MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

MS4 question worksheet for 2021 annual report

Municipal Separate Storm Sewer Systems (MS4s)

Reporting period January 1, 2021 to December 31, 2021

Due June 30, 2022

*Copy of questions – **Not for submittal***

Instructions: This form is for your personal use only. Complete the online annual report to provide a summary of your activities under the 2013 MS4 Permit (Permit) between January 1, 2021, and December 31, 2021. The online annual report and additional information can be found on the Minnesota Pollution Control Agency's (MPCA) website at: https://stormwater.pca.state.mn.us/index.php?title=MS4_Annual_Report.

Note: The annual report questions remain unchanged from the previous annual report because MS4 permittees were covered under the 2013 MS4 Permit for the majority of 2021. In the next annual report (due June 30, 2023), you will be required to report on activities completed to meet requirements under the 2020 MS4 Permit.

Questions: Contact Cole Landgraf (cole.landgraf@state.mn.us or 651-757-2880) or your assigned MPCA staff member listed at https://stormwater.pca.state.mn.us/index.php?title=MS4_staff_contact_information_and_staff_assignments.

Contact information

MS4 General contact information

Full name: Tina Carstens Title: Administrator

Mailing address: 2665 Noel Drive

City: Little Canada State: MN Zip code: 55117

Phone: 651-792-7960 Email: tina.carstens@rwmwd.org

Preparer contact information *(if different from the MS4 General contact)*

Full name: Nicole Title: Soderholm

Mailing address: 2665 Noel Drive

City: Little Canada State: MN Zip code: 55117

Phone: 651-792-7976 Email: nicole.soderholm@rwmwd.org

Minimum Control Measure (MCM) 1: Public education and outreach

The following questions refer to Part III.D.1. of the Permit.

2. Did you select a stormwater-related issue of high priority to be emphasized during this Permit term? [Part III.D.1.a.(1)] ☒ Yes ☐ No

3. If '***Yes***' in **Q2**, what is your stormwater-related issue(s)? *Check all that apply.*
   - ☐ Total Maximum Daily Loads (TMDLs)
   - ☐ Local businesses
   - ☒ Residential best management practices (BMPs)
   - ☐ Pet waste
   - ☐ Yard waste
   - ☒ Deicing materials
   - ☐ Household chemicals
   - ☐ Construction activities
   - ☐ Post-construction activities
   - ☒ Other (describe): Storm drain cleaning

4. Have you distributed educational materials or equivalent outreach to the public focused on illicit discharge recognition and reporting? [Part III.D.1.a.(2)] ☒ Yes ☐ No

5. Do you have an implementation plan as required by the Permit? [Part III.D.1.b.] ☒ Yes ☐ No

6. How did you distribute educational materials or equivalent outreach? [Part III.D.1.a.] *Check all that apply in table below.*

7. For the items checked in **Q6** below, who is the intended audience? *Check all that apply in table below.*

8. For the items checked in **Q6** below, enter the total circulation/audience in table below (if unknown, use best estimate).

Q6. How did you distribute educational materials? *(Check all that apply):*	**Q7. Intended audience?** *(Check all that apply.)*						**Q8. Total circulation /audience:**
	Residents	***Local businesses***	***Developers***	***Students***	***Employees***	***Other***	
☒ ***Brochure***	☒	☐	☐	☐	☐	☐	200
☒ ***Newsletter***	☒	☐	☐	☐	☐	☐	1,591
☐ ***Utility bill insert***	☐	☐	☐	☐	☐	☐	
☐ ***Newspaper ad***	☐	☐	☐	☐	☐	☐	
☐ ***Radio ad***	☐	☐	☐	☐	☐	☐	
☐ ***Television ad***	☐	☐	☐	☐	☐	☐	
☐ ***Cable access channel***	☐	☐	☐	☐	☐	☐	
☒ ***Stormwater-related event***	☒	☐	☐	☒	☐	☐	400
☒ ***School presentation or project***	☐	☐	☐	☒	☐	☐	671
☒ ***Website***	☒	☐	☐	☐	☐	☐	53,013
☒ ***Other (1): describe*** *Smart Salting targeted letter to school principals, churches*	☐	☐	☐	☐	☐	☒	97
☒ ***Other (2): describe*** *BMP tour, Shoreview*	☐	☐	☐	☐	☐	☐	15
☐ ***Other (3): describe***	☐	☐	☐	☐	☐	☐	

For **Q9** and **Q10**, provide a brief description of each activity related to public education and outreach (e.g., rain garden workshop, school presentation, public works open house) held and the date each activity was held from January 1, 2021, to December 31, 2021. [Part III.D.1.c.(4)]

9. Date of activity *in table below*

10. Description of activity *in table below*

Q9. Date of activity	**Q10. Description of activity**
Throughout 2021	See Addendum for MCM 1

11. Between January 1, 2021, and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your public education and outreach program? [Part IV.B.] ☒ Yes ☐ No

If '***Yes,***' describe these modifications:

RWMWD needed to modify plans for the annual WaterFest event because partners and participants were hesitant to participate due to the ongoing Covid-19 pandemic. During a normal year the event typically draws between 1,500 and 3,000 people. There was a much smaller audience in 2021 (est. 400 visitors).

In general, RWMWD staff engaged a smaller number of school-aged youth during 2021 due to pandemic-related school disruptions, visitor policies, etc. Programming was more focused on outdoor

activities in the spring and fall as much as possible for safer interacftion with students and teachers.

MCM 2: Public participation/involvement

The following questions refer to Part III.D.2.a. of the Permit.

12. You must provide a minimum of one opportunity each year for the public to provide input on the adequacy of your Stormwater Pollution Prevention Program (SWPPP). Did you provide this opportunity between January 1, 2021, and December 31, 2021? [Part III.D.2.a.(1)] ☒ Yes ☐ No

13. If '***Yes***' in **Q12**, what was the opportunity that you provided? *Check all that apply.* ☒ Yes ☐ No

    ☒ Public meeting
    ☐ Public event
    ☐ Other

14. If '***Public meeting***' in **Q13**, did you hold a stand-alone meeting or combine it with another event?

    ☐ Stand-alone
    ☒ Combined

    Enter the date of the public meeting: 6/2/21

    Enter the number of citizens that attended and were informed about your SWPPP: 5

15. If '***Public event***' in **Q13**, describe:

    Enter the date (mm/dd/yyyy) of the public meeting:

    Enter the number of citizens that attended and were informed about your SWPPP:

16. If '***Other***' in **Q13**, describe:

    Enter the date (mm/dd/yyyy) of the public meeting:

    Enter the number of citizens that attended and were informed about your SWPPP:

17. Between January 1, 2021, and December 31, 2021, did you receive any input regarding your SWPPP? ☐ Yes ☒ No

    If '**Yes**,' enter the total number of individuals or organizations that provided comments on your SWPPP.

18. If '***Yes***' in **Q17**, did you modify your SWPPP as a result of written input received? [Part III.D.2.b.(2)] ☐ Yes ☐ No

    If '***Yes***,' describe those modifications.

19. Between January 1, 2021, and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your public participation/involvement program? [Part IV.B.] ☐ Yes ☒ No

    If '**Yes**,' describe those modifications.

MCM 3: Illicit discharge detection and elimination

The following questions refer to Part III.D.3. of the Permit.

20. Do you have a regulatory mechanism which prohibits non-stormwater discharges to your MS4? [Part III.D.3.b.] ☒ Yes ☐ No

21. Did you identify any illicit discharges between January 1, 2021, and December 31, 2021? [Part III.D.3.h.(4)] ☒ Yes ☐ No

22. If '***Yes***' in **Q21**, enter the number of illicit discharges detected. 2

23. If '***Yes***' in **Q21**, how did you discover these illicit discharges? Check all that apply and enter the number of illicit discharges discovered by each category.

☒ Public complaint
☒ Staff

24. If '***Public complaint***' in **Q23**, enter the number discovered by the public: 1

25. If '***Staff***' in **Q23**, enter the number discovered by staff: 1

26. If '***Yes***' in **Q21**, did any of the discovered illicit discharges result in an enforcement action (this includes verbal warnings)? ☒ Yes ☐ No

27. If '***Yes***' in **Q26**, what type of enforcement action(s) was taken and how many of each action were issued between January 1, 2021, and December 31, 2021? ***Check all that apply.*** *For each of the below checked, enter the number that were issued.* ☒ Yes ☐ No

☒ Verbal warning: 1
☐ Notice of violation: _____
☐ Fine: _____
☐ Criminal action: _____
☐ Civil penalty: _____
☒ Other: describe

In 1 out of 2 illicit discharge incidents, self-reporting by another public entity alerted the District and the MN Duty Officer prior to any opportunity for staff or public discovery. Discharge occurred in infrastructure owned by that MS4. The District likes to be kept in the loop and often provides follow-up for water resource protection purposes.

28. If '***Yes***' in **Q26**, did the enforcement action(s) taken sufficiently address the illicit discharge(s)? ☒ Yes ☐ No

29. If '***No***' in **Q28**, why was the enforcement not sufficient to address the illicit discharge(s)?

30. Do you have written Enforcement Response Procedures (ERPs) to compel compliance with your illicit discharge regulatory mechanism(s)? [Part III.B.] ☒ Yes ☐ No

31. Between January 1, 2021 and December 31, 2021, did you train all field staff in illicit discharge recognition (including conditions which could cause illicit discharges) and reporting illicit discharges for further investigations? [Part III.D.3.e.] ☒ Yes ☐ No

32. If '***Yes***' in **Q31**, how did you train your field staff? ***Check all that apply.***

☐ Email
☐ PowerPoint
☐ Presentation
☒ Video
☐ Field training
☐ Other: describe

The following questions refer to Part III.C.1. of the Permit.

33. Did you update your storm sewer system map between January 1, 2021, and December 31, 2021? [Part III.C.1.] ☒ Yes ☐ No

34. Does your storm sewer map include all pipes 12 inches or greater in diameter and the direction of stormwater flow in those pipes? [Part III.C.1.a.] ☒ Yes ☐ No

35. Does your storm sewer map include outfalls, including a unique identification (ID) number and an associated geographic coordinate? [Part III.C.1.b.] ☒ Yes ☐ No

36. Does your storm sewer map include all structural stormwater BMPs that are part of your MS4? [Part III.C.1.c.] ☒ Yes ☐ No

37. Does your storm sewer map include all receiving waters? [Part III.C.1.d.] ☒ Yes ☐ No

38. In what format is your storm sewer map available:

☐ Hardcopy only
☒ GIS
☐ CAD
☐ Other: describe

39. Between January 1, 2021, and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your illicit discharge detection and elimination program? [Part IV.B.] ☐ Yes ☒ No

If '**Yes**,' describe those modifications.

MCM 4: Construction site stormwater runoff control

The following questions refer to Part III.D.4. of the Permit

40. Do you have a regulatory mechanism that is at least as stringent as the Agency's general permit to Discharge Stormwater Associated with Construction Activity (CSW Permit) No. Minn. R. 100001 (http://www.pca.state.mn.us/index.php/view-document.html?gid=18984) for erosion and sediment controls and waste controls? [Part III.D.4.a.] ☒ Yes ☐ No
(Permit can be found on the MPCA website at https://www.pca.state.mn.us/water/construction-stormwater (titled 'Minnesota NPDES/SDS Construction Stormwater General Permit').

41. Have you developed written procedures for site plan reviews as required by the Permit? [Part III.D.4.b.] ☒ Yes ☐ No

42. Have you documented each site plan review as required by the Permit? [Part III.D.4.f.] ☒ Yes ☐ No

43. Enter the number of site plan reviews conducted for sites an acre or greater between January 1, 2021, and December 31, 2021. 33

44. What types of enforcement actions do you have available to compel compliance with your regulatory mechanism? Check all that apply and enter the number of each used from January 1, 2021, to December 31, 2021.

☒ Verbal warning, Number that were issued: 2
☒ Notice of violation, Number that were issued: 73
☐ Administrative order, Number that were issued: _____
☒ Stop-work order, Number that were issued: 0
☐ Fine, Number that were issued: _____
☒ Forfeit of security of bond money: 22
☐ Withholding of certificate of occupancy _____
☐ Criminal action, Number that were issued: _____
☒ Civil penalty, Number that were issued: 0
☒ Other: describe. Compliance letter from attorney, Number that were issued: 0

45. Do you have written ERPs to compel compliance with your construction site stormwater runoff control regulatory mechanism(s)? [Part III.B.] ☒ Yes ☐ No

46. Enter the number of active construction sites an acre or greater that were in your jurisdiction between January 1, 2021, and December 31, 2021: 44

47. Do you have written procedures for identifying priority sites? [Part III.D.4.d.(1)] ☒ Yes ☐ No

48. If '**Yes**,' in **Q47**, How are sites prioritized? *Check all that apply.*

- ☒ Site topography
- ☐ Soil characteristics
- ☒ Types of receiving water(s)
- ☒ Stage of construction
- ☒ Compliance history
- ☐ Weather conditions
- ☒ Citizen complaints
- ☐ Project size
- ☐ Other: describe

49. Do you have a checklist or other written means to document site inspections when determining compliance? [Part III.D.4.d.(4)] ☒ Yes ☐ No

50. Enter the number of site inspections conducted for sites an acre or greater between January 1, 2021, and December 31, 2021. 523

51. Enter the frequency at which site inspections are conducted (e.g., daily, weekly, monthly). [Part III.D.4.d.(2)] Weekly, biweekly, monthly, or seasonally depending on project stage and priority level

52. Enter the number of trained inspectors that were available for construction site inspections between January 1, 2021, and December 31, 2021. 3

53. Provide the contact information for the inspector(s) and/or organization that conducts construction stormwater inspections for your MS4. List your primary construction stormwater contact first if you have multiple inspectors.

(1) Inspector name:

Organization: Mary Fitzgerald, RWMWD
Phone (office): 651-792-7956
Phone (work cell):
Email: mary.fitzgerald@rwmwd.org
Preferred contact method: Phone or e-mail

(2) Inspector name:

Organization: Nicole Soderholm, RWMWD
Phone (office): 651-792-7976
Phone (work cell):
Email: nicole.soderholm@rwmwd.org
Preferred contact method: Phone or e-mail

(3) Inspector name:

Organization: Paige Ahlborg, RWMWD
Phone (office): 651-792-7964
Phone (work cell):
Email: paige.ahlborg@rwmwd.org
Preferred contact method: Phone or e-mail

54. What training did inspectors receive? ***Check all that apply.***

- ☒ University of Minnesota Erosion and Stormwater Management Certification Program
- ☐ Qualified Compliance Inspector of Stormwater (QCIS)
- ☐ Minnesota Laborers Training Center Stormwater Pollution Prevention Plan Installer or Supervisor
- ☐ Minnesota Utility Contractors Association Erosion Control Training
- ☐ Certified Professional in Erosion and Sediment Control (CPESC)
- ☐ Certified Professional in Stormwater Quality (CPSWQ)
- ☐ Certified Erosion Sediment and Storm Water Inspector (CESSWI)
- ☐ Other: describe

55. Between January 1, 2021, and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your construction site stormwater runoff control program? [Part IV.B.] ☐ Yes ☒ No

If '**Yes**,' describe those modifications:

MCM 5: Post-construction stormwater management in new development and redevelopment

The following questions refer to Part III.D.5. of the Permit.

56. Do you have a regulatory mechanism which meets all requirements as specified in Part III.D.5.a. of the Permit? ☒ Yes ☐ No

57. What approach are you using to meet the performance standard for Volume, Total Suspended Solids (TSS), and Total Phosphorus (TP) as required by the permit? [Part III.D.5.a.(2)] *Check all that apply.* Refer to the Technical Support Document at http://www.pca.state.mn.us/index.php/view-document.html?gid=17815 for guidance on stormwater management approaches. *The TSD can be found on the MPCA website at https://www.pca.state.mn.us/water/municipal-stormwater-ms4 (refer to the Post Construction Stormwater Management section under the 'Guidance and BMPs' tab).*

- ☐ Retain a runoff volume equal to one inch times the area of the proposed increase of impervious surfaces on-site
- ☐ Retain the post-construction runoff volume on site for the 95th percentile storm
- ☒ Match the pre-development runoff conditions
- ☐ Adopt the Minimal Impact Design Standards
- ☐ An approach has not been selected
- ☒ Other method (Must be technically defensible - e.g., based on modeling, research and acceptable engineering practices)

If 'Other method,' describe:

Retain a volume of 1.1" times the area of the new and reconstructed impervious surfaces onsite. All stormwater BMPs require pretreatment method(s) for TSS removal. Runoff rates for the 2, 10, and 100-year critical storm events must not exceed existing conditions.

58. Do you have written ERPs to compel compliance with your post-construction stormwater management regulatory mechanism(s)? [Part III.B.] ☒ Yes ☐ No

59. Between January 1, 2021, and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your post-construction stormwater management program? [Part IV.B.] ☐ Yes ☒ No

If '***Yes***,' describe those modifications.

MCM 6: Pollution prevention/good housekeeping for municipal operations

The following questions refer to Part III.D.6. of the Permit.

60. Enter the total number of **structural stormwater BMPs**, **outfalls** (excluding underground outfalls), and **ponds** within your MS4 (exclude privately owned). Enter the number for each category below:

Structural stormwater BMPs: 21

Outfalls: 19

Ponds: 20

61. Enter the total number of **structural stormwater BMPs**, **outfalls** (excluding underground outfalls), and **ponds** that were inspected from January 1, 2021 to December 31, 2021 within your MS4 (exclude privately owned) [Part III.D.6.e.]. Enter the number for each category below:

    Structural stormwater BMPs: 21

    Outfalls: 19

    Ponds: 20

62. Have you developed an alternative inspection frequency for any structural stormwater BMPs, as allowed in Part III.D.6.e.(1) of the Permit? ☐ Yes ☒ No

63. Based on inspection findings, did you conduct any maintenance on any structural stormwater BMPs? [Part III.D.6.e.(1)] ☒ Yes ☐ No

64. If '***Yes***' in **Q63**, briefly describe the maintenance that was conducted:

    Removed 1 CY material (sediment/debris/muck) from Battle Creek sump, removed 1 CY material from Tanners Lake Alum Plant sump, removed 1 CY material from ABI sump, removed 1 CY material from Frost-Kennard spent lime chamber, removed 92 tons sediment/muck from PFS pavers, removed/replaced 50 tons filter rock at Gervais Mill Pond filter strip, removed 75 CY materia from Lower Afton Road sand trap, removed 12 CY material from ABI Pond diversion, reconstructed Owasso Basin berm, dredged 3,680 linear feet of Gervais Creek (removed 6,162 tons of material), cleaned 580 linear feet of permeable weirs at Tanners Wetland/Horseshoe Park, cleaned 65 linear feet of permeable weirs at Tanners 5th Street wetlands, repaired sink hole around overflow structure at McKnight berm.

    The District coordinates maintenance activities for other MS4s by hiring a contractor and overseeing work. The cities then reimburse the District for project costs. This year, activities included: removed 127 tons of material from Round Lake Pond (City of Little Canada), removed 220 tons material from Margaret Pond and replaced stormwater infrastructure under Margaret Avenue (City of North St. Paul).l

65. Do you own or operate any stockpiles, and/or storage and material handling areas? [Part III.D.6.e.(3)] ☐ Yes ☒ No

66. If '***Yes***' in **Q65**, did you inspect all stockpiles and storage and material handling areas quarterly? [Part III.D.6.e.(3)] ☐ Yes ☐ No

67. If '***Yes***' in **Q66**, based on inspection findings, did you conduct maintenance at any of the stockpiles and/or storage and material handling areas? ☐ Yes ☐ No

68. If '***Yes***' in **Q67**, briefly describe the maintenance that was conducted:

69. Between January 1, 2021, and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your pollution prevention/good housekeeping for municipal operations program? [Part IV.B.] ☐ Yes ☒ No

    If '***Yes***,' describe those modifications:

Discharges to impaired waters with a EPA-approved TMDL that includes an applicable WLA

If you have been assigned a Waste Load Allocation (WLA) in a TMDL that was approved by the U.S. Environmental Protection Agency (EPA) prior to August 1, 2013, and were not meeting WLA(s) at the time of your permit application, you must complete the **TMDL Annual Report Form**, available on the MPCA website at: https://stormwater.pca.state.mn.us/index.php?title=Download_page_with_TMDL_forms.

Attach your completed TMDL Annual Report Form to the actual Annual Report as instructed within that document. [Part III.E.]

71. [question left blank for you to attach a file]

Alum or Ferric Chloride Phosphorus Treatment Systems

The following questions refer to Part III.F.3.a. of the Permit. Provide the information below as it pertains to your alum or ferric chloride phosphorus treatment system.

72. Date(s) of operation:

Month	Date(s) of operation (mm/dd/yyyy – mm/dd/yyyy)
January	N/A
February	N/A
March	N/A
April	4/14/21-4/30/21
May	5/1/21-5/31/21
June	6/1/21-6/16/21, 6/20/21-6/30/21
July	7/1/21-7/20/21
August	N/A
September	9/13/21-9/30/21
October	N/A
November	N/A
December	N/A

Month	Q73 Chemical(s) used for treatment	Q74 Gallons of alum or ferric chloride treatment	Q75 Gallons of water treated	Q76 Calculated pounds of phosphorus removed
January	N/A	N/A	N/A	N/A
February	N/A	N/A	N/A	N/A
March	N/A	N/A	N/A	N/A
April	Alum	1,423	37,867,089	13.6
May	Alum	777	51,401,362	13.4
June	Alum	235	11,812,344	2.2
July	Alum	175	2,286,868	0.2
August	N/A	N/A	N/A	N/A
September	Alum	380	8,359,678	0.9
October	N/A	N/A	N/A	N/A
November	N/A	N/A	N/A	N/A
December	N/A	N/A	N/A	N/A

77. Any performance issues and corrective action(s), including date(s) when corrective action(s) were taken, between January 1, 2021, and December 31, 2021:

The outflow pH was below 6.0 from 17:12 to 20:22 on 8/9/21. The Minnesota Department of Public Safety Duty Officer was contacted, and the pH values below 6.0 were reported. At the time of the low pH readings, the treatment facility was not operational. The inflow mixer was being repaired and kicked up a lot of sediment that likely had high alum concentrations, causing the low pH measured at the outflow. To resolve this issue, (1) the pipe to the alum treatment facility was blocked off, and the weir was removed to prevent water from entering and exiting the floc pond; (2) the mixing chamber was cleaned out (alum removed); (3) the inflow pipe was then unblocked to allow water to reeenter the treatment facility. The alum facility did not resume normal operations until 9/13/21 due to a lack of inflow because of persistent regional drought conditions.

Partnerships

78. Did you rely on any other regulated MS4s to satisfy one or more permit requirements? ☐ Yes ☒ No

79. If '***Yes***' in **Q78**, describe the agreements you have with other regulated MS4s and which permit requirements the other regulated MS4s help satisfy: [Part IV.B.6.]

Additional information

If you would like to provide any additional files to accompany your Annual Report, use the space below to upload those files. For each space, you may attach one file.

80. [Optional space for you to attach a file]
81. [Optional space for you to attach a file]
82. [Optional space for you to attach a file]
83. Optional, describe the file(s) uploaded:

Owner or Operator Certification

The person with overall administrative responsibility for SWPPP implementation and permit compliance must certify this MS4 Annual Report. This person must be duly authorized and should be either a principal executive (i.e., Director of Public Works, City Administrator) or ranking elected official (i.e., Mayor, Township Supervisor).

☒ Yes - *I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete (Minn. R. 7001.0070). I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment (Minn. R. 7001.0540).*

By typing my name in the following space, I certify the above statements to be true and correct, to the best of my knowledge, and that information can be used for the purpose of processing my MS4 Annual Report.

Name of certifying official: The certifying official must electronically sign the online Annual Report form.

Title: Administrator Date: *(mm/dd/yyyy)*

Note: In the online form, you will be prompted to provide the email(s) of the individual(s) you would like to receive the MS4 Annual Report for 2021 submittal confirmation email from the MPCA. After you submit the form, please allow up to three business days to receive this confirmation email.

Email (1) nicole.soderholm@rwmwd.org

Email (2)

Email (3)

2021 MS4 Annual Report Addendum: MCM 1

Schools and Youth Engagement

5/6, 5/11: Ames Lake Clean-Up with 2 fourth and 2 fifth Grade L'Etoile du Nord classes hiked to Ames Lake to explore the life in the wetland and do a clean-up around the Lake with RWMWD education staff on May 6 and May 11, 100 kids

4/29: Rain garden clean-up and run-off lesson at Weaver Elementary in Maplewood on April 29 with 3 classes (75 kids)

5/25: Three Weaver Elementary fifth grade classes visited Wakefield Park on May 25 to explore the wildlife, flora, rain gardens and study and measure the water quality of Wakefield Lake. (75 kids)

5/26: Central Park Elementary rain garden clean-up – May 26 with two 6th grade classes in Roseville (50 youth)

Site preparations and Native planting at Boys and Girls Club with L'Etoile du Nord fifth graders (52) and high school youth (42)

10/26, 11/4: Watershed lesson and water quality monitoring pre-lesson in class with two fifth grade classes) from L'Etoile du Nord in St. Paul on October 26 followed up by hands-on lesson at Ames Lake in St. Paul doing water quality monitoring on November 4 (50 youth)

10/29, 11/1: Walking field trip by 3 fourth grade classes from Battle Creek Elementary to McKnight Basins, Battle Creek and neighborhood rain gardens to learn about flow of water through watershed, flood prevention and protecting water through rain gardens October 29 and November 1, (66 kids)

11/3, 11/5: Watershed and non-point source pollution education lesson for 2 classes of Central Park 6th graders in Roseville on November 3 and leaf/storm drain cleaning at Wildlife Rehabilitation Center and Central Park arboretum parking lots in Roseville on November 5 (50 youth)

11/23, 11/24: Battle Creek Elementary watershed non-point source pollution lesson with 3 fourth grade classes, November 23 and 24 (66 kids)

Planting for Water Quality – seed starting for L'Etoile du Nord third graders, 2 classes , December 8 and December 16 (45 kids)

Community Outreach/Education/Stewardship Events

2/24: Water Steward virtual tour for 2021 Water Stewards-in-training presented by certified Water Stewards, Linda Neilson, Paul Gardner and Michelle Natarajan sharing their experiences of water stewardship capstone projects including rain gardens, rain barrels and bee lawns (4 adults)

6/19-6/27**:** WaterFest**,** a public education and engagement event at Lake Phalen – included "We Are Water" exhibit (400 participants)

7/12: Shoreview BMP Tour for the public, July 12 with stops at the Hoffman residence to see two rain gardens, a stop at the Gardner residence to see tiered rain garden system with curb cut and multiple rain barrels and two shoreline restoration projects at Snail Lake and Snail Lake Regional Park. (15 people)

Throughout August: Shoreview Self-Guided BMP tour held during the month of August featuring 12 stops in Shoreview including home and school rain gardens, shoreline and wetland buffer restorations, a native pollinator school garden and sites that featured permeable asphalt, pavers, pervious concrete, rain barrels and a stormwater pond that uses iron filings to capture and reduce phosphorus levels. This tour's itinerary was published online on our website with descriptions and a map with signs at each location with QR codes that linked to this information about each BMP (unknown participants).

8/21: Bikes and Blooms tour in Battle Creek Subwatershed August 21 --stops at a variety of watershed friendly rain gardens, native plantings and landscaping projects on the East Side of St. Paul. This tour provided the opportunity to learn about the history of water management in the Battle Creek area, view projects implemented to address flooding issues at the McKnight infiltration basins in Battle Creek Regional Park's Water Park and the weirs along the creek. The tour also introduced the group to boulevard native plantings that resolved drainage issues, a bee lawn/alternative turf project recently completed at a residence, and a large front yard pollinator friendly native planting. (20 attendees)

Outreach and Education:

Smart Salting:

Smart Salting Letters to principals at 26 elementary schools

Smart Salting Letters to principals at 17 middle and high schools

Smart Salting Letters to 54 churches

SMART Salting Workshops:

Smart Salting for Property Managers, Nov. 2, 18 participants

Adopt-A-Drain:

A total of 882 drains adopted, 467 participants. Collected 5,681.3 pounds of debris, 65 new participants adopted 184 new drains in 2021

Illicit Discharge Detection and Elimination (IDDE) Education

“When Watershed Educators Go Rogue” EMWREP East Metro Blog (12,407 views (8501 visitors)

RWMWD Website

53,013 visitors

22,646 page views

RWMWD Newsletter

1,591 recipients

Newsletter Article education topics:

Adopt a drain: 10/8, 11/8

Rain gardens, native planting: 9/17

RWMWD Social media

1,126 Facebook followers

675 Instagram followers

1,017 Twitter followers

Social Media Posts by Topic

Adopt a Drain: 4/9, 6/23. 9/22, 10/8, 12/1 (Facebook and Twitter)

Yard waste: 10/5 (Facebook)

Raingardens and native plants: 7/14, 4/22 (Facebook and Twitter) 6/22 (Instagram)

Pet waste: 6/15 (Twitter and Facebook)

Deicing/smart salting: 1/26, 2/11, (Facebook, Twitter, Instagram) and 12/7, 12/10, 12/19 (Instagram and Facebook)

Stewardship grants April 22, 2021 (Facebook)

Who polluted the water May 25, 2021 (Facebook)

Stormwater grants September 29, 2021 (Facebook)

Salt Report December 6, 2021 (Facebook)

Ice and Snow Removal Tips December 19,2021 (Facebook)

EMWREP Blog about Salt: https://eastmetrowater.org/2021/10/26/salt-a-growing-problem-for-minnesotas-water/ Blog has 8501 visitors

Annual Report

Prepared for the Ramsey Washington Metro Watershed District for Submittal to the Minnesota Pollution Control Agency to Fulfill the Reporting Requirements for the Tanners Alum Treatment Facility permitted under the General NPDES/SDS Permit for Municipal Separate Storm Sewer Systems, Permit MNR040000

Barr Engineering Co.

May 2022

1.0 Report Overview

Discharge from the Tanner's Lake Alum Treatment Facility is permitted under the Ramsey Washington Metro Watershed District (RWMWD) Municipal Separate Storm Sewer Systems (MS4) permit which is covered by the Minnesota Pollution Control Agency (MPCA) Small MS4 General Permit MNR040000. Submission of an annual report is required by the MS4 permit. Included in this 2021 annual report are:

- Operation details including volume of water treated, gallons of alum used, and average alum dose.
- Summaries of data collected from the inflow to the facility and outflow from the facility (i.e., floc pond discharge), and
- Phosphorus load removed by the alum treatment facility, estimated from FLUX modeling,
- Lake data from Tanner's Lake, and
- Summary of 2021 sludge management activities.

2.0 Operation in 2021

In 2021, the Tanner's alum treatment facility operated for a total of 113 days during April 14 through September 30. The alum plant was shut down multiple times during the treatment season due to lack of flow into the treatment facility. The treatment facility was shut down on June 16, resumed operation on June 20, was shut down on July 20, resumed operation on September 13, and was shut down on September 30, which was the end of the 2021 treatment season. Total water flows treated by the Tanners alum treatment facility in 2021 were 29,515,241 gallons. Total alum application in 2021 was 2,990 gallons. The average aluminum dose applied in 2021 was 5.54 mg/L Al.

3.0 Tabular Summary of 2021 In-Stream Data

Data collected from permitted monitoring points SW001 (upstream of treatment plant), and SD002 (discharge from floc pond) during April 14 through September 30, 2021 are summarized in Tables 1 and 2.

The 2021 data collected from permitted monitoring points SW001 and SD002 have been electronically submitted to the MPCA in EQUIS format.

Table 1 **Water Quality Data Summary: Upstream Inflow to the Alum Treatment Facility (SW001)**

Date	Sample	Aluminum (µg/L)		Phosphorus (mg/L)			pH (SU)
		Total	Dissolved	Total	Dissolved	Ortho	
4/15/2021	Grab	150	9.0*	0.086	0.0058	0.006	7.85
4/22/2021	Grab		32.2	0.054	<0.010	<0.0021	7.80
4/28/2021	Grab		<7.1	0.19	<0.010	0.016	7.89
5/5/2021	Grab	1,390	8.3*	0.079	<0.010	<0.0021	7.73
5/12/2021	Grab		<7.1	0.1	0.012	0.0022*	7.41
5/19/2021	Grab		12.2*	0.17	0.041	0.026	7.73
5/27/2021	Grab		11.0*	0.36	0.081	0.049	7.62
6/3/2021	Grab	207	10.8*	0.22	0.024	0.016	7.90
6/9/2021	Grab		7.1*	0.21	0.034	0.014	7.88
Due to lack of flow, the alum treatment facility was shut down on 6/16/2021 and resumed operation on 6/21/2021							
6/24/2021	Grab		27.8	0.079	0.025	0.019	7.34
7/1/2021	Grab	108	19.4*	0.085	0.031	0.019	7.92
7/8/2021	Grab		14.8*	0.082	0.032	0.028	8.06
7/15/2021	Grab		22	0.075	0.039	0.029	7.78
Due to lack of flow, the alum treatment facility was shut down on 7/20/2021 and resumed operation on 9/13/2021.							
8/10/2021	Grab	120	35.4	0.078	0.034	0.023	7.48
9/16/2021	Grab	52.7	8.4*	0.16	0.028	0.017	7.68
9/22/2021	Grab		<8.0	0.1	0.029	0.027	7.64
9/30/2021	Grab		<8.0	0.071	0.022	0.024	7.75

*Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

Table 2 Water Quality Data Summary: Discharge from Floc Removal Basin (SD002)

Date	Sample	Aluminum (µg/L)		Phosphorus (mg/L)			pH (SU)
		Total	Dissolved	Total	Dissolved	Ortho	
4/15/2021	Grab	2,230	67	0.026	<0.0024	0.0015	7.30
4/22/2021	Grab		49.8	0.018*	<0.010	<0.0021	7.68
4/28/2021	Grab		46.9	0.026	<0.010	0.0068	7.57
5/5/2021	Grab	90	51.1	0.03	0.013*	<0.0021	7.24
5/12/2021	Grab		44.1	0.042	0.0077	<0.0012	7.78
5/19/2021	Grab		42.5	0.038	<0.0024	0.0020	7.31
5/27/2021	Grab		45.9	0.076	0.0097	0.0014	7.16
6/3/2021	Grab	2,570	76.8	0.076	0.0091	<0.0012	7.27
6/9/2021	Grab		47.9	0.10	0.011	<0.0012	7.40
6/16/2021	Grab		93.3	0.15	0.0038*	0.0024	7.12
6/24/2021	Grab		24.0	0.038	0.005	<0.0014	7.31
7/1/2021	Grab	286	17.0*	0.068	0.0064	0.003	7.38
7/8/2021	Grab		19.7*	0.055	0.0032*	<0.0014	7.38
7/15/2021	Grab		18.6*	0.056	0.0039*	0.0031	7.46
7/20/2021	Grab		13.9*	0.024	0.007	0.0021	7.32
8/10/2021	Grab	1,990	30.2	0.043	0.11	<0.0014	6.82
9/16/2021	Grab	1,060	50.1	0.064	0.0089	0.0024	7.16
9/22/2021	Grab		51.4	0.04	0.0038*	0.0023	7.28
9/30/2021	Grab		24.8	0.03	0.0027*	0.03	7.33

*Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

4.0 Graphical Summary of 2021 In-Stream Data and Compare 2021 Data with Previous Years

Figures 1 through 5 present 2021 data in graphical format and compare it with data collected in previous years. The data collection location for the outflow has varied between the floc pond outflow (1998-2003 and 2007-2021) and the 7th Street wetland outflow (2004-2006). The historical graphs in this report only present the outflow data from the floc pond, the outflow specified in the MS4 permit. Inflow and outflow total aluminum data are presented in Figure 1. Inflow and outflow dissolved aluminum data are presented in Figure 2. Inflow and outflow total phosphorus data are presented in Figure 3. Inflow and outflow dissolved phosphorus data are presented in Figure 4. Dissolved phosphorus during 2008 through 2017 was measured as ortho phosphorus.

During 2018, dissolved phosphorus was measured as ortho phosphorus during May 3 and May 10 and as dissolved phosphorus during all other 2018 monitoring events. All 2019 through 2021 dissolved phosphorus measurements were as dissolved phosphorus. Inflow and outflow pH data are presented in Figure 5.

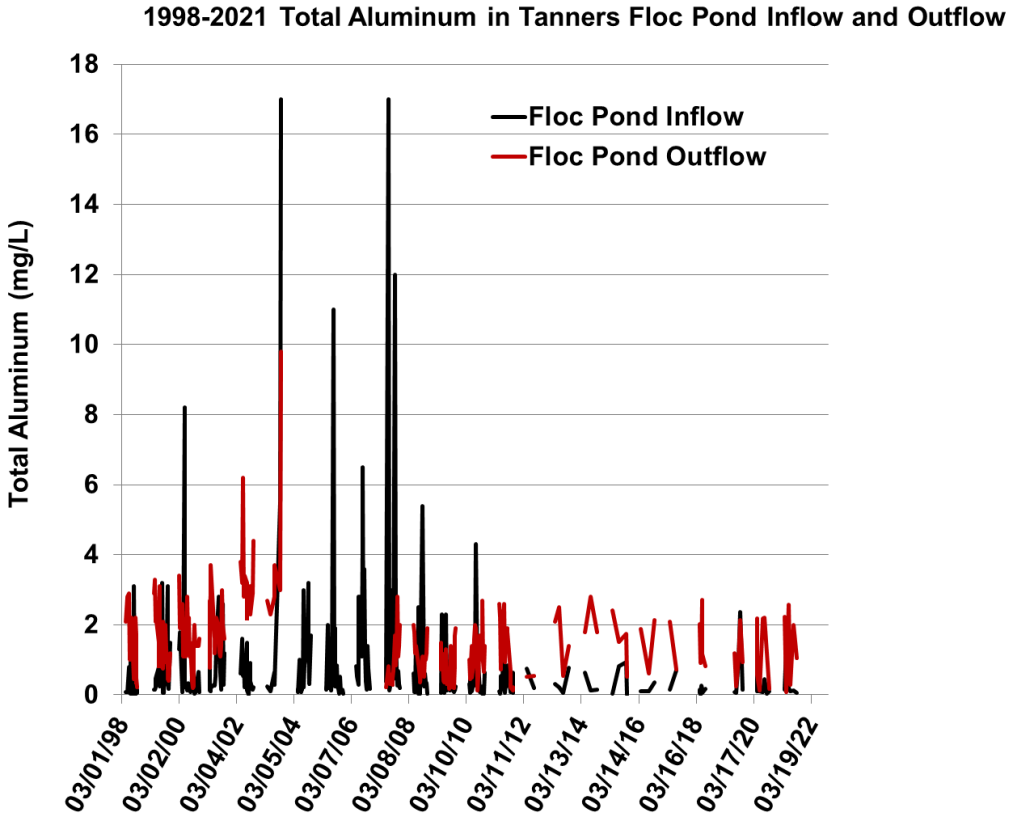

Figure 1. 1998-2021 Total Aluminum in Tanners Floc Pond Inflow and Outflow

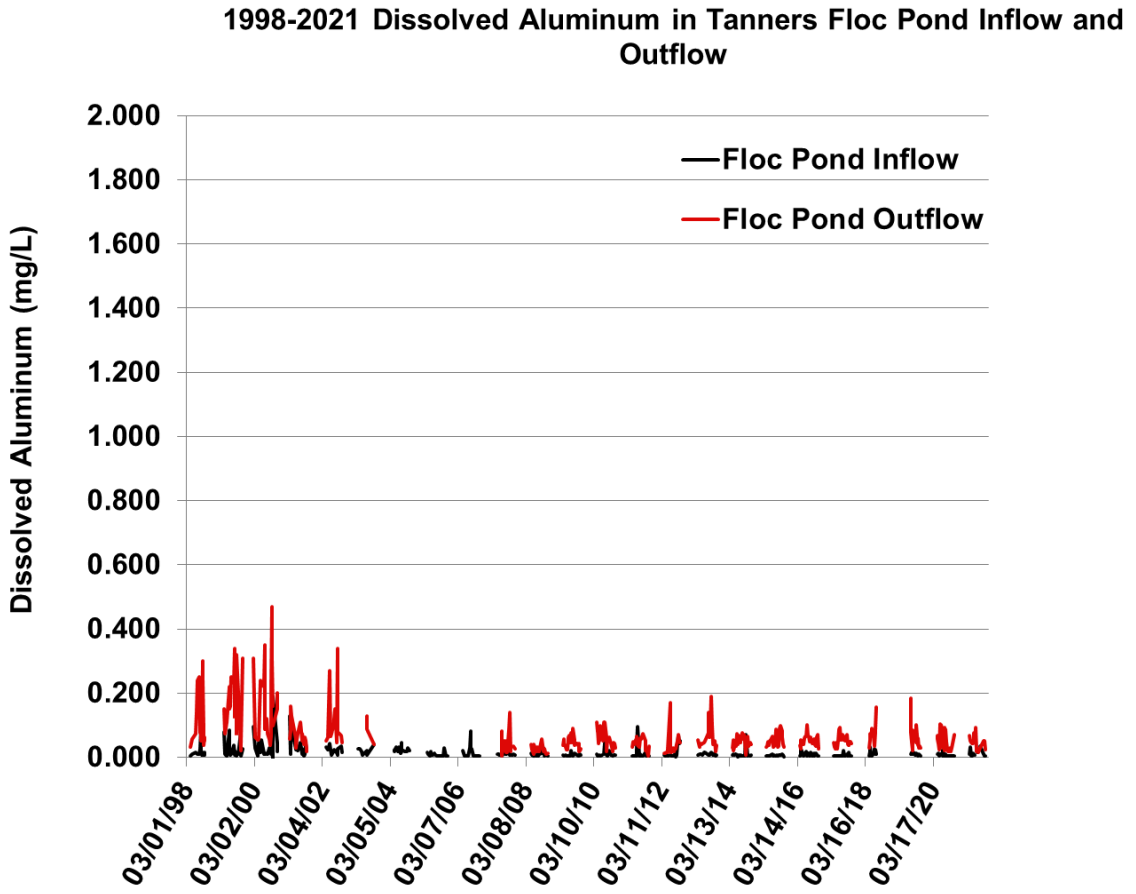

Figure 2. 1998-2021 Dissolved Aluminum in Tanners Floc Pond Inflow and Outflow

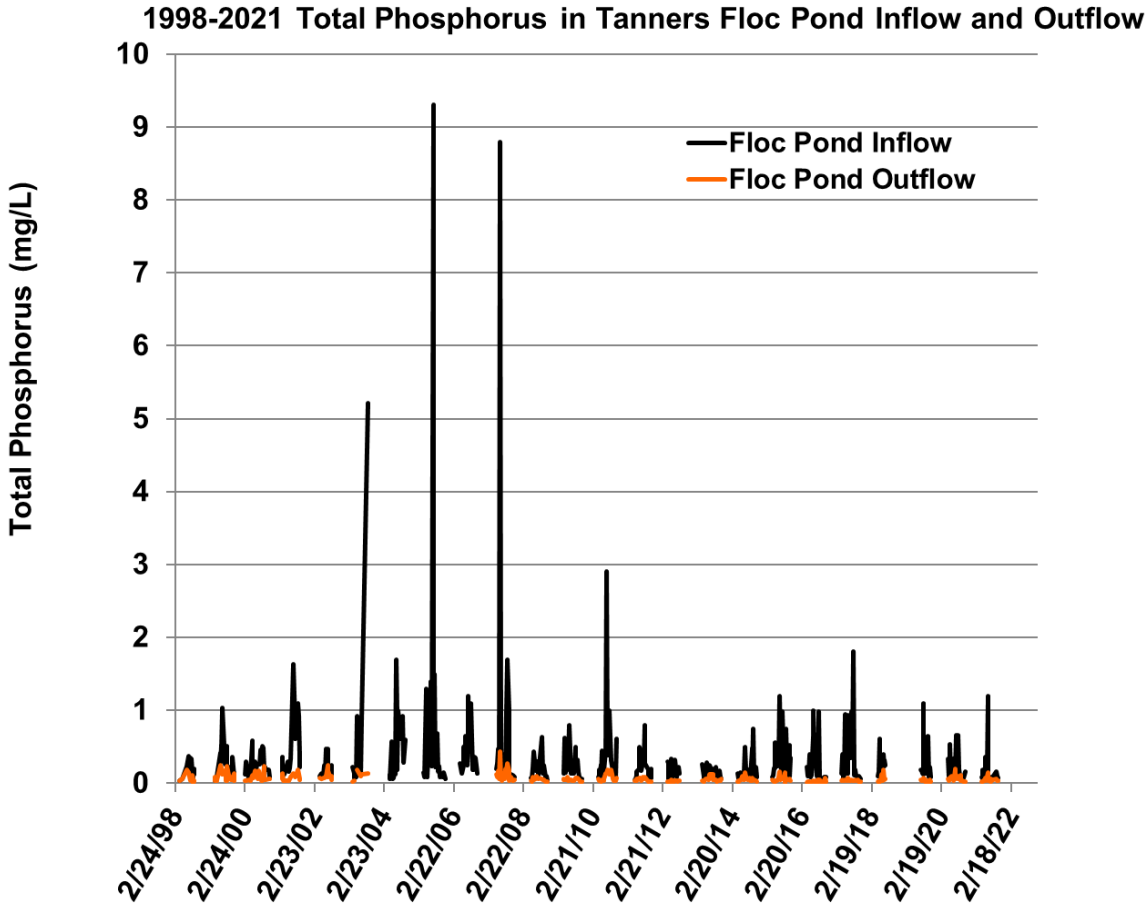

Figure 3. 1998-2021 Total Phosphorus in Tanners Floc Pond Inflow and Outflow

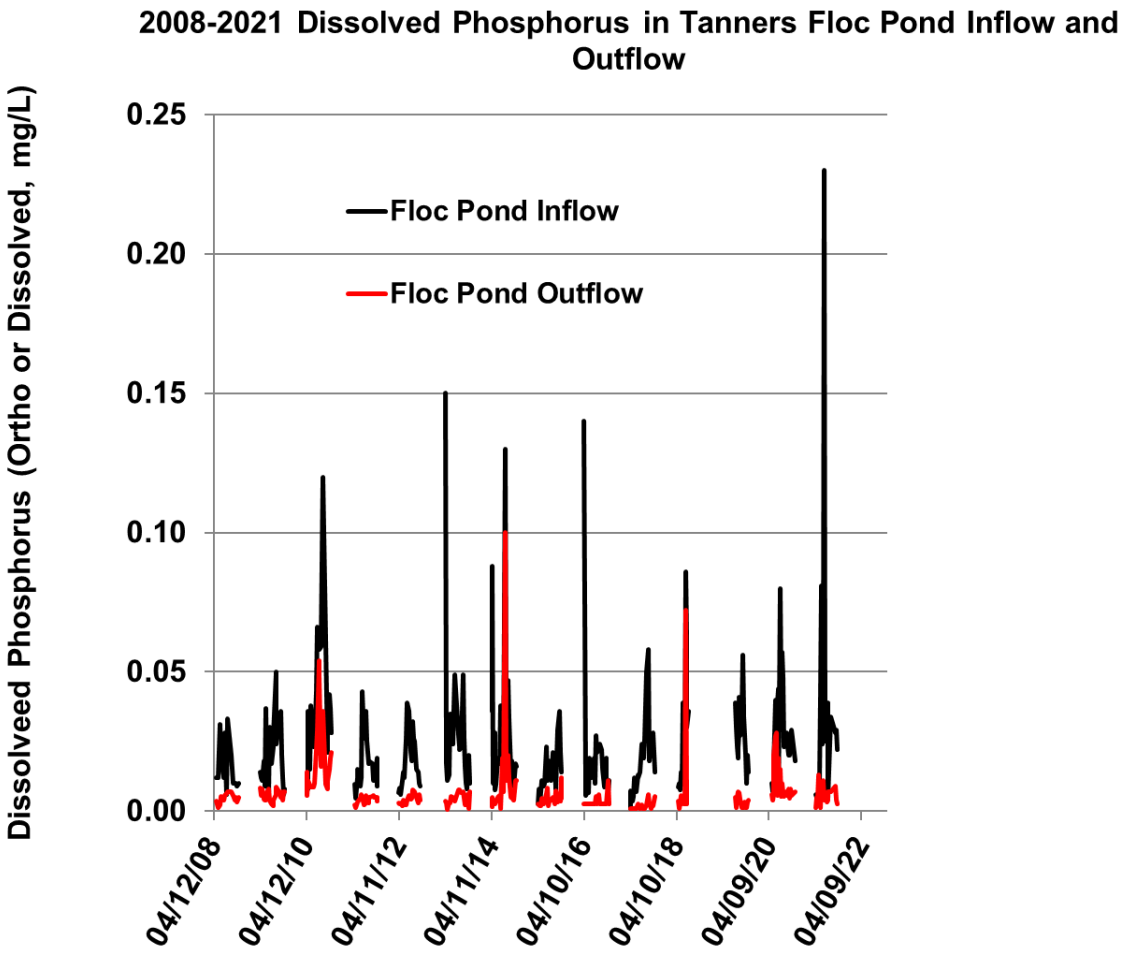

Figure 4. 2008-2021 Dissolved Phosphorus in Tanners Floc Pond Inflow and Outflow

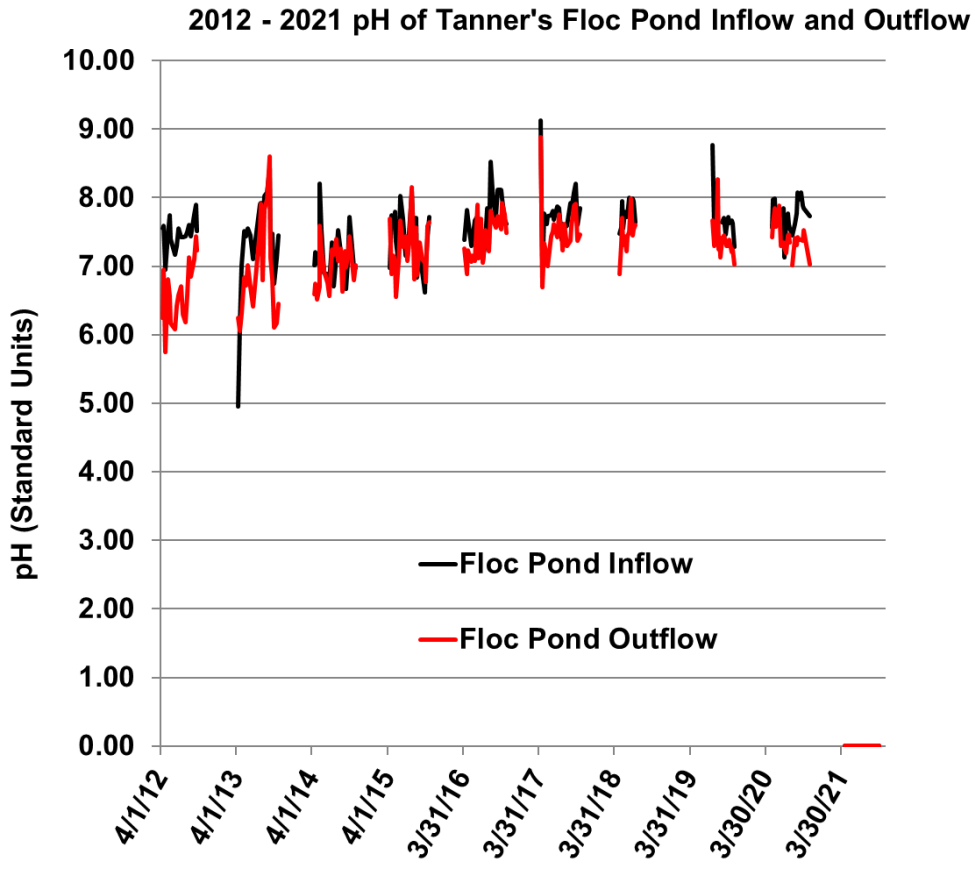

Figure 5. 2012-2021 pH of Tanners Floc Pond Inflow and Outflow

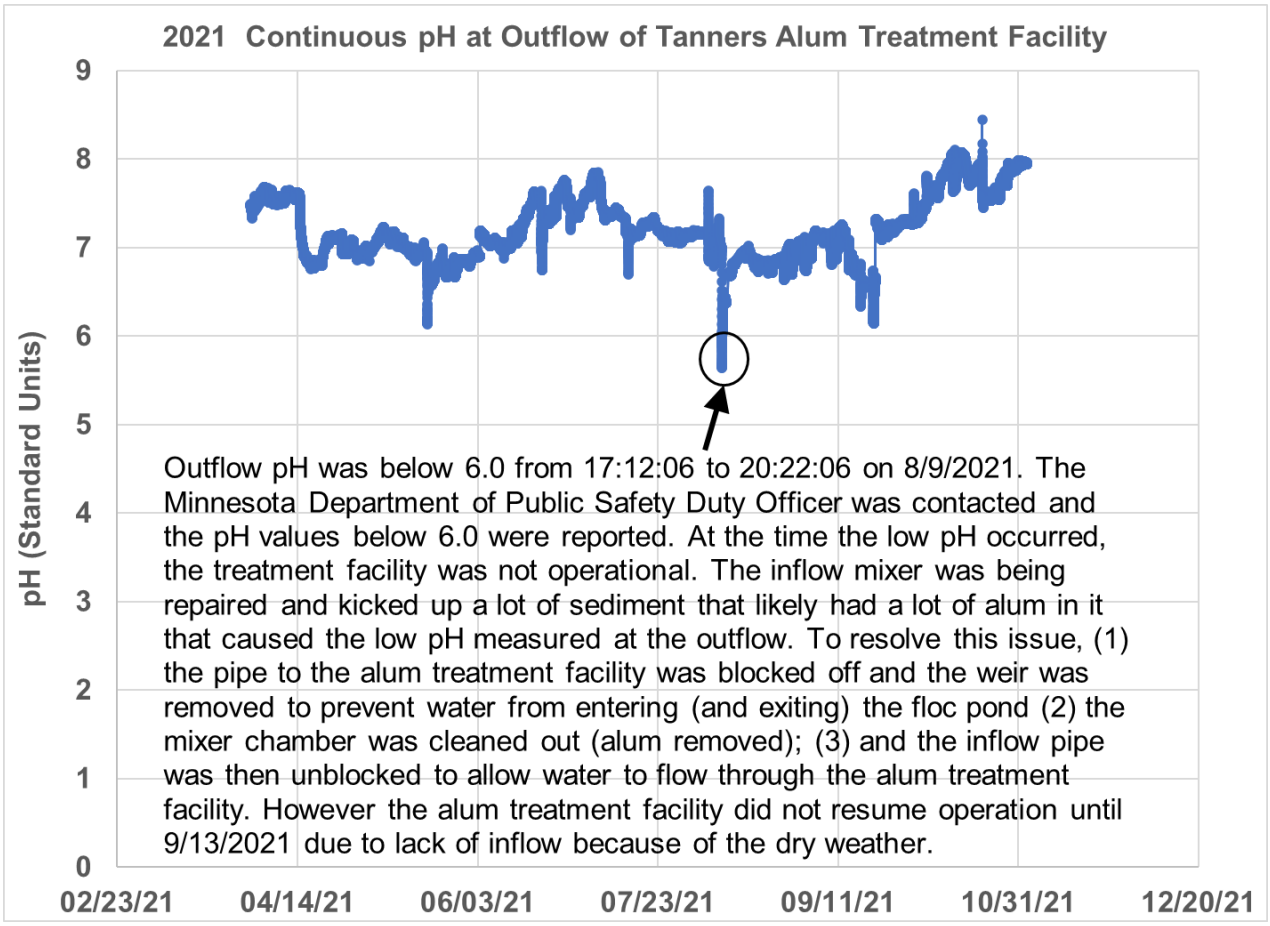

Figure 6. 2021 Continuous pH of Tanners Floc Pond Outflow

5.0 2021 Phosphorus Removal by Treatment Facility: FLUX Modeling

Total and dissolved phosphorus removal by the Tanner's Alum Treatment Facility during 2021 were estimated from FLUX modeling of inflow and outflow phosphorus load during the period of facility operation. Continuous flow data together with inflow and outflow total and dissolved phosphorus data were input into the FLUX model to determine phosphorus load. FLUX estimated total phosphorus and dissolved phosphorus inflow and outflow loads and loads removed by the alum treatment facility are for the operation period of the alum treatment facility and do not include periods when the facility was not treating inflow waters. The dry weather in 2021 resulted in the alum treatment facility being shut down due to lack of inflow during a substantial portion of the treatment season. The alum treatment facility began operation on April 14 and ended operation for the 2021 treatment season on September 30. During this period, the alum treatment facility was shut down due to lack of inflow on June 16, resumed operation on June 20, was shut down on July 20 due to lack of inflow, resumed operation on September 13, and remained in operation until the end of the treatment season on September 30. Periods when the facility was not in operation were not included in the estimated inflow or outflow load or load

removed by the alum treatment facility. 2021 model results are presented in Table 3. Table 3 also presents the FLUX model results for 2012 through 2020.

In 2021, the estimated inflow total phosphorus load during the period of facility operation was 42 pounds. The treatment facility removed an estimated 30 pounds of total phosphorus. On average, 72 percent of the total phosphorus load entering the treatment facility during the 2021 period of operation was removed by alum treatment (Table 3).

During 2012 through 2020, average total phosphorus removal rates by the Tanners alum treatment facility have ranged from a low of 68 percent in 2020 to a high of 89 percent in 2016. The 2021 average total phosphorus removal rate of 72 percent was within the range of removal rates observed during 2012 through 2020.

In 2021, the estimated inflow dissolved phosphorus load during the period of facility operation was 7 pounds and the treatment facility removed an estimated 5 pounds of dissolved phosphorus. Hence, on average, 73 percent of the dissolved phosphorus load entering the treatment facility was removed by alum treatment (Table 3). The 2021 dissolved phosphorus removal rate was within the range of removal rates observed during 2012 through 2020 (59 to 92 percent) (Table 3).

Monthly inflow and outflow total phosphorus loads estimated by FLUX are shown in Figure 6 and monthly inflow and outflow dissolved phosphorus loads are shown in Figure 7.

Table 3. Tanners Alum Treatment Facility: 2012-2021 Phosphorus Removal Estimated from FLUX Modeling

Year	Parameter	Inflow Mass (lbs)	Outflow Mass (lbs)	Phosphorus Removed (lbs)	Phosphorus Removal (%)
2012	Total Phosphorus	151	21	130	86
	Dissolved Phosphorus (Ortho)	13	2	11	82
2013	Total Phosphorus	158	43	115	73
	Dissolved Phosphorus (Ortho)	35	4	32	89
2014	Total Phosphorus	350	106	244	70
	Dissolved Phosphorus (Ortho)	34.6	8.3	26.3	76
2015	Total Phosphorus	514	77	437	85
	Dissolved Phosphorus (Ortho)	19	6	13	70
2016	Total Phosphorus	509	57	452	89
	Dissolved Phosphorus (Ortho)	34	5	29	85
2017	Total Phosphorus	405	51	354	87
	Dissolved Phosphorus (Ortho)	25	2	23	92
2018	Total Phosphorus	182**	52**	129**	71**
	Dissolved Phosphorus (Dissolved and Ortho*)	23**	9**	13**	59**
2019	Total Phosphorus	193**	23**	169**	88**
	Dissolved Phosphorus (Dissolved)	21**	2**	19**	90**
2020	Total Phosphorus	198**	64**	134**	68**
	Dissolved Phosphorus (Dissolved)	28**	10**	18**	65**
2021	Total Phosphorus	42**	12**	30**	72**
	Dissolved Phosphorus (Dissolved)	7**	2**	5**	73**

*Ortho phosphorus was measured on 5/3/2018 and 5/10/2018 and dissolved phosphorus was measured on all other 2018 sample dates.

**FLUX estimated loads and loads removed by alum treatment facility are for the operation period of the alum treatment facility. Periods when the facility was not in operation were not included in the estimated loads or loads removed by the alum treatment facility.

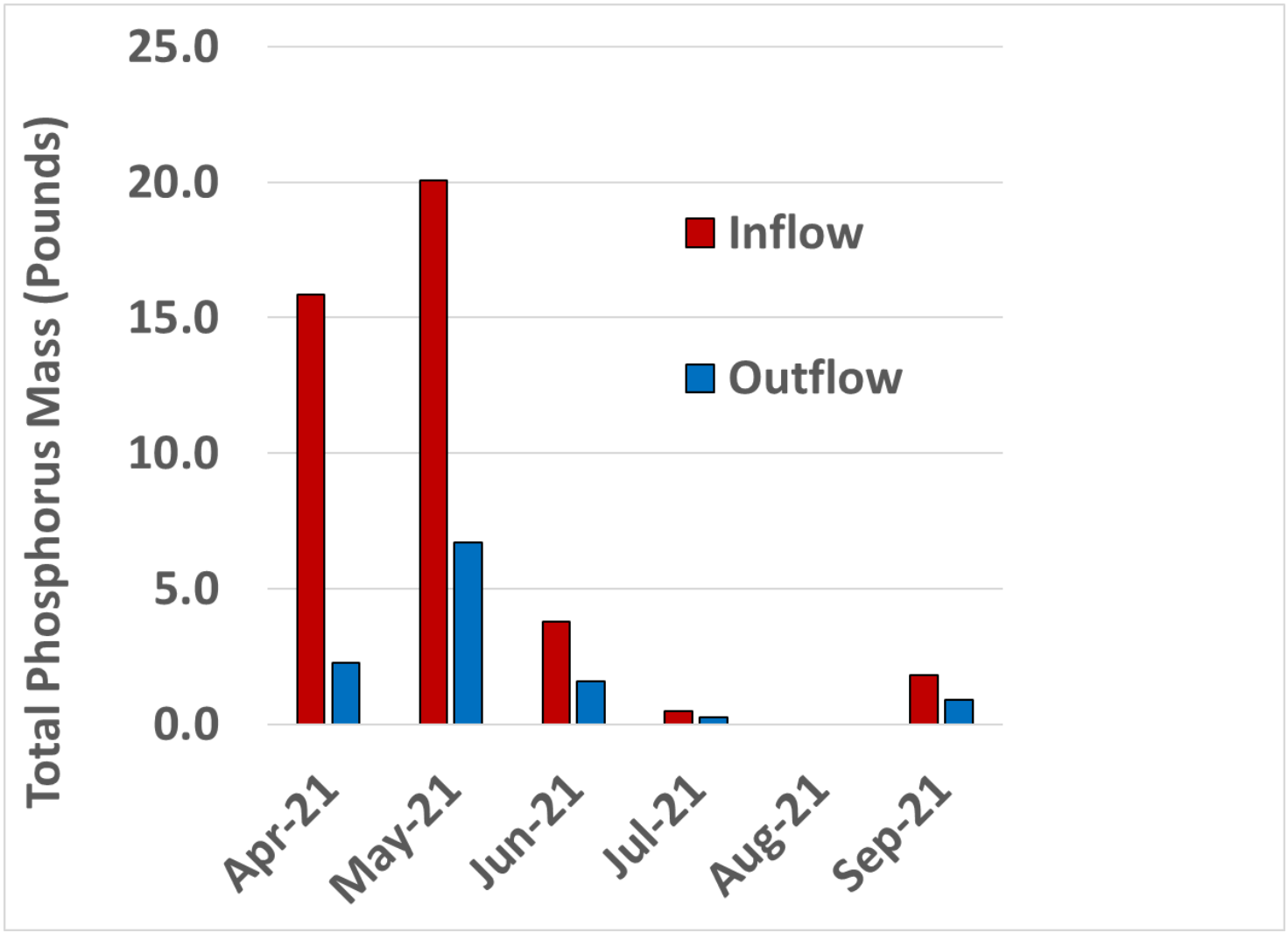

Figure 6. 2021 Inflow and Outflow Total Phosphorus Loads

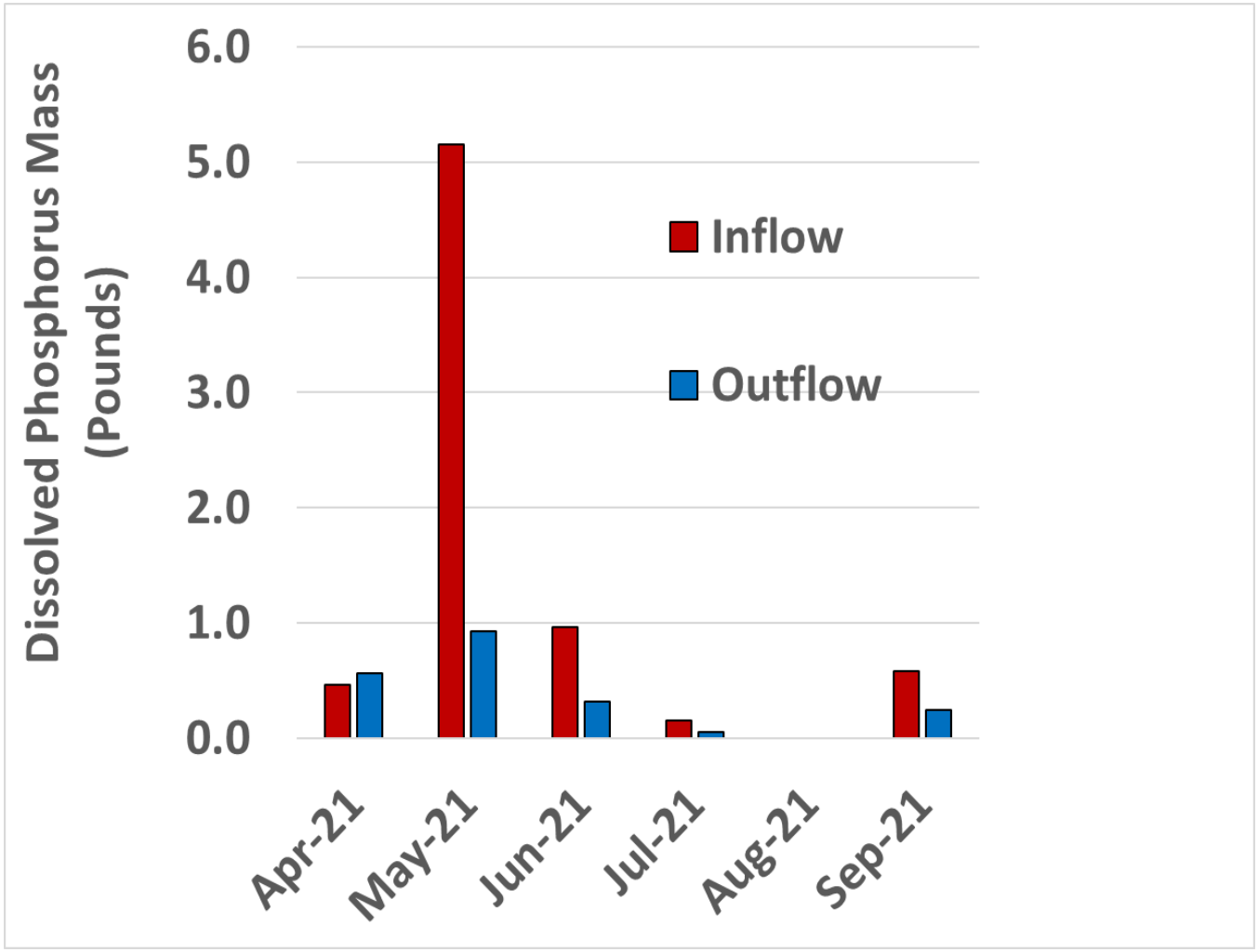

Figure 7. 2021 Inflow and Outflow Dissolved Phosphorus Loads

A monthly summary of gallons of water treated, gallons of alum applied during treatment, and pounds of total and dissolved phosphorus removed during the 2021 operation period for the Tanners alum treatment facility is shown in Table 4.

Table 4. Tanners Alum Treatment Facility: Summary of Gallons of Water Treated, Gallons of Alum Applied during Treatment, and the FLUX Modeling Estimate of Pounds of Total and Dissolved Phosphorus Removed during the 2021 Operation Period*

Month	Q73 Chemical used for treatment	Q74 Gallons of alum or ferric chloride treatment	Q75 Gallons of water treated	Q76 Calculated pounds of total phosphorus removed	Q76 Calculated pounds of dissolved phosphorus removed
January	*	0	0	0	0
February	*	0	0	0	0
March	*	0	0	0	0
April	Alum	1,423	37,867,089	13.6	0.0
May	Alum	777	51,401,362	13.4	4.2
June	Alum	235	11,812,344	2.2	0.6
July	Alum	175	2,286,868	0.2	0.1
August	*	0	0	0	0
September	Alum	380	8,359,678	0.9	0.3
October	*	0	0	0	0
November	*	0	0	0	0
December	*	0	0	0	0

*The 2021 treatment facility operation period was April 14 through September 30. The treatment facility was shut down during parts of June, July, and September and for all of August. The gallons of water treated and calculated pounds of total phosphorus and dissolved phosphorus removed is only for the period of operation and does not include the periods when the treatment facility was not operational.

6.0 Sludge Removal Activities Occurring in 2021-

RWMWD staff assessed the floc depths in the floc pond on October 5, 2021. Staff determined that the pond needed to be cleaned out and proceeded with clean out of the alum floc pond.

The floc pond cleanout occurred during October 6, 2021 through October 19, 2021. A total of 8,298,300 gallons of alum sludge from the pond was pumped to a nearby sanitary sewer located near the intersection of Century Avenue and Margaret Avenue East (Table 5). Alum sludge samples were collected on October 12, 2021 and October 14, 2021. Total Suspended solids and total phosphorus concentrations measured in the samples as well as average total suspended solids and total phosphorus from the two samples are summarized in Table 6.

Table 5. Daily Volume Pumped from Tanners Alum Floc Pond During October 6, 2021 through October 19, 2021

Date	Time	Volume (USG)
10/6/2021	15:58	29,905
10/7/2021	19:08	111,388
10/8/2021	20:04	235,282
10/9/2021	13:10	284,712
10/11/2021	19:45	346,268
10/12/2021	20:03	500,377
10/13/2021	20:00	621,308
10/14/2021	16:30	709,978
10/15/2021	20:00	806,422
10/16/2021	17:15	873,153
10/17/2021	17:00	950,738
10/18/2021	16:00	1,028,649
10/19/2021	15:00	1,800,120

Table 6 Total Suspended Solids and Total Phosphorus Concentrations in Alum Sludge Removed from Tanners Floc Pond: October 12, 2021, October 14, 2021, and Average

Year	Sample 1 Total Suspended Solids (mg/L) 10/12/2021	Sample 2 Total Suspended Solids (mg/L) 10/14/2021	Average Total Suspended Solids (mg/L)	Sample 1 Total Phosphorus (mg/L) 10/12/2021	Sample 2 Total Phosphorus (mg/L) 10/14/2021	Average Total Phosphorus (mg/L)
2021	19,500	18,600	19,050	42.5	36.6	39.6

RWMWD staff assessed the floc depths in the floc pond on October 5, 2021 and again on May 5, 2022. Results of floc pond assessments on October 5, 2021 and May 5, 2022 are shown in Figures 8 through 11. The assessments indicate a significant quantity of alum sludge was removed from the floc pond during October 6 through October 19, 2021.

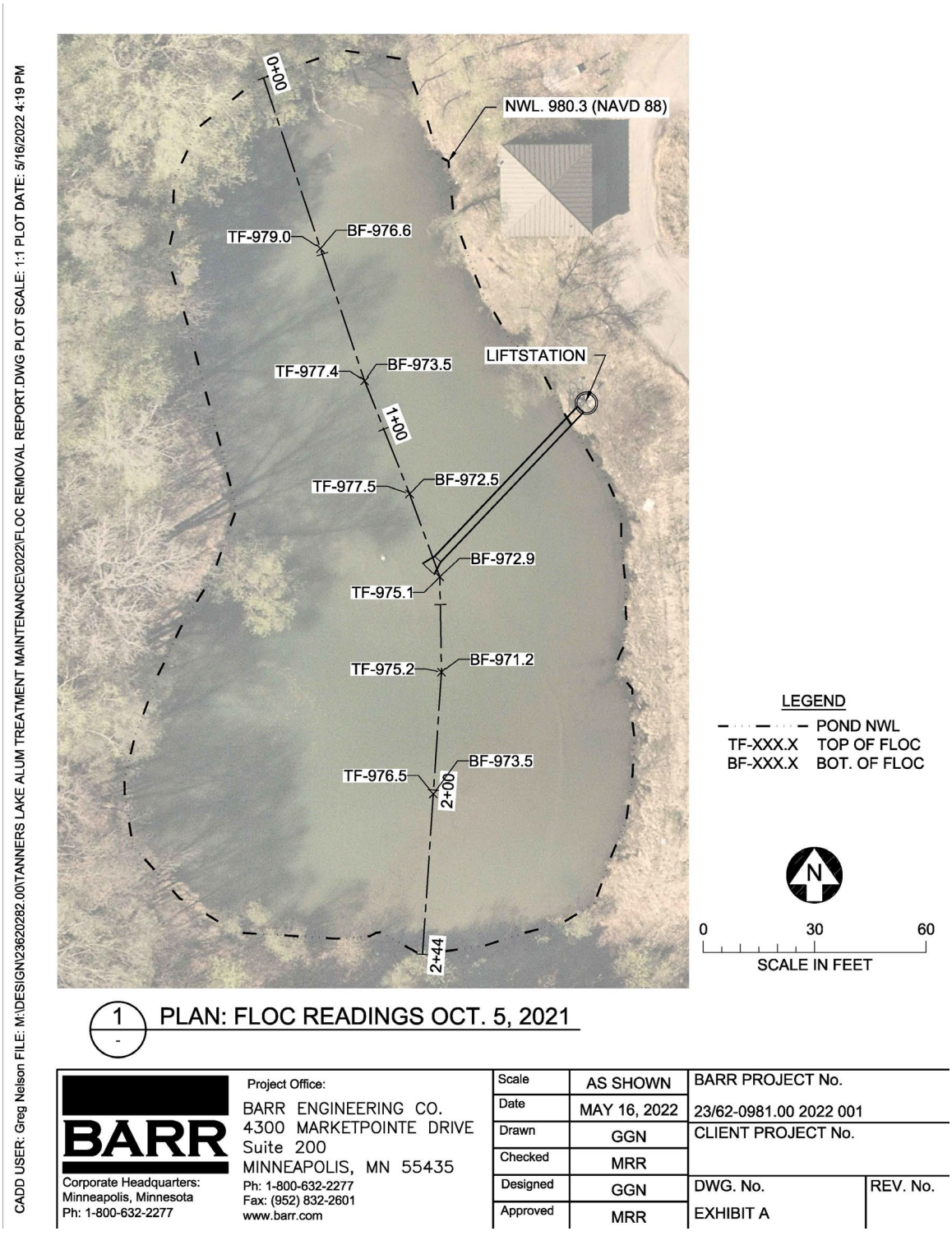

Figure 8. Tanners Alum Floc Pond Floc Readings October 5, 2021

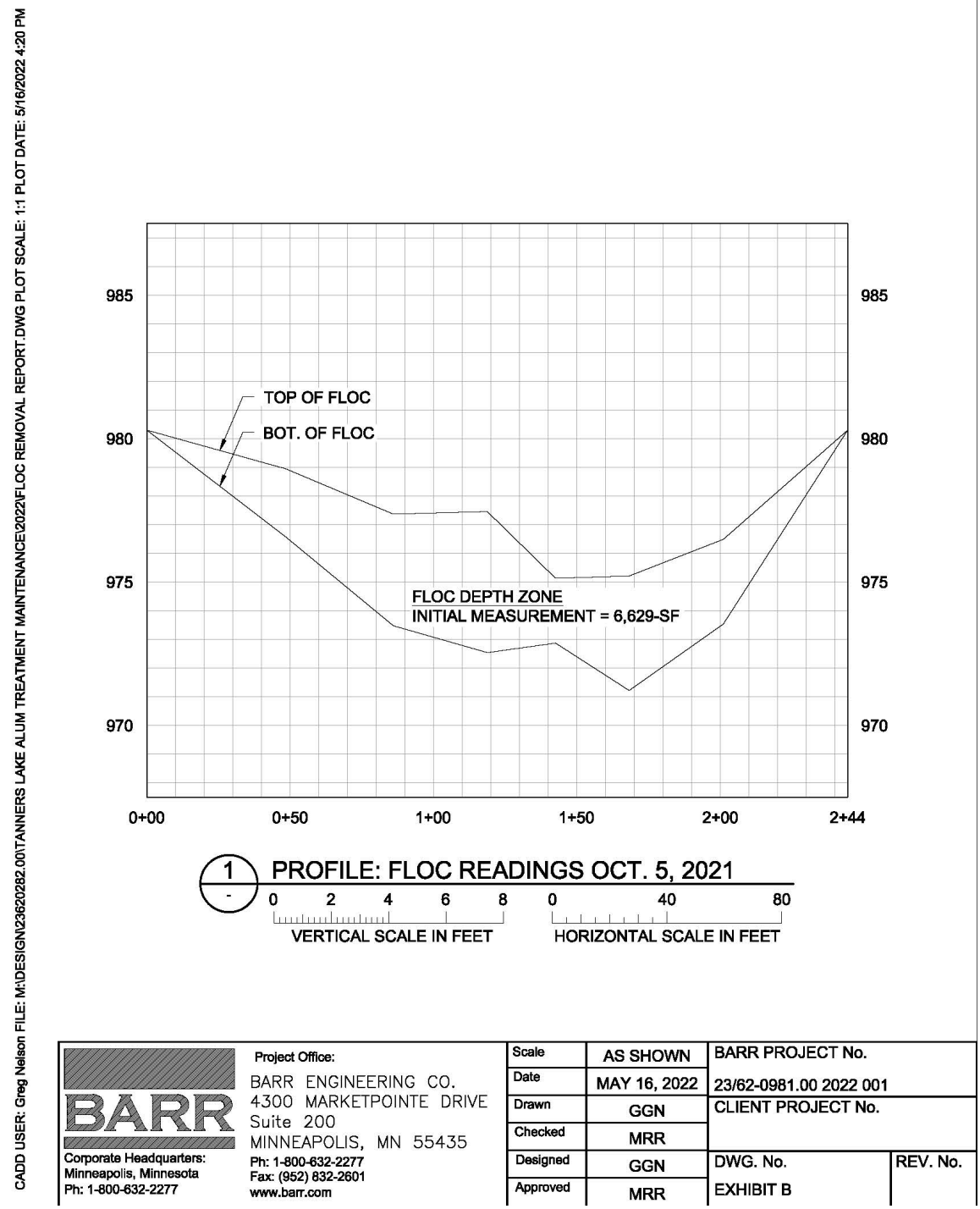

Figure 9. Tanners Alum Floc Pond Profile Floc Readings October 5, 2021

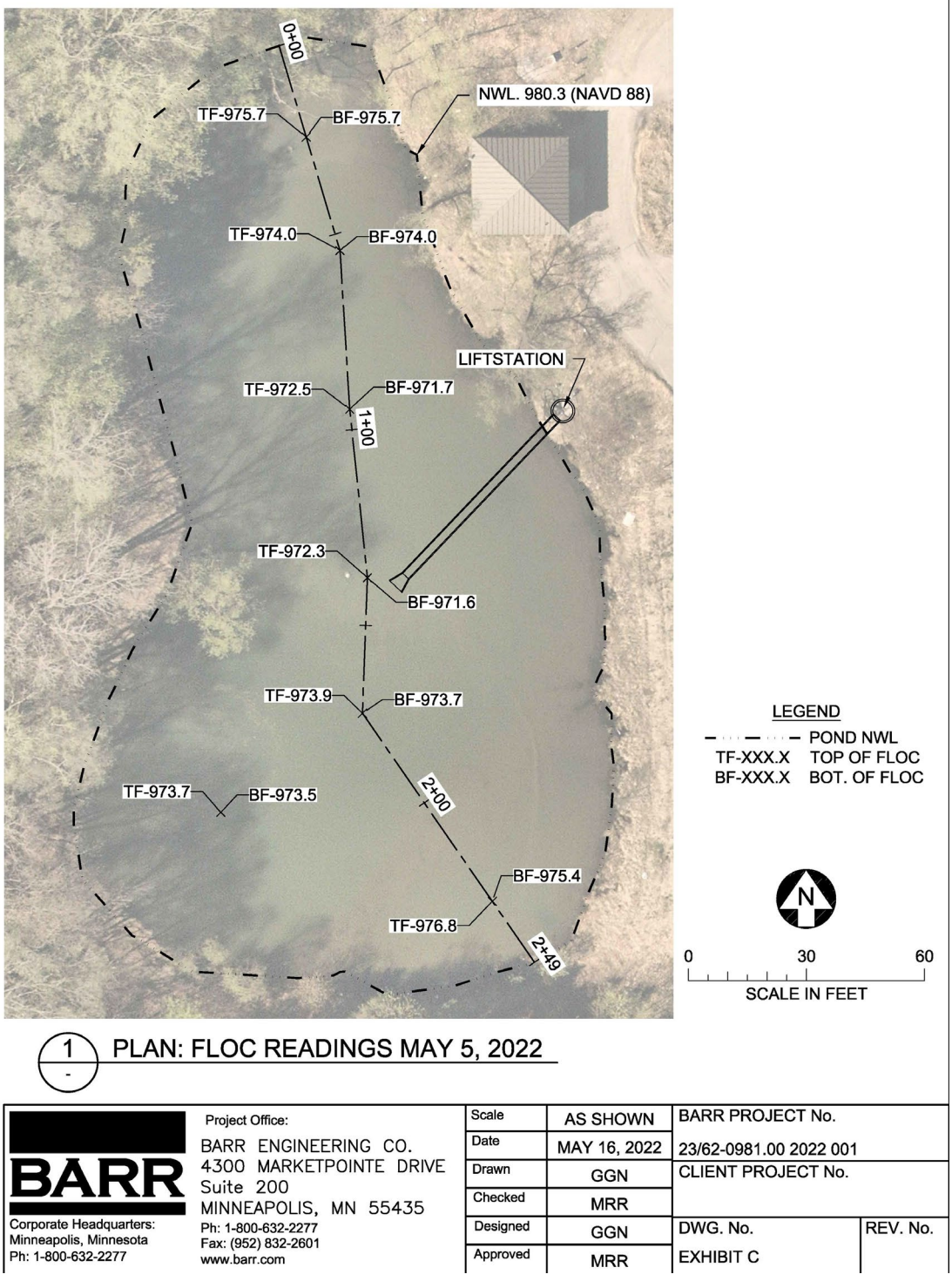

Figure 10. Tanners Alum Floc Pond Floc Readings May 5, 2022

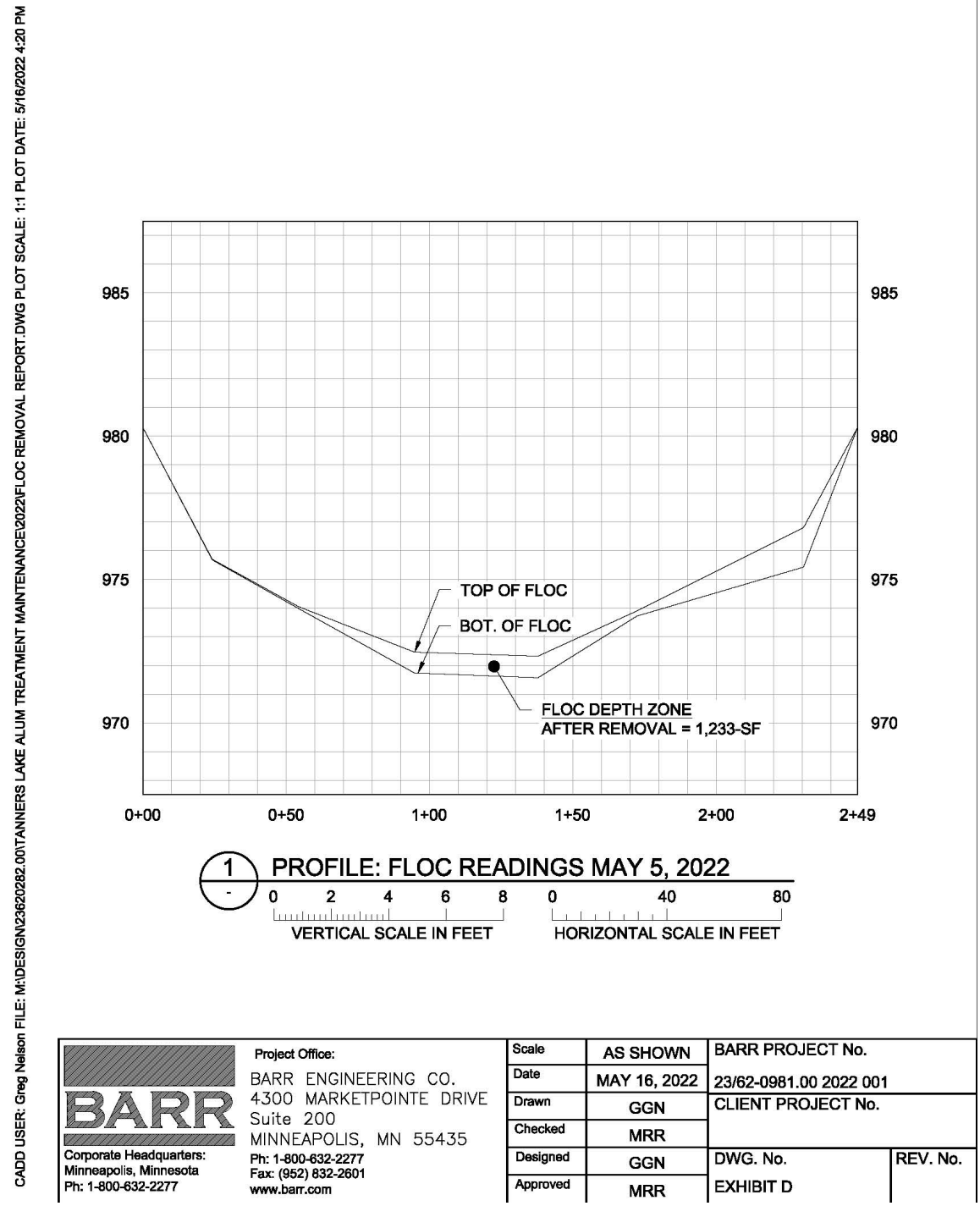

Figure 11. Tanners Alum Floc Pond Profile Floc Readings May 5, 2022