Proposed Improvements for Increased Removal of Phosphorous and Suspended Solids from the Urban Ecology Center Subwatershed

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Why improve urban stormwater runoff quality?

Stormwater that contains large amounts of total phosphorous causes downstream water bodies to become overgrown with algae which leads to an ecological imbalance within the lake or stream.

Total suspended solids contain many pollutants that are harmful to both water bodies, and the animals that live within their system. These pollutants include metals, silt, sand, and bacteria, among others.

How can improvements be made?

Implementation of new best management practices (BMPs) for reducing the load of total phosphorous and total suspended solids in storm water runoff was analyzed using P8 software. These options are pictured to the right.

What is the best option?

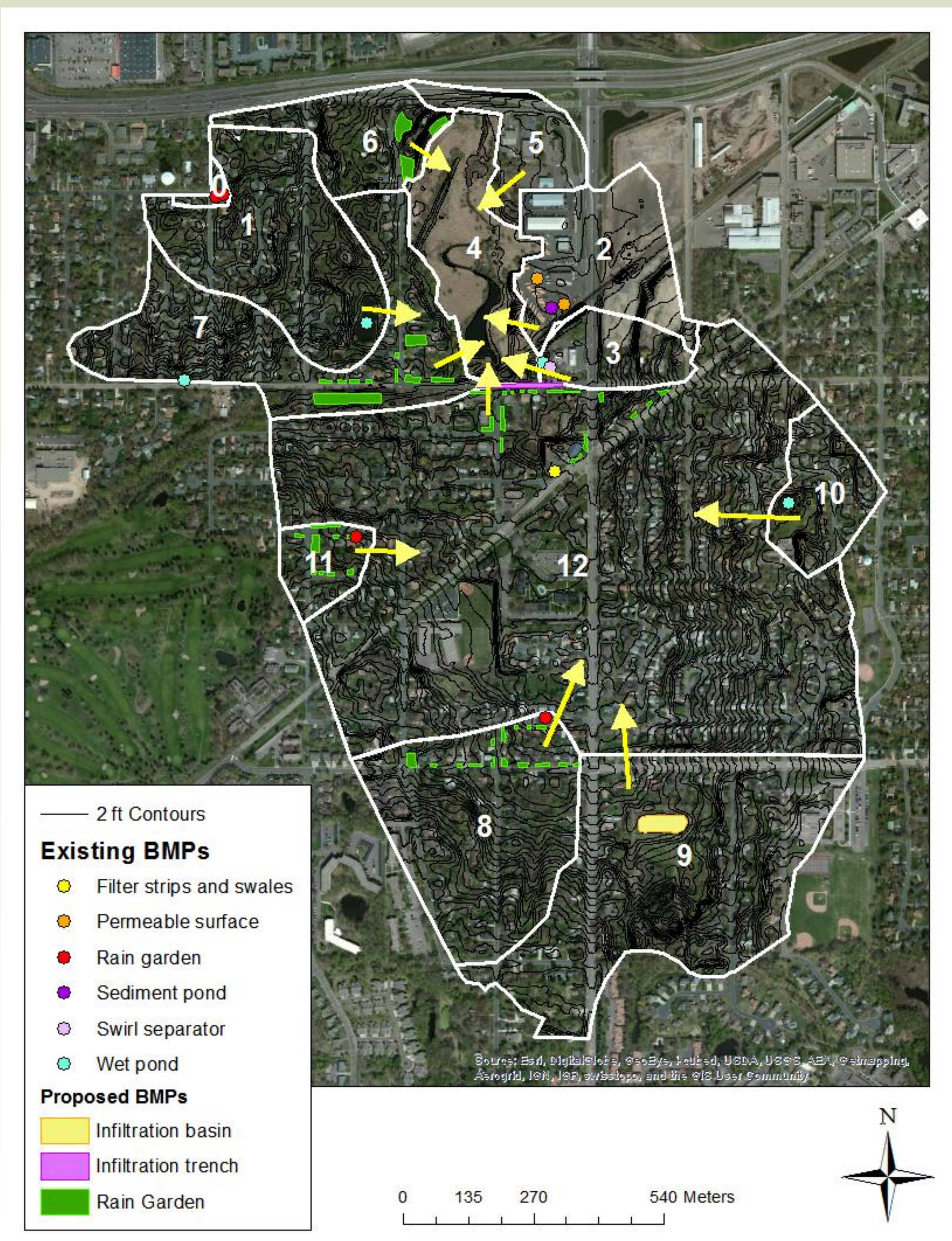
The best option is implementing additional rain gardens within the drainage area. The rain gardens were found to be the most economical option for removing suspended solids and total phosphorous.

Due to the relatively high costs of implementing any of these practices, it is apparent that the current stormwater treatment methods within the Urban Ecology Center's Subwatershed are efficiently removing suspended solids and phosphorous. See a listing of these practices below.

Existing BMPs

Sub-drainage Area Number	Start Year	Type
10	1987	Wet pond
1	1990	Wet pond
7	1991	Wet pond
3	1998	Wet pond
12	2002	Filter strips and swales
3	1998	Swirl separator
0	2011	Rain garden
0	2011	Rain garden
8	2013	Rain garden
11	2013	Rain garden

Source: Paulos, et. al., Resilient Communities Project, 2014



Source: Paulos, et. al., Resilient Communities Project, 2014

Sub-drainage areas and routing used for P8 analysis

Options for Improving Stormwater Quality

Source: rwmwd.org

Rain Garden: captures runoff and facilitates slow infiltration

Source: rwmwd.org

Sump: captures pollutants before they reach water bodies

Source: tymco.com

Street Sweeping: captures pollutants before they reach the storm sewer

Source: rotondo-es.com

Infiltration Vault: stores stormwater to facilitate slow infiltration

Results of the Additional Potential BMPs

Sub-drainage Number	BMP Practice	Construction cost of new BMP	Annual O&M	*Cost efficiency [$/ per pound of TP removed]	*Cost efficiency [$/ per pound of TSS removed]
6	Rain Gardens	$299,914	$11,742	3261	12.88
7	Rain Gardens	$402,134	$20,107	2185	6.69
8	Rain Gardens	$229,616	$11,481	1913	6.97
9	Rain Gardens	$457,534	$22,877	1922	6.87
11	Rain Gardens	$190,163	$9,508	7923	30.29
12	Rain Gardens	$370,564	$18,528	599	2.72
9	Infiltration Basin	$556,521	$27,826	4382	8.00
12	Infiltration Vault	$1,132,500	N/A	1,721	6.31
3	Stormceptor 450	$9898	$400	3661	1.43

* Based upon a 20 Year Life Span
Cost efficieny does not include annual O&M

Source: Paulos, et. al., Resilient Communities Project, 2014

Completed for the City of North St. Paul
- April 2014 -
Thanks to Mike Greco, John Gulliver, Morgan Dawley and RWMWD Staff

University of Minnesota

This project was completed as part of John Gulliver's - CE5511 class: Urban Hydrology and Land Development, a course at the University of Minnesota, with support from the Resilient Communities Project (RCP). RCP is an initiative of the Sustainability Faculty Network at the University of Minnesota, with funding and administrative support provided by the Center for Urban and Regional Affairs (CURA) and the Institute on the Environment (IonE). To learn more, visit rcp.umn.edu.

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For access to the supporting report, please contact mill5144@umn.edu