stormwater runoff for small to medium sized (less than 1 - 12 acres) sites
- Robust modeling results from EPA's Stormwater Management Model (SWMM)
- Reliable regional planning cost estimates

Storm Water Management Model (SWMM) Programmed within the SWC



- Calculator is based on SWMM: Dynamic rainfall-runoff simulation model for long-term simulation of runoff quantity
- SWMM produces stormwater runoff estimates in the background of the Stormwater Calculator

LID Cost Estimation Module (Released May 2017):

- **Intended Uses:**
  - National and regional (metropolitan areas) planning level cost estimates (magnitude (high & low) of costs between planning scenarios)

- **Limitations:**
  - Doesn't provide final construction/build costs
  - Doesn't provide lifecycle costs (gives annual operation and maintenance (O & M) costs, not replacement costs)
  - Regional costs not available for all areas of the US (many of the Western states)

LID Cost Estimation Module:
Development of Regionalized LID/Green Infrastructure Costs

- **Utilization of Bureau of Labor Statistics (BLS) Data for regional costs**
  - *National Producer Price Index*: outputs of service, construction, utilities, and other goods producing entities
    - Examples include: concrete storm sewer pipe, construction sand and gravel, etc.
  - *Consumer Price Index*: regional/city data (23 major US cities)
    - Examples include: fuels and utilities, energy, and diesel fuel

- **Data easily updated and maintained annually by EPA**

- **Development of regional costs comparable to Engineering News Record (ENR) and RS Means**

SWC:
Site Parameters and Embedded National Data-sets

- **Location:** Bing Maps
- **Soils:** NRCS SSURGO *(web service)*
- **Slope:** NRCS SSURGO
- **Hydraulic Conductivity:** NRCS SSURGO
- **Precipitation and Temperature:** National Climate Center (NCDC)-NOAA *(EPA's BASINS Model)*
- **Evaporation:** Calculation based on meteorological data
- **Climate Change Future Scenarios:** Precipitation & evaporation *(EPA's CREAT 2.0)*
- **Land-Cover/Use:** User provided
- **LID Practices (*new costing module available*):** User provided

How the SWC may compliment Green LTCP-EZ

- Sizing of LID/GI controls
  - Gallons controlled (Currently done for GI projects with the Northeastern Ohio Regional Sewer District GI Grants Program: https://www.neorsd.org/stormwater-2/green-infrastructure-grant-program/)
  - May design LID/GI controls for 24-hour design storms
  - Provides historical hourly rainfall (NOAA weather stations)
- Provides present regional planning level capital and annual O & M costs

SWC Application:
NE Ohio Regional Sewer District Green Infrastructure Grant Program for Combined Sewer Area

NORTHEAST OHIO REGIONAL SEWER DISTRICT

2018 GREEN INFRASTRUCTURE GRANT FOR THE COMBINED SEWER AREA

*Pre-Construction – Average Annual Runoff (in) of Total Drainage Area Treated: _____

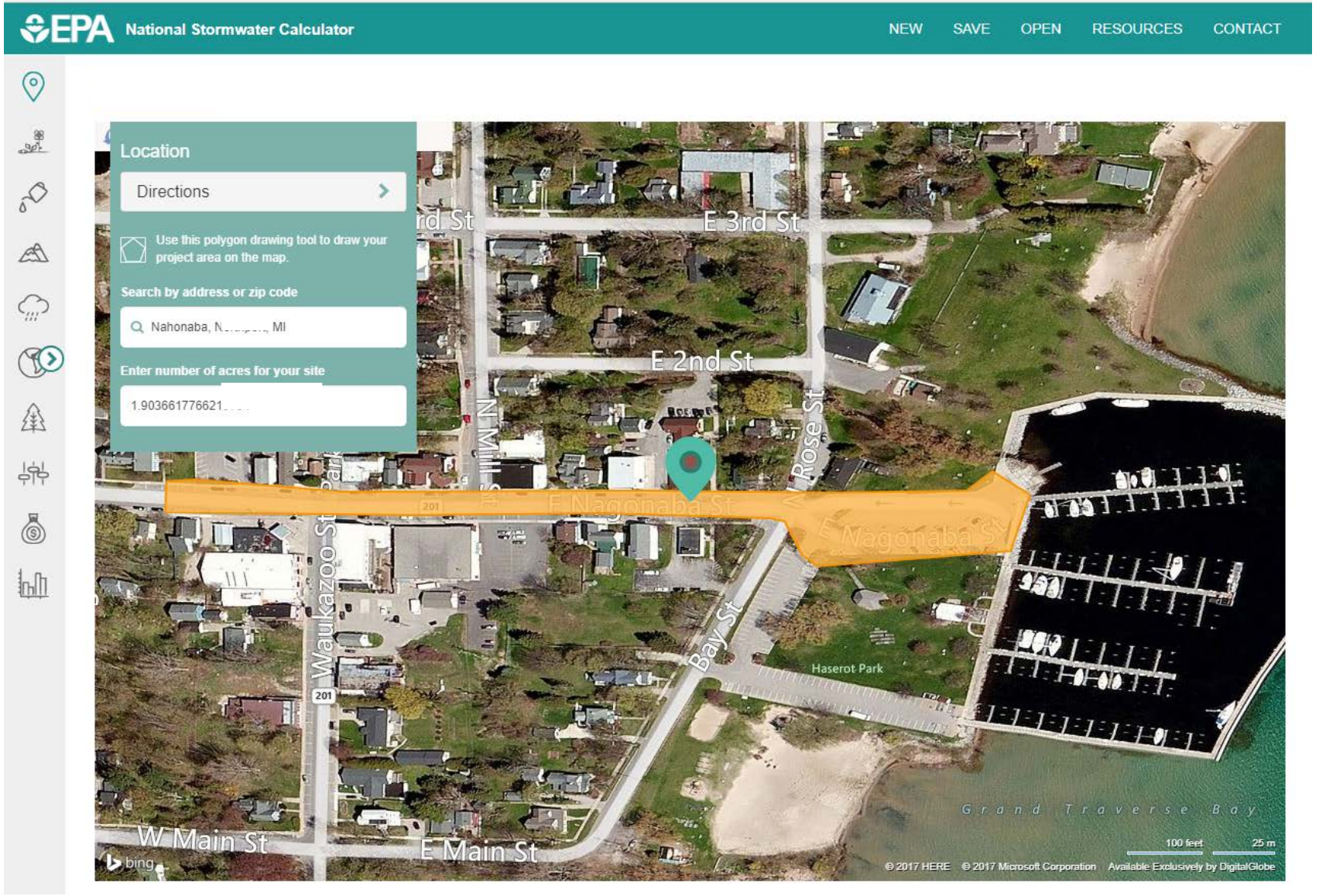
*Post-Construction - Average Annual Runoff (in) of Total Drainage Area Treated: _____

Annual Runoff Reduction (g/yr.): _____
(Runoff Reduction (in) / 12 x Treated Drainage Area (acre) x 325,851.433 = gal/yr.)

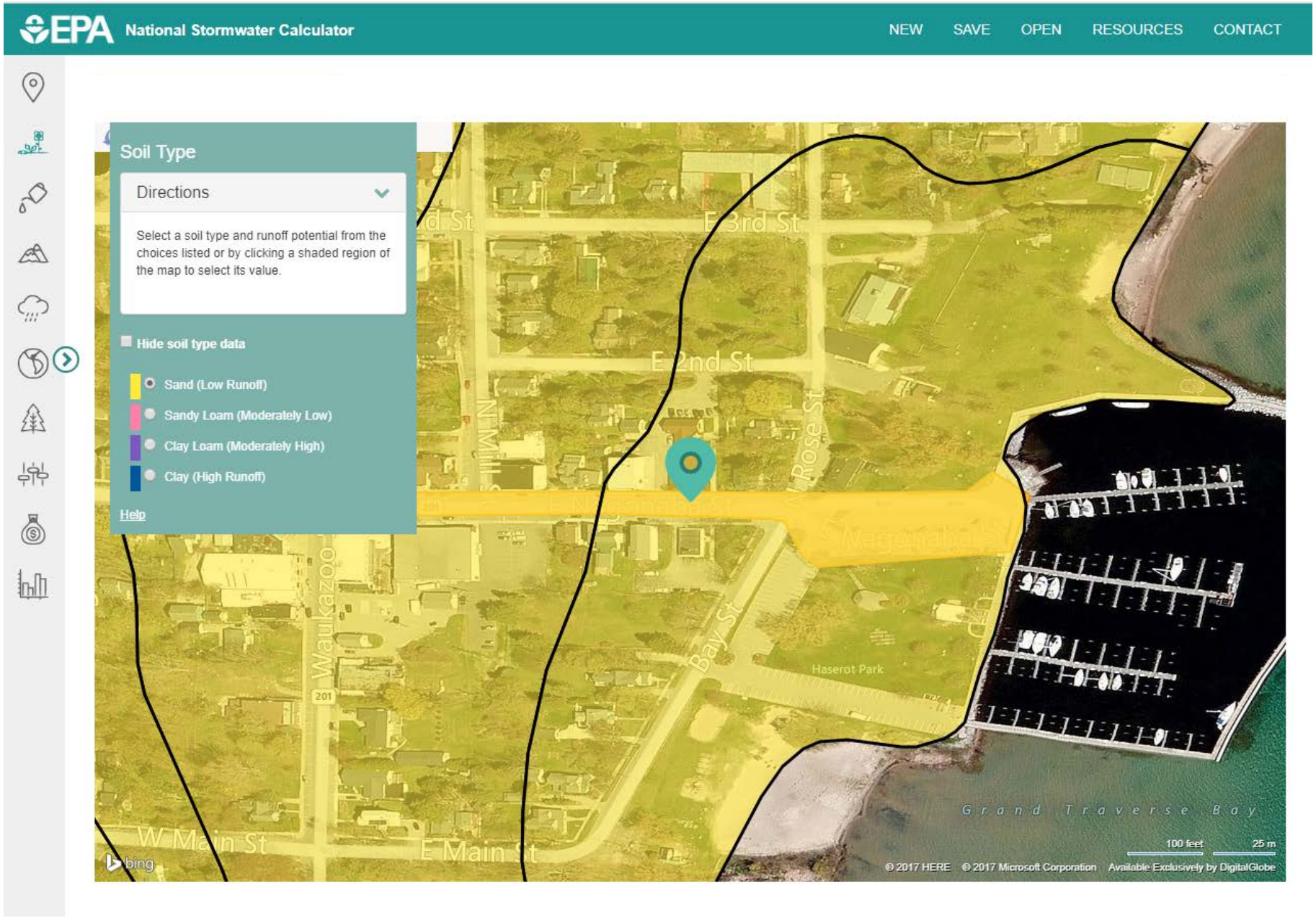
**Analysis using the US EPA Stormwater Calculator ver.1.1*
http://www2.epa.gov/water-research/national-stormwater-calculator

SWC Mobile Web App Application (Northport, MI)

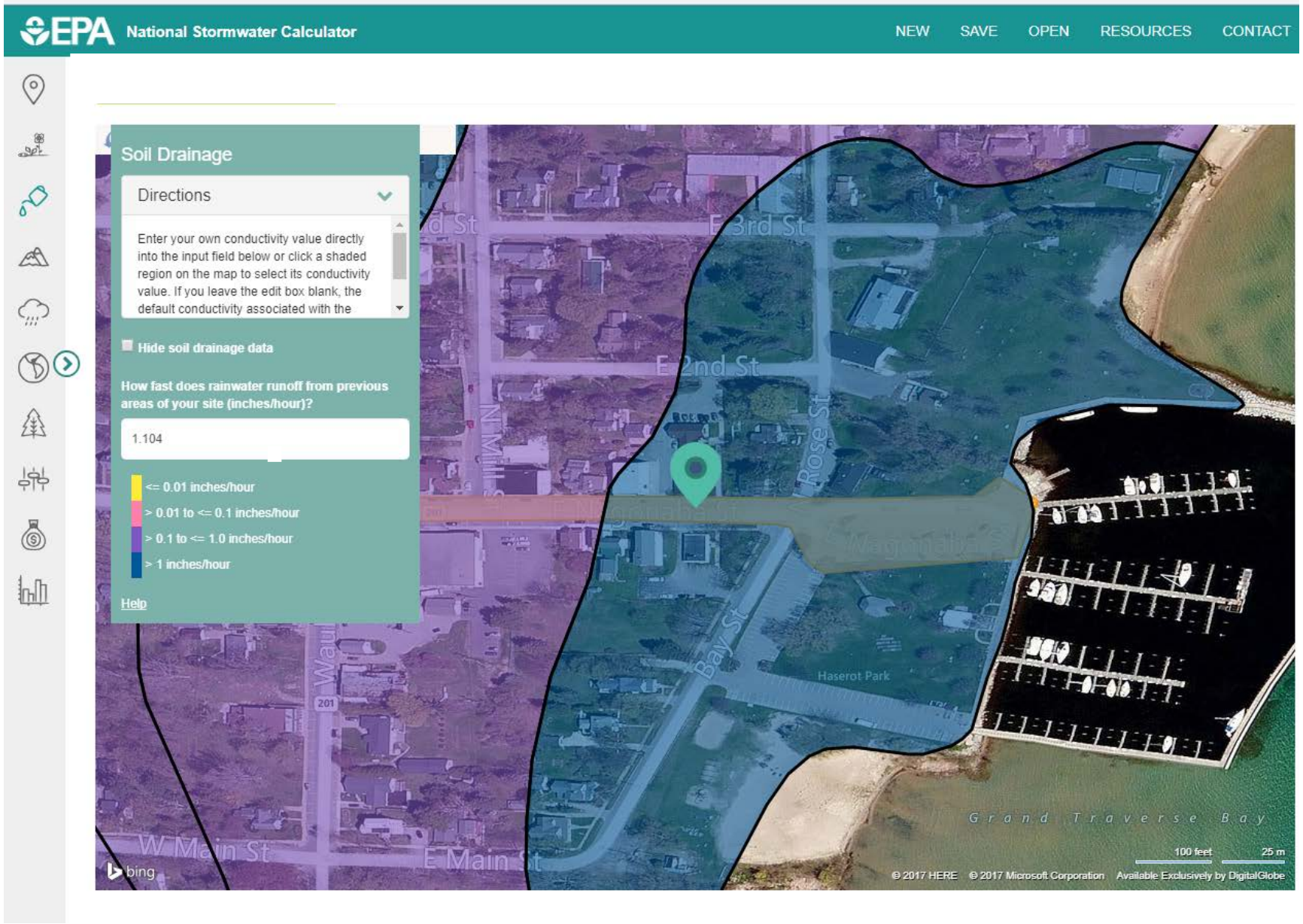
Location:



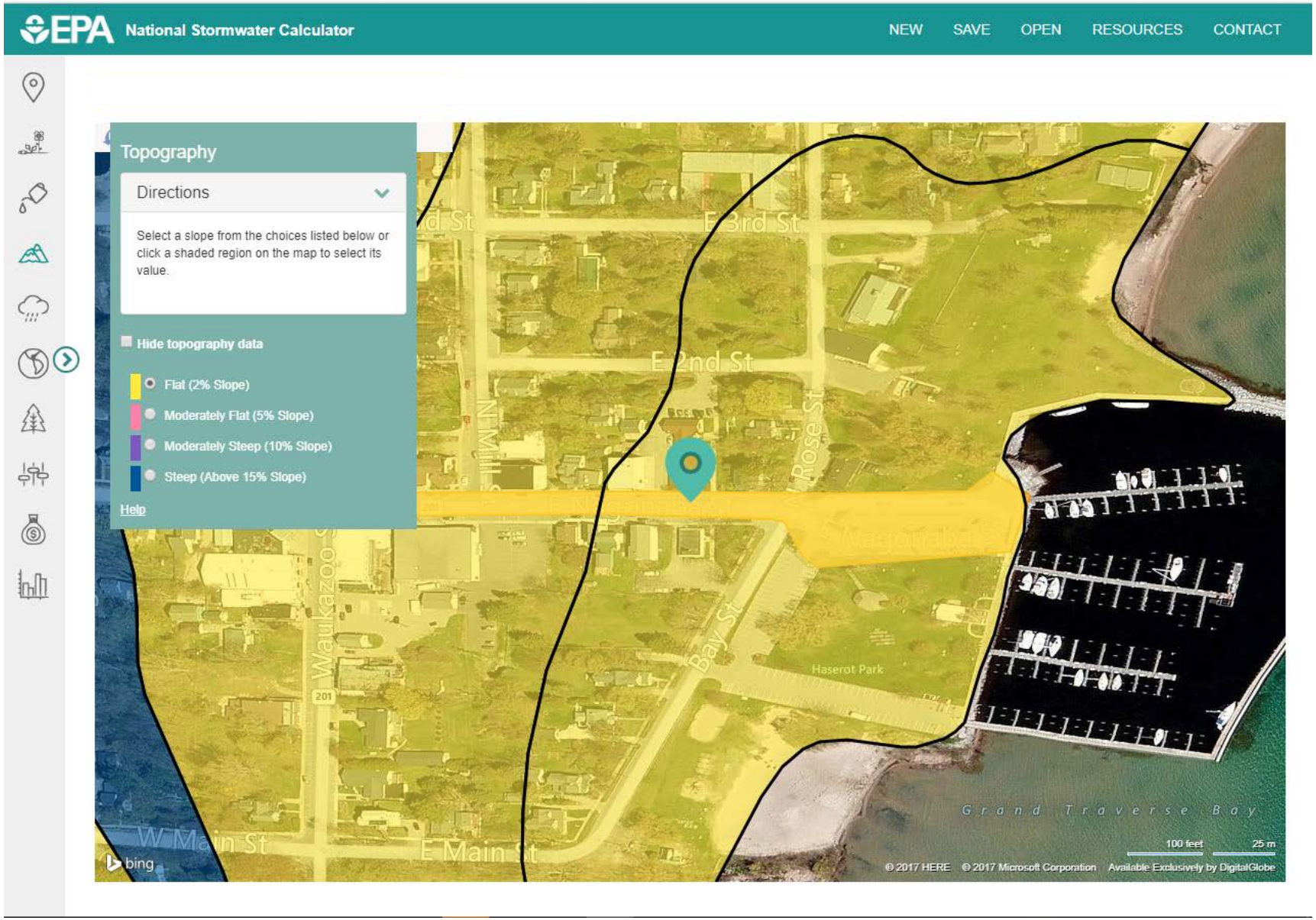
Soil Runoff Potential:



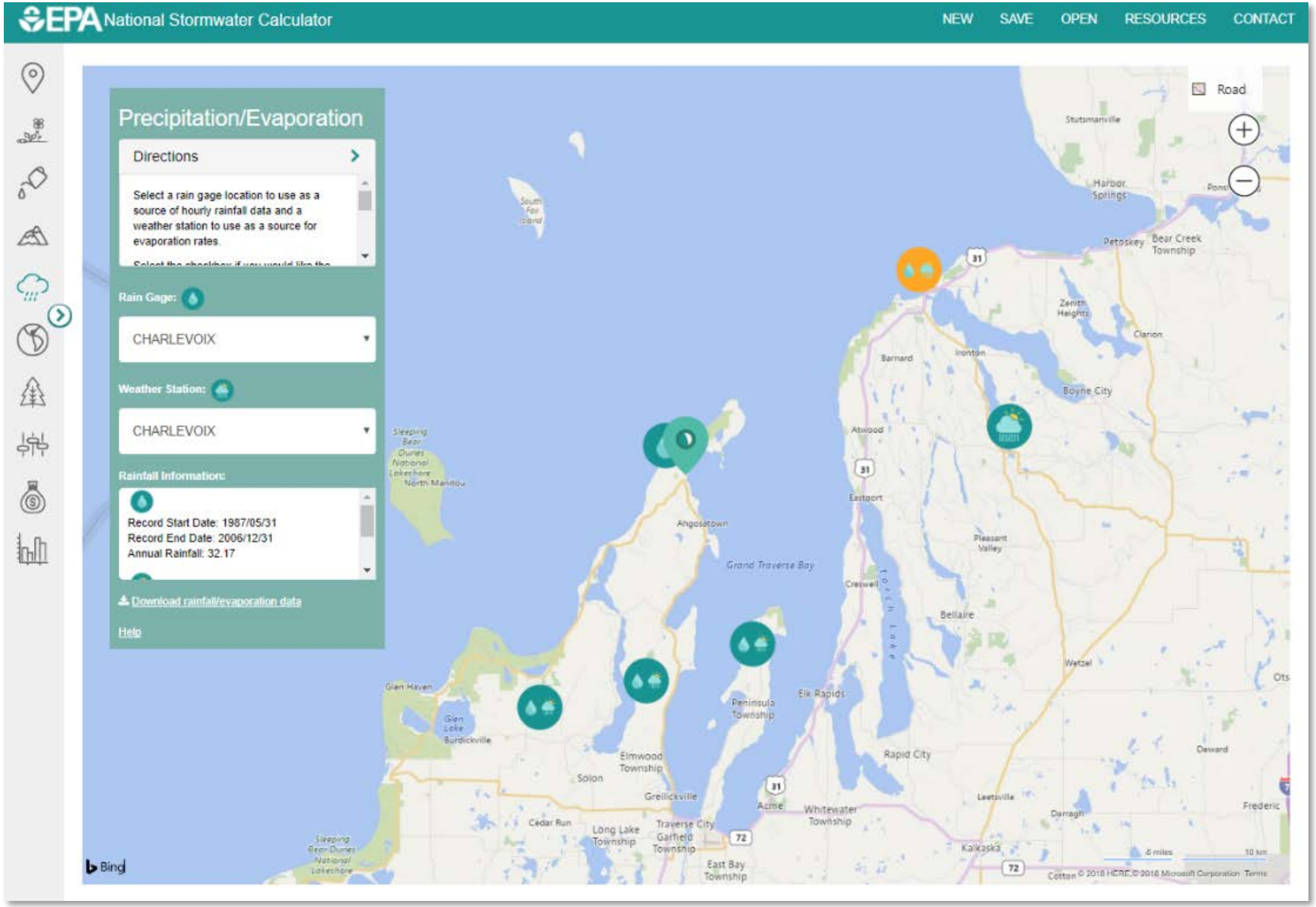
Soil Infiltration Capacity:



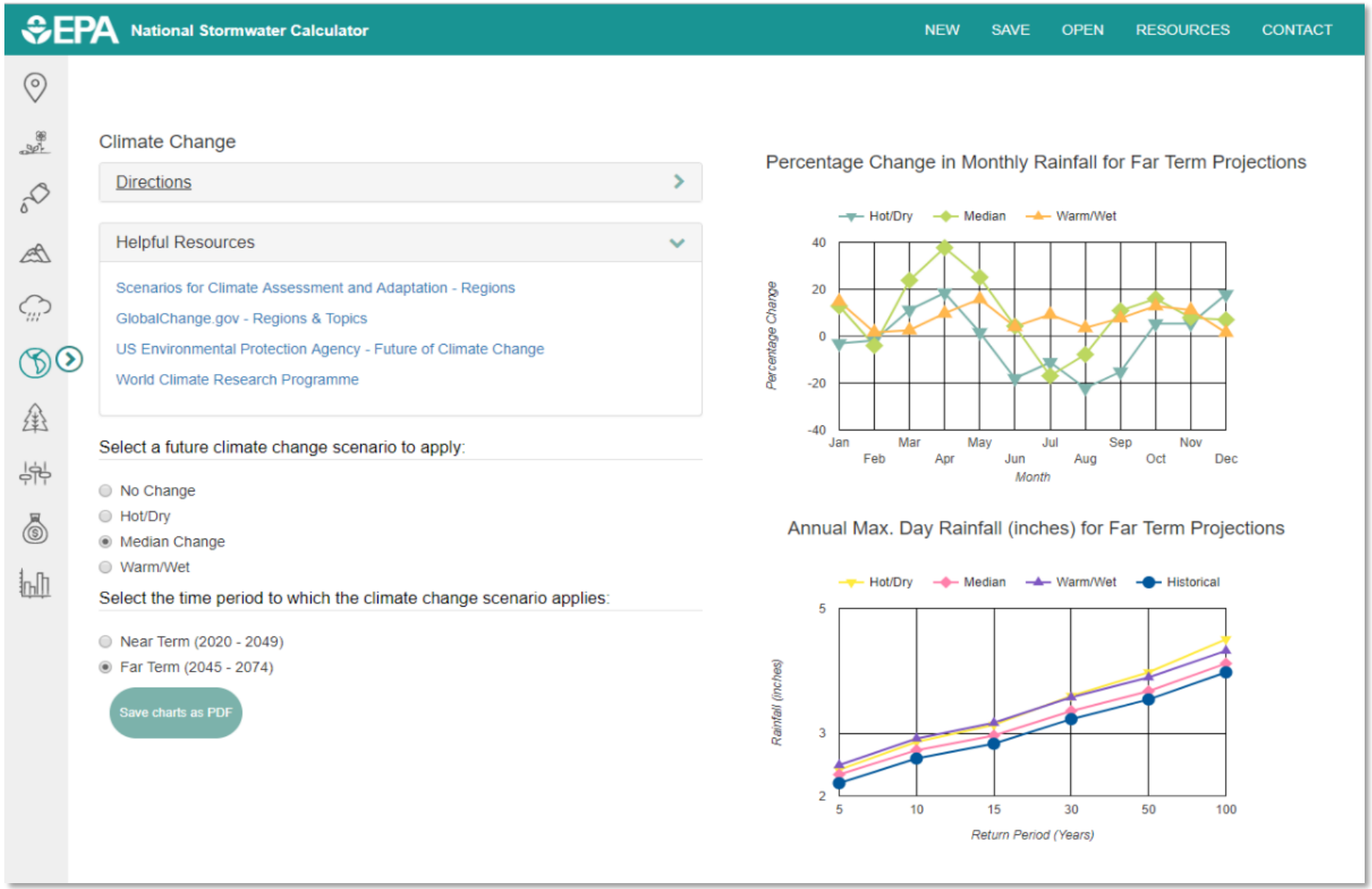
Topography/Slope:



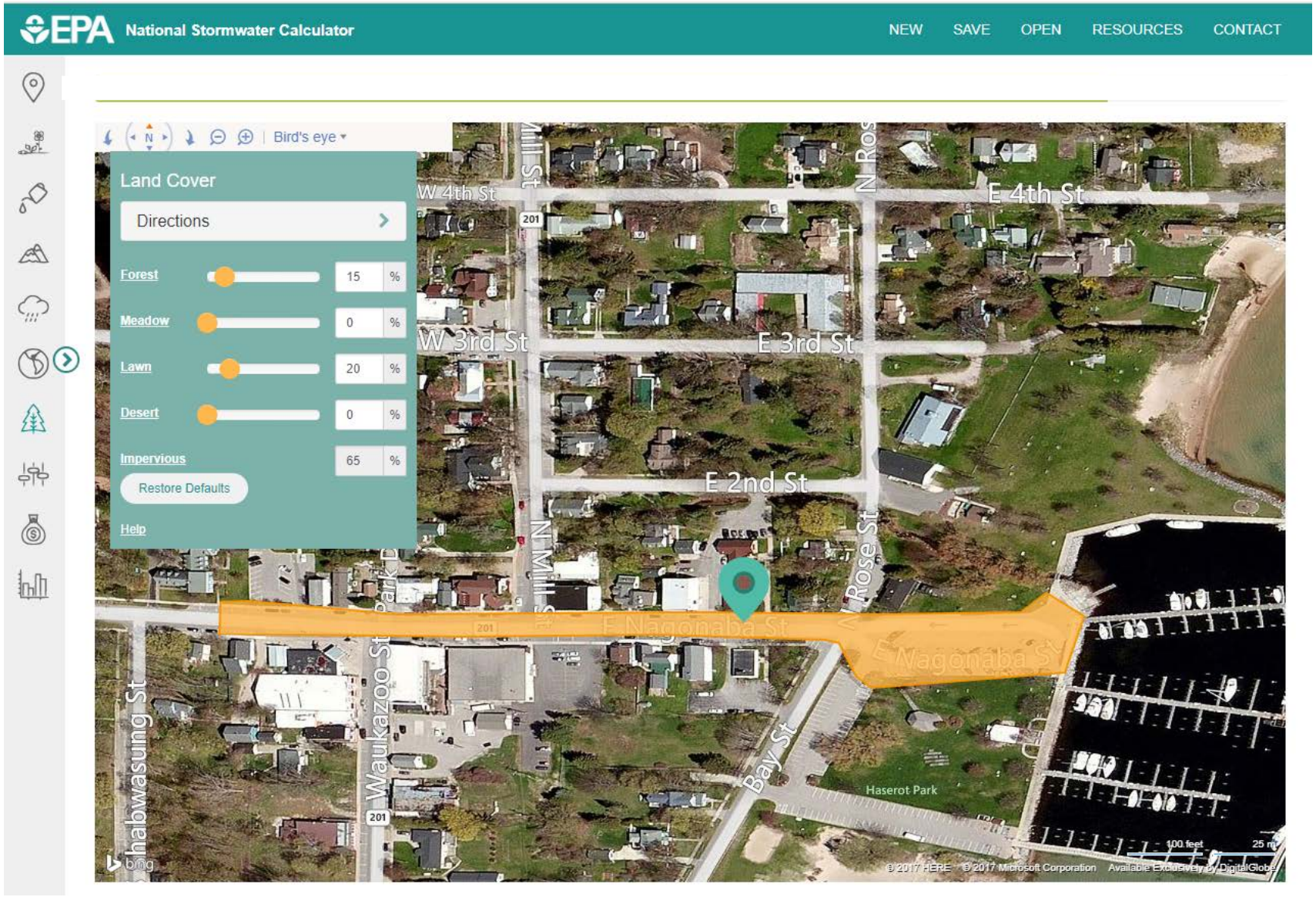
Historical Weather (precipitation/evaporation)



Climate Change Scenarios & 24-Hour Design Storm Events



Land Cover:


EPA National Stormwater Calculator
NEW
SAVE
OPEN
RESOURCES
CONTACT
Bird's eye
Land Cover
Directions
Forest 15 %
Meadow 0 %
Lawn 20 %
Desert 0 %
Impervious 65 %
Restore Defaults
Help
W 4th St
E 4th St
W 3rd St
E 3rd St
E 2nd St
N Rose St
E Nagonaba St
Waukazoo St
Bay St
Haserot Park
201
100 feet
25 m
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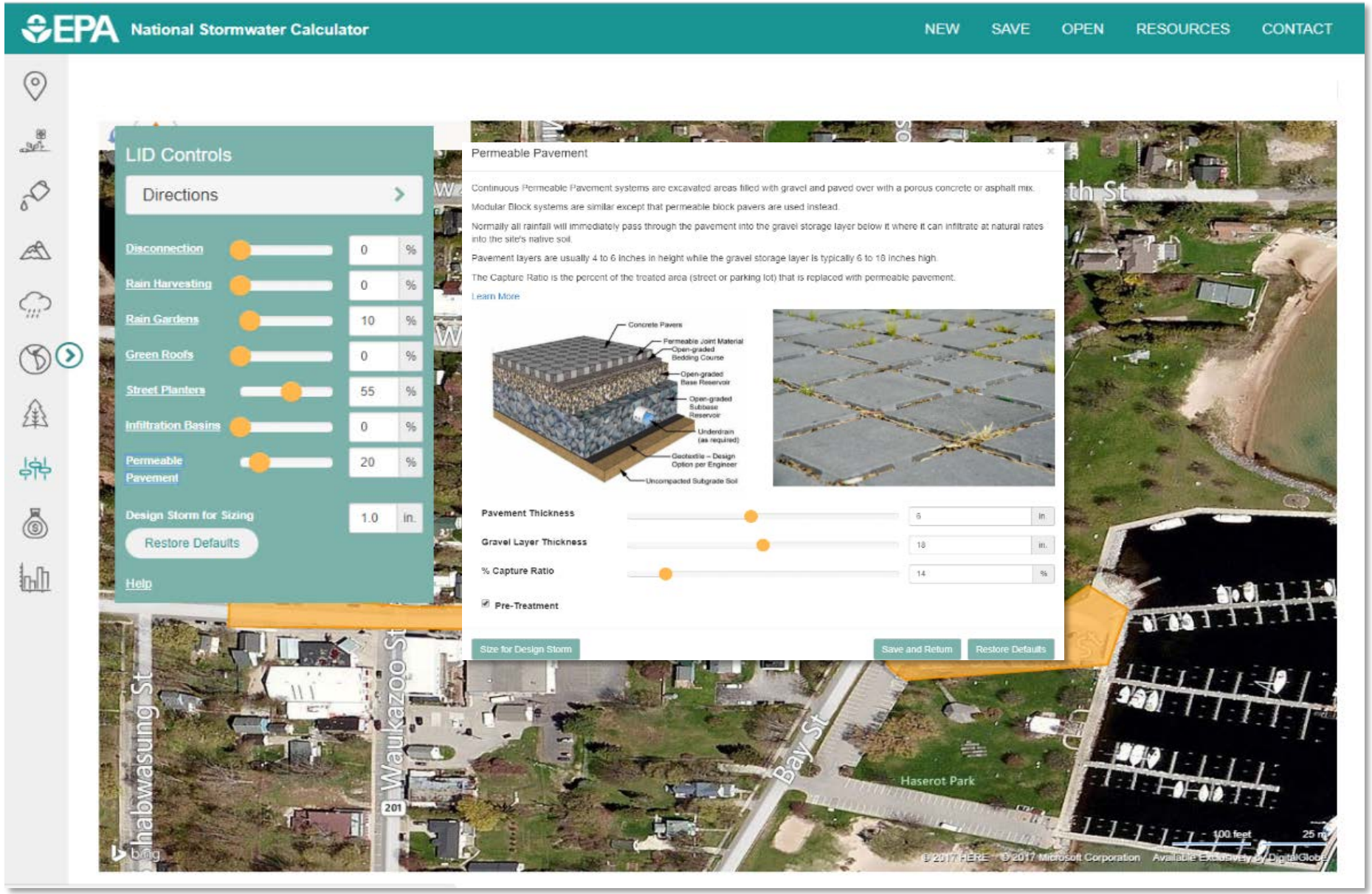
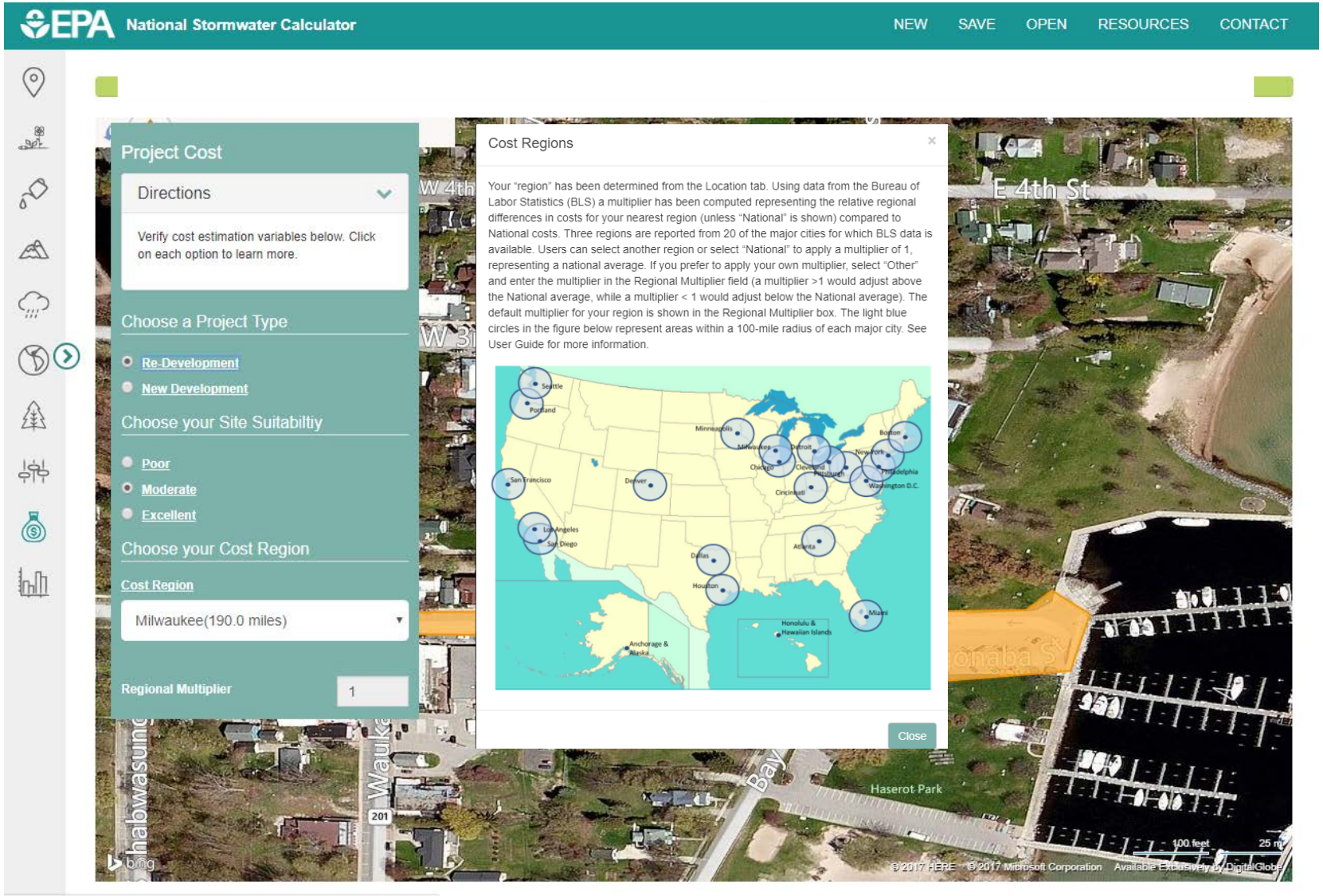
Sizing LID/GI Controls

SW Control Sizing Options (examples shown below):

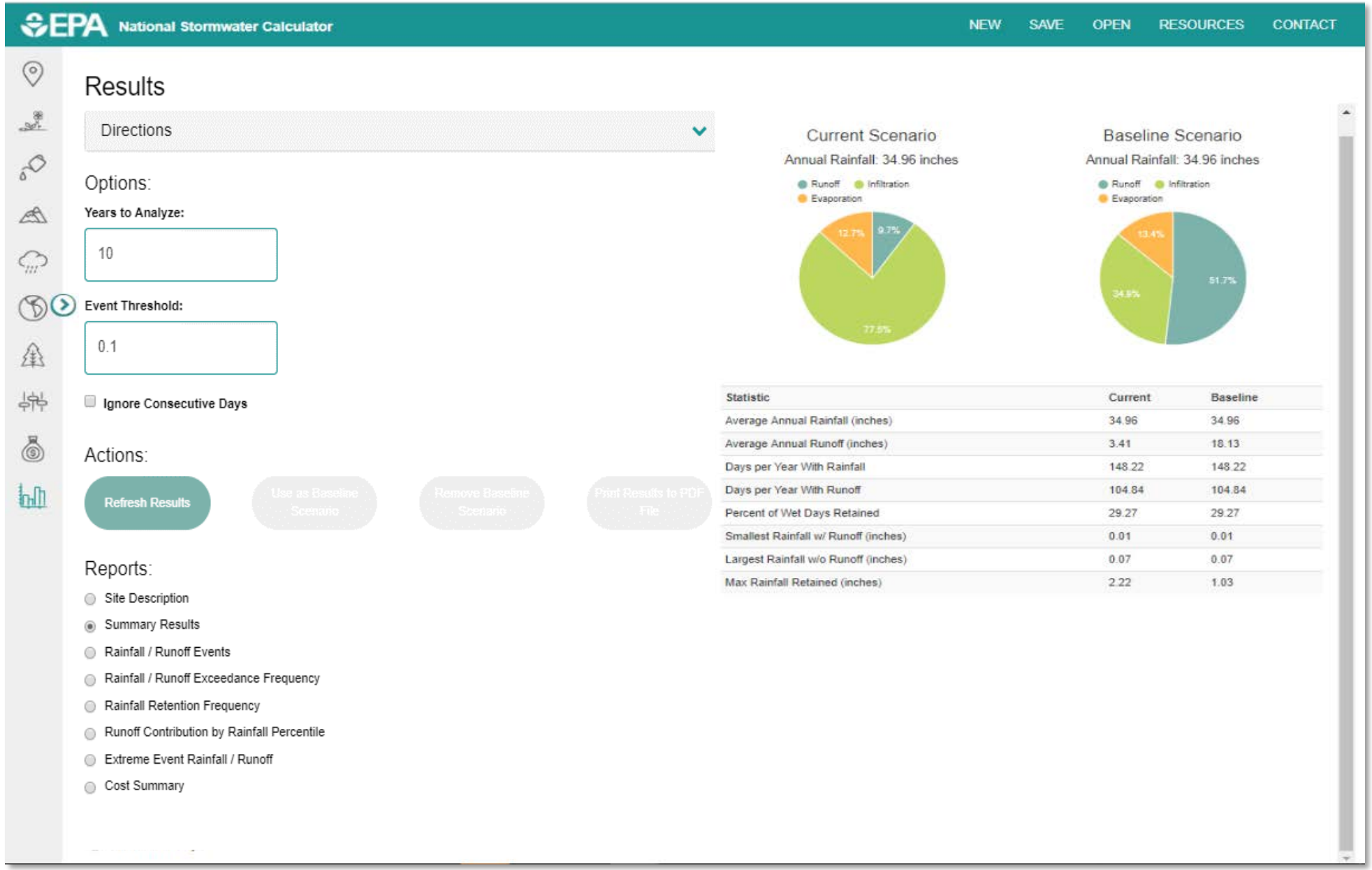
- Design Storm (1 inch)
- Percentile Storm (85th %)



Project Cost:
Development Type, Site Suitability, and Cost Region

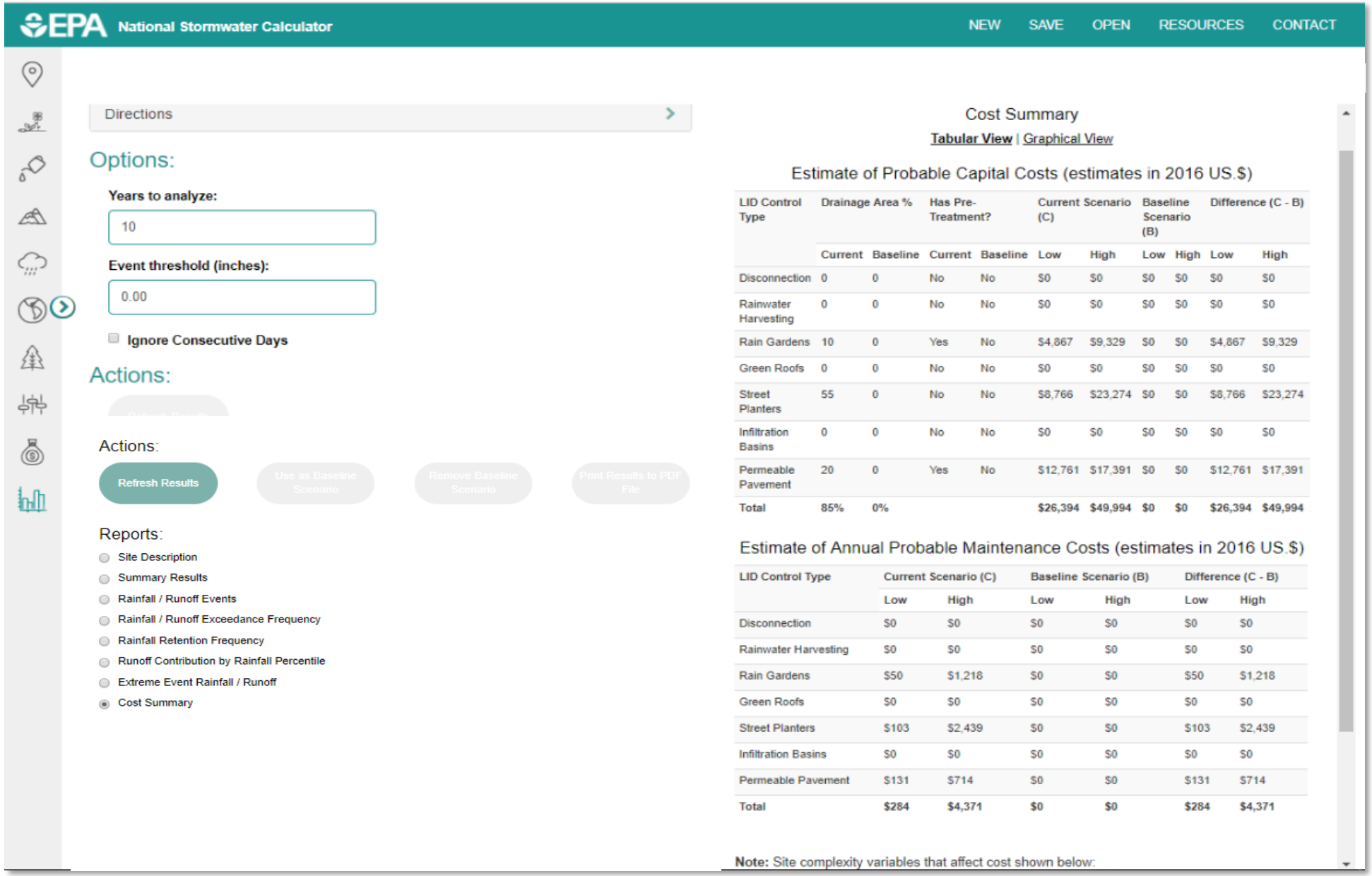


Runoff Reduction Results



Statistic	Current	Baseline
Average Annual Rainfall (inches)	34.96	34.96
Average Annual Runoff (inches)	3.41	18.13
Days per Year With Rainfall	148.22	148.22
Days per Year With Runoff	104.84	104.84
Percent of Wet Days Retained	29.27	29.27
Smallest Rainfall w/ Runoff (inches)	0.01	0.01
Largest Rainfall w/o Runoff (inches)	0.07	0.07
Max Rainfall Retained (inches)	2.22	1.03

Costs Results



SWC Assisting with Next Steps

- Sharing planning results with decision-makers
- Applying for funding
- Developing:
  - Implementation plans
  - Construction documents
- Informing O&M needs

http://news.maryland.gov/dnr/2017/06/29/over-800000-announced-to-support-local-green-infrastructure-projects-to-improve-communities-and-provide-jobs/

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