



Unstacking Ecological Services– M2

Part 2

Nykamp, Shaw, Milius, Alosimi, Killen

Calculator Review

Green roofs help to reduce the amount of runoff from rooftops by holding stormwater in the plantings and growing media. The calculator shows how much water can be saved by a green roof and to calculate the reduced energy use.

Green Roof

Property Type

Commercial

Size (sq. ft.):

600

Calculate

➔

Energy Use (equiv. kWh/year)	9.3
CO2 reduction (kg/year)	13.3
# Days Car Removed from Roadway	1
Median Runoff Reduction (%/year)	60%
Recharge obtained / year (k-gal)	7.7
TSS Removed (lbs/year)	6.5
Total Capital Costs	\$19,080.00
Total Cost/gallon	\$0.10
Maintenance Costs / year	\$246.00

Porous pavement helps to reduce stormwater runoff by allowing the water to infiltrate into its open pore space. The calculator tool below can help you determine how much water porous pavement can hold and how much pollution it prevents from entering into area waterways.

Paths/Porous Pavement

Property Type

Commercial

Size (sq. ft.):

20,000

Calculate



Energy Use (equiv. kWh/year)	387.1
CO2 reduction (kg/year)	554.4
# Days Car Removed from Roadway	34
Median Runoff Reduction (%/year)	75%
Recharge obtained / year (k-gal)	322.6
TSS Removed (lbs/year)	338.7
Total Capital Costs	\$100,000.00
Total Cost/gallon	\$0.02
Maintenance Costs / year	\$4,600.00

[scroll over for details](#)

Rainwater harvesting includes rain barrels and cisterns. Rain barrels are water collection units that you can put on the outside of your home or garage that collect stormwater from your gutter system. Cisterns are similar to rain barrels in that they can collect water from the gutters on your roof and can also hold grey water from inside and outside of your home (shower water, laundry water, but not toilet water). Use the calculator tool below to help you determine the benefits of installing a rainwater harvesting system.

Cistern and Rain Barrels

Property Type

Commercial

Size (gallons)

2000

Calculate



Energy Use (equiv. kWh/year)	51.6
CO2 reduction (kg/year)	73.9
# Days Car Removed from Roadway	5
Median Runoff Reduction (%/year)	40%
Recharge obtained / year (k-gal)	43.0
TSS Removed (lbs/year)	24.1
Total Capital Costs	\$5,080.00
Total Cost/gallon	\$0.01
Maintenance Costs / year	\$20.00

Green Values Stormwater Management Calculator

Green Interventions:

- ☒ i Roof Drains to Raingardens at All Downspouts:
- ☒ i Half of Lawn Replaced by Garden with Native Landscaping:
- ☒ i Porous Pavement used on Driveway, Sidewalk and other non-street pavement:
- ☐ i Green Roofs:
- ☒ i Provide Tree Cover for an Additional 25% of Lot
- ☒ i Use Drainage Swales instead of Stormwater Pipes:

Site Statistics:

☒ i Select a scenario:

Custom

☒ i Is this an existing site:
(If clicked no construction costs included)

☒ i Total size of site:

1.35

acres

☒ i Number of lots:

1

☒ i Average Roof Size, including Garage:

8412

ft.²

☒ i Average Number of Trees on Lot:

137

☒ i Average Driveway Area:

10000

ft.²

☒ i Average Impermeable patio, deck, alley or parking lot:

21150

ft.²

☒ i Sidewalk Width:

5

ft.

☒ i Average Street Width:

32

ft.

☒ i Soil Type:

C

☒ i Average Slope:

3%

☒ i Real Discount Rate:

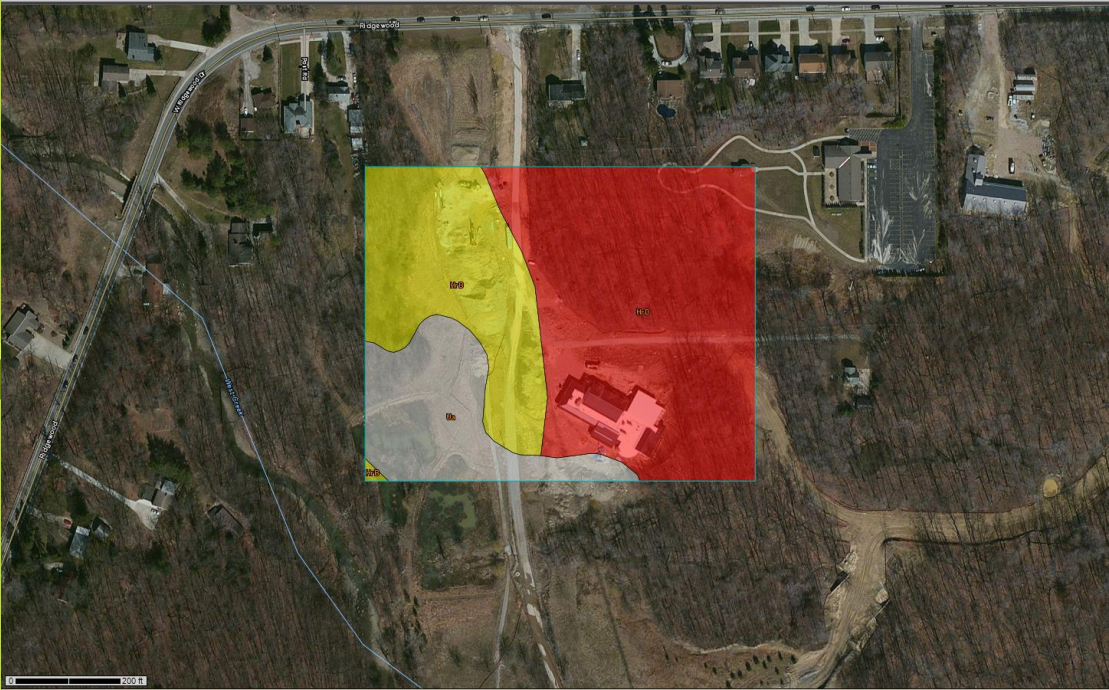
3.1

%

☒ i Life Cycle in Years:

100

Input



NG	TYPE	A77	A78	A79	A80	A81	A82	A83	A84	A85	A86	A87	A88
DWN	Shade							3		1		3	
DWN	Shade						3	6					
DWN	Shade							3					
C	Ornamental										7		
DWN	Ornamental								3	2			
DWN	Ornamental						4		2		4	1	7
DWN	Shade									2		4	
DWN	Shade		1	1									
DWN	Ornamental						4		5	24	5		
DWN	Ornamental						1						
DWN	Ornamental							9					
DWN	Ornamental										2	2	
DWN	Shade						2		2				
DWN	Shade							3	3				
DWN	Shade		1					1					
DWN	Shade						3	3	2				2
DWN	Ornamental						1			2		2	1
DWN	Evergreen				9								
DWN	Evergreen				9								
DWN	Evergreen							4					5
DWN	Shade							3					
DWN	Shade					3		6					3
DWN	Shade	1		1			3	4					2
DWN	Shade					2							2
DWN	Shade											2	
DWN	Evergreen							7	3				14
DWN	Shade									2			

Tables — Drainage (OH) — Summary By Map Unit

Summary by Map Unit — Cuyahoga County, Ohio (OH035)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
HrB	Hornell silt loam, 2 to 6 percent slopes	Somewhat limited	Hornell (85%)	Restricted permeability (0.94)	2.7	26.4%
				Depth to bedrock (0.11)		
				Slope (0.04)		
HrD	Hornell silt loam, 12 to 18 percent slopes	Very limited	Hornell (85%)	Slope (1.00)	5.8	56.1%
				Restricted permeability (0.94)		
				Depth to bedrock (0.11)		
Ua	Udorthents, loamy	Not rated	Udorthents (100%)		1.8	17.5%
Totals for Area of Interest					10.4	100.0%

Results

RESULTS

The difference between the conventional system and the green intervention(s) you chose **increases** the total 100 year life cycle costs and/or **decreases** benefits by a total of **\$212,166**. This strategy reduces peak discharge by **39%**.

[Permanent link for this configuration](#)

Hydrologic

Financial

Financial Detail

Scenario Detail

Hydrologic Results

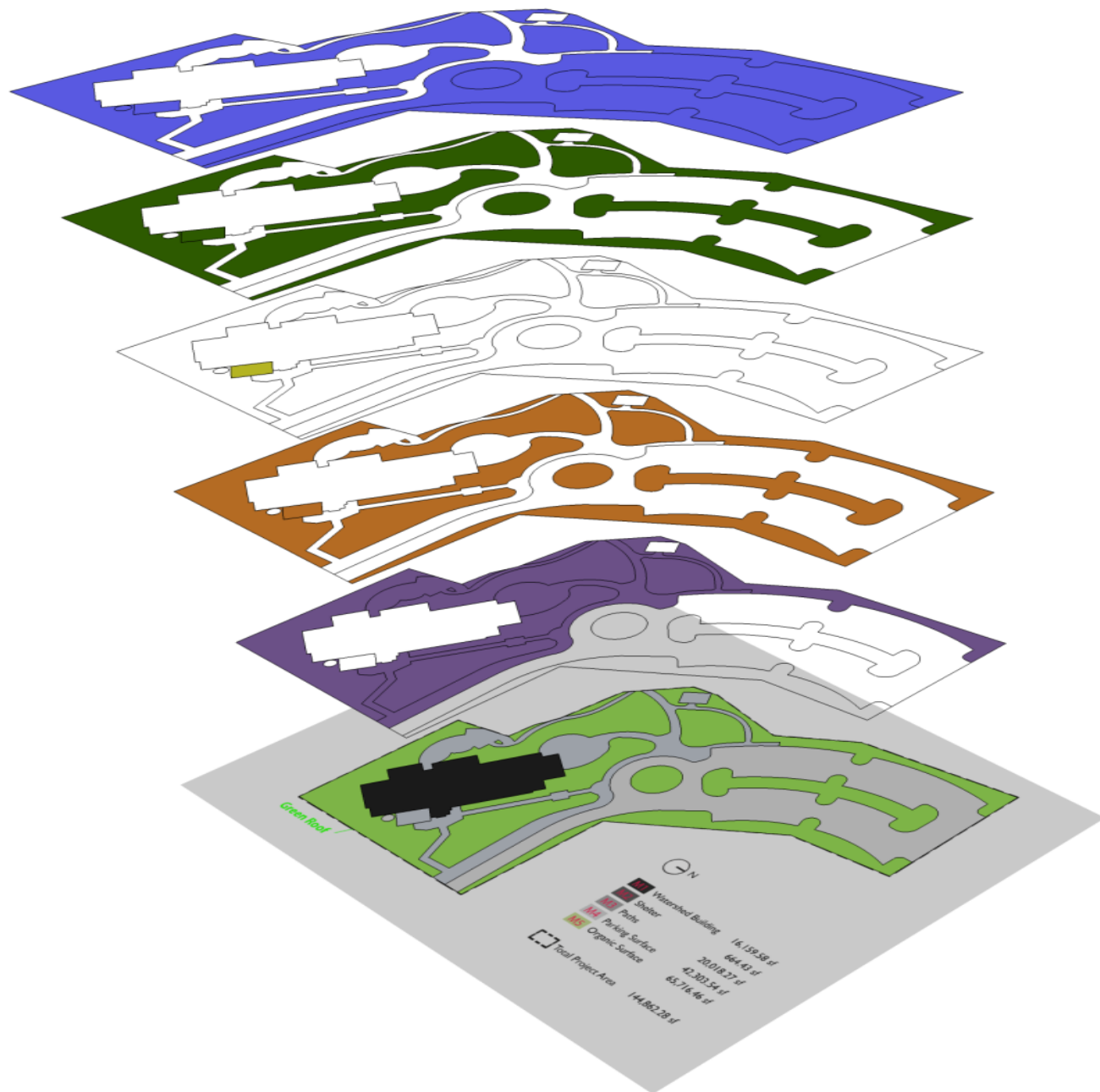
Lot Level Improvements:	Conventional	Green	Reduction
Lot Discharge (cf)	3,770	506	86.6%
Lot Peak Discharge (cfs)	0.93	0.12	87.5%
Total Site Improvements:	Conventional	Green	Reduction
Total Peak Discharge (cfs)	1.49	0.90	39.3%
<i>i</i> Detention Size Improvements:	Conventional	Green	Reduction
Total Detention Required (ft³)	3,636	1,674	54%
Annual Discharge Improvements:	Conventional:	Green:	Average Annual Ground Water Recharge Increase:
Average Annual Discharge (acre ft)	1.13	0.69	0.28

<http://greenvalues.cnt.org/calculator/calculator.php>

VRS Calculator- Green Roof Only



- Rainfall Capture- 825.75 ft³/yr
- Biodiversity – Species Richness of 38
- Ambient Urban Air Temperature- Production Estimate 19 sqft.
- Honey Production- 2 lbs/yr



Water

Biodiversity

Energy

Nutrients

Human Health

