

2020 UPDATED GULLY INVENTORY AND CONDITION ASSESSMENT

October 12, 2020

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LOWER MINNESOTA RIVER
WATERSHED DISTRICT



Young Environmental Consulting
Group, LLC

2020 Updated Gully Inventory and Condition Assessment

prepared for

Lower Minnesota River Watershed District

Chaska, Minnesota

Revision 0

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prepared by



Young Environmental Consulting Group, LLC

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TABLE OF CONTENTS

	<u>Page No.</u>
EXECUTIVE SUMMARY	1
ACKNOWLEDGEMENTS	6
1.0 INTRODUCTION	1-1
2.0 GULLY BACKGROUND	2-1
2.2 Gully Development Causes.....	2-2
2.3 Unstable Drainage Features	2-3
3.0 2008 INVENTORY ASSESSMENT AND DATA REVIEW	3-1
3.1 2008 Gully Inventory Background	3-1
3.2 2008 Inventory Analysis.....	3-2
3.3 Erosion Potential.....	3-4
3.4 2008 Benchmarks.....	3-8
3.5 Additional Data Review.....	3-8
3.5.1 Local Water Plan Review and Outreach.....	3-8
3.5.2 Historical Landslide Inventory	3-11
3.5.3 Minnesota Spring Inventory	3-11
4.0 FIELD DATA COLLECTION	4-1
4.1 Training.....	4-1
4.2 Equipment and Software Requirements.....	4-2
4.3 Community Outreach.....	4-2
4.4 Field Data Collection	4-2
4.4.2 General Site Information.....	4-1
4.4.3 Gully Site Information	4-1
4.4.4 Pipe Outfall Site Information.....	4-2
4.4.5 Combination Site Information	4-2
4.4.6 Inaccessible Sites	4-2
4.4.7 Non-Applicable Sites.....	4-2
4.5 Data Evaluation and Review.....	4-3
4.5.1 2020 Gully Condition Assessment.....	4-3
4.5.2 2020 Pipe Outfall Ratings.....	4-4
5.0 CITY OF BLOOMINGTON	5-1
5.1 Previous Restoration Efforts	5-4
5.2 Field Survey Discussion	5-6
5.3 Findings.....	5-6
5.4 Bloomington Gully Progression	5-9

5.5	Bloomington High-Priority Sites	5-11
5.5.1	HPR 15.....	5-12
5.5.2	Gully L32.....	5-15
5.5.3	HPR 16.....	5-17
5.5.4	HPR 17.....	5-21
5.5.5	High-Priority Site L47	5-25
5.5.6	Gully L364.....	5-26
5.5.7	Gully L381	5-28
5.5.8	High-Priority Region 18	5-30
5.5.9	Gully L260.....	5-33
5.5.10	Gully L266.....	5-34
5.5.11	HPR 19.....	5-35
5.5.12	Gully L105.....	5-38
5.5.13	HPR 20.....	5-39
6.0	CITY OF CARVER	6-1
6.1	Previous Restoration Efforts.....	6-1
6.2	Field Survey Discussion	6-1
6.3	Findings.....	6-4
6.4	Carver Gully Progression.....	6-7
6.5	Carver High-Priority Sites	6-9
6.5.1	HPR 1.....	6-10
6.5.2	HPR 2.....	6-14
6.5.3	HPR 3.....	6-17
6.5.4	HPR 4.....	6-20
6.5.5	HPR 5.....	6-23
6.5.6	HPR 6.....	6-27
6.5.7	HPR 7.....	6-30
6.5.8	HPR 8.....	6-33
6.5.9	HPR 9.....	6-37
6.5.10	L178	6-40
6.5.11	L430.....	6-42
7.0	CITY OF CHANHASSEN	7-1
7.1	Previous Restoration Efforts.....	7-1
7.2	Field Survey Discussion	7-1
7.3	Findings.....	7-4
7.4	Chanhasen Gully Progression	7-4
7.5	Chanhasen High-Priority Sites	7-5
7.5.1	HPR 10.....	7-9
7.5.2	HPR 11.....	7-12
7.5.3	HPR 12.....	7-16
8.0	CITY OF CHASKA	8-1
8.1	Previous Restoration Efforts.....	8-1
8.2	Field Survey Discussion	8-4

8.3	Findings.....	8-4
8.4	Chaska Gully Progression.....	8-7
8.5	Chaska High-Priority Sites and Regions.....	8-9
8.5.1	HPR 24.....	8-9
8.5.2	Gully 999-035.....	8-12
9.0	CITY OF EDEN PRAIRIE.....	9-1
9.1	Previous Restoration Efforts.....	9-1
9.2	Field Survey Discussion.....	9-4
9.3	Findings.....	9-4
9.4	Eden Prairie Gully Progression.....	9-5
9.5	Eden Prairie High-Priority Regions.....	9-9
9.5.1	HPR 13.....	9-10
9.5.2	HPR 14.....	9-15
9.5.3	Gully 999-105.....	9-19
9.5.4	Gully 999-127.....	9-20
10.0	JACKSON TOWNSHIP.....	10-1
10.1	Previous Restoration Efforts.....	10-1
10.2	Field Survey Discussion.....	10-1
10.3	Findings.....	10-4
10.4	Jackson Township Gully Progression.....	10-4
10.5	Jackson Township High-Priority Sites.....	10-7
10.5.1	Gully L292.....	10-7
11.0	CITY OF LILYDALE.....	11-1
11.1	Previous Restoration Efforts.....	11-1
11.2	Field Survey Discussion.....	11-1
11.3	Lilydale High-Priority Sites.....	11-1
12.0	CITY OF MENDOTA.....	12-1
12.1	Previous Restoration Efforts.....	12-1
12.2	Field Survey Discussion.....	12-1
12.3	City of Mendota High-Priority Sites.....	12-1
13.0	CITY OF MENDOTA HEIGHTS.....	13-1
13.1	Previous Restoration Efforts.....	13-1
13.2	Field Survey Discussion.....	13-1
13.3	Findings.....	13-1
13.4	Mendota Heights High-Priority Sites.....	13-8
13.4.1	HPR 21.....	13-8
13.4.2	HPR 22.....	13-11
13.4.3	HPR 23.....	13-14
14.0	NEXT STEPS.....	14-1

15.0 BIBLIOGRAPHY 15-1

APPENDIX A - 2008 AND 2020 WAYPOINT IDENTIFICATION REFERENCE

APPENDIX B - 2020 GULLY INVENTORY DATA SHEETS

LIST OF TABLES

	<u>Page No.</u>
Table 5-1: City of Bloomington Gully Erosion Potential Summary	5-9
Table 6-1: City of Carver Gully Erosion Potential Summary	6-7
Table 7-1: City of Chanhassen Gully Erosion Potential Summary	7-4
Table 8-1: City of Chaska Gully Erosion Potential Summary.....	8-7
Table 9-1: City of Eden Prairie Gully Erosion Potential Summary	9-5
Table 10-1: Jackson Township Gully Erosion Potential Summary	10-4

LIST OF FIGURES

	<u>Page No.</u>
Figure 1. Example of gully erosion progression between 1992 (top photo) and 2006 (bottom photo) (San Francisco Estuary Institute 2006).	2-4
Figure 2. LMRWD 2008 Gully Inventory Locations.	3-3
Figure 3. Example of a high erosion potential site along Rice Creek in Fridley, MN in 2019.	3-5
Figure 4. Example of a moderate erosion potential site in Eden Prairie, MN in 2020.	3-6
Figure 5. Example of a low erosion potential site in Medina, MN in 2020 (Outdoor News 2020).	3-7
Figure 6. Planned and Completed Gully Projects within LMRWD since 2008.	3-10
Figure 7. Example of a pipe outfall marked as needing immediate repair.	4-5
Figure 8. Example of a pipe outfall marked as “maybe” needing repairs.	4-6
Figure 9. Example of a pipe rated as being stable and not in need of immediate repairs.	4-7
Figure 10. Bloomington 2008 Inventory Locations.	5-2
Figure 11. City of Bloomington 2020 survey locations.	5-3
Figure 12. Bloomington 2020 Pipe Outfall Conditions.	5-7
Figure 13. Bloomington 2020 Gully Conditions.	5-8
Figure 14. Bloomington Erosion Progression and HPRs.	5-10
Figure 15. Bloomington High-Priority Region 15.	5-13
Figure 16. Comparison of erosion within the L216 stream channel in 2008 (a) and 2020 (b).	5-14
Figure 17. Photos from the 2020 field survey to L219. Person for scale in 'b' emphasizes depth of incision.	5-14
Figure 18. Photo ‘a’ is from 2008, depicting the L32 channel and right bank. Photo ‘b’ illustrates erosion along the left bank of the channel in 2020.	5-16
Figure 19. Bloomington High Priority Region 16.	5-18
Figure 20. Photo of Gully L232 in 2008.	5-19
Figure 21. Photos of Gully L232 in 2020. In photo ‘a’ the head cut recedes into grass near a parking lot and is covered by geotextile fabric. In photo ‘b’ the gully channel widens further downstream.	5-19
Figure 22. Severe erosion at Gully 999-117. Photo ‘a’ was taken looking downstream at the head cut. Photo ‘b’ was taken looking downstream at an incised section of the gully.	5-20
Figure 23. Bloomington High-Priority Region 17.	5-23
Figure 24. Comparison of gully L453 in 2008 (a) and 2020 (b). Both photos were taken looking upstream at the steep gully channel.	5-24
Figure 25. Comparison of Gully L233 from 2008 (left) to 2020 (right). The 2008 photo depicts the pipe outfall filled with riprap. and the 2020 photo shows the incised channel formed below the pipe outlet.	5-24
Figure 26. Comparison of Site L47 between 2008 (a) and 2020 (b). Photo ‘b’ was taken looking downstream from the head cut.	5-25
Figure 27. A comparison of the pipe outfall and gully head cut between 2008 (a) and 2020 (b).	5-27

Figure 28. Photo ‘a’ is looking downstream from the head cut toward riprap and a widened gully channel. Photo ‘b’ is looking downstream toward the toe of the gully at overhanging banks.....	5-27
Figure 29. Photo from the 2008 Gully Inventory illustrating the pipe outfall and scour.	5-29
Figure 30. Photos from 2020 Inventory. Photo ‘a’ is looking upstream at the gully channel. Photo ‘b’ is looking downstream at the pipe outfall and pond.	5-29
Figure 31. Bloomington High-Priority Region 18.....	5-31
Figure 32. Comparison of site L255 between 2008 (a) and 2020 (b).	5-32
Figure 33. Photo a: Channel incision and bare soil along the banks of L260 in 2008. Photo b: Left bank of Gully Channel L260 in 2020.....	5-33
Figure 34. Comparison of Site L266 between 2008 (a) and 2020 (b). Channel widening and unstable banks are evident in photo ‘b’.....	5-34
Figure 35. Bloomington High-Priority Region 19.....	5-36
Figure 36. Difference in Site L270 between 2008 (a) and 2020 (b).	5-37
Figure 37. Comparison of Gully L105 between 2008 (a) and 2020 (b).	5-38
Figure 38. Bloomington High-Priority Region 20.....	5-40
Figure 39. A comparison of Site L394 between 2008 (a) and 2020 (b).	5-41
Figure 40. Carver 2008 Inventory Locations.....	6-2
Figure 41. Carver 2020 Survey Locations.....	6-3
Figure 42. Carver 2020 Pipe Outfall Conditions.	6-5
Figure 43. Carver 2020 Gully Conditions.....	6-6
Figure 44. Carver Erosion Progression and High-Priority Regions.	6-8
Figure 45. Carver High-Priority Region 1.	6-12
Figure 46. Photo ‘a’ is an image taken in 2008 of L145’s banks with person for scale; Photo ‘b’ is an image taken in 2020 of L145’s channel and left bank with a person for scale.....	6-13
Figure 47. Photo ‘a’ is an image taken in 2008 of L146’s channel with a person for scale; Photo ‘b’ is an image taken in 2020 of L146’s channel and left bank with a person for scale.....	6-13
Figure 48. Carver High-Priority Region 2.	6-15
Figure 49. Photo ‘a’ is an upstream view of L126’s head cut area taken in 2008; Photo ‘b’ is an upstream view of L126’s channel taken in 2020, looking toward the head cut area.	6-16
Figure 50. Carver High-Priority Region 3.	6-18
Figure 51. Photo ‘a’ is an image of L128’s channel and banks taken in 2008; Photo ‘b’ is an upstream view of L128’s channel taken in 2020.	6-19
Figure 52. Carver High-Priority Region 4.	6-21
Figure 53. Photo ‘a’ is an image of L148’s channel and banks taken in 2008; Photo ‘b’ is an upstream view of L148’s channel taken in 2020; and Photo ‘c’ is an upstream view of L150’s channel taken in 2020.....	6-22
Figure 54. Carver High-Priority Region 5.	6-24
Figure 55. Photo ‘a’ is an upstream view of L133’s head cut taken in 2008; Photo ‘b’ is an upstream view of L133’s head cut taken in 2020.....	6-26
Figure 56. Photo ‘a’ is an image of L135’s channel and banks around the head cut area taken in 2008; Photo ‘b’ is an upstream view of L135’s head cut area and left bank.....	6-26

Figure 57. Carver High-Priority Region 6.....	6-28
Figure 58. Photo ‘a’ is an upstream view of L157’s channel taken in 2008; Photo ‘b’ is an upstream view of L157’s channel taken in 2020.....	6-29
Figure 59. Carver High-Priority Region 7.....	6-31
Figure 60. Photo ‘a’ is a view of L175’s channel and banks taken in 2008; Photo ‘b’ is an upstream view taken in 2020 of L175’s channel and banks.....	6-32
Figure 61. Carver High-Priority Region 8.....	6-35
Figure 62. Photo ‘a’ is an upstream view of L170’s channel taken in 2008; Photo ‘b’ is another upstream view of L170’s channel taken in 2020.....	6-36
Figure 63. Photo ‘a’ is an upstream view of L426’s channel taken in 2008, Photo ‘b’ is a downstream view taken in 2020 of L426’s channel.....	6-36
Figure 64. Carver High-Priority Region 9.....	6-38
Figure 65. Photo ‘a’ is a downstream view of L186’s channel taken in 2008; Photo ‘b’ is a downstream view of L186’s channel taken in 2020.....	6-39
Figure 66. Photo ‘a’ is an image taken in 2008 of the culvert forming the head cut of L178 and its downstream channel; Photo ‘b’ is an image taken in 2020 of L178’s downstream channel, showing significant incision of the channel.....	6-41
Figure 67. Photo ‘a’ is an upstream view of L430 highlighting the old foundation inside the channel; Photo ‘b’ is a downstream view of L430’s channel from the knickpoint.....	6-43
Figure 68. Chanhassen 2008 Inventory Locations.....	7-2
Figure 69. Chanhassen 2020 Survey Locations.....	7-3
Figure 70. Chanhassen 2020 Pipe Outfall Conditions.....	7-6
Figure 71. Chanhassen 2020 Gully Conditions.....	7-7
Figure 72. Chanhassen Erosion Progression and High-Priority Regions.....	7-8
Figure 73. Chanhassen High-Priority Region 10.....	7-10
Figure 74. Comparison of gully sites between 2008 (a) and 2020 (b). The 2008 picture shows an unspecified angle of the gully. The 2020 picture shows an upstream view toward the head cut and unstable pipe outlet.....	7-11
Figure 75. Chanhassen High-Priority Region 11.....	7-13
Figure 76. Similar characteristics and active erosion around Gully L203 in 2008 (a) and 2020 (b). Deep incision not seen at time of the visit, possibly blocked by vegetation.....	7-14
Figure 77. Progression of low erosion potential to high erosion potential at Site L202. Photo ‘a’: 2008, looking upstream; Photo ‘b’: 2020, looking downstream.....	7-15
Figure 78. Chanhassen High-Priority Region 12.....	7-17
Figure 79. Comparison of Gully L436 in 2008 (a) and 2020 (b).....	7-18
Figure 80. Comparison of Gully L435 in 2008 (a) and 2020 (b).....	7-18
Figure 81. Chaska 2008 Inventory Locations.....	8-2
Figure 82. Chaska 2020 Locations Surveyed.....	8-3
Figure 83. Chaska 2020 Pipe Outfall Conditions.....	8-5
Figure 84. Chaska 2020 Gully Conditions.....	8-6
Figure 85. Chaska Gully Erosion Progression and High-Priority Regions.....	8-8
Figure 86. Chaska High-Priority Region 24.....	8-10
Figure 87. Photo ‘a’ is an upstream view of L113’s channel taken in 2008; Photo b is an upstream view of L113’s channel taken in 2020.....	8-11

Figure 88. Downstream view of 999-035's channel taken in 2020.....	8-13
Figure 89. Upstream view of Gully 999-005's channel taken in 2020, residential drain pipe is circled in red.	8-15
Figure 90. Eden Prairie 2008 Inventory Locations.....	9-2
Figure 91. Eden Prairie 2020 Survey Locations.	9-3
Figure 92. Eden Prairie 2020 Pipe Outfall Conditions.	9-6
Figure 93. Eden Prairie 2020 Gully Conditions.....	9-7
Figure 94. Eden Prairie Erosion Progression and High-Priority Regions.	9-8
Figure 95. Eden Prairie Priority Region 13.	9-11
Figure 96. View of Site L205 from 2008 ('a') to 2020 ('b').	9-12
Figure 97. Photo 'a' is a view of L209's head cut area taken in 2008. Photo 'b' is a downstream view of L209 taken in 2020.	9-12
Figure 98. Photo of Site L434 from 2008 Inventory.	9-13
Figure 99. Photos of Site L434 from 2020 Inventory.....	9-14
Figure 100. Eden Prairie High-Priority Region 14.....	9-16
Figure 101. Progression of erosion at Site L275 from 2008 (a) to 2020 (b).....	9-17
Figure 102. Comparison of Site L277 in 2008 (a) and 2020 (b).....	9-17
Figure 103. View of Sites L279 (a) and 999-166 (b) taken in 2020.....	9-18
Figure 104. View of Gully 999-105 taken in 2020 looking upstream toward the pedestrian walking trail and gully head cut.....	9-19
Figure 105. Photos of Gully 999-127 in 2020.	9-20
Figure 106. 2008 Gully Inventory Locations within Jackson Township.....	10-2
Figure 107. Jackson Township 2020 Inventory Locations.	10-3
Figure 108. Jackson Township 2020 Pipe Condition.....	10-5
Figure 109. Jackson Township 2020 Gully Conditions.....	10-6
Figure 110. Jackson Township High-Priority Sites.....	10-8
Figure 111. Side stream view of the large slump on Gully L292's right bank, with person for scale.....	10-9
Figure 112. Photo 'a' shows the downstream channel conditions at Gully L292 in 2008; Photo 'b' shows the downstream channel conditions in 2020.	10-9
Figure 113. Lilydale 2008 Inventory Locations.....	11-2
Figure 114. Lilydale 2020 Survey Locations.....	11-3
Figure 115. Lilydale 2020 Pipe Outfall Conditions.....	11-4
Figure 116. Mendota 2008 Inventory Locations.....	12-2
Figure 117. Mendota 2020 Survey Locations.....	12-3
Figure 118. Mendota 2020 Pipe Outfall Conditions.....	12-4
Figure 119. Mendota 2020 Gully Conditions.....	12-5
Figure 120. City of Mendota Heights 2008 Gully Inventory Locations.....	13-3
Figure 121. City of Mendota Heights 2020 Survey Locations.	13-4
Figure 122. Mendota Heights 2020 Pipe Outfall Conditions.....	13-5
Figure 123. Mendota Heights 2020 Gully Conditions.....	13-6
Figure 124. Mendota Heights Erosion Progression and High-Priority Regions.....	13-7
Figure 125. Mendota Heights High-Priority Region 22.....	13-9
Figure 126. Upstream view of Gully L23; 3a is an upstream view of Gully L23's channel taken in 2008, 3b is an upstream view of Gully L23's channel taken in 2020.	13-10

Figure 127. High-Priority Region No. 22.	13-12
Figure 128. Left to right: a. Gully L17 upstream view in 2008; b. Gully L17 downstream view in 2020; c. Upstream view of end of knickpoint and start of Gully 999-047 in 2020.	13-13
Figure 129. Mendota Heights High-Priority Region 23	13-15
Figure 130. Photo ‘a’ is an upstream view of Gully 317’s channel taken in 2008, Photo ‘b’ is a downstream view of Gully 317’s channel taken in 2020.	13-16
Figure 131. Photo ‘a’ shows the upstream view of Gully L319’s channel taken back in 2008; Photo ‘b’ shows the upstream view of Gully L319’s channel taken in 2020.	13-17

LIST OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Term/Phrase/Name</u>
2008 Inventory	2008 Gully Inventory
CIP	Capital Improvement Plan
District	Lower Minnesota River Watershed District
GIS	Geographic Information Systems
GPS	Global Positioning System
HPR	High-Priority Region
ID	Identifier
Inventory	2008 Gully Inventory
LiDAR	Light Detection and Ranging
LMRWD	Lower Minnesota River Watershed District
LWP	Local Water Plan
MnDNR	Minnesota Department of Natural Resources
N/A	Non-applicable
NRCS	Natural Resource Conservation Service
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
Presentation	Young Environmental Gully 101 Presentation
Project	Gully Inventory and Condition Assessment Project
RPBCWD	Riley-Purgatory-Bluff Creek Watershed District
USDA	United States Department of Agriculture
Young Environmental	Young Environmental Consulting Group

EXECUTIVE SUMMARY

In the summer of 2020, the Lower Minnesota River Watershed District (LMRWD or District) retained Young Environmental Consulting Group (Young Environmental) to complete a gully and pipe outfall condition assessment and inventory (Project). The cities included in the study were: Bloomington, Carver, Chaska, Chanhassen, Eden Prairie, Jackson Township, Lilydale, Mendota, and Mendota Heights. The other cities within the District will be presented in a companion document. This study builds on a previous 2008 inventory collected by the Minnesota Conservation Corps for the District. The project aimed to provide information to municipalities on the current conditions of gullies and pipe outfalls identified in 2008 as well as collecting new locations that may be contributing sediment into the Minnesota River.

The project consisted of three components: desktop assessment, fieldwork, and data evaluation.

1. Desktop Assessment

This phase of the project included an in-depth review of the 2008 inventory to review the previous data collected for applicability to the current study, assessment of the conditions at the time of survey based on the photographs collected, and additional data requests to partner cities to determine if any of the 2008 locations had been further studied or corrected in the interim. The primary goal of this desktop assessment was to establish the foundation for the fieldwork component and create the list of sites that needed to be surveyed over the summer. It was also used to establish a benchmark condition for each site that could be used to assess the current conditions and the progression of trends for individual gullies and pipe outfall locations.

2. Fieldwork

The fieldwork component was used to assess the current conditions of the gullies identified in 2008 from the list of sites developed in the desktop analysis. Additional sites were added to the overall list as new gullies. Pipe outfall locations were encountered in the field that had not been identified in 2008 or as part of the desktop analysis. In the field, Young Environmental assessed the current conditions using the same benchmarking criteria established for the desktop analysis, with standard data collection forms. For gully sites, the current condition was summarized by the erosion potential, or the general likelihood that the site would contribute sediment to the Minnesota River without intervention. Areas with high erosion potential were actively eroding and contributing sediment downstream, while areas with low erosion potential were relatively stable and not in need of immediate restoration. For sites that contained a pipe outfall, this

condition was summarized by whether the outfall needed immediate attention or repairs to continue functioning as intended.

3. Data Evaluation

The data collected in the field and developed during the desktop analysis were used to develop a list of high-priority regions (HPRs), or areas that contained more than one high-priority site, and high-priority sites within the District's boundaries. From the data collected, these high-priority sites were determined to be contributing large amounts of sediment downstream to the lower Minnesota River. For gullies, high-priority sites were determined to be those that had progressed in severity since 2008 or were newly identified as having a high erosion potential. For pipe outfalls, high-priority sites were those that in 2020 were determined to need immediate repairs. The high-priority sites were grouped by city and are generally summarized, by City, below.

Full descriptions of each high-priority site and HPR are detailed in the individual city sections of the report, but the following offers a brief summary of each community evaluated, including the conditions encountered in the field and areas of concern.

Bloomington

The City of Bloomington is located in Hennepin County on the north side of the Minnesota River. Heavy vegetation consistently made access conditions difficult; in addition, many gullies were located on or directly behind private property, making residential interactions more common in the city. Most gullies in Bloomington were rated as low to moderate erosion potential. A common gully type found in Bloomington was a bowl-shaped groundwater seep emerging as a head cut, which would go on to form a small stream that would either destabilize the soil and lead to channel incision or become vegetated and show few problem indicators. Pipe outfalls types were found to have more variety, but the pipes generally either drained water beneath trails or discharged into streams, lakes or wetlands surrounding the Minnesota River. Out of all the gullies evaluated, Bloomington had 24 high-priority sites; separated into six HPRs and eight stand-alone sites.

Carver

The City of Carver is located in Carver County along the north side of the Minnesota River. In Carver, access conditions were restricted in some severe gullies due to steep slopes and instability. Residential interactions occurred when the team visited gullies whose head cuts backed into residential properties. Carver contained some of the deepest gullies and the highest concentration of high erosion potential sites, particularly within the Spring Creek watershed. Many gullies contained groundwater-fed streams with

water flowing in the channels at the time of the visit. Additionally, many gullies branched out and connected at various points. The pipe outfalls fell into variable categories such as larger pipes around the downtown area of Carver, new pipes feeding into retention ponds on construction sites, and residential drainage pipes. Carver had 41 high-priority sites, which are separated into nine HPRs and two stand-alone sites.

Chanhassen

The City of Chanhassen is located in Carver County along the north side of the Minnesota River. Chanhassen did not have any access condition issues or residential interactions. Groundwater seeps and streams seemed to be the cause of most of the gullies, and in some sites, unstable drainage features appear to have exacerbated the erosion. Most gullies surveyed in Chanhassen were rated as having high erosion potential, most likely as a result of the groundwater seepage and steep slopes around the area. Several new pipe outfalls were found around the highway, the result of a recently finished road construction project along Flying Cloud Drive. Additional construction projects around Great Plains Boulevard were also noted and may have affected the hydrology in this area. The City of Chanhassen was found to have 10 high-priority sites separated into three HPRs.

Chaska

The City of Chaska is located in Carver County along the north side of the Minnesota River. Chaska did not have any difficult access conditions or interactions with residents. Groundwater seeps and groundwater-fed streams were common in the area, especially around Seminary Fen, with many flowing through the small tributaries of the Minnesota River. Many of the pipe outfalls in Chaska were found concentrated around the point where East Creek flows through the downtown area. There were four general areas where gullies were located: Clay Hole Lake, Seminary Fen, East Creek near downtown Chaska, and the Minnesota River floodplain, but only four high-priority sites. There was one HPR in the Minnesota River floodplain and two stand-alone high-priority sites.

Eden Prairie

The City of Eden Prairie is located in Hennepin County along the north side of the Minnesota River. Access conditions in the Eden Prairie were not challenging outside of sporadic sections of heavy vegetation. Additionally, there were no residential interactions in the city. Steep hillslopes and groundwater springs throughout Eden Prairie resulted in many high erosion potential sites. The most extensive erosion in the city was found at Richard T. Anderson Conservation Area, but some sections of Purgatory Creek were also found to be heavily eroded. Various types of pipe outfalls were observed in the city, but commonly, the stormwater from these outfalls was discharged into the wetlands of the Minnesota

River. Along Flying Cloud Drive, steep slopes drain towards the Minnesota River, but these showed little signs of active erosion as they are stabilized by vegetation along the channel and banks. Eden Prairie had 13 high-priority sites, which are separated into two HPRs and two stand-alone sites.

Jackson Township and Shakopee

Shakopee was not specifically included as part of the study, but three previously identified sites were evaluated in the 2020 study and have been included in the Jackson Township data. Jackson Township is located south of the Minnesota River in unincorporated Scott County, across the river from the City of Carver and to the west of the City of Shakopee. In Jackson Township, access conditions were restricted for certain sites due to steep slopes. Some residential interactions occurred with sites located near private property. Of the five gullies investigated in Jackson Township, unstable drainage features are assumed to be the cause of two, while the causes of the remaining three remain undetermined. Most of the pipe outfalls in Jackson Township allowed flow underneath a walking trail or discharged into a tributary of the Minnesota River. Jackson Township had only one high-priority site and contained no HPRs.

Mendota, Mendota Heights, and Lilydale

Mendota, Mendota Heights, and Lilydale are neighboring communities located south of the Minnesota River within Dakota County. The conditions in these three cities were similar: access to and visibility of many of the gullies and pipe outfalls were made difficult by their proximity to the Union Pacific railroad, steep slopes along the valley wall and riverbanks, and heavy buckthorn thickets throughout the region. Mendota Heights contained the most sites at 62 locations, while only six sites were found in Mendota and four in Lilydale. Very few seeps or groundwater-fed streams were observed in the area; in general, most gullies formed from weathering bedrock, with a head cut cutting into St. Peter sandstone underlain by Platteville limestone. As the head cut progresses backwards, the limestone weathers more quickly, causing the limestone layer to collapse into the gully as the sandstone is eroded underneath it. Due to this, most gullies in the area were bowl-shaped head cuts forming weathered slumps and not actual gullies. Many of the pipe outfalls in the region drained from the road on the bluff and flowed down a chute, ultimately draining beneath the railroad and into the Minnesota River. This region had very few high erosion potential sites, Mendota Heights had six high-priority sites, separated into three HPRs and three stand-alone sites. Neither Lilydale nor Mendota contained any high-priority sites or regions.

The results from this study will be shared with each community at a future collaborative work session. The goal of this work session will be to identify areas for potential partnership and develop a list of priority sites for future study.

A second phase of the project will occur in 2021 to identify gullies and collect baseline condition assessments on the south side of the Minnesota River, in the communities of Burnsville, Eagan, Savage, and Shakopee, following the same methodology outlined in this report. The results from the second phase of the project will be appended as Volume 2 of the Updated Gully Inventory and Condition Assessment. A summary document in plain language and with simple graphics will also be developed to provide a high-level summary of Volumes 1 and 2 and refer readers to the technical volumes for more detail.

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