



***CRWC Green Infrastructure Support
Rochester Hills Final Presentation
November 9, 2015***

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Clinton River Watershed Council

Our Mission:

The mission of the Clinton River Watershed Council is to protect, enhance, and celebrate the Clinton River, its watershed, and Lake St. Clair.

Our Vision:

Individual and community actions protect and improve the health of the Clinton River, assuring that its natural, economic, and recreational value enhances the quality of life of those who live, work, and play in the Clinton River watershed and Lake St. Clair.





Waterlowns

Connecting people and waterways in the Clinton River and Lake St. Clair



Project Introduction

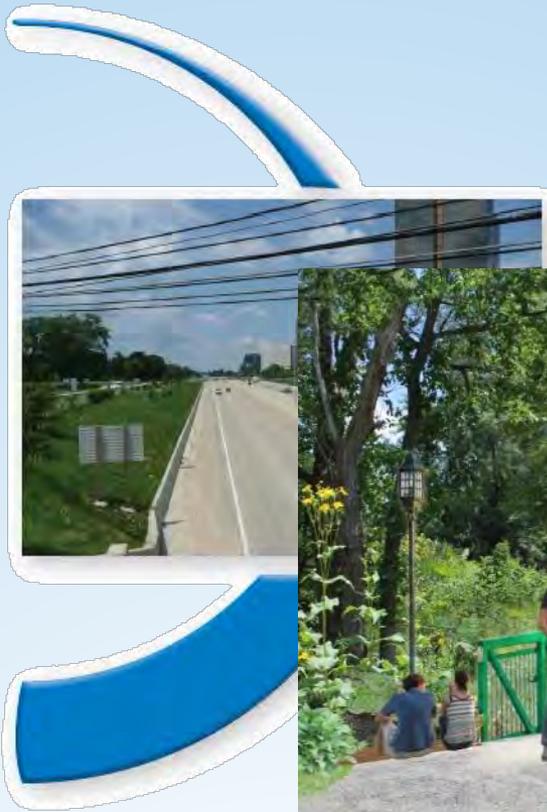
- Goals:
 - Conceptual site plans showing suggested green infrastructure improvements
 - Artistic renderings of suggested green infrastructure improvements
 - Stormwater volume reduction estimates
 - Generalized cost estimates
- 2015 Conceptual Green Infrastructure Plans:
 - Rochester Hills
 - Sterling Heights
 - Utica

What is Green Infrastructure?



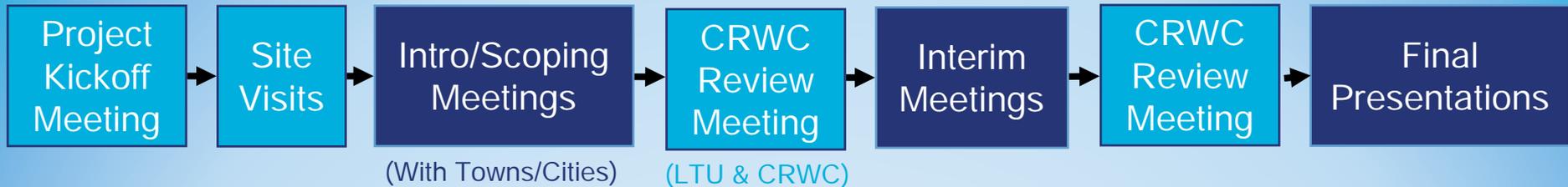
Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments. Green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems that mimic nature by soaking up and storing water. - United States Environmental Protection Agency

Why Green Infrastructure?



Project Timeline and Deliverables

- May – November 2015



- Deliverables:

- Report – Final Site Plan, Stormwater Calculations, and Cost Estimates
- Printed Graphic Boards
- PowerPoint Presentation
- Digital Copies

- Cost Estimation

- WERF – BMP and LID Whole Life Cost Models Tool
- RS Means, MI LID Manual, Published Literature, and Local
- Primary Contract Labor (not insourced or volunteer)

Runoff Reductions

Existing Runoff
from 2.26" of Rain

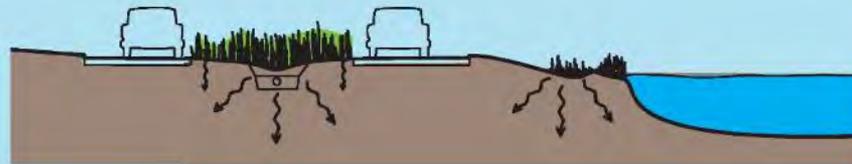


Proposed Runoff Reduction

Stormwater runoff reductions were calculated for a 2-year 24-hour storm event (2.26" of Rain).

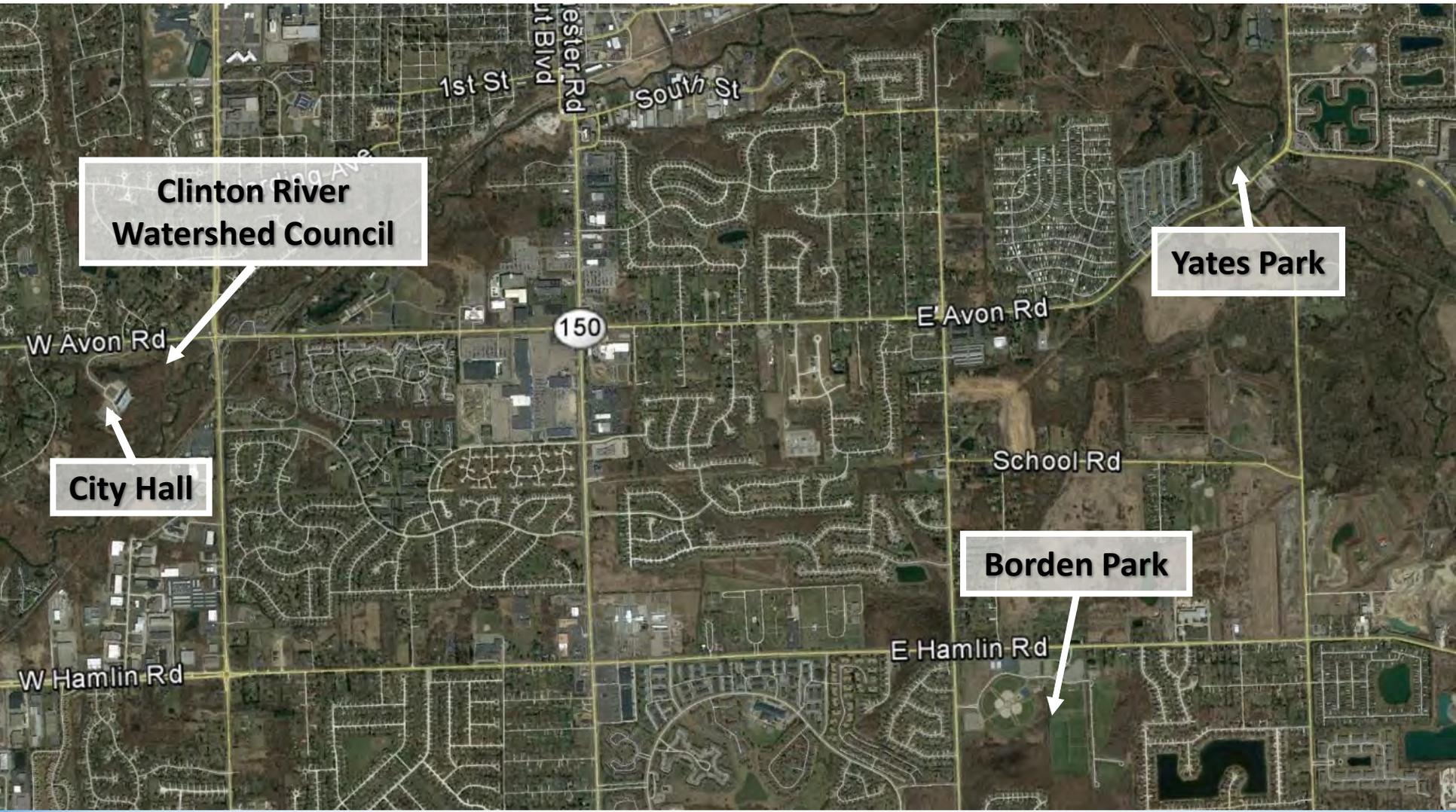


Swale Conveyance



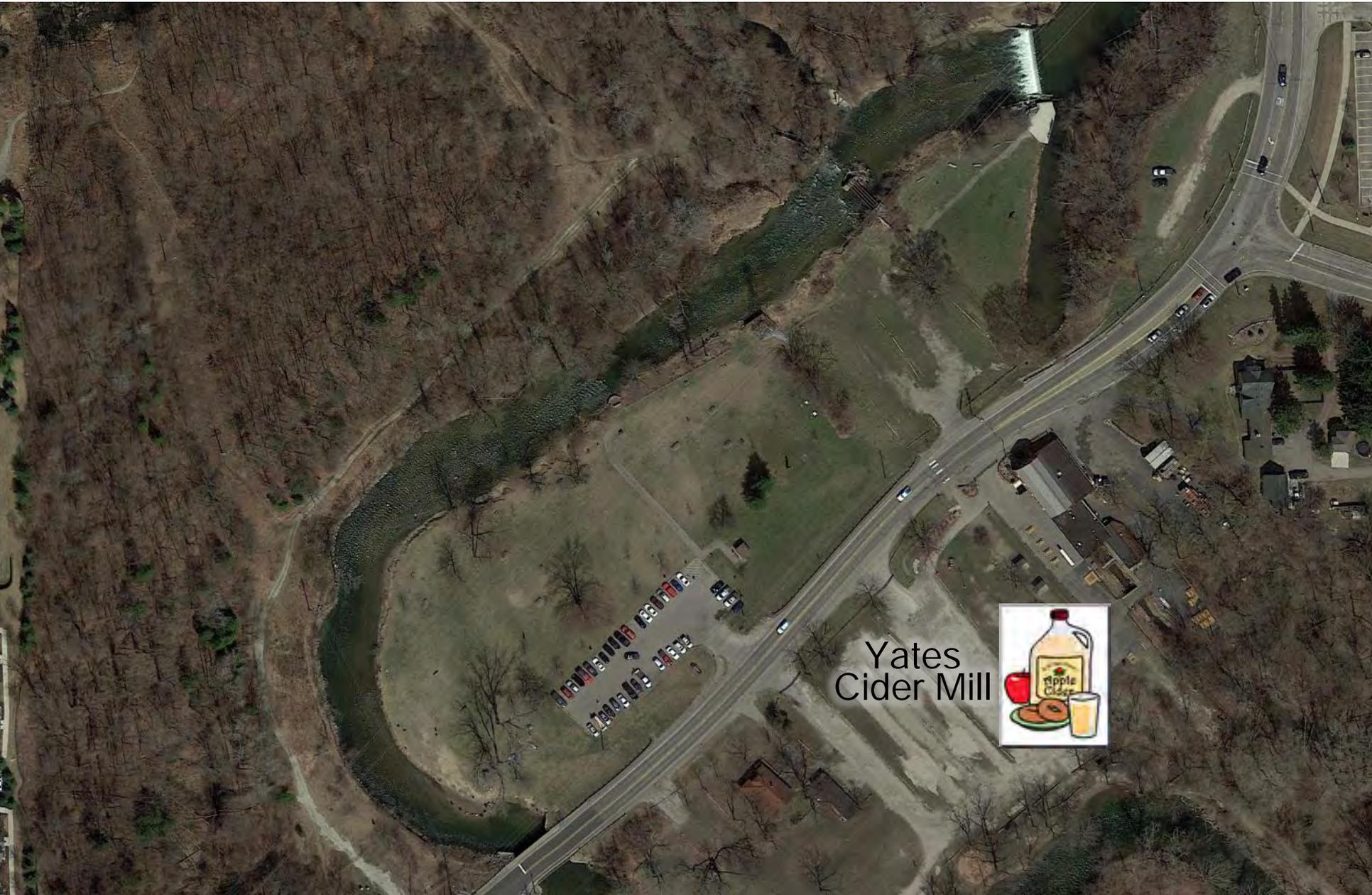
Naturalized Shore

Rochester Hills Sites





Yates Park

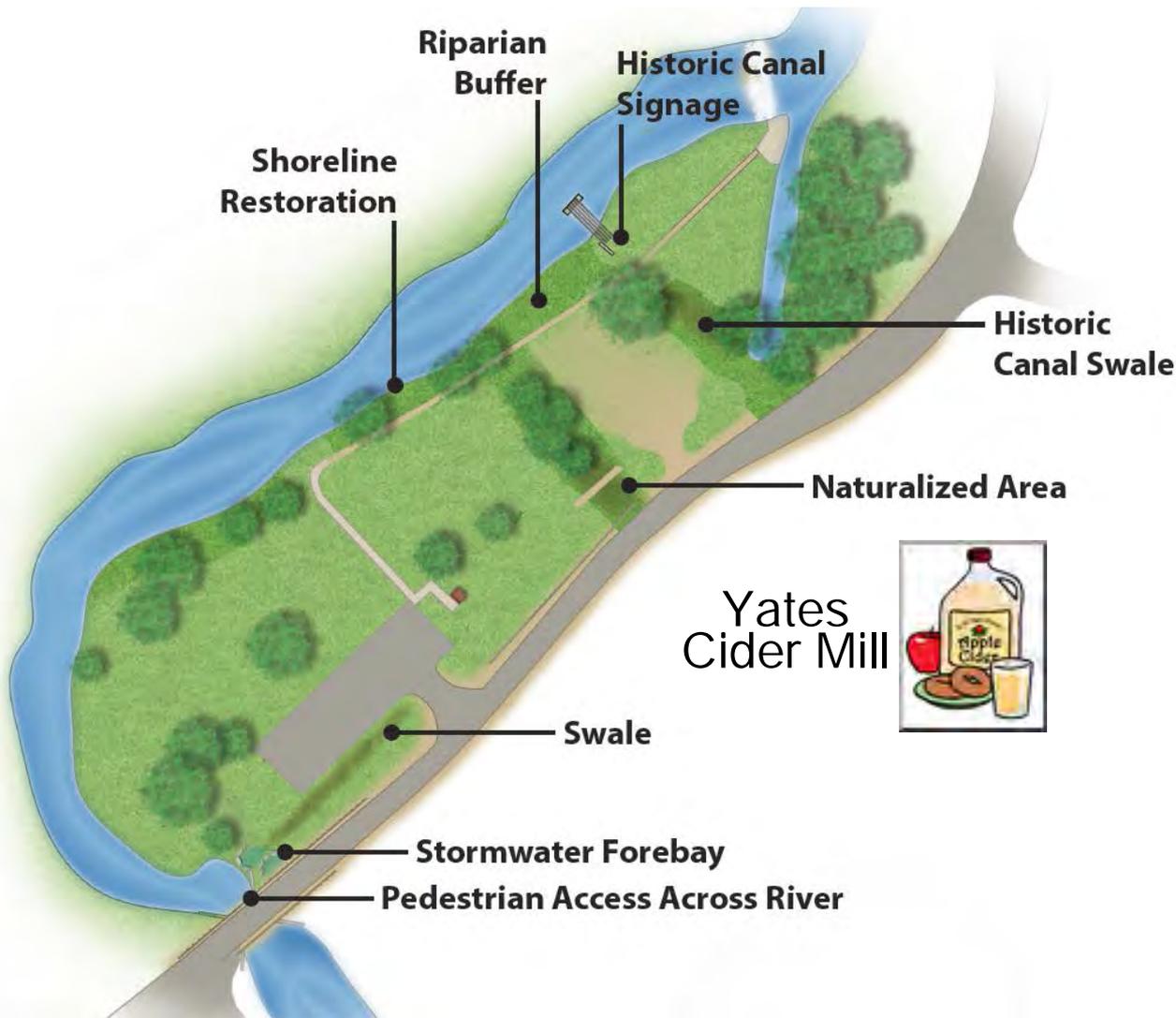


Yates
Cider Mill





Yates Park



Yates Park - Existing





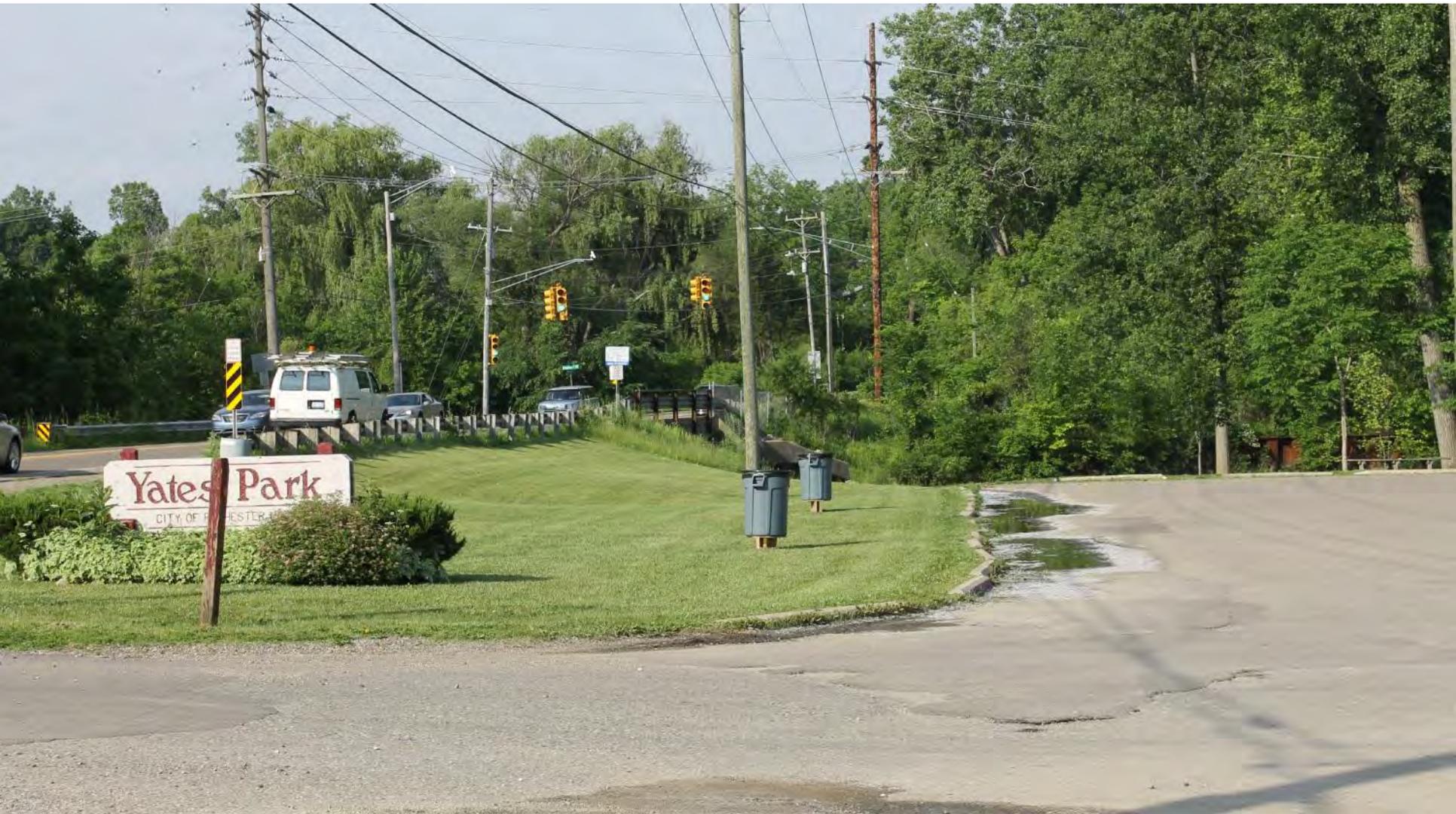
Yates Park



Pedestrian
Space on Bridge

Stormwater Forebay
\$3,200

Yates Park - Existing



Yates Park



Pedestrian
Space on Bridge

100%
Reduction

BioSwale
\$3,200

Yates Park – Historic Canal

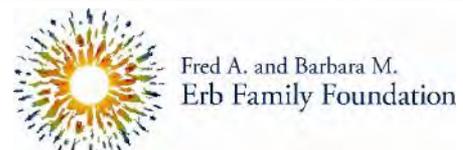
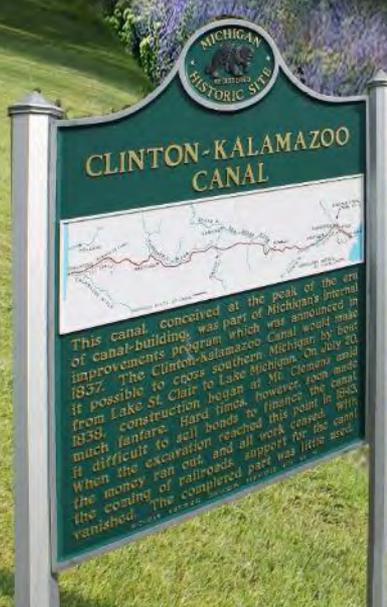


Yates Park – Historic Canal



100%
Reduction

Swale
\$1,500



Yates Park - Existing





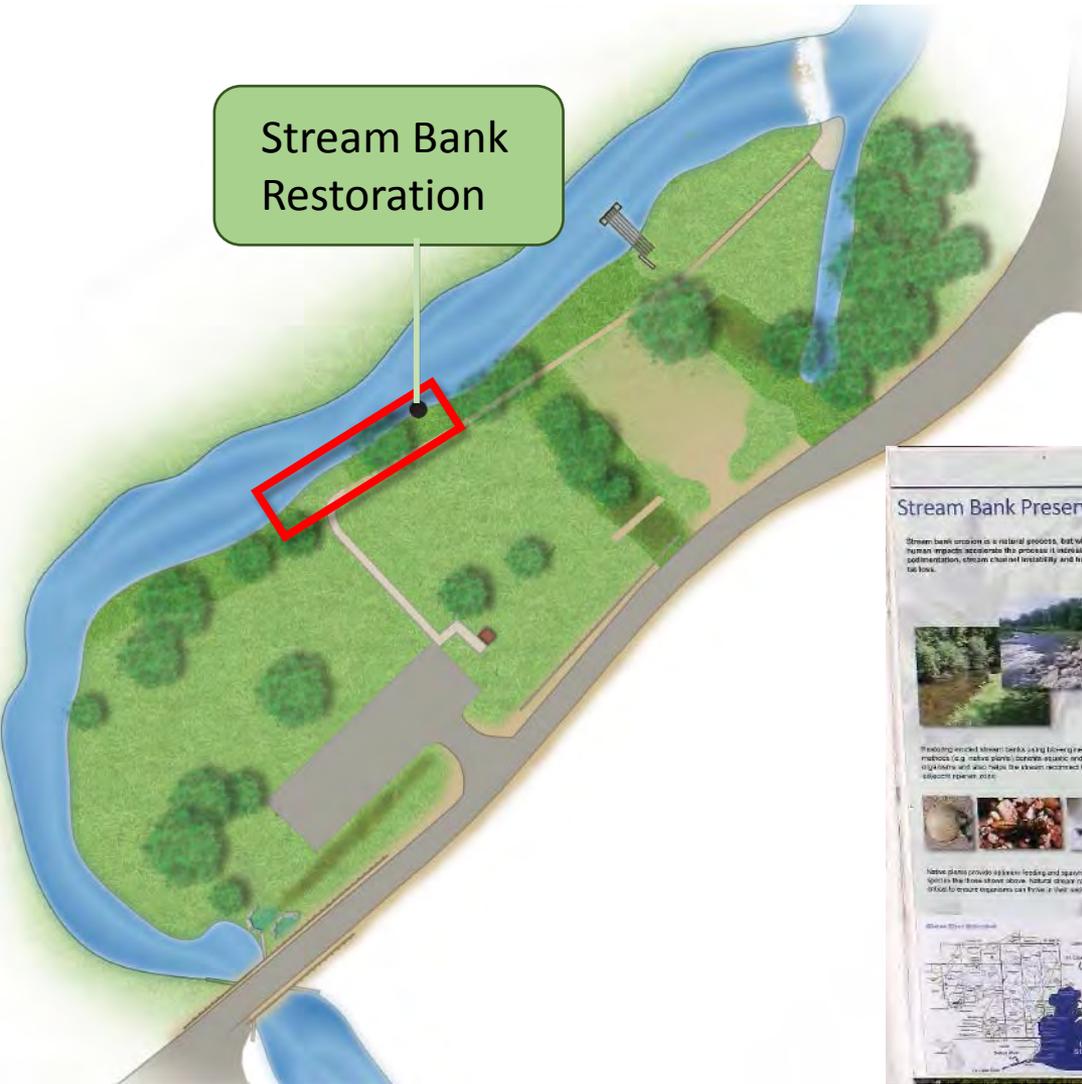
Yates Park

12%
Reduction

Riparian Buffer/
Native Plants
\$4,400



Yates – Stream Bank Restoration



Yates Park Stream Bank Restoration

Stream Bank Preservation

Stream bank erosion is a natural process, but when human impacts accelerate the process it increases sedimentation, stream channel instability, and habitat loss.



Reversing eroded stream banks using native planting methods (e.g. native plants) controls erosion and promotes riparian and stream bank vegetation to stabilize stream banks.



Native plants provide wildlife feeding and spawning habitat. Riparian plants also stabilize stream banks and reduce erosion.



Project Goal

To restore the stream bank using native vegetation to help provide stability, prevent erosion, and re-establish habitat.





Riparian Buffers

Riparian vegetation is the plants, shrubs and trees that grow adjacent to a stream or river. The vegetation is extremely important because of the many ecological benefits it provides.



The roots of riparian trees and shrubs help to provide stability and prevent erosion while the above ground portion of the plants provides shade-out food resources for stream and aquatic organisms. Additionally, vegetation hanging over the stream provides shade and helps to keep the water temperature cool and less susceptible to heat stress aquatic animals.



How To Help



Do Native? Native plants have evolved natural defenses which help to deter herbivores and insects. Riparian plants also provide habitat for native species and riparian plants provide food resources for birds and wildlife.



If you park in a park it's out if you see garbage, please don't take it. Riparian plants help to stabilize stream banks and riparian plants provide food resources for birds and wildlife.



Stay on the path! To protect habitat, please stay on the designated foot paths that lead to the river. Soil and sediment that is washed into the water increases turbidity and reduces water quality. Turbidity is a measure of water clarity. The growth of algae, plants and other organisms is reduced by turbidity. If you do become lost, please call 911. If you do become lost, please call 911. If you do become lost, please call 911.

For more information contact:
The Clinton River Watershed Council
1115 W. Avon Road, Rochester Hills, MI 48309
www.cfwc.org



Borden Park



Borden Park



Borden Park - Existing



Borden Park



Rain Garden
\$5,000

100%
Reduction



Borden Park Rain Gardens & Swale



- Four Rain Gardens
 - \$93,000 Total
- Swale
 - \$15,600

Borden Park - Existing



Borden Park Rain Gardens



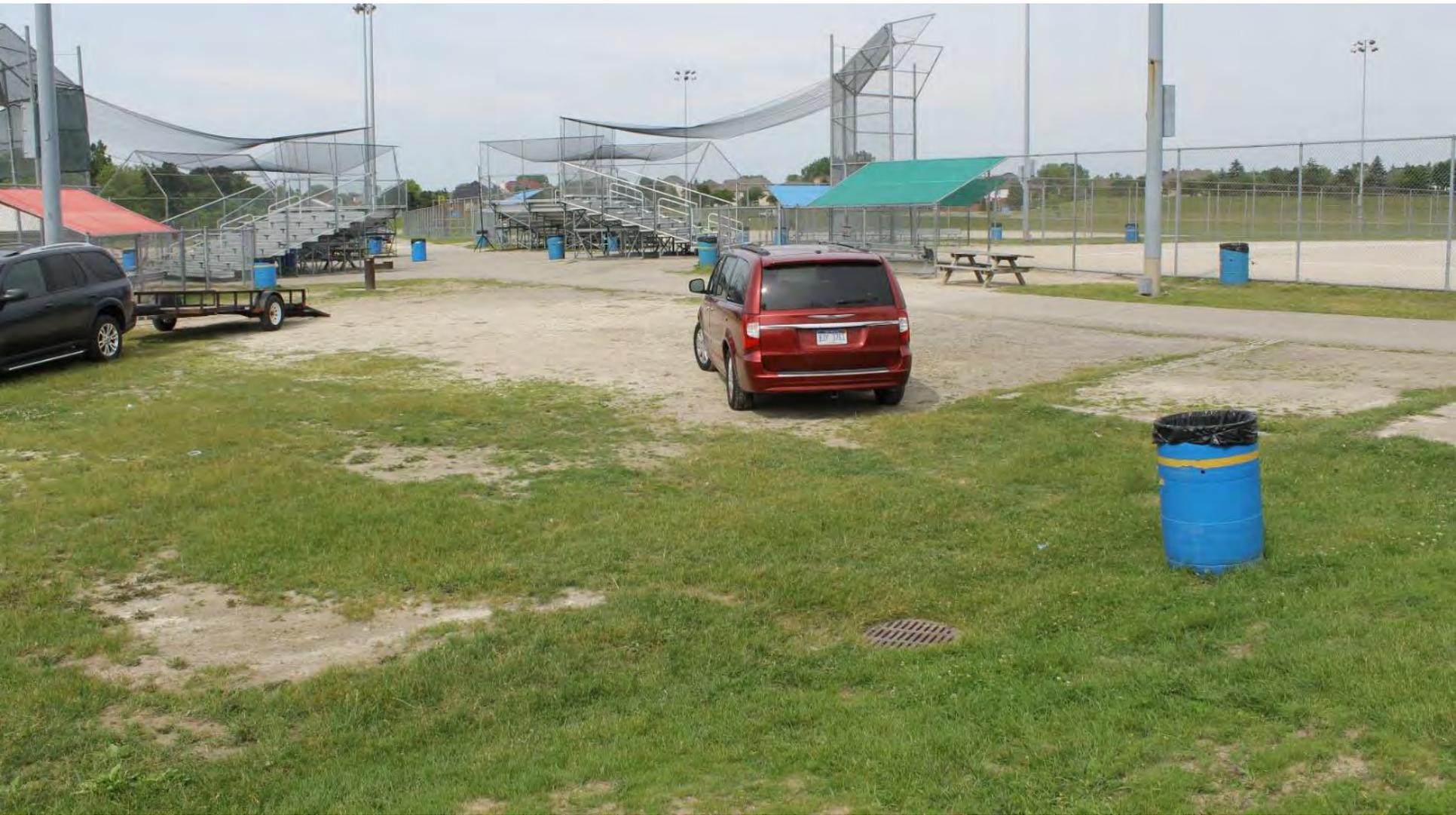
Borden Park - Existing



Borden Park - Swale



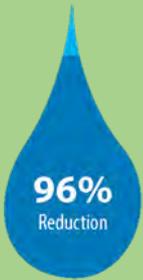
Borden Park - Existing



Borden Park



Permeable Pavers
\$52,000



Bioretention Cell
\$5,700

Borden Park



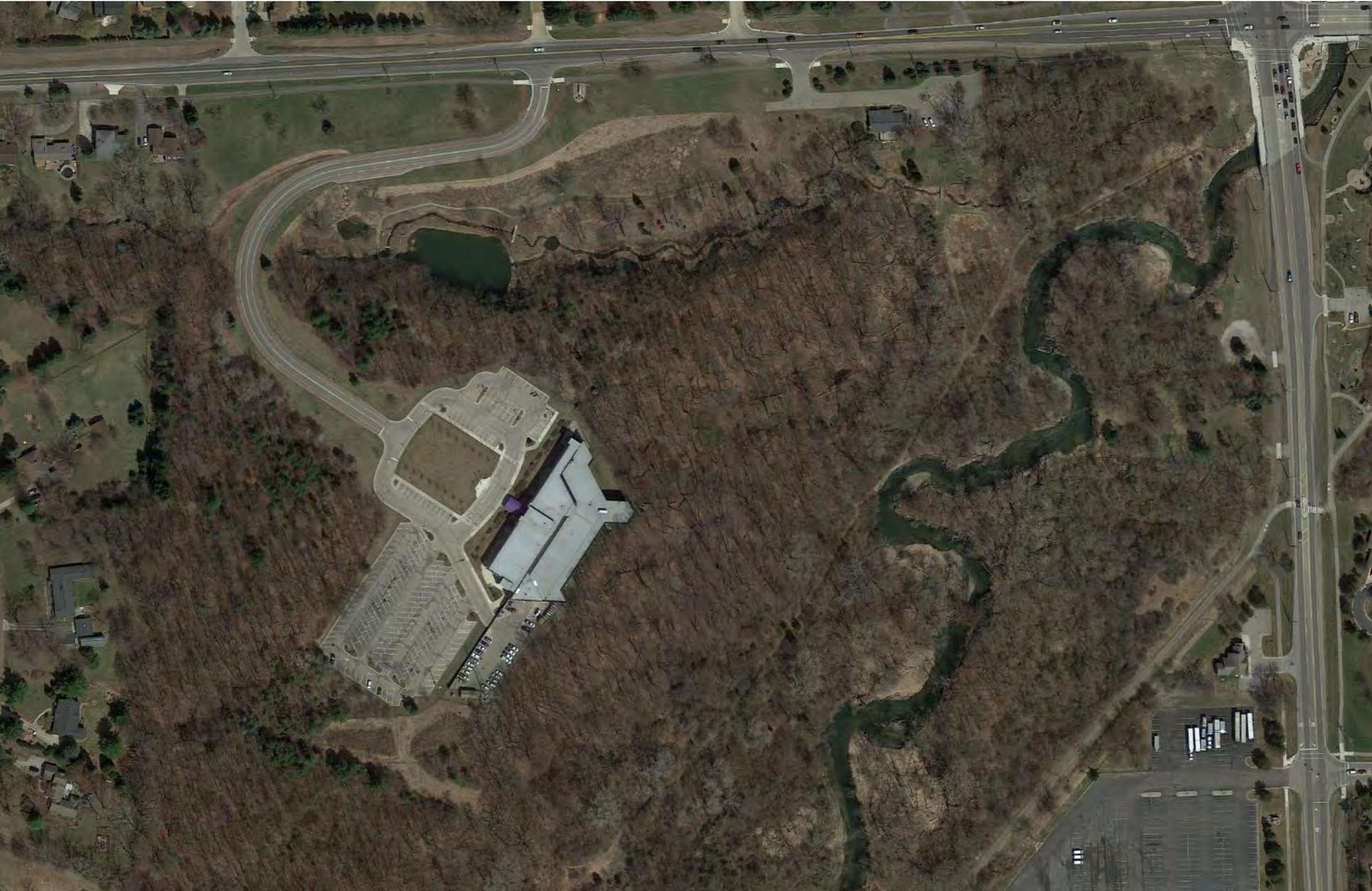
Permeable Pavers
\$52,000



Bioretention Cell
\$5,700

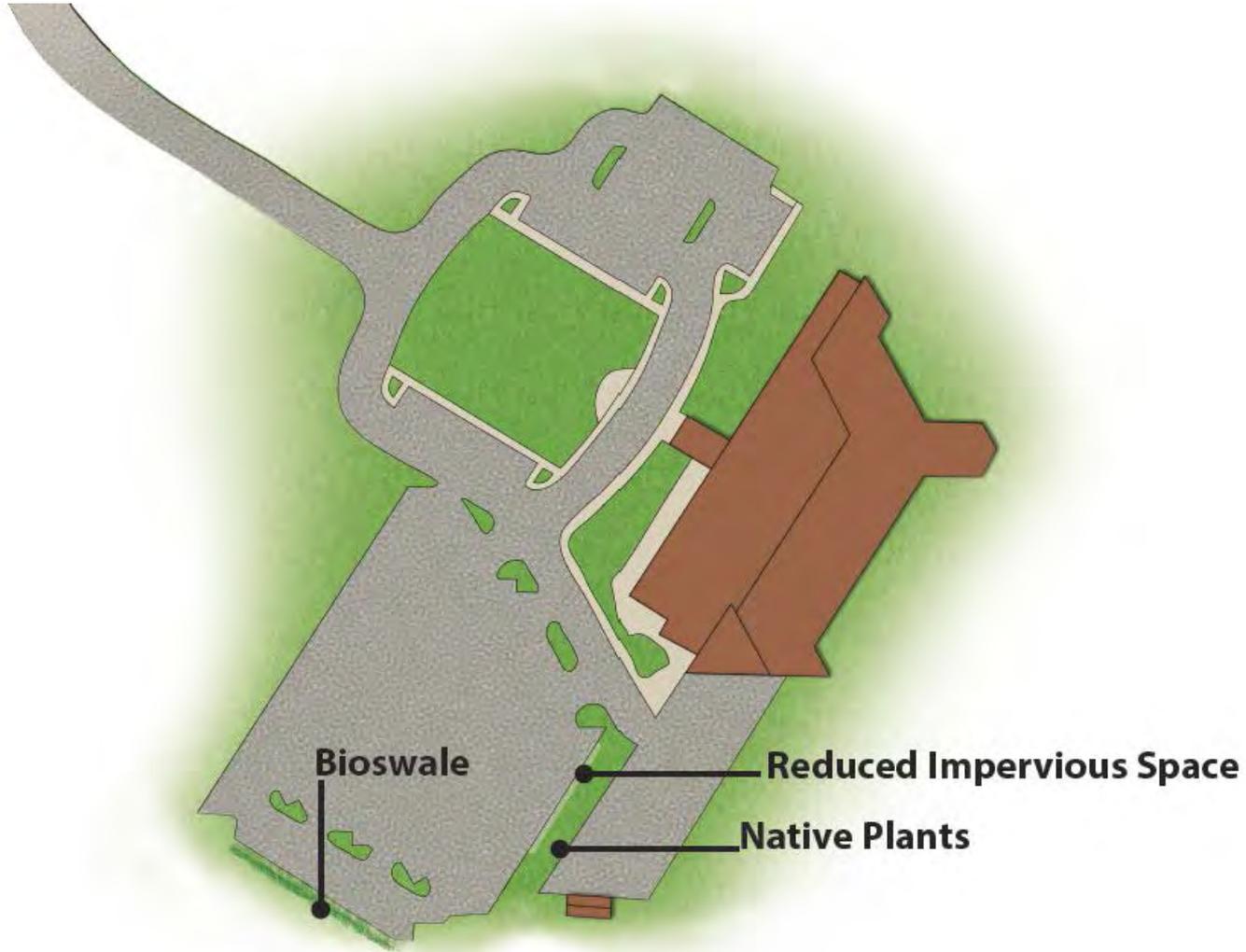


CWRC Office and City Hall





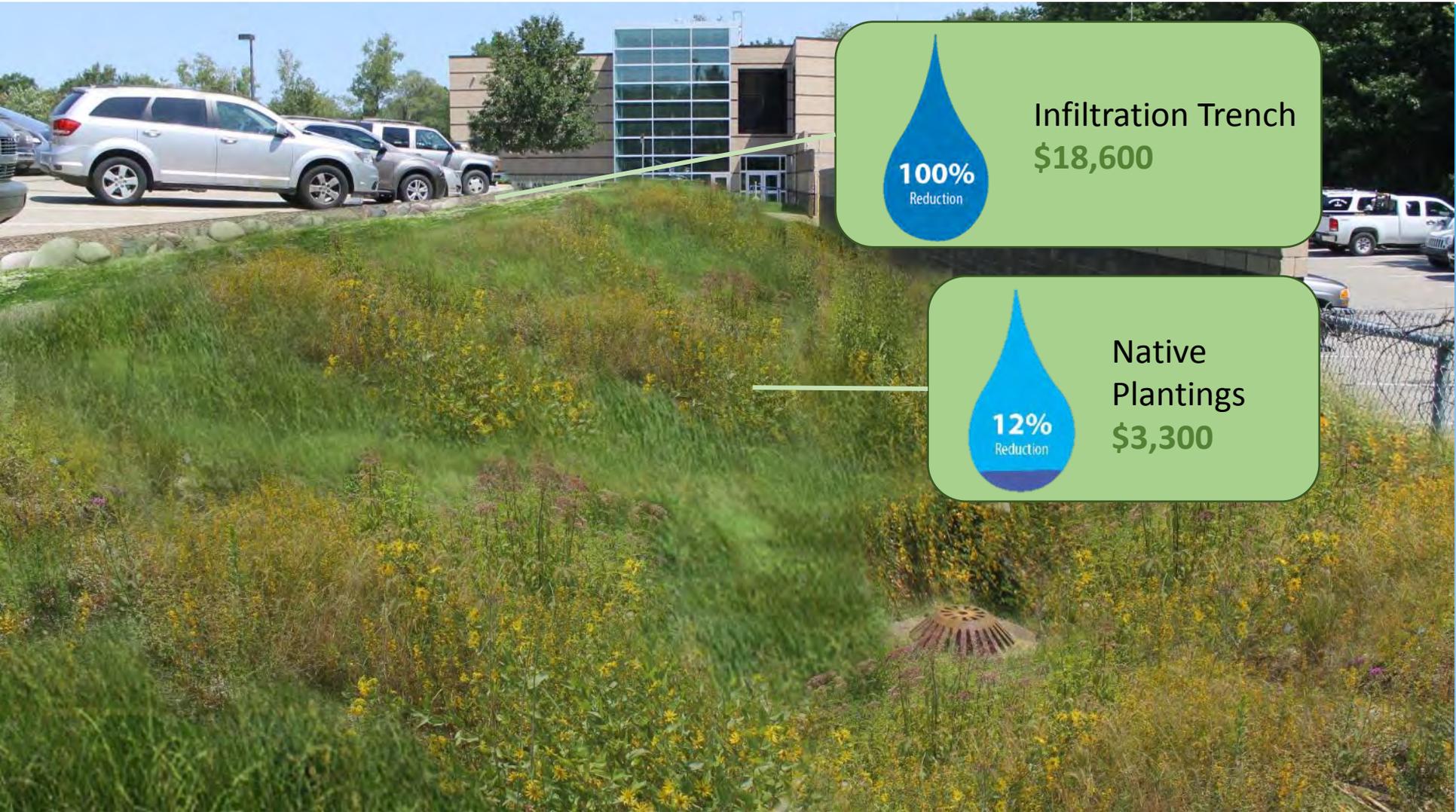
Rochester Hills City Offices



Rochester Hills City Offices - Existing



Rochester Hills City Offices



 Infiltration Trench
\$18,600

 Native Plantings
\$3,300

Rochester Hills City Offices - Existing

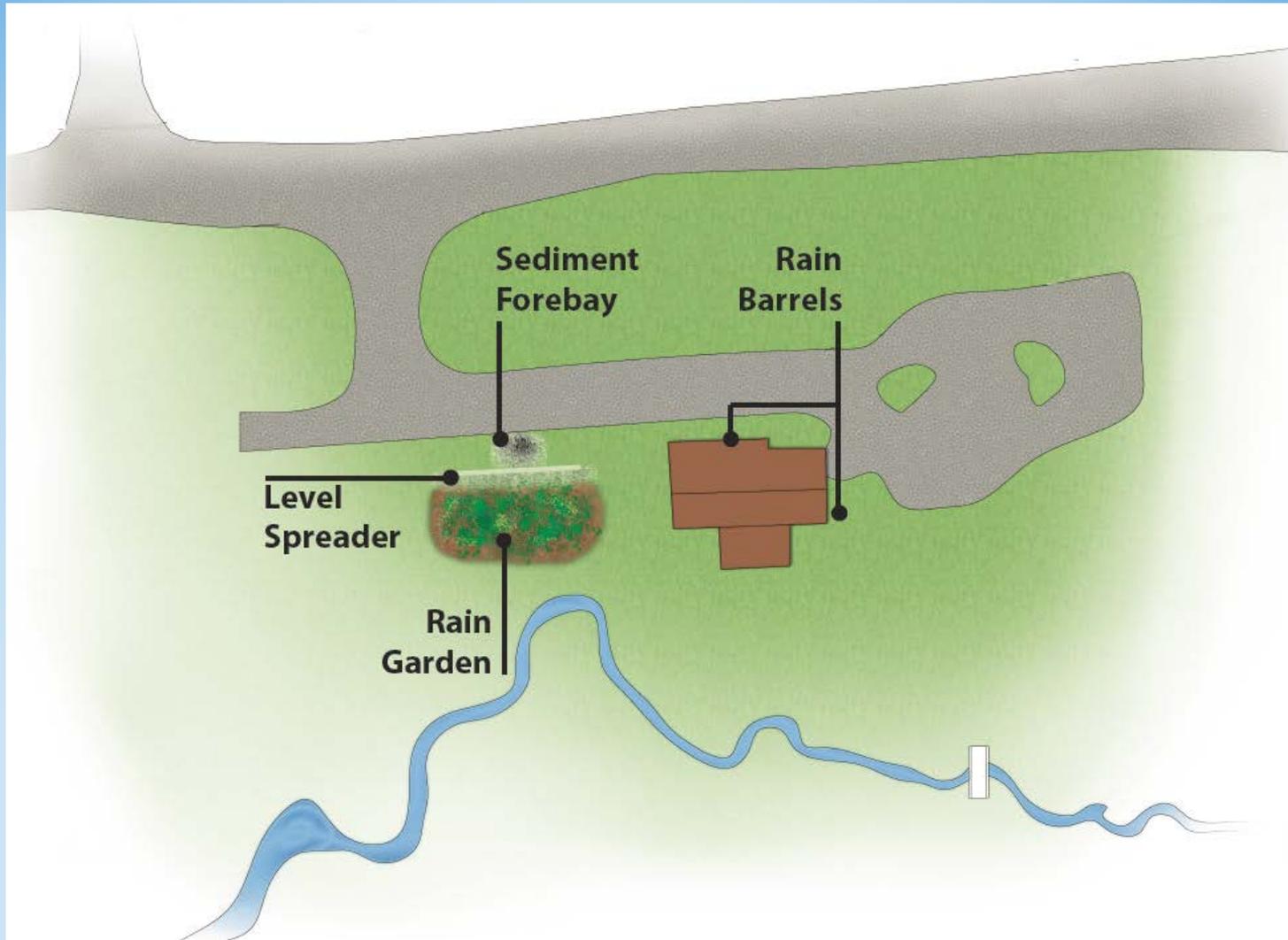


Rochester Hills City Offices - Existing





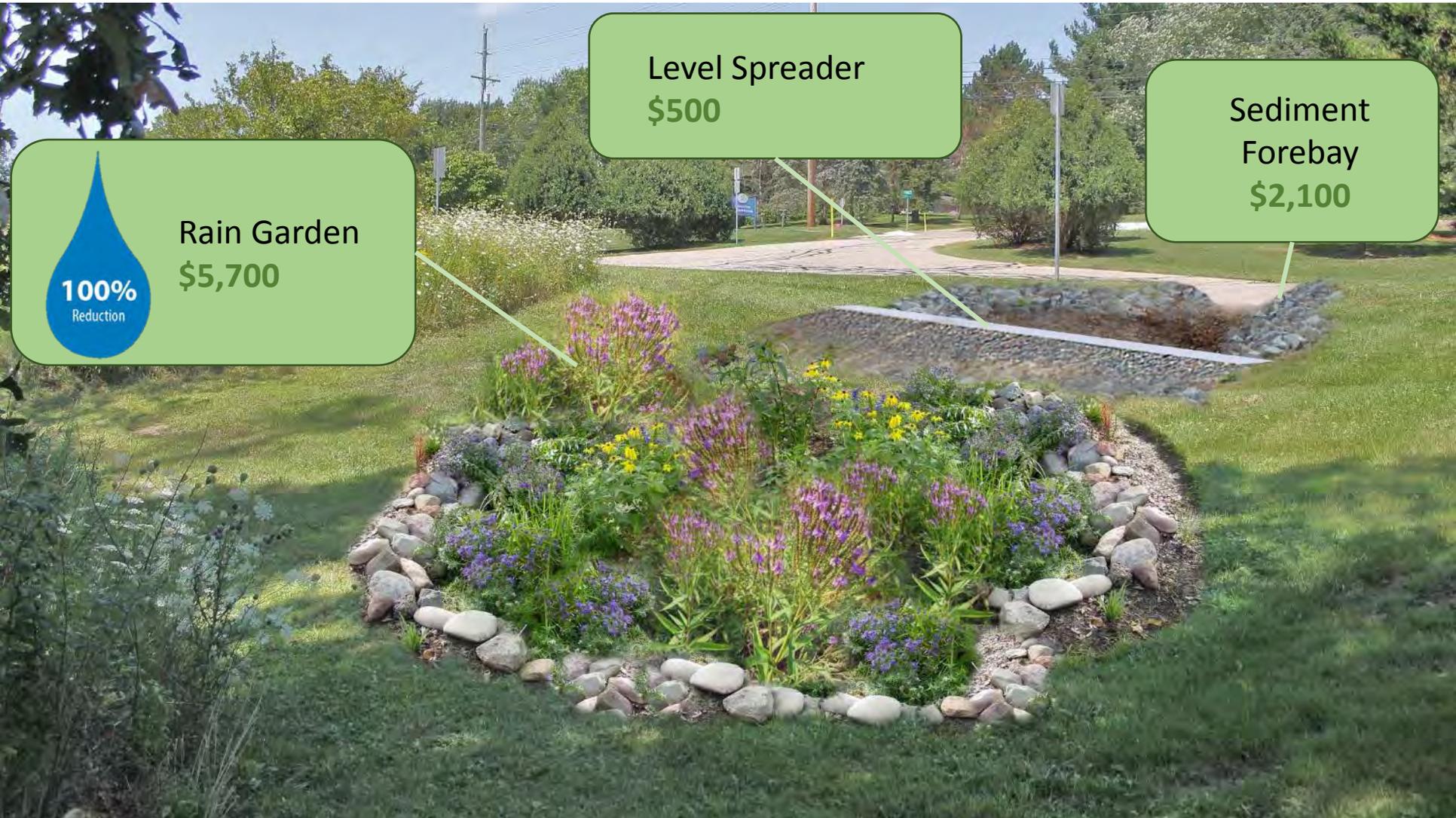
CRWC Office



CRWC Office - Existing



CRWC Office



CRWC Office - Existing



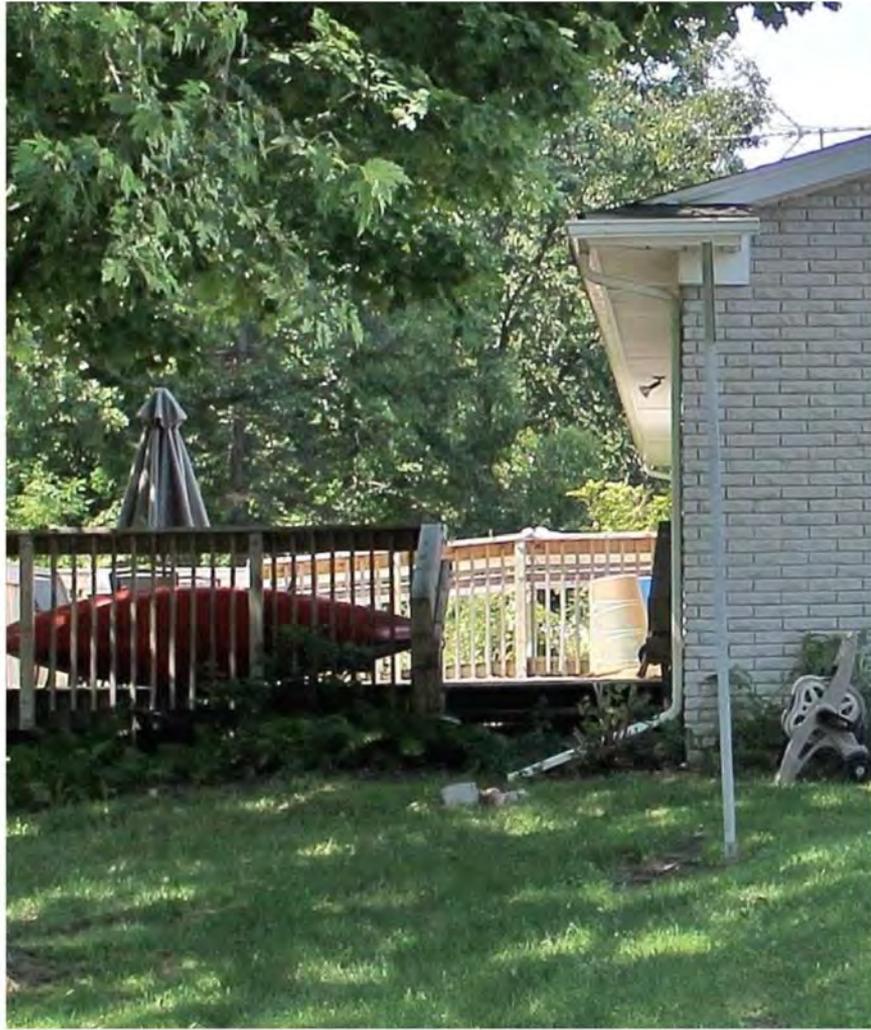
Bench Rain Cistern



Rain Collection
Cistern
\$900



CRWC Office



Rochester Hills Runoff Reductions



Total Improvements:
 \$249,800 + Placemaking
 \$1.22/Gallon

Runoff from 2.26" Rain – Existing
 Runoff from 2.26" Rain– Proposed

Site	Existing Runoff (gallons)	Proposed Runoff (gallons)	Reductions	
			(gallons)	%
CRWC Offices	6,033	4,142	1,890	31%
Borden Park	882,341	723,635	158,707	18%
Yates Park	123,265	106,963	16,302	13%
City Hall	48,404	20,935	27,469	57%
Sites Total	1,060,043	855,675	204,368	19%



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<http://www.ltu.edu/engineering/civil/watertowns.asp>

