NOAA Northeast Regional Climate Center:
Climate & Weather Information for
New England Water Utilities & Stormwater Managers Workshop

U.S. EPA National Stormwater Calculator (SWC)

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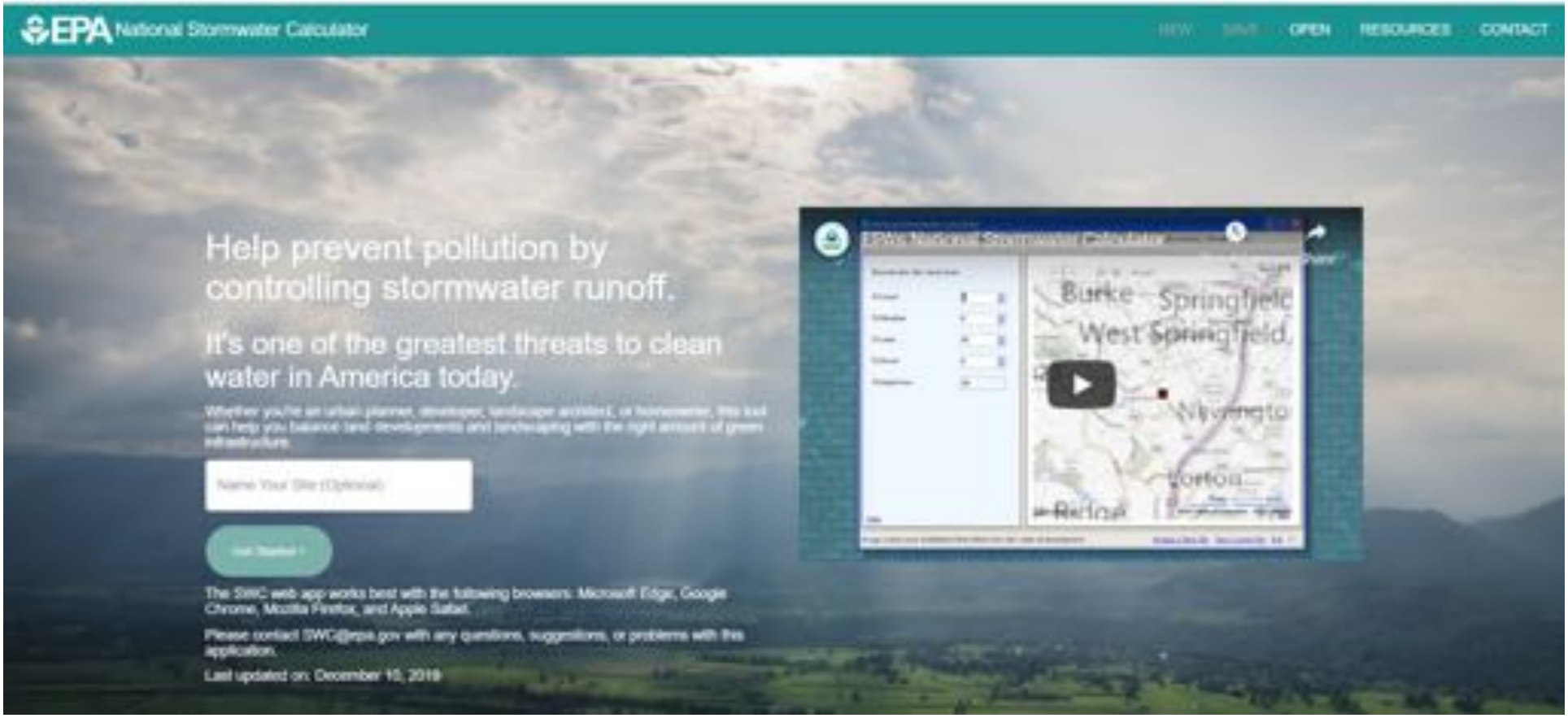
National Stormwater Calculator (SWC)



https://www.epa.gov/water-research/national-stormwater-calculator

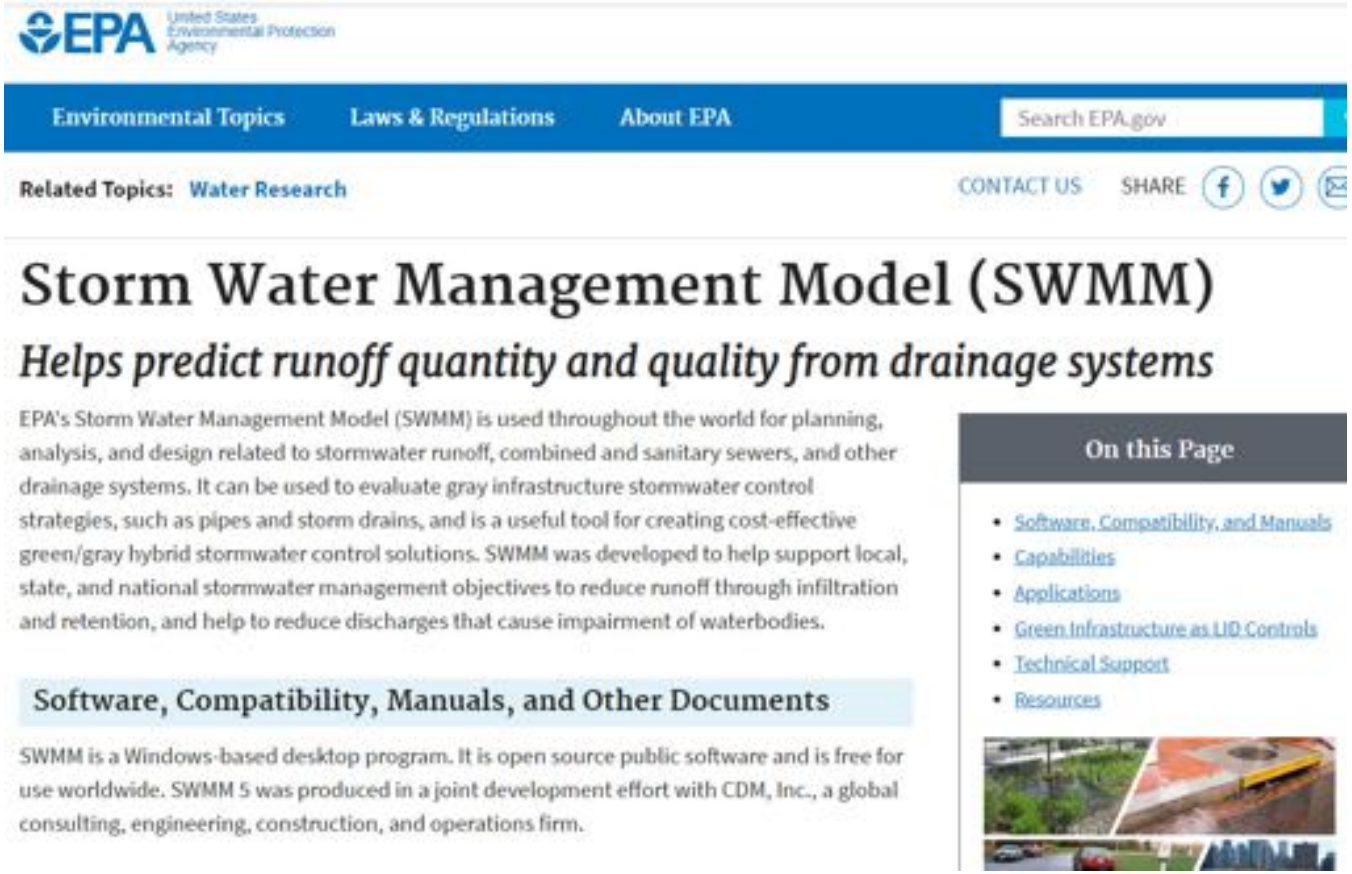
What is the SWC?

- **Stormwater Management (Green Infrastructure/Low Impact Development (LID)) Design and Planning Tool**
  - Allow for screening-level analysis of various green infrastructure (GI) practices, including planning level costs (green roofs, rain gardens, cisterns, etc.) throughout the U.S.
  - Model post-construction urban stormwater runoff discharges
    - Effects of alternative GI controls
    - Effects of changes in weather/climate
  - Allow non-technical professionals to conduct screening level stormwater runoff for small to medium sized (less than 1 - 12 acres) urban sites

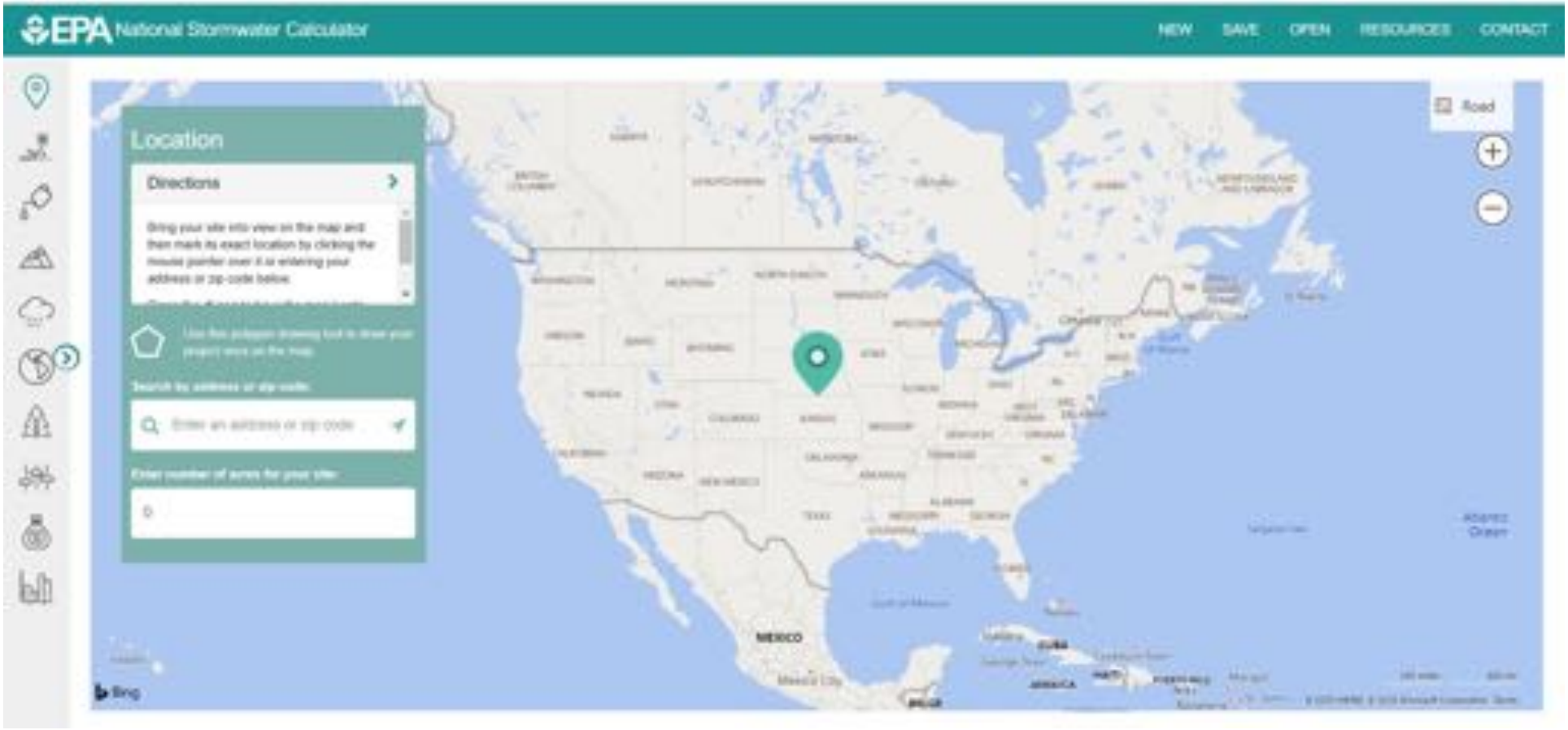
Storm Water Management Model (SWMM)

- SWMM: A dynamic rainfall-runoff simulation model for long-term simulation of runoff quantity. Is an industry standard for urban stormwater modeling.

- SWMM produces stormwater runoff estimates in the background of the SWC



SWC
Web Application



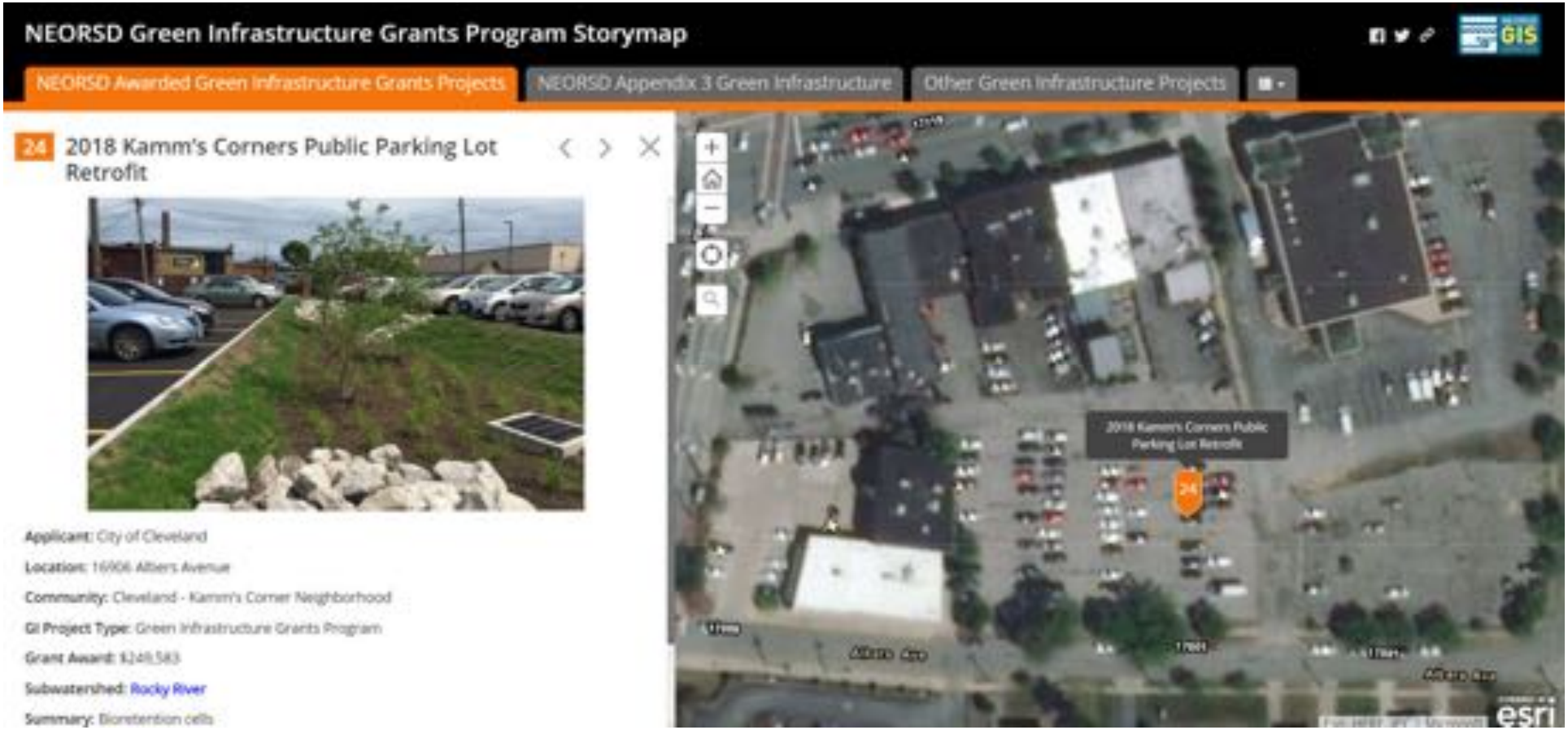
https://swcweb.epa.gov/stormwatercalculator/

SWC:
Site Parameters and Embedded Data-sets

- **Location:** Bing Maps
- **Soils:** NRCS SSURGO
- **Slope:** NRCS SSURGO
- **Hydraulic Conductivity:** NRCS SSURGO
- **Precipitation and Temperature:** National Climate Center (NCDC)-NOAA from EPA's BASINS Model
- **Potential Evapotranspiration:** Calculation based on meteorological data
- **Climate Change Future Scenarios:** Precipitation & potential evapotranspiration
- **Land-Cover/Use:** Menu driven by user
- **LID Practices & Costs:** Menu driven by user

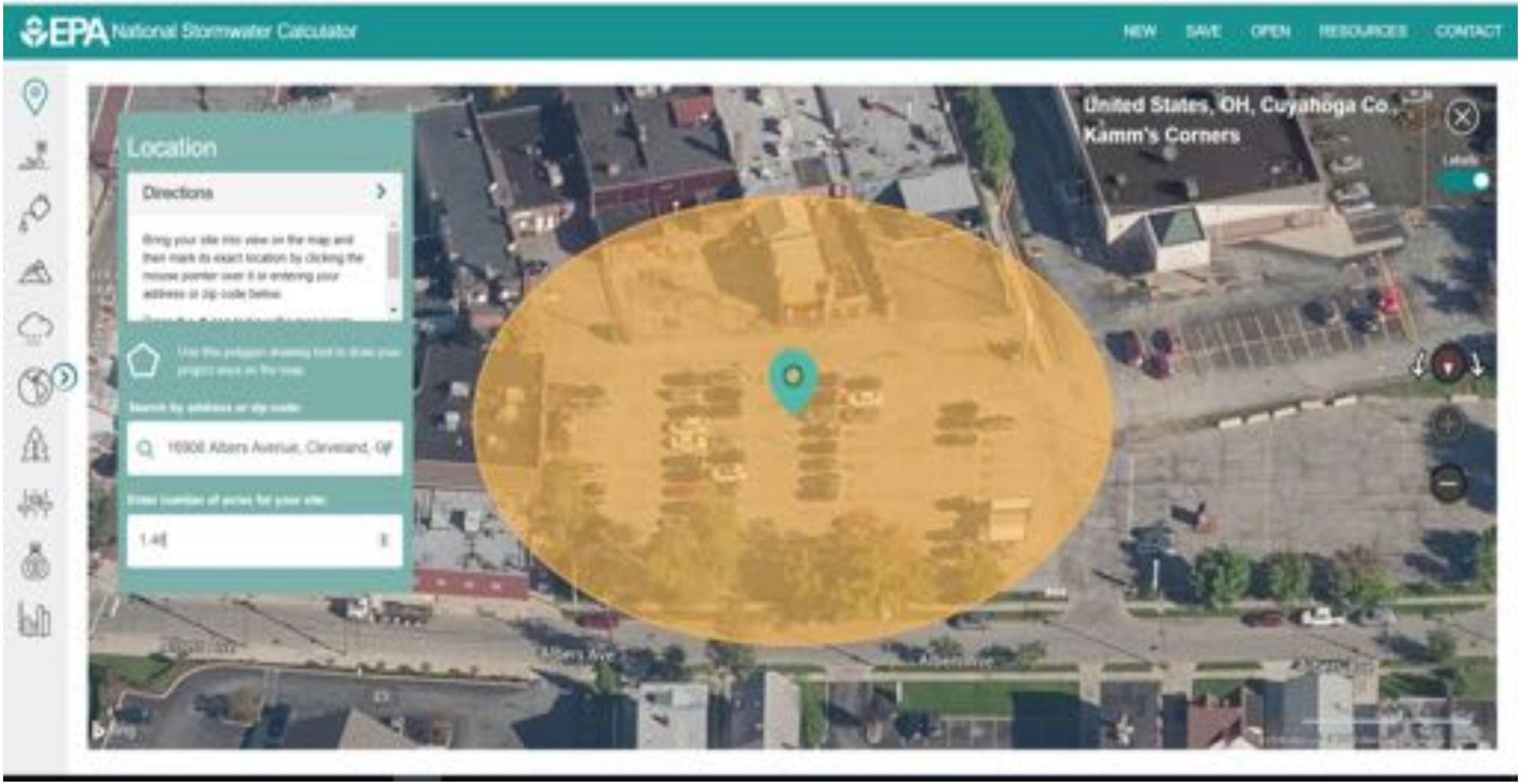
SWC Application:
Northeast Ohio Regional Sewer District (NEORSD)Green Infrastructure Grants Program Kamm's Corners Public Parking Lot Retrofit Project

- SWC used by grant applicants for quantifying stormwater runoff reductions of proposed projects

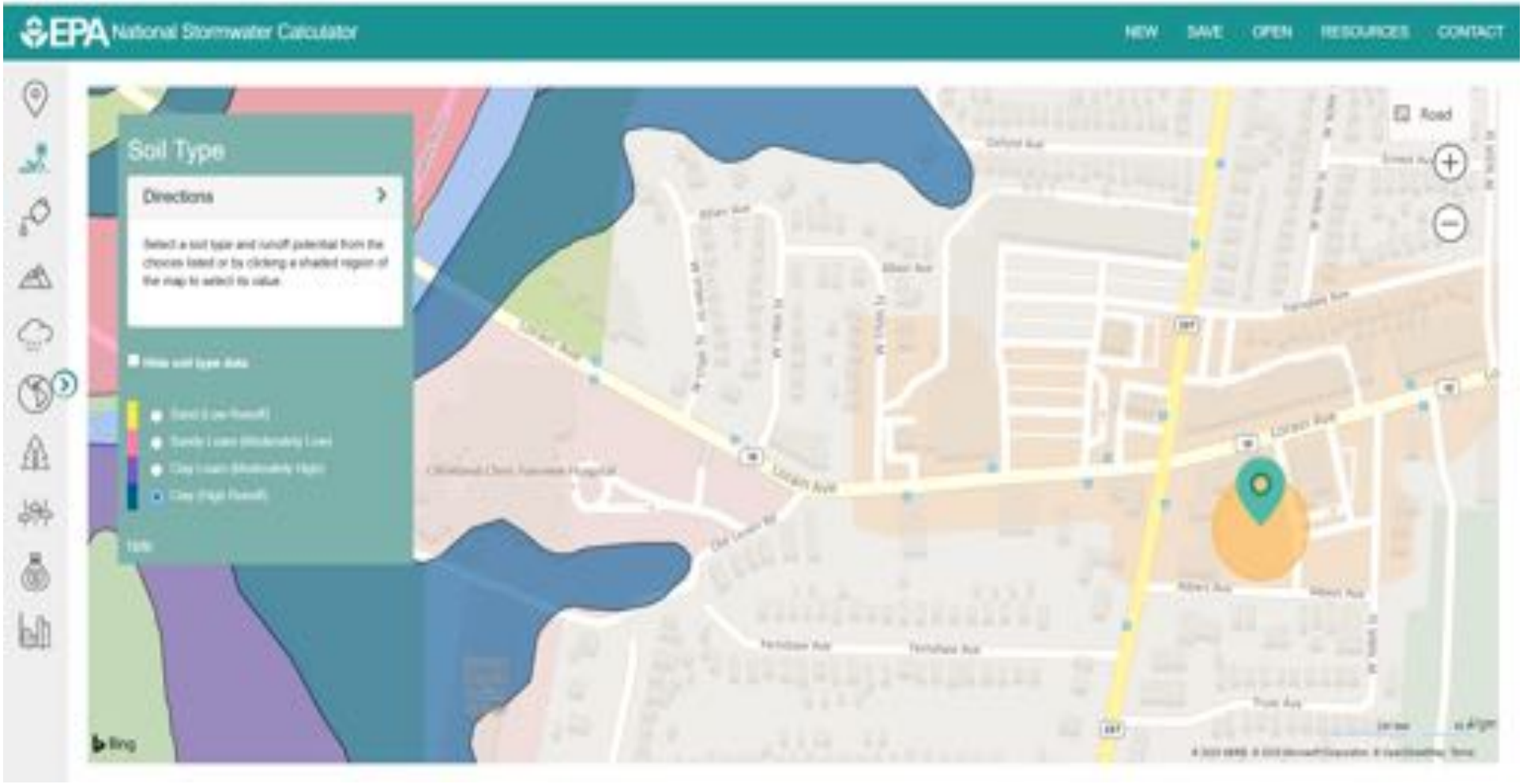


https://neorsd.maps.arcgis.com/apps/Shortlist/index.html?appid=efd0ff60d52f4860978c5bb4098cb3d9

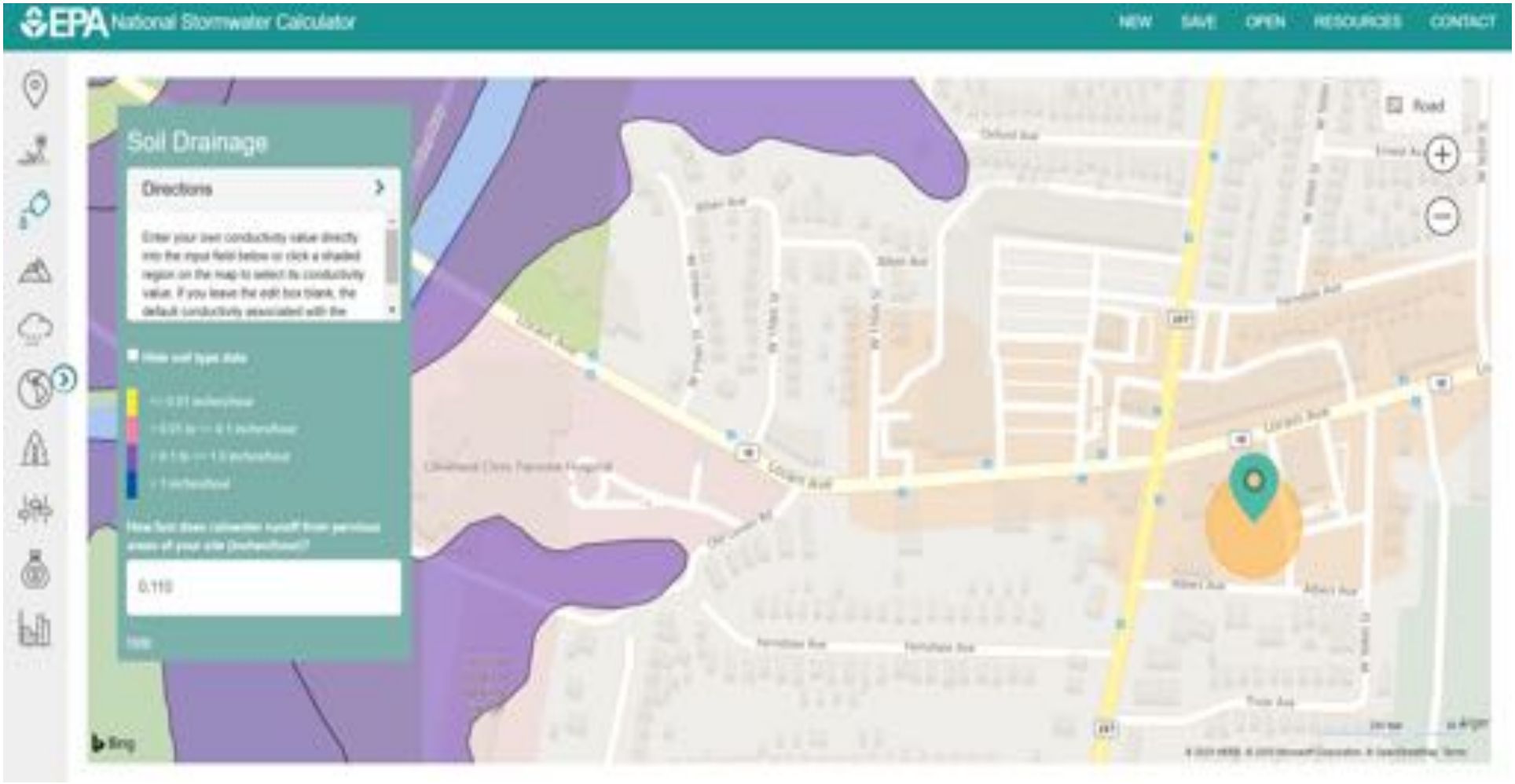
SWC Analysis:
Project Location



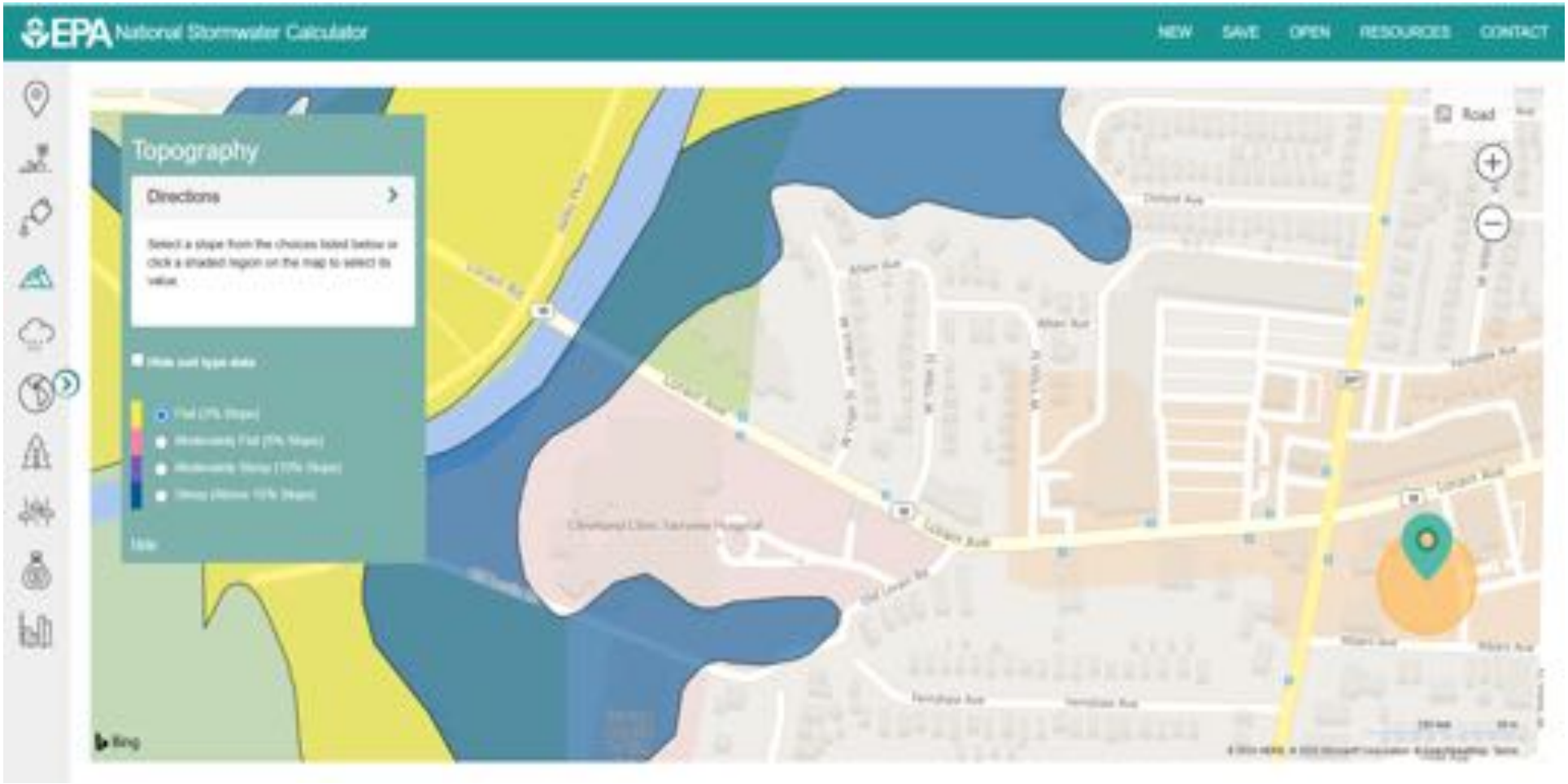
SWC Analysis:
Soil Type: Rainfall Runoff Potential



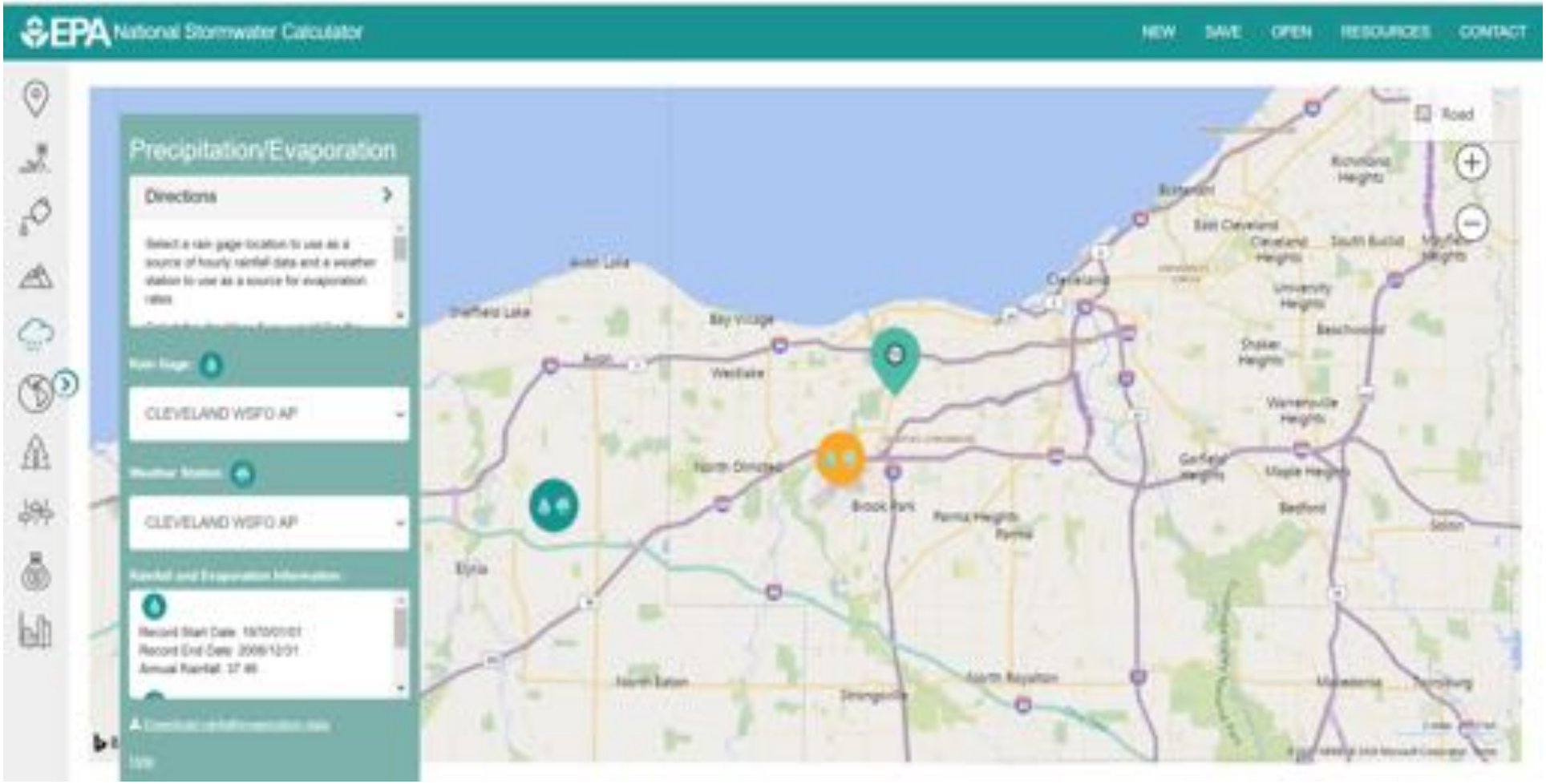
SWC Analysis:
Soil Drainage (infiltration rate)



SWC Analysis:
Topography



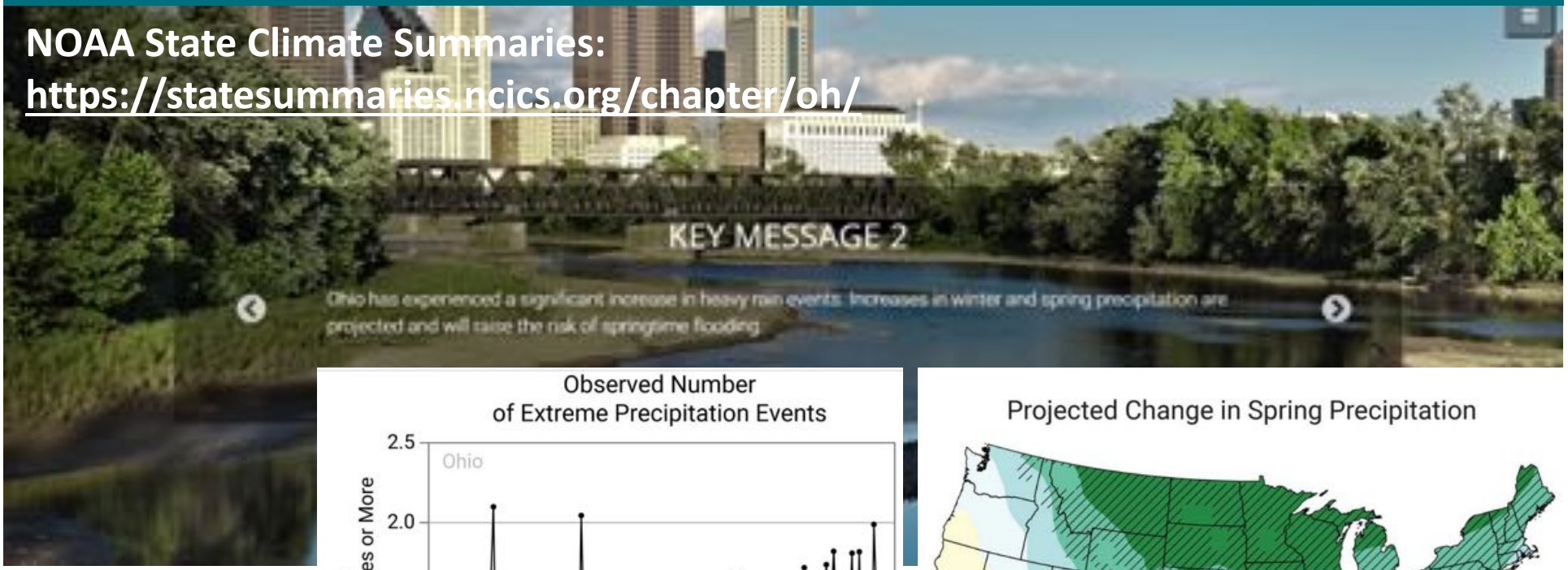
SWC Analysis:
Historical Precipitation & Potential Evapotranspiration

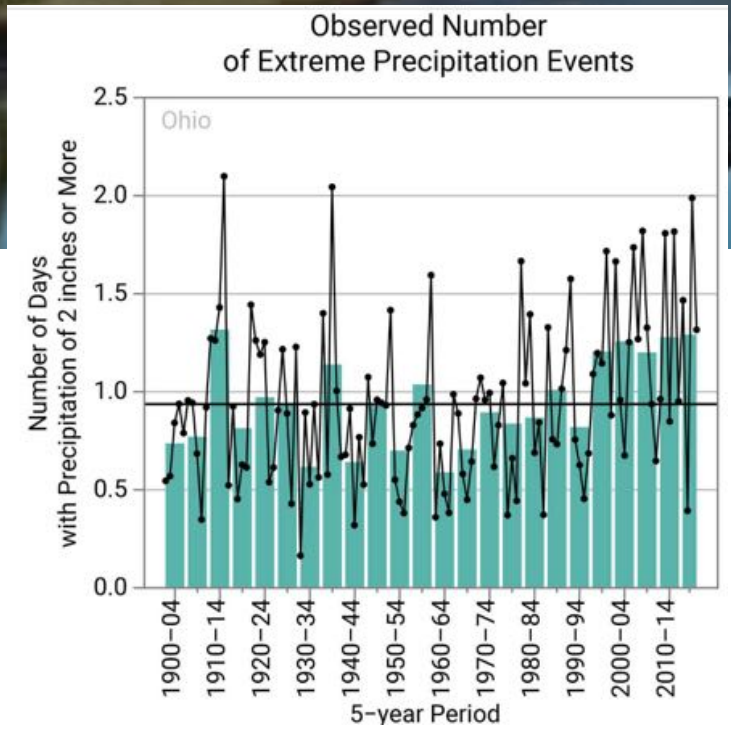


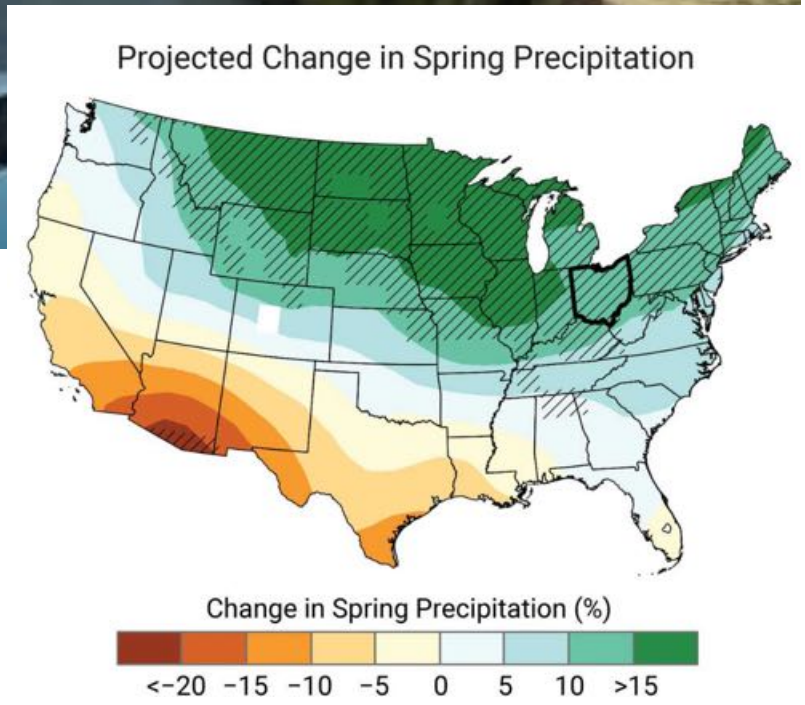
SWC Analysis:
Existing Land Cover

SWC Analysis:
Extreme Weather Impacts: State of Ohio – 2019

NOAA State Climate Summaries:
https://statesummaries.ncics.org/chapter/oh/







Extreme Weather Scenario Data:
U.S. EPA's Climate Resilience Evaluation & Awareness Tool (CREAT) 2.0

- Climate scenarios derived from a range of outcomes of the World Climate Research Programme's CMIP3 multi-model dataset.

- Contains a database of climate change effects across the US localized to a grid of 0.5 degrees in latitude and longitude (about 30 by 30 miles).

https://creat.epa.gov/creat/

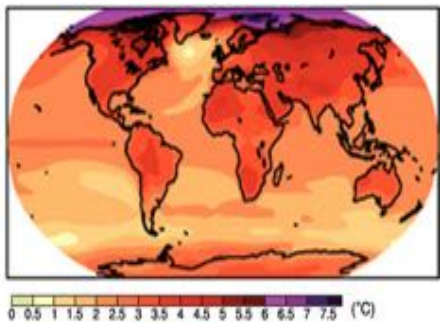
Extreme Weather Scenario Data Sources:
U.S. EPA's Climate Resilience Evaluation & Awareness Tool (CREAT) 2.0

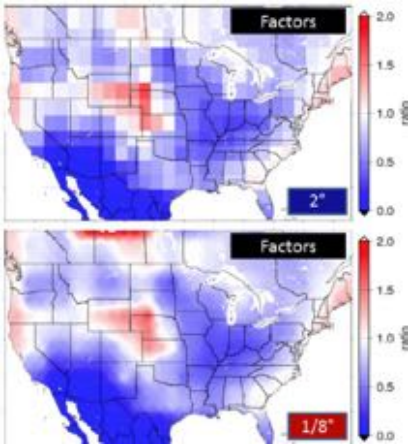
IPCC/WCRP CMIP3
Daily climate projections for 2020-2074 from 9 GCM models at a coarse (2-5°) scale.

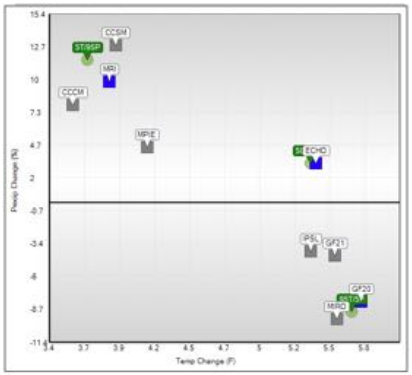
BOR/LLNL
Downscaled projections of monthly averages to ½ degree grid cells.

EPA-CREAT
Select Warm/ Wet, Median, & Hot/Dry out-comes for each cell.

SWC & SWMM-CAT
Mapping of monthly CREAT scenarios (including PET and extreme events) to 7,000 NWS stations.



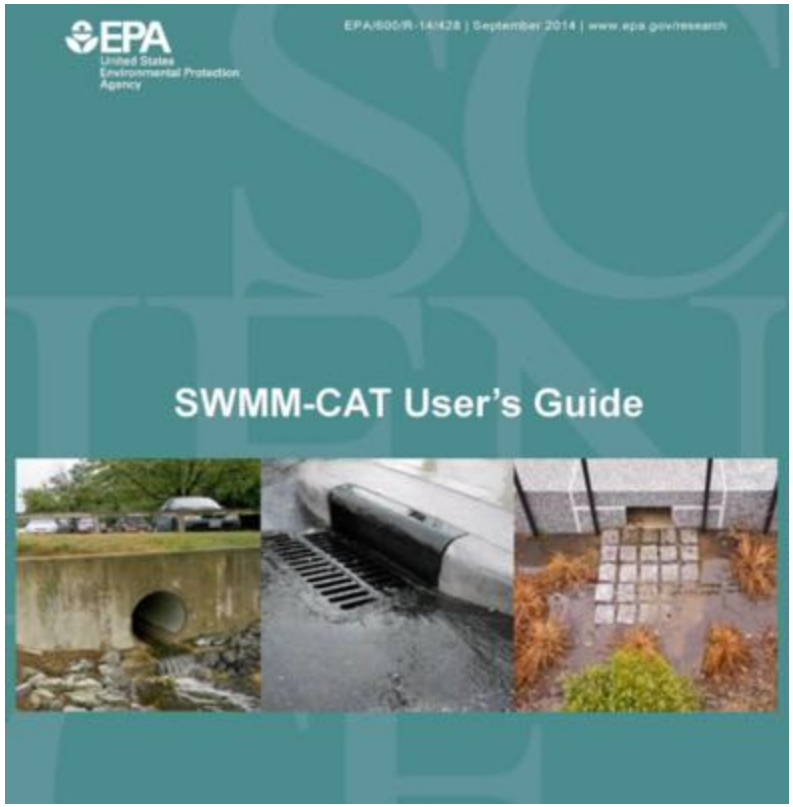




IPCC – International Program for Climate Change; WCRP – World Climate Research Program;
CMIP3 – 3rd Coupled Model Intercomparison Project;
BOR – Bureau of Reclamation; LLNL – Lawrence Livermore National Laboratory

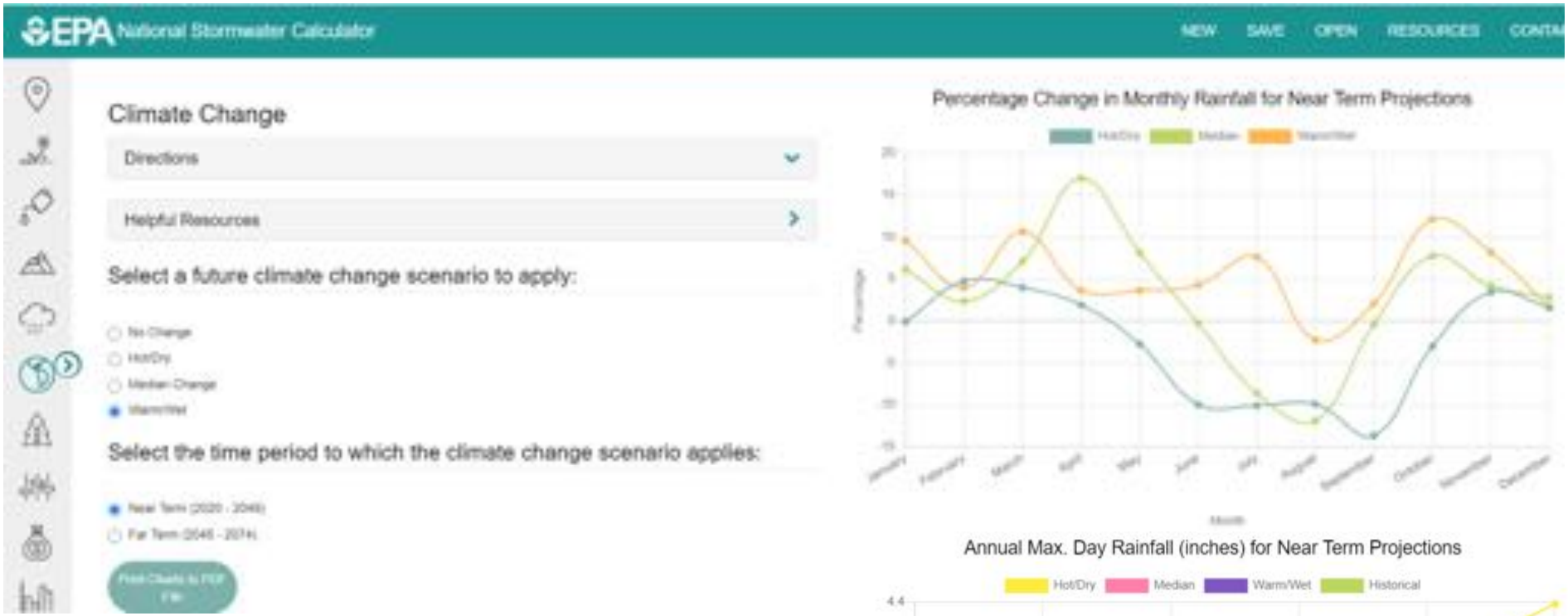
SWMM Climate Adjustment Tool (CAT):
Climate Change Scenarios & Extreme Storm Events

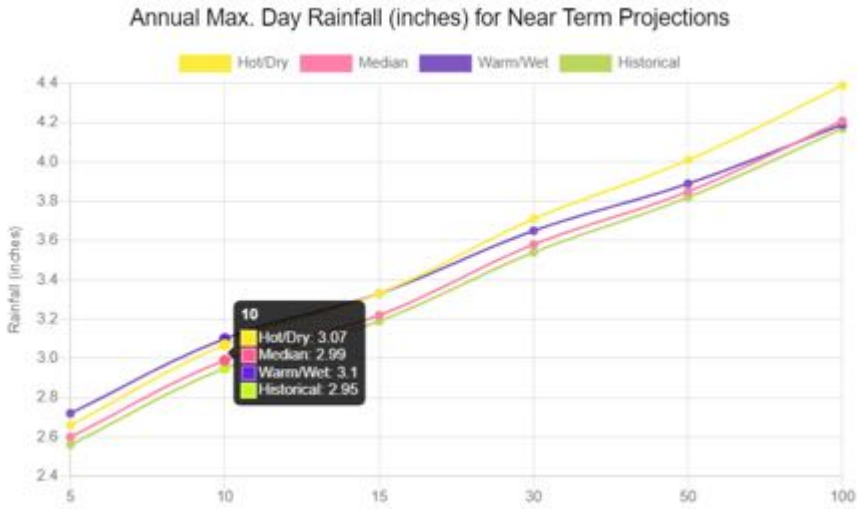
- Provides an add-in tool to SWMM and the SWC to identify seasonal changes in precipitation and temperature, as well as changes in extreme design events, at a localized level.
- Uses EPA-CREAT's localized seasonal adjustment factors derived from GCM runs that can be applied to historical meteorological records.
- Allows the user to apply their own climate adjustments if they so choose.



https://www.epa.gov/water-research/storm-water-management-model-swmm

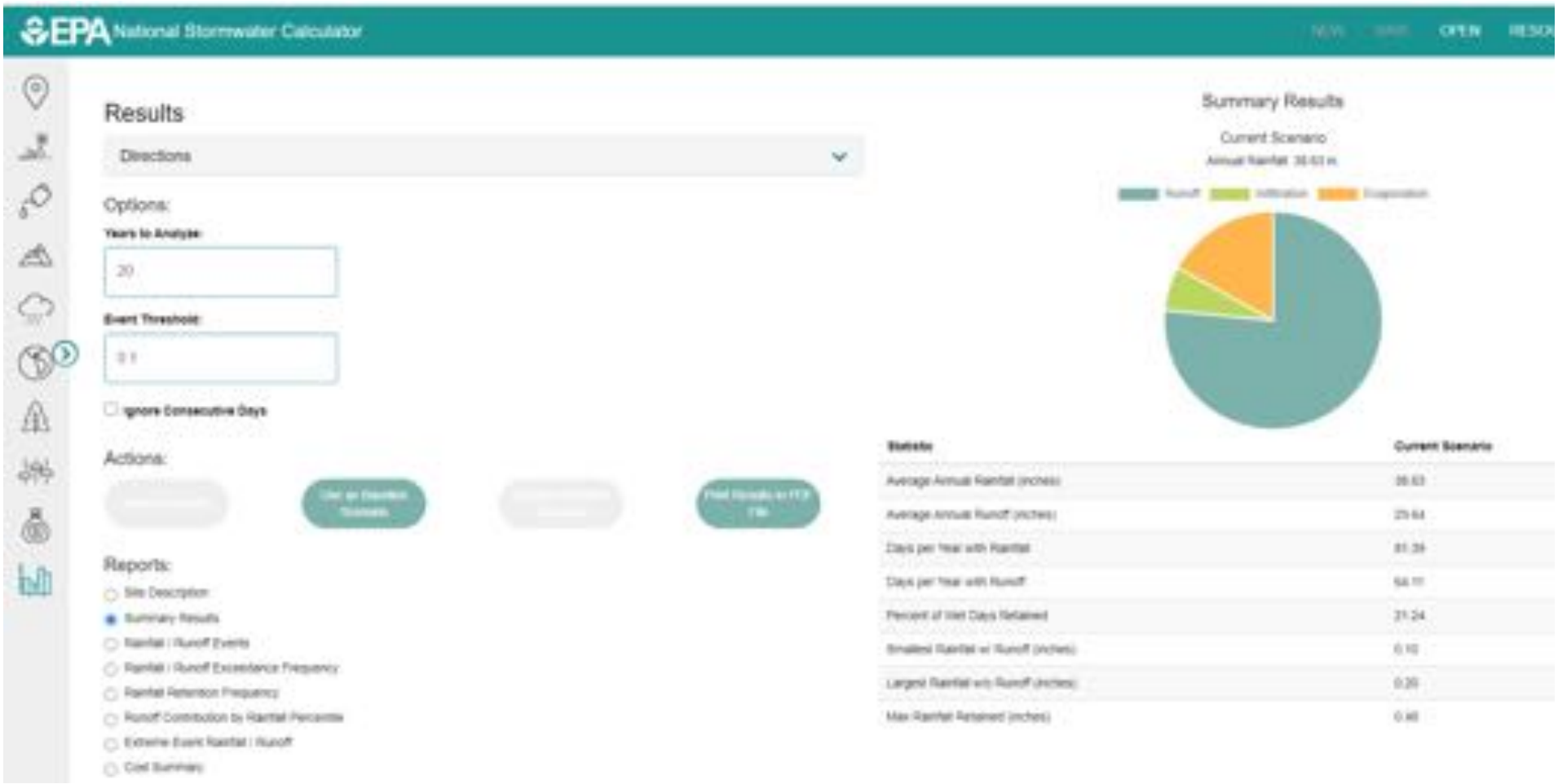
SWC Analysis:
Climate Change Scenarios & Extreme Storm Events





- CREAT 2.0 regional grid results encompass each of the SWC's rain gage and weather station locations.

SWC Analysis:
Baseline Results



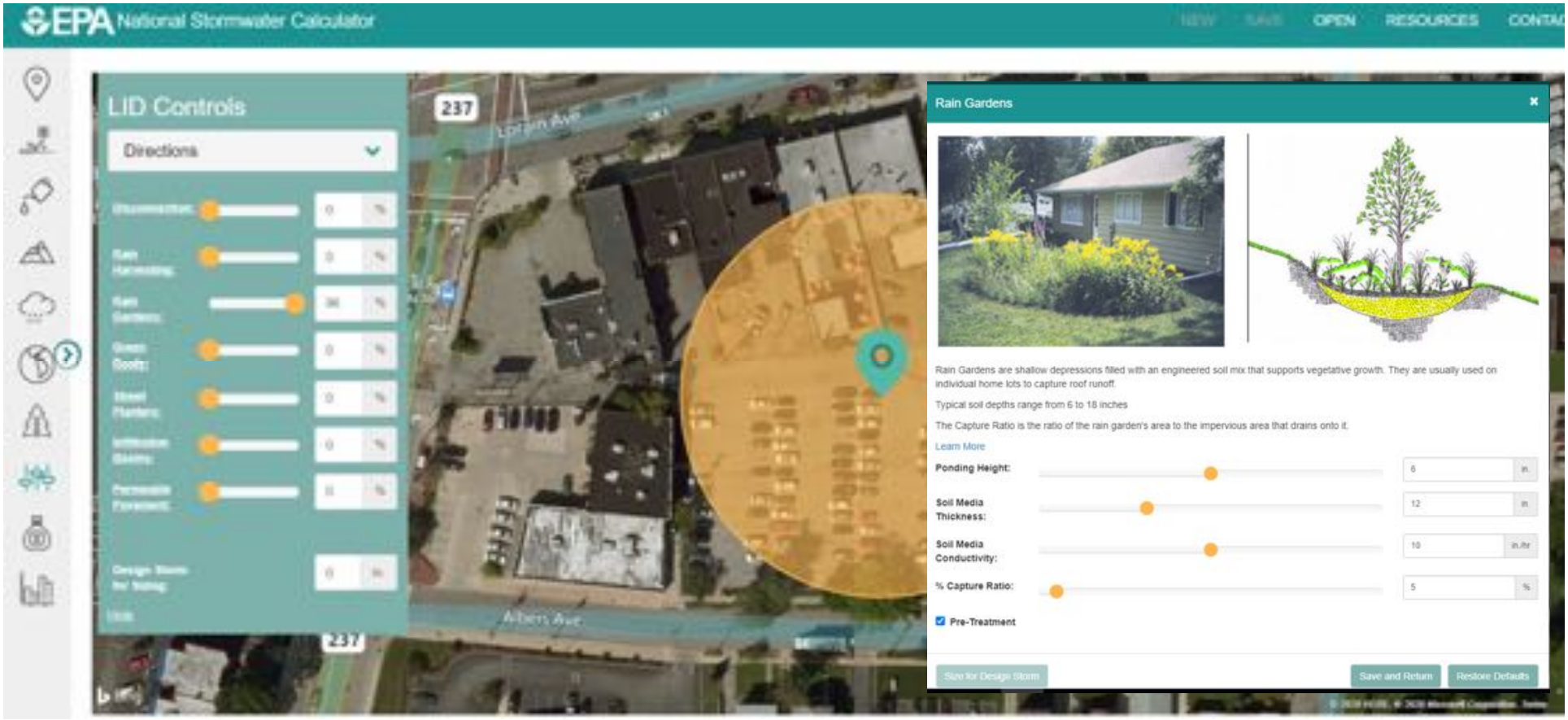
LID Controls:

Fact Sheet

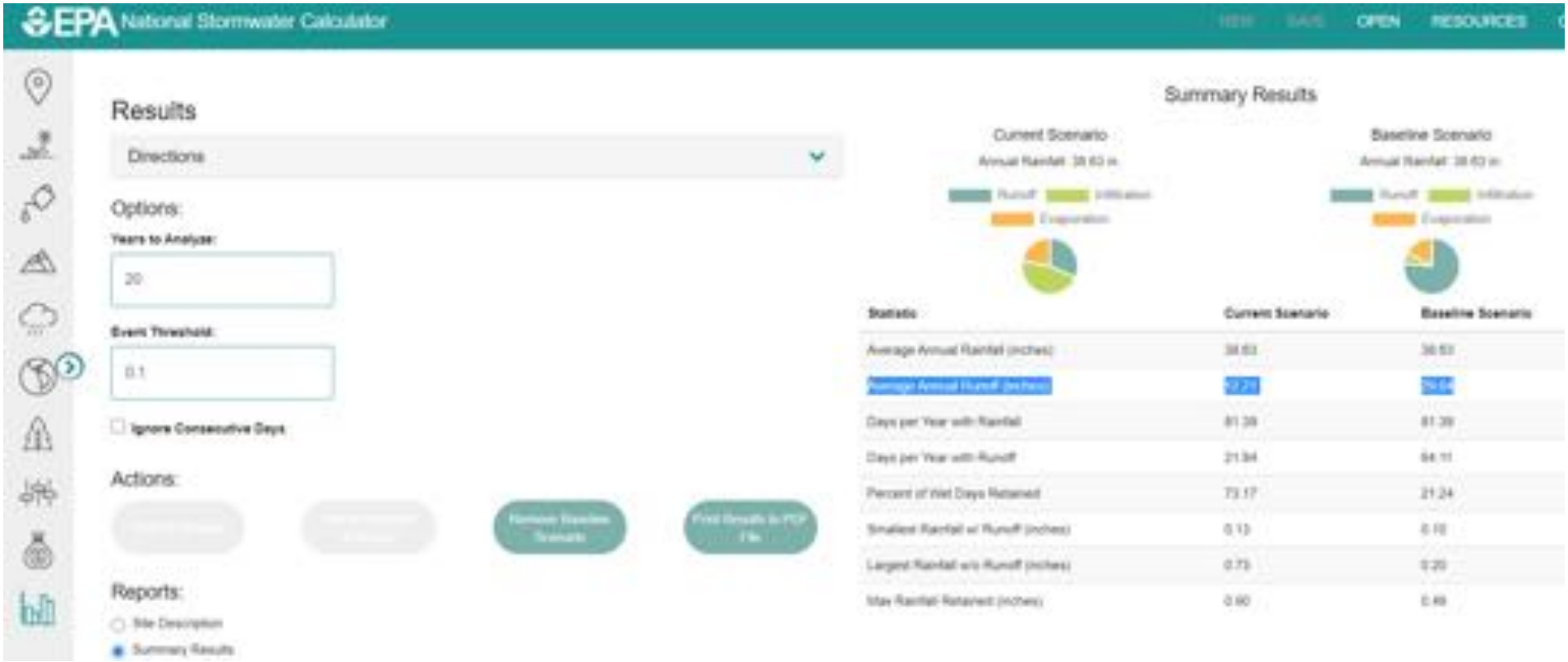
Kamm's Corners Public Parking Lot Retrofit Project (NEORSD)

https://gis2.neorsd.org/storymap/SW_GIG_GRANTS/GIG_2014CURRENT/2018kamms.png

SWC Analysis:
LID: Redevelopment Project

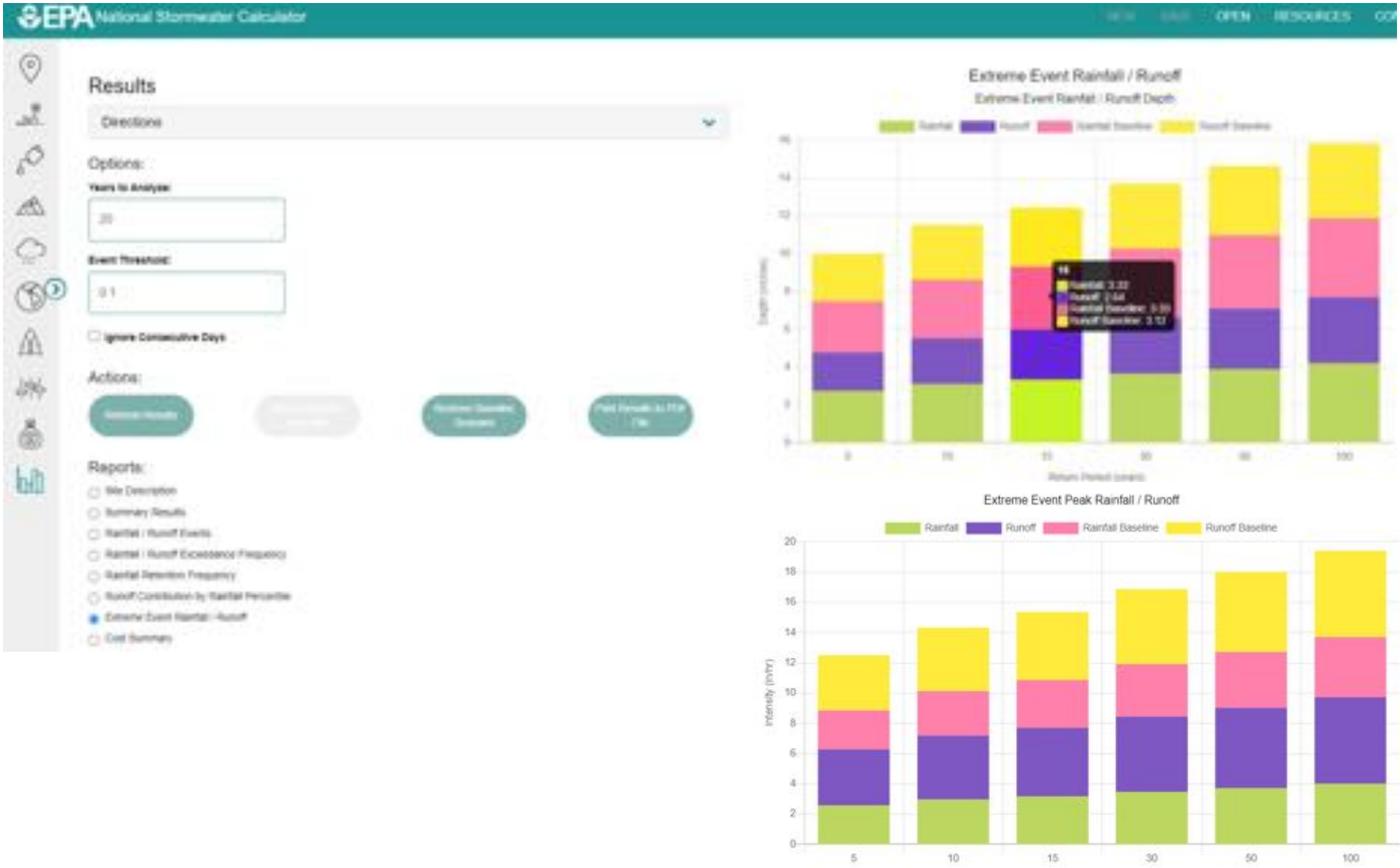


SWC Analysis:
Runoff Reduction Results



Estimated runoff reduction of 17.43 inches/year ~ 690,457 gal./year

SWC Analysis:
Runoff Results: Extreme Storm Events



Discussion and Questions

Thank You!

National Stormwater Calculator Website:

https://www.epa.gov/water-research/national-stormwater-calculator

Contact: SWC@epa.gov

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