



HURON-CLINTON  
metroparks

# Lake Erie Metropark Stormwater Management Plan

September 2019



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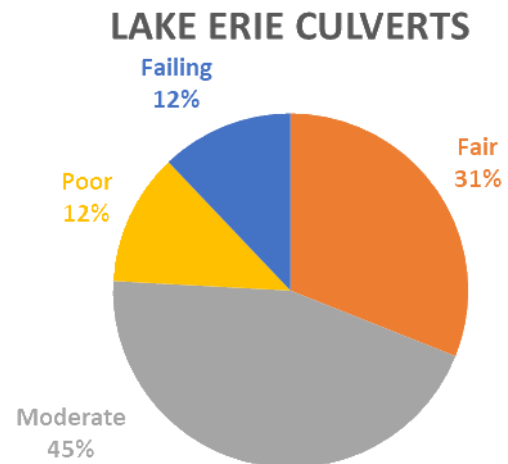
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## Lake Erie Metropark Stormwater Structure Recommendations

Table 1. Summary of Lake Erie Culvert Inspection and Maintenance Needs

Culvert Rating	Number of Culverts	Culverts Needing Immediate Cleanout	Culverts Needing Future Cleanout	Culverts Needing Replacement or Repair
New	0	0	0	0
Fair	18	0	1	0
Moderate	26	1	4	0
Poor	7	1*	0	7
Failing	7	5*	0	7
<b>Total:</b>	58	7*	5	14
<b>Repair Cost:</b>		<b>\$107</b>	<b>\$994</b>	<b>\$62,270</b>

\*Culvert may be replaced before it needs to be cleaned out.



*Left: Failing culvert in Lake Erie Metropark. Right: Proportion of culverts in each condition category.*

Table 2. Individual Culvert Replacement Costs

Culvert ID	Diameter (in)	Length (ft)	Condition	Maintenance Need	Cost Opinion
<b>CUL-LE-005*</b>	12	32	Failing	Replacement	\$3,989
<b>CUL-LE-006*</b>	12	15	Failing	Replacement	\$1,816
<b>CUL-LE-009</b>	12	28	Poor	Replacement	\$3,492
<b>CUL-LE-010</b>	12	59	Poor	Replacement	\$7,323
<b>CUL-LE-011</b>	18	46	Failing	Replacement	\$6,854
<b>CUL-LE-012</b>	12	30	Moderate	Immediate Cleanout	\$107
<b>CUL-LE-015*</b>	48	12	Failing	Replacement	\$4,627
<b>CUL-LE-021</b>	12	16	Poor	Replacement	\$1,969
<b>CUL-LE-023*</b>	12	52	Poor	Replacement	\$6,477
<b>CUL-LE-028</b>	8	16	Moderate	Future Cleanout	\$57
<b>CUL-LE-031</b>	27	77	Moderate	Future Cleanout	\$459
<b>CUL-LE-036*</b>	12	33	Failing	Replacement	\$4,145
<b>CUL-LE-037</b>	12	58	Poor	Replacement	\$7,264
<b>CUL-LE-046</b>	8	58	Moderate	Future Cleanout	\$203
<b>CUL-LE-047</b>	14	51	Poor	Replacement	\$6,435
<b>CUL-LE-049</b>	10	8	Fair	Future Cleanout	\$29
<b>CUL-LE-051</b>	12	49	Poor	Replacement	\$6,102
<b>CUL-LE-054*</b>	8	6	Failing	Replacement	\$629
<b>CUL-LE-057</b>	10	11	Failing	Replacement	\$1,148
<b>CUL-LE-058</b>	36	33	Moderate	Future Cleanout	\$246
<b>Total:</b>					<b>\$63,371</b>

\*Culvert may be replaced before it needs to be cleaned out.

Table 3. Individual Stormwater Gravity Main Replacement Costs

Stormwater Gravity Main ID	Diameter (in)	Length (ft)	Maintenance Need	Cost Opinion
<b>STG-LE-0003^</b>	18	351	Partial Replacement, Monitor Closely	\$11,475
<b>STG-LE-0009^</b>	18	270	Cutting and Grouting	\$12,618
<b>STG-LE-0019!^</b>	18	48	Complete Replacement	\$9,954
<b>STG-LE-0051^</b>	15	127	Complete Replacement	\$21,348
<b>Total:</b>				<b>\$55,395</b>

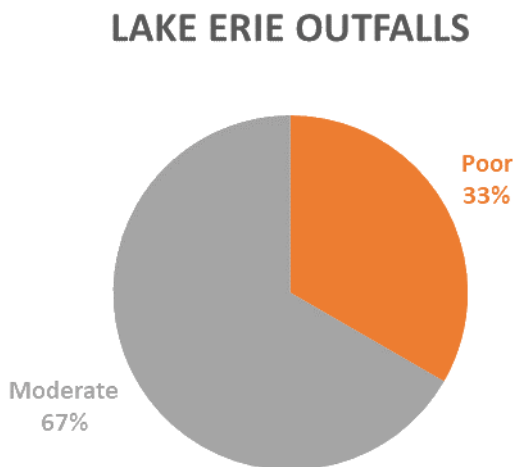
^Televised

! High Priority



Table 4. Summary of Lake Erie Outfall Inspection and Maintenance Needs

Outfall Rating	Number of Outfalls	Outfalls Needing Immediate Cleanout	Outfalls Needing Future Cleanout	Outfalls Needing Replacement or Repair
New	0	0	0	0
Fair	0	0	0	0
Good	2	0	0	0
Poor	1	0	0	1
Failing	0	0	0	0
<b>Total:</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Repair Cost:</b>		<b>\$0</b>	<b>\$0</b>	<b>\$6,250</b>



*Left: Proportion of outfalls in each condition category. Right: Outfall in moderate condition in Lake Erie Metropark.*

Table 5. Individual Outfall Replacement Costs

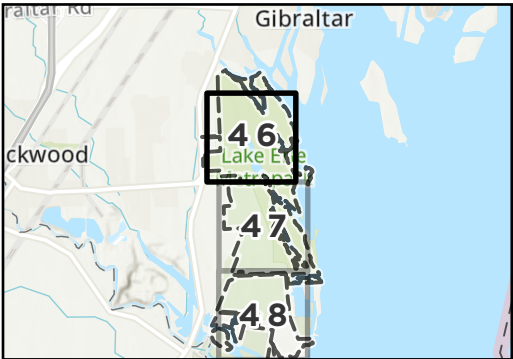
Outfall ID	Diameter (in)	Condition	Maintenance Need	Cost Opinion
<b>SDC-LE-002</b>	12	Poor	Replacement	\$6,250
<b>Total:</b>				<b>\$6,250</b>























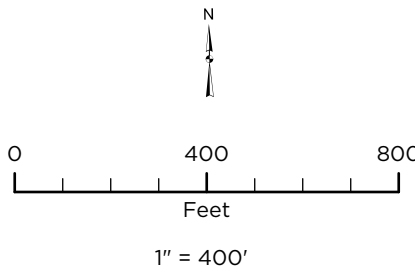
# Stormwater Structure Ratings

Lake Erie Metropark

Map Sheet: 46 of 48



Outfalls (Field Rating)	Gravity Main (Pipe Rating Index)
 Failing	 1
 Poor	 2
 Moderate	 3
 Fair	 4
 New	 5
<b>Culverts (Field Rating)</b>	 Gravity Main (Other)
 Failing	 Culvert (Other)
 Poor	<b>Roads</b>
 Moderate	 Roads
 Fair	 Park Boundary
 New	
 (Not Rated)	



**Source:** Data provided by Huron-Clinton Metroparks, State of Michigan, OHM Advisors, NearMap and ESRI. OHM Advisors does not warrant the accuracy of the data and/or the map. This document is intended to depict the approximate spatial location of the mapped features within the Community and all use is strictly at the user's own risk.

**Coordinate System:** NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl.

**Map Published:** October 23, 2019



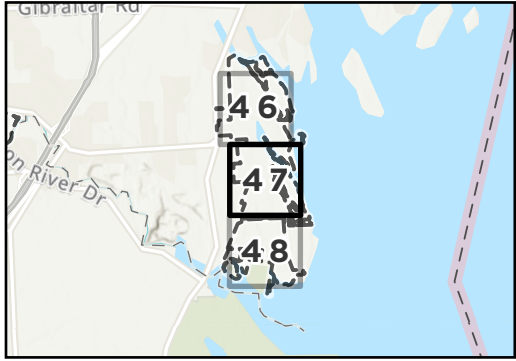






















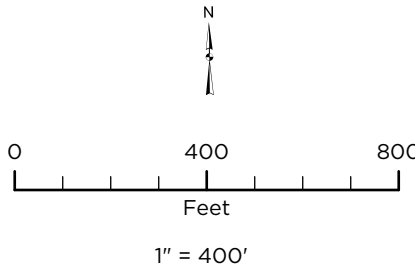
## Stormwater Structure Ratings

Lake Erie Metropark

Map Sheet: 47 of 48



Outfalls (Field Rating)	Gravity Main (Pipe Rating Index)
 Failing	 1
 Poor	 2
 Moderate	 3
 Fair	 4
 New	 5
	 Gravity Main (Other)
Culverts (Field Rating)	Culvert (Other)
 Failing	 Culvert (Other)
 Poor	
 Moderate	
 Fair	
 New	
 (Not Rated)	



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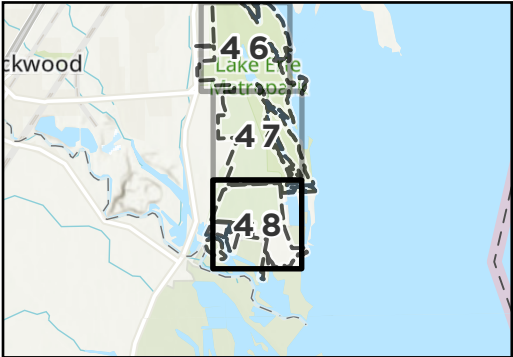
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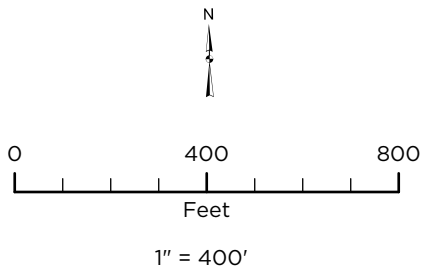
# Stormwater Structure Ratings

Lake Erie Metropark

Map Sheet: 48 of 48



Outfalls (Field Rating)	Gravity Main (Pipe Rating Index)
 Failing	 1
 Poor	 2
 Moderate	 3
 Fair	 4
 New	 5
<b>Culverts (Field Rating)</b>	 Gravity Main (Other)
 Failing	 Culvert (Other)
 Poor	<b>Roads</b>
 Moderate	 Roads
 Fair	 Park Boundary
 New	
 (Not Rated)	



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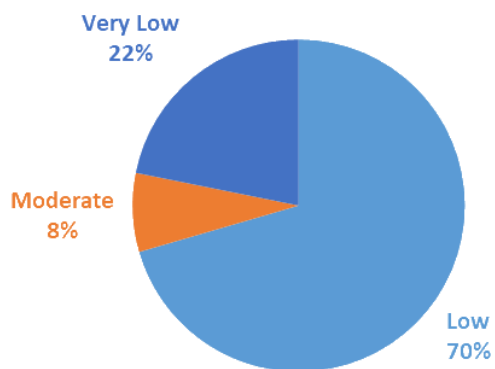
## Lake Erie Metropark Streambank Summary and Recommendations

Table 6. Lake Erie Erosion Severity Summary

Erosion Condition	Feet of Streambank (miles)	Cost of Restoration
Very High	0.0 (0.0)	
High	0.0 (0.0)	
Moderate	2,541.67 (0.48)	
Low	23,351.29 (4.42)	
Very Low	7,233.75 (1.37)	
<b>Total:</b>	<b>33,126.7 (6.27)</b>	<b>\$0*</b>

\*No restoration recommended at this time.

### LAKE ERIE EROSION SEVERITY



Left: Proportion of stream in each erosion severity category. Right: Moderate erosion on a small stream in Lake Erie Metropark.



## Lake Erie Metropark Shoreline Summary and Recommendations

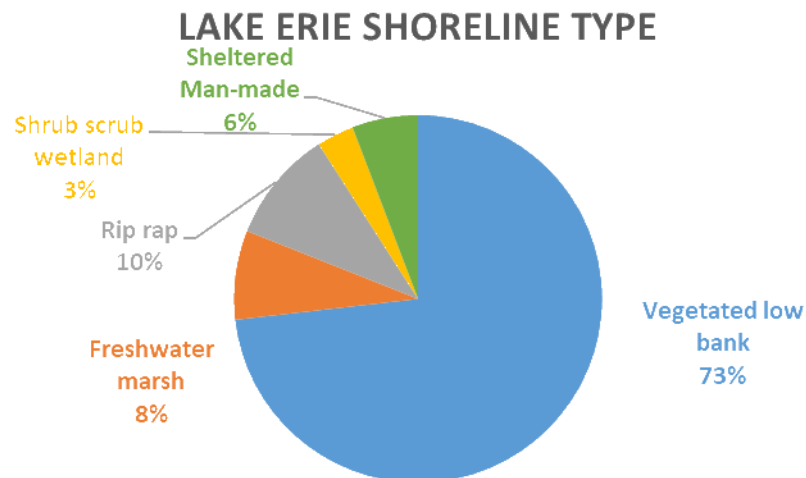


*Major slumping in Lake Erie Metropark.*

Table 7. Shoreline Inspection Summary

Erosion Condition	Length of Shoreline (feet)
Major	2,716.7
Minor	19,413.7
None	44,267.6
<b>Total:</b>	<b>66,398.0</b>
<b>Restoration Cost:</b>	<b>\$13,650</b>

Lake Erie Metropark has a large proportion of shoreline. Recommended restoration activity is largely invasive species related, with some shoreline stabilization plantings.



*Proportion of each shoreline type present in Lake Erie Metropark.*




# Lake Erie Metropark

Shoreline Rehab Siting






 Shoreline Rehab Site

**Invasive Vegetation Pt**

**Invasive Type**








-  Black Alder
-  Cattail
-  Multiple
-  Other
-  Phragmites

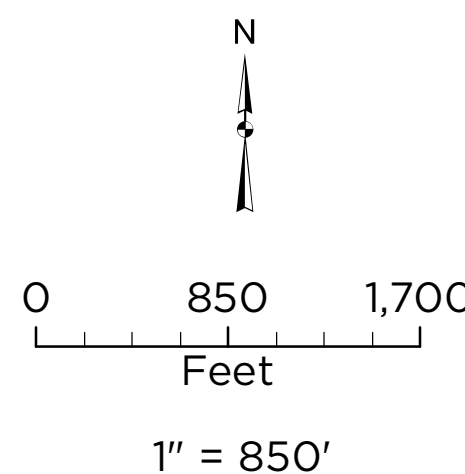
**Invasive Density**

-  1 - IND/FEW/SEV
-  2 - < 1000 SF
-  3 - > 1000 SF
-  4 - 0.5 - 1 AC
-  5 - > 1 AC

**Shoreline Condition**

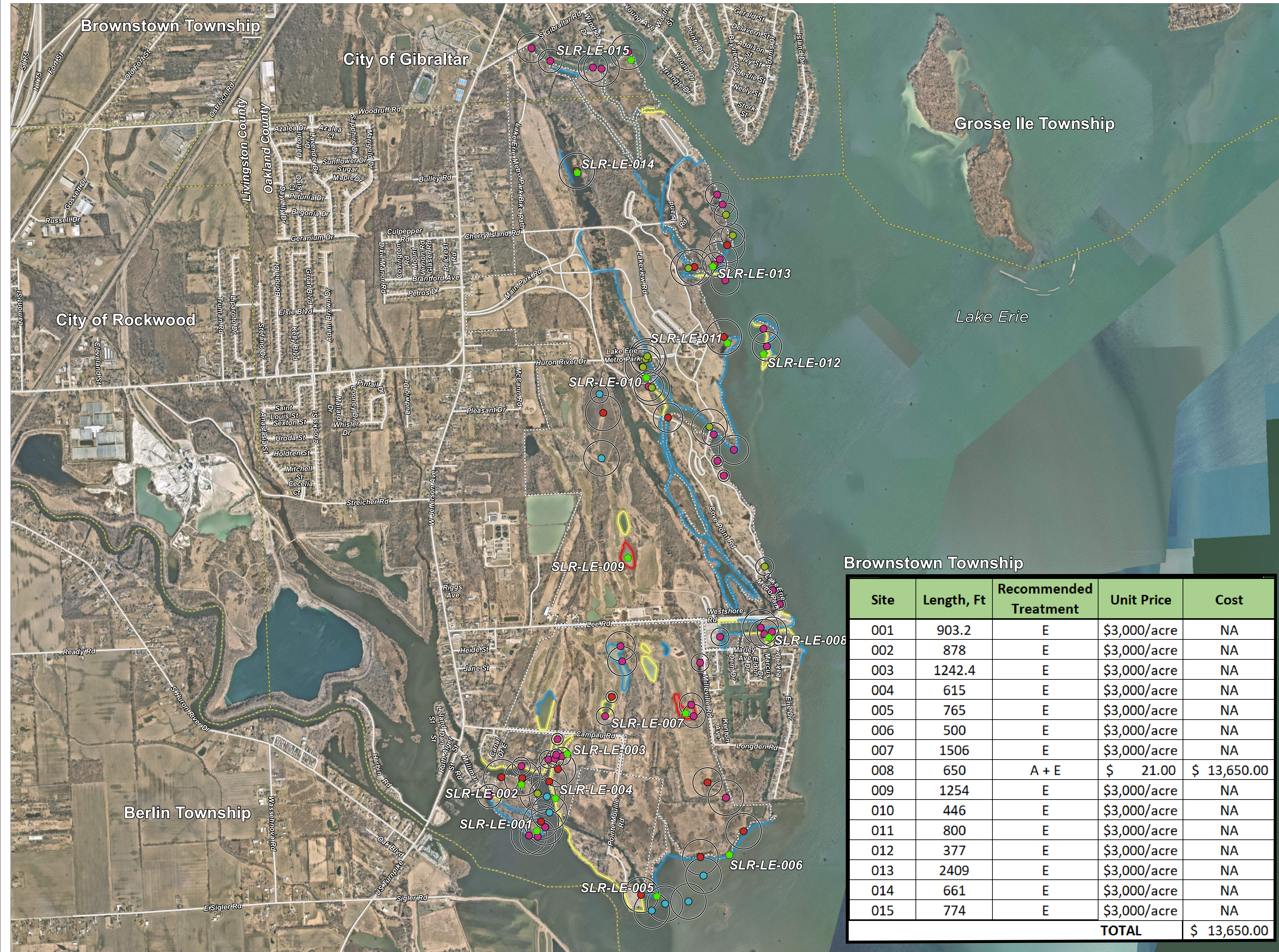
**Slumping Severity**

-  Major
-  Minor
-  None
-  HCMA Park Boundary
-  Municipal Boundary
-  County Boundary
-  Roads

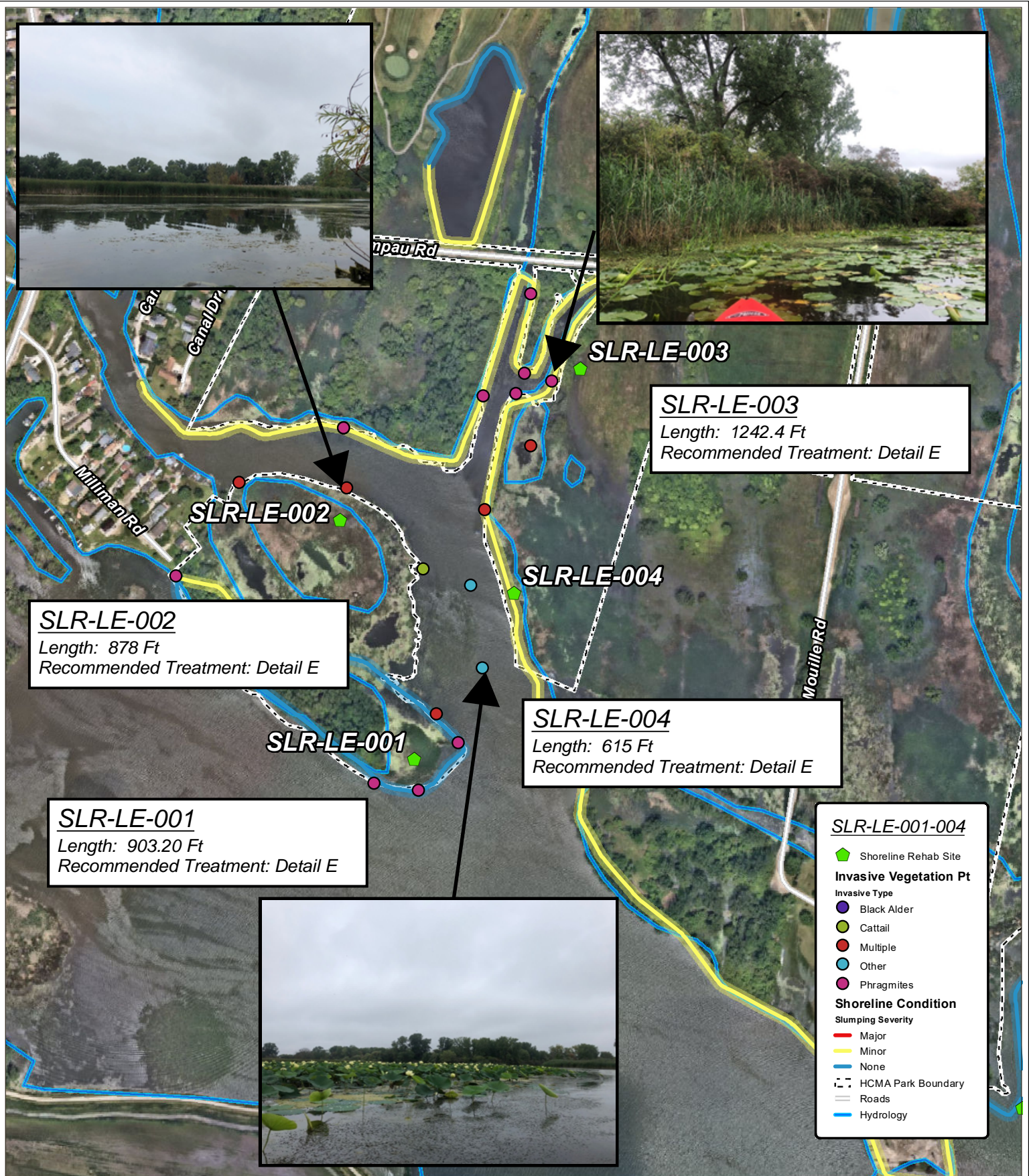


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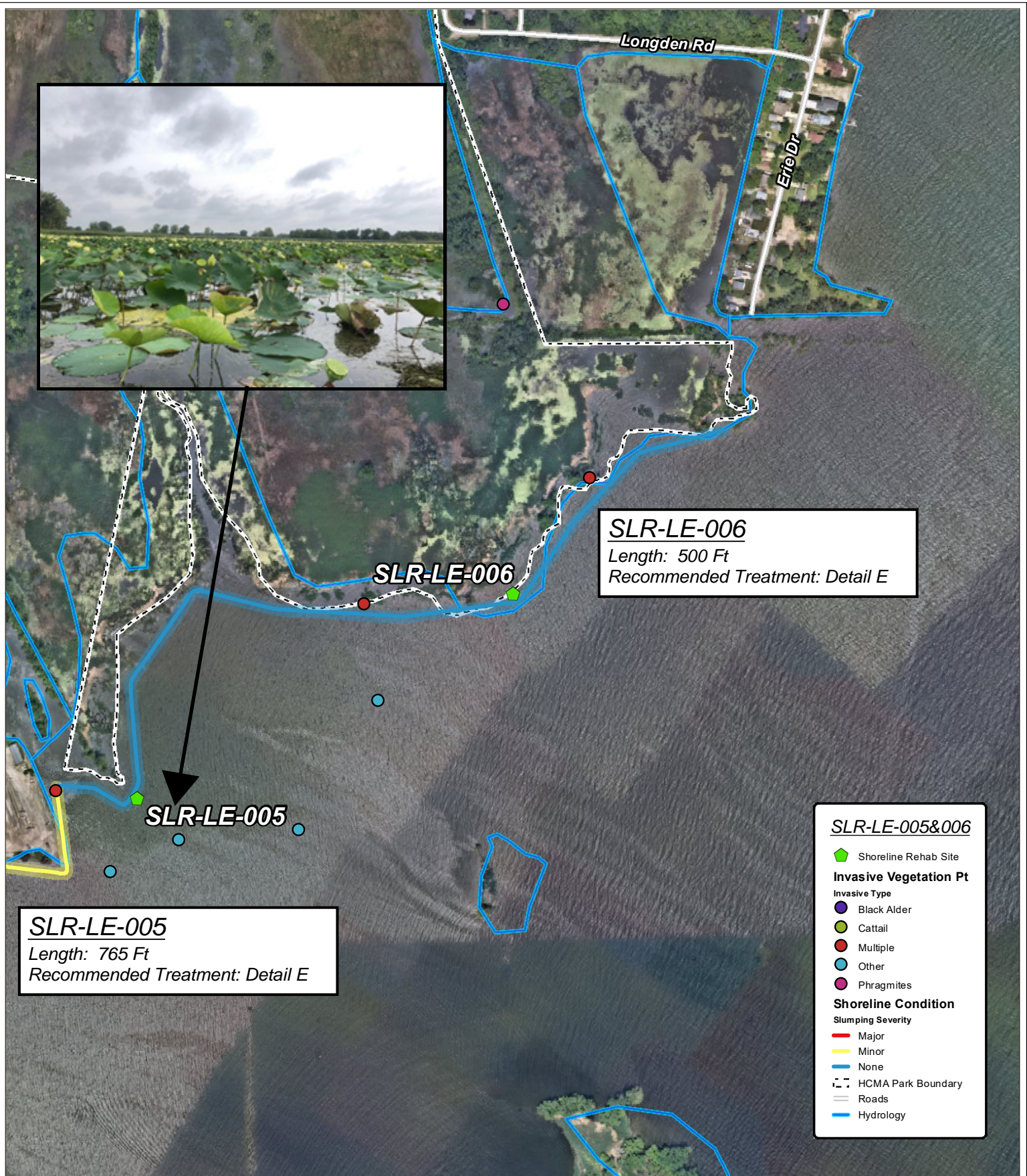
## Lake Erie Metropark Shoreline Rehabilitation Siting

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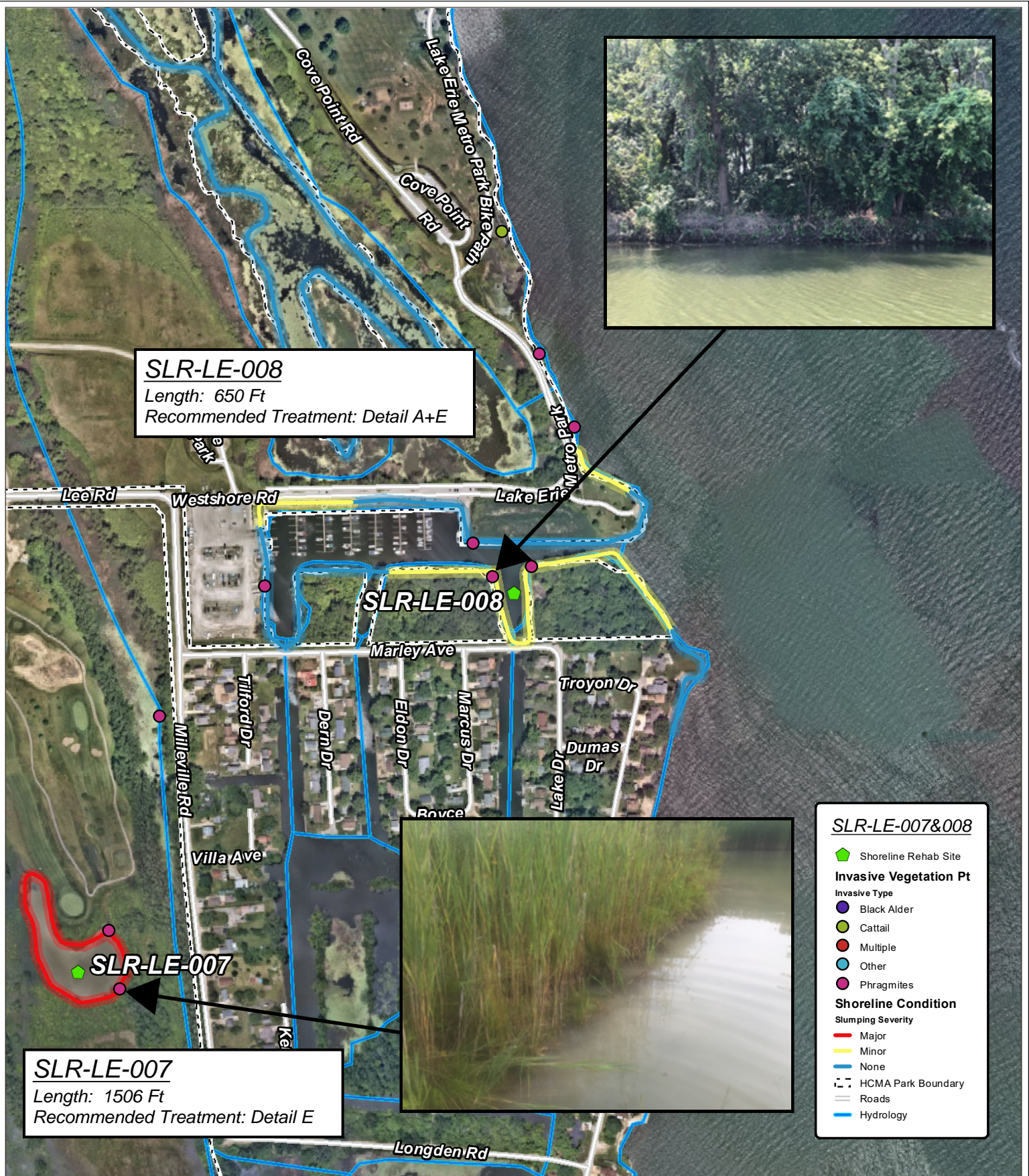
Map Published: October 22, 2019





## Lake Erie Metropark Shoreline Rehabilitation Siting





## Lake Erie Metropark Shoreline Rehabilitation Siting

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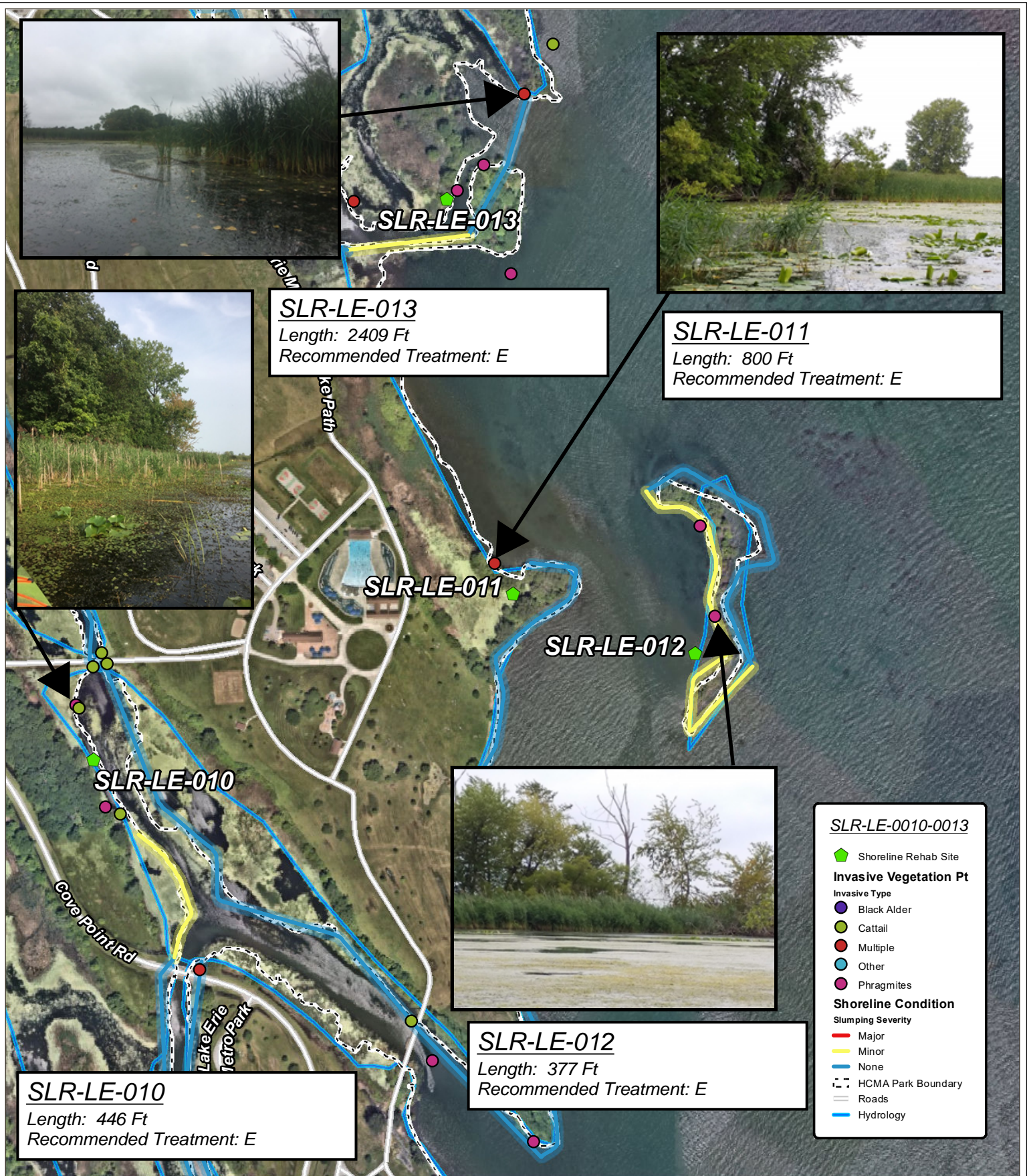
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Map Published: October 22, 2019









## Lake Erie Metropark Shoreline Rehabilitation Siting







**SLR-LE-015**

Length: 774 Ft

Recommended Treatment: E



**SLR-LE-015**

**SLR-LE-015**

Shoreline Rehab Site

**Invasive Vegetation Pt**

Invasive Type

- Black Alder
- Cattail
- Multiple
- Other
- Phragmites

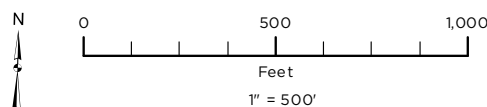
**Shoreline Condition**

Stumping Severity

- Major
- Minor
- None

- HCMA Park Boundary
- Roads
- Hydrology

## Lake Erie Metropark Shoreline Rehabilitation Siting



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Map Published: October 22, 2019





## Lake Erie Metropark Green Infrastructure Recommendations

In Lake Erie, the green infrastructure practices listed in Table 1 are recommended to improve water quality and ameliorate flooding issues in the park where feasible. These practices are also outlined on the attached green infrastructure maps.

Table 8. Lake Erie Green Infrastructure Recommendations

Site ID	Site	Practice Type	Treatment Surface Area (ft <sup>2</sup> )	Cost Opinion	Cost per sq ft of Treatment Area (\$/ft <sup>2</sup> )
<b>GI-LE-01</b>	Entrance	Naturalized Swale	6,839	\$11,626	\$1.70
<b>GI-LE-02</b>	Entrance	Naturalized Swale	3,258	\$5,539	\$1.70
<b>GI-LE-03</b>	Entrance	Naturalized Swale	19,191	\$32,625	\$1.70
<b>GI-LE-04</b>	Entrance	Naturalized Swale	38,498	\$65,447	\$1.70
<b>GI-LE-05</b>	Marshland Museum	Rain Garden	2,980	\$31,474	\$10.56
<b>GI-LE-06</b>	Shelter A	Naturalized Swale	4,135	\$7,030	\$1.70
<b>GI-LE-07</b>	Shore Fishing	Naturalized Swale	1,605	\$2,729	\$1.70
<b>GI-LE-08</b>	Shelter D	Naturalized Swale	4,173	\$7,094	\$1.70
<b>GI-LE-09</b>	Shelter D	Naturalized Swale	5,867	\$9,974	\$1.70
<b>GI-LE-10</b>	Shelter D	Naturalized Swale	6,934	\$11,788	\$1.70
<b>GI-LE-11</b>	Shelter E	Naturalized Swale	2,586	\$4,396	\$1.70
<b>GI-LE-12</b>	Marina Point	Naturalized Swale	5,633	\$9,576	\$1.70
<b>GI-LE-13</b>	Marina Point	Naturalized Swale	1,710	\$2,907	\$1.70
<b>GI-LE-14</b>	Great Wave Area	Naturalized Swale	4,687	\$7,968	\$1.70
<b>GI-LE-15</b>	Great Wave Area	Naturalized Swale	4,512	\$7,670	\$1.70



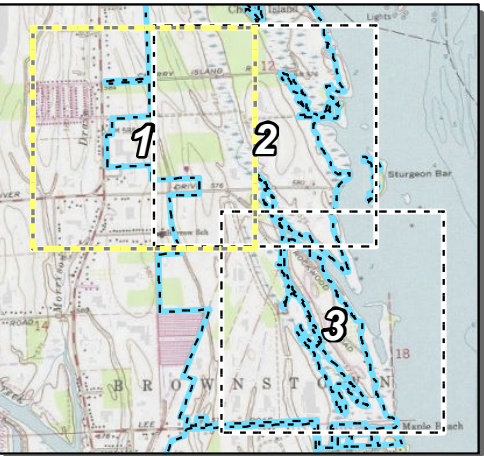
Site ID	Site	Practice Type	Treatment Surface Area (ft <sup>2</sup> )	Cost Opinion	Cost per sq ft of Treatment Area (\$/ft <sup>2</sup> )
<b>GI-LE-16</b>	Marina Point	No Mow	17,621	\$0.00	\$0.00
<b>GI-LE-17</b>	Entrance	Naturalized Swale	36,904	\$62,737	\$1.70
<b>GI-LE-18</b>	Entrance	Naturalized Swale	51,360	\$87,312	\$1.70
<b>Total:</b>			<b>218,493</b>	<b>\$367,892</b>	








# Lake Erie Metropark

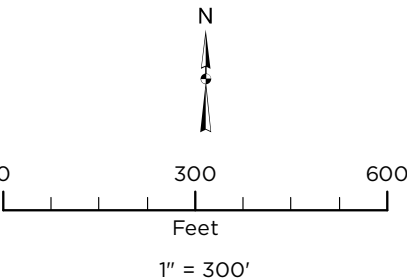
Green Infrastructure  
Recommendation Areas

Area: 1 of 3



## Recommendation Area GSI Type

-  Naturalized Swale (6)
-  Stormwater Gravity Main
-  HCMA\_swCulvert (18)
-  HCMA Park Boundary
-  Roads



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Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Int'l Feet

Map Published: October 1, 2019

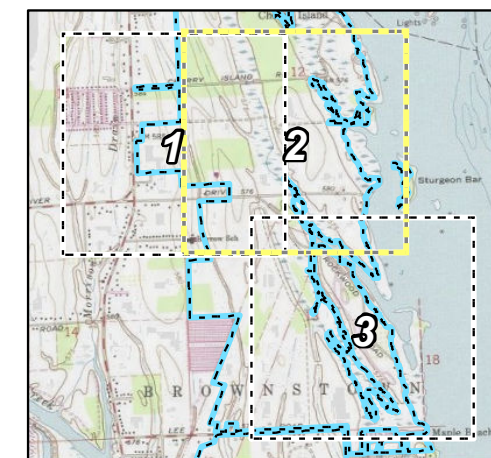









## Lake Erie Metropark

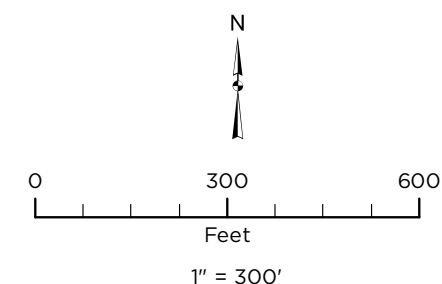
Green Infrastructure  
Recommendation Areas

Area: 2 of 3



### Recommendation Area GSI Type

-  Naturalized Swale (6)
-  Stormwater Gravity Main
-  HCMA\_swCulvert (22)
-  HCMA Park Boundary
-  Roads



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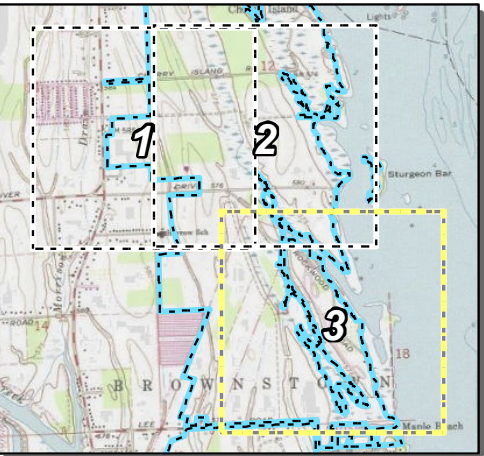
**Map Published:** October 1, 2019



# Lake Erie Metropark

## Green Infrastructure Recommendation Areas

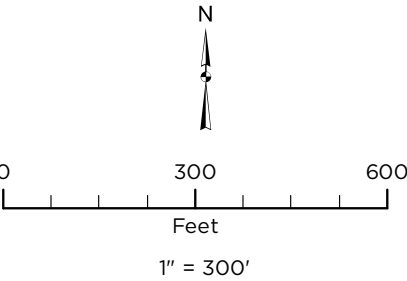
Area: 3 of 3



### Recommendation Area

#### GSI Type

-  No-Mow (1)
-  Naturalized Swale (7)
-  Stormwater Gravity Main
-  HCMA\_swCulvert (12)
-  HCMA Park Boundary
-  Roads



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**Map Published:** October 1, 2019



## Lake Erie Metropark Recommendation Prioritization

Each table in this section is prioritized, with the most urgent projects listed first. Projects with **red** Site IDs need immediate attention. Projects with **green** Site IDs can be accomplished by HCMA staff. **Bold** projects may be eligible for grant funding. Underlined projects may be good volunteer or education opportunities. All other projects will likely require annual budget allocations to complete.

Table 9. Lake Erie Culvert Repair Priorities

Culvert ID	Diameter (in)	Length (ft)	Condition	Maintenance Need	Cost Opinion
CUL-LE-015	48	12	Failing	Replacement	\$4,627
CUL-LE-011	18	46	Failing	Replacement	\$6,854
CUL-LE-036	12	33	Failing	Replacement	\$4,145
CUL-LE-005	12	32	Failing	Replacement	\$3,989
CUL-LE-006	12	15	Failing	Replacement	\$1,816
CUL-LE-057	10	11	Failing	Replacement	\$1,148
CUL-LE-054	8	6	Failing	Replacement	\$629
CUL-LE-047	14	51	Poor	Replacement	\$6,435
CUL-LE-010	12	59	Poor	Replacement	\$7,323
CUL-LE-037	12	58	Poor	Replacement	\$7,264
CUL-LE-023	12	52	Poor	Replacement	\$6,477
CUL-LE-051	12	49	Poor	Replacement	\$6,102
CUL-LE-009	12	28	Poor	Replacement	\$3,492
CUL-LE-021	12	16	Poor	Replacement	\$1,969
CUL-LE-031	27	77	Moderate	Future Cleanout	\$459
CUL-LE-046	8	58	Moderate	Future Cleanout	\$203
CUL-LE-012	12	30	Moderate	Immediate Cleanout	\$107
CUL-LE-058	36	33	Moderate	Future Cleanout	\$246
CUL-LE-028	8	16	Moderate	Future Cleanout	\$57
CUL-LE-049	10	8	Fair	Future Cleanout	\$29
<b>Total:</b>					<b>\$63,370</b>

Table 10. Lake Erie Stormwater Gravity Main Repair Priorities

Stormwater Gravity Main ID	Diameter (in)	Length (ft)	Maintenance Need	Cost Opinion
STG-LE-0019	18	48	Complete Replacement	\$9,954
STG-LE-0051	15	127	Complete Replacement	\$21,348
STG-LE-0003	18	351	Partial Replacement, Monitor Closely	\$11,475
STG-LE-0009	18	270	Cutting and Grouting	\$12,618
<b>Total:</b>				<b>\$55,395</b>



Table 11. Lake Erie Outfall Repair Priorities

Outfall ID	Diameter (in)	Condition	Maintenance Need	Cost Opinion
SDC-LE-002	12	Poor	Replacement	\$6,250
<b>Total:</b>				<b>\$6,250</b>

Table 12. Lake Erie Green Infrastructure Installation Priorities

Site ID	Site	Practice Type	Treatment Surface Area (ft <sup>2</sup> )	Cost Opinion	Cost per sq ft of Treatment Area (\$/ft <sup>2</sup> )
<a href="#"><u>GI-LE-13</u></a>	<a href="#"><u>Marina Point</u></a>	<a href="#"><u>Naturalized Swale</u></a>	<a href="#"><u>1,710</u></a>	<a href="#"><u>\$2,907</u></a>	<a href="#"><u>\$1.70</u></a>
<a href="#"><u>GI-LE-07</u></a>	<a href="#"><u>Shore Fishing</u></a>	<a href="#"><u>Naturalized Swale</u></a>	<a href="#"><u>1,605</u></a>	<a href="#"><u>\$2,729</u></a>	<a href="#"><u>\$1.70</u></a>
<a href="#"><u>GI-LE-16</u></a>	Marina Point	No Mow	17,621	\$0.00	\$0.00
<a href="#"><u>GI-LE-18</u></a>	Entrance	Naturalized Swale	51,360	\$87,312	\$1.70
<a href="#"><u>GI-LE-04</u></a>	Entrance	Naturalized Swale	38,498	\$65,447	\$1.70
<a href="#"><u>GI-LE-17</u></a>	Entrance	Naturalized Swale	36,904	\$62,737	\$1.70
<a href="#"><u>GI-LE-03</u></a>	Entrance	Naturalized Swale	19,191	\$32,625	\$1.70
<a href="#"><u>GI-LE-10</u></a>	Shelter D	Naturalized Swale	6,934	\$11,788	\$1.70
<a href="#"><u>GI-LE-01</u></a>	Entrance	Naturalized Swale	6,839	\$11,626	\$1.70
<a href="#"><u>GI-LE-09</u></a>	Shelter D	Naturalized Swale	5,867	\$9,974	\$1.70
<a href="#"><u>GI-LE-12</u></a>	Marina Point	Naturalized Swale	5,633	\$9,576	\$1.70
<a href="#"><u>GI-LE-14</u></a>	Great Wave Area	Naturalized Swale	4,687	\$7,968	\$1.70
<a href="#"><u>GI-LE-15</u></a>	Great Wave Area	Naturalized Swale	4,512	\$7,670	\$1.70
<a href="#"><u>GI-LE-08</u></a>	Shelter D	Naturalized Swale	4,173	\$7,094	\$1.70
<a href="#"><u>GI-LE-06</u></a>	Shelter A	Naturalized Swale	4,135	\$7,030	\$1.70



Site ID	Site	Practice Type	Treatment Surface Area (ft <sup>2</sup> )	Cost Opinion	Cost per sq ft of Treatment Area (\$/ft <sup>2</sup> )
GI-LE-02	Entrance	Naturalized Swale	3,258	\$5,539	\$1.70
GI-LE-11	Shelter E	Naturalized Swale	2,586	\$4,396	\$1.70
GI-LE-05	Marshland Museum	Rain Garden	2,980	\$31,474	\$10.56
<b>Total:</b>			<b>218,493</b>	<b>\$367,892</b>	

Table 13. Lake Erie Shoreline Rehabilitation Priorities

Shoreline Restoration Site ID	Length (ft)	Recommended Treatment	Unit Cost (\$/ft)	Cost Opinion
SLR-LE-001	903.20	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-002	878.00	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-003	1,242.40	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-004	615.00	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-005	765.00	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-006	500.00	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-007	1,506.00	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-009	1,254.00	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-010	446.00	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-011	800.00	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-012	377.00	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-013	2,409.00	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-014	661	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-015	774	E (Invasive Species Removal)	\$3,000/acre	NA
SLR-LE-008	650.00	A+E (Tree Removal, Excavation, Plant Restoration, and Invasive Species Removal)	\$21	\$13,650