

# Lake Michigan Watershed Ravine Inventory, Lake and Cook Counties, Illinois

## Summary Report

March 2019



**STORMWATER MANAGEMENT COMMISSION**

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*Data provided by the City of Lake Forest and MGP inc*

## Overview

Thirty-three ravines in Lake County and seven ravines in Cook County were assessed in the late fall of 2018 and the early winter of 2019 by Lake County Stormwater Management Commission (SMC). An additional thirteen ravines in Lake County were assessed by the City of Lake Forest in the summer of 2017. Appendix A contains an index map of all the ravines inventoried. It is accompanied by a set of maps with one map for each individual ravine inventoried. This report updates previous summaries produced in 2009 (“Stresses and Opportunities in Illinois Lake Michigan Watersheds: Strategic Sub-Watershed Identification Process Report (SSIP) for the Lake Michigan Watershed Ecosystem Partnership”) and in 2013 (Addendum #1).

In 2008 the Alliance for the Great Lakes and Northwater Consulting assessed 33 ravines in Lake and Cook counties. In the spring of 2011 SMC assessed the following 7 ravines: Bull Creek, Dead Dog Creek, Kellogg Creek, Pettibone Creek, Ravine 7L, Spring Bluff Ravine and Waukegan River. In addition to the 2008 and 2011 assessments, Pettibone Creek was also surveyed in 2008. All ravines were assessed according to the guidelines outlined in the 2009 Strategic Sub-Watershed Identification Process (SSIP), therefore the analyses presented in this 2019 report may be used to show changes that have occurred since 2008/2011. Ravines were assessed to determine the location of high erosion areas with regard to ravine bed and bank characteristics, density of discharge point outlets (concentrated discharge points), and distance/acreage of homes and roads to/within the ravine banks.

## Indicators

For the 2019 study ravines were assessed by SMC as well as the City of Lake Forest using criteria from the SSIP for the Lake Michigan Watershed Ecosystem Partnership. The indicators used are detailed on page 67 of the October 2009 SSIP final report “Stresses and Opportunities in Illinois Lake Michigan Watersheds Strategic Sub-Watershed Identification Process Report (SSIP) for the Lake Michigan Watershed Ecosystem Partnership”.

## Data Collection Equipment and Methodology

Geographic location data was collected in the field with an iPad using the ArcGIS Collector application. An iPad is a portable tablet computer with a touch screen which allows users to easily collect data. The Collector Application was downloaded onto the iPad to capture field data while simultaneously uploading this data to ArcGIS Online, an online, cloud-based mapping and analysis software. Collector uses an aerial basemap in combination with a Global Positioning System (GPS) location so users can ensure they are collecting accurate data based on their visual observations.

Data was collected for each ravine beginning at the most downstream end and then moving upstream. The four categories of field data collected were: ravine bed properties, ravine bank properties, ravine bed rank, and discharge points (discharge points may be stormwater pipe outfalls, or individual sump pump and other pipes discharging directly to the ravine). The field observer established a data point at each location where the properties of a section of the ravine bed or bank changed markedly. The criteria for making this determination are outlined in the following section. For discharge points, data points were established wherever the field observer noted a discharge point (generally, all discharge point data indicates the location of concentrated flow into a ravine). The locations, descriptions, and photos of each data point were then downloaded into ArcGIS as geodatabases for further analyses. ArcGIS is a cartographic software program that enables mapping, analysis and sharing of geographic data. Geodatabases are the standard electronic collection of files in a folder format of geographic data used by ArcGIS. Files are typically represented by shapefiles such as points, lines, or polygons on a map and attachments include photos or geographic locations.

**Table 1:** Ravines surveyed in 2019

Ravine Name	County	Surveyed by
Spring Bluff Ravine	Lake	SMC
Dead Dog Ravine	Lake	SMC
Kellogg Creek	Lake	SMC
Carmel Park Ravine	Lake	SMC
Bull Creek	Lake	SMC
Ganster Ravine	Lake	SMC
Glen Flora Tributary	Lake	SMC
Terrace and Harding Avenue Ravine	Lake	SMC
Stanley Ravine	Lake	SMC
Upton Park Ravine	Lake	SMC
Waukegan River	Lake	SMC
Pettibone Creek	Lake	SMC
Crabtree Ravine	Lake	SMC
Lillian Dells Ravine	Lake	SMC
Ravine Park Ravine	Lake	SMC
South Ravine	Lake	SMC
Cemetery Ravine	Lake	City of Lake Forest (2017)
Spruce Avenue Ravine	Lake	City of Lake Forest (2017)
Clark's Ravine	Lake	City of Lake Forest (2017)
Woodland Road Ravine	Lake	City of Lake Forest (2017)
Woodbine Lane Ravine	Lake	City of Lake Forest (2017)
Westminster Road Ravine	Lake	City of Lake Forest (2017)
Witchhazel/Seminary Ravine	Lake	City of Lake Forest (2017)
Maplewood Road Ravine	Lake	City of Lake Forest (2017)
Mayflower Ravine	Lake	City of Lake Forest (2017)
Stone Gate Road Ravine	Lake	City of Lake Forest (2017)
Walden Ravine	Lake	City of Lake Forest (2017)
McCormick/Janes Ravine	Lake	City of Lake Forest (2017)
Hutchinson Ravine	Lake	City of Lake Forest (2017)
MacArthur and Scott Loop Ravine	Lake	SMC
Scott Loop Ravine	Lake	SMC
Bartlett Ravine	Lake	SMC
Van Horne Ravine	Lake	SMC
Schenck Ravine	Lake	SMC
Ravine 10L	Lake	SMC
Ravine 9L	Lake	SMC
Ravine 9L2	Lake	SMC
Ravine 8L	Lake	SMC
Ravine 7L	Lake	SMC
Ravine 6L	Lake	SMC
Ravine 5L	Lake	SMC
Ravine 4L	Lake	SMC
Ravine 3L	Lake	SMC
Ravine 2L	Lake	SMC
Lakeview Terrace Ravine	Lake	SMC
Ravine 1L	Lake/Cook	SMC
Ravine 7C	Cook	SMC
Ravine 6C	Cook	SMC
Ravine 5C	Cook	SMC
Ravine 4C	Cook	SMC
Ravine 3C	Cook	SMC
Ravine 2C	Cook	SMC
Ravine 1C	Cook	SMC

**Field Assessment Criteria**

Ravine beds and banks were qualitatively assessed to evaluate the stability of each channel. A qualitative evaluation simply means the ranking is based on the visual condition of a channel rather than an absolute numerical measurement. Observations of the bed and banks were ranked using an ordinal scale: most unstable bed, unstable, moderate, stable, and most stable bed. A rank of most unstable bed represents a channel that is actively eroding, and a rank of most stable bed represents a stable channel that is not visibly eroding. The ranks were determined based on the observed bed and bank properties. A more detailed explanation of this ranking system can be found on page 68 of the SSIP report. Data points were collected on the iPad as changes were observed in bed or bank stability. The resulting rank applies to the stretch of bed or bank in between the downstream point and ending at the next point collected upstream.

**Table 2.** Criteria collected in the field using ArcGIS Collector (explanation in following sections)

Category	Type
Bank Properties	Gully
	Scarp
	Other
Bed Properties	Existing Project
	Failing Structure
	Log Jam
	Natural Knickpoint
	Other
Discharge points	Exposed Pipe
	Residential
	Sanitary Sewer
	Storm Sewer
	Other

**Bank Properties**

Bank properties are separated into two types: gullies and scarps. Each bank property type was ranked with the aforementioned ordinal scale to evaluate the stability of the banks and severity of erosion. “Gully” refers to a deep v-shaped channel cut into the slopes as a result of concentrated surface water flow (Figures 1 & 2). Gully data is collected as a single point and does not reflect the distance or length of a gully, merely the stability of the channel. “Scarp” refers to an area of land eroded away from the ravine bank, leaving behind a concave area exposed with a slump of the eroded sediment moving down slope (Figures 3 & 4). It is rare for scarps to receive a rank higher than moderate, because a scarp is already severely eroded by definition.



**Figure 1.** Gully rated 'most unstable' in Ravine 7L.



**Figure 2.** Gully rated 'unstable' in Ravine 10L.



**Figure 3.** Scarp rated 'most unstable' in Ravine 3L.



**Figure 4.** Scarp rated 'unstable' in Ravine 3L.

## Bed Properties

Bed properties are separated into five types: existing project, failing structure, log jam, natural knickpoint, and other. Existing, failed, and other types of projects and structures commonly include features such as manholes, revetments, gabions, culverts, and retaining walls. Existing projects and structures are features that have clearly been constructed in the ravine and are in a functioning state at the time of observation. Failing structures are those which have been compromised, broken, or are otherwise no longer functioning as intended. If these projects or structures span a significant distance of the bank, a data point is collected at both the downstream and upstream ends to note the extent of the structure. Log jams are collections of woody debris in the ravine bed. They are common features and are considered a jam if it blocks or alters the flow of the channel. A natural knickpoint is a change in channel slope caused by differing rates of erosion above and below the knickpoint. Figures 5-8 are photographic examples of bed property features.



Figure 5. Failed structure, concrete head wall



Figure 6. Existing project in Ravine 10L.



Figure 7. Log jam in South Ravine.



Figure 8. Natural knick point in Bull Creek.

In addition to observing and inventorying the location of bed properties, ravine beds were also ranked using the ordinal (most unstable bed to most stable bed) scale to evaluate stability. Please refer to Chapter 4, “Lake Michigan Ravines” in the SSIP Report for a detailed explanation of the ravine bed rank criteria and methodology. Bed material was also recorded in the comment field of the bed rank shapefile. Bed material refers to the type of sediment composing the ravine bed and may consist of clay, silt, sand, gravel, cobble, or a combination thereof. This information is recorded as a comment in the shapefile, or the electronic file containing the bed rank data. The information is then accessible using ArcGIS software (discussed above) or can be provided by one of the custodians of this data (Alliance for the Great Lakes or Lake County Stormwater Management Commission).

### Discharge point

Discharge points are separated into five different types: exposed pipe, residential, storm sewer, sanitary sewer, and other. Exposed pipes are discharge points that are visible, but could not be clearly identified as residential, storm sewer, or sanitary sewer. The “other” field was not commonly used in this study, but when used referred to pipes that appeared inactive but have the potential to become a discharge point. Pipes without an outfall, such as sanitary lines exposed in the bed of the ravine, were classified under ‘bed properties’ as an ‘existing project’ since they do not

discharge into the ravine. Figures 9 and 10 are photographic examples of this difference. Figure 9 is a pipe that was classified as an existing project. It is an exposed sanitary pipe that while visible has no outlet into the ravine and therefore cannot be classified as a discharge point. Figure 10 is a disconnected metal pipe that could potentially be a source of discharge and was therefore classified as a discharge point rather than an existing project. In addition to classifying each discharge point by type, pipe material, diameter, and a picture of the pipe were recorded in the comment field of the shapefiles.



Figure 9. Sanitary pipe as an 'existing project'.



Figure 10. Disconnected metal pipe as a 'discharge point'.

## Results Summary

Various assessment criteria were considered when calculating the final erosion risk score. Based on the field data collected in 2019, some of the more dynamic criteria were updated to calculate new erosion risk scores. For the 2019 scores, data were updated for the following categories: total number of discharge points, number of failing structures, number of log jams, number of natural knick points, and number of gullies ranked 'most unstable' or 'unstable'. However, data were not updated for criteria that were determined to have experienced negligible or no change, such as the average distance from ravine bank to roads or buildings. In these cases, data from 2009 and/or 2011 were used. These criteria were used to calculate an "erosion risk score". A score of 100 represents the most unstable ravine with the highest risk of erosion, and a score of 0 represents the most stable ravine with the lowest potential for erosion. The table below lists the 2019 erosion risk scores, the 2009 rank, the 2011 rank, and the new 2019 rank. A more detailed explanation of the erosion risk calculation can be found in the "Scoring Methodology" and "Lake Michigan Ravines" chapters of the SSIP report. More information can be found in the web mapping application at the following link:

<https://lakecountyiil.maps.arcgis.com/apps/webappviewer/index.html?id=e27d8207042a4b38bd9b36e26a39b632>.

Ravines appear in the web application under the names listed above. Ravine names can be searched in the search bar.

**Table 3:** Erosion risk scores, previous rankings, and current rankings. Ravines are ranked 0-100, with 100 = highest risk

Ravine Name	2019 Erosion Risk Score	2009 Rank (of 47)	2011 Rank (of 52)	2019 Rank (of 53)
Bartlett Ravine	36.4025	36	31	29
Bull Creek	95.4780	-	7	5
Carmel Park Ravine	37.6722	45	50	28
Cemetery Ravine*	30.5509	26	30	31
Clark's Ravine*	65.4665	7	8	16
Crabtree Ravine	31.6545	33	42	30
Dead Dog Creek	21.6208	-	24	41
Ganster Ravine	29.3873	47	52	34
Glen Flora Tributary	13.1136	46	51	50
Hutchinson Ravine*	8.3467	44	49	53
Kellogg Creek	77.1480	-	10	12
Lakeview Terrace Ravine	21.9636	35	39	40
Lillian Dells Ravine	26.8267	28	32	37
MacArthur & Scott Loop Ravine	23.5530	32	37	39
Maplewood Road Ravine*	14.2019	30	35	49
Mayflower Ravine*	44.5753	16	20	24
McCormick/Janes Ravine*	71.0427	9	12	13
Pettibone Creek	27.0273	13	14	36
Ravine 1C	39.2507	25	28	26
Ravine 1L	96.4222	5	6	4
Ravine 2C	64.9932	11	15	17
Ravine 2L	48.1216	21	23	22
Ravine 3C	39.1825	41	46	27
Ravine 3L	99.2185	3	3	2
Ravine 4C	84.8882	8	11	10
Ravine 4L	68.9440	14	18	15
Ravine 5C	90.4108	10	13	8
Ravine 5L	50.5204	20	25	21
Ravine 6C	44.4253	24	27	25
Ravine 6L	51.8553	23	29	20
Ravine 7C	57.0019	17	21	18
Ravine 7L	99.0875	2	1	3
Ravine 8L	30.1252	19	22	32
Ravine 9L	69.6556	15	17	14
Ravine 9L2	45.9710	38	40	23
Ravine 10L	99.3350	1	2	1
Ravine Park Ravine	53.4768	18	19	19
Schenck Ravine	16.0442	27	33	48
Scott Loop Ravine	21.0759	29	36	42
South Ravine	90.8078	6	9	7
Spring Bluff Ravine	16.6455	-	45	47
Spruce Avenue Ravine	12.3410	-	-	51
Stanley Ravine	30.1129	39	43	33
Stone Gate Road Ravine*	27.8021	22	26	35
Terrace&Harding Avenue Ravine	26.4702	37	41	38
Upton Park Ravine	17.2771	43	47	45
Van Horne Ravine	12.1992	42	48	52
Walden Ravine*	86.8474	12	16	9
Waukegan River	83.0202	-	5	11
Witchhazel /Seminary Ravine*	91.7993	4	4	6
Westminster Road Ravine*	16.7804	31	34	46
Woodbine Lane Ravine*	17.3948	34	38	44
Woodland Road Ravine*	19.6086	40	44	43

\*Ravines assessed by the City of Lake Forest in 2017. Larger sections of Kellogg Creek, Ravine 3L, and Ganster Ravine and a smaller section of Pettibone Creek were surveyed in 2019.

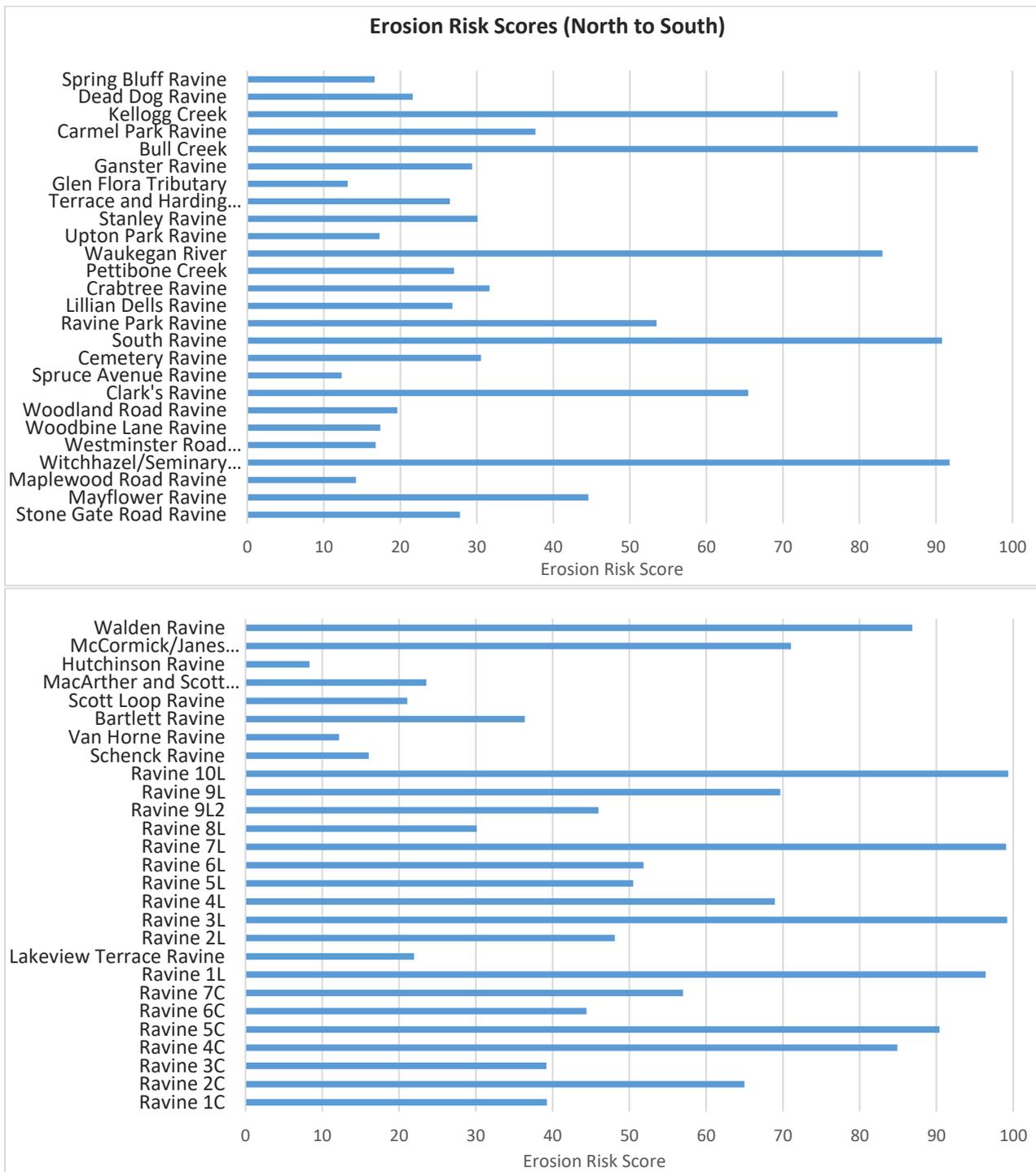
## Results Summary Discussion

### Ravines with the Highest Erosion Risk Scores

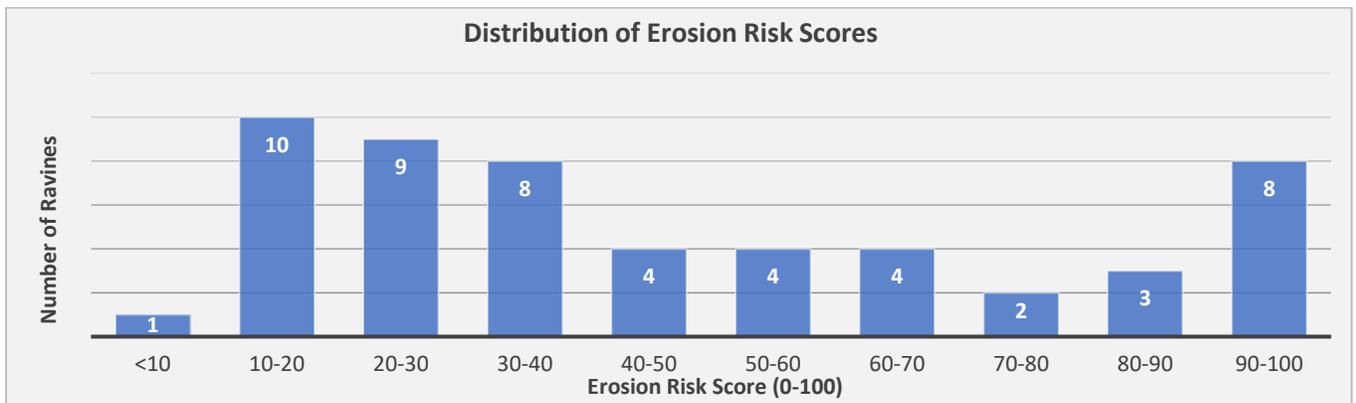
With the addition of the 2019 field data, the highest ranked ravines for erosion potential are: Ravine 10L, Ravine 3L, Ravine 7L, Ravine 1L, and Bull Creek Ravine. These ravines have the highest overall scores, all scoring above 95. When compared with the 2011 data the three highest ranking ravines remained unchanged, however; the order of these ravines compared against one another shifted slightly. Ravine 10L was bumped to the top from second, and Ravine 7L shifted down from first to third. Despite this reordering the actual numerical scores did not change significantly from 2011 to 2019. This also holds true for ravines ranked outside the top three: Witchhazel/Seminary Ravine, Ravine 1L, and Bull Creek Ravines. These ravines experienced small changes in ranking and erosion score. Of the ravines with the highest scores in 2011, Waukegan River is the only ravine that dropped considerably in ranking. In 2011 Waukegan River was ranked fifth and currently ranks eleventh. This drop was caused by two factors. The first being a significant difference in discharge points found in the ravine in 2011 (117) compared with 2019 (82). The second factor being a decrease from 9 knick points in 2011 to 0 in 2019. Erosion risk scores for all 53 ravines are compared in figure 11.

**Table 4.** Ravines with the highest erosion risk scores, 2011 & 2019

Ravine Name	Erosion Risk Score 2011	Ravine Name	Erosion Risk Score 2019
Ravine 7L	99.61	Ravine 10L	99.33
Ravine 10L	99.07	Ravine 3L	99.22
Ravine 3L	98.40	Ravine 7L	99.09
Witchhazel / Seminary Ravine	95.56	Ravine 1L	96.42
Waukegan River	93.99	Bull Creek	95.48



**Figure 11.** The bar graph displays the 2019 erosion risk scores for all ravines. The ravines are ordered geographically (north to south). The length of the blue bar represents the erosion risk score for the corresponding ravine.



**Figure 12.** Shows the distribution of the 2019 erosion risk scores. Each bar represents the number of ravines that fell into a particular scoring range. The category of ravines scoring between ‘10-20’ contains 10 ravines, which is the most of any category. There was only one ravine that received an erosion risk score of less than 10. *Erosion risk scores are calculated relative to each other\**

### Ravines with the Lowest Erosion Risk Scores

There were more dynamic changes to the ranking of the ravines with the lowest erosion scores. Hutchinson Ravine has the lowest 2019 erosion risk score and has dropped in ranking since 2011. Hutchinson Ravine was found to have the same number of discharge points and failing structures in 2019 as in 2011, but there was a decrease from 7 to 0 log jams. The elimination of logs jams is responsible for the drop in rank. In 2011, Ganster Ravine had the lowest erosion risk score. There was an additional section of Ganster Ravine surveyed in 2019, which likely lead to the increased score for that ravine. This extension of the ravine is south of Montesano Avenue and runs along Alta Vista Drive. Ganster Ravine now ranks 34 out of 53. Carmel Park Ravine also jumped in ranking. Carmel Park had a score of 8.98 and now has a score of 37.67. 10 additional discharge points were found in the ravine and the bed is measurably more eroded than in 2011. This is discussed further in the ‘Erosion Risk Score Discrepancies’ section. Furthermore, there was an additional ravine, Spruce Avenue Ravine, surveyed in 2019, which impacted the ranking order. However, relative to each other, many of the ravines in this category (Schenk Ravine, Hutchinson Ravine, Maplewood Road Ravine, and Van Horne Ravine), experienced decreases in erosion score. The table below lists the ravines with the lowest erosion risk scores for 2011 and 2019.

**Table 5:** Ravines with the lowest erosion risk score, 2011 & 2019

Ravine Name	Erosion Risk Score 2011	Ravine Name	Erosion Risk Score 2019
Upton Park Ravine	15.66	Schenk Ravine	16.04
Van Horne Ravine	14.27	Maplewood Road Ravine	14.20
Hutchinson Ravine	11.41	Glen Flora Tributary	13.11
Carmel Park Ravine	8.98	Spruce Avenue Ravine	12.34
Glen Flora Tributary	8.54	Van Horne Ravine	12.20
Ganster Ravine	6.78	Hutchinson Ravine	8.35

**Ravines with Greatest Decrease in Erosion Risk Score**

Pettibone Creek, Dead Dog Creek, Ravine 8L, Stone Gate Road Ravine, and Clark’s Ravine sustained the greatest decreases in erosion risk score. Since a score of 100 represents the highest qualitative risk of erosion relative to the other ravines, a decrease in score from 2011 to 2019 indicates that either remediations or other improvements have been made or that conditions in other ravines have worsened causing the decrease in score. Pettibone Creek’s score decreased by almost 50, dropping from 75.93 to 27.03. This drastic decrease in score is because a smaller section of the ravine was surveyed in 2019 than in 2011. In 2019 only the portion south of the Great Lakes Naval Station was surveyed. The remaining ravines in this category, Pettibone Creek, Dead Dog Creek, Ravine 8L, and Stone Gate Road Ravine, all scored under 30 in 2019. Clark’s Ravine erosion score dropped by approximately 16, but its 2019 score of 65.47 is still relatively high.

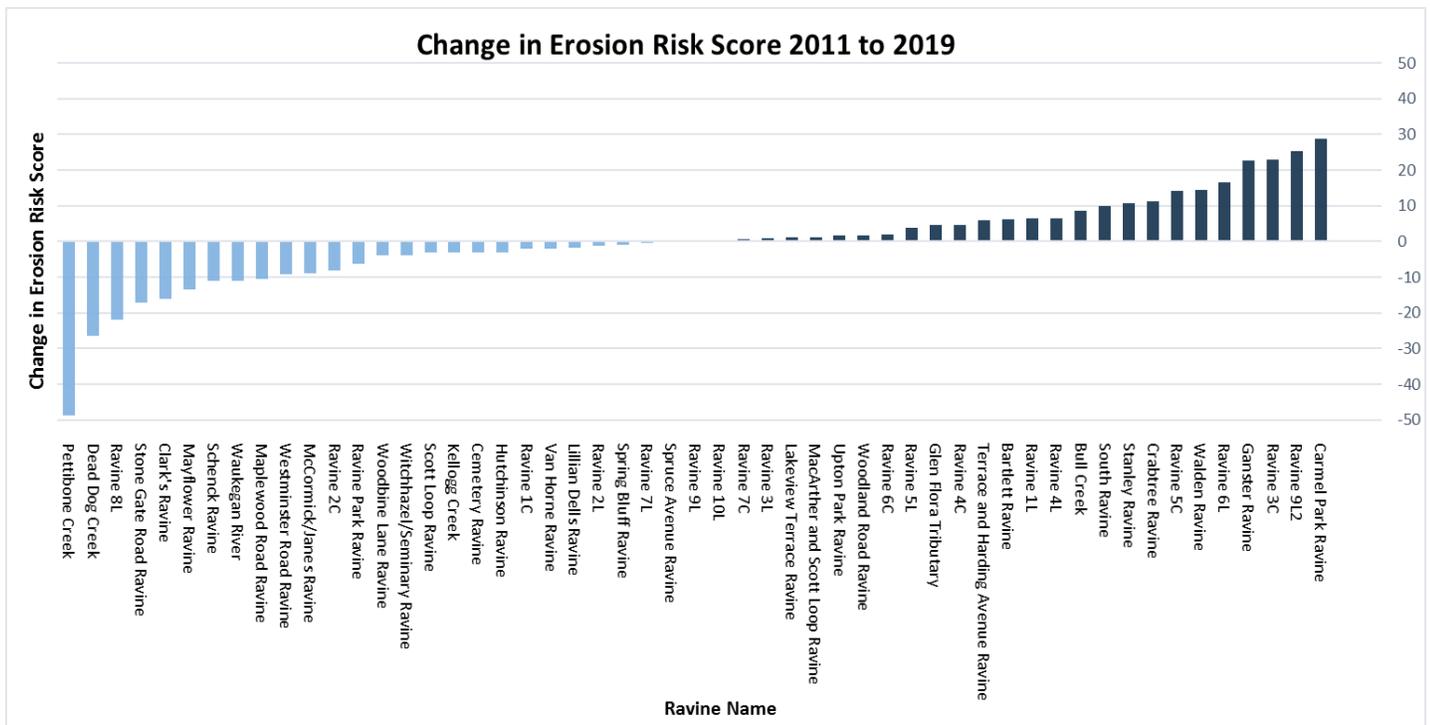
**Table 6.** Ravines with the greatest decrease in 2019 erosion risk score

Ravine Name	Erosion Risk Score 2011	Erosion Risk Score 2019	Change in Score
Pettibone Creek	75.93	27.03	-48.90
Dead Dog Creek	48.16	21.62	-26.54
Ravine 8L	52.16	30.12	-22.04
Stone Gate Road Ravine	45.00	27.80	-17.20
Clark’s Ravine	81.66	65.47	-16.19

Each criterion that factors into the calculation of the final erosion score is weighted differently, and therefore affects the final score to various degrees. The number of ‘discharge points’ is one criterion which is strongly weighted in the final erosion risk score calculation. The table below compares the number of discharge points collected for each ravine in 2011 and in 2019, as well as other consequential bed properties. For ravines where the overall erosion risk score decreased, there was also a general decrease in the number log jams and natural knick points. For example, Dead Dog Creek had 7 natural knick points in 2011 and 0 in 2019. In 2011 Dead Dog Creek had 31 discharge points and 27 in 2019. This trend towards a decrease in number of log jams, natural knick points, and other bed properties was observed for ravines where scores decreased.

**Table 7.** Change in bed properties for ravines with the greatest decrease in erosion risk score

Ravine Name	All Discharge Points		Difference	Failing Structures		Difference	Log Jams		Difference	Knick Points		Difference
	2011	2019		2011	2019		2011	2019		2011	2019	
Pettibone Creek	71	72	1	1	2	1	39	7	-32	14	3	-11
Dead Dog Creek	31	27	-4	5	2	-3	21	0	-21	7	0	-7
Ravine 8L	14	22	8	2	2	0	7	0	-7	1	0	-1
Stone Gate Road Ravine	20	20	0	4	2	-2	12	1	-11	0	0	0
Clark’s Ravine	52	52	0	4	15	11	13	4	-9	0	1	1



**Figure 13.** This graph shows the change in erosion risk scores from 2011 to 2019. The light blue bars represent a decrease in erosion risk score and the dark blue bars represent an increase in score.

### Ravines with the Greatest Increase in Erosion Risk Score

Conversely the following ravines saw the largest increases in erosion risk score: Ravine 6L, Ganster Ravine, Ravine 3C, Ravine 9L2, and Carmel Park Ravine. Carmel Park Ravine experienced the greatest change in score. This is due to the additional discharge points found in the ravine and an increase in length of eroding channel. The extension added to Ganster Ravine impacted the number of discharge points and other bed properties causing its increase in score. While each ravine in this category increased in score, it is important to note each individual risk score, relative to other ravines, remains low. Ravine 6L has the highest risk score at 51.86. Apart from Ravine 6L, the other scores range from 29.39-45.97.

**Table 8.** Ravines with the greatest increase in erosion risk score

Ravine Name	Erosion Risk Score 2011	Erosion Risk Score 2019	Change in Score
Carmel Park Ravine	8.98	37.67	+28.69
Ravine 9L2	20.56	45.97	+25.41
Ravine 3C	16.15	39.18	+23.04
Ganster Ravine	6.78	29.39	+22.61
Ravine 6L	35.24	51.86	+16.61

Table 9 compares the total number of discharge points and other bed properties collected in 2011 and 2019 for the ravines that experienced the greatest increase in erosion score. Number of discharge points, failing structures, log jams, knick point are all positively correlated with erosion risk score. Therefore, an increase in any of those criteria will cause a corresponding increase erosion risk score, a trend that was also seen in 2011. In 2011 Ravine 9L2 was

ranked 40 out of 52 and now ranks 23 out of 53. This jump in rank stems from an increase in discharge points and failing structures. For this ravine, there was an increase of 31 discharge points and 5 additional failing structures.

**Table 9.** Change in bed properties from 2011 to 2019 for ravines that had the greatest increase 2019 score

Ravine Name	All Discharge Points		Difference	Failing Structures		Difference	Log Jams		Difference	Knick Points		Difference
	2011	2019		2011	2019		2011	2019		2011	2019	
<b>Carmel Park Ravine</b>	4	14	+10	1	2	+1	1	3	+2	0	1	+1
<b>Ravine 9L2</b>	4	35	+31	3	8	+5	1	2	+1	0	1	+1
<b>Ravine 3C</b>	0	18	+18	0	0	0	0	0	0	0	0	0
<b>Ganster Ravine</b>	3	15	+12	0	1	+1	4	6	+2	0	3	+3
<b>Ravine 6L</b>	8	12	+4	0	6	+6	5	8	+3	2	7	+5

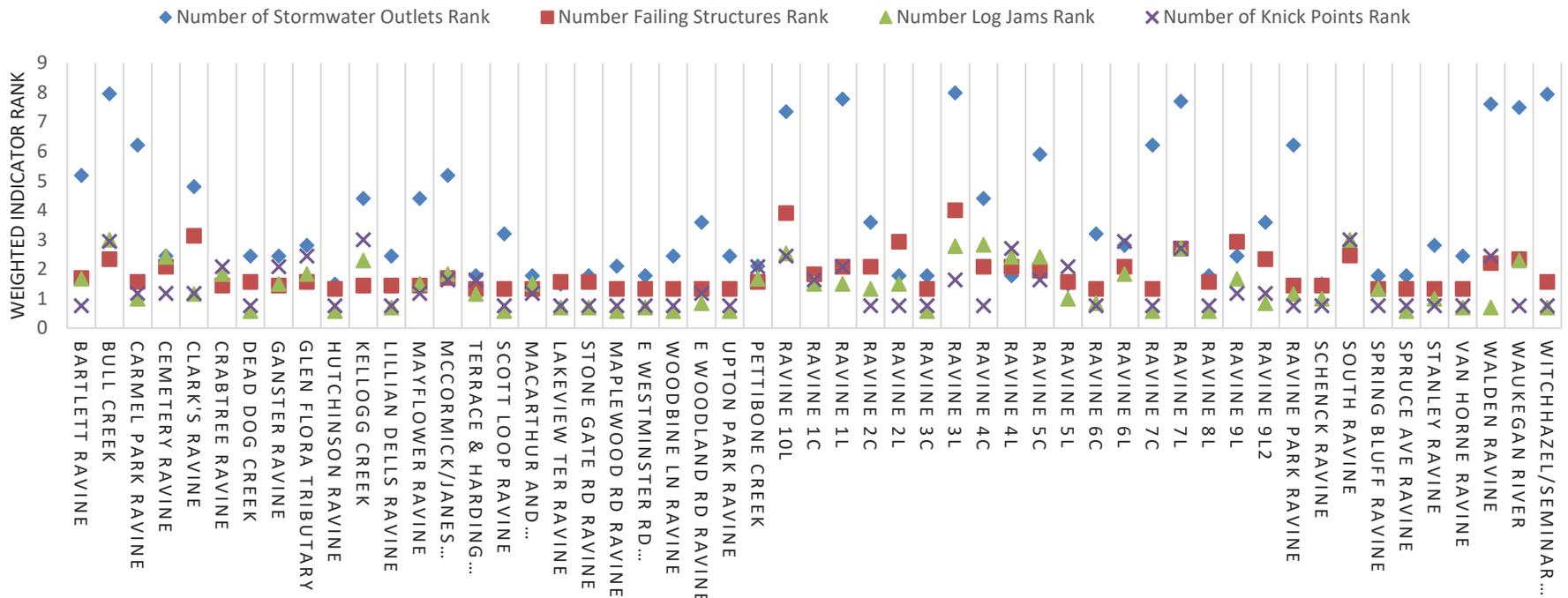
**Comparison of Weighted Erosion Risk Scores**

Each criterion is weighted differently and affects the erosion risk score of a ravine to varying degrees. Of the criteria surveyed in the field (number of stormwater outlets, number of failing structures, number of log jams, and number of knick points) stormwater outlets has the heaviest weight. However, depending on the actual number of stormwater outlets present in a ravine, this may or may not be the most influential criterion on the final erosion risk score. Most of the erosion risk scores were strongly impacted by the weighted rank from stormwater outlets, but there were a few circumstances where other factors had a greater effect. For example, Crabtree Ravine and Ravine 4L’s erosion scores were more heavily impacted by the amount of knick points. This resulted in lower than anticipated erosion risk scores based on field observations. This is discussed further in ‘Erosion Risk Score Discrepancies’ section. Table 10 lists the ravines where criteria other than stormwater outlets had a greater impact on final erosion scores. Figure 14 compares the weighted indicator ranks for each bed property for the ravines surveyed in 2019.

**Table 10.** Ravines where stormwater outlets did not have the largest impact on final erosion score (shown in Figure 14)

Ravine Name	Bed Property with Most Effect Erosion Risk Score
<b>Lakeview Terrace Ravine</b>	Number of Failing Structures
<b>Ravine 1C</b>	Number of Failing Structures
<b>Ravine 2L</b>	Number of Failing Structures
<b>Ravine 9L</b>	Number of Failing Structures
<b>Crabtree Ravine</b>	Number of Knick Points
<b>Ravine 4L</b>	Number of Knick Points
<b>Ravine 5L</b>	Number of Knick Points
<b>Ravine 6L</b>	Number of Knick Points
<b>South Ravine</b>	Number of Knick Points

## 2019 WEIGHTED INDICATOR RANK AFFECT ON EROSION RISK SCORE PER RAVINE



**Figure 14.** The effects of weighted indicators for each ravine are compared against one another in this graph. The blue diamond represents the weighted rank of the stormwater outlets for each ravine. This metric has the strongest weight and had the greatest impact on final erosion scores for most ravines. The red square represents the weighted indicator score for failing structures, the green triangle represents log jams, and the purple X represents knick points.

## Erosion Risk Score Discrepancies

An erosion risk score is just one indication of the level of erosion in a ravine, field observations are another. For instance, Crabtree Ravine and Ravine 4L were visually observed to be more severely eroded than their erosion risk scores indicate. Crabtree Ravine scored 31.65 and Ravine 4L scored 68.94. Crabtree Ravine has large sections of bank that are noticeably eroding, and navigation through the ravine was extremely difficult due to extensive log jams and unstable channel conditions. As previously mentioned, factors like number of discharge points, knick points, and other bed properties are weighted differently and effect the final erosion scores to varying degrees. 90.77% of ravine banks in Crabtree Ravine were assessed to be ‘most unstable’ or ‘unstable’. While this metric is considered when determining the final erosion risk score the low number of bed properties had a stronger pull on the final erosion risk score. Crabtree Ravine has a total of 5 discharge points, 3 knick points, and 1 failing structure. These factors are responsible for the relatively low erosion score. Ravine 4L is another instance where the erosion risk score does not correspond with field observations. 73.46% of the banks were ranked ‘most unstable’ or ‘unstable’, but very few discharge points were recorded.

This divergence also exists when comparing channel erosion and erosion risk score. Carmel Park Ravine and Ravine 3C are two examples. 100% of the ravine channel was surveyed as ‘most unstable’ or ‘unstable’ for both ravines, and both ravines have erosion risk scores under 40. As mentioned in a previous section, Carmel Park Ravine had an increase of 10 discharge points (4 to 14), and discharge points in Ravine 3C increased from 0 to 18. Compared with other ravines, 14 and 18 are relatively low quantities of discharge points and likely deflated the erosion risk scores for Carmel Park Ravine and Ravine 3C. Table 11 lists the percentage of both bank and channel erosion compared to each ravine’s 2019 erosion risk score. The percentage of surveyed erosion does not always correspond with the erosion risk score. Such as with Crabtree Ravine, there are cases where the erosion risk score is vastly different than the observed bank or channel erosion.

**Table 11.** Ravines listed in order of highest bank and channel erosion percentage (percent rated unstable/most unstable)

Ravine Name	% Bank Erosion	Erosion Risk Score	Ravine Name	% Channel Erosion	Erosion Risk Score
Crabtree Ravine	90.77	31.65	Carmel Park Ravine	100.00	37.67
Ravine 4L	73.46	68.94	Ravine 3C	100.00	39.18
Ravine 6L	68.93	51.86	Ravine 7C	99.41	57.00
Stone Gate Road Ravine	57.47	27.80	Ravine 6C	97.53	44.43
Witchhazel/Seminary Ravine	54.63	91.80	Ravine 4C	97.53	84.89
Ravine 2C	53.81	64.99	Ravine 5C	96.83	90.41
South Ravine	44.96	90.81	Ravine 5L	83.09	50.52
Ravine 5L	43.16	50.52	Ravine 6L	78.46	51.86
McCormick/Janes Ravine	42.77	71.04	Crabtree Ravine	69.20	31.65
Ravine 1L	41.41	96.42	Terrace & Harding Avenue Ravine	67.98	26.47
MacArthur & Scott Loop Ravine	41.31	23.55	Ravine 4L	64.72	68.94
Ravine 5C	40.82	90.41	Ganster Ravine	53.93	29.39
Ravine 7L	40.73	99.09	Van Horne Ravine	41.52	12.20
Schenck Ravine	40.62	16.04	South Ravine	35.81	90.81
Ravine 10L	40.43	99.33	Spruce Avenue Ravine	33.58	12.34
Ravine 9L	40.12	69.66	Stanley Ravine	29.52	30.11
Mayflower Ravine	39.92	44.58	Ravine 10L	24.71	99.33
Clark's Ravine	39.47	65.47	Stone Gate Road Ravine	18.45	27.80
Walden Ravine	37.79	86.85	Ravine 1C	16.67	39.25
Ravine 4C	33.52	84.89	Dead Dog Creek	16.48	21.62
Ravine 7C	32.56	57.00	McCormick/Janes Ravine	16.09	71.04
Ravine 2L	32.05	48.12	Clark's Ravine	15.96	65.47
Woodbine Lane Ravine	31.01	17.39	Walden Ravine	15.51	86.85
Terrace & Harding Avenue Ravine	30.54	26.47	Witchhazel/Seminary Ravine	14.66	91.80
Westminster Road Ravine	28.92	16.78	Ravine 8L	14.25	30.13
Ravine 3L	27.63	99.22	Woodland Road Ravine	13.32	19.61
Cemetery Ravine	26.42	30.55	Ravine 9L2	13.31	45.97
Maplewood Road Ravine	24.71	14.20	Waukegan River	13.06	83.02
Stanley Ravine	23.65	30.11	Ravine 2L	12.67	48.12
Kellogg Creek	20.52	77.15	Ravine 1L	12.50	96.42
Ravine 9L2	19.95	45.97	Ravine 3L	11.98	99.22
Spruce Avenue Ravine	19.92	12.34	Ravine 2C	11.52	64.99
Waukegan River	18.87	83.02	Ravine 9L	11.28	69.66
Woodland Road Ravine	17.23	19.61	Bull Creek	9.94	95.48
Pettibone Creek	16.45	27.03	Ravine 7L	9.46	99.09
Bull Creek	16.40	95.48	Kellogg Creek	8.92	77.15
Dead Dog Creek	15.58	21.62	Westminster Road Ravine	8.82	16.78
Lillian Dells Ravine	14.31	26.83	Cemetery Ravine	8.07	30.55
Carmel Park Ravine	13.90	37.67	Mayflower Ravine	7.99	44.58
Ravine 8L	13.48	30.13	MacArthur & Scott Loop Ravine	7.49	23.55
Ravine Park Ravine	10.77	53.48	Lillian Dells Ravine	5.51	26.83
Scott Loop Ravine	8.84	21.08	Hutchinson Ravine	4.86	8.35
Ravine 6C	8.48	44.43	Schenck Ravine	3.88	16.04
Ravine 1C	7.51	39.25	Bartlett Ravine	3.76	36.40
Bartlett Ravine	6.59	36.40	Maplewood Road Ravine	2.45	14.20
Ravine 3C	5.92	39.18	Glen Flora Tributary	1.54	13.11
Spring Bluff Ravine	5.74	16.65	Pettibone Creek	1.54	27.03
Ganster Ravine	4.33	29.39	Woodbine Lane Ravine	0.00	17.39
Glen Flora Tributary	3.68	13.11	Ravine Park Ravine	0.00	53.48
Hutchinson Ravine	3.62	8.35	Scott Loop Ravine	0.00	21.08
Lakeview Terrace Ravine	0.49	21.96	Spring Bluff Ravine	0.00	16.65
Upton Park Ravine	0.00	17.28	Lakeview Terrace Ravine	0.00	21.96
Van Horne Ravine	0.00	12.20	Upton Park Ravine	0.00	17.28

**Effects of Bed Properties on Channel and Bank Erosion**

One factor that affects erosion in a ravine is the density of discharge points. A higher number of discharge points should increase the potential for erosion in a ravine. Table 12 below looks at this relationship for ravines in this study. The ravines listed in the table have the highest number of discharge points per foot of channel, so it is expected they would also have the highest amounts of erosion. Ravine 4L has the most discharge points per foot of channel and does have high amounts of bank and channel erosion. However, while Ravine 9L also has a high density of discharge points; only 40.12% of its bank and 12.50% of its channel are considered unstable. For this analysis the quantity of discharges/ft was the only factor considered: frequency and volume of individual discharges were not considered. The sheer number of discharge points is not enough information to draw definitive conclusions about the impact of discharges on erosion. If frequency and volume had been accounted for there would likely be a stronger correlation between observed erosion and the number of discharge points.

**Table 12.** Ravines with the highest number of discharge points per foot of channel

Ravine Name	Total Number of Discharge Points	Discharge Points /Channel ft	% Channel Erosion	% Bank Erosion	Erosion Risk Score
Ravine 4L	44	0.0316	64.72	73.46	68.94
Ravine 3C	18	0.0302	100.00	5.92	39.18
Ravine 5L	23	0.0279	83.09	43.16	50.52
Ravine 9L	112	0.0266	11.28	40.12	69.66
Ravine 1L	273	0.0240	12.50	41.41	96.42
Ravine 2C	77	0.0220	11.52	53.81	64.99

**Table 13.** Ravines with the highest number of Natural Knick Points per foot of channel

Ravine Name	Total Number of Knick Points	Knick Points/ Channel ft	% Channel Erosion	% Bank Erosion	Erosion Score
Ravine 6L	7	0.005408078	78.46	68.93	<b>51.86</b>
Crabtree Ravine	3	0.004476877	69.20	90.77	<b>31.65</b>
Ravine 5L	3	0.003634381	83.09	43.16	<b>50.52</b>
Ravine 4L	5	0.003591335	64.72	73.46	<b>68.94</b>
Terrace and Harding Avenue Ravine	2	0.003172438	67.98	30.54	<b>26.47</b>
MacArthur and Scott Loop Ravine	1	0.001809136	7.49	41.31	<b>23.55</b>

**Table 14.** Ravines with the most failing structures per foot of channel

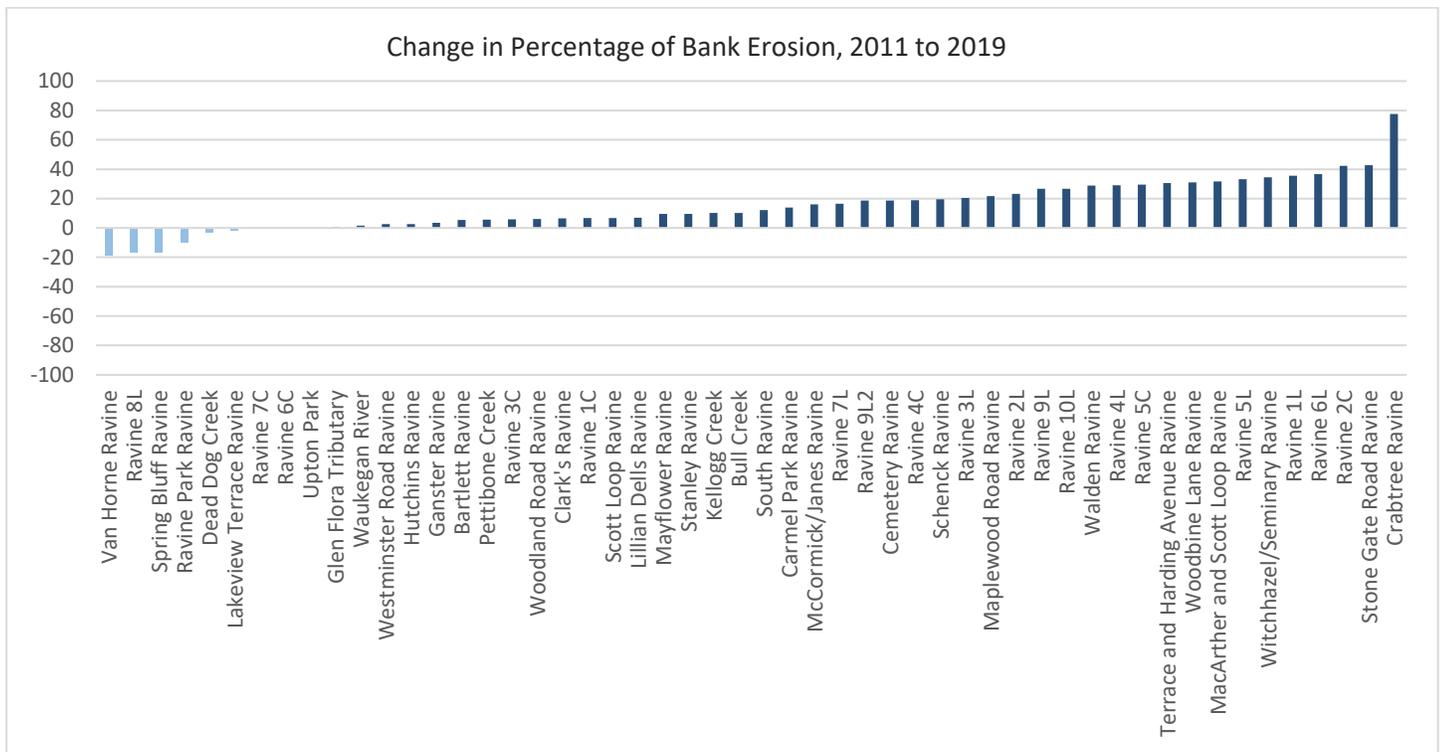
Ravine Name	Total Number of Failing Structures	Failing Structures/Channel ft	% Channel Erosion	% Bank Erosion	Erosion Risk Score
Ravine 6L	6	0.004635496	78.46	68.93	51.86
Ravine 4L	6	0.004309602	64.72	73.46	68.94
Ravine 9L2	8	0.004027042	13.31	19.95	45.97
Ravine 3L	85	0.003940868	11.98	27.63	99.22
Ravine 2L	13	0.003912881	12.67	32.05	48.12
Ravine 9L	13	0.003082205	11.28	40.12	69.66

**Table 15.** Ravine with the highest number of log jams per foot of channel

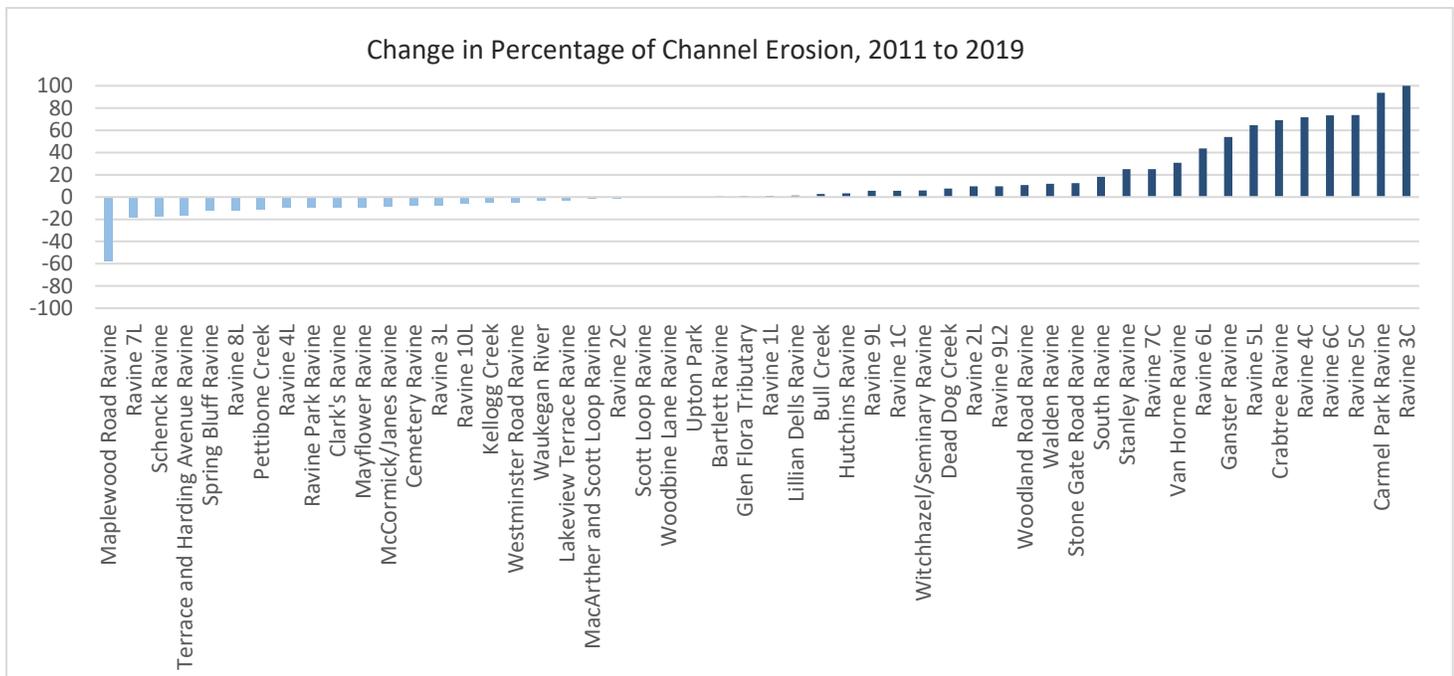
Ravine Name	Total Number of Log Jams	Log Jams/ channel ft	% Channel Erosion	% Bank Erosion	Erosion Score
Crabtree Ravine	8	0.011938338	69.20	90.77	31.65
MacArthur and Scott Loop Ravine	6	0.010854817	7.49	41.31	23.55
Ravine 4L	12	0.008619204	64.72	73.46	68.94
Terrace and Harding Avenue Ravine	4	0.006344876	67.98	30.54	26.47
Ravine 6L	8	0.006180661	78.46	68.93	51.86
Ravine 4C	17	0.004379987	97.53	33.52	84.89

**Change in Erosion From 2011 to 2019**

There was a general increase in the amount of erosion observed since 2011. In 2019 there were 9 ravines found to have either no change to their percentage of bank erosion or a lower percentage of bank erosion. 18 ravines had percent increases of more than 20. Figure 15 displays the change in percentage of bank erosion from 2011 to 2019. While many of the ravines had increased amounts of bank erosion, closer to half of the ravines had lower amounts of channel erosion recorded in 2019 than in 2011. Figure 16 displays the change in percentage of channel erosion since 2011. There was also a general increase in channel erosion since 2011: 24 ravines had decreases in the percentage of eroding channel, and 6 ravines had a change of 5 or less. The observed changes in erosion could also be partially attributed to different observers performing the assessments. It is important to note the 2008, 2011, and 2019 surveys were each conducted by different groups of observers.



**Figure 15.** The change in percentage of bank erosion from 2011 to 2019. The light blue bars indicate a decrease in the percentage of bank erosion, where the darker blue bars show an increase in percentage of bank erosion. Each bar corresponds to the ravine name listed below. \*Spruce Avenue Ravine was not surveyed in 2011 and has been excluded from this graph.



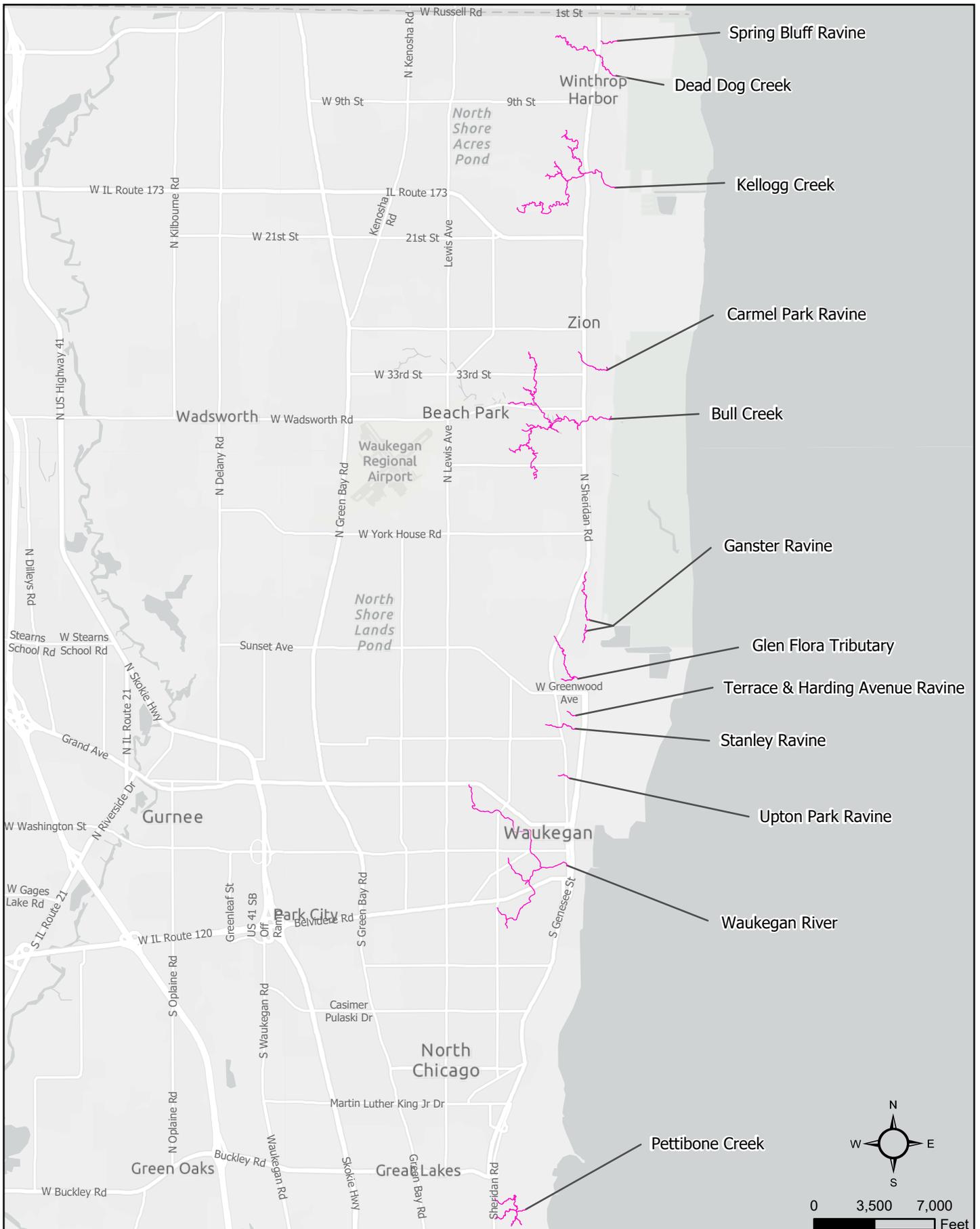
**Figure 16.** The change in percentage of channel erosion from 2011 to 2019. The light blue bars indicate a decrease in the percentage of channel erosion, where the darker blue bars show an increase in percentage of channel erosion. Each bar corresponds to the ravine name listed below. \*Spruce Avenue Ravine was not surveyed in 2011 and has been excluded from this graph.

## Summary

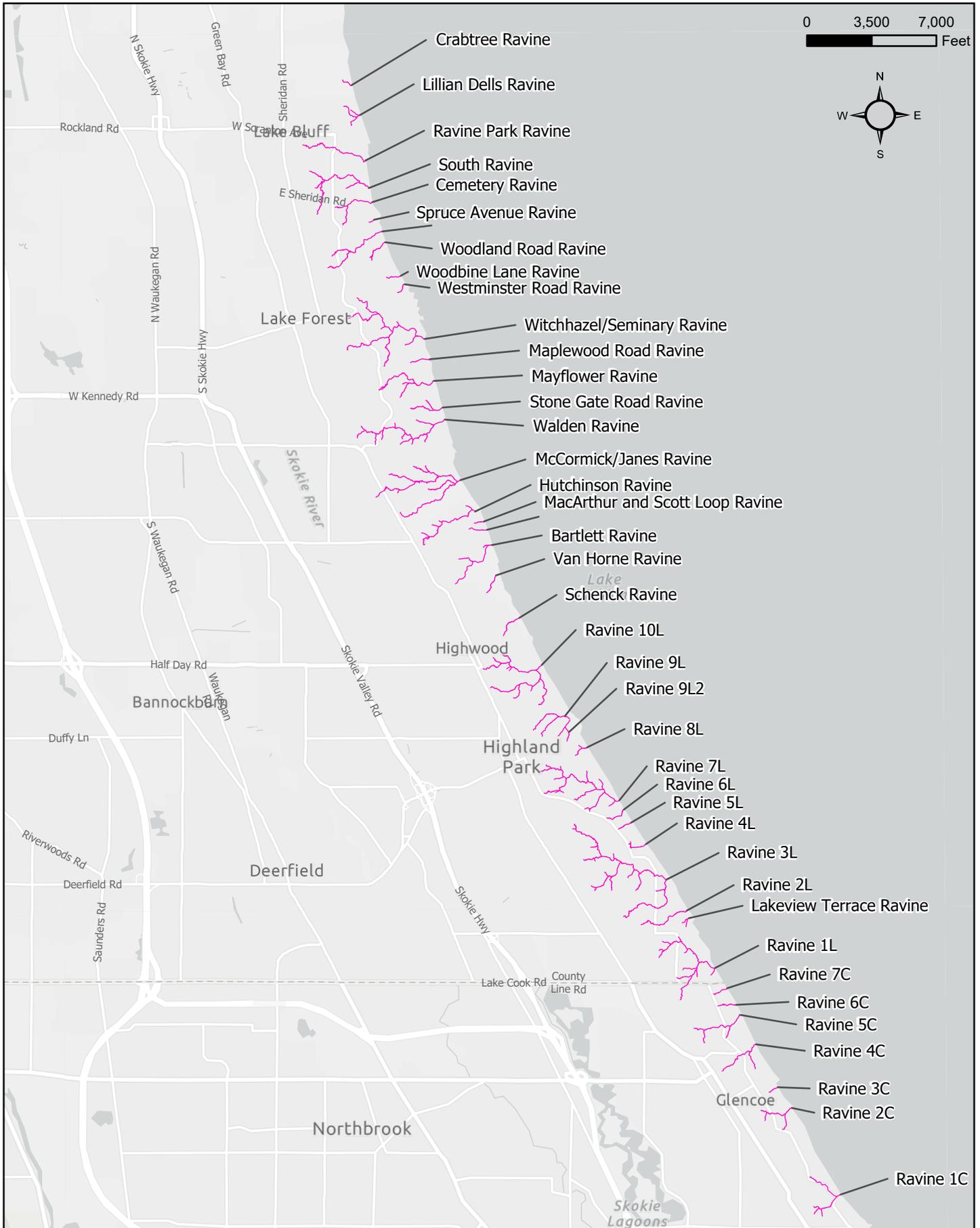
Thirty-three ravines in Lake County and seven ravines in Cook County were inventoried in the late fall of 2018 and the early winter of 2019 by SMC. An additional thirteen ravines in Lake County were inventoried by the City of Lake Forest in the summer of 2017. The combined 2017 and 2019 data was used to evaluate erosion levels as well as to assess changes that have occurred since previous inventories (2009 and 2011). In order to make comparisons and draw conclusions from the data collected each ravine was assigned an erosion risk score. This metric allows for basic inferences to be made; however, because a ravine's erosion risk score is calculated relative to other ravines this metric cannot be used as an exact measure of erosion. When comparing the 2019 erosion risk scores with the scores from 2009 and 2011, ravines with the highest erosion risk scores remained relatively the same. There were more dynamic changes to the erosion risk scores of the lowest ranking ravines. There are several explanations for this observed variance. Some explanations include: a smaller portion of a ravine was surveyed than in prior inventories, a larger quantity of discharge points was found, or changes to the condition of other ravines caused the increase/decrease. Generally ravines that experienced the largest increases in erosion risk score also had increases in number of discharge points, failing structure, and/or knick points. There were however several instances where a ravine's erosion risk score did not correspond with observations made in the field. Some of the ravines with the greatest amounts of observed bank or channel erosion had relatively low erosion risk scores. Each field criterion is weighted differently, and ravines with low erosion risk scores and high amount of observed erosion tended to have fewer of the heavily weighted criteria. Since 2011 there has been a greater general increase in ravine bank instability than in channel instability. From 2011 to 2019 roughly 17% of ravines surveyed saw a decrease in percentage of banks rated stable or unstable. However, closer to 50% of ravines surveyed had lower percentages of channel erosion recorded in 2019 than in 2011.

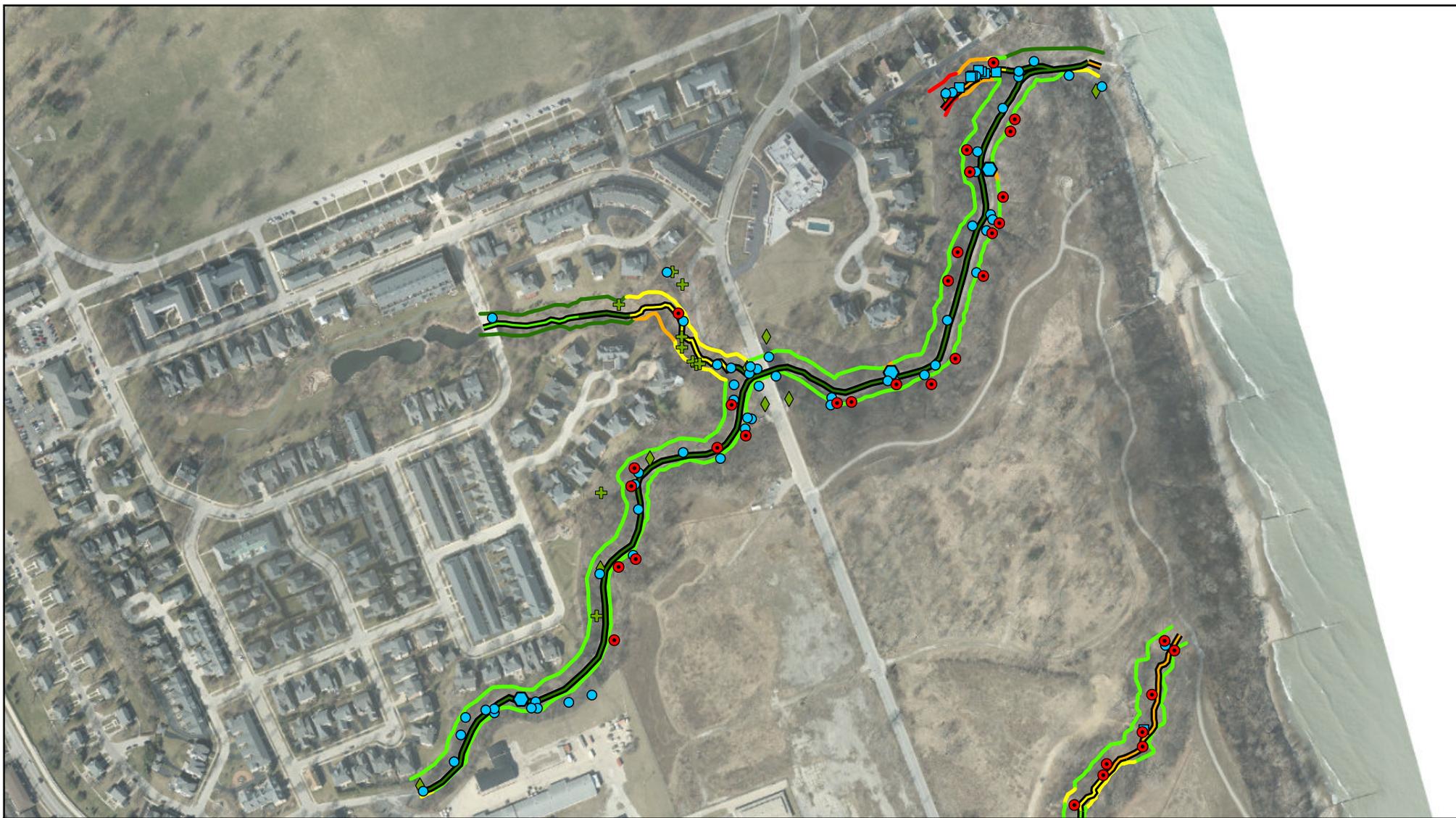
# Appendix A

# Ravine Inventory Index Map - North



# Ravine Inventory Index Map - South





**STORMWATER MANAGEMENT COMMISSION**

Lake County Stormwater Management Commission Courtesy Map 2019. This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate. This map should not be used to determine building set-backs or as a basis for purchasing property. Field Surveys and delineations are required to verify the exact locations of property lines and other map features.

**Legend**

- Gully
- Existing Project
- ◆ Failing Structure
- Log Jam
- ▲ Natural Knick Point
- ⊕ Residential
- ◆ Municipal Stormwater

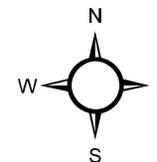
**Channel Stability Rank**

- 1
- 2
- 3
- 4
- 5

\*sections with a rank of 1 are considered the worst

**Bank Stability Rank**

- Not Surveyed
- 1
- 2
- 3
- 4
- 5

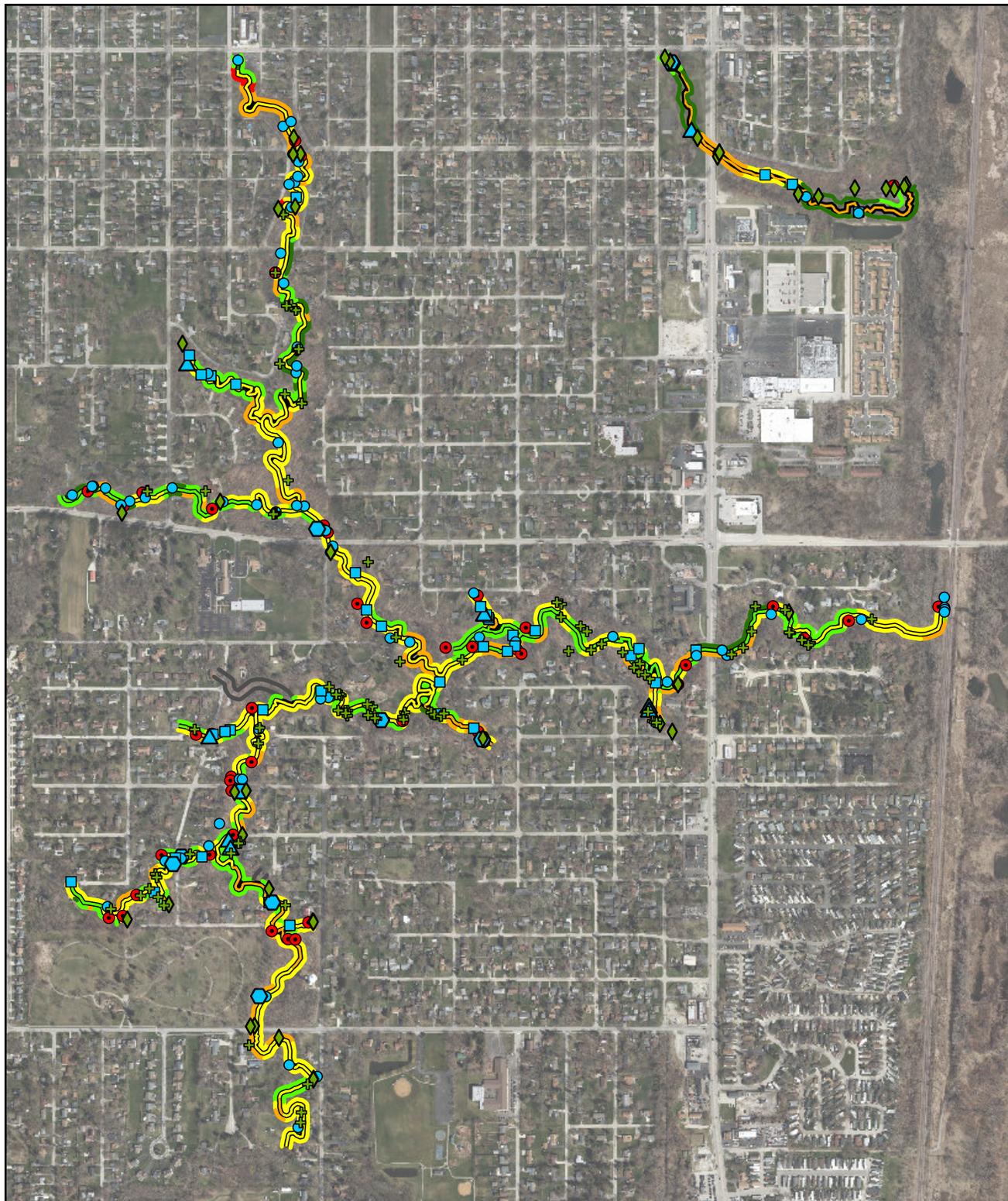


Scale 1:4,800



**Bartlett Ravine**

Ranked 29 out of 53  
for Erosion Potential

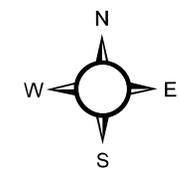


# Bull Creek

Ranked 5 out of 53  
for Erosion Potential

## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | — 1                    |
| ⬡ Failing Structure    | — 2                    |
| ■ Log Jam              | — 3                    |
| ▲ Natural Knick Point  | — 4                    |
| ⊕ Residential          | — 5                    |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | — 1                    |
|                        | — 2                    |
|                        | — 3                    |
|                        | — 4                    |
|                        | — 5                    |



Scale: 1:12,000

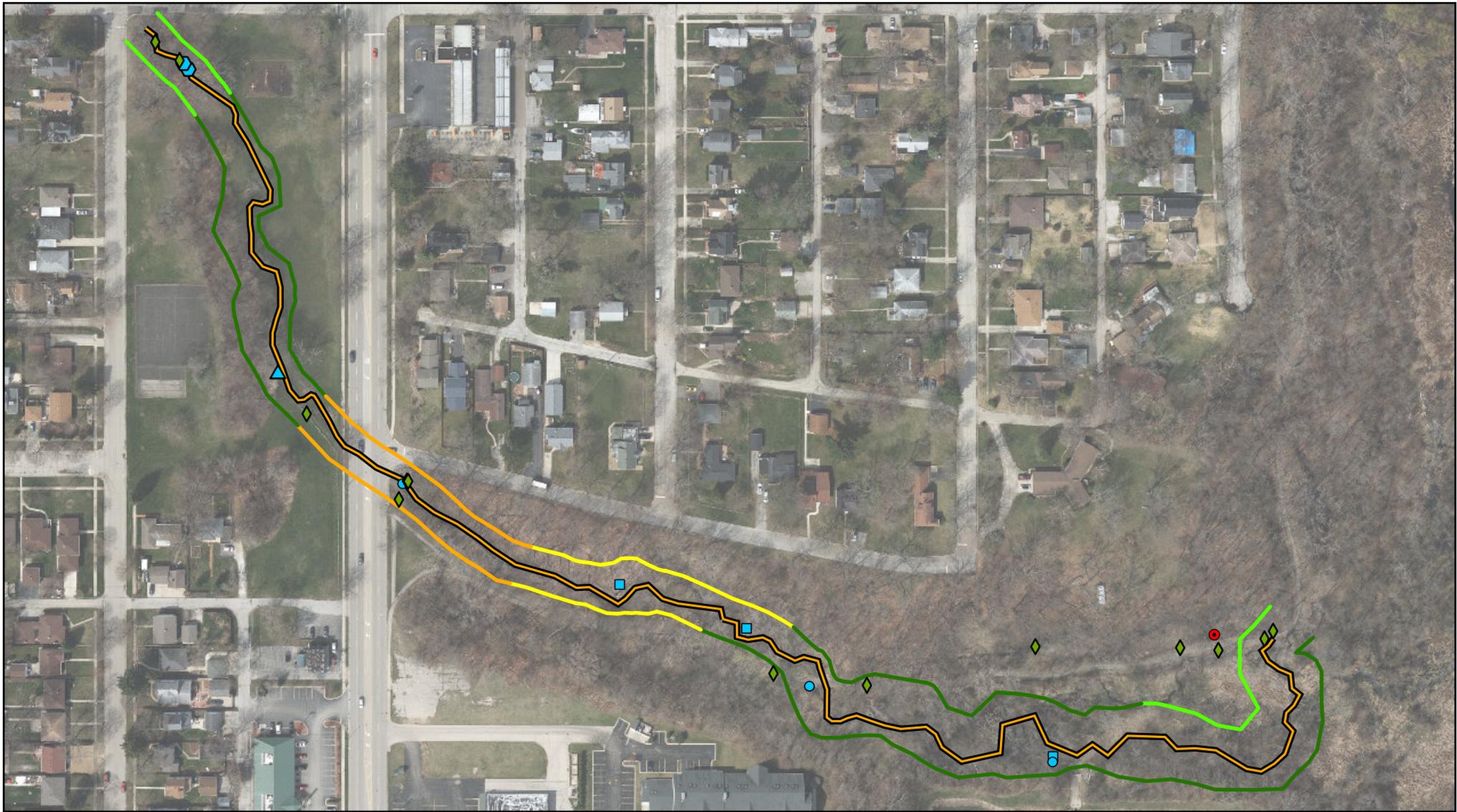


\*sections with a rank of 1 are considered the worst



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**STORMWATER MANAGEMENT COMMISSION**

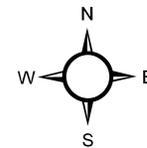
Lake County Stormwater Management Commission Courtesy Map 2019. This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate. This map should not be used to determine building set-backs or as a basis for purchasing property. Field Surveys and delineations are required to verify the exact locations of property lines and other map features.

**Legend**

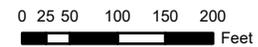
- Gully
- Existing Project
- ⬡ Failing Structure
- ⬢ Log Jam
- ▲ Natural Knick Point
- ⊕ Residential
- ◆ Municipal Stormwater

- Channel Stability Rank**
- 1
  - 2
  - 3
  - 4
  - 5
- \*sections with a rank of 1 are considered the worst

- Bank Stability Rank**
- Not surveyed
  - 1
  - 2
  - 3
  - 4
  - 5

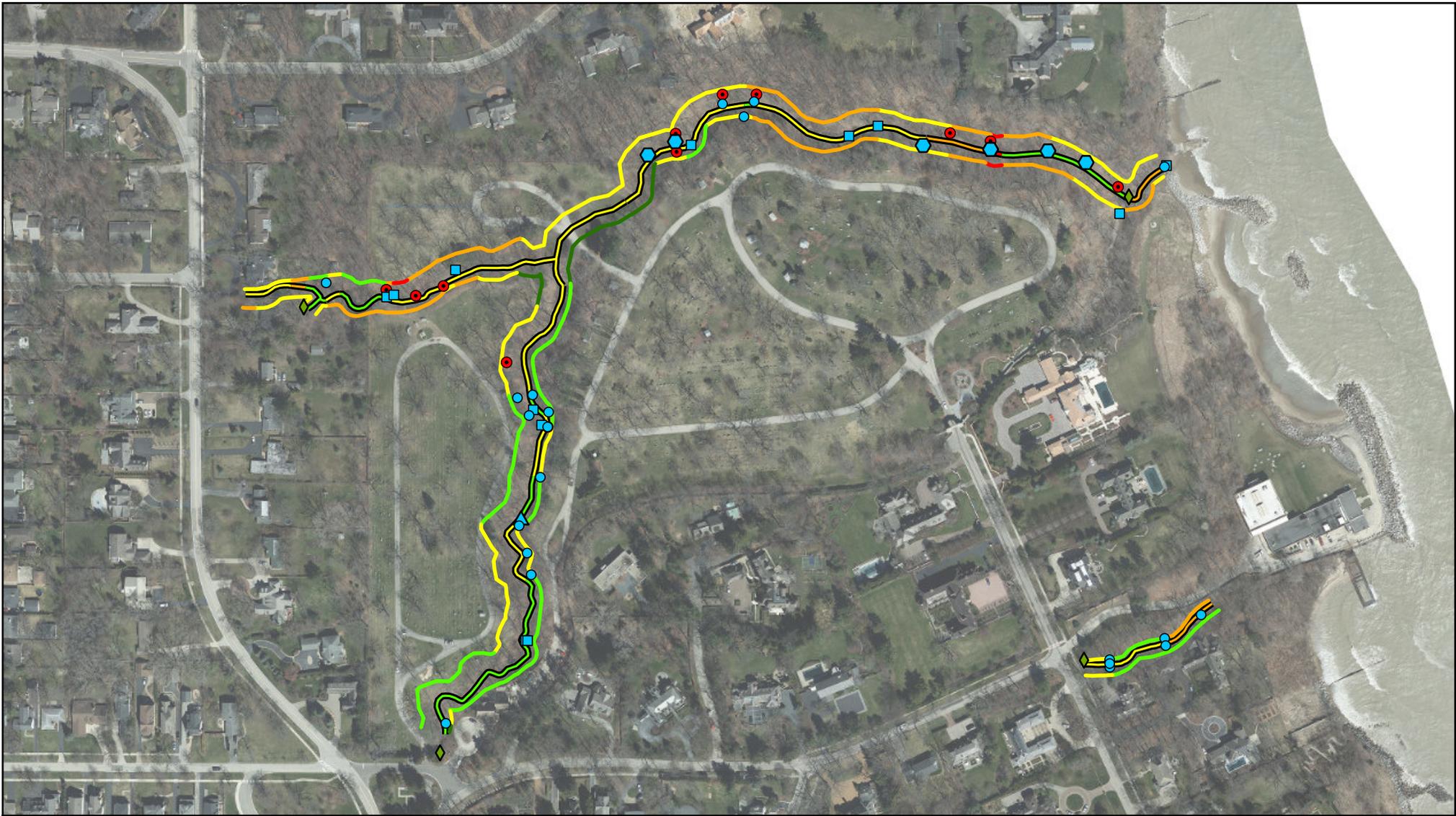


Scale: 1:2,400



Carmel Park Ravine

Ranked 28 out of 53  
for Erosion Potential



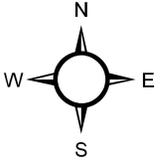

**STORMWATER MANAGEMENT COMMISSION**

Lake County Stormwater Management Commission Courtesy Map 2019. This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate. This map should not be used to determine building set-backs or as a basis for purchasing property. Field Surveys and delineations are required to verify the exact locations of property lines and other map features.

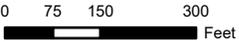
**Legend**

● Gully	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	1	Not surveyed
◆ Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
✦ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

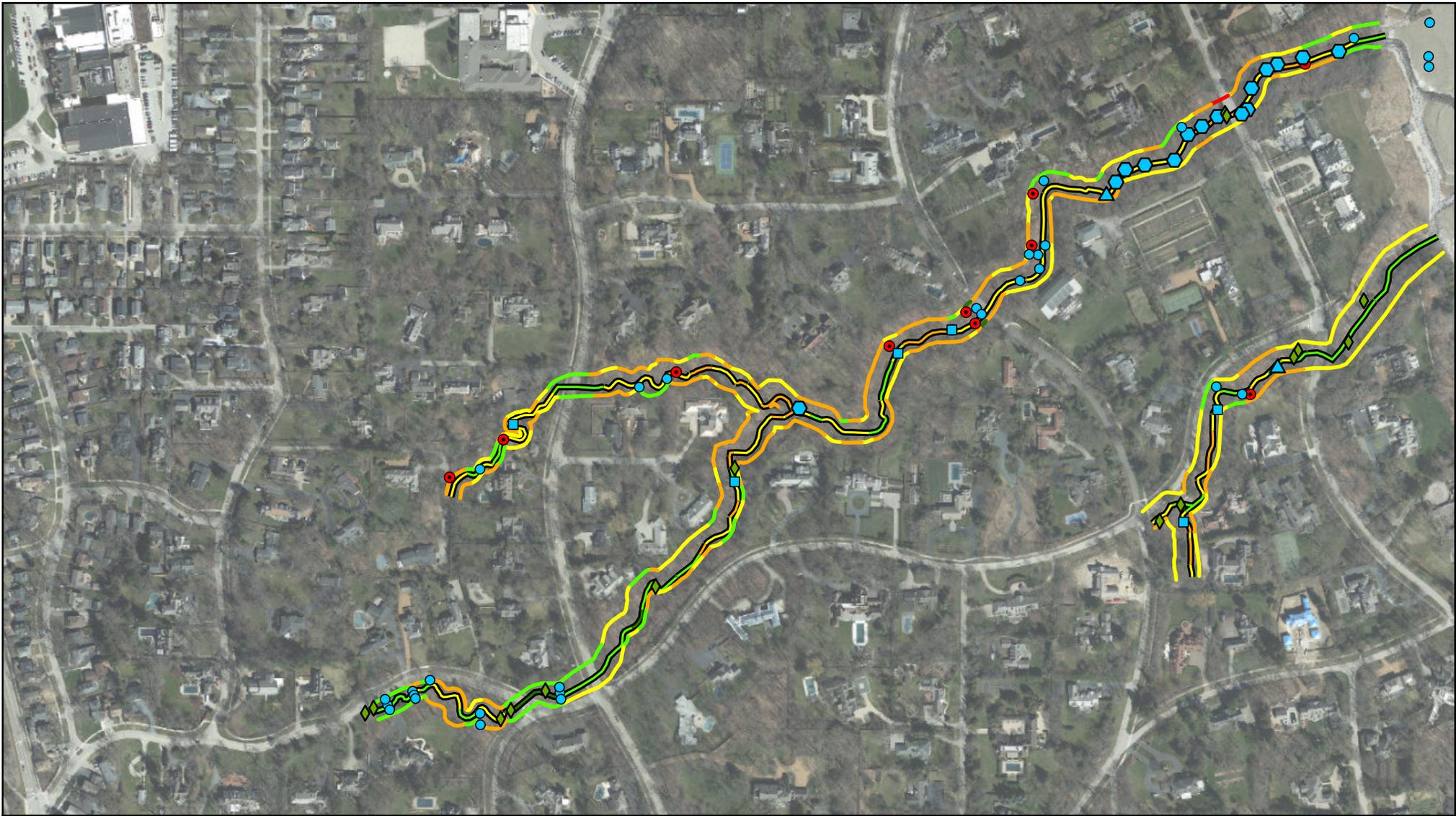


Scale 1:3,600



**Cemetery Ravine**

**Ranked 31 out of 53  
for Erosion Potential**



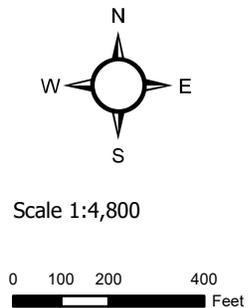

**STORMWATER MANAGEMENT COMMISSION**

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**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	— Not surveyed
⬡ Failing Structure	2	1
⬢ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

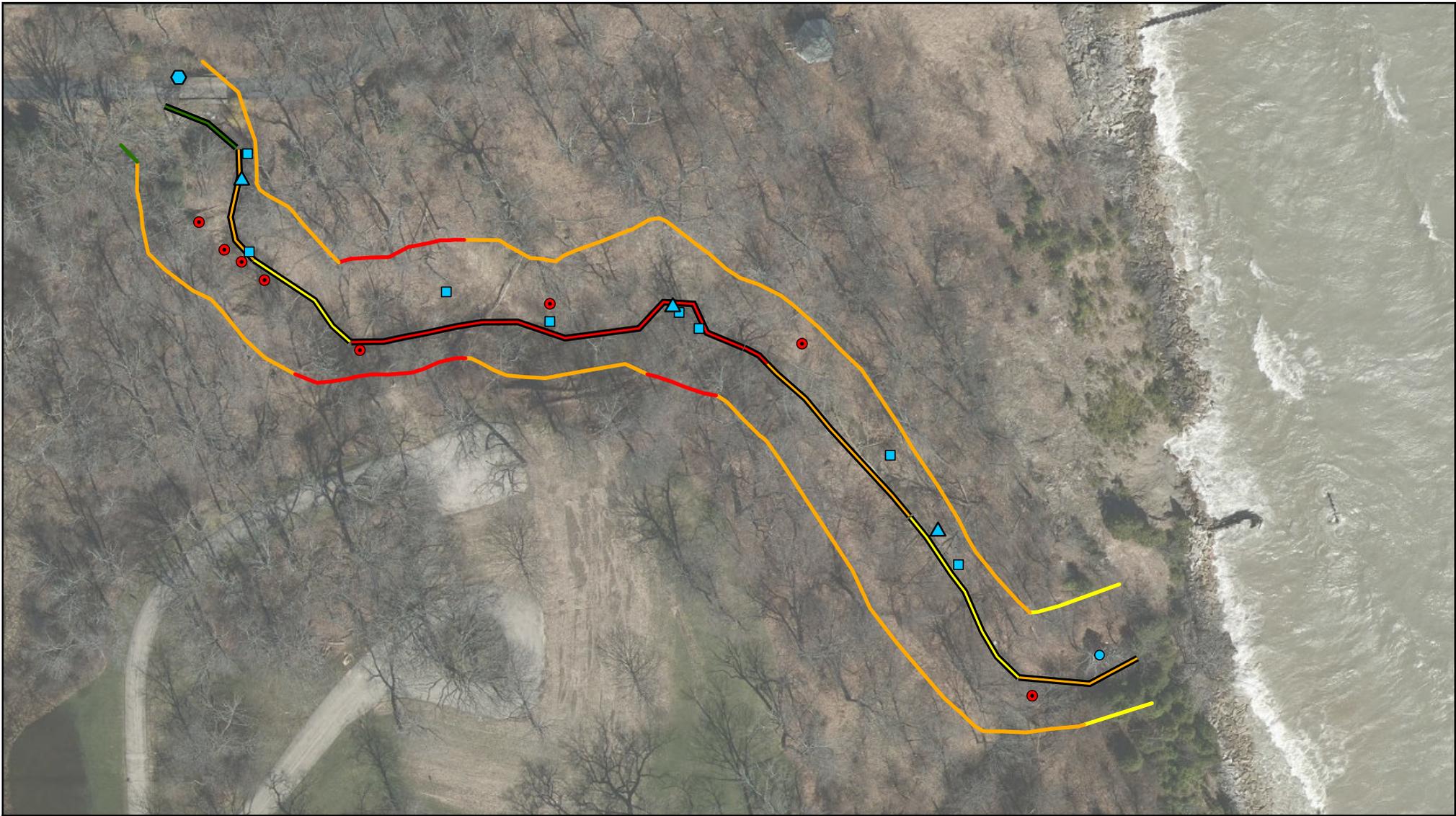
\*sections with a rank of 1 are considered the worst



Scale 1:4,800  
0 100 200 400 Feet

**Clark's Ravine**

**Ranked 16 out of 53  
for Erosion Potential**

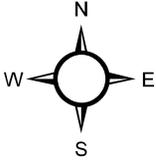



**STORMWATER MANAGEMENT COMMISSION**

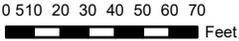
Lake County Stormwater Management Commission  
 Courtesy Map 2019. This map is provided for general  
 locational information only. Map features have been  
 derived from various sources, each of which has its own  
 scale and accuracy. The locations of all features are  
 approximate. This map should not be used to determine  
 building set-backs or as a basis for purchasing property.  
 Field Surveys and delineations are required to verify the  
 exact locations of property lines and other map features.

**Legend**

● Gully	Channel Stability Rank 1	Bank Stability Rank Not surveyed
● Existing Project	Channel Stability Rank 2	Bank Stability Rank 1
● Failing Structure	Channel Stability Rank 3	Bank Stability Rank 2
■ Log Jam	Channel Stability Rank 4	Bank Stability Rank 3
▲ Natural Knick Point	Channel Stability Rank 5	Bank Stability Rank 4
⊕ Residential	*sections with a rank of 1 are considered the worst	
◆ Municipal Stormwater		Bank Stability Rank 5



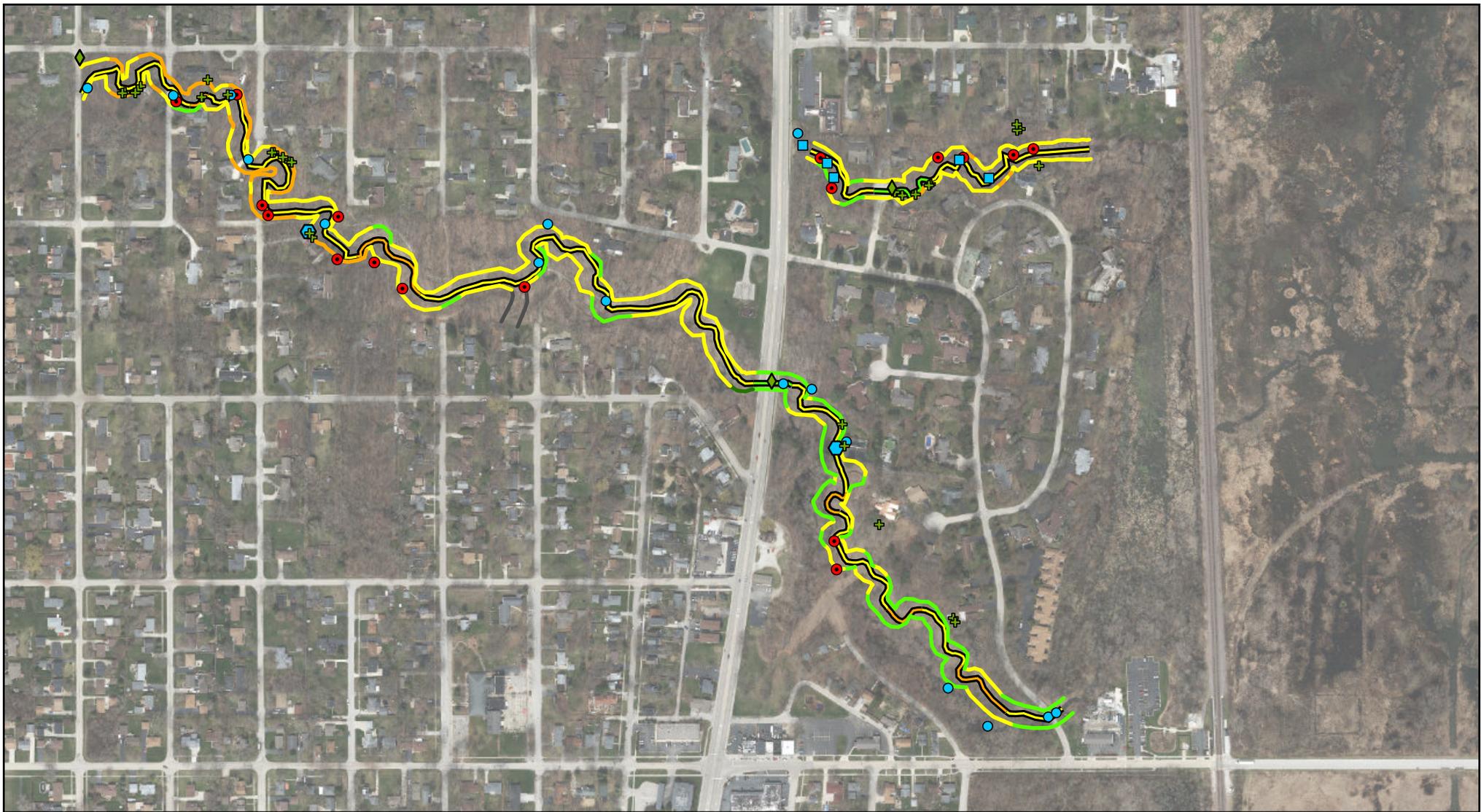
Scale 1:840



0 10 20 30 40 50 60 70 Feet

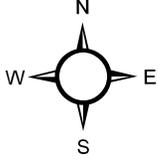
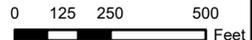
**Crabtree Ravine**

**Ranked 30 out of 53  
for Erosion Potential**




**STORMWATER MANAGEMENT COMMISSION**  
 Lake County Stormwater Management Commission  
 Courtesy Map 2019. This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate. This map should not be used to determine building set-backs or as a basis for purchasing property. Field Surveys and delineations are required to verify the exact locations of property lines and other map features.

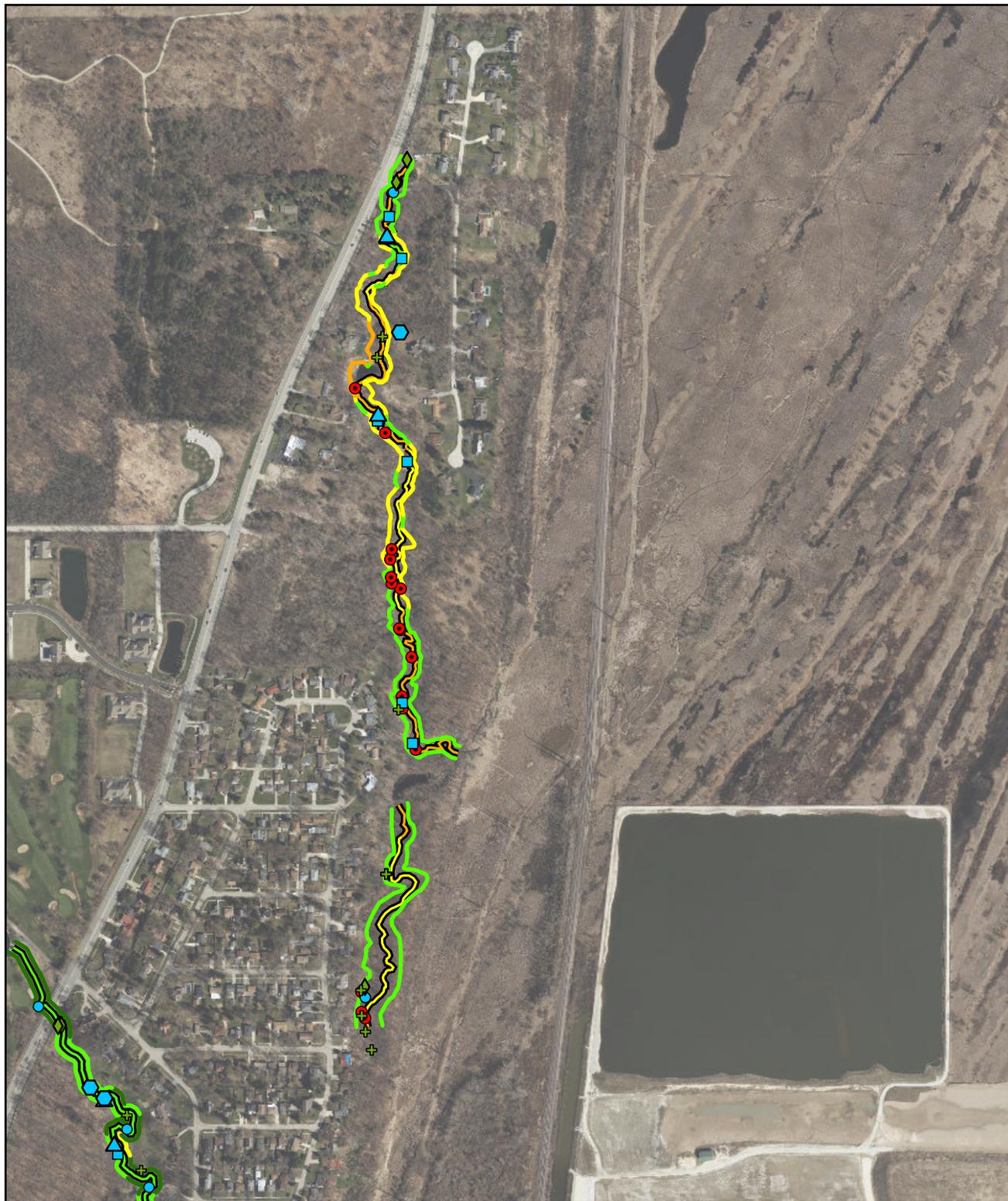
**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank	 Scale: 1:6,000 
● Existing Project	— 1	— Not surveyed	
● Failing Structure	— 2	— 1	
■ Log Jam	— 3	— 2	
▲ Natural Knick Point	— 4	— 3	
⊕ Residential	— 5	— 4	
◆ Municipal Stormwater		— 5	

\*sections with a rank of 1 are considered the worst

**Dead Dog Creek**

**Ranked 41 out of 53  
for Erosion Potential**

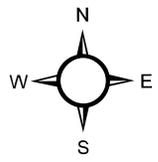


# Ganster Ravine

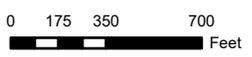
Ranked 34 out of 53  
for Erosion Potential

### Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | — 1                    |
| ⬡ Failing Structure    | — 2                    |
| ■ Log Jam              | — 3                    |
| ▲ Natural Knick Point  | — 4                    |
| ⊕ Residential          | — 5                    |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | — 1                    |
|                        | — 2                    |
|                        | — 3                    |
|                        | — 4                    |
|                        | — 5                    |



Scale: 1:8,400

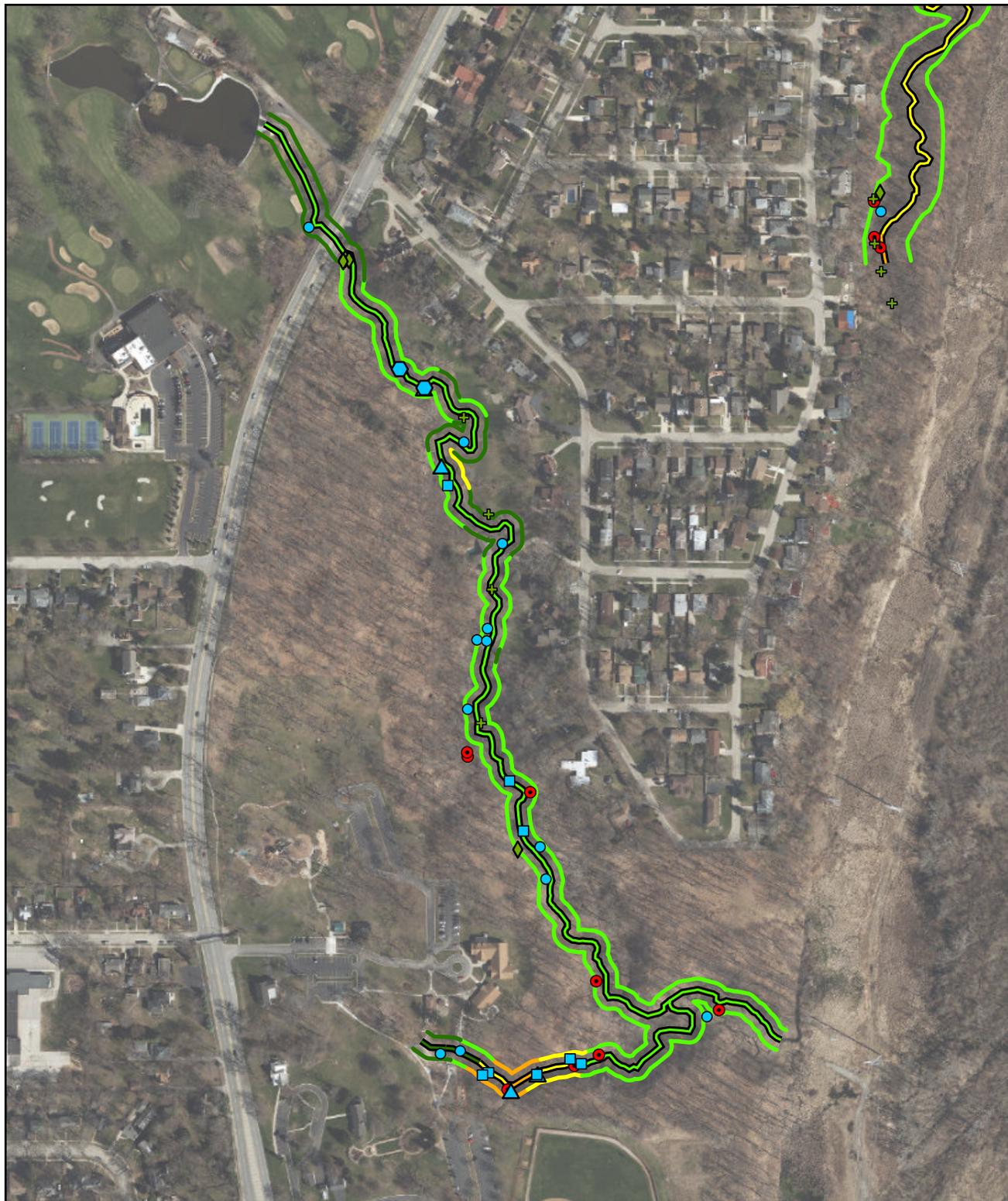


\*sections with a rank of 1 are considered the worst



### STORMWATER MANAGEMENT COMMISSION

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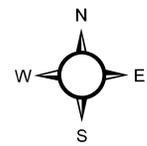


# Glen Flora Tributary

Ranked 50 out of 53  
for Erosion Potential

## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ⬡ Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| ⊕ Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale: 1:4,800

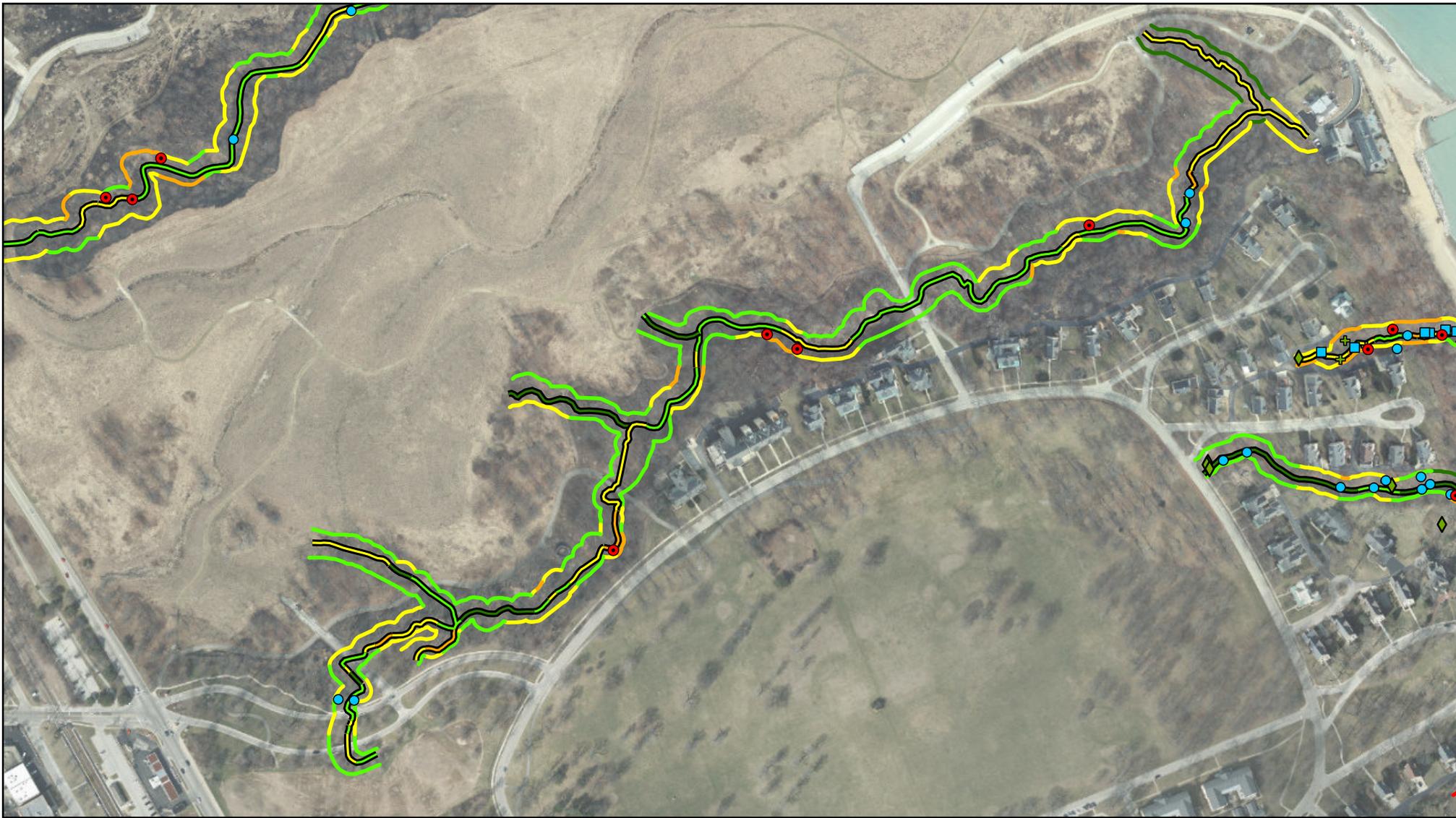


\*sections with a rank of 1 are considered the worst



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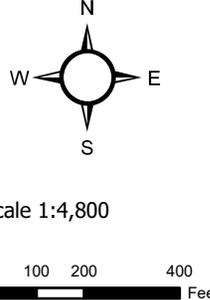

**STORMWATER MANAGEMENT COMMISSION**

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**Legend**

● Gullies	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	1	Not surveyed
◆ Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
✦ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

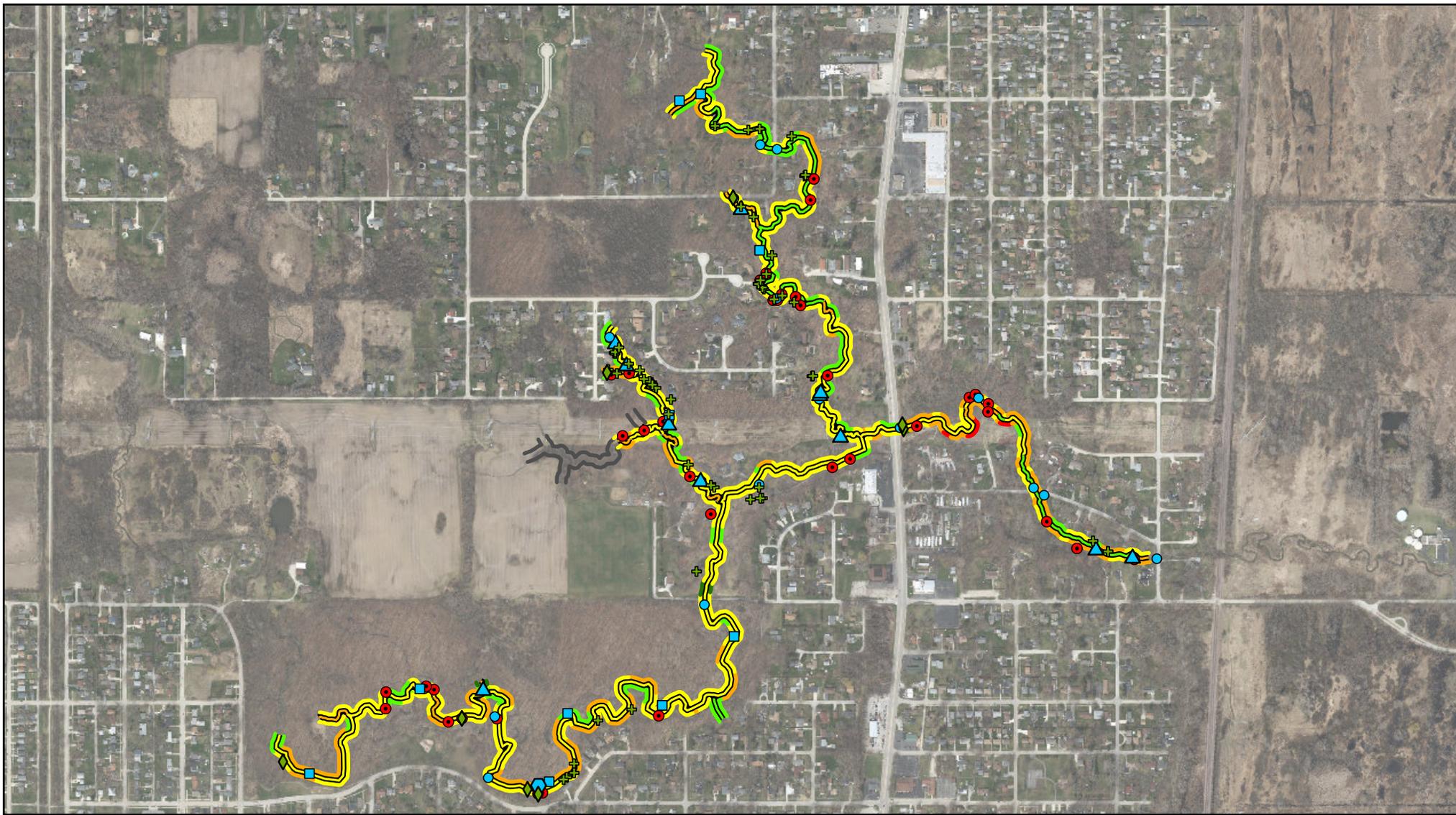


Scale 1:4,800

0 100 200 400 Feet

**Hutchinson Ravine**

**Ranked 53 out of 53 for Erosion Potential**

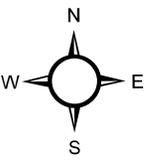



**STORMWATER MANAGEMENT COMMISSION**

Lake County Stormwater Management Commission Courtesy Map 2019. This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate. This map should not be used to determine building set-backs or as a basis for purchasing property. Field Surveys and delineations are required to verify the exact locations of property lines and other map features.

**Legend**

● Gully	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>	⊙ Not surveyed
● Existing Project	— 1	— 1	— 1
● Failing Structure	— 2	— 2	— 2
■ Log Jam	— 3	— 3	— 3
▲ Natural Knick Point	— 4	— 4	— 4
⊕ Residential	— 5	— 5	— 5
◆ Municipal Stormwater	*sections with a rank of 1 are considered the worst		



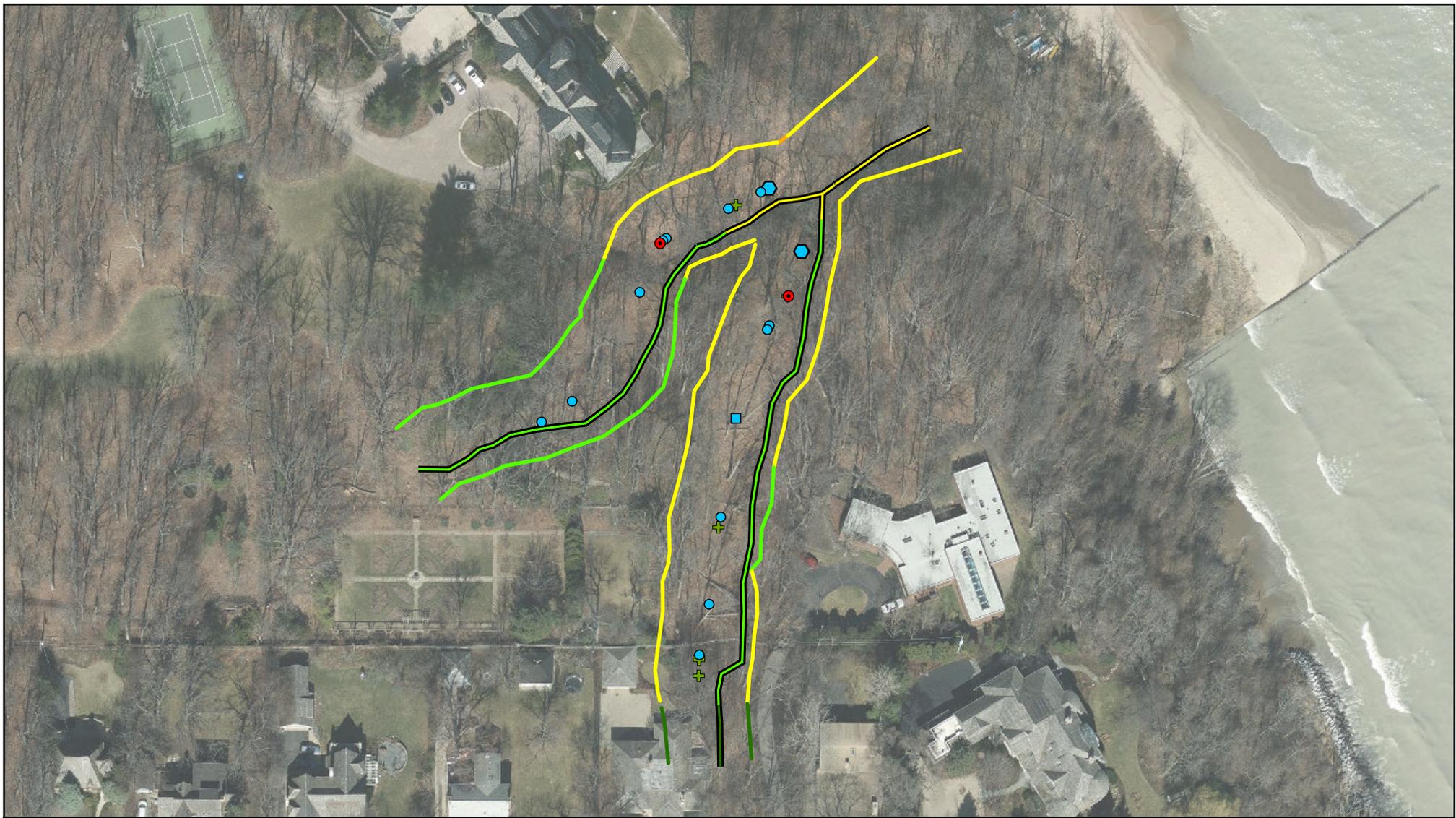
Scale: 1:10,800



0 150 300 600 900 Feet

Kellogg Creek

Ranked 12 out of 53  
for Erosion Potential



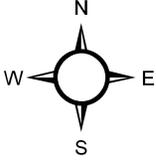

**STORMWATER MANAGEMENT COMMISSION**

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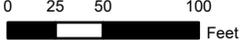
**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	Not Surveyed
⬡ Failing Structure	2	1
⬢ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

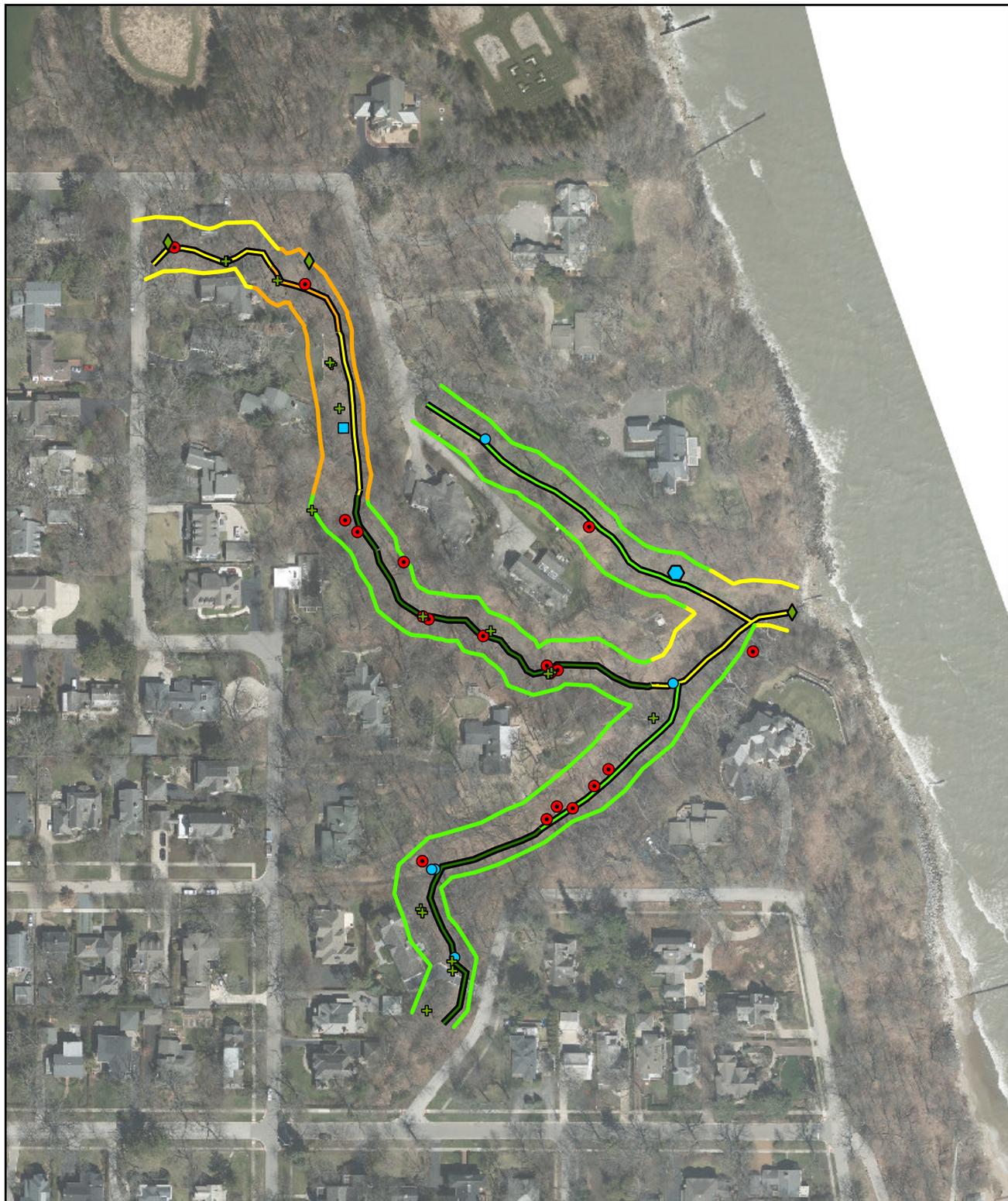


Scale 1:1,200



**Lakeview Terrace Ravine**

**Ranked 40 out of 53 for Erosion Potential**

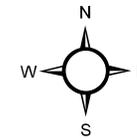


# Lillian Dells Ravine

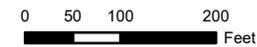
Ranked 37 out of 53  
for Erosion Potential

## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ◆ Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| ✚ Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale: 1:2,400

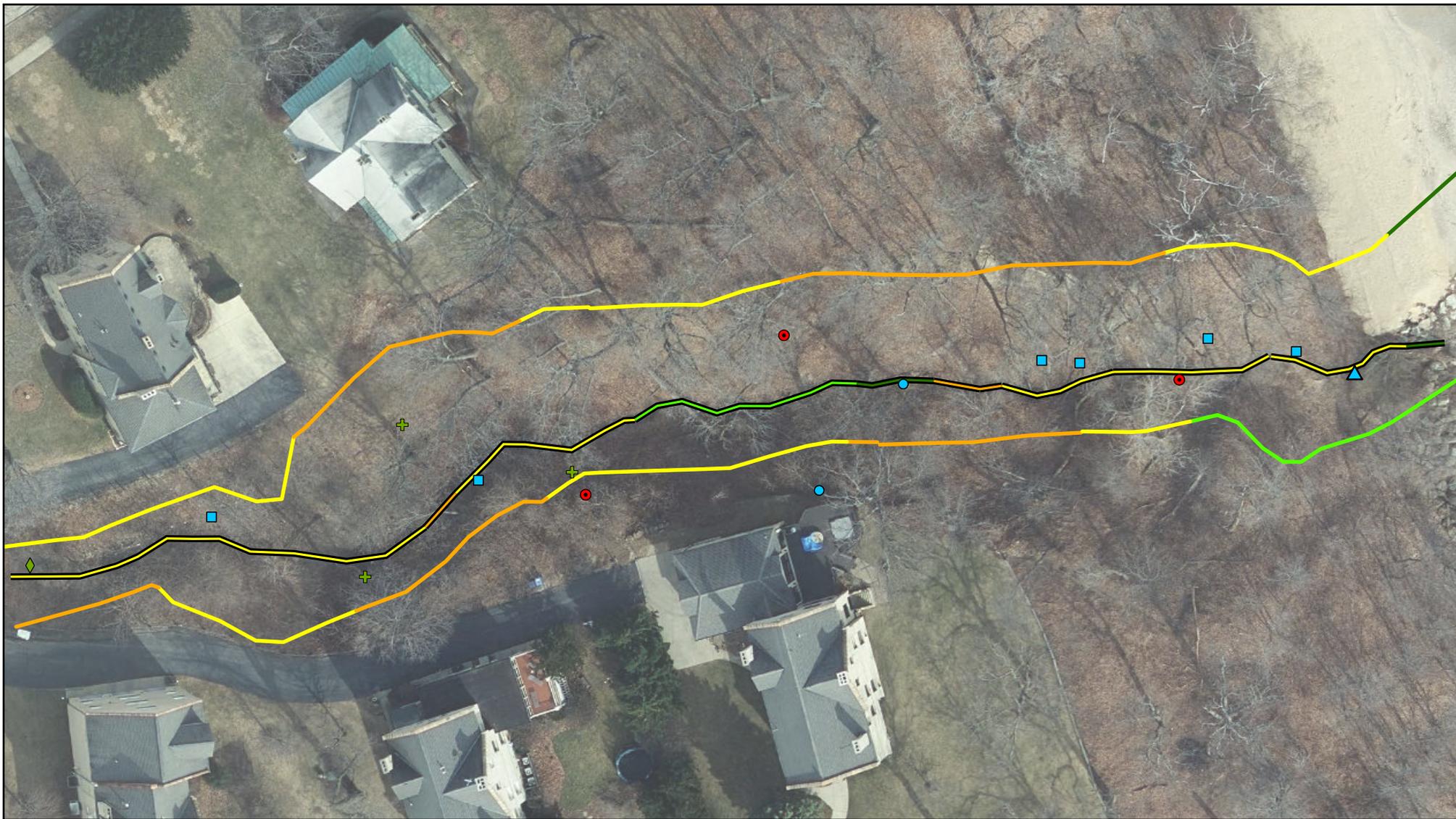


\*sections with a rank of 1 are considered the worst



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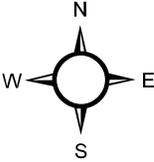

**STORMWATER MANAGEMENT COMMISSION**

Lake County Stormwater Management Commission  
 Courtesy Map 2019. This map is provided for general  
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 building set-backs or as a basis for purchasing property.  
 Field Surveys and delineations are required to verify the  
 exact locations of property lines and other map features.

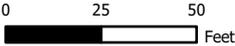
**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	— Not Surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
✚ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst



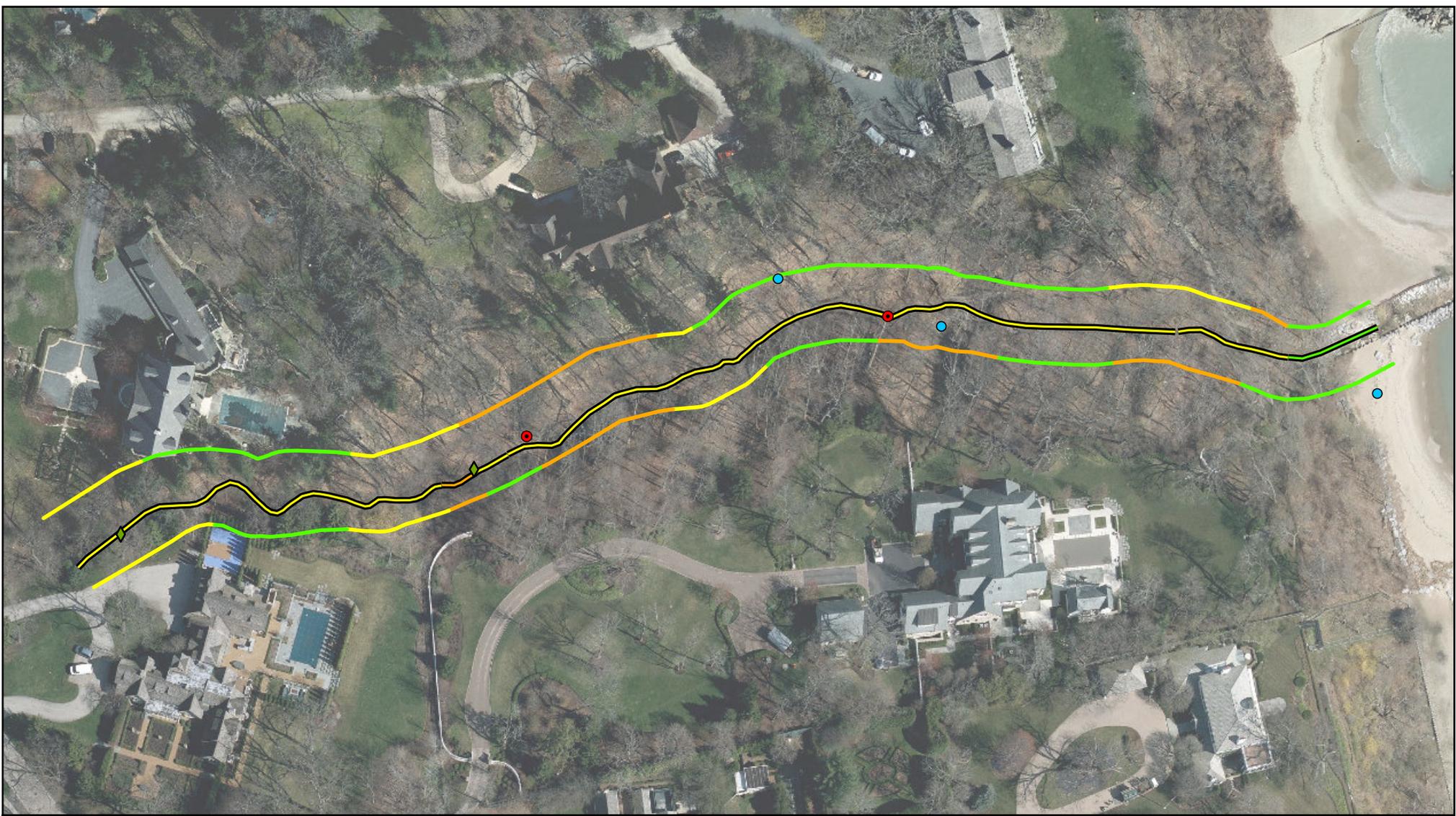
Scale 1:600



0 25 50 Feet

**MacArther & Scott Loop Ravine**

**Ranked 39 out of 53  
for Erosion Potential**

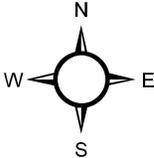



**STORMWATER MANAGEMENT COMMISSION**

Lake County Stormwater Management Commission  
 Courtesy Map 2019. This map is provided for general  
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 building set-backs or as a basis for purchasing property.  
 Field Surveys and delineations are required to verify the  
 exact locations of property lines and other map features.

**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	Not surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater	*sections with a rank of 1 are considered the worst	



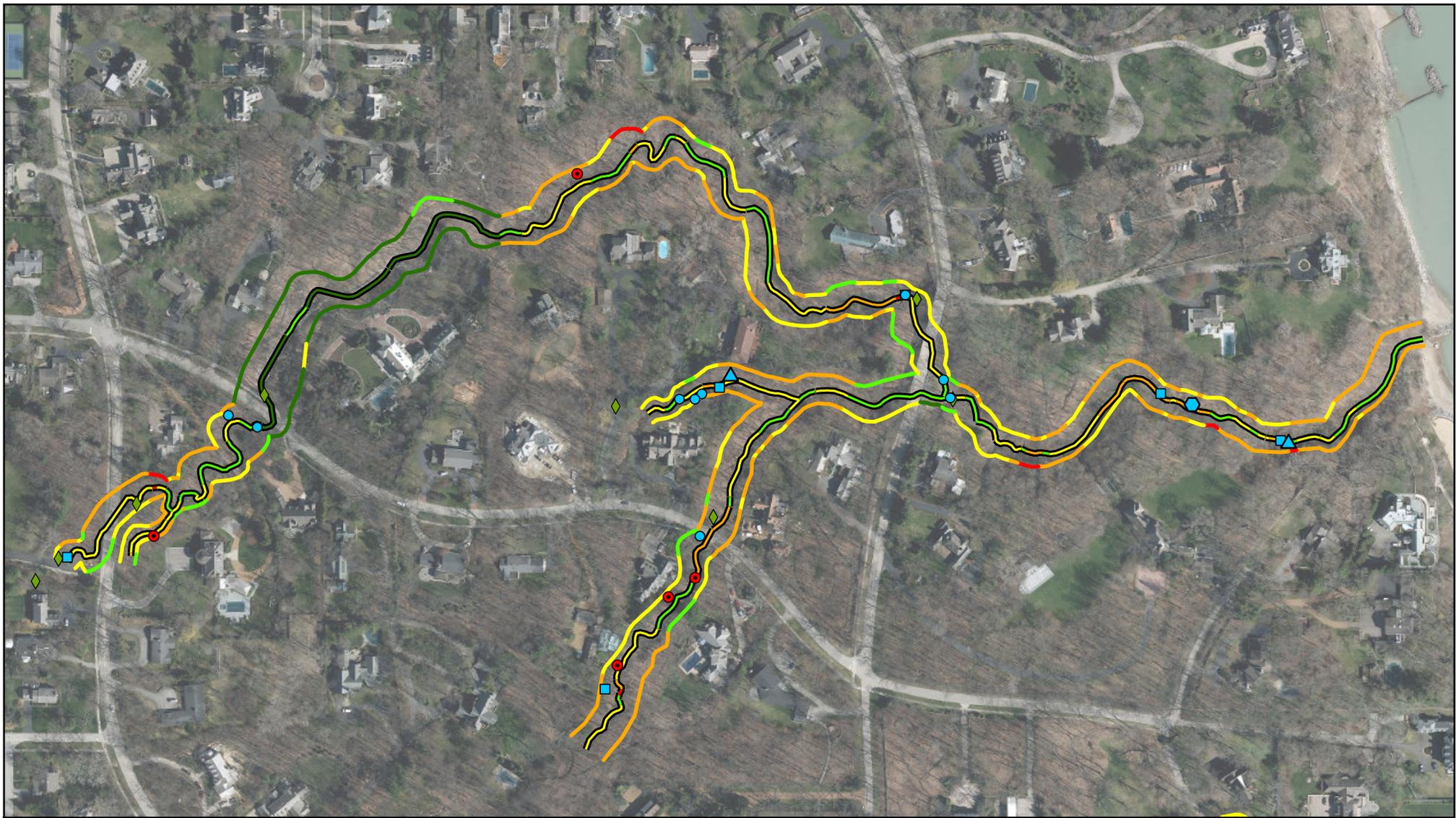
Scale 1:1,320



0 55 110 Feet

**Maplewood Road  
Ravine**

**Ranked 49 out of 53  
for Erosion Potential**



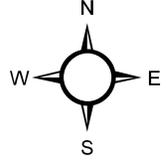

**STORMWATER MANAGEMENT COMMISSION**

Lake County Stormwater Management Commission  
 Courtesy Map 2019. This map is provided for general  
 locational information only. Map features have been  
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 approximate. This map should not be used to determine  
 building set-backs or as a basis for purchasing property.  
 Field Surveys and delineations are required to verify the  
 exact locations of property lines and other map features.

**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	Not Surveyed
⬡ Failing Structure	2	1
⬢ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

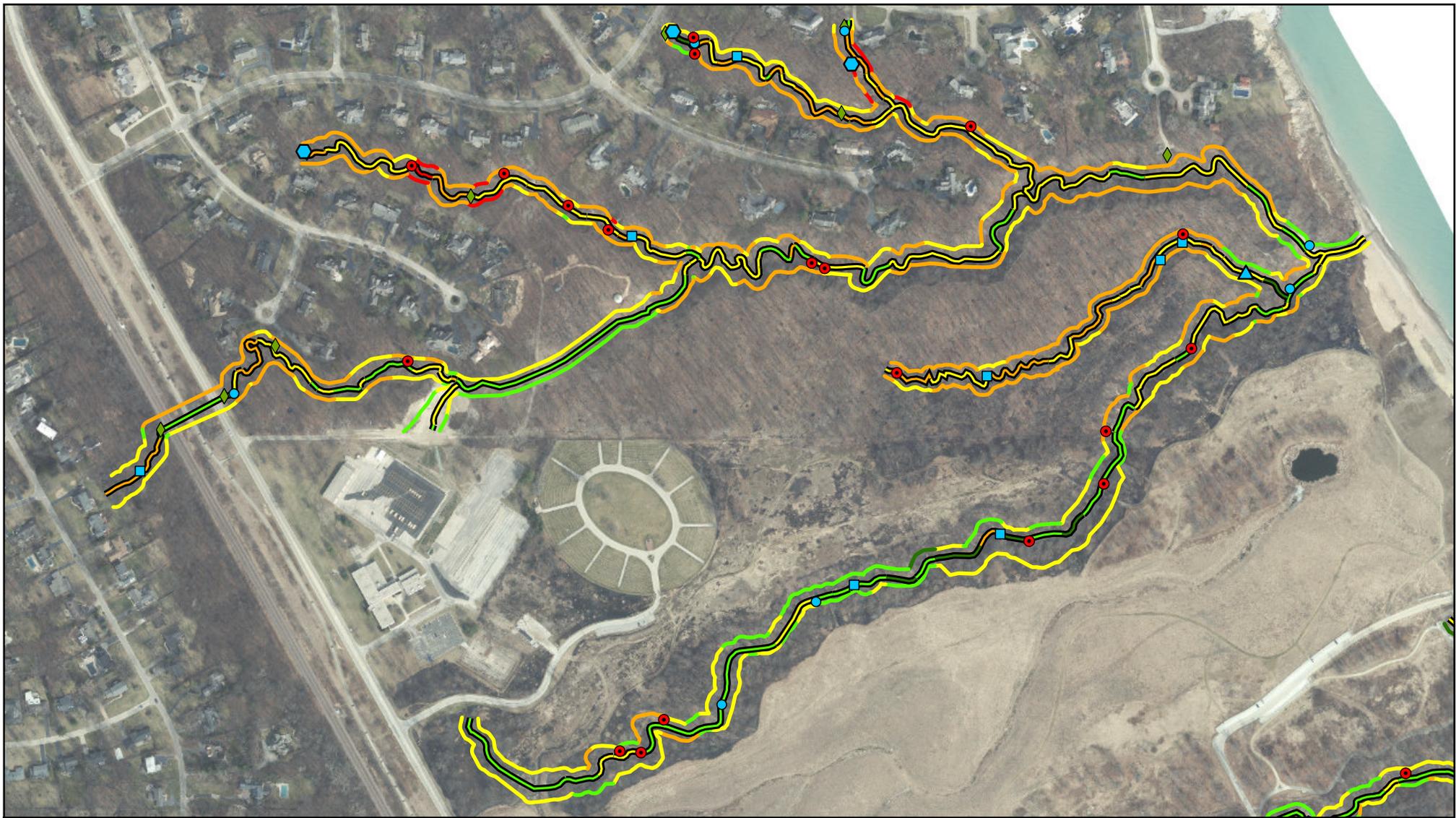


Scale 1:3,600



**Mayflower Ravine**

**Ranked 24 out of 53  
 for Erosion Potential**



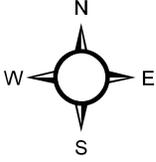

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Lake County Stormwater Management Commission  
 Courtesy Map 2019. This map is provided for general  
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 building set-backs or as a basis for purchasing property.  
 Field Surveys and delineations are required to verify the  
 exact locations of property lines and other map features.

**Legend**

● Gully	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	— 1	— Not Surveyed
● Failing Structure	— 2	— 1
■ Log Jam	— 3	— 2
▲ Natural Knick Point	— 4	— 3
✚ Residential	— 5	— 4
◆ Municipal Storm		— 5

\*sections with a rank of 1 are considered the worst



Scale 1:6,000



**McCormick/Janes  
Ravine**

**Ranked 13 out of 53  
for Erosion Potential**



# Pettibone Creek

## Ranked 36 out of 53 for Erosion Potential

**Legend**

● Gully	Channel Stability Rank
● Existing Project	— 1
⬡ Failing Structure	— 2
■ Log Jam	— 3
▲ Natural Knick Point	— 4
⊕ Residential	— 5
◆ Municipal Stormwater	<b>Bank Stability Rank</b>
	— Not surveyed
	— 1
	— 2
	— 3
	— 4
	— 5

Scale: 1:3,600

0 50 100 200 300 Feet

\*sections with a rank of 1 are considered the worst

**STORMWATER MANAGEMENT COMMISSION**

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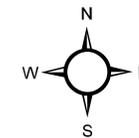


# Ravine 1C

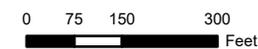
Ranked 27 out of 53  
for Erosion Potential

## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ⬡ Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| ⊕ Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not Surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale: 1:3,600

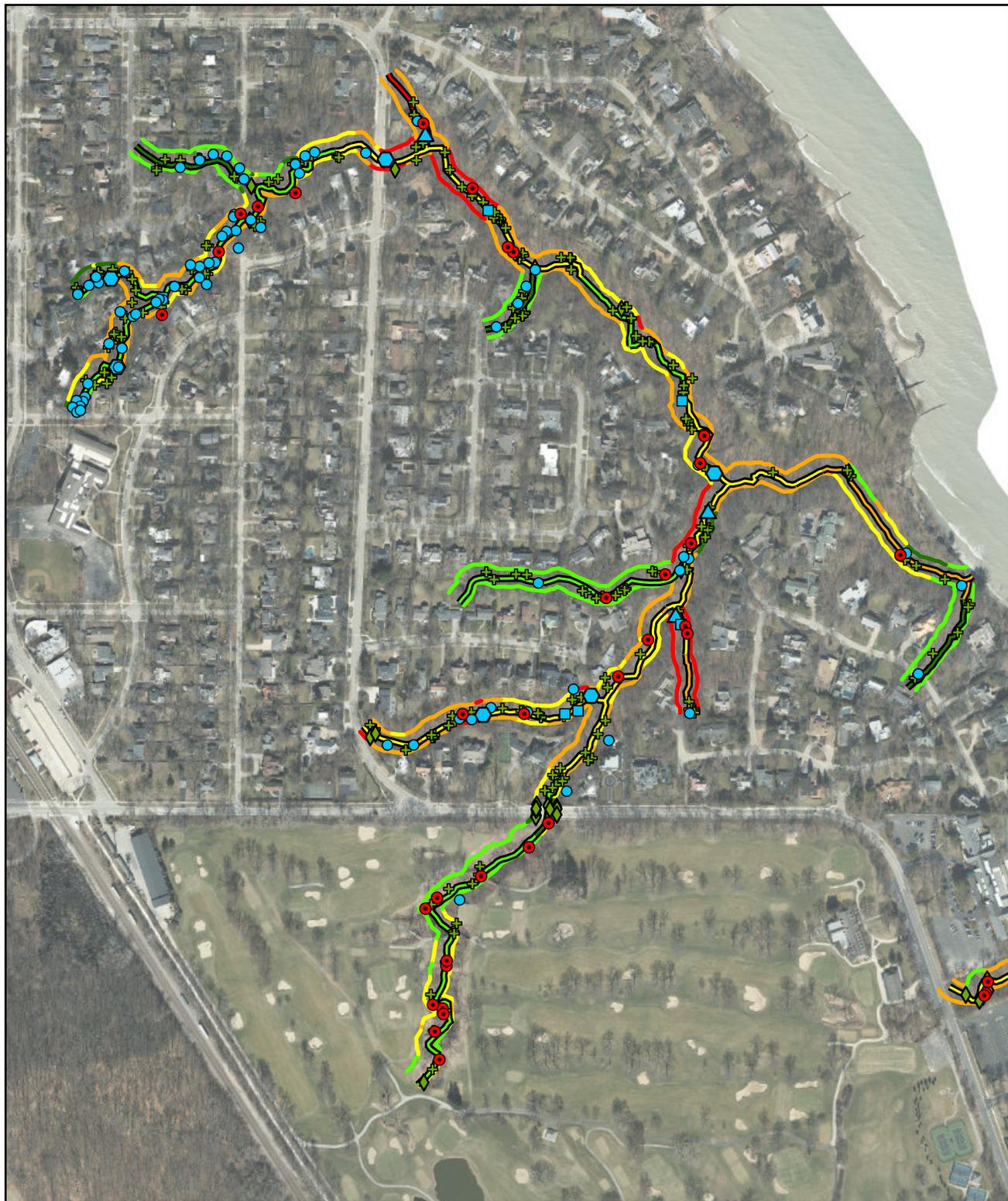


\*sections with a rank of 1 are considered the worst



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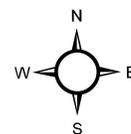


# Ravine 1L

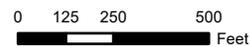
Ranked 4 out of 53  
for Erosion Potential

## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gullies              | Channel Stability Rank |
| ● Existing Project     | — 1                    |
| ⬡ Failing Structure    | — 2                    |
| ⬢ Log Jam              | — 3                    |
| ▲ Natural Knick Point  | — 4                    |
| ⊕ Residential          | — 5                    |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | — 1                    |
|                        | — 2                    |
|                        | — 3                    |
|                        | — 4                    |
|                        | — 5                    |



Scale: 1:6,000

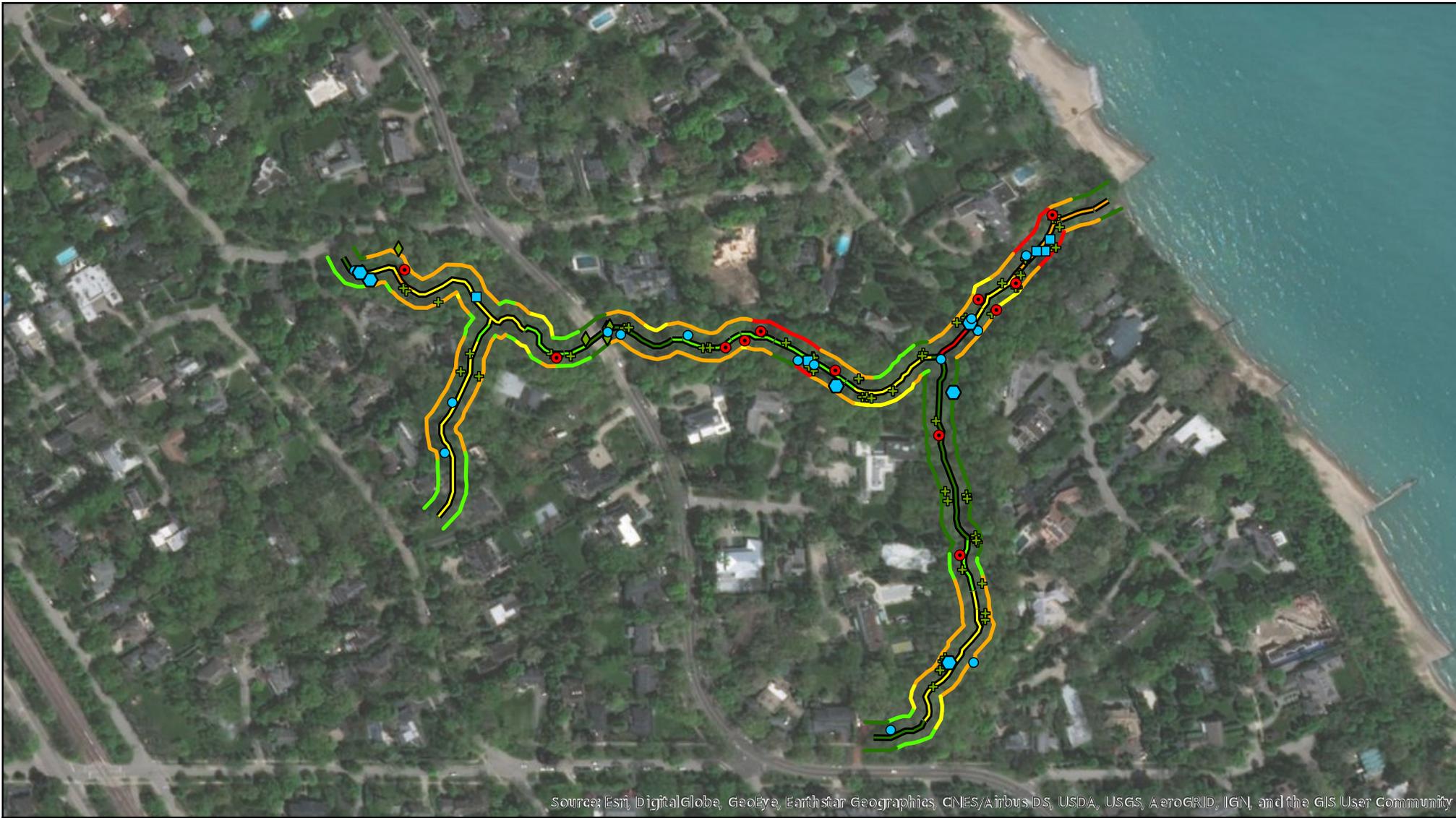


\*sections with a rank of 1 are considered the worst



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



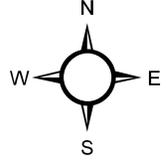
**STORMWATER MANAGEMENT COMMISSION**

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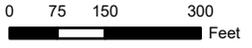
**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	— Not Surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

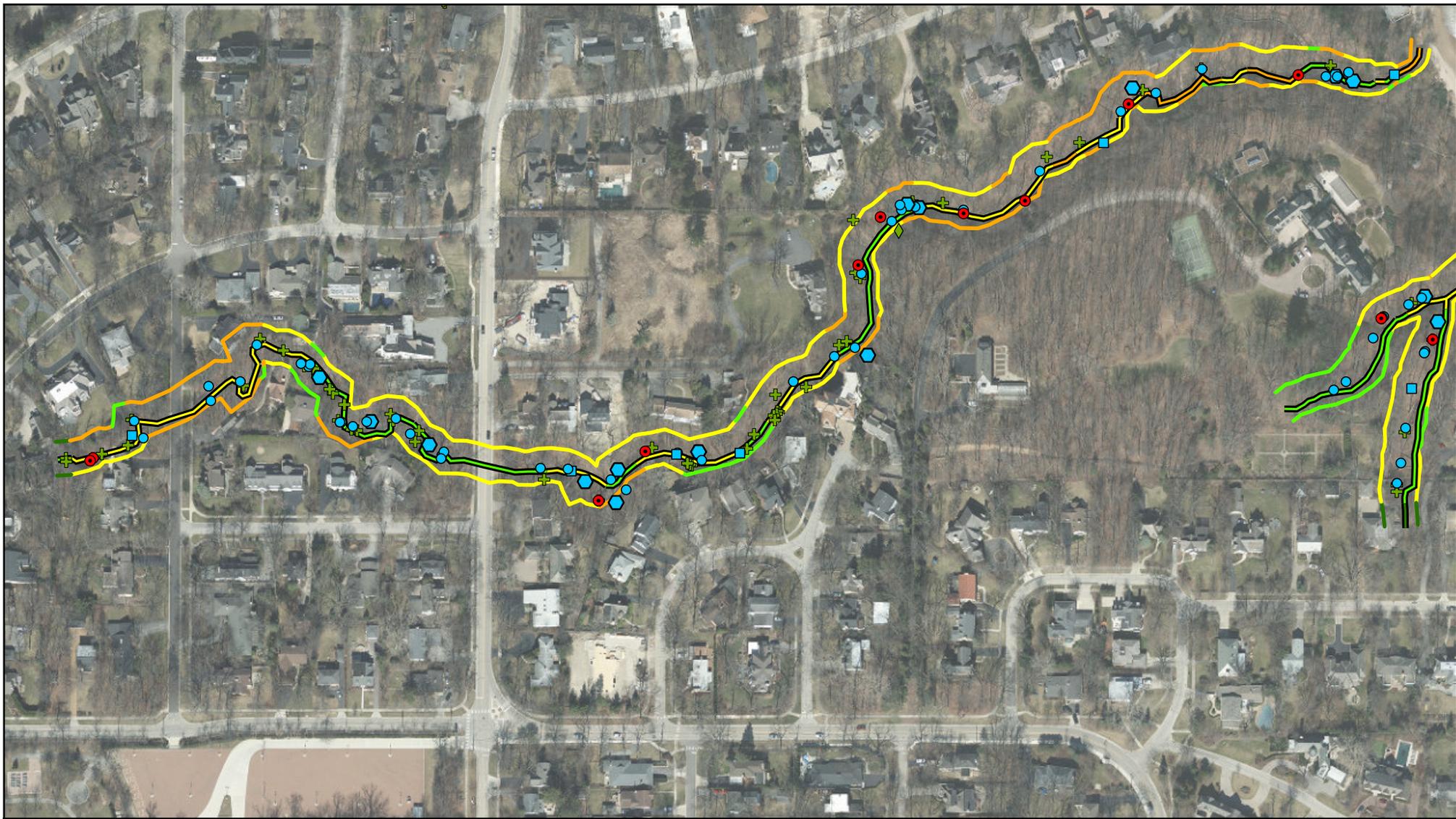


Scale 1:3,600



**Ravine 2C**

**Ranked 17 out of 53  
for Erosion Potential**



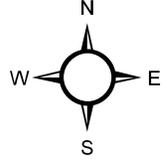

**STORMWATER MANAGEMENT COMMISSION**

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 building set-backs or as a basis for purchasing property.  
 Field Surveys and delineations are required to verify the  
 exact locations of property lines and other map features.

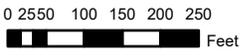
**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	— 1	— Not Surveyed
● Failing Structure	— 2	— 1
■ Log Jam	— 3	— 2
▲ Natural Knick Point	— 4	— 3
⊕ Residential	— 5	— 4
◆ Municipal Stormwater		— 5

\*sections with a rank of 1 are considered the worst



Scale 1:3,000



0 2550 100 150 200 250 Feet

**Ravine 2L**

**Ranked 22 out of 53  
for Erosion Potential**



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**STORMWATER MANAGEMENT COMMISSION**

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**Legend**

● Gully	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	1	Not Surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
✚ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

Scale 1:720

0 15 30 60 Feet

**Ravine 3C**

**Ranked 26 out of 53  
for Erosion Potential**

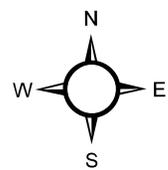


# Ravine 3L North Section

Ranked 2 out of 53  
for Erosion Potential

### Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ● Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| ⊕ Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale 1:6,000

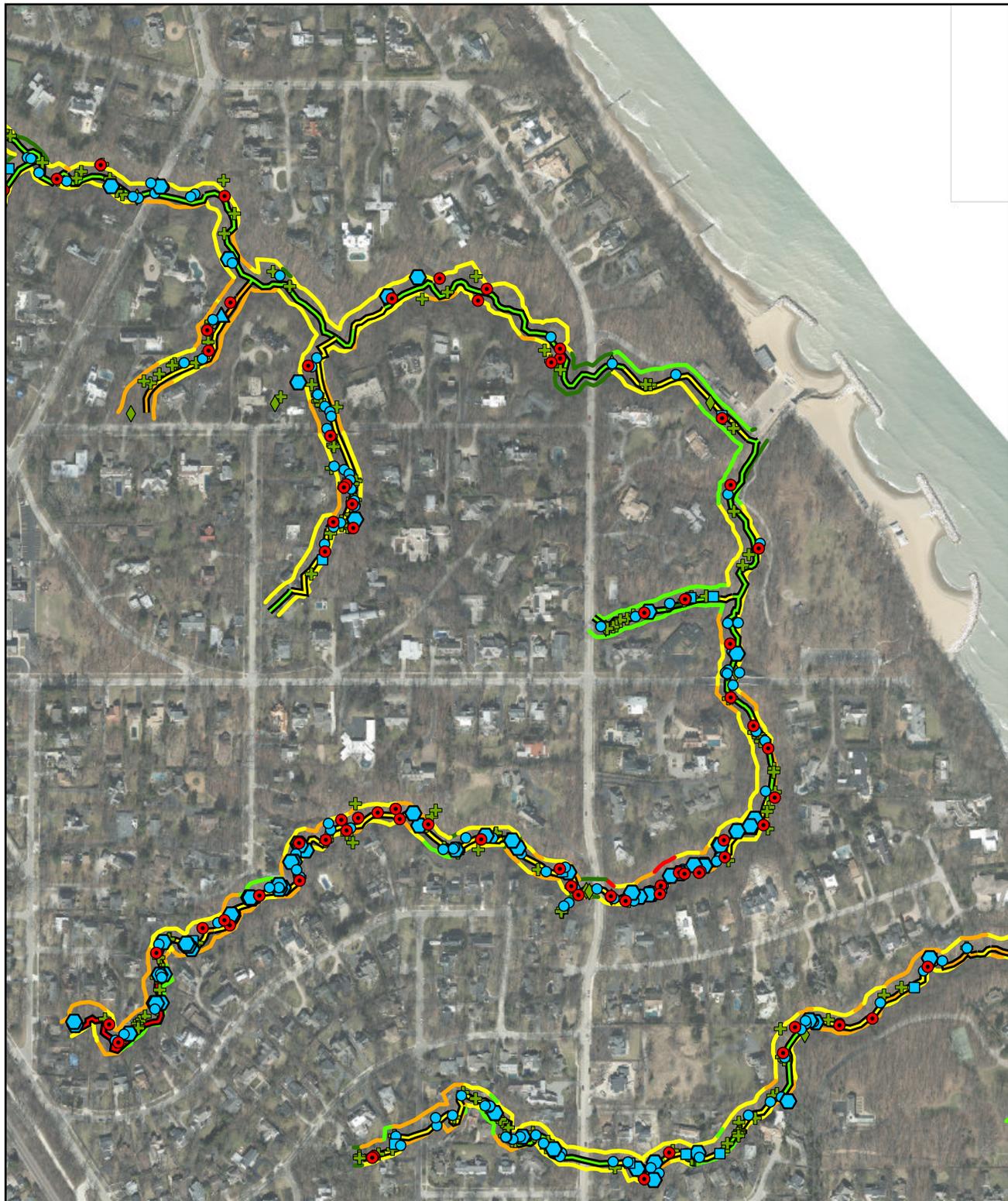


\*sections with a rank of 1 are considered the worst



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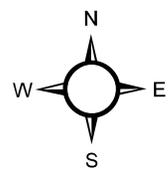


# Ravine 3L South Section

Ranked 2 out of 53  
for Erosion Potential

### Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ● Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| ✚ Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale 1:6,000

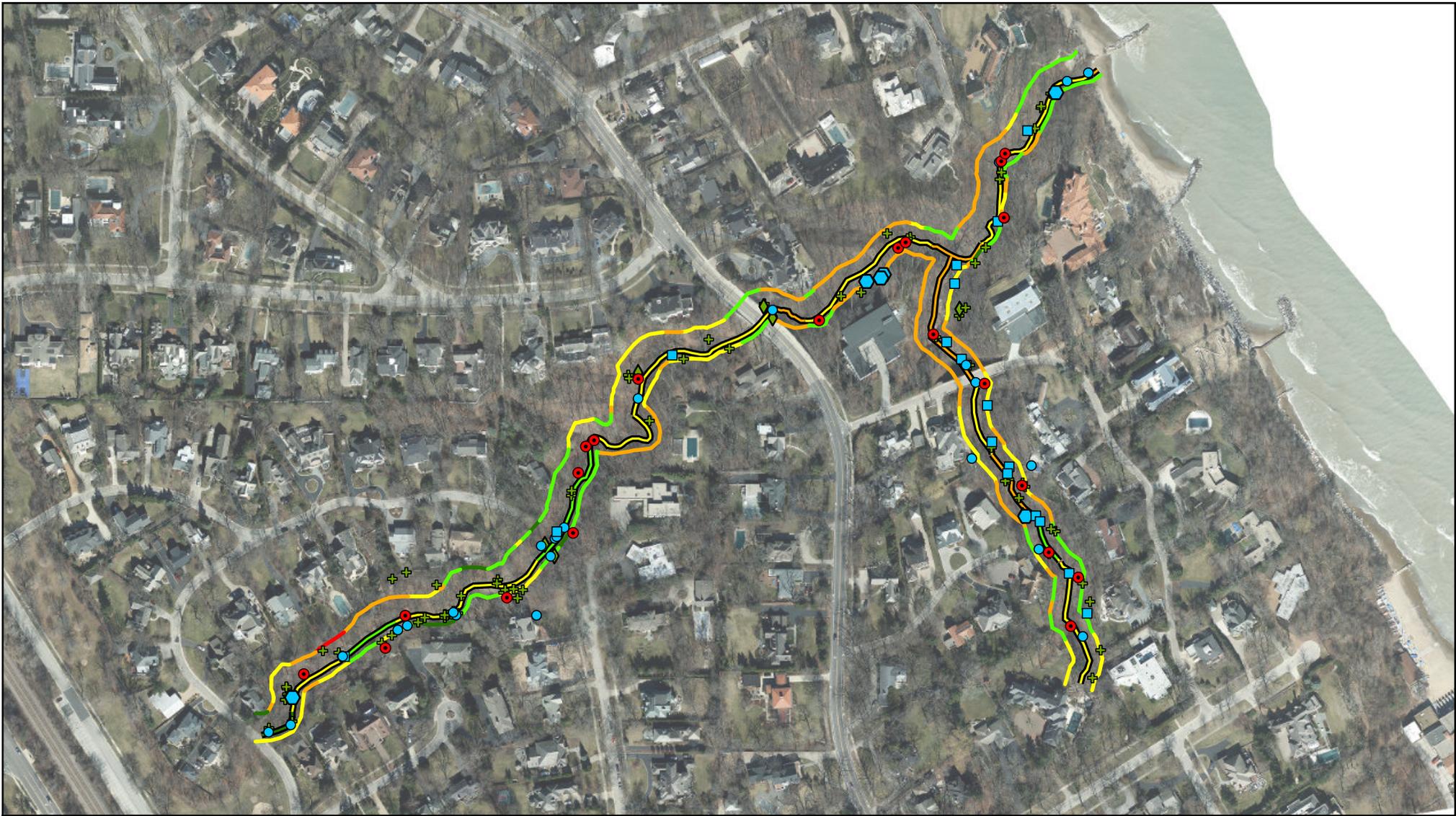


\*sections with a rank of 1 are considered the worst



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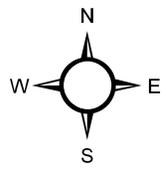

**STORMWATER MANAGEMENT COMMISSION**

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 exact locations of property lines and other map features.

**Legend**

● Gullies	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	— 1	— Not surveyed
⬡ Failing Structure	— 2	— 1
⬢ Log Jam	— 3	— 2
▲ Natural Knick Point	— 4	— 3
⊕ Residential	— 5	— 4
◆ Municipal Stormwater		— 5

\*sections with a rank of 1 are considered the worst

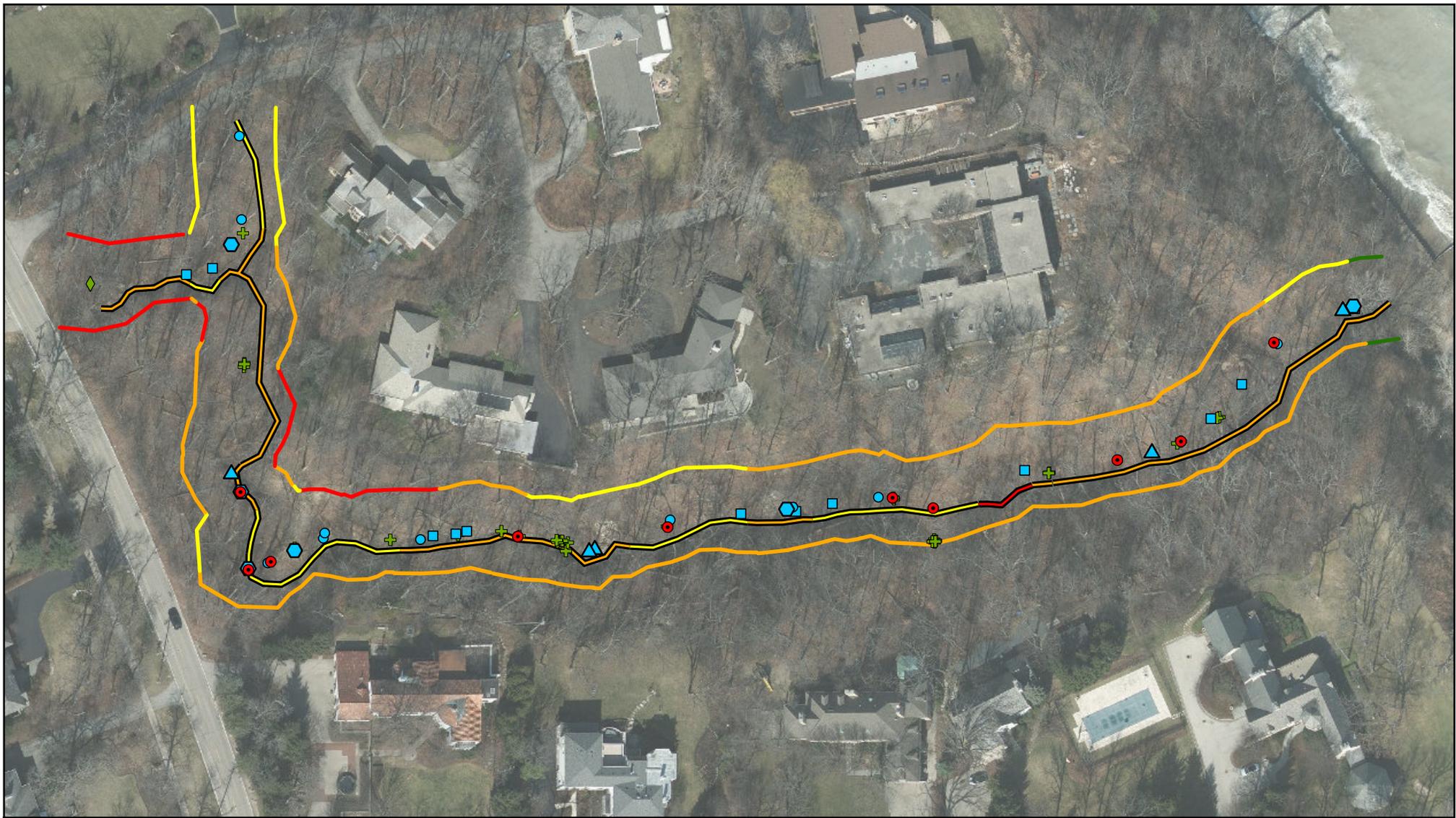


Scale 1:3,600



**Ravine 4C**

**Ranked 10 out of 53  
for Erosion Potential**



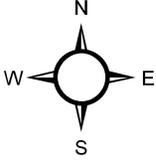

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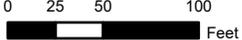
**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	Not Surveyed
⬡ Failing Structure	2	1
⬢ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

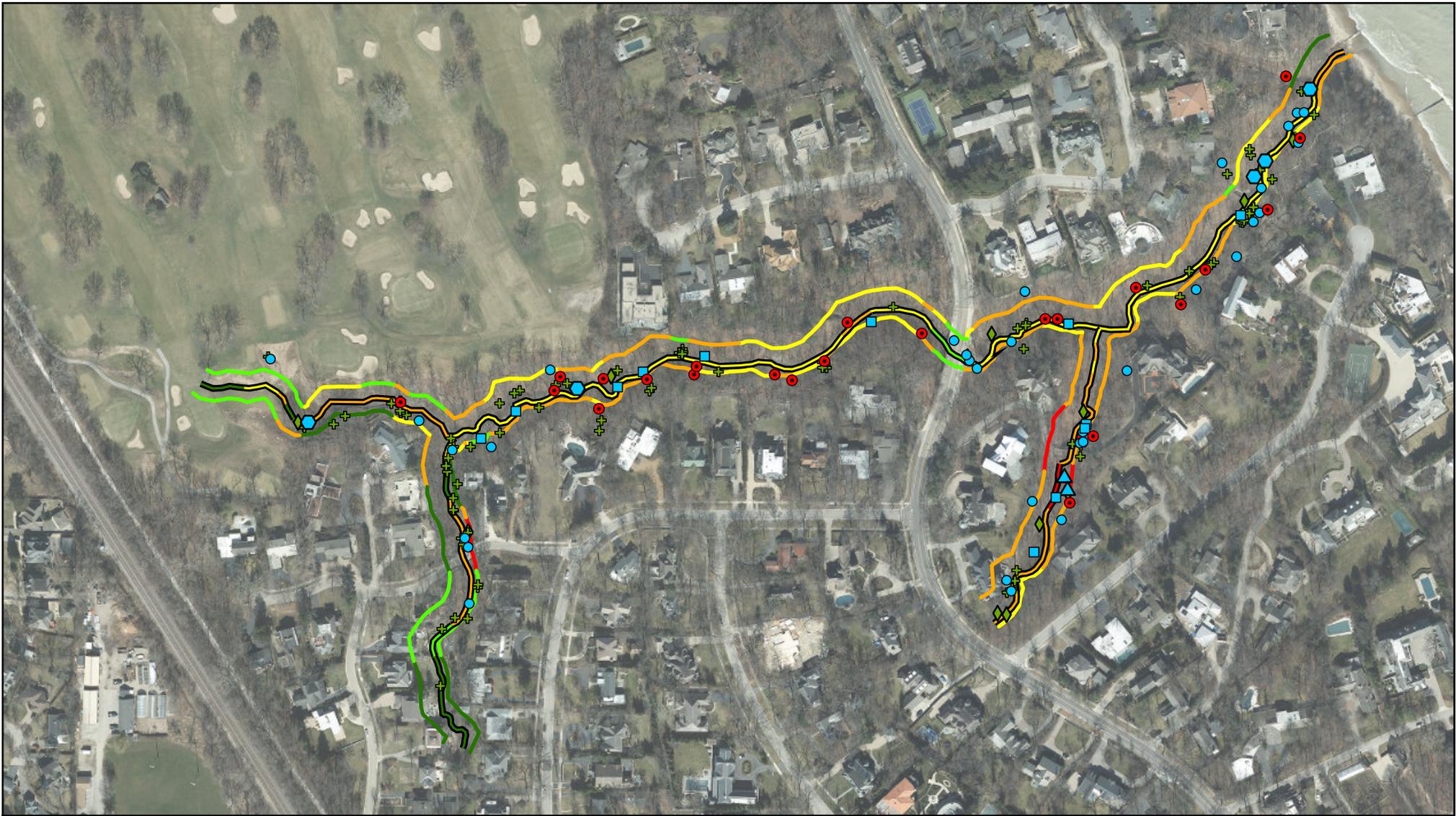


Scale 1:1,200



**Ravine 4L**

**Ranked 15 out of 53  
for Erosion Potential**



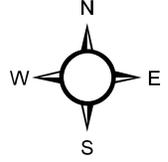

**STORMWATER MANAGEMENT COMMISSION**

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**Legend**

● Gullies	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	1	Not surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

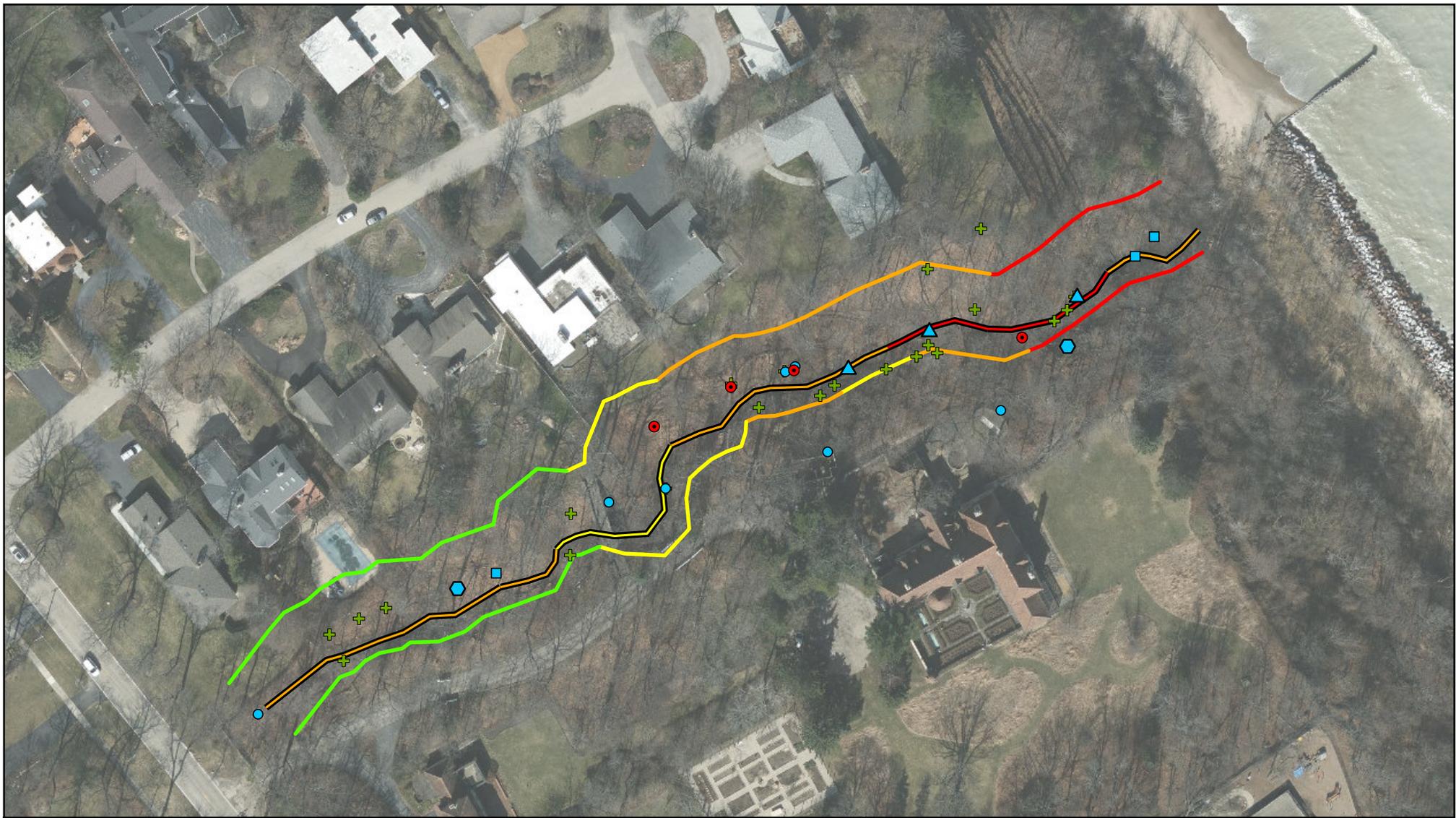


Scale 1:3,600



Ravine 5C

Ranked 8 out of 53  
for Erosion Potential



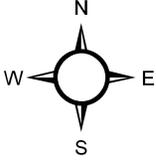

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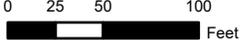
**Legend**

● Gully	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	— 1	— Not Surveyed
⬡ Failing Structure	— 2	— 1
⬢ Log Jam	— 3	— 2
▲ Natural Knick Point	— 4	— 3
⊕ Residential	— 5	— 4
◆ Municipal Stormwater		— 5

\*sections with a rank of 1 are considered the worst

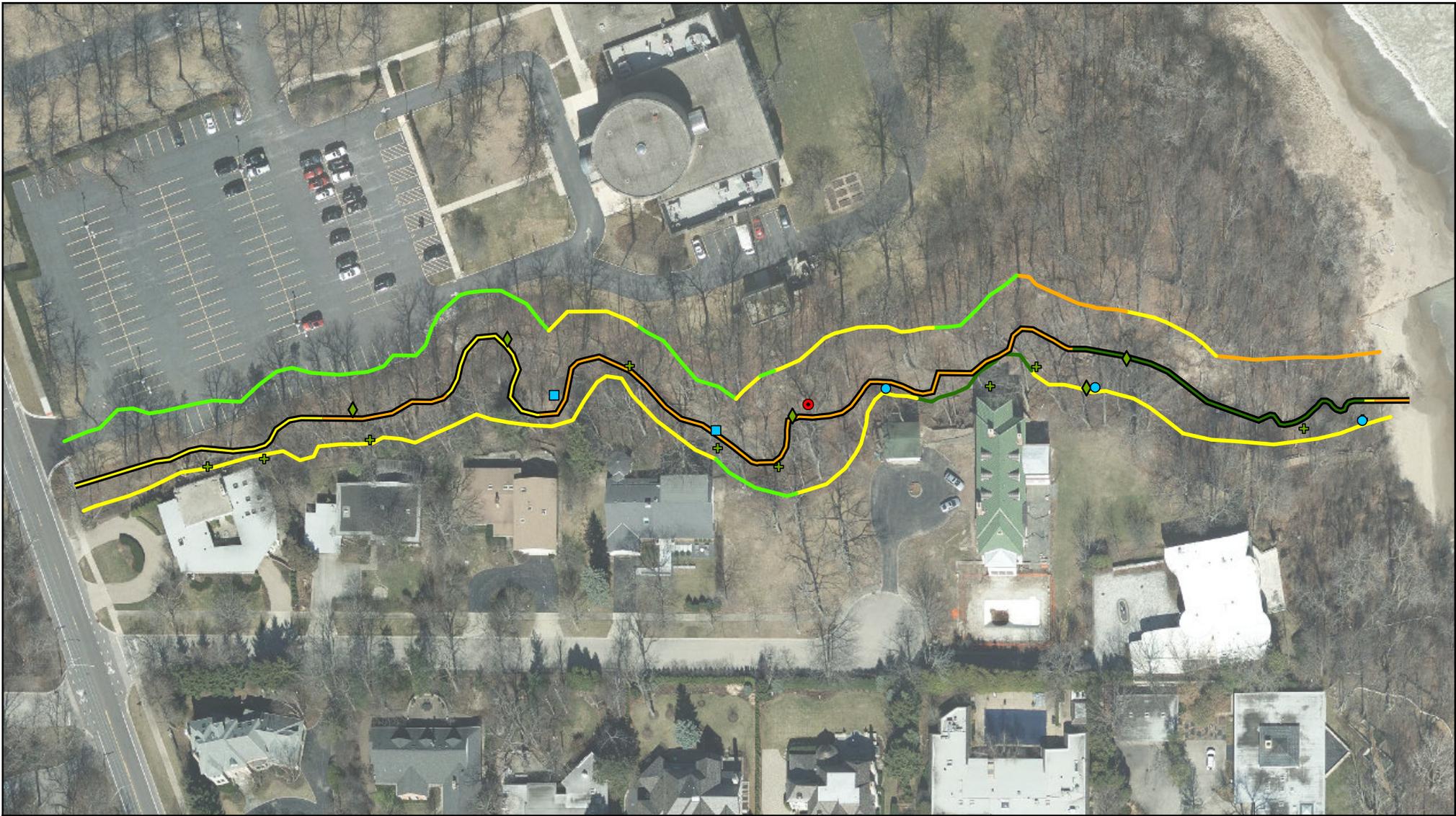


Scale 1:1,200



**Ravine 5L**

**Ranked 21 out of 53  
for Erosion Potential**



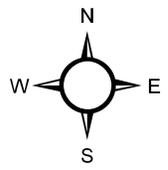

**STORMWATER MANAGEMENT COMMISSION**

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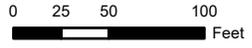
**Legend**

● Gullies	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	Not surveyed
● Failing Structure	2	1
● Log Jam	3	2
▲ Natural Knick Point	4	3
✚ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst



Scale 1:1,200



**Ravine 6C**

**Ranked 25 out of 53  
for Erosion Potential**



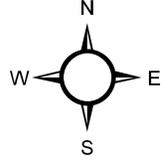

**STORMWATER MANAGEMENT COMMISSION**

Lake County Stormwater Management Commission  
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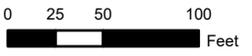
**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	— Not Surveyed
⬡ Failing Structure	2	1
⬢ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

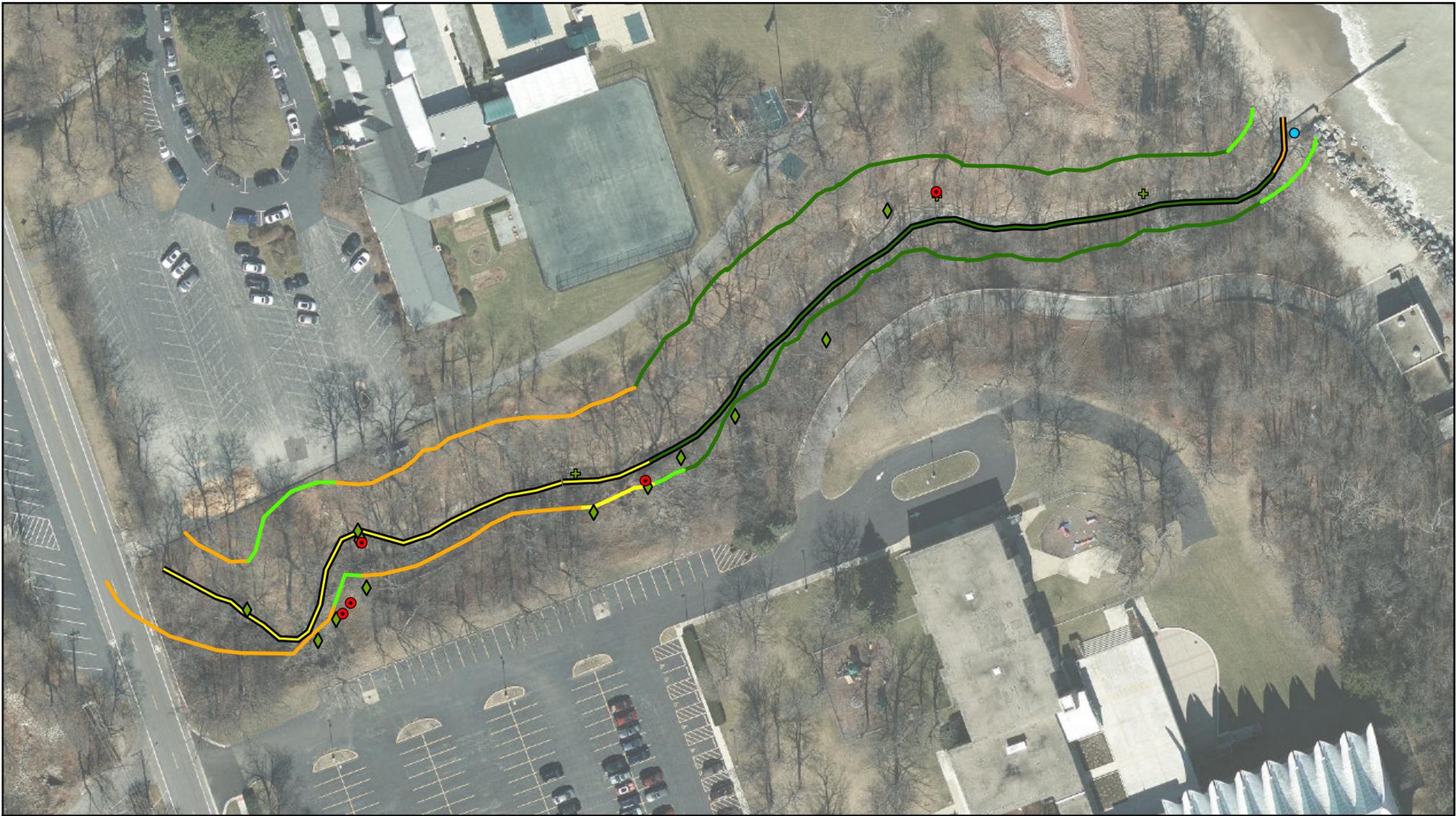


Scale 1:1,200



**Ravine 6L**

**Ranked 20 out of 53  
for Erosion Potential**



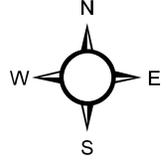

**STORMWATER MANAGEMENT COMMISSION**

Lake County Stormwater Management Commission Courtesy Map 2019. This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate. This map should not be used to determine building set-backs or as a basis for purchasing property. Field Surveys and delineations are required to verify the exact locations of property lines and other map features.

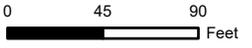
**Legend**

● Gullies	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	1	Not surveyed
◆ Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst



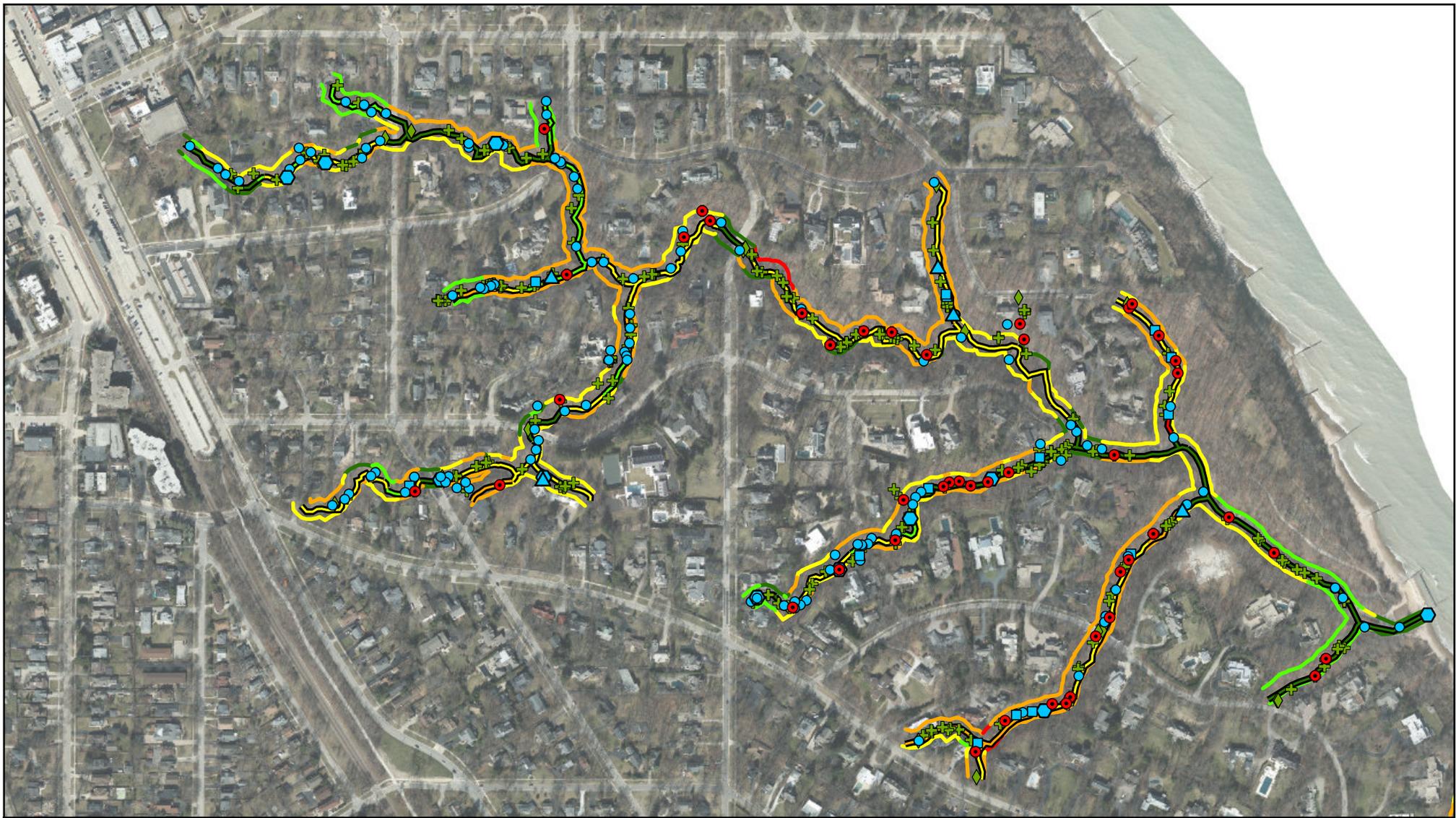
Scale 1:1,080



0 45 90 Feet

**Ravine 7C**

**Ranked 18 out of 53  
for Erosion Potential**



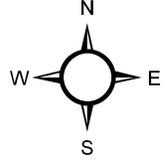

**STORMWATER MANAGEMENT COMMISSION**

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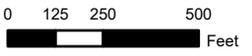
**Legend**

● Gully	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	— 1	— Not Surveyed
◆ Failing Structure	— 2	— 1
■ Log Jam	— 3	— 2
▲ Natural Knick Point	— 4	— 3
⊕ Residential	— 5	— 4
◆ Municipal Stormwater		— 5

\*sections with a rank of 1 are considered the worst

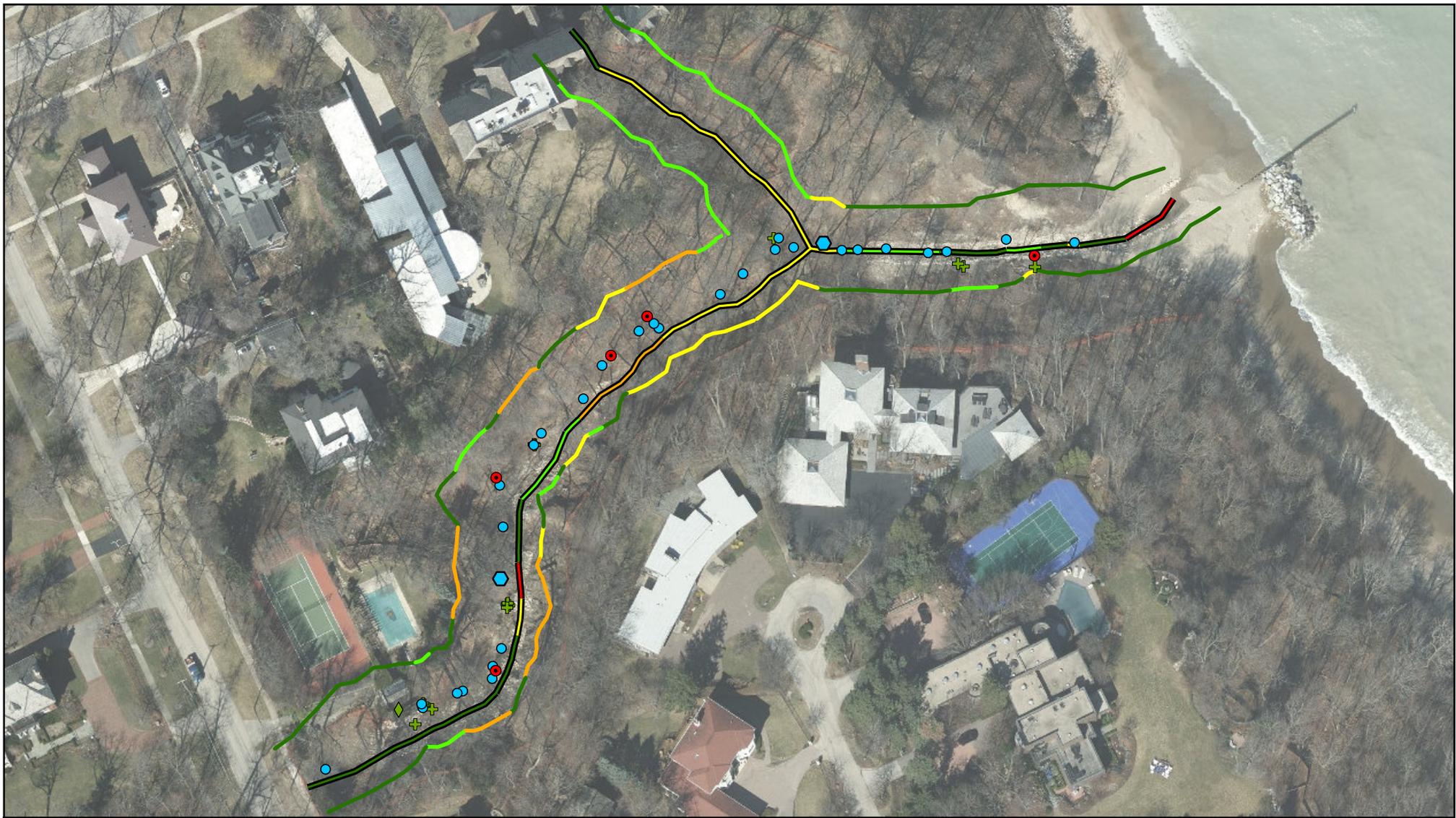


Scale 1:6,000



**Ravine 7L**

**Ranked 3 out of 53  
for Erosion Potential**



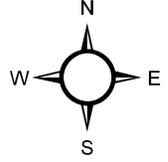

**STORMWATER MANAGEMENT COMMISSION**

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**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	— 1	— Not Surveyed
⬡ Failing Structure	— 2	— 1
⬢ Log Jam	— 3	— 2
▲ Natural Knick Point	— 4	— 3
⊕ Residential	— 5	— 4
◆ Municipal Stormwater		— 5

\*sections with a rank of 1 are considered the worst

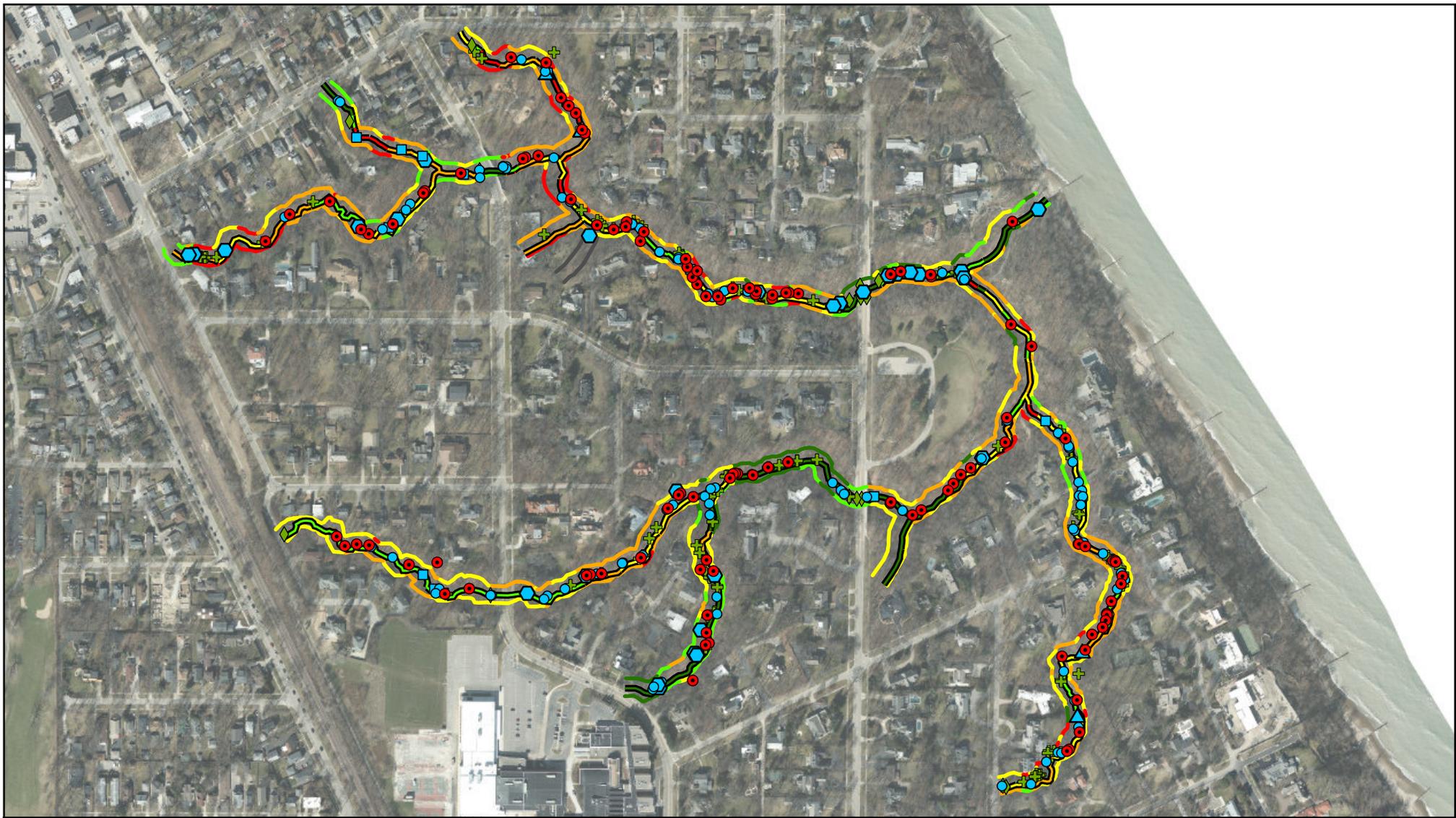


Scale 1:1,200



**Ravine 8L**

**Ranked 32 out of 53  
for Erosion Potential**



**STORMWATER MANAGEMENT COMMISSION**

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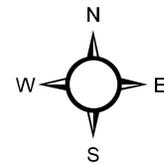
**Legend**

- Gully
- Existing Project
- Failing Structure
- Log Jam
- ▲ Natural Knick Point
- ⊕ Residential
- ◆ Municipal Stormwater

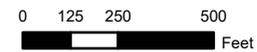
- Channel Stability Rank**
- 1
  - 2
  - 3
  - 4
  - 5

\*sections with a rank of 1 are considered the worst

- Bank Stability Rank**
- Not Surveyed
  - 1
  - 2
  - 3
  - 4
  - 5

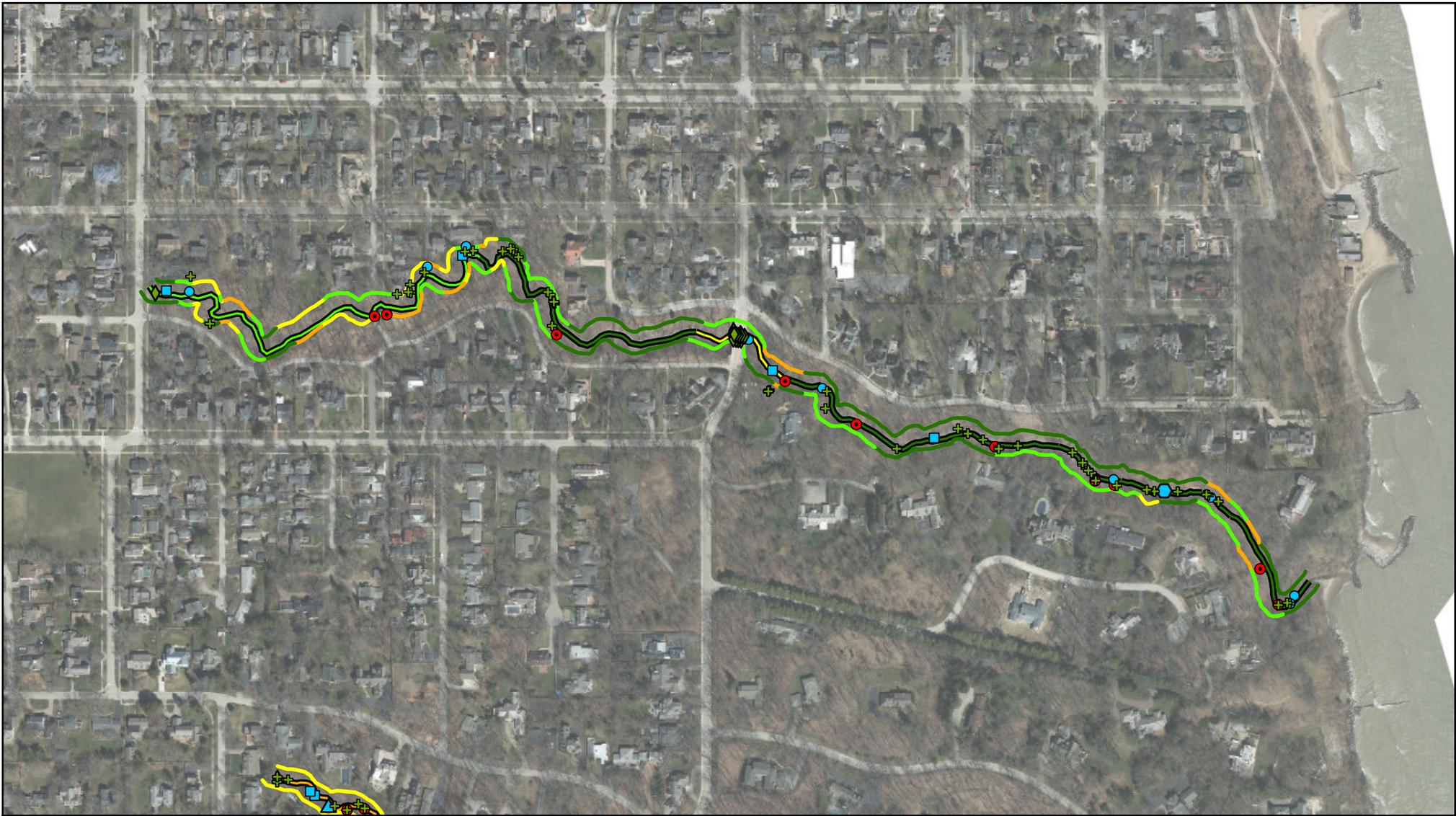


Scale 1:6,000



**Ravine 10L**

**Ranked 1 out of 53  
for Erosion Potential**

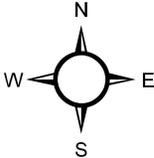



**STORMWATER MANAGEMENT COMMISSION**

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**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	Not surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater	*sections with a rank of 1 are considered the worst	

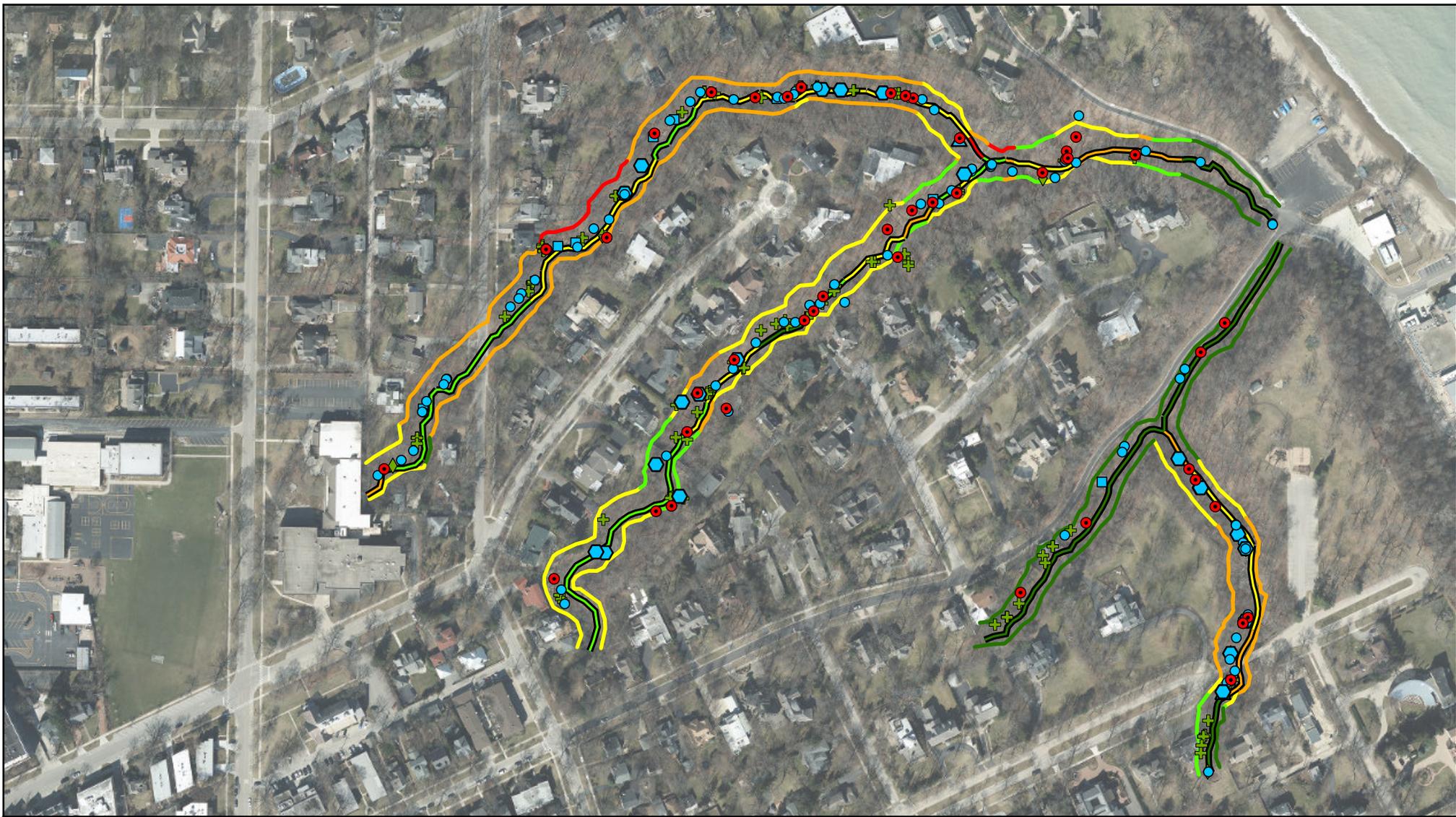


Scale 1:4,800



**Ravine Park Ravine**

**Ranked 19 out of 53 for Erosion Potential**



**STORMWATER MANAGEMENT COMMISSION**

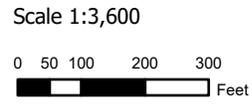
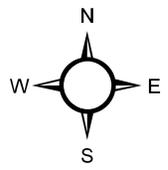
Lake County Stormwater Management Commission  
 Courtesy Map 2019. This map is provided for general  
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**Legend**

- Gully
- Existing Project
- ⬡ Failing Structure
- ⬡ Log Jam
- ▲ Natural Knick Point
- ⊕ Residential
- ◆ Municipal Stormwater

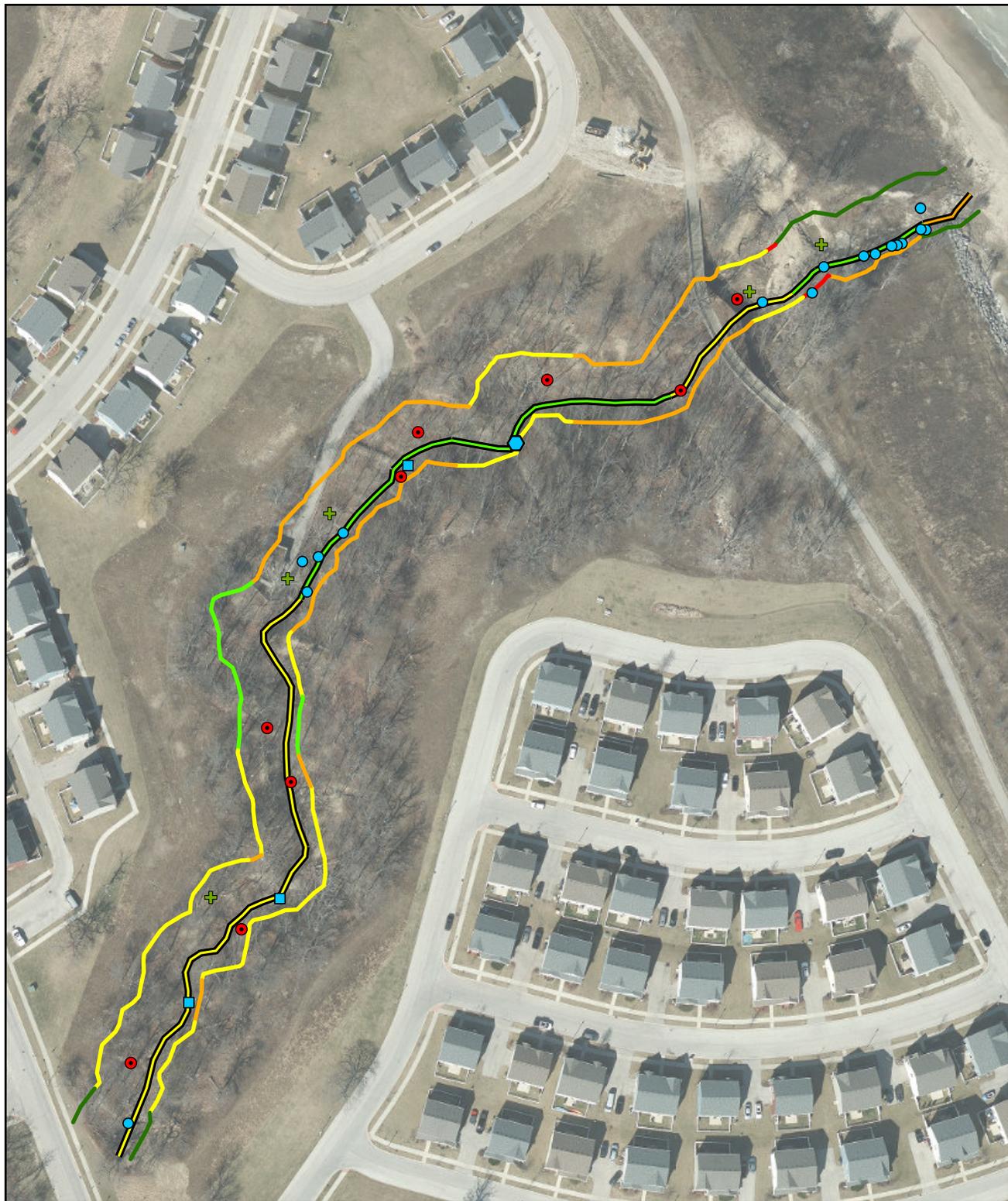
- Channel Stability Rank**
- 1
  - 2
  - 3
  - 4
  - 5
- \*sections with a rank of 1  
are considered the worst

- Bank Stability Rank**
- Not Surveyed
  - 1
  - 2
  - 3
  - 4
  - 5



**Ravines 9L & 9L2**

Ranked 14 out of 53  
 Ranked 23 out of 53  
 for Erosion Potential

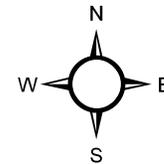


# Schenck Ravine

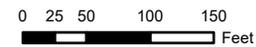
Ranked 48 out of 53  
for Erosion Potential

## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ● Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| + Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not Surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale 1:1,800

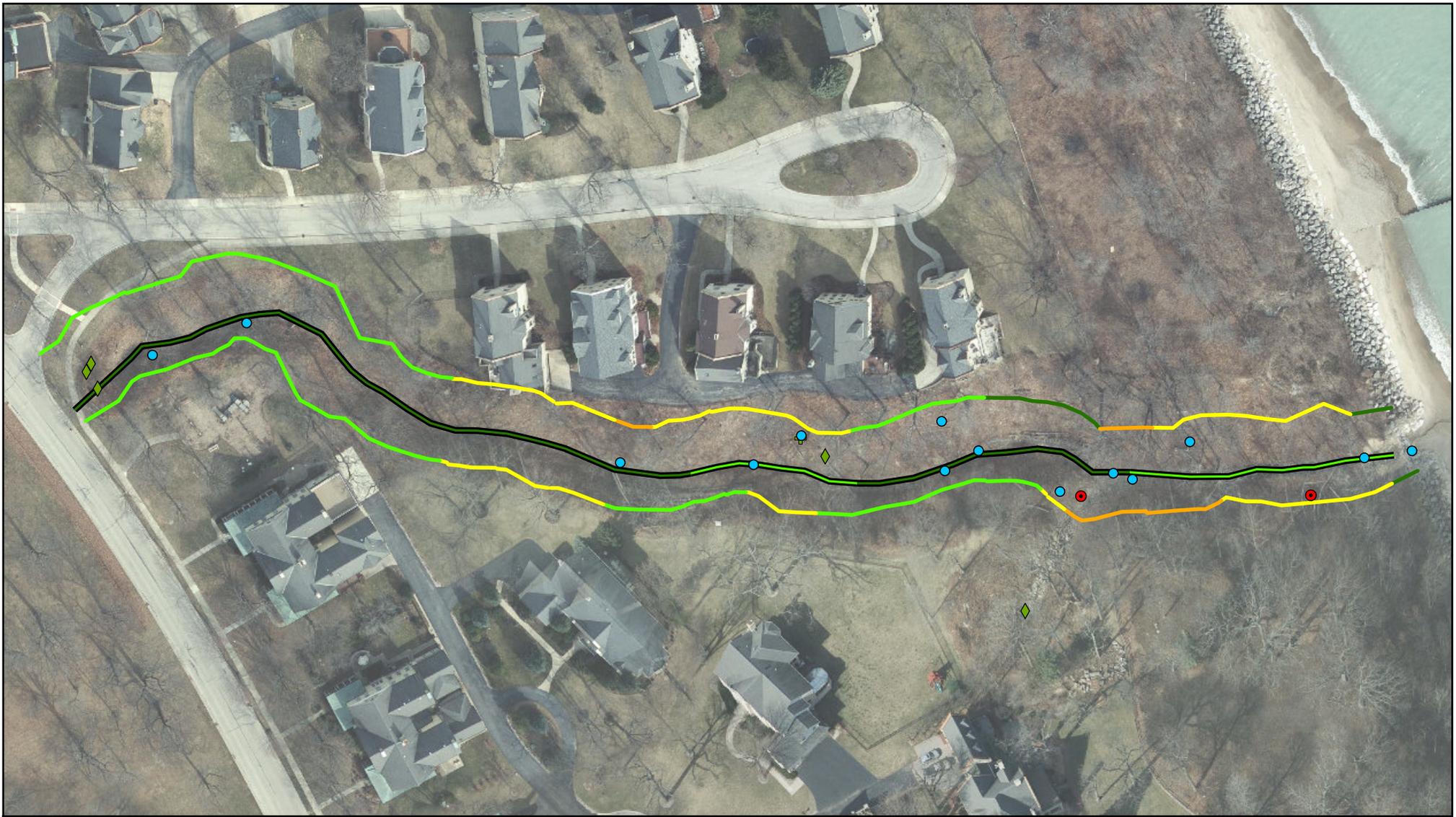


\*sections with a rank of 1 are considered the worst



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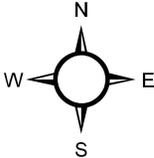

**STORMWATER MANAGEMENT COMMISSION**

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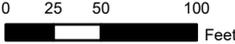
**Legend**

● Gully	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	1	Not Surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

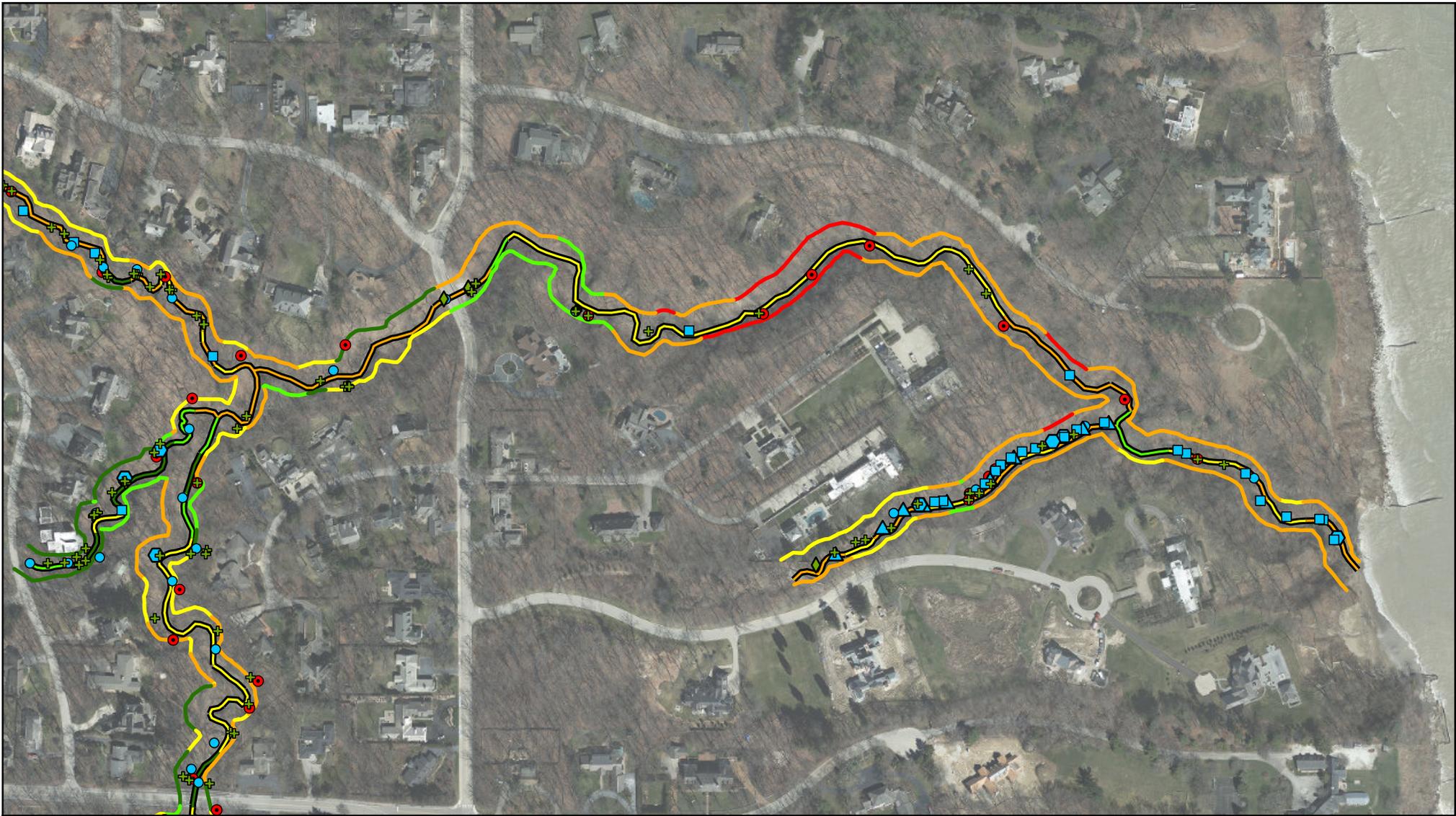


Scale 1:1,200



**Scott Loop Ravine**

**Ranked 42 out of 53  
for Erosion Potential**



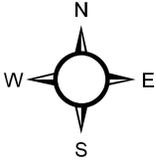

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**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	— Not surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

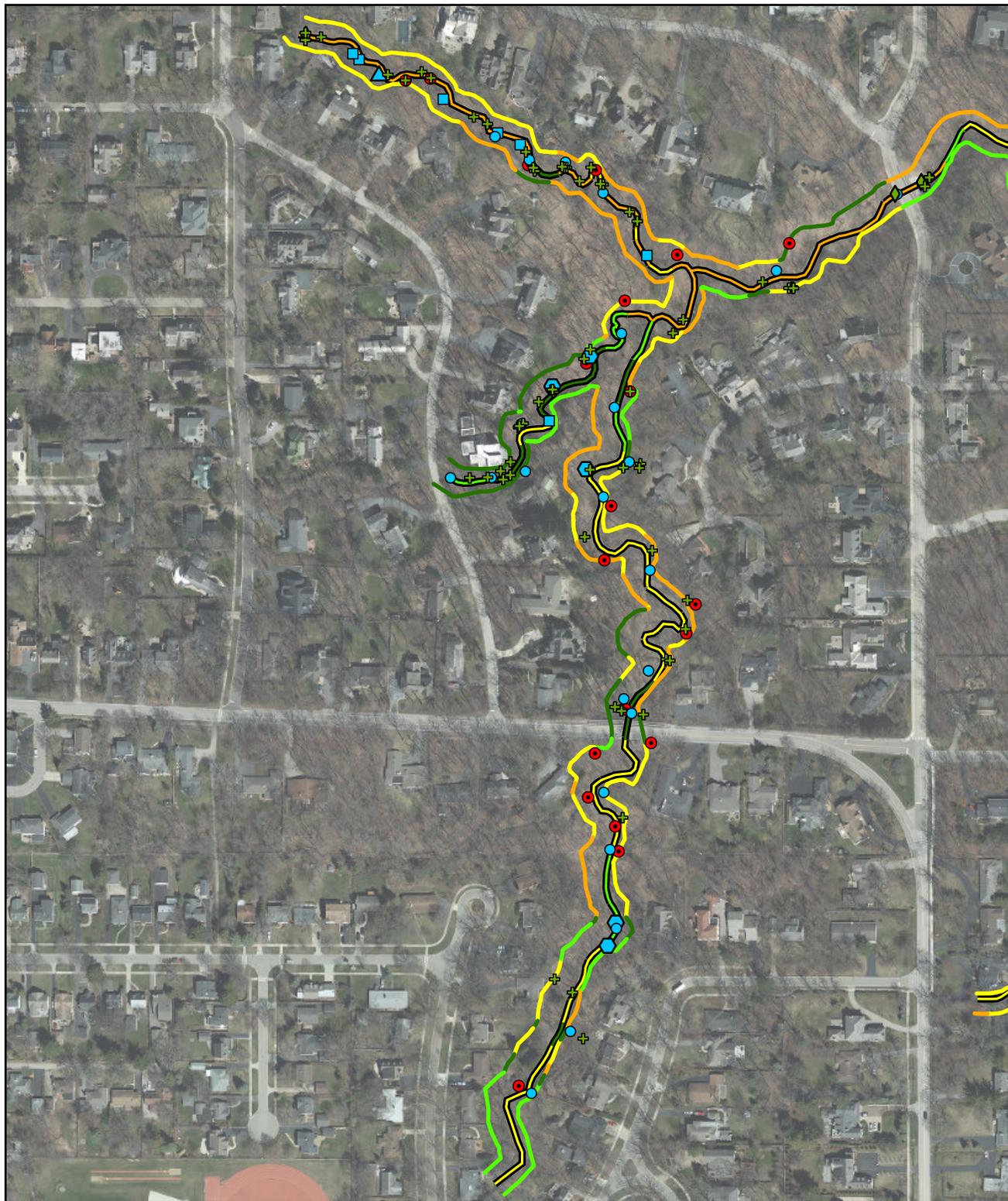


Scale 1:3,600



**South Ravine  
East Section**

**Ranked 7 out of 53  
for Erosion Potential**

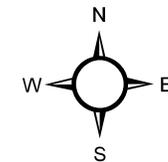


# South Ravine West Section

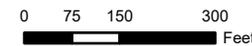
Ranked 7 out of 53  
for Erosion Potential

## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ◆ Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| ✚ Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale: 1:3,600

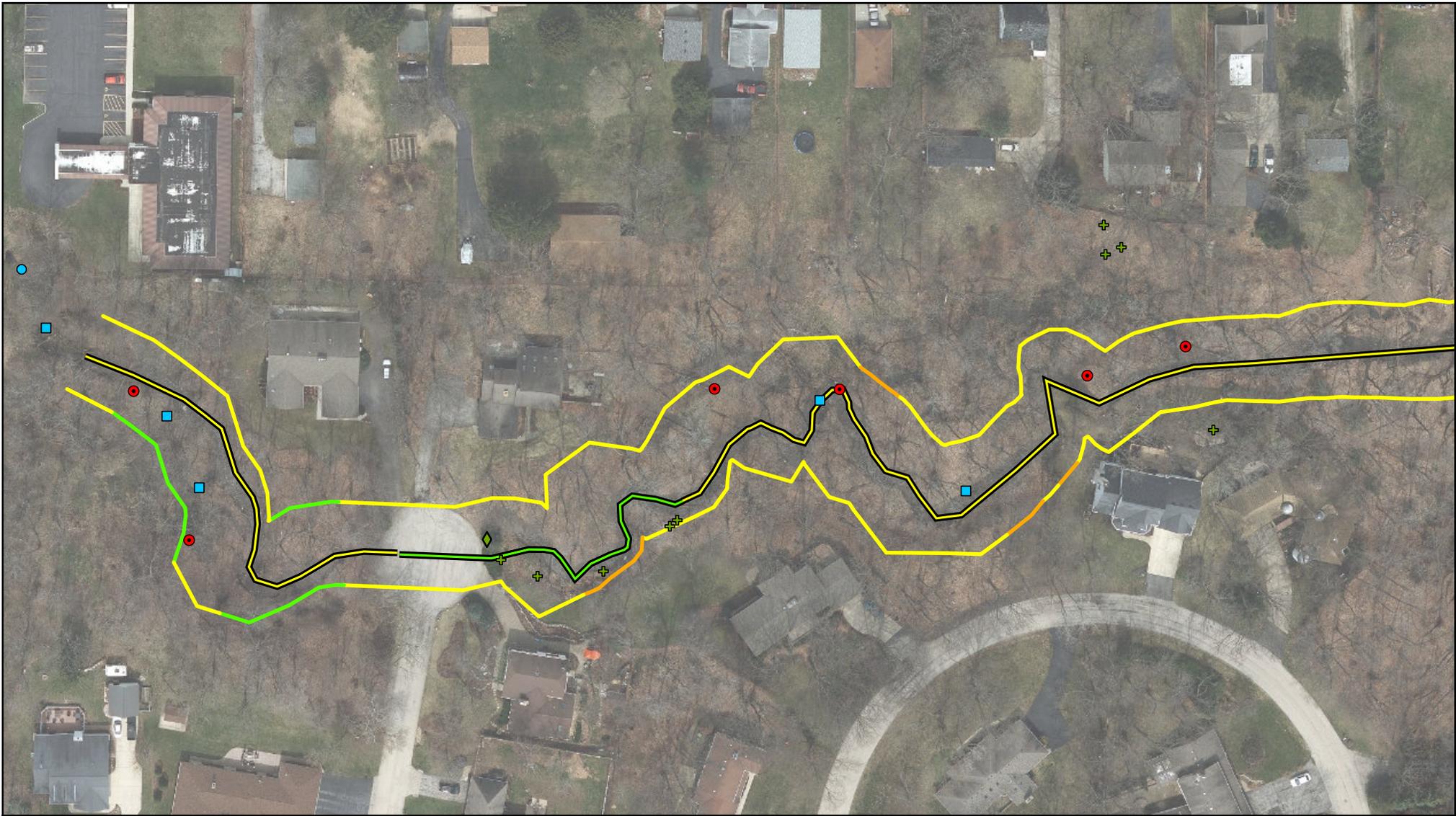


\*sections with a rank of 1 are considered the worst



## STORMWATER MANAGEMENT COMMISSION

Lake County Stormwater Management Commission Courtesy Map 2019. This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate. This map should not be used to determine building set-backs or as a basis for purchasing property. Field Surveys and delineations are required to verify the exact locations of property lines and other map features.



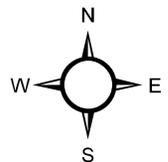

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**Legend**

● Gully	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	1	Not surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
✚ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

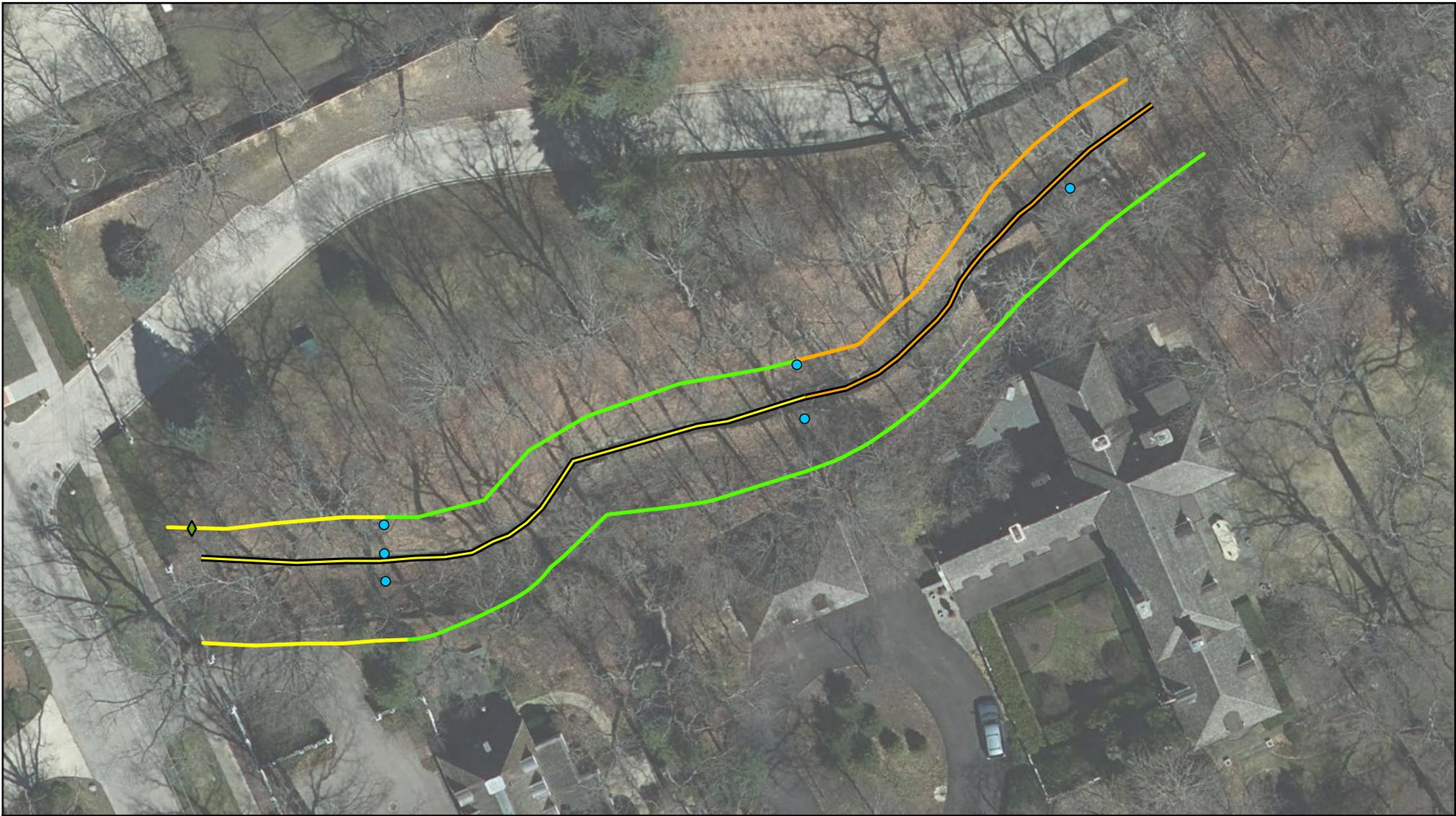


Scale 1:1,200



**Spring Bluff Ravine**

**Ranked 47 out of 53  
for Erosion Potential**



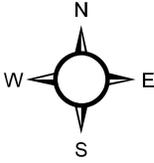

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**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	Not surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
✚ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

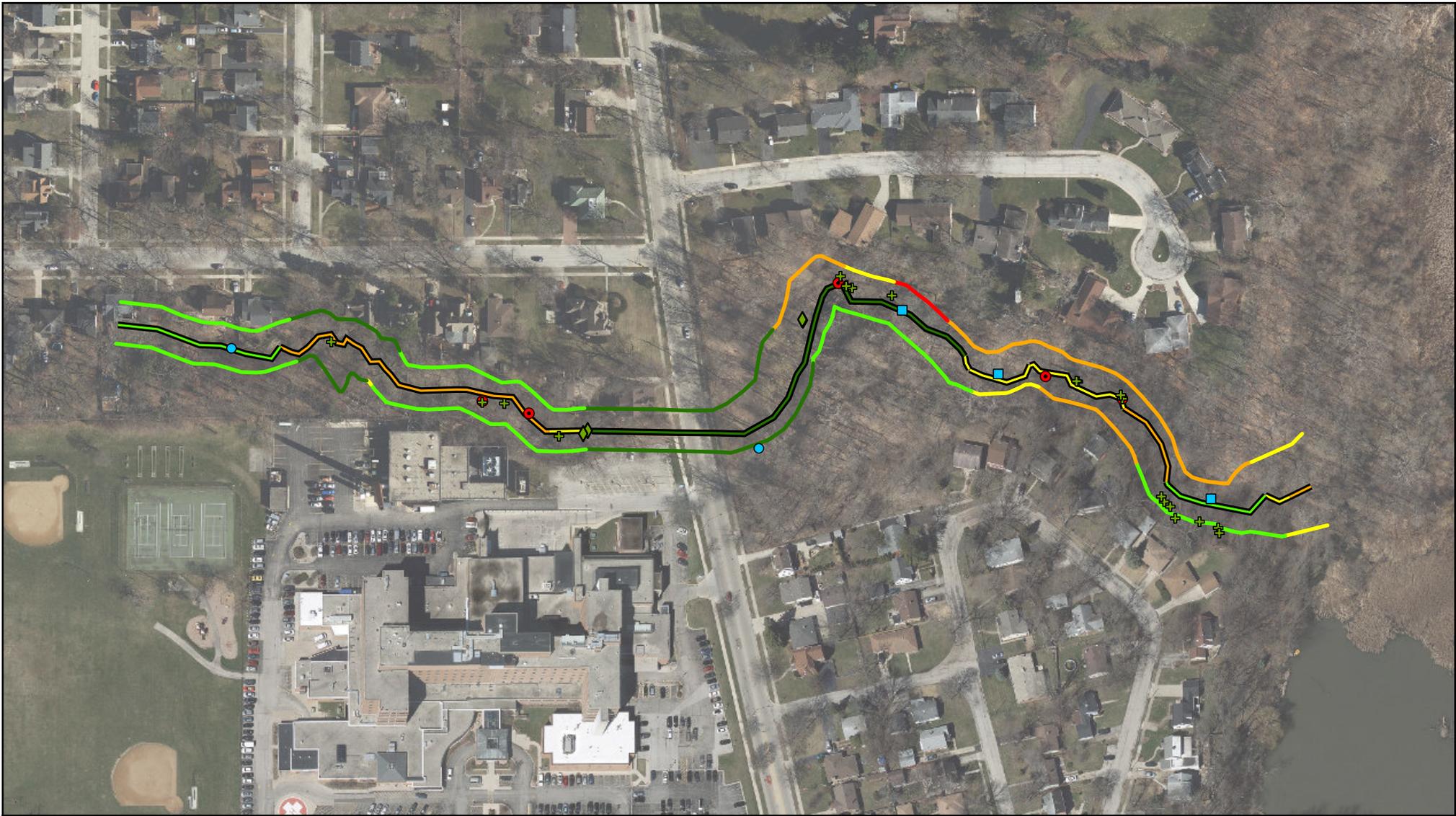


Scale: 1:480



**Spruce Avenue Ravine**

**Ranked 52 out of 53  
for Erosion Potential**



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**Legend**

- Gully
- Existing Project
- Failing Structure
- Log Jam
- ▲ Natural Knick Point
- ⊕ Residential
- ◆ Municipal Stormwater

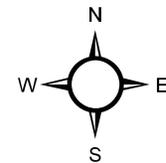
**Channel Stability Rank**

- 1
- 2
- 3
- 4
- 5

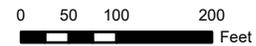
\*sections with a rank of 1 are considered the worst

**Bank Stability Rank**

- Not surveyed
- 1
- 2
- 3
- 4
- 5



Scale 1:2,400



**Stanley Ravine**

**Ranked 33 out of 53  
for Erosion Potential**



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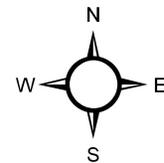
**Legend**

- Gully
- Existing Project
- Failing Structure
- Log Jam
- ▲ Natural Knick Point
- ⊕ Residential
- ◆ Municipal Stormwater

- Channel Stability Rank**
- 1
  - 2
  - 3
  - 4
  - 5

\*sections with a rank of 1 are considered the worst

- Bank Stability Rank**
- Not Surveyed
  - 1
  - 2
  - 3
  - 4
  - 5

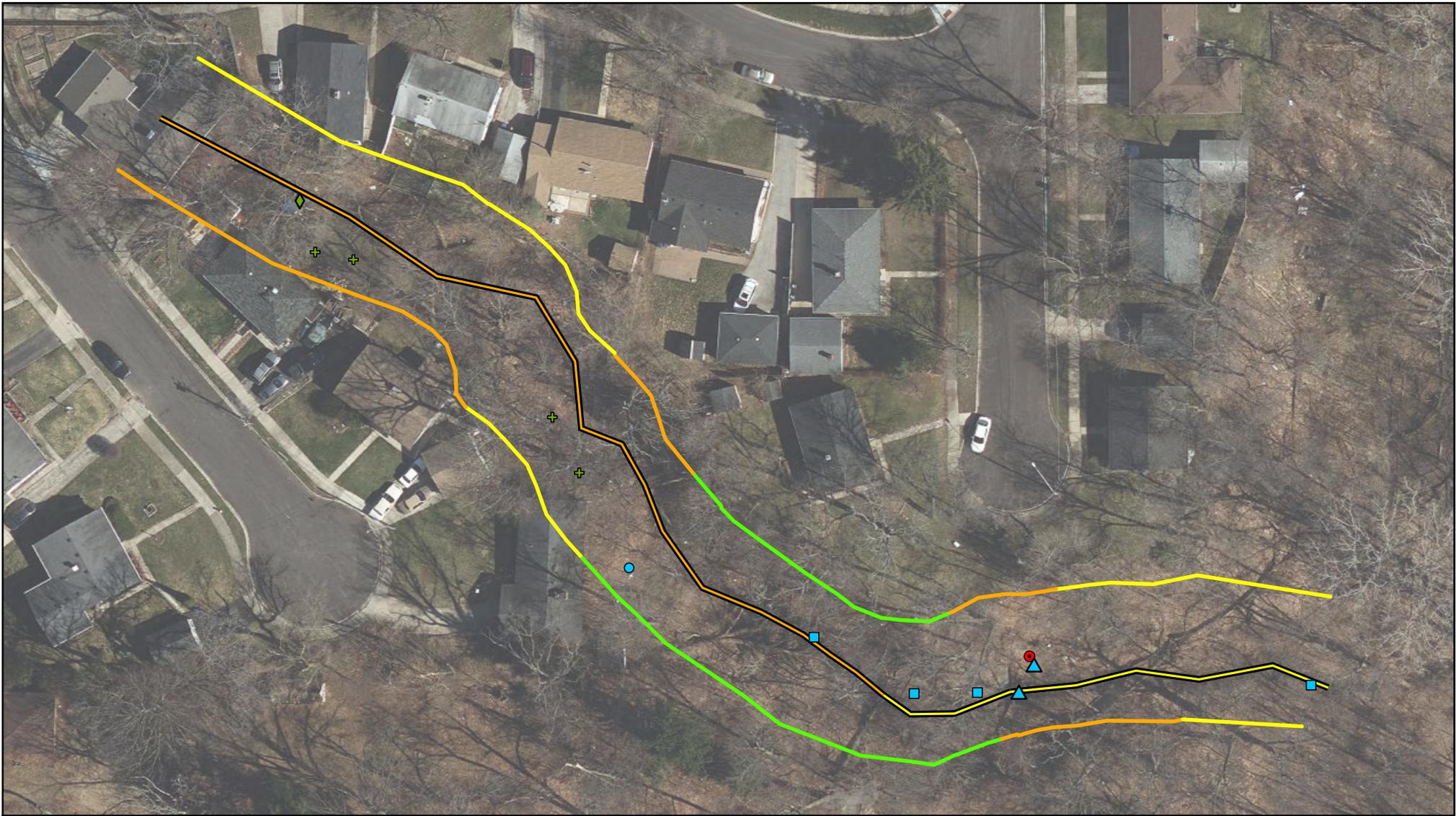


Scale 1:2,400



**Stone Gate Road Ravine**

**Ranked 35 out of 53 for Erosion Potential**



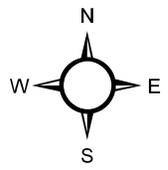

**STORMWATER MANAGEMENT COMMISSION**

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 exact locations of property lines and other map features.

**Legend**

● Gully	<b>Channel Stability Rank</b>	<b>Bank Stability Rank</b>
● Existing Project	1	Not surveyed
⬡ Failing Structure	2	1
⬢ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

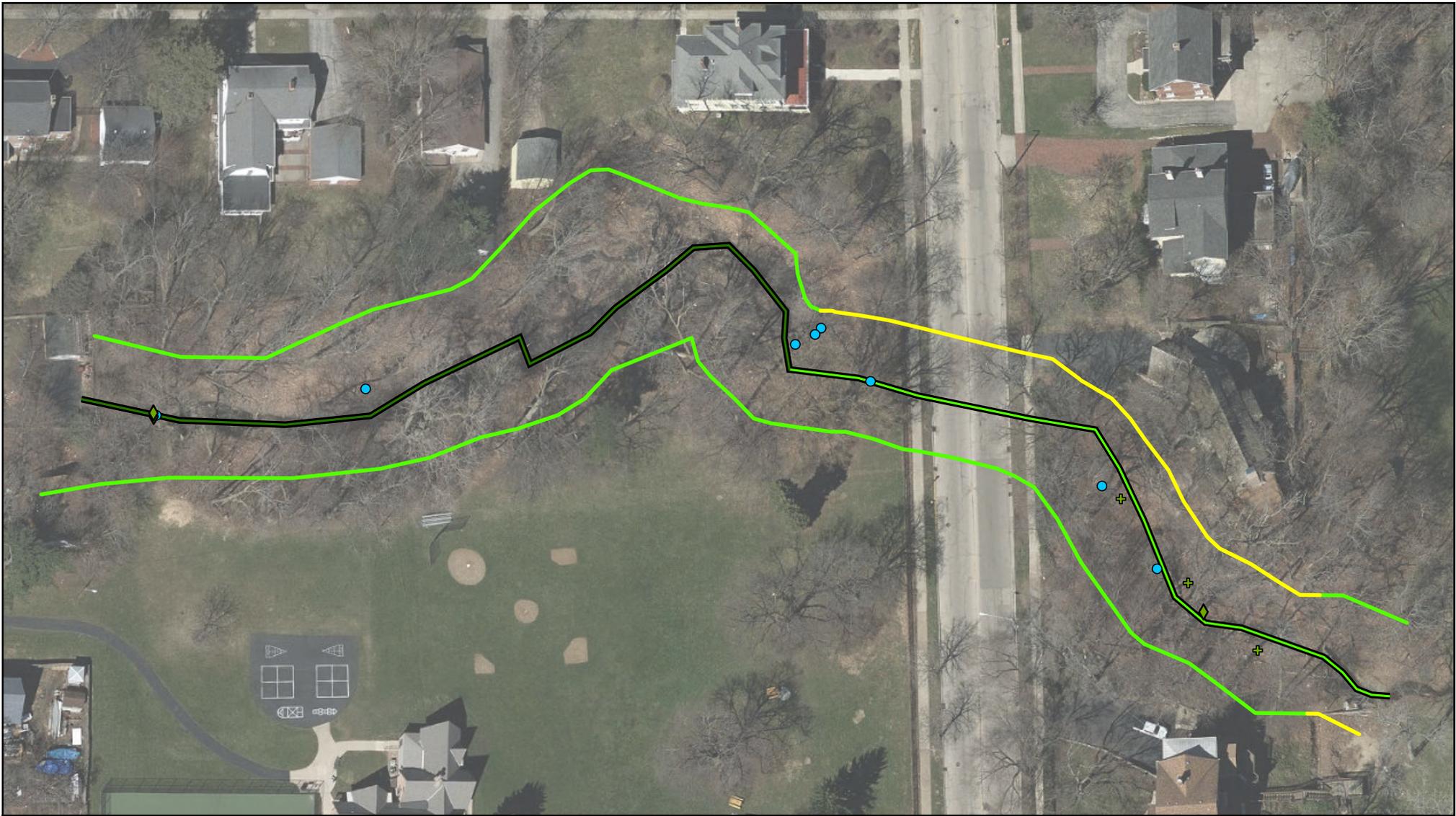


Scale 1:720



Terrace & Harding  
Avenue Ravine

Ranked 38 out of 53  
for Erosion Potential

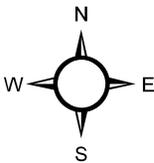



**STORMWATER MANAGEMENT COMMISSION**

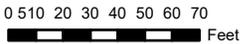
Lake County Stormwater Management Commission Courtesy Map 2019. This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate. This map should not be used to determine building set-backs or as a basis for purchasing property. Field Surveys and delineations are required to verify the exact locations of property lines and other map features.

**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	Not surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
✚ Residential	5	4
◆ Municipal Stormwater	*sections with a rank of 1 are considered the worst	

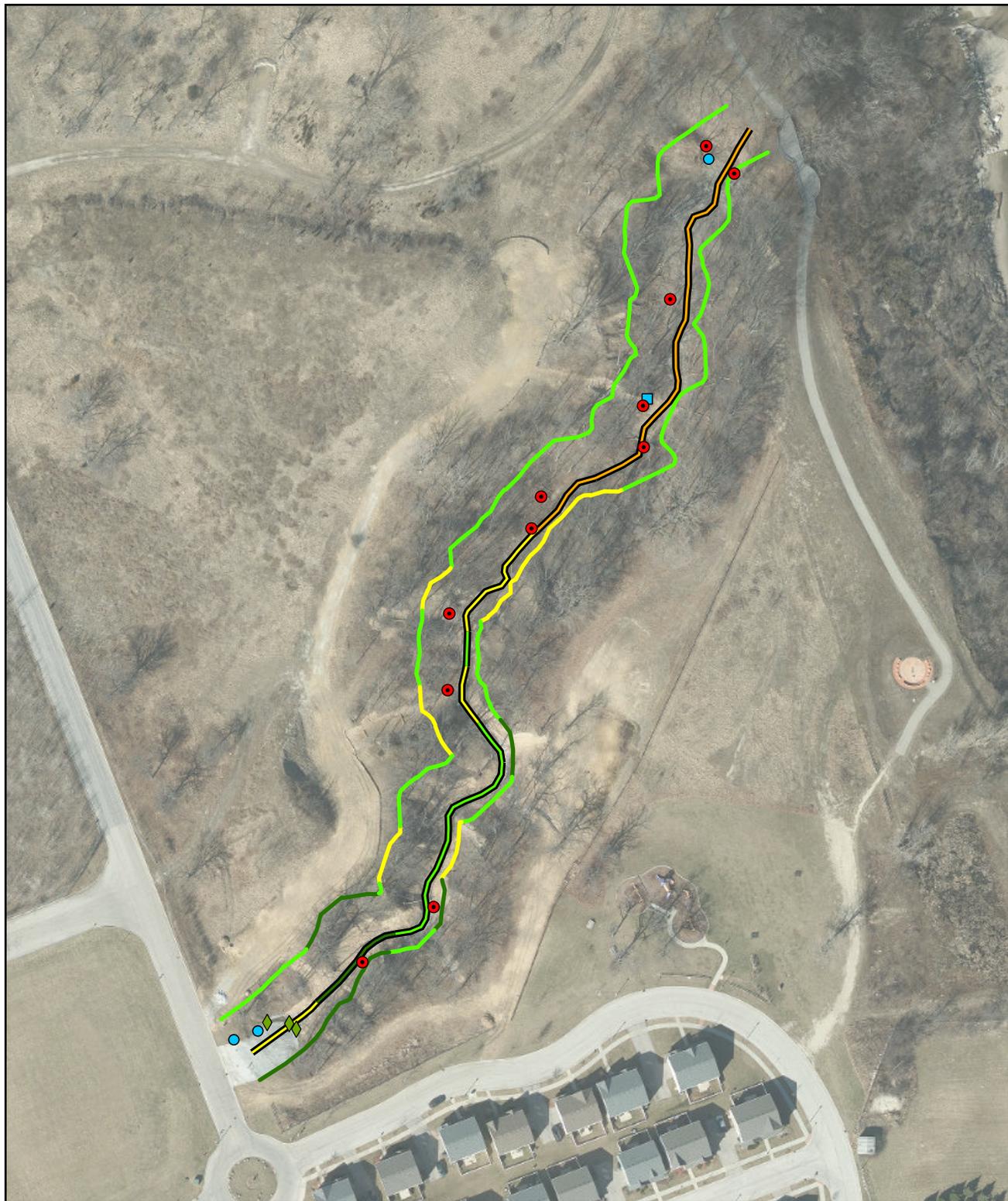


Scale 1:840



## Upton Park Ravine

Ranked 45 out of 53  
for Erosion Potential

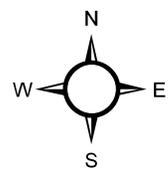


# Van Horne Ravine

Ranked 51 out of 53  
for Erosion Potential

## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ⬡ Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| ⊕ Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not Surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale 1:1,800

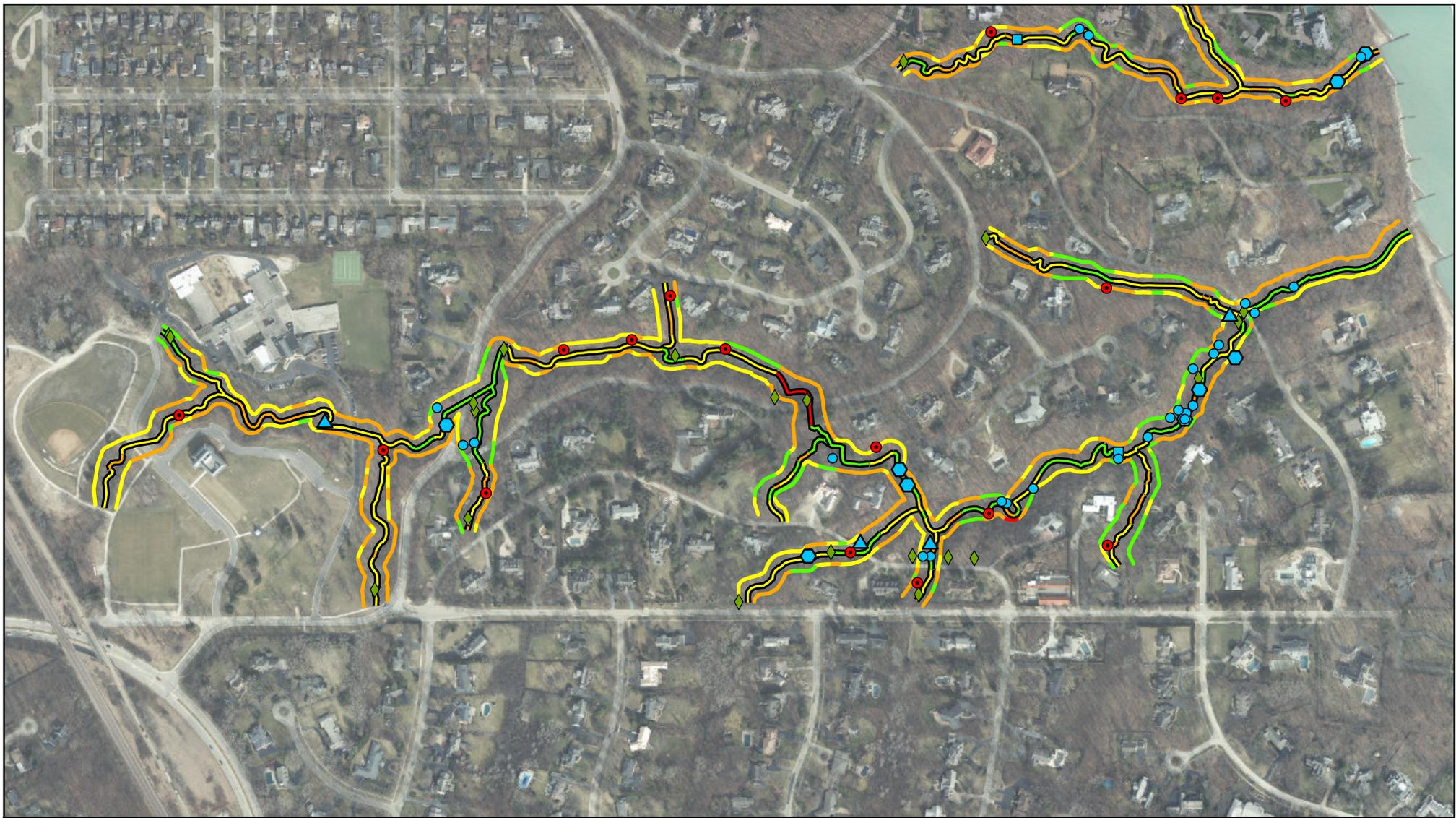


\*sections with a rank of 1 are considered the worst



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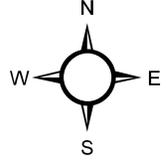

**STORMWATER MANAGEMENT COMMISSION**

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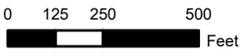
**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	— 1	— Not Surveyed
◆ Failing Structure	— 2	— 1
■ Log Jam	— 3	— 2
▲ Natural Knick Point	— 4	— 3
⊕ Residential	— 5	— 4
◆ Municipal Stormwater		— 5

\*sections with a rank of 1 are considered the worst



Scale 1:6,000



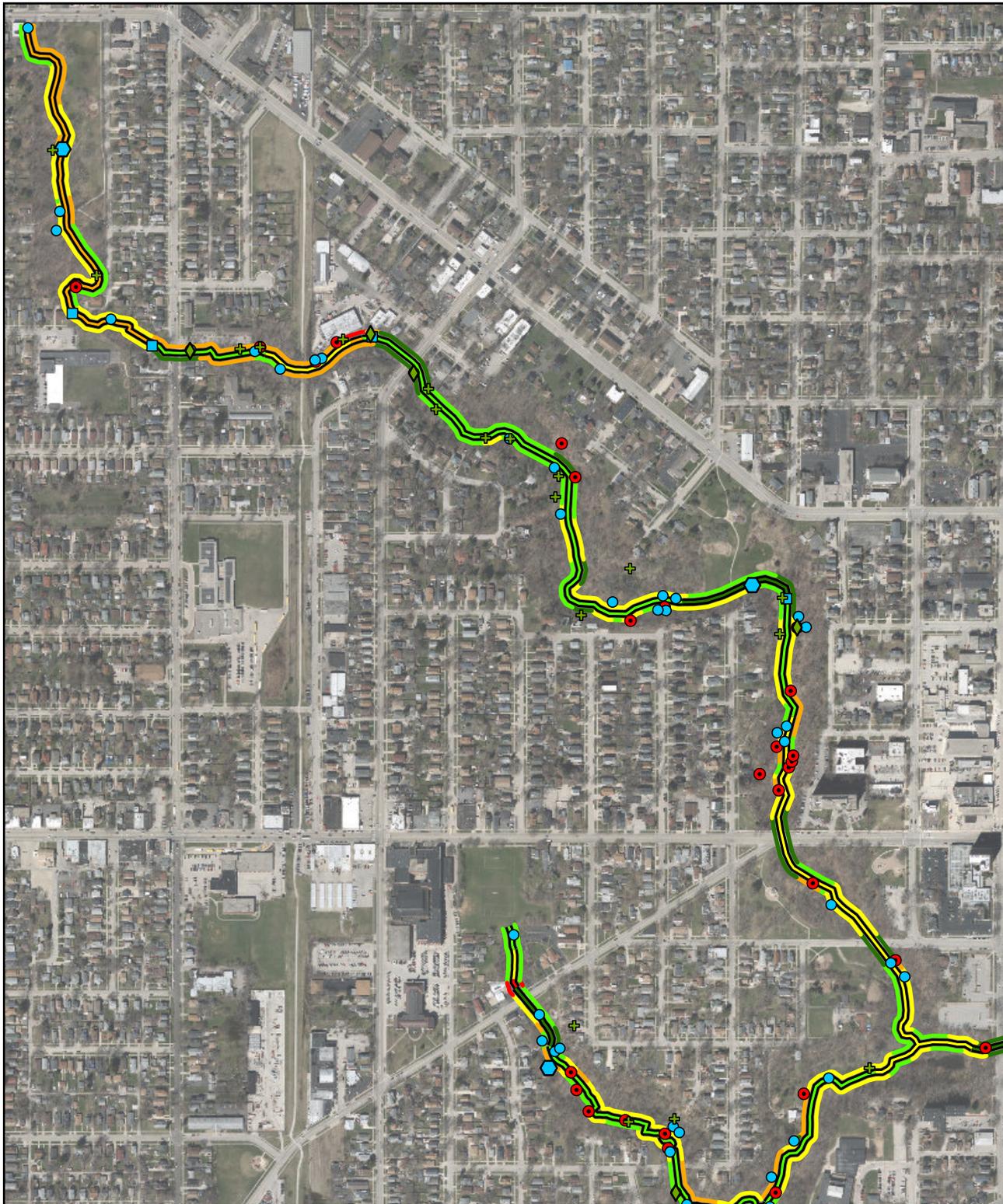
0 125 250 500 Feet

**Walden Ravine**

**Ranked 9 out of 53  
for Erosion Potential**

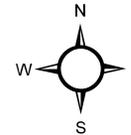
# Waukegan River North Section

Ranked 11 out of 53  
for Erosion Potential

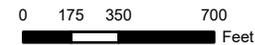


## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ⬢ Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| ⊕ Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale: 1:8,400

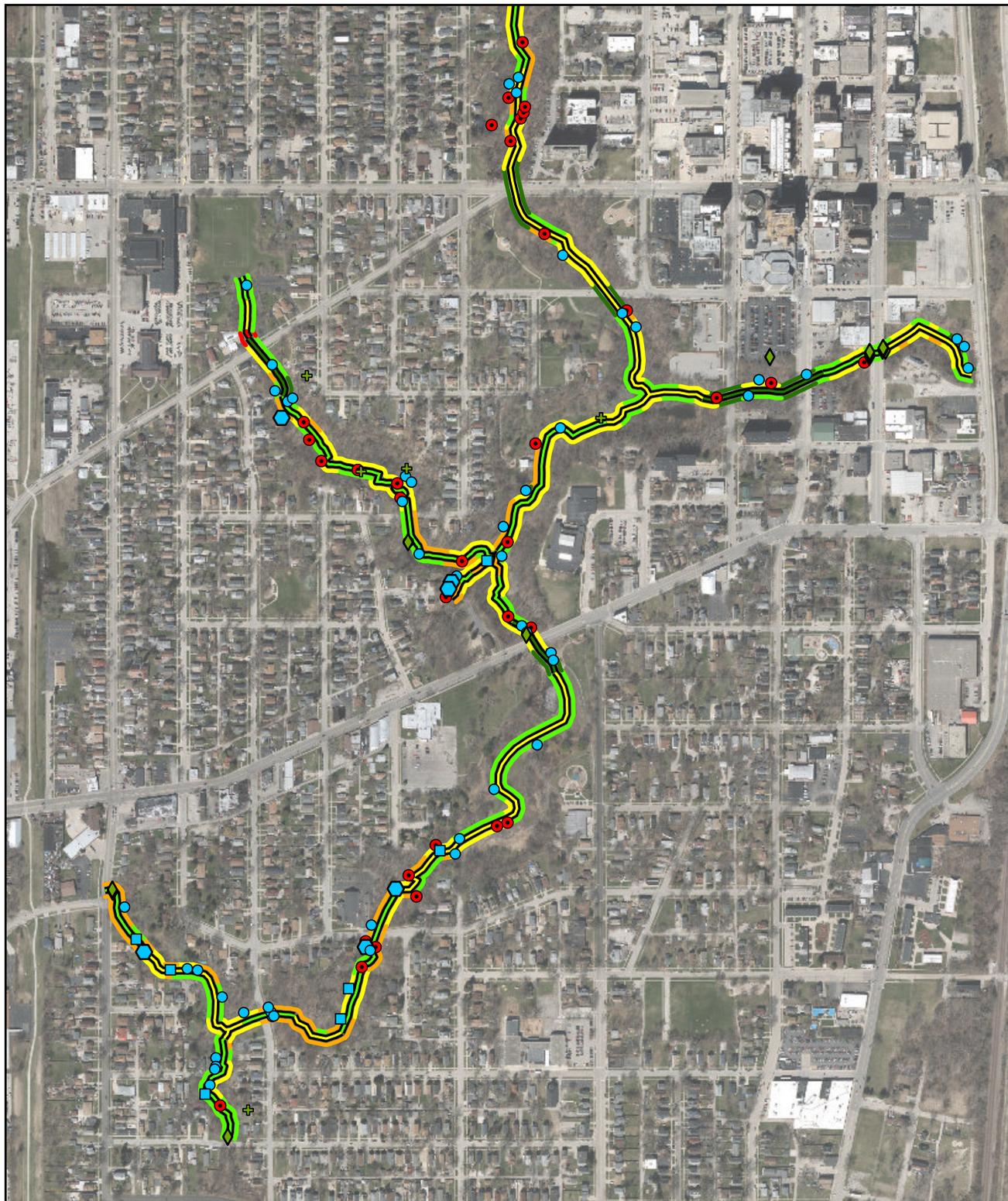


\*sections with a rank of 1 are considered the worst



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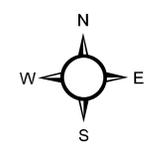


# Waukegan River South Section

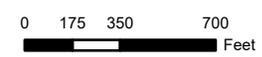
Ranked 11 out of 53  
for Erosion Potential

### Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ● Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| ✚ Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale: 1:8,400



\*sections with a rank of 1 are considered the worst



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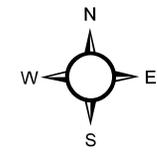


# Westminster Road Ravine

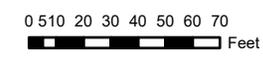
Ranked 46 out of 53  
for Erosion Potential

## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gully                | Channel Stability Rank |
| ● Existing Project     | 1                      |
| ⬡ Failing Structure    | 2                      |
| ■ Log Jam              | 3                      |
| ▲ Natural Knick Point  | 4                      |
| ⊕ Residential          | 5                      |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not surveyed         |
|                        | 1                      |
|                        | 2                      |
|                        | 3                      |
|                        | 4                      |
|                        | 5                      |



Scale: 1:840

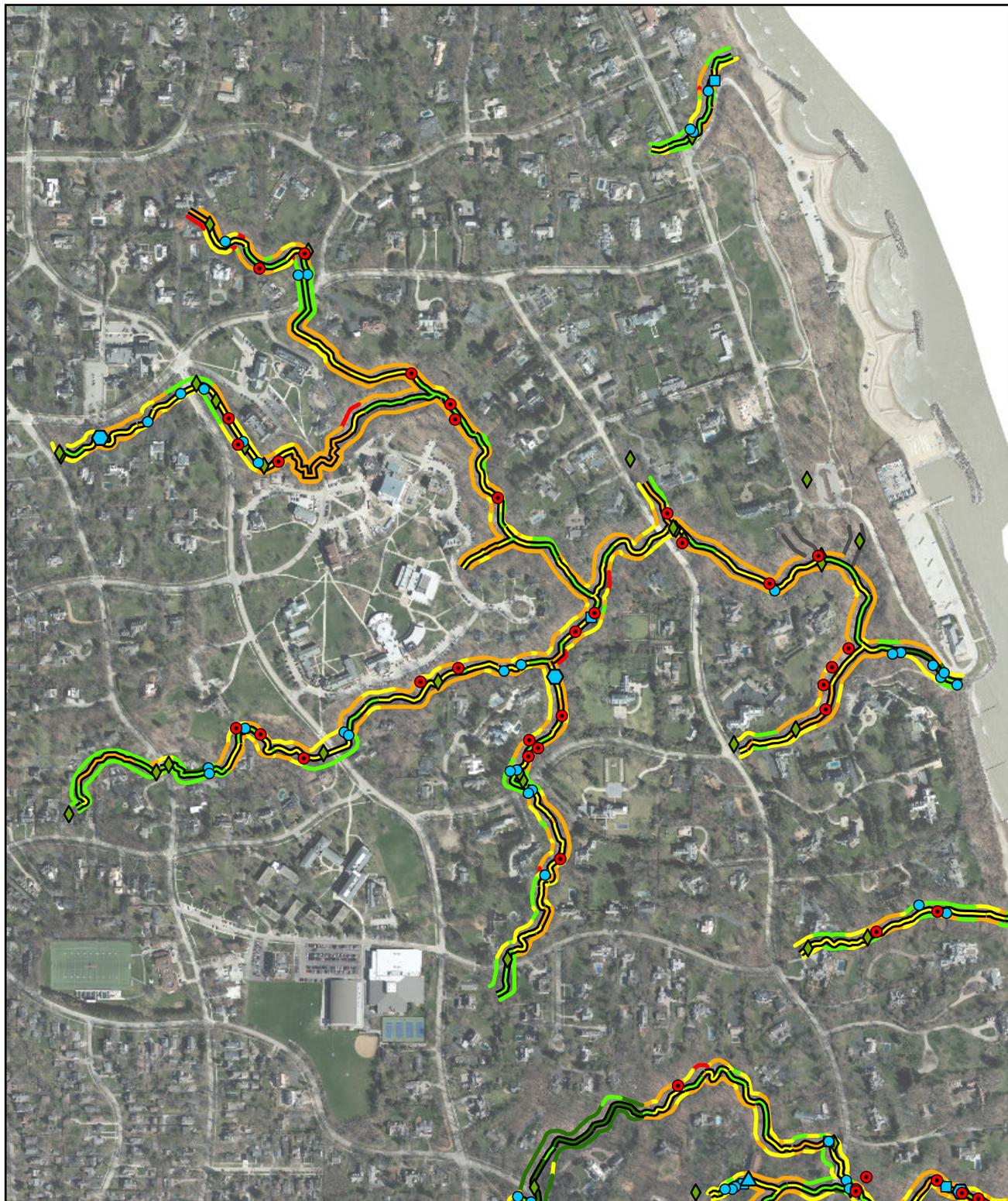


\*sections with a rank of 1 are considered the worst



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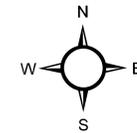


# Witchhazel/Seminary Ravine

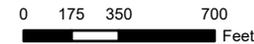
Ranked 6 out of 53  
for Erosion Potential

## Legend

- |                        |                        |
|------------------------|------------------------|
| ● Gullies              | Channel Stability Rank |
| ● Existing Project     | — 1                    |
| ⬡ Failing Structure    | — 2                    |
| ■ Log Jam              | — 3                    |
| ▲ Natural Knick Point  | — 4                    |
| ⊕ Residential          | — 5                    |
| ◆ Municipal Stormwater | Bank Stability Rank    |
|                        | — Not Surveyed         |
|                        | — 1                    |
|                        | — 2                    |
|                        | — 3                    |
|                        | — 4                    |
|                        | — 5                    |



Scale: 1:8,400

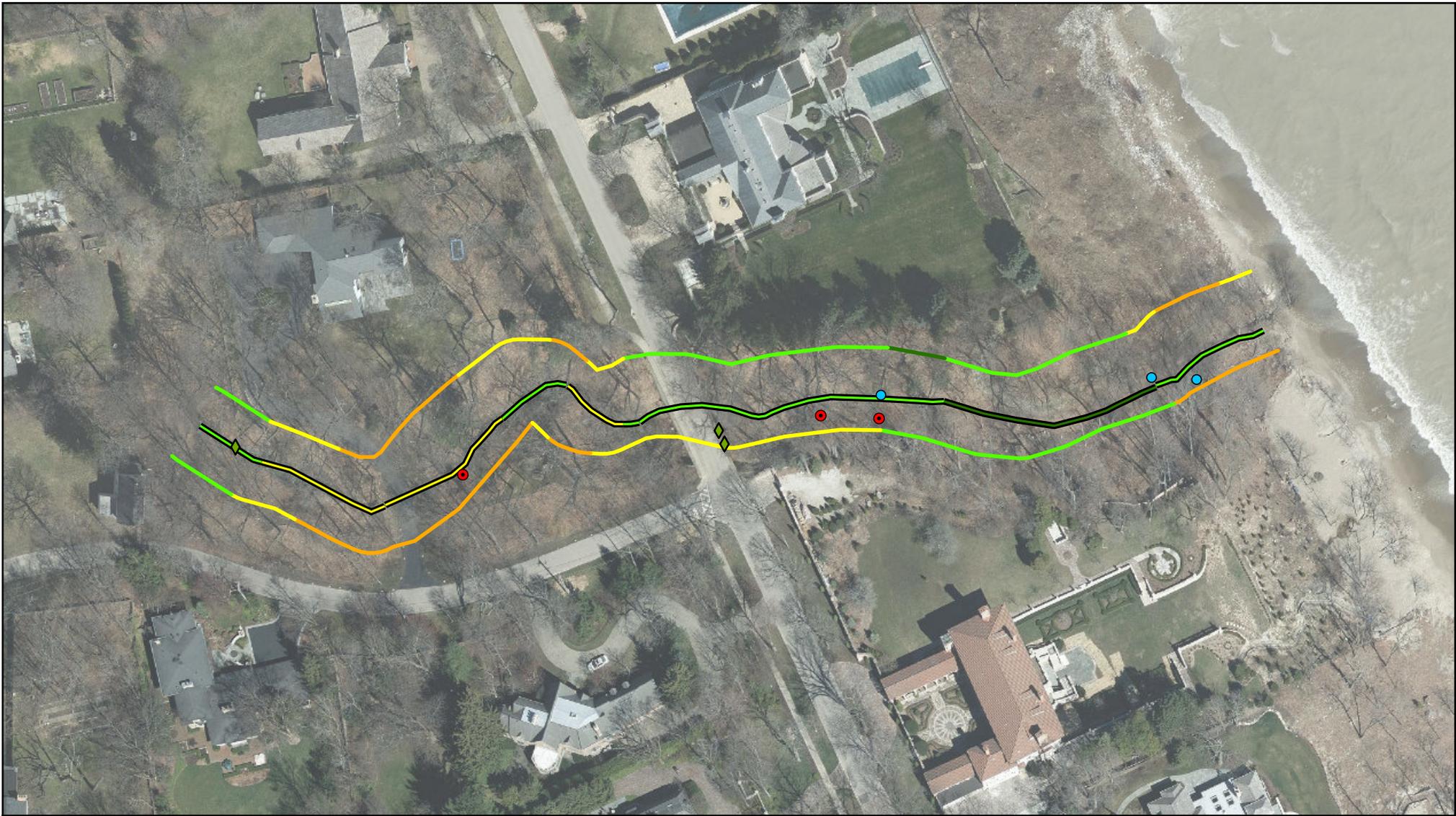


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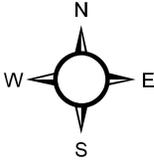

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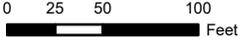
**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	— Not surveyed
● Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
⊕ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst

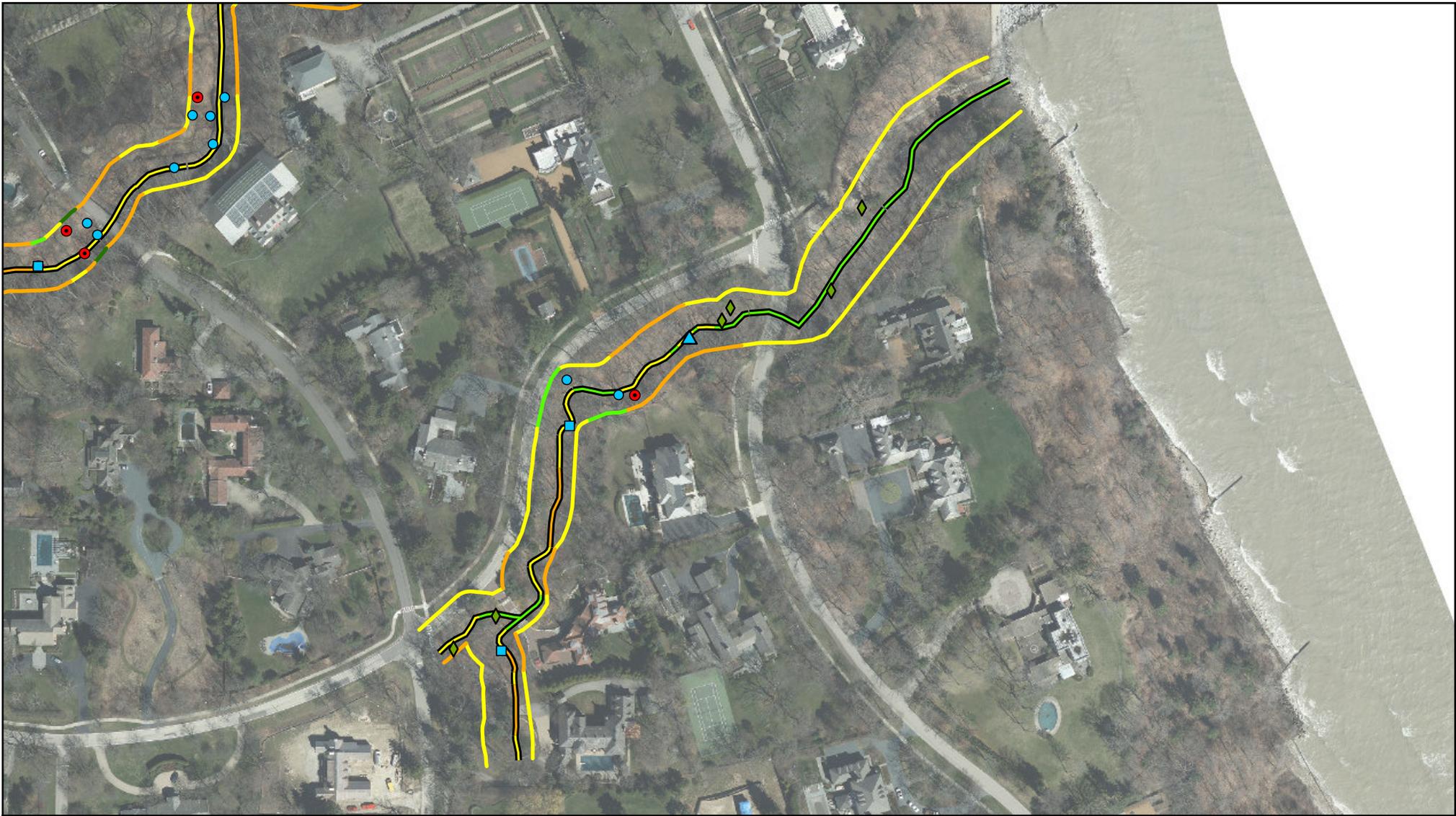


Scale 1:1,200



**Woodbine Lane Ravine**

**Ranked 44 out of 53 for Erosion Potential**



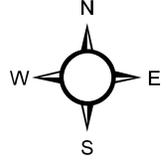

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**Legend**

● Gully	Channel Stability Rank	Bank Stability Rank
● Existing Project	1	Not surveyed
◆ Failing Structure	2	1
■ Log Jam	3	2
▲ Natural Knick Point	4	3
✚ Residential	5	4
◆ Municipal Stormwater		5

\*sections with a rank of 1 are considered the worst



Scale 1:2,400



**Woodland Road Ravine**

**Ranked 43 out of 53  
for Erosion Potential**