AGENDA

Blackduck City Council - Work Session Meeting

6:00 PM - Monday, January 26, 2026

City Hall, 8 Summit Drive, Blackduck MN

BLACKDUCK PUBLIC SAFETY COMMITEE

THURSDAY, DECEMBER 18, 2025 @ 1PM

MEETING MINUTES

CALL TO ORDER: The Public Safety Committee of the City of Blackduck met in a scheduled meeting at the City Hall at 1:00pm, December 18, 2025.

Roll Call
Councilors present: Mayor Gullette

Staff Present: City Administrator Christina Regas, Public Works Director Mike Schwanke, Police Chief Arhart

Others Present: none

The meeting was called to order at 1:00pm the Pledge of Allegiance was not recited.

Topic(s) covered in the committee meeting were as follows:

BLACKDUCK POLICE DEPARTMENT CONTRACT FOR SERVICES WITH SHERIFF DEPARTMENT
Committee members held a discussion regarding the potential of contracting with the Sheriff department for law enforcement services to include cost of services and what type and amount of services.

Committee members agreed the potential contract with Beltrami Sheriff Department would require the following:

1. Coverage of a minimum of 40 per week of one law enforcement officer in Blackduck.
2. Coverage of City of Blackduck Ordinances including but not limited to Sections 700 Traffic Codes and 920 Animals.
3. Presence of law enforcement in the Blackduck School of a minimum of 8 hours per week (presence could include attending athletic games; Boys & Girls Club; etc.)
4. Presence of law enforcement in the Blackduck Community (visible presence of squad to deter speeding etc. to connect with residents and improve visibility)
5. Provide periodical reports of statistics/response calls to the Blackduck City Council.

Committee members meet with Beltrami County Sheriff representatives on January 8th, 2026 @ 1pm and will discuss needs/wants. Next steps include presenting recommendations and discussions with full city council January 26th, 2026 work session with Sheriff Riggs and staff.

ADJOURN – The Committee adjourned their meeting at 2:15pm.

NAME	PAY GRADE	Step	HOURLY	NO. HOURS	GROSS SALARY	PERA	MEDICARE	PAID LEAVE	FLEX DOLLARS $1,540.00	GRAND TOTAL	Average OT
Deputy	12	9	$46.87	2093	$98,088.45	$17,361.65	$1,422.28	$387.45	$18,480.00	**$135,739.83**	
Deputy OT	12	9	$46.87	100	$4,686.50	$829.51	$67.95	$18.51	0	**$5,602.48**	
Holiday			$46.87	80	$3,749.20	$663.61	$54.36	$14.81	9	**$4,481.98**	
NOTE:										**$141,342.31**	

2026 is assumption of New union contract following COLA- Flex increases given to non-union Employees

Vehcile set aside	**$20,000.00**
Vehicle maint	**$3,000.00**
Fuel (200 Gallons X$3)	**$600.00**
	$175,026.77
Longevity	**$1,588.34**
Shift Diff	**$1,000.00**
Grand Total	**$177,615.11**

payment to the Payroll Office in advance of the desired coverage.

ARTICLE 19. LONGEVITY:

19.1 Full-time employees and part-time employees who are regularly scheduled to work twenty (20) or more hours per week shall be eligible for longevity pay upon completion of the required number of years of continuous employment in accordance with the following bi-weekly schedule.

	After 5 years	After 10 years	After 15 years
Investigator	10.70	42.80	64.19
Deputy	10.19	40.73	61.09
Court Security Deputy	8.65	34.58	51.87

So there will be no misunderstandings, the following example is set out:

A Deputy, after completing five (5) years of service as a covered employee, shall receive $10.19 over and above his/her base bi-weekly pay. A Deputy, after completing ten (10) years of service as a covered employee shall receive $40.73 over his/her base bi-weekly pay, and a deputy, after completing fifteen (15) years of service as a covered employee shall receive $61.09 over his/her base bi-weekly pay.

An employee shall receive this payment commencing with the first day of the payroll period following the date when the proper number of years was attained. All employees hired after January 1, 2023 will no longer be eligible for longevity pay.

From: Michael Schwanke
To: Christina Regas
Subject: FW: City of Blackduck; SWP Implementation Grant Application Results
Date: Friday, December 19, 2025 10:15:05 AM

Mike Schwanke

Public Works Director
City of Blackduck
Hours; M-F 8am-4pm CST
Office: 218-835-4809
Fax: 218-835-4801
City Shop: 218-835-4804
michael.schwanke@blackduckmn.com

http://www.blackduckmn.com/city/public-works

From: Wojski, Eddie (MDH) <eddie.wojski@state.mn.us>
Sent: Friday, December 19, 2025 8:59 AM
To: Michael Schwanke <Michael.Schwanke@blackduckmn.com>
Subject: City of Blackduck; SWP Implementation Grant Application Results

[EXTERNAL]

Hi Mike,

You applied for a Source Water Protection (SWP) Implementation grant in the Fall of 2025.

You received the points needed to qualify for funding and placed on our priority wait list. ***Availability of grant funds have been exhausted and your application is placed on a waiting list.*** At this time, it is undetermined when funding will become available. I will contact you when that is determined.

Once funds become available, you will receive a grant agreement via DocuSign for your review and signature.

It is very important that you do not begin any work or incur any expenses until you receive an executed grant agreement signed by you and MDH.

If your grant agreement states the need for Plan Review, you will need to contact David Weum, Minnesota Department of Health (MDH) Plan Review Engineer at 651-201-4684 or david.weum@state.mn.us for plan review process and information.

Note: MDH DOES NOT reimburse funds for Well and Sealing permit fees.

You may begin work and start incurring expenses for your project once you receive a fully executed grant agreement.

Thank you for your patience. Feel free to contact me with any questions.

Eddie Wojski
Grant Coordinator | Drinking Water Protection Section

Minnesota Department of Health
Office: 651-201-4576

Sewer Operational Revenue Budget Worksheet 2027 - TEST FOR LIFT-STATION DEBT

updated 12/10/25	2024 Budget	2024 Actual	2025 Budget	2025 Actual	2026 Worksheet	
R 602-33400 State Grants and Aids	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-33422 Other State Aid Grants	$0.00	$0.00	$0.00	$325.00	$0.00	
R 602-34000 Charges for Services	$2,500.00	$14,075.00	$5,000.00	$15,325.00	$5,000.00	*Sewer Discharge*
R 602-34110 Sale of Property	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-34950 Other Revenues	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-36100 Special Assessments	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-36102 Penalties and Interest	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-36200 Miscellaneous Revenues	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-36210 Interest Earnings	$750.00	$2,667.52	$750.00	$1,711.76	$750.00	
R 602-36240 Reimbursements	$0.00	$1,102.82	$0.00	$206.46	$0.00	
R 602-37140 Water Meter Sales	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-37200 Sewer Sales	$221,000.00	$209,062.38	$250,297.86	$207,043.76	$262,172.36	*uses rate study calculations to = revenue*
R 602-37240 Farm Lease Agreement Revenue	$6,098.00	$6,098.00	$6,098.00	$6,098.00	$6,098.00	
R 602-37250 Sewer Connect/Reconnect Fee	$0.00	$32.50	$0.00	$0.00	$0.00	
R 602-37260 Swr Penalty	$1,500.00	$1,114.77	$1,500.00	$1,066.56	$1,500.00	
R 602-39101 Sales of General Fixed Assets	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-39104 Transfer from Money Market	$0.00	$17,735.30	$0.00	$0.00	$0.00	
R 602-39201 Transfer from General Fund	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-39203 Transfer from Other Fund	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-39204 Intrafund Transfer	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-39269 Transfer from Liquor Fund	$0.00	$0.00	$0.00	$0.00	$0.00	
R 602-39331 Insurance Proceeds	$0.00	$0.00	$0.00	$0.00	$0.00	
	$231,848.00	$251,888.29	$263,645.86	$231,776.54	$275,520.36	

Sewer Operational Expenditure Budget Worksheet 2026-2034 - TEST LIFTSTATION DEBT

		2026 Worksheet	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
E 602-43200-101	Full-Time Employees Regular	$79,090.68	$82,254.31	$85,544.48	$88,966.26	$92,524.91	$96,225.91	$100,074.94	$104,077.94	$108,241.06	$112,570.70	$117,073.53	$121,756.47
E 602-43200-102	Full-Time Employees Overtime	$6,000.00	$6,240.00	$6,489.60	$6,749.18	$7,019.15	$7,299.92	$7,591.91	$7,895.59	$8,211.41	$8,539.87	$8,881.47	$9,236.72
E 602-43200-103	Part-Time Employees	$1,373.10	$1,428.02	$1,485.14	$1,544.55	$1,606.33	$1,670.59	$1,737.41	$1,806.91	$1,879.18	$1,954.35	$2,032.52	$2,113.82
E 602-43200-120	Employer Contribution to Union Pension	$2,100.80	$2,184.83	$2,272.23	$2,363.11	$2,457.64	$2,555.94	$2,658.18	$2,764.51	$2,875.09	$2,990.09	$3,109.70	$3,234.09
E 602-43200-121	PERA	$6,034.78	$6,276.17	$6,527.22	$6,788.31	$7,059.84	$7,342.23	$7,635.92	$7,941.36	$8,259.01	$8,589.37	$8,932.95	$9,290.27
E 602-43200-122	FICA	$6,155.48	$6,401.70	$6,657.77	$6,924.08	$7,201.04	$7,489.08	$7,788.65	$8,100.19	$8,424.20	$8,761.17	$9,111.61	$9,476.08
E 602-43200-135	MN Paid Leave	$708.08	$736.40	$765.86	$796.49	$828.35	$861.49	$895.95	$931.78	$969.06	$1,007.82	$1,048.13	$1,090.06
E 602-43200-131	Employer Paid Health	$14,433.16	$15,010.49	$15,610.91	$16,235.34	$16,884.76	$17,560.15	$18,262.55	$18,993.05	$19,752.78	$20,542.89	$21,364.60	$22,219.19
E 602-43200-200	Office Supplies (GENERAL)	$400.00	$416.00	$432.64	$449.95	$467.94	$486.66	$506.13	$526.37	$547.43	$569.32	$592.10	$615.78
E 602-43200-205	Heating Fuel	$1,000.00	$1,040.00	$1,081.60	$1,124.86	$1,169.86	$1,216.65	$1,265.32	$1,315.93	$1,368.57	$1,423.31	$1,480.24	$1,539.45
E 602-43200-206	Electricity	$21,000.00	$21,840.00	$22,713.60	$23,622.14	$24,567.03	$25,549.71	$26,571.70	$27,634.57	$28,739.95	$29,889.55	$31,085.13	$32,328.54
E 602-43200-207	Computer Supplies	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E 602-43200-208	Training and Instruction	$1,000.00	$1,040.00	$1,081.60	$1,124.86	$1,169.86	$1,216.65	$1,265.32	$1,315.93	$1,368.57	$1,423.31	$1,480.24	$1,539.45
E 602-43200-210	Operating Supplies (GENERAL)	$1,000.00	$1,040.00	$1,081.60	$1,124.86	$1,169.86	$1,216.65	$1,265.32	$1,315.93	$1,368.57	$1,423.31	$1,480.24	$1,539.45
E 602-43200-212	Motor Fuels	$2,000.00	$2,080.00	$2,163.20	$2,249.73	$2,339.72	$2,433.31	$2,530.64	$2,631.86	$2,737.14	$2,846.62	$2,960.49	$3,078.91
E 602-43200-213	Lubricants and Additives	$500.00	$520.00	$540.80	$562.43	$584.93	$608.33	$632.66	$657.97	$684.28	$711.66	$740.12	$769.73
E 602-43200-220	Repair/Maint Supply (GENERAL)	$1,500.00	$1,560.00	$1,622.40	$1,687.30	$1,754.79	$1,824.98	$1,897.98	$1,973.90	$2,052.85	$2,134.97	$2,220.37	$2,309.18
E 602-43200-221	Equipment Parts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E 602-43200-222	Tires	$1,500.00	$1,560.00	$1,622.40	$1,687.30	$1,754.79	$1,824.98	$1,897.98	$1,973.90	$2,052.85	$2,134.97	$2,220.37	$2,309.18
E 602-43200-240	Small Tools and Minor Equip	$600.00	$624.00	$648.96	$674.92	$701.92	$729.99	$759.19	$789.56	$821.14	$853.99	$888.15	$923.67
E 602-43200-250	Merchandise Resale (GENERAL)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E 602-43200-301	Auditing and Acct g Services	$3,500.00	$3,640.00	$3,785.60	$3,937.02	$4,094.50	$4,258.29	$4,428.62	$4,605.76	$4,789.99	$4,981.59	$5,180.85	$5,388.09
E 602-43200-303	Engineering Fees	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E 602-43200-304	Legal Fees	$100.00	$104.00	$108.16	$112.49	$116.99	$121.67	$126.53	$131.59	$136.86	$142.33	$148.02	$153.95
E 602-43200-308	Testing/Analysis	$1,700.00	$1,768.00	$1,838.72	$1,912.27	$1,988.76	$2,068.31	$2,151.04	$2,237.08	$2,326.57	$2,419.63	$2,516.42	$2,617.07
E 602-43200-310	Other Professional Services	$4,000.00	$4,160.00	$4,326.40	$4,499.46	$4,679.43	$4,866.61	$5,061.28	$5,263.73	$5,474.28	$5,693.25	$5,920.98	$6,157.82
E 602-43200-322	Postage	$700.00	$728.00	$757.12	$787.40	$818.90	$851.66	$885.72	$921.15	$958.00	$996.32	$1,036.17	$1,077.62
E 602-43200-331	Travel Expenses	$1,000.00	$1,040.00	$1,081.60	$1,124.86	$1,169.86	$1,216.65	$1,265.32	$1,315.93	$1,368.57	$1,423.31	$1,480.24	$1,539.45
E 602-43200-361	General Liability Ins	$2,452.74	$2,550.85	$2,652.88	$2,759.00	$2,869.36	$2,984.13	$3,103.50	$3,227.64	$3,356.74	$3,491.01	$3,630.65	$3,775.88
E 602-43200-362	Property Ins	$5,834.22	$6,067.59	$6,310.29	$6,562.70	$6,825.21	$7,098.22	$7,382.15	$7,677.44	$7,984.53	$8,303.91	$8,636.07	$8,981.51
E 602-43200-366	Workers Compensation Insurance	$2,555.30	$2,657.51	$2,763.81	$2,874.36	$2,989.34	$3,108.91	$3,233.27	$3,362.60	$3,497.10	$3,636.99	$3,782.47	$3,933.77
E 602-4320-368	Refuse/Garbage Disposal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E 602-43200-401	Repairs/Maint Buildings	$125.00	$130.00	$135.20	$140.61	$146.23	$152.08	$158.16	$164.49	$171.07	$177.91	$185.03	$192.43
E 602-43200-402	Repairs/Maint Structures	$10,000.00	$10,400.00	$10,816.00	$11,248.64	$11,698.59	$12,166.53	$12,653.19	$13,159.32	$13,685.69	$14,233.12	$14,802.44	$15,394.54
E 602-43200-404	Repairs/Maint Machinery/Equip	$4,500.00	$4,680.00	$4,867.20	$5,061.89	$5,264.36	$5,474.94	$5,693.94	$5,921.69	$6,158.56	$6,404.90	$6,661.10	$6,927.54
E 602-43200-405	Depreciation (GENERAL)	$20,000.00	$20,800.00	$21,632.00	$22,497.28	$23,397.17	$24,333.06	$25,306.38	$26,318.64	$27,371.38	$28,466.24	$29,604.89	$30,789.08
E 602-43200-433	Dues and Subscriptions	$8,735.00	$9,084.40	$9,447.78	$9,825.69	$10,218.71	$10,627.46	$11,052.56	$11,494.66	$11,954.45	$12,432.63	$12,929.93	$13,447.13
New Debt for Lift-Station	Principal	$14,000.00	$14,000.00	$14,000.00	$14,000.00	$14,000.00	$14,000.00	$14,000.00	$14,000.00	$14,000.00	$14,000.00	$14,000.00	$14,000.00
New Debt for Lift-Station	Interst												
E 602-43200-613	2023A Bond - Principal - *PW/PS Facility (381)*	$16,056.93	$13,134.57	$13,430.09	$13,732.27	$14,041.25	$14,357.17	$14,680.21	$15,010.51	$5,557.60	$5,682.64	$5,810.50	$5,941.24
E 602-43200-614	2023A Bond - Interest - *PW/PS Facility (381)*	$9,723.83	$7,490.03	$7,194.50	$6,892.33	$6,583.35	$6,267.42	$1,251.30	$5,614.08	$5,276.34	$5,151.30	$5,023.44	$4,892.70
E 602-43200-615	2023B Bond - Principal - *PW/PS Facility (382)*	$3,176.31	$2,595.05	$2,650.19	$2,706.51	$2,764.02	$2,822.75	$2,882.73	$2,943.99	$1,029.30	$1,051.18	$1,073.51	$1,096.33
E 602-43200-616	2023B Bond - Interest - *PW/PS Facility (382)*	$1,713.04	$1,316.43	$1,261.28	$1,204.97	$1,147.45	$1,088.71	$1,028.73	$967.48	$904.92	$883.04	$860.71	$837.89
		$256,268.45	$258,598.34	$267,400.82	$276,555.42	$286,076.19	$295,977.78	$301,582.37	$316,985.03	$316,355.09	$327,938.57	$339,985.38	$352,514.07

Debt & Expense Study 10 years out for Lift-Station MN Rural Water Loan

assumes Lift-Station Bond begins 2027 for 10 years + assumes GF Levy increases 4% annually for cost of living

Year	Debt Levy Total *(includes LS debt)*	General Fund Levy Total	Complete Levy	Lift Station Debt Balance *(assumes LS debt begins 2027)*	Operating Expense Budget Wastewater *(assumes expense increase 4% annually & assumes $14,000 of new LS debt)*
2027	$94,634.00	$394,568.72	$489,202.72	$225,000.00	$258,598.34
2028	$88,156.00	$410,351.47	$498,507.47	$200,000.00	$267,400.82
2029	$87,810.00	$426,765.53	$514,575.53	$175,000.00	$276,555.42
2030	$88,644.00	$443,836.15	$532,480.15	$150,000.00	$286,076.19
2031	$88,248.00	$461,589.59	$549,837.59	$125,000.00	$295,977.78
2032	$87,802.00	$480,053.18	$567,855.18	$100,000.00	$301,582.37
2033 - *Bond 2024A sunsets*	$55,542.00	$499,255.31	$554,797.31	$75,000.00	$316,985.03
2034	$79,078.00	$519,225.52	$598,303.52	$50,000.00	$316,355.09
2035	$79,078.00	$539,994.54	$619,072.54	$25,000.00	$327,938.57
2036	$79,078.00	$561,594.32	$640,672.32	-$5,000.00	$339,985.38
2037	$79,078.00	$584,058.09	$663,136.09	$0.00	$352,514.07

Invoice

Blackduck Public Library
72 1st St. E
Blackduck, Mn 56630
Christina (218-368-9394)

Gustafson Home Improvements (GHI)
12927 Portage, Ln NE
Bemidji, MN 56601
218-689-3279

Project description: 2025

Library Remodel additions to project

Description of work:

- Build new counter wall at new location of reception /checkout area. new top purchased and installed. $1,026.00
- New base cabinets purchased and tops for north wall of new office area. $1,020.00
- New flooring in bathrooms (epoxy)

  New carpet tile in the rest of the building minus the storage and mechanical spaces. $2904.00 + $10527.67= $13431.67 my bid covered the area we were working in which was about ¼ of the flooring space.

  amount due for additional flooring = $10,073.75
- Remove vinyl base and prep and paint the remaining walls of the building and reinstall vinyl base. $2,940.00

Project additional cost of the work done with labor and materials and sub contractors

Total $15059.75

If you have any questions please call.

Tony Gustafson
Gustafson Home Improvements (GHI)
218-689-3279
gustafson.h.i@gmail.com

Thank you for your business.
GHI

2025-2026 Blackduck Public Library Revenue and Expenses

updated 1/26/2026

Date	Description of Expense/Revenue	Revenue	Expense	Balance
Apr-25	KRLS Project Funding	$57,583.00		$57,583.00
Jul-25	GHI - first half		$29,000.00	$28,583.00
Sep-25	GHI - 25% of last half		$14,500.00	$14,083.00
Oct-25	Bessler Electric - update lighting		$6,975.00	$7,108.00
Aug-25	LOST	$385.87		$7,493.87
Sep-25	LOST	$9,557.87		$17,051.74
Oct-25	LOST	$10,952.38		$28,004.12
Nov-25	LOST	$9,850.76		$37,854.88
Nov-25	VARI- circulation desk order		$546.82	$37,308.06
Nov-25	Pinnacle - commitment new logo - Invoice #89906		$1,100.00	$36,208.06
Nov-25	Clarity Glass - door quote w/ADA - *approved by council*		$11,412.00	$24,796.06
Nov-25	2025 Front Door Levy Funds	$7,000.00		$31,796.06
Sep-25	DOE Grant reimbursement #1	$21,475.00		$53,271.06
	estimated Balance of LOST to receive	$37,652.16		$90,923.22
	Budget for New Signage		$2,000.00	$88,923.22
	Budget for New Exterior Book Return		$5,000.00	$83,923.22
	Budget for New Shelving - Quote #944032		$62,887.44	$21,035.78
	Budget for New patio & landscaping		$10,000.00	$11,035.78
	DOE Grant amount for Remaining construction	$34,500.00		$45,535.78
12/2/2025	Amazon - TV Cart for MP Room		$239.19	$45,296.59
12/3/2025	The Library Store - Quote #945042 - Invoice 945042 pd		$8,864.54	$36,432.05
12/10/2025	Amazon - DVD shelving, bathroom cabinet, chairmats		$416.44	$36,015.61
12/10/2025	LOST - October	$8,410.95		$44,426.56
	Friends of the Library Donation (Shelving offset)	$18,782.34		$63,208.90
12/29/2025	DOE Grant Reimbursement #2 - TV cart, #945042, vari	$7,829.56		$71,038.46
1/2/2026	Balance of GHI contract Check#15441		$14,500.00	$56,538.46
1/5/2026	Northwoods Lumber - building supplies misc.		$234.66	$56,303.80
1/12/2026	LOST - November 2025	$8,190.01		$64,493.81
1/13/2026	Grainger - baby changing table & mirror bathroom		$654.18	$63,839.63
1/26/2026	GHI - Library additions (remaining flooring, counters, cabinets)		$15,059.75	$48,779.88

Blackduck Community Library

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December 5, 2025

Creative Spaces — LIBRARY • SCHOOL • OFFICE — by TLS

PROJECT

Blackduck Library

72 First St. SE
Blackduck, MN 56630

DATE

12/05/2025

101

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Guidelines and protocol are followed to ensure that suggested items fit with the space, intention, and budget. It is the client's responsibility to make the final decision if the product meets their quality and price expectations. The drawings and specifications are conceptual in nature and intended for design and visual purposes only. They are not intended for architectural or engineering purposes.

PROJECT

Blackduck Library

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Blackduck, MN 56630

DATE

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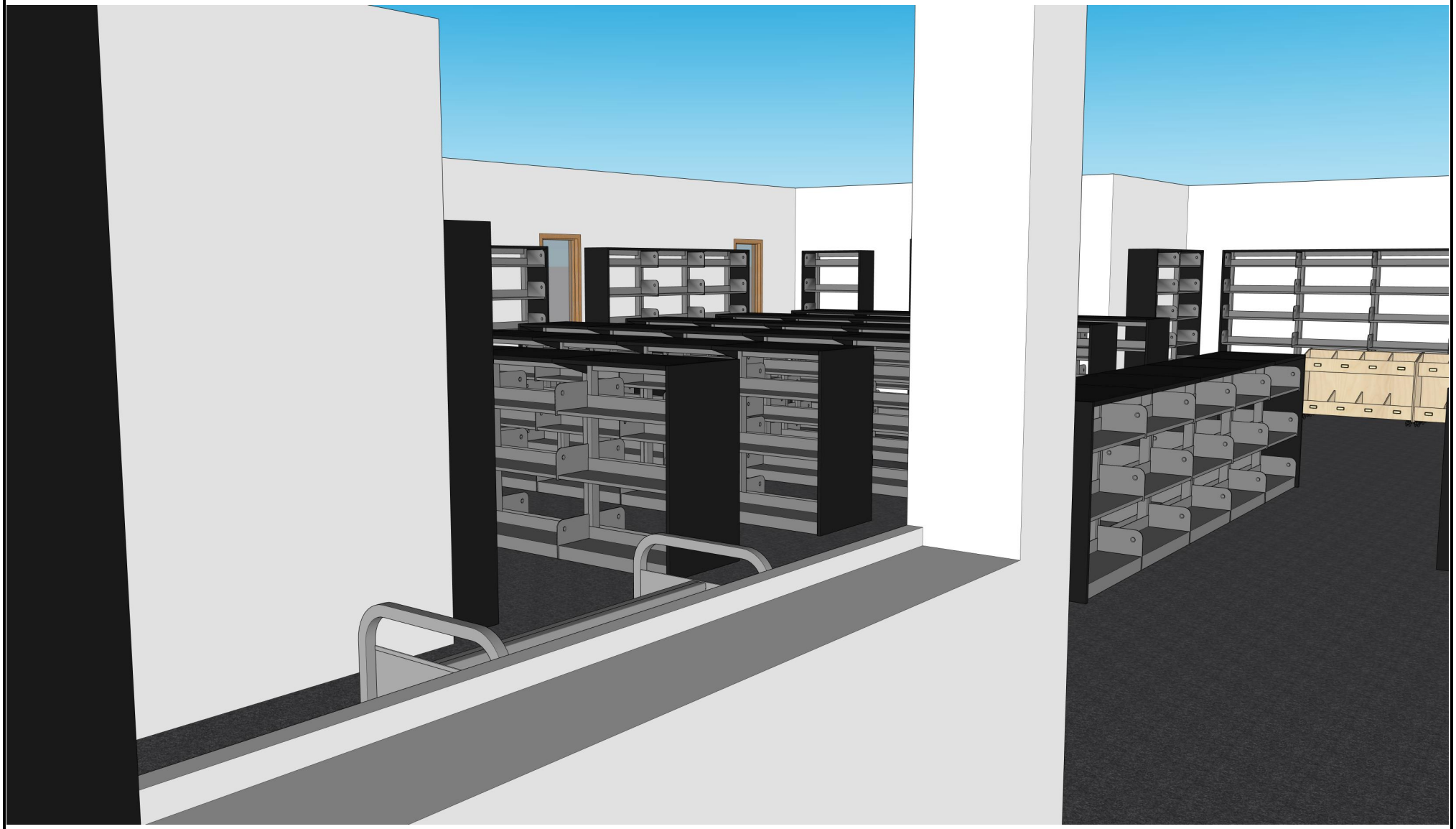

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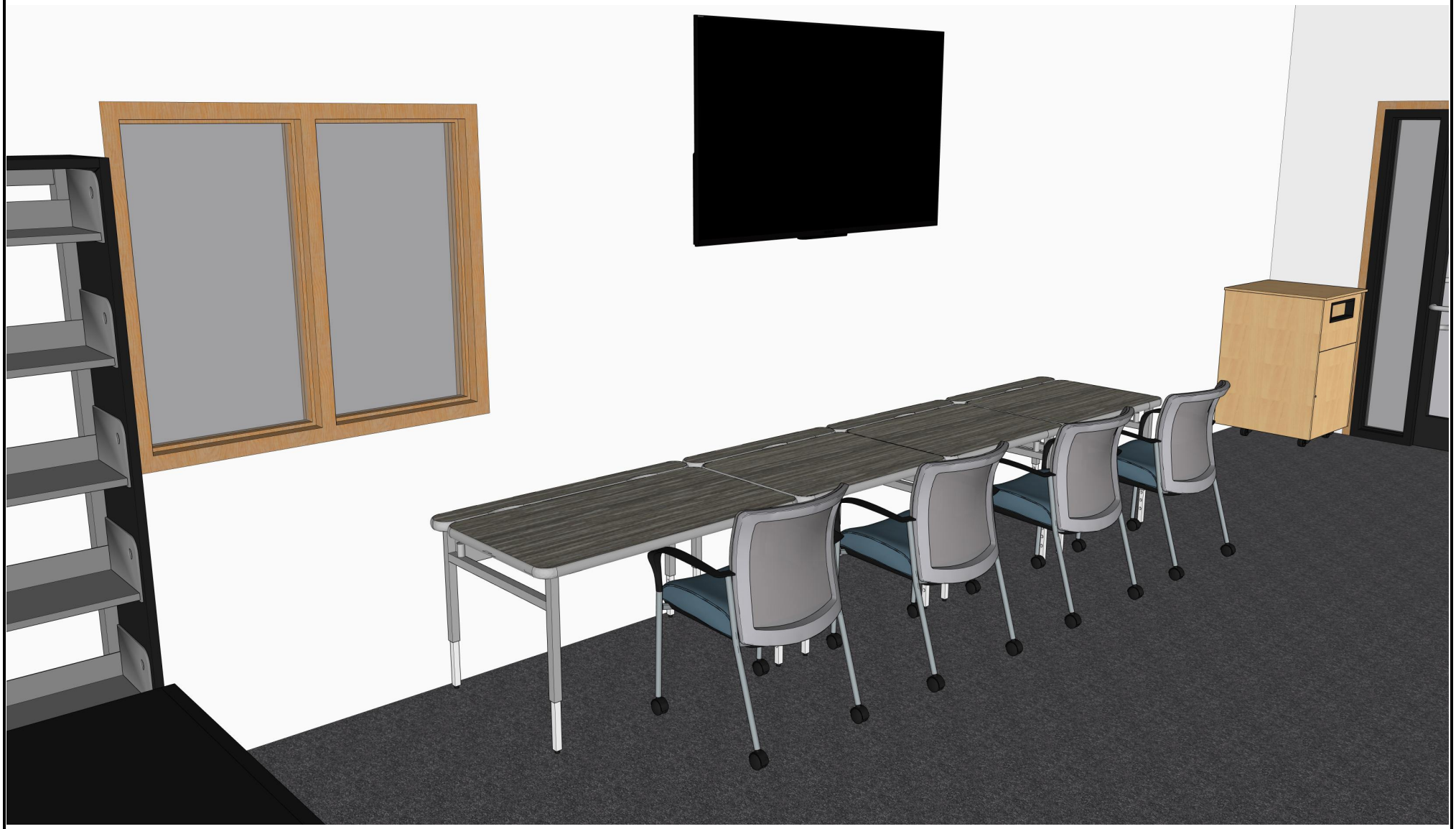

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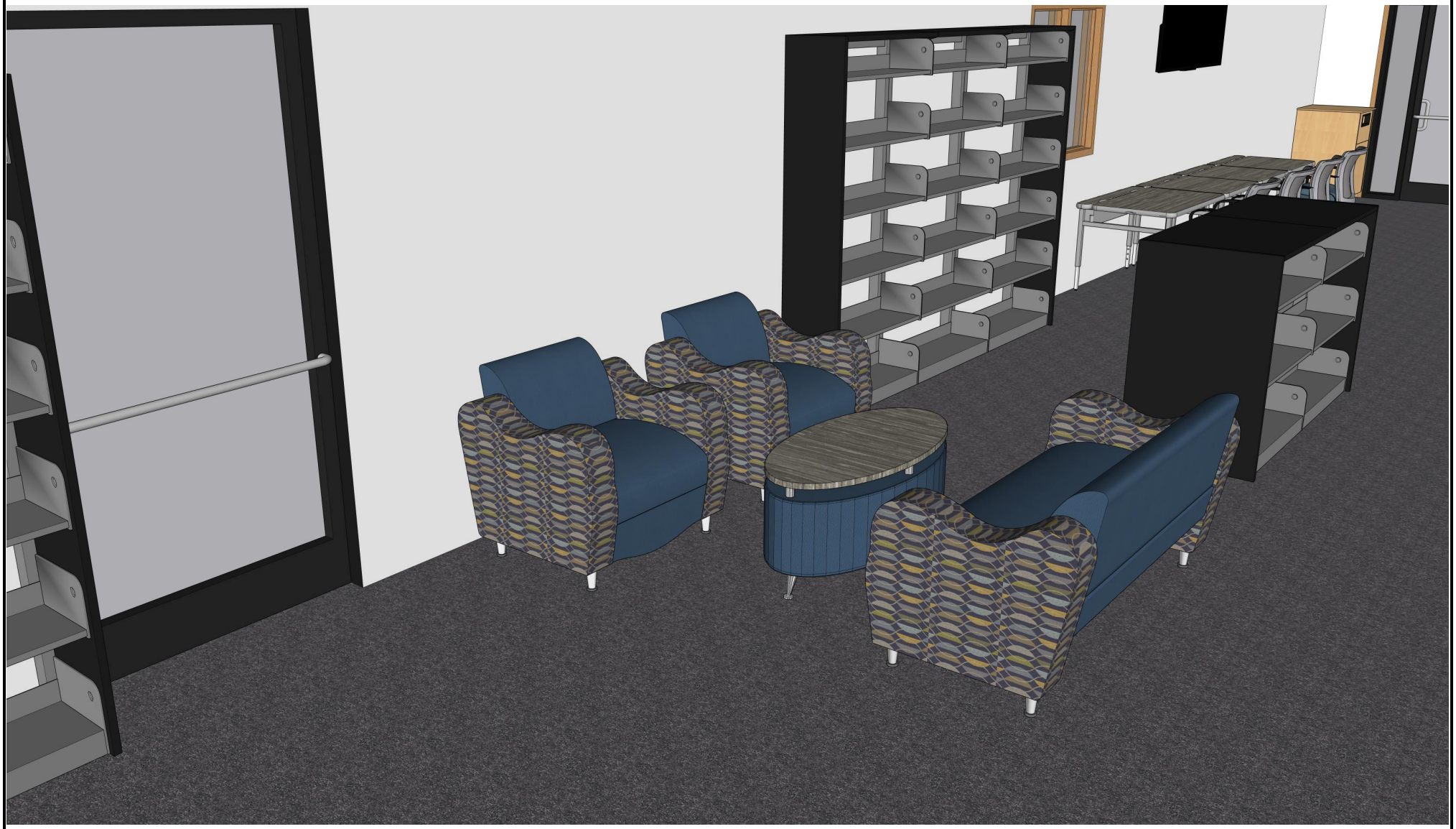

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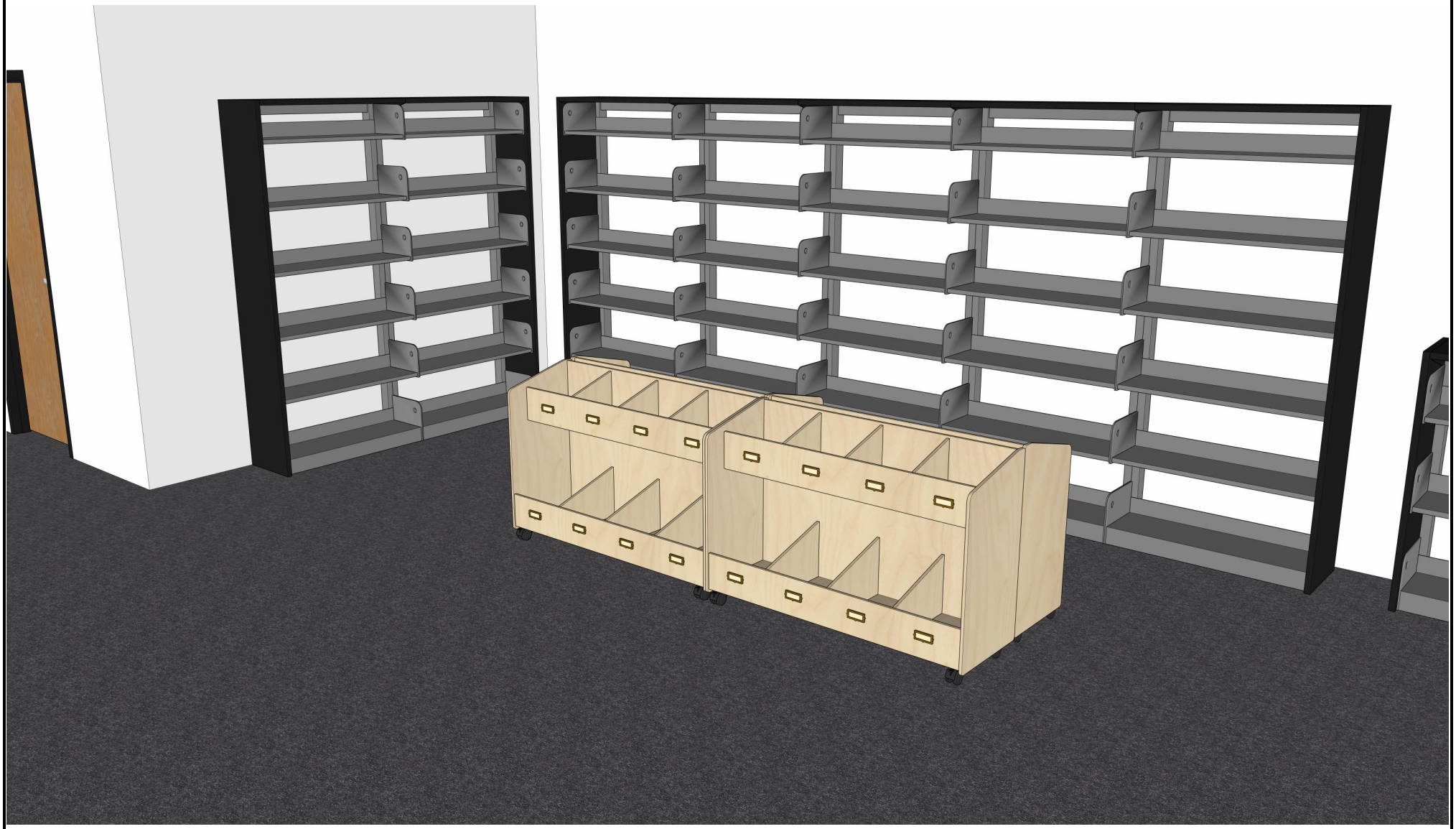

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11

THE LIBRARY STORE®
112 E. South Street, PO Box 0964
Tremont, IL 61568-0964
TEL [800] 548-7204
FAX [800] 320-7706
www.thelibrarystore.com

QUOTE: 944032

Customer Number: 594001
Issue Date: 12/16/2025
Expiration Date: 12/31/2025
Bid Code: DESIGN

Ship To:

Christina Regas
Blackduck Community Library
72 First St SE
Blackduck, MN 56630
(218) 835-6600 x
blackduck@krls.org

Bill To:

Christina Regas
Blackduck Library - City of Bluckduck
PO Box 380
Blackduck, MN 56630-0380
christina.regas@blackduckmn.com

Qty	Item	Item Description	Retail Price	Your Price	Ext Price
24	92-33410-LTGREY	estey Steel Cantilever Integral Back Library Shelving - 78 in.H x 12 in.D Single-Face - Light Grey	~~$1,319.41~~	$605.79	$14,538.96
16	92-3065	estey Steel Cantilever End Panel - 78 in.H Single-Face **Color: (PLEASE SPECIFY WHEN ORDERING)**	~~$412.91~~	$188.78	$3,020.48
24	92-3094	estey Steel Cantilever Canopy Top - 12 in.D Single-Face	~~$108.41~~	$48.73	$1,169.52
2	92-33350-LTGREY	estey Steel Cantilever Integral Back Library Shelving - 42 in.H x 12 in.D Single-Face - Light Grey	~~$806.66~~	$370.76	$741.52
4	92-3061	estey Steel Cantilever End Panel - 42 in.H Single-Face	~~$295.66~~	$135.10	$540.40
2	92-3094	estey Steel Cantilever Canopy Top - 12 in.D Single-Face	~~$108.41~~	$48.73	$97.46
4	88-18929	Jonti-Craft Mobile Book Organizer - 8 Sections	~~$1,194.95~~	$570.65	$2,282.60
30	277-WFIB4824	estey Steel Cantilever Integral Back Library Shelving - 48 in.H x 24 in.D Double-Face	~~$1,072.33~~	$824.87	$24,746.10
12	277-WDP4824A	Estey Cantilever Steel End Panel 48"H x 24"W	~~$430.07~~	$330.82	$3,969.84
30	92-3096	estey Steel Cantilever Canopy Top - 24 in.D Double-Face	~~$188.91~~	$85.75	$2,572.50
7	92-33500-LTGREY	estey Steel Cantilever Integral Back Library Shelving - 42 in.H x 24 in.D Double-Face - Light Grey	~~$1,259.91~~	$579.28	$4,054.96

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QUOTE: 944032

Customer Number: 594001
Issue Date: 12/16/2025
Expiration Date: 12/31/2025
Bid Code: DESIGN

Qty	Item	Item Description	Retail Price	Your Price	Ext Price
4	92-3071	estey Steel Cantilever End Panel - 42 in.H Double-Face	~~$575.66~~	$264.65	$1,058.60
7	92-3096	estey Steel Cantilever Canopy Top - 24 in.D Double-Face	~~$188.91~~	$85.75	$600.25

Sub-Total:	$59,393.19
Tax:	$0.00
Shipping:	$3,494.25
Quote Total (USD):	**$62,887.44**

Shipping Information:

Your quote will ship via semi-truck with a power lift gate to lower the items to ground level. You will be responsible for unloading the items from the lift gate.
*Please contact us if other services are needed so we can provide a more accurate shipping quote.

Comments:

•Pricing valid for listed items and quantities only
•Shipping charges are subject to change after 30 days
•To ensure you receive your quoted prices, quote number 944032 must be referenced at the time of purchase
***Please note: While we will strive to hold pricing where possible, due to current economic conditions, product and shipping costs are changing rapidly and we may be forced to revise your quote prior to expiration.**

Prepared By: Tosha Landesz
E-Mail: toshal@thelibrarystore.com
Phone: 800-548-7204 x7583

Kelly Hanks
Branch Manager
Kitchigami Regional Library

72 First St SE
Blackduck, MN 56630
hanksk@krls.org
218-553-1710

City Council

Dear Members of the City Council,

I hope this letter finds you well. I am writing to formally request and provide my approval for the purchase and installation of shelving units as detailed in the quote provided by TheLibraryStore.com. This acquisition is crucial for the enhancement and organization of our library facilities, and I believe it will significantly benefit our community by improving accessibility and efficiency.

Details of the Request

- **Vendor:** TheLibraryStore.com
- **Items:** Shelving units as specified in Quote #944032
- **Purpose:** To improve the storage and organization of library materials
- **Total Cost:** $62,887.44

Thank you for considering this request. I am available to discuss any questions or concerns you may have regarding this proposal. Please feel free to contact me at your earliest convenience.

Thank you for your attention and support.

Sincerely,

Kelly Hanks
Branch Manager
Kitchigami Regional Library

AARP : Community Challenge Grant Program

Grant Background: The AARP Community Challenge Grant Program is part of the nationwide AARP Livable Communities initiative that helps communities become great places to live for residents of all ages. The program is intended to help communities make immediate improvements and jump-start long-term progress.

Purpose: Blackduck Development Corporation seeks AARP support for age-friendly capital improvements and accessible community signage that address long-standing infrastructure gaps affecting residents age 50 and older.

Why This Matters: Blackduck is a rural community with a growing aging population and limited access to capital funding. Decades of underinvestment in accessibility and walkability have created barriers that limit independence, increase safety risks, and reduce participation in community life for older adults.

What do we need from the City: BDC requires a letter of support from the mayor to demonstrate we have secured the key partnership / permissions necessary to perform work within the city. BDC will be fully responsible for the funds, the project, and its implementation start to close out.

Project Description:

The City of Blackduck, Minnesota seeks AARP support for age-friendly capital improvements and accessible community signage that address long-standing infrastructure gaps affecting residents age 50 and older.

Blackduck is a rural community with a growing aging population and limited access to capital funding. Decades of underinvestment in public infrastructure focused on accessibility and walkability have created barriers that limit independence, increase safety risks, and reduce participation in community life for older adults.

This project will fund high-impact improvements in key public areas, including downtown corridors, parks, and community amenities. Investments will include clear, high-contrast wayfinding signage, safer pedestrian guidance, and targeted capital upgrades that improve mobility and orientation. These improvements are designed to support older adults with limited mobility, vision changes, or reduced access to private transportation.

Without meaningful intervention, these barriers will continue to compound, contributing to isolation, increased fall risk, and earlier displacement from the community. This project prioritizes aging in place by enabling residents to confidently and safely navigate their town.

AARP's support is especially important because funding for rural, age-focused infrastructure remains scarce despite clear demographic need. Blackduck does not have access to large municipal capital budgets, and incremental fixes are no longer sufficient.

In addition to improving daily accessibility, the project will strengthen community resilience by helping older adults locate essential services and safe routes during emergencies.

With AARP's investment, Blackduck can demonstrate how thoughtful, well-funded capital improvements can transform small towns into age-friendly communities where residents are able to remain independent, connected, and supported throughout later life.

Deliverables:

- Finalize project scope, accessibility standards, and priority locations with city leadership and community stakeholders, and complete preliminary designs for age-friendly signage and public space improvements.
- Finalize design specifications for high-contrast, accessible signage, secure vendor quotes and materials, and conduct site readiness assessments for installation and minor capital upgrades.
- Procure signage and construction materials, prepare sites for installation, and coordinate timelines to minimize disruption for older residents and ensure safe implementation.
- Install age-friendly wayfinding and community signage, complete targeted capital improvements supporting walkability and rest areas, and conduct on-site accessibility checks for residents age 50+.
- Complete remaining installations, conduct walk-throughs with older adults and community members, and make final adjustments to improve usability, clarity, and safety.
- Document completed improvements, share community updates, and begin tracking early outcomes related to accessibility, navigation, and public space use by older adults.
- Finalize project close-out, submit the final report highlighting deliverables and impact for residents age 50+, and establish a maintenance plan to ensure long-term benefit.

Blackduck®
A GREAT PLACE FOR FAMILIES
8 Summit Ave. NE, PO Box 380, Blackduck, MN 56630-0380

January 26, 2026

RE: Municipal Support for AARP Grant Application

To whom it may concern,

On behalf of the City of Blackduck this letter is to provide strong support of the Blackduck Development Corporations application to AARP for funding to advance age-friendly capital improvements and accessible community signage.

Blackduck is a small rural community with a growing population of residents aged 50 and older. Many of our residents have lived here for decades and want to remain active, independent, and connected in the community they call home. However, like many rural towns, we have experienced long-standing underinvestment in public infrastructure, particularly improvements focused on accessibility, walkability, and navigation for older adults.

This project directly addresses those gaps. The proposed improvements will make our public spaces safer and easier to navigate through clear signage, improved visibility, and thoughtful design that reflects the real needs of older residents. These are not cosmetic upgrades. They are practical improvements that reduce fall risk, increase confidence, and help residents remain engaged in daily community life.

The City of Blackduck is working closely with the Blackduck Development Corporation on this effort and fully supports the project. All work will take place on city-controlled property and aligns with our priorities around livability, accessibility, and aging in place. The City is prepared to assist with coordination, permitting, and implementation so the project can move forward promptly if funding is awarded.

Funding opportunities for age-focused infrastructure in rural communities are limited, even as the need continues to grow. AARP's investment would make a meaningful difference here, allowing Blackduck to implement improvements that would otherwise remain out of reach despite their importance to public safety and quality of life.

Thank you for AARP's commitment to supporting age-friendly communities and encourage you to give this application your full consideration. This project represents a smart, lasting investment in the well-being of older adults and the future of our community.

Thank you,

Maxwell Gullette
Mayor of Blackduck, MN

Lower Red Lake Stormwater BMP Retrofit Study

Red Lake, Redby, Little Rock, Ponemah, Blackduck, Northome, and Kelliher, MN

Prepared for Beltrami Soil and Water Conservation District

Prepared by HR Green, Inc.
2550 University Avenue W
Suite 400N
St. Paul, MN 55114
March 31, 2025

Executive Summary

The Lower Red Lake Stormwater Best Management Practice (BMP) Retrofit Study, prepared by HR Green, Inc. for the Beltrami Soil and Water Conservation District, provides a comprehensive analysis of stormwater management practices. The goal is to provide guidance to the Beltrami SWCD to implement targeted, measurable, and prioritized BMPs to protect water resources within the Lower Red Lake watershed in Minnesota. The study evaluates seven communities: Blackduck, Kelliher, Northome, Red Lake, Redby, Ponemah, and Little Rock, focusing on the implementation of BMPs to address water quality issues, particularly those related to Total Suspended Solids (TSS) and Total Phosphorus (TP).

There are several impaired water bodies that receive runoff from the evaluated communities. The waters impaired by either nutrients or TSS, as determined by the Minnesota Pollution Control Agency (MPCA), are as follows:

- Blackduck Lake west of Blackduck - nutrient impairment.
- Bartlett Lake in Northome - nutrient impairment.
- Pike Creek in Red Lake - TSS impairment.
- Mud River in Redby - TSS impairment.

Most of the communities are not densely developed and use roadside ditches for drainage, which treat stormwater through pollutant capture and infiltration. Areas with curb, gutter, and storm sewer were the primary focuses of this study. Desktop watershed delineation and field reconnaissance were performed to assess the current stormwater infrastructure and identify potential BMP locations. BMPs evaluated in the study include raingardens, forebays, infiltration basins, retention ponds, and underground devices like SAFL Baffles and hydrodynamic separators (HDS). These BMPs were considered based on their effectiveness in treating concentrated sources of pollution and their feasibility given the local soil and hydrologic conditions. Conditions were modeled in P8 Urban Catchment Model to estimate the pollutant loading from each watershed and removals from both existing storm infrastructure and potential proposed BMPs.

The initial cost of BMP alternatives were estimated using a 30% contingency and a 20% engineering design fee. The present-day value, which represents the total cost to design, construct, inspect, and maintain a BMP over a 30-year period, was used to determine the cost per pound of pollutant removal over 30 years. Annual and intermittent maintenance costs were estimated from specific assumptions made for each type of BMP regarding operational procedures.

Each structural BMP alternative was compiled into a table and ranked in order of highest to lowest priority, based on their cost-effectiveness and potential impact on water quality improvements, with a focus on watersheds that discharge to impaired waters. Non-structural BMP solutions are not a primary focus of this report, but some possibilities are briefly discussed.

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Appendices

Appendix A: WinSLAMM Land Use Classifications
Appendix B: Northome TH46 Updates

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I. Introduction

A. Purpose and General Scope

The Beltrami Soil and Water Conservation District (SWCD) has partnered with the Red Lake Department of Natural Resources (DNR) to investigate seven communities for sites suitable for stormwater Best Management Practices (BMPs). The BMPs are intended to reduce pollutant discharges to various water bodies, all of which are within the Lower Red Lake watershed. The goal of this report is to provide guidance to the Beltrami SWCD to implement targeted, measurable, and prioritized BMPs to protect water resources within developed areas of the Upper/Lower Red Lake watersheds. The seven communities evaluated in this analysis are Blackduck, Kelliher, Northome, Red Lake, Redby, Ponemah, and Little Rock.

Water quality pollutants such as Total Suspended Solids (TSS) and Total Phosphorus (TP) are produced in the highest concentrations in urbanized and heavily trafficked areas. In addition, structural BMPs are most effective when treating concentrated sources of pollution, which typically occurs in areas with curb, gutter, and/or storm sewer infrastructure. Roadside ditches may also direct flows to single points and provide treatment through pollutant capture and infiltration. Locations where no concentrated stormwater flows exist are both much less polluted and much more difficult to treat effectively, so these locations were not considered as a part of this study.

Each of the seven communities investigated for this study is discussed in detail below. Some cities have more discussion and potential BMP locations because there are more opportunities for BMPs in more densely developed areas.

B. Evaluated Communities

Little Rock, Red Lake, Redby, and Ponemah are located in Red Lake Nation and along the shoreline of Lower Red Lake. Blackduck, Northome, and Kelliher are outside of Red Lake Nation but within the Lower Red Lake watershed. The communities evaluated in this study and relevant water bodies are shown in Figure 1. Of the seven, Red Lake and Blackduck are the most developed communities with the largest storm sewer systems. Little Rock and Ponemah are the least densely developed with little concentrated flow and small drainage networks.

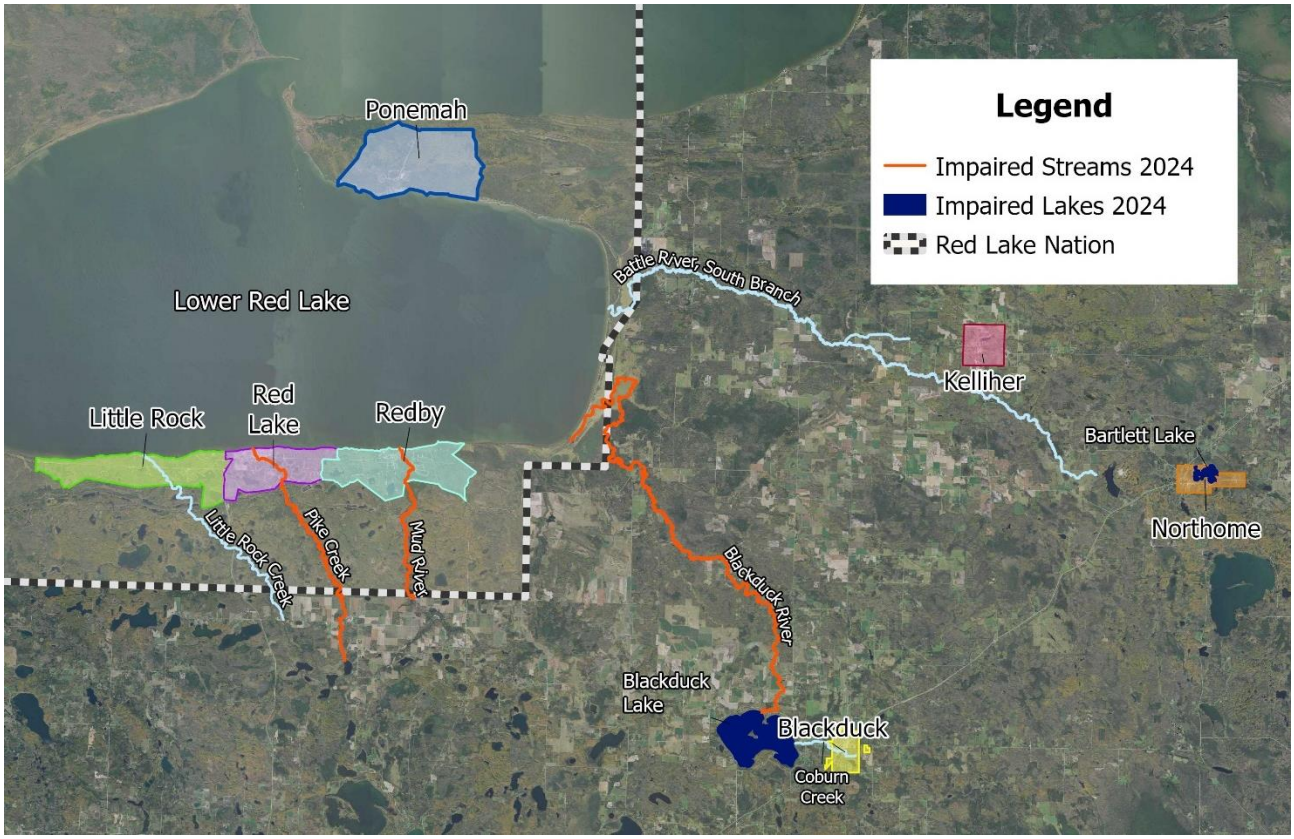


Figure 1: Boundaries of the evaluated communities and relevant water bodies.

There are several impaired water bodies, as determined by the Minnesota Pollution Control Agency (MPCA), that receive runoff from the communities in this study (Table 1). Stormwater runoff has a strong influence on TSS and nutrient impairments; therefore, they will be the primary pollutants evaluated in this study. Other impairments identified in these waters are influenced by factors other than stormwater runoff and were not a focus of this study.

Table 1: Impaired waters receiving runoff from evaluated communities.

Waterbody	Community	Impairments
Blackduck Lake	Blackduck	Mercury and nutrient
Bartlett Lake	Northome	Nutrient
Pike Creek	Red Lake	TSS, dissolved oxygen, and benthic macroinvertebrates bioassessments
Mud River	Redby	TSS and E. coli

C. Methods

Field Reconnaissance

A two-day field visit was performed in December of 2024 to gather information on each city's storm water infrastructure and assess possible BMP locations. HR Green was joined by Beltrami SWCD staff on the first day and Red Lake DNR staff on the second day. Visits were made to the Red Lake Nation tribal engineering office and to the Blackduck, Northome, and Kelliher town halls to gain knowledge of drainage patterns and outfall locations from staff. Catch basins and manholes were opened, when possible, to fill any knowledge gaps. Some infrastructure and flow paths were not visible due to recent snowfall at the time of the visit. A desktop analysis using Google Street View also assisted in identifying infrastructure locations.

Watershed Delineation, Land Use, and Soil Data

Watersheds to each of the identified outfalls were delineated based on MnTOPO LiDAR data and the knowledge acquired during the field visit. In order to model the pollutant loading to these locations, watershed parameters were assigned. These parameters include directly and indirectly connected impervious area ratios, sediment accumulation and decay rates, particle distribution of accumulated sediment and wash-off rates, and sediment-pollutant affiliations by particle size, among others. The values are determined based on land use, which was assessed using aerial imagery. See land use classifications and corresponding parameter values in Appendix A. Minor modifications to these land use parameters were made when attempting to account for the presence of gravel driveways in Red Lake Nation communities. A scale factor for particle loading varying from 1.1 to 1.25 was manually applied to impervious surface pollution sources at targeted locations.

NRCS soils data obtained from the NRCS Web Soil Survey were used for classification of hydrologic soil groups.

Initial Retrofit Review

The process of screening for BMP retrofit opportunities involved evaluating available land and soil types both at storm sewer outfalls and throughout the entire watershed. Various types of BMPs were considered for retrofit facilities, including raingardens, forebays, infiltration basins, retention basins, and underground devices. A brief description of each and a list of assumptions made for the analysis are summarized below.

Raingardens

A raingarden is a constructed depression with native plantings where stormwater runoff from small rain events is captured and infiltrated. Including a form of pretreatment for raingardens can ease maintenance demands and improve the performance of the system. Raingardens require annual maintenance to remove sediment buildup and weeds and intermittent maintenance to replace mulch and failed plantings.

Example of a raingarden

Assumptions:

- Surface area of 150 ft^2 per raingarden for modeling purposes and 1-foot-deep surface ponding.
- Each raingarden costs \$68/ft^2. Right of way acquisition costs are not included.
- Raingarden is located in the boulevard with a curb cut and Rain Guardian™ Bunker forebay.
- Assumed 1.5 feet of engineered media, no underdrain, and no retaining walls.
- Planting completed by contractor (combination of plugs and 4-inch pots for grasses, sedges and forbs).
- No raingardens were evaluated in HSG type D soil. Areas with HSG D soil do not permit infiltration practices and would require an underdrain. Underdrains need to be connected to the main storm sewer system, which would involve the removal and replacement of roadway pavement and increases the cost of each raingarden.
- Annual and intermittent inspection and maintenance is performed by the City at least once per year unless otherwise designated.

Forebay

A forebay is a depressional area located in front of a larger water treatment system or water body designed to slow flow and allow solids to settle. Forebays are used to consolidate maintenance in one location and improve the larger system's performance. Maintenance is performed intermittently to remove the sediment from the bottom of the forebay. This can typically be done using a skid loader.

Example of a forebay

Assumptions:

- The forebay has a depth of 3 feet below the outfall invert.
- A concrete pad is cast at the bottom of the forebay to allow for easy cleanout.
- Overflow exits via a rip rap berm.
- Annual inspections and intermittent maintenance are performed by the City unless otherwise designated.

- Cost of each forebay was estimated based on the respective forebay footprint area and includes a concrete maintenance access path.

Where storm sewer outlets to a natural system like a channel or pond, forebays were evaluated to provide a consolidated location for maintenance.

Infiltration Basin

An infiltration basin is a depression that collects stormwater and allows it to infiltrate into the soil. They are typically located at the end of a pipe and are used to reduce runoff rates and treat pollutants like sediment and phosphorus. Including a form of pretreatment can ease maintenance demands and improve the performance of the system. Examples of required maintenance include mowing, sediment removal, and erosion repair.

Example of an infiltration basin

Assumptions:

- The ponding depth at the recommended device location depends on HSG type and a 48-hour drawdown time.
- Native soils with a D type HSG do not permit infiltration practices.
- In-situ soils are scarified or amended to improve infiltration capacity.
- A forebay is placed at the storm sewer outlet to the basin and a concrete pad is cast at the bottom to allow for easy sediment removal. The forebay overflows over a rip rap berm.
- Outlet for the basin is an elevated beehive structure.
- Cost of each infiltration basin was estimated based on the respective footprint area and includes a forebay and concrete maintenance access path.
- Annual inspections and intermittent maintenance are performed by the City unless otherwise designated.

Retention Pond

A retention pond is a permanent pool of water designed to store water and release it slowly to prevent flooding and allow sediment to settle. It is typically implemented when groundwater is high or soils are ineffective for infiltration. Including a form of pretreatment can ease maintenance demands and improve the performance of the system. Examples of maintenance include sediment removal, removing invasive species such as cattails, and erosion repair.

Example of a retention pond

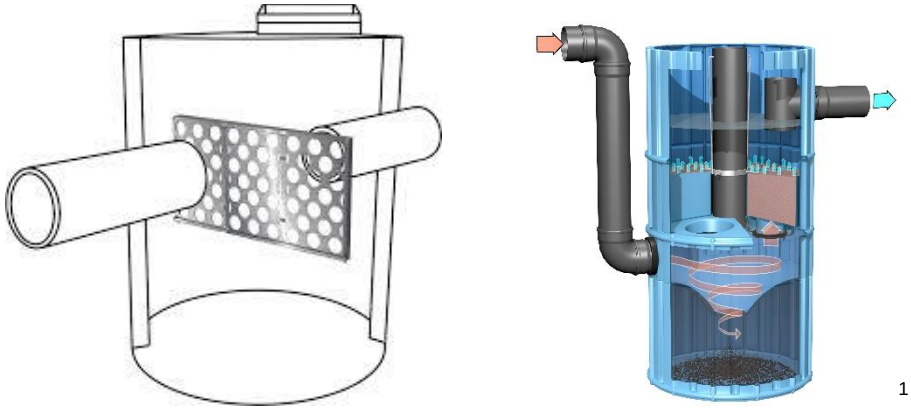
Assumptions:

- Retention ponds were only considered when soils were unsuitable for infiltration (HSG D).
- Permanent pool depth of 3 feet.

- A forebay is placed at the storm sewer outlet into the basin and a concrete pad is cast at the bottom to allow for easy sediment removal. The forebay overflows over a rip rap berm.
- Outlet for the basin is an elevated beehive structure.
- Cost of each retention pond was estimated based on the respective footprint area and includes a forebay and concrete maintenance access path.
- Annual inspections and intermittent maintenance are performed by the City unless otherwise designated.

Underground Device

The pollutant removal mechanisms of underground devices vary depending on the target pollutant. They are typically used when a site's layout or topography may not support an above ground system. Two common types of devices to treat TSS are sumped manholes and hydrodynamic separators (HDS). The SAFL Baffle is a modified sumped manhole that has a screen to help capture sediment. A hydrodynamic separator uses swirl forces and gravity to settle the TSS. HDSs can be more effective than SAFL baffles for larger watersheds, however they are also more expensive. Both types of devices require a vactor truck to remove the accumulated sediment. Depending on the amount of sediment loading, this maintenance can vary but it is recommended annually. These underground devices primarily target TSS, while achieving marginal TP treatment. Devices that target nutrients are also available in the form of filtration. Proprietary underground filtration devices rely on media filled cartridges or membrane filters to capture or adhere soluble nutrients, while also achieving high levels of TSS removal.



[1]

Figure 2. Illustrations of a SAFL Baffle (left) and HDS device (right).

Assumptions:

- Device is built off-line under a paved roadway. Construction was assumed to include removal and replacement of concrete pavement.
- SAFL Baffle is a 72-inch manhole with a sump depth of 3 feet. Placed in-line with existing storm sewer.

[1] https://upstreamtechnologies.us/docs/SAFL-Baffle-Design-Guide.pdf
https://sustainabletechnologies.ca/home/urban-runoff-green-infrastructure/conventional-stormwater-management/hydrodynamic-separators/

- HDS device is sized for a residential drainage area between 25-50 acres. Placed off-line of existing storm sewer.
- One SAFL Baffle was estimated to cost $69,000 to design and construct.
- An HDS was estimated to cost $300,000 to design and construct.
- Annual inspection and maintenance is performed by the City unless otherwise designated.
- Assumed a vactor truck could be rented for $1,500 per day.

SAFL Baffle treatment efficiency significantly decreases as watershed area increases. As a result, best engineering judgement was used to determine the drainage area threshold between SAFL Baffle and HDS implementation. The ranges are given in Table 2 below.

Table 2: Underground devices evaluated for site based on size of drainage area.

Drainage Area [acres]	Underground Device
Area < 3.5	SAFL Baffle
3.5 ≤ Area < 12	Two SAFL Baffles
Area ≥ 12	HDS

Existing and Proposed Modeling

The water quality of each watershed's existing and proposed stormwater effluent was modeled within P8 Urban Catchment Model. The default temperature data and NURP50 loading values were used.

Watersheds were modeled to the nearest waterbody or wetland as classified by the National Wetland Inventory (NWI). Areas primarily made up of recent development with the presence of stormwater BMPs already in place were assumed to meet existing state requirements for stormwater treatment and were not included in the analysis. If over 50% of TSS loading was removed by an existing system (e.g. drainage ditch), the watershed was determined to have sufficient treatment and was not evaluated for BMP retrofits. All other watersheds were considered "targeted" watersheds and were analyzed for potential BMPs.

Cost Estimation

Cost of BMPs were calculated using a 30% contingency and 20% engineering design fee. The present-day value is the current worth of a future sum of money. For the purposes of this analysis, it is used to describe the total cost to design, construct, inspect, and maintain a BMP over the course of 30 years. The present-day value was calculated using the equation below.

$$PV = \sum_{n=0}^{n} \frac{FV}{(1+r)^n}$$

PV = present value
FV = future value (cost of annual inspection and maintenance)
r = discount rate
n = period of time in years

The future value (FV) is the annual inspection and maintenance cost. A discount rate of 3.5% and timeframe of 30 years were used. The cost per pound of removal for each alternative was calculated by dividing the present value by the pounds of pollutant removed over 30 years.

Limitations of Analysis

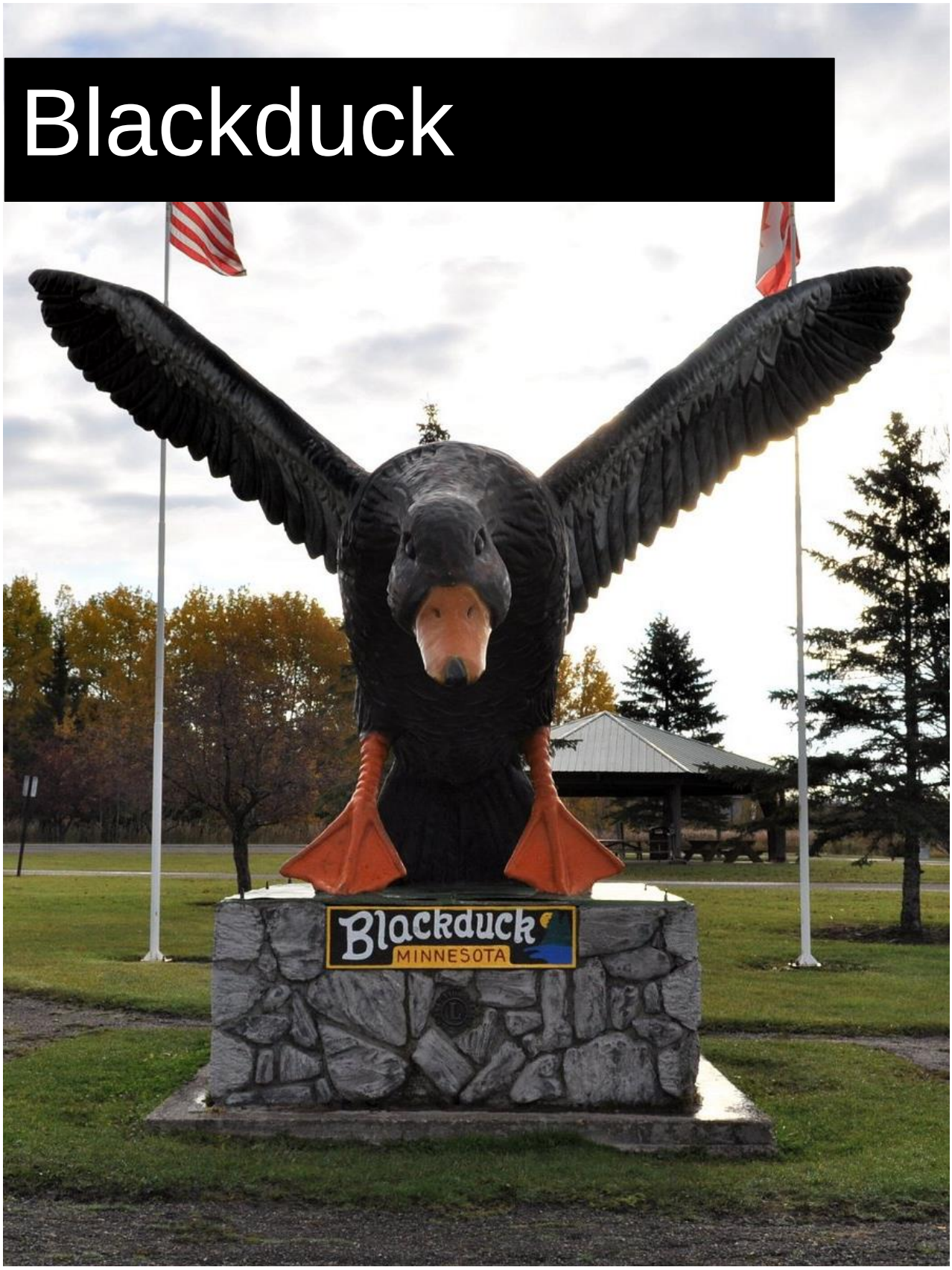
The following were **not** used when evaluating retrofit locations and alternatives:

- storm sewer invert, rim, or diameter
- utility data and location (water, sanitary, electric, etc)
- site-specific geotechnical data or groundwater information

If selected, underground devices should be sized correctly based on estimated flow rate to the device and manufacturer specifications. This will require more storm sewer information to model the system. Underground devices also require a certain amount of cover, which cannot be evaluated without invert and rim data.

Any BMP location selected for design should be vetted for utility conflicts and geotechnical borings should be obtained. Raingardens and infiltration basin sites should be evaluated for soil conditions related to infiltration.

The BMP alternatives identified for each community are described in the sections below.


Blackduck
Blackduck
MINNESOTA

II. Blackduck

A. Watersheds and Drainage Patterns

Blackduck is one of the largest developed areas evaluated in this study. Drainage from Blackduck is all routed to Coburn Creek which eventually outlets to Blackduck Lake (Figure 1). According to the MPCA, Blackduck Lake is impaired by mercury and nutrients. The majority of individual watersheds in the City are routed to roadside ditches and do not have curb and gutter, with the exception of downtown, Main Street N, and Liberty Drive. Blackduck was divided into eleven watersheds which are described in Table 3 and shown in Figure 3.

Table 3: Existing Drainage Area Summary - Blackduck

Watershed Number	Runoff Area [acres]	HSG	Targeted Watershed
1	0.6	D	No
2	3.4	D	Yes
3	304.1	D	No
4	44.6	D	No
5	13.6	D	No
6	33.1	D	Yes
7	3.5	D	Yes
8	7.3	D	Yes
9	9.3	D	Yes
10	15.7	D	No
11	3.9	D	No

- Watershed 1: storm sewer outlets to a ditch east of Main Street N, approximately 450 ft south of the intersection of Liberty Drive NE. Ditch flows to the wetland south of Liberty Drive NE.
- Watershed 2: storm sewer outlets directly to the wetland south of Liberty Drive NE.
- Watersheds 3 and 4: residential neighborhoods and fields which drain to a system of roadside ditches. The northern half of the drainage area is outside city limits.
- Watershed 5: partially flows to a depressional area and partially drains to a roadside ditch east of HWY 71.
- Watershed 6-8: storm sewer from Watershed 6 outlets to a drainage channel in Blackduck Wayside Rest Park. Watersheds 7 and 8 are areas of the park that drain to the drainage channel.
- Watershed 9: storm sewer outlets to a ditch south of Railroad Avenue SE which flows to Coburn Creek.
- Watershed 10: storm sewer outlets to the southwest corner of 3rd Street E and Railroad Avenue SE and eventually flows to a wetland which connects to Coburn Creek.
- Watershed 11: storm sewer outlets to the northeast corner of Summit Avenue and 4th Street E and flows northeast in a ditch alongside the trail.

Watersheds 1, 10, and 11 had annual TSS removal efficiencies over 50% when existing conditions were modeled in P8 and therefore, were not analyzed for BMP retrofit opportunities.

Watersheds 3, 4, and 5 were also not evaluated because they combine into a large ditch network which cannot be accurately modeled in P8 on a large scale. It was assumed to provide sufficient treatment. As a result, only Watersheds 2, 6-8, and 9 were evaluated for possible BMP retrofits.

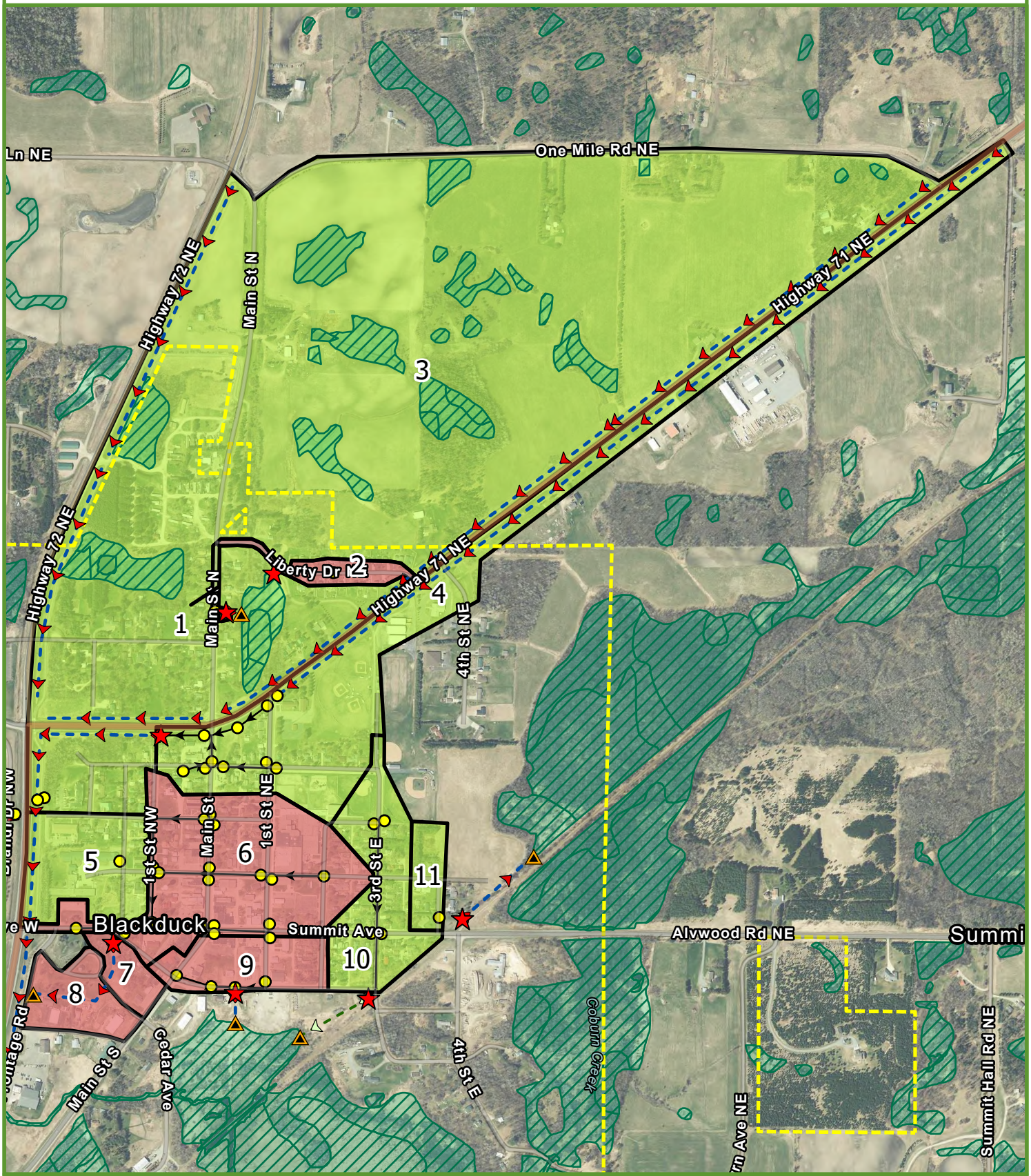


Figure 3 Blackduck Watershed Overview

- Storm Node
- Storm Sewer Outlet
- End of Model (if different than outlet)
- Grassy slope
- Ditch/Channel
- StormSewer
- National Wetland Inventory

Watershed Priority

- Sufficient Treatment
- Target Watershed
- City Limits

N

0 900 Feet

1 inch =900 feet

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B. Watershed 2

Watershed 2 produces runoff from the Liberty Drive NE medium density residential neighborhood and outlets directly to an NWI wetland to the west (Figure 4). The wetland overflows to the roadside ditch north of Highway 71 NE. There is no existing treatment performed at this site. The total existing pollutant outflow to the wetland is 832 lbs of TSS and 2.7 lbs of TP.

Table 4: Blackduck Watershed 2 Retrofit BMP Annual Performance and Value

Blackduck Watershed 2	Pollutant Removal Relative to Discharge Point				
Alternative	TSS		TP		Size Assumptions
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	HSG D – Soils unsuitable for infiltration				
Infiltration Basin	HSG D – Soils unsuitable for infiltration				
Forebay	Insufficient space – outlet is too close to wetland				
SAFL Baffle	53%	437	10%	0.3	

	Design & Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
SAFL Baffle	$69,000	$1,890	N/A	$103,761	$7.92	$12,810

Assumes:

1. City owns and operates all facilities and is responsible for all maintenance expenses.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.

C. Watersheds 6-8

Watershed 6 is the largest target watershed in Blackduck, capturing the majority of runoff from downtown and discharging to a channel in Blackduck Wayside Rest Park. The channel starts at the southwest corner of Railroad Avenue SW and Summit Avenue W and runs south to a culvert under Cedar Avenue. Cedar Avenue is a dirt road that is lightly trafficked. The channel then flows west under Frontage Road to connect to a State Highway 71 drainage ditch that flows into Coburn Creek. The three watershed system was modeled in P8 until the crossing under Frontage Road and the watersheds from the park were directed to corresponding reaches of the channel (Watersheds 7 and 8). The P8 model estimated that the existing channel system removes 57% of annual TSS loading. To be consistent with the study assumptions, that should mean the watershed has sufficient treatment and would not be analyzed for BMP retrofits; however, because Blackduck Lake has a nutrient impairment and the existing TP removal efficiency is less than 50%, BMP alternatives were still considered at the site. With the existing channel system, the existing pollutant outflow at the discharge point (culvert under Frontage Road) is 6,813 lbs of TSS and 39.3 lbs of TP annually.

Because the existing drainageway runs through a park, there is available land and City right-of-way to construct a retention pond. Soils are expected to be poor for infiltration, so a retention pond was considered at this site. The pond was placed in Watershed 8 because topography and proximity to the roadway would make a pond difficult to construct in Watershed 7. Options for a forebay and underground device were evaluated at the outlet of Watershed 3 (Figure 4).

Table 5: Blackduck Watersheds 6, 7, and 8 Retrofit BMP Annual Performance and Value

Blackduck Watersheds 6-8	Pollutant Removal Relative to Discharge Point				
Alternative	TSS		TP		Size Assumptions
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	57%	9,095	23%	11.9	
Raingardens	HSG D – Soils unsuitable for infiltration				
Forebay	6%	377	3%	1.3	Surface area of 0.05 acres and depth of 3 ft
Retention Pond	58%	3,951	44%	17.3	Total surface area of 0.75 acres and depth of 3 ft
HDS	53%	3,635	15%	5.7	

	Design & Construction Cost	Maintenance Cost (30-yr)		Present Day Value	$/lb - TSS	$/lb - TP
		Annual	Intermittent			
Forebay	$98,800	$65	$998 (3-yr)	$107,686	$9.53	$2,761
Retention Pond	$314,100	$65	$1,107 (5-yr)	$344,842	$2.91	$664
HDS	$300,000	$2,280	N/A	$341,934	$3.14	$1,983

Assumes:

1. City owns and operates all facilities and is responsible for all maintenance expenses.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.
4. Forebay
    a. Inspected annually and dredged every 3 years.
5. Retention Pond
    a. Seeding and planting completed by contractor (combination of seed mix, plugs, and 4-inch pots for grasses, sedges and forbs).
    b. Includes forebay with concrete bottom that is 10% of the total footprint.
    c. Inspected annually and forebay is dredged every 5-years.

D. Watershed 9

Watershed 9 captures a portion of runoff from primarily commercial buildings in the southern part of downtown and outlets to a ditch that flows south through an NWI wetland to Coburn Creek (Figure 4). The ditch was modeled up to the wetland and is currently performing a limited amount of treatment. With the ditch, the existing pollutant loading to the wetland is 2,316 lbs of TSS and 11.6 lbs of TP.

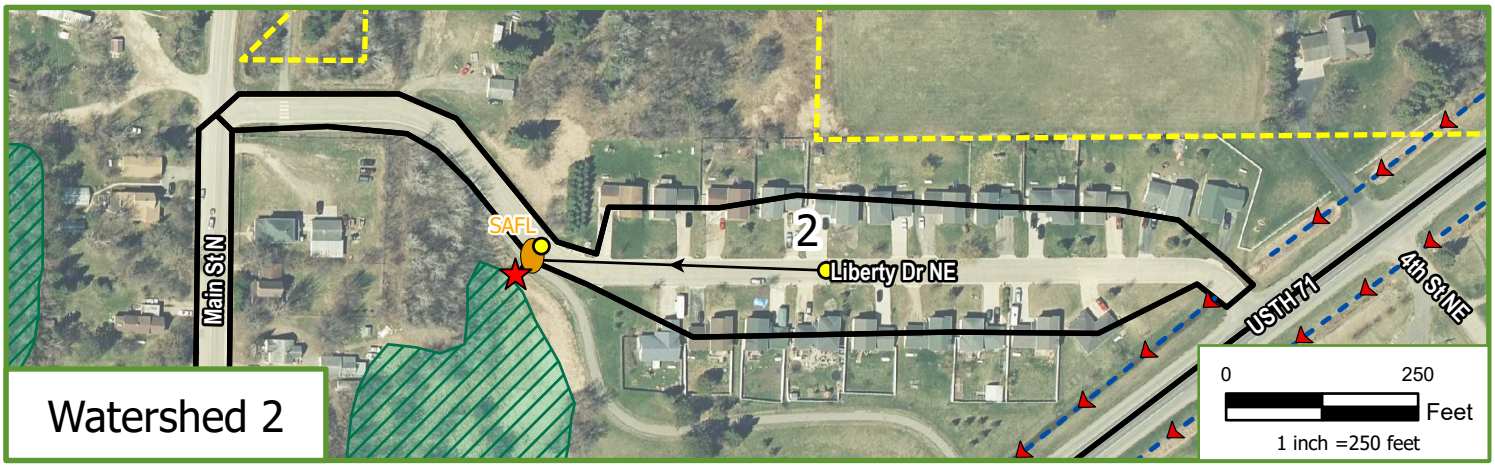
Table 6: Blackduck Watershed 9 Retrofit BMP Annual Performance and Value

Blackduck Watershed 9	Pollutant Removal Relative to Discharge Point				
Alternative	TSS		TP		Size Assumptions
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	45%	1,860	13%	1.8	
Raingardens	Steep slopes				
Infiltration Basin	HSG D – Soils unsuitable for infiltration				
Forebay	Insufficient space - landlocked by surrounding properties				
Two SAFL Baffles	50%	1,164	10%	1.2	

	Design & Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
Two SAFL Baffles	$138,000	$2,020	N/A	$172,761	$4.95	$4,964

Assumes:

1. City owns and operates all facilities and is responsible for all maintenance expenses.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.



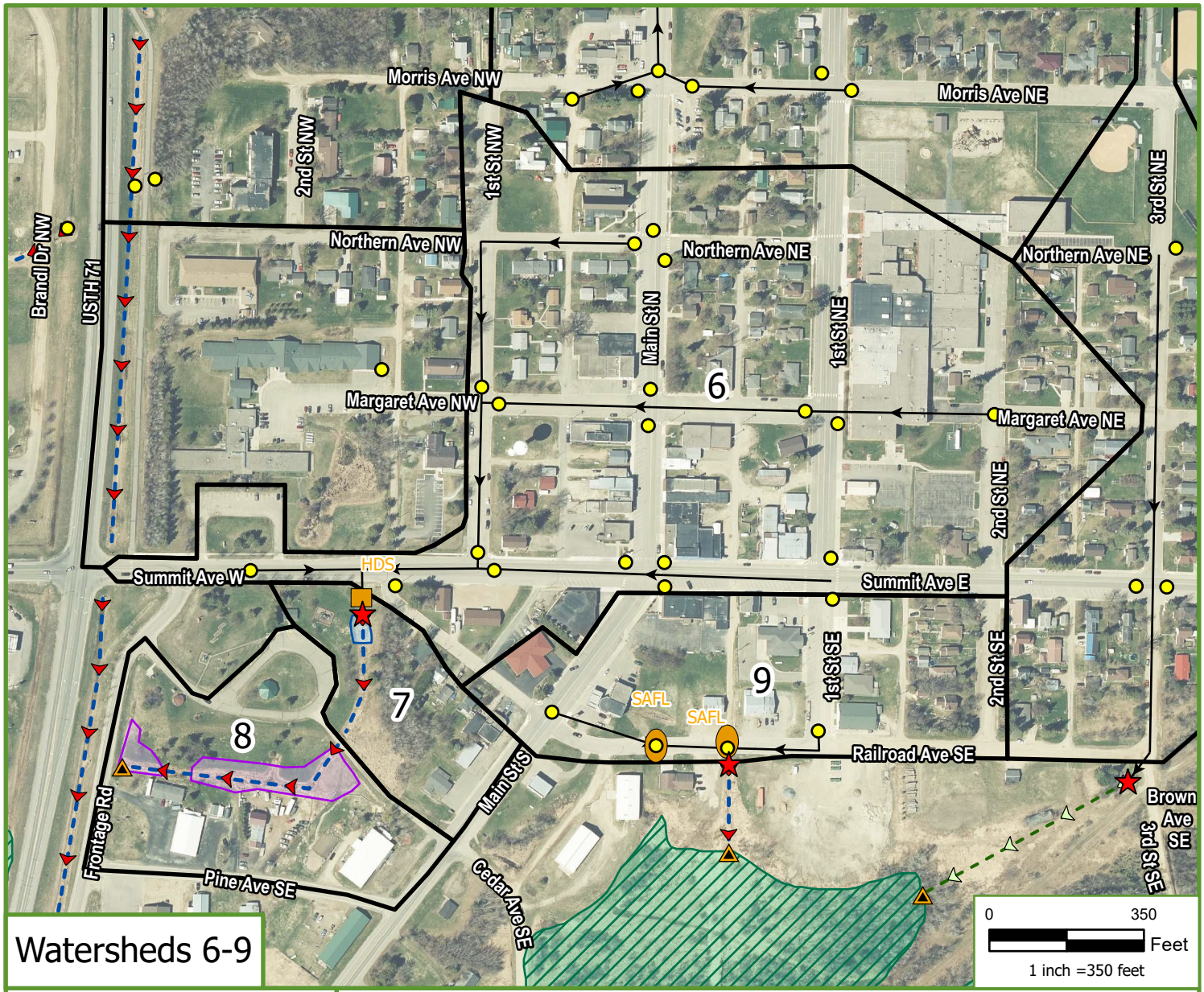


Figure 4
Blackduck BMP Alternatives

- Storm Node
- Storm Sewer Outlet
- End of Model (if different than outlet)
- Grassy slope
- Ditch/Channel
- City Limits
- Pond
- Forebay
- Underground Device
- StormSewer
- Watersheds
- National Wetland Inventory

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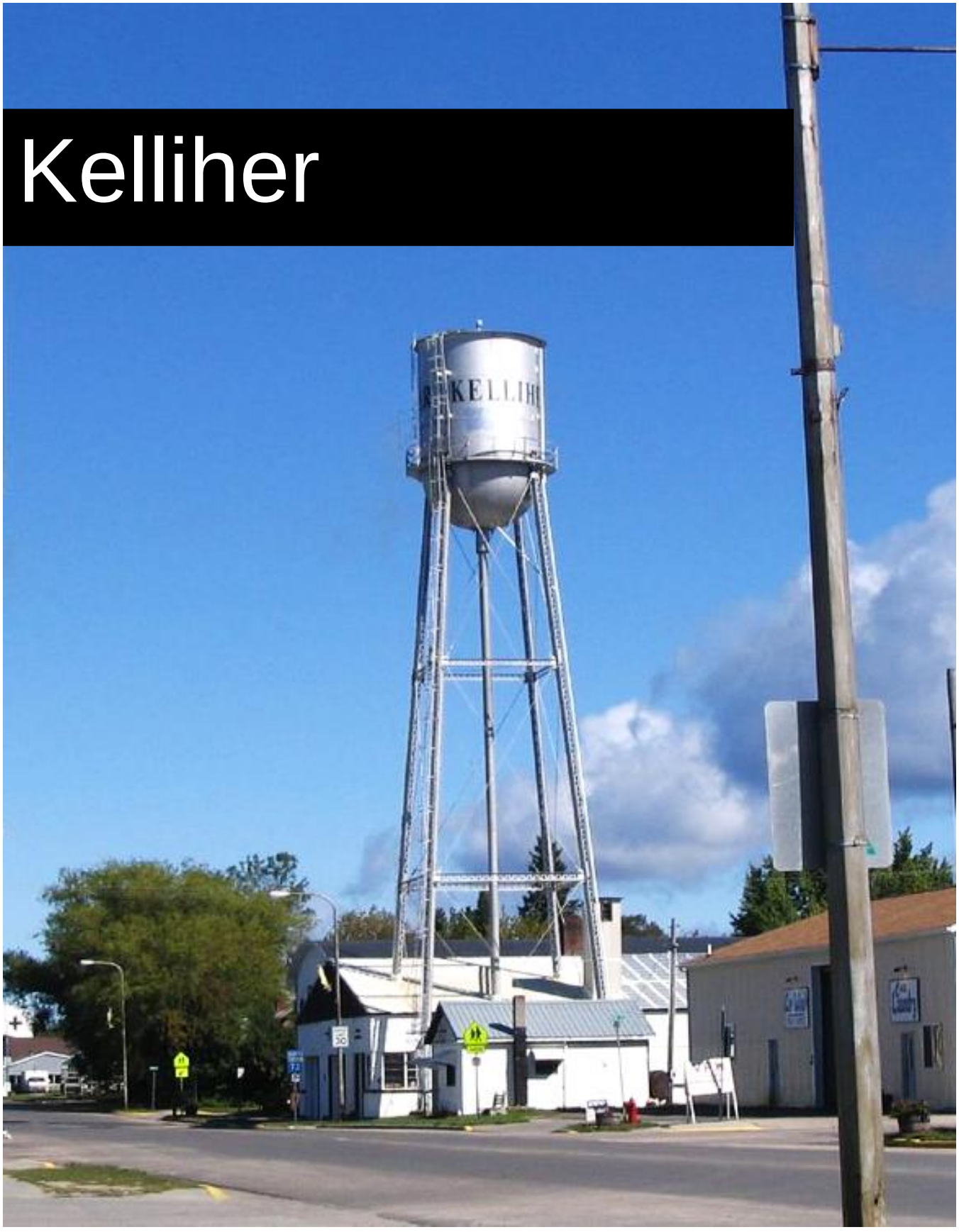
Kelliher

III. Kelliher

A. Watersheds and Drainage Patterns

Kelliher is located directly southwest of Bullhead Lake, which does not have any impairments according to the MPCA. Both runoff from the City and flow from Bullhead Lake travel through multiple wetlands to connect to the South Branch Battle River. The river runs northwest all the way to Lower Red Lake (Figure 1). Kelliher was divided into four watersheds as shown in Figure 5 and described in Table 7. Storm sewer is primarily located along Clark Avenue.

Table 7: Kelliher Existing Drainage Area Summary

Watershed Number	Runoff Area [acres]	HSG	Targeted Watershed
1	4.4	D	Yes
2	109.3	D	No
3	7.7	D	Yes
4	24.7	D	Yes

- Watershed 1: discharges to a 75-foot-long ditch NE of Clark Avenue N and 6th Street NE that flows to an NWI wetland. A culvert under Clark Avenue connects the system to a larger wetland on the east side of Clark Avenue.
- Watershed 2: drainage area to an NWI wetland east of Derwal Road NE and south of Norway Lane NW. Flow is mostly concentrated in a channel which starts west of Lakin Ave NW and runs west to the wetland.
- Watershed 3: discharges to the channel in Watershed 2.
- Watershed 4: outlets to a hillslope of an NWI wetland southwest of Clark Avenue S and Kelliher Road SW.

According to P8 modeling, Watershed 2 has an annual TSS removal efficiency above 50% and therefore was considered to have sufficient treatment.

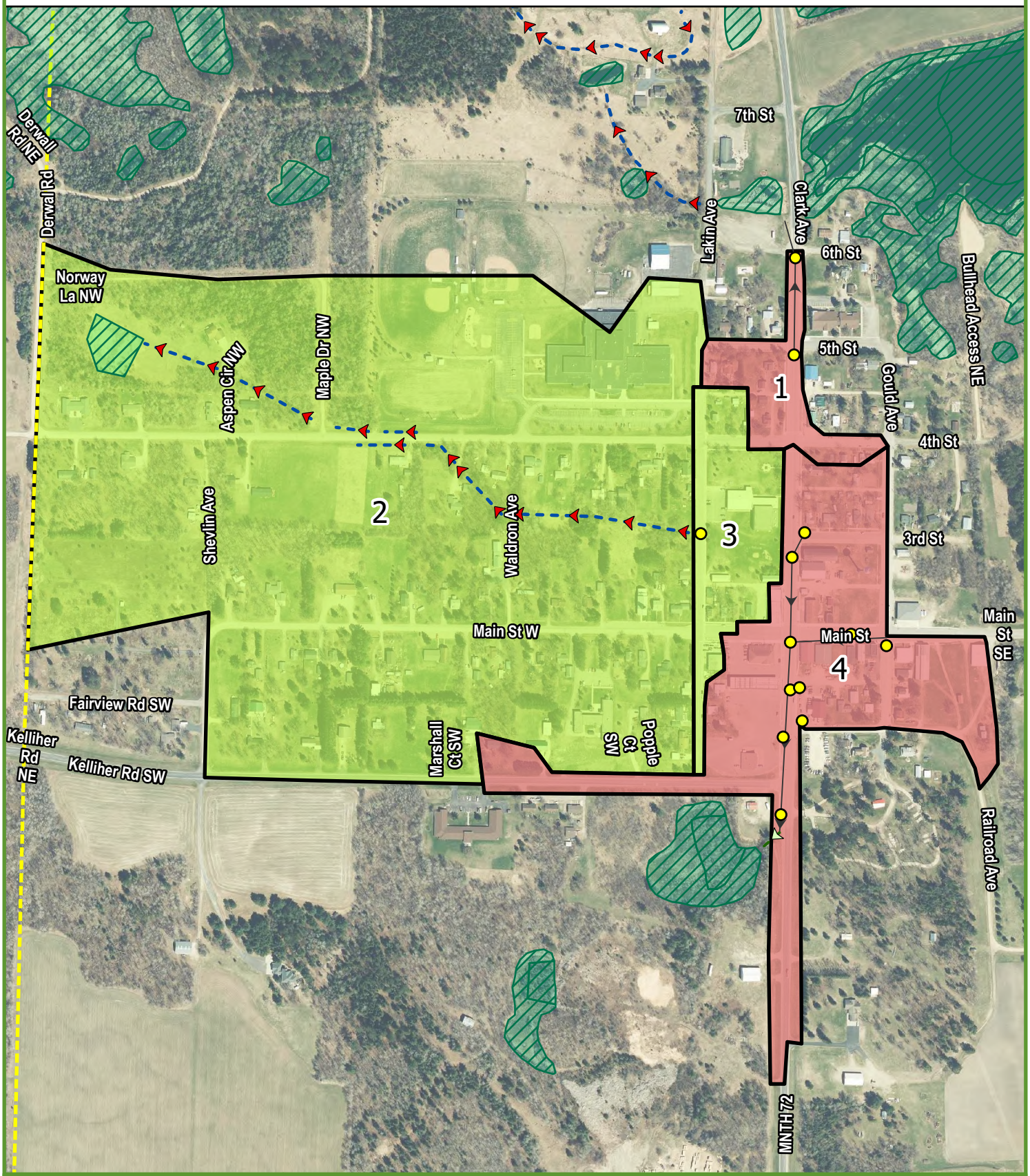

Figure 5
Kelliher Watershed Overview

- Storm Node
- Storm Sewer Outlet
- End of Model (if different than outlet)
- Grassy slope
- Ditch/Channel
- StormSewer
- National Wetland Inventory
- Sufficient Treatment
- Target Watershed
- City Limits

N

0 525 Feet

1 inch =525 feet

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B. Watershed 1

Watershed 1 is primarily comprised of low-density residential parcels. The storm sewer outlet discharges to a ditch northwest of Clark Avenue N and 6th Street and enters a small NWI wetland. The system was modeled to this point (Figure 6). With the ditch treatment, the existing pollutant loading to the wetland is 400 lbs of TSS and 2.0 lbs of TP.

Table 8: Kelliher Watershed 1 Retrofit BMP Annual Performance and Value

Kelliher Watershed 1	Pollutant Removal Relative to Discharge Point				
Alternative	TSS		TP		Size Assumptions
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	HSG D – Soils unsuitable for infiltration				
Water Quality Basin	Soils unsuitable for infiltration basin (HSG D) and already discharges into a pond				
Forebay	79%	563	65%	1.5	Surface area of 0.07 acres and depth of 1.5 ft
Two SAFL Baffles	60%	428	15%	0.3	

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
Forebay	$114,450	$65	$790 (3-yr)	$120,321	$7.12	$2,674
Two SAFL Baffles	$138,000	$2,020	N/A	$172,761	$13.46	$16,692

Assumes:

1. City owns and operates all facilities and is responsible for all maintenance expenses.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.
4. Forebay
    a. Inspected annually and dredged every 3 years.

C. Watershed 4

Watershed 4 is the largest watershed with a storm sewer network in downtown Kelliher and is primarily made up of commercial land use. The trunkline runs south from 3rd Street along Clark Avenue S and outlets south of The Road Runner Drive Inn to an NWI wetland (Figure 6). The system was modeled to the end of the outlet pipe. The existing pollutant loading from the watershed is 10,056 lbs TSS and 32.4 lbs TP.

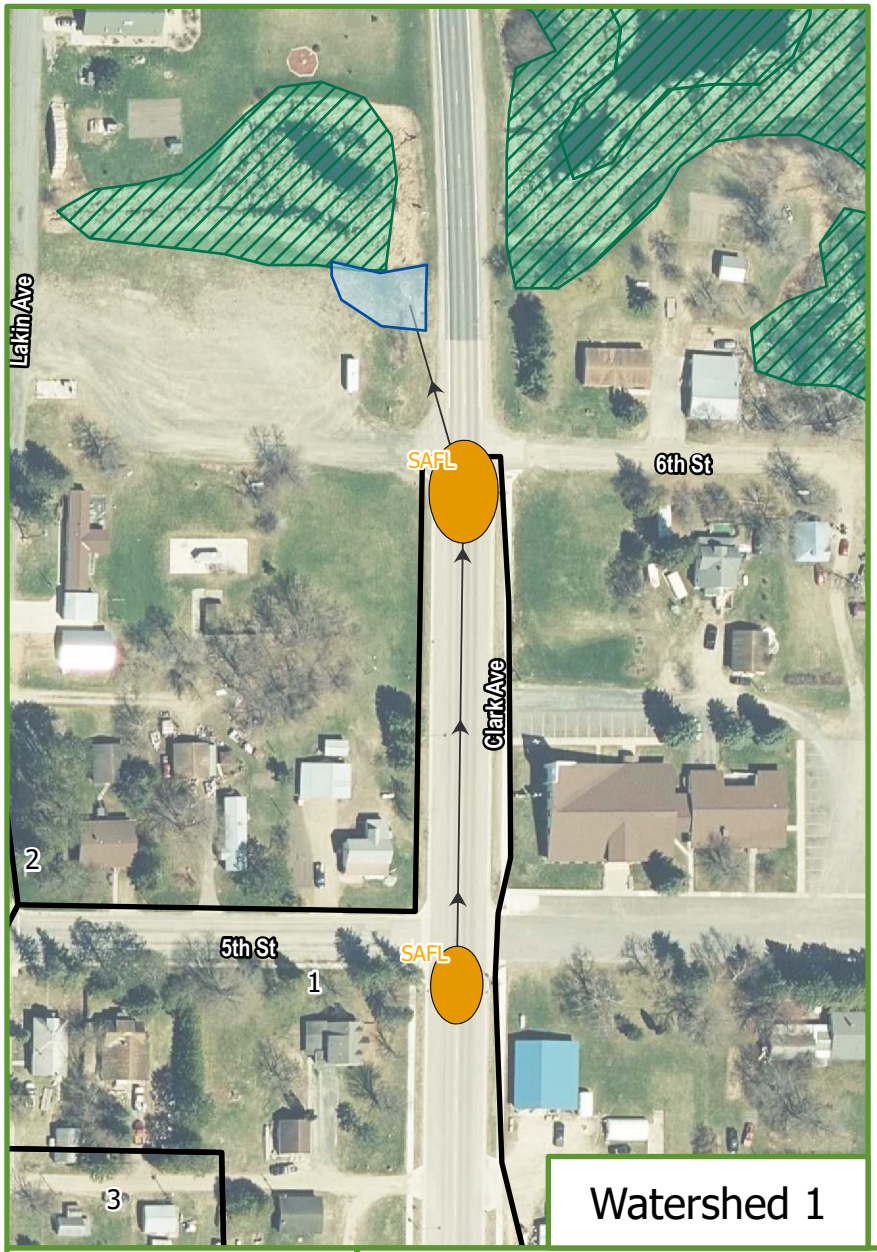
Table 9: Kelliher Watershed 4 Retrofit BMP Annual Performance and Value

Kelliher Watershed 4	Pollutant Removal Relative to Discharge Point				
	TSS		TP		Size Assumptions
Alternative	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	27%	2755	5%	1.7	
Raingardens	HSG D – Soils unsuitable for infiltration				
Water Quality Basin	Insufficient space – outlet is too close to wetland				
Forebay					
HDS	72%	5,315	16%	4.8	

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
HDS	$300,000	$2,280	N/A	$341,934	$2.14	$2,375

Assumes:

1. City owns and operates all facilities and is responsible for all maintenance expenses.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.



Watershed 1

Watershed 4

Figure 6 Kelliher BMP Alternatives

- Storm Node
- Storm Sewer Outlet
- End of Model (if different than outlet)
- Grassy slope
- Ditch/Channel
- StormSewer
- National Wetland Inventory
- Watersheds
- City Limits
- Forebay
- Underground Device

N

0 75 150 Feet

1 inch =150 feet

BELTRAMI SOIL & WATER SWCD CONSERVATION DISTRICT

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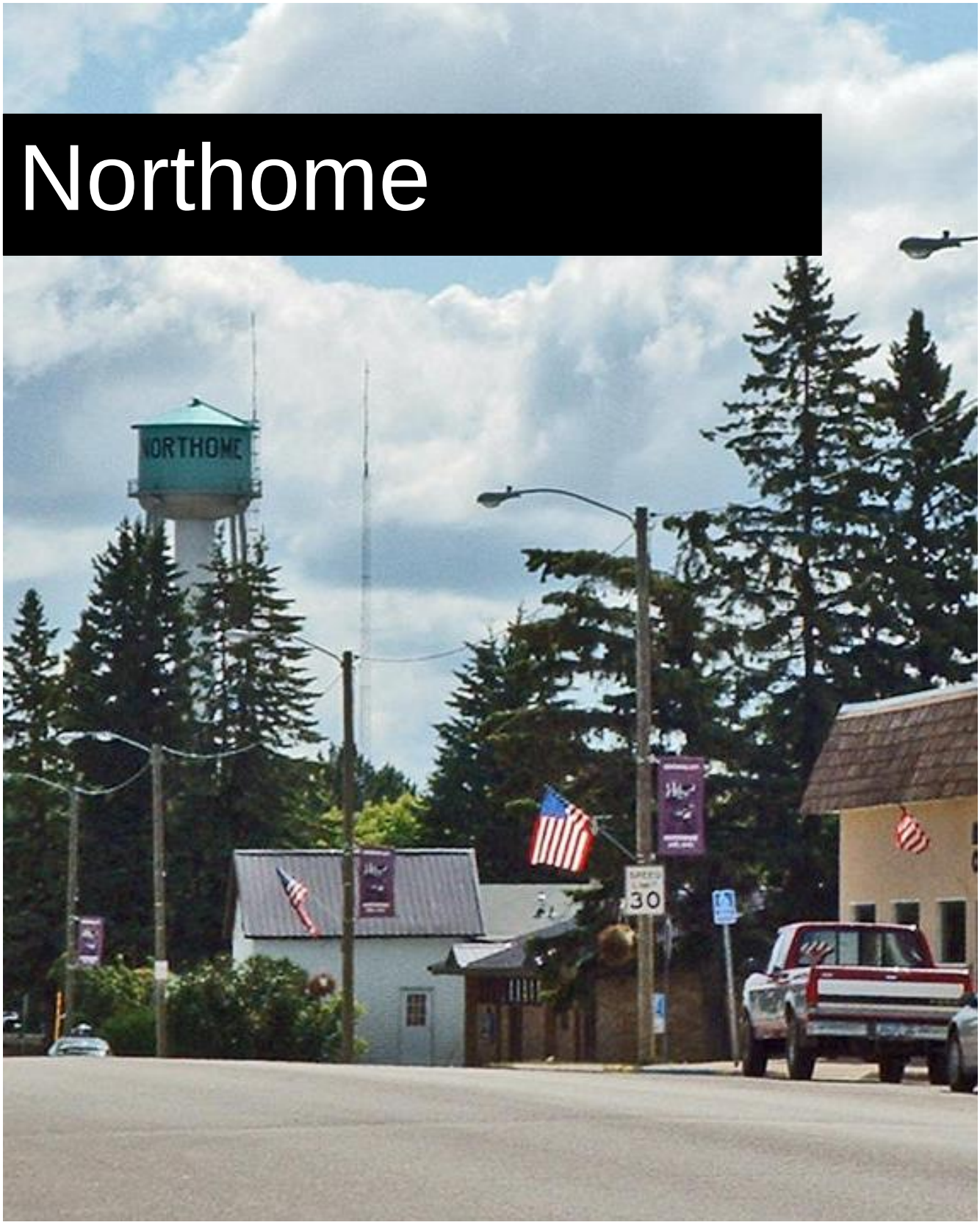
Northome



IV. Northome

A. Watersheds and Drainage Patterns

The main developed area of Northome is located to the southwest of Bartlett Lake, which has a nutrient impairment according to the MPCA.

TH 1 (Main Street) pavement and storm sewer were reconstructed in 2019. This area is represented by Watershed 4 in Figure 7. The storm sewer outlet is located approximately 600 feet east of the intersection of TH 1 and 5th Street and discharges to a ditch that flows north to Bartlett Lake. Watershed 4 was assumed to have sufficient treatment because the outlet manhole has a sump depth of five feet.

MnDOT has plans to reconstruct TH 46 (2nd Street) between Jones Street and Minnesota Street, including upgrades to the storm sewer system. Concept plans for these improvements are included in Appendix B. Watersheds 1, 2, 3, and 5 have been updated to reflect the anticipated future conditions. All watersheds are summarized in Table 10 and displayed in Figure 7.

Table 10: Northome Existing and Future Drainage Area Summary

Watershed Number	Runoff Area [acres]	HSG	Targeted Watershed
1	0.7	D	Yes
2	7.1	D	Yes
3	7.6	D	Yes
4	3.6	D	No
5	5.0	D	No
6	11.6	D	Yes
7	0.6	D	Yes
8	4.0	D	No

- Watersheds 1, 2, & 3: storm sewer will be connected when road improvements are constructed. The storm sewer discharges to Bartlett Lake north of Lake Street and 5th Street.
- Watershed 4: storm sewer outlet is located approximately 600 feet east of the intersection of TH 1 and 5th Street and discharges to a ditch that flows north to Bartlett Lake.
- Watershed 5: future storm sewer will outlet south of Front Street, either on the west or east side of 2nd Street.
- Watershed 6: discharges directly to NWI wetlands east of 3rd Street.
- Watershed 7: storm sewer catch basins discharge directly to NWI wetlands located east of 1st Street and Cathleen Street.
- Watershed 8: storm sewer catch basins discharge to a 175-foot long ditch that flows west to NWI wetland. The ditch provides sufficient treatment (over 50% annual TSS removal).

Watershed 5 is planned to outlet to grassed low-lying areas, which is estimated by P8 to provide sufficient treatment. Additionally, based on the recent TH1 project it is possible that MnDOT will place a sumped manhole at the outlet of the new storm sewer system, which would provide further treatment.

Watershed 8 was modeled in P8 and had an annual TSS removal efficiency over 50% and therefore was considered to have sufficient treatment. Watersheds 1-3, 6 and 7 were evaluated for possible BMP retrofits.

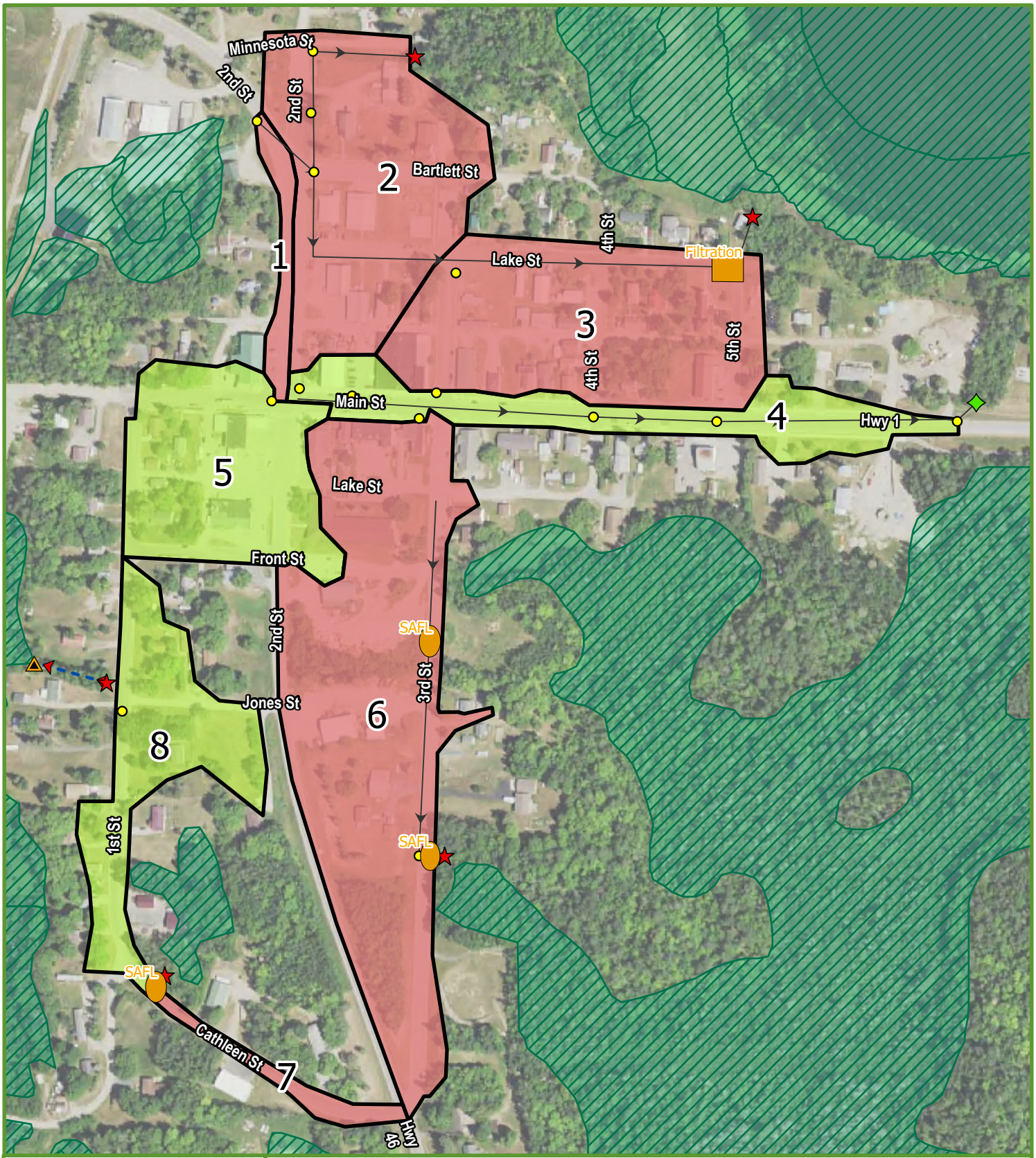


Figure 7 Northome Watershed Overview and BMP Alternatives

- Storm Node
- Outfall
- Sumped MH Outfall
- End of Model (if different than Outlet)
- Storm Sewer
- Ditch/Channel
- Underground Device
- National Wetland Inventory

Watershed Priority

- Sufficient Treatment
- Target Watershed

N

0 325 Feet

1 inch =325 feet

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B. Watersheds 1-3

When TH 46 is reconstructed, updated storm sewer north of TH 1 will connect to the existing 12-inch trunkline along Lake Street, which outlets to Bartlett Lake north of the intersection with 5th Street. Runoff from Watersheds 1, 2, and 3 will flow to that outlet. Land use in the watersheds is a mix of commercial and residential. The system was modeled to the end of the outlet pipe (Figure 7). Steep slopes in all three watersheds make raingardens infeasible.

Because Barlett Lake has a nutrient impairment, an underground filter device was evaluated instead of an HDS. A filter device is more effective at treating TP than an HDS, which primarily treats TSS. It should be noted that the outlet is next to a historic jailhouse, which may present construction challenges for an underground device in the green space.

Table 11: Northome Watersheds 1-3 Retrofit BMP Annual Performance and Value

Northome Watersheds 1-3	Pollutant Removal Relative to Discharge Point				
	TSS		TP		Size Assumptions
Alternative	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	Steep slopes & HSG D – Soils unsuitable for infiltration				
Water Quality Basin	Soils unsuitable for infiltration basin (HSG D) and insufficient space for retention pond				
Forebay	Insufficient space – outlet is too close to wetland				
Underground Filter Device	80%	4,344	60%	10.5	

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
Underground Filter Device	$318,000	$3,060	$6,000 (4-yr)	$385,837	$2.96	$1,225

Assumes:

1. City owns and operates all facilities and is responsible for all maintenance expenses.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.
4. Underground Filter Device
    a. Includes a 72” SAFL Baffle as pretreatment to the underground filter device.
    b. Filters should be removed and cleaned annually.
    c. Filters should be replaced every 3-5 years.
    d. A vactor truck is used annually to remove sediment from both devices.

C. Watershed 6

Watershed 6 is comprised of mostly low-density residential land use with storm sewer along 3rd Street. The storm sewer outlets directly to an NWI wetland east of 3rd Street without treatment. The system was modeled to the end of the outlet pipe. The existing pollutant loading from the watershed is 3,592 lbs TSS and 11.6 lbs TP.

Table 12: Northome Watershed 6 Retrofit BMP Annual Performance and Value

Northome Watershed 6	Pollutant Removal Relative to Discharge Point				
	TSS		TP		Size Assumptions
Alternative	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	Steep slopes & HSG D – Soils unsuitable for infiltration				
Water Quality Basin					
Forebay	Insufficient space – outlet is too close to wetland				
Two SAFL Baffles	60%	2,156	15%	1.7	SAFL Baffle or similar

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
Two SAFL Baffles	$138,000	$1,890	N/A	$172,761	$2.67	$3,310

Assumes:

1. City owns and operates all facilities and is responsible for all maintenance expenses.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.

D. Watershed 7

Watershed 7 primarily represents Cathleen Street (Figure 7). The low-density residential area developed along the road is sloped away from the roadway. Catch basins on Cathleen Street discharge directly to an NWI wetland. Overflow from the wetland discharges to the southeast corner of the intersection of 1st Street and Jones Street. Based on P8 modeling, the annual pollutant loading from the watershed is 412 lbs TSS and 1.3 lbs TP.

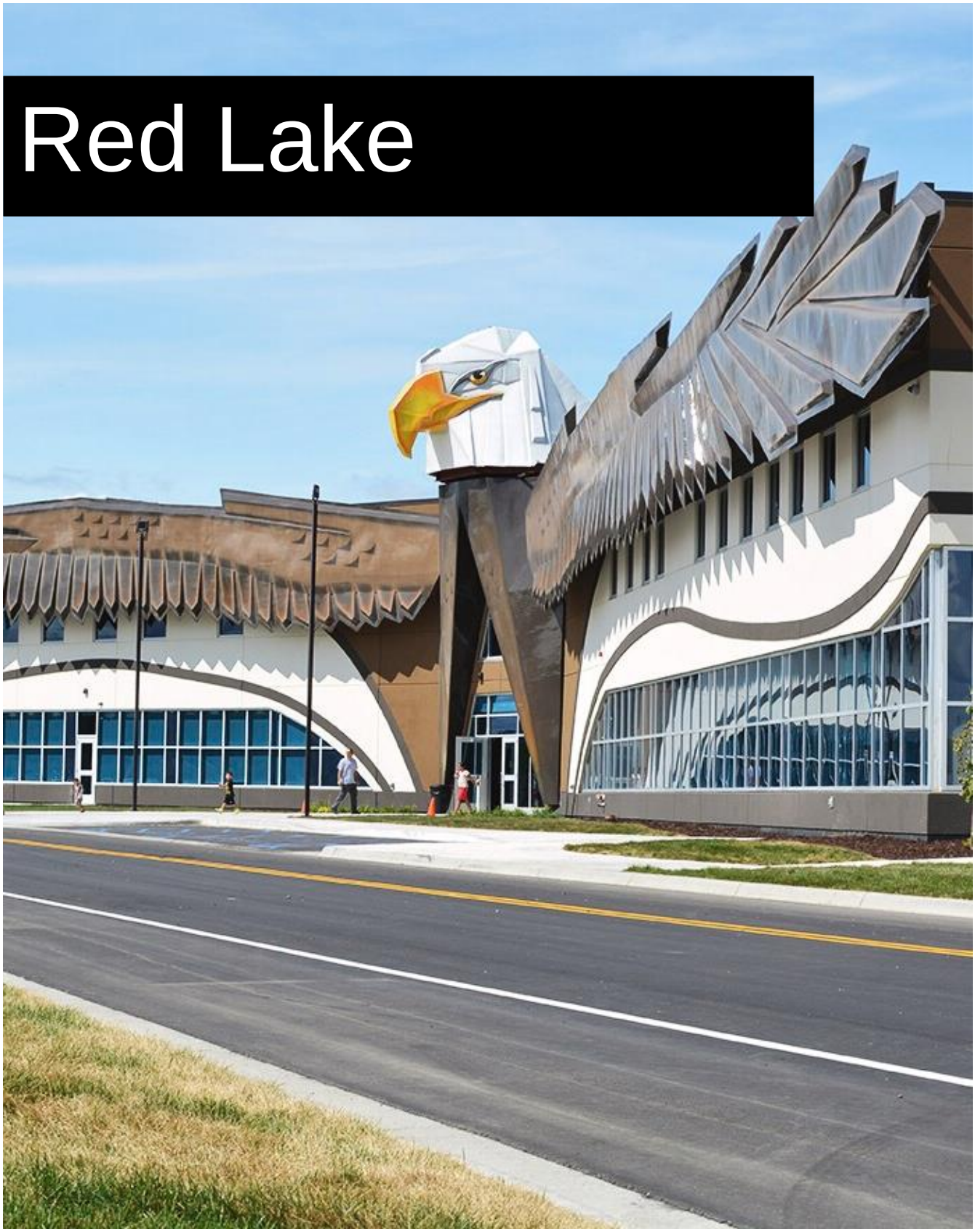
Table 13: Northome Watershed 7 Retrofit BMP Annual Performance and Value

Northome Watershed 7	Pollutant Removal Relative to Discharge Point				
	TSS		TP		Size Assumptions
Alternative	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	HSG D – Soils unsuitable for infiltration				
Water Quality Basin	Insufficient space – outlet is too close to wetland				
Forebay					
SAFL Baffle	78%	321	20%	0.3	SAFL Baffle or similar

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
SAFL Baffle	$69,000	$1,890	N/A	$103,761	$10.76	$13,303

Assumes:

1. City owns and operates all facilities and is responsible for all maintenance expenses.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.


Red Lake

V. Red Lake

A. Watersheds and Drainage Patterns

The Red Lake community is the largest of those evaluated in this study. It is located along the southern shoreline of Lower Red Lake. Pike Creek runs through the center of the community and outlets to Lower Red Lake. The creek is impaired for TSS, dissolved oxygen, and benthic macroinvertebrates bioassessments according to the MPCA. Most of the community has drainage ditches which are routed to small lakes and wetlands. The focus of this analysis was on the developed areas near Lower Red Lake with storm sewer systems. Seven major watersheds were identified and outlined in Table 14 and Figure 8.

Table 14: Red Lake Existing Drainage Area Summary

Watershed Number	Runoff Area [acres]	HSG	Targeted Watershed
1	49.4	B & D	No
2	35.0	B & D	No
3	18.7	B & D	Yes
4	28.6	A & B	Yes
5	32.1	A & D	No
6	46.1	A & D	No
7	34.7	A & D	Yes

- Watershed 1: small drainage swale outlets to Lower Red Lake.
- Watershed 2: storm sewer from parking lot outlets to Lower Red Lake. Residential neighborhood runoff flows overland to Lower Red Lake.
- Watershed 3: storm sewer discharges directly to the lake north of Pike Creek Avenue N. The northernmost end of Pine Creek Avenue N was recently reconstructed to be a turnaround point, and Red Lake Family & Children Services was constructed to the east.
- Watershed 4: storm sewer discharges to the Pike Creek floodplain. Exact location unknown.
- Watershed 5: storm sewer is assumed to be directed to a stormwater basin east of the high school.
- Watershed 6: storm sewer is directed to stormwater basins designed at time of construction.
- Watershed 7: storm sewer discharges directly to an NWI wetland located northeast of North Street and Norway Drive.

The Red Lake Police Department is located in Watershed 1 and Red Lake Hospital is located in Watershed 2. Because both were recently developed, it was assumed that both have existing treatment. The residential neighborhood in Watershed 1 does not have storm sewer and has no constructible location for an effective BMP. The residential portion of Watershed 2 does have curb and gutter; however, runoff discharges through a residential property and does not connect to the storm sewer in Watershed 3.

No data was available for the stormwater basins in Watersheds 5 and 6. Because Watersheds 5 and 6 have stormwater basins, they are assumed to receive sufficient water quality treatment.

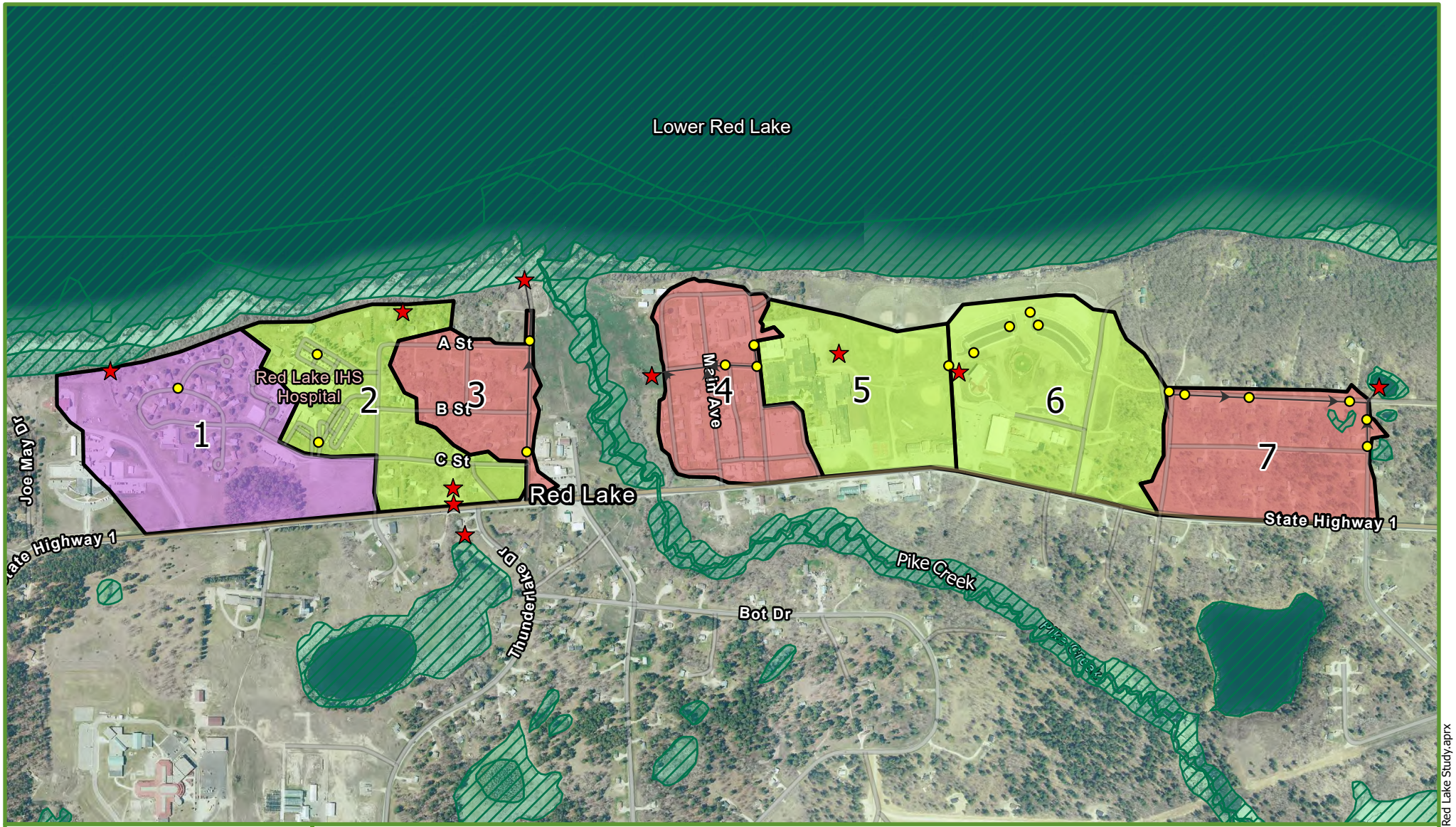


Figure 8
Red Lake Watershed Overview

- Storm Node
- Outfall
- StormSewer
- National Wetland Inventory

Watershed Priority

- Sufficient Treatment
- Target Watershed
- Treatment Infeasible

N

0 500 1,000 Feet

1 inch = 1,000 feet

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B. Watershed 3

Watershed 3 is primarily residential with dirt driveways. Red Lake Family and Children Services was recently built along Pike Creek Ave N near the lake and the north end of Pike Creek Ave N was reconstructed (Figure 9). Raingarden placement in this watershed was restricted due to steep slopes along Lussier Road, Pike Creek Avenue, and A Street. No raingardens were placed in areas with HSG D soil. The existing loading from this watershed is estimated to be 9,997 lbs of TSS and 32.7 lbs of TP.

Table 15: Red Lake Watershed 3 Retrofit BMP Annual Performance and Value

Red Lake Watershed 3	Pollutant Removal Relative to Discharge Point				
Alternative	TSS		TP		Size Assumptions
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	58%	1,283	38%	2.8	6 raingardens, 150 ft^2 and 1 ft deep
Water Quality Basin	Constructability concerns				
Forebay	Insufficient space – outlet is too close to lake/wetland				
HDS	80%	1,478	20%	1.2	

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
Raingardens	$73,473	$900	$3,600	$101,091	$2.62	$1,203
HDS	$300,000	$2,280	N/A	$341,934	$6.42	$7,701

Assumes:

1. City owns and operates all facilities.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.
4. Raingardens
    a. Weeds, sand, and debris removed annually and mulch reapplied every 5-years.

C. Watershed 4

Watershed 4 contains homes and office buildings, including both Red Lake DNR and Red Lake Tribal Engineering. There is storm sewer along 3rd Street NE that outlets to Pike Creek approximately 1,000 feet upstream of the creek outlet to Red Lake (Figure 9). Due to snow, the exact outlet location could not be identified during the field visit in December. Pike Creek is impaired by TSS, therefore sediment removal is the priority for this watershed. The existing annual pollutant loading from the watershed is 11,717 lbs TSS and 37.7 lbs TP.

Table 16: Red Lake Watershed 4 Retrofit BMP Annual Performance and Value

Red Lake Watershed 4	Pollutant Removal Relative to Discharge Point				
Alternative	TSS		TP		Size Assumptions
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	51%	5,923	28%	10.5	19 raingardens, 150 ft^2 and 1 ft deep
Infiltration Basin	94%	6,887	86%	20.1	Surface area of 0.21 acres and depth of 1.5 ft
Forebay	Hillside slopes are too steep				
HDS	80%	9,374	20%	7.5	

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
Raingardens	$232,666	$2,850	$11,400 (5-yr)	$320,121	$1.80	$1,016
Infiltration Basin	$139,700	$65	$1,110 (3-yr)	$147,070	$0.71	$244
HDS	$300,000	$2,280	N/A	$341,934	$1.22	$1,512

Assumes:

1. City owns and operates all facilities.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.
4. Raingardens
    a. Weeds, sand, and debris removed annually and mulched reapplied every 5-years.
5. Infiltration Basin
    a. Seeding and planting completed by contractor (seed mix).
    b. Includes forebay with concrete bottom that is 10% of the total footprint.
    c. Inspected annually and forebay is dredged every 3-years.

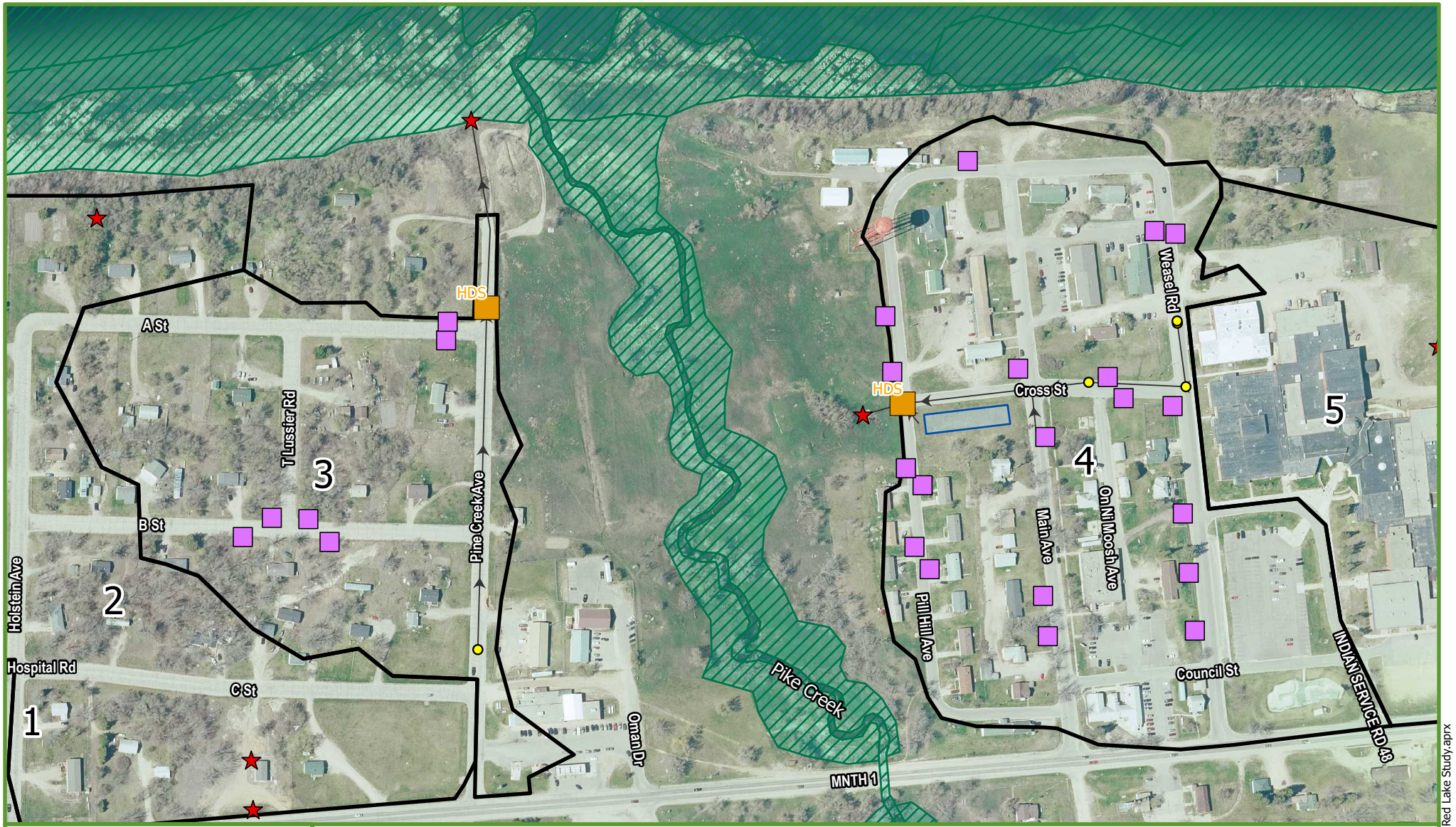

Figure 9
Red Lake
Watersheds 3 and 4
BMP Alternatives

- Storm Node
- Outfall
- StormSewer
- Raingardens
- Infiltration Basin
- Underground Device
- National Wetland Inventory
- Watersheds

N

0 325 Feet

1 inch =325 feet

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D. Watershed 7

Watershed 7 is a neighborhood with dirt driveways and curb and gutter. There is storm sewer along North Street and Norway Drive that combine where the streets intersect and outlet to an NWI wetland without treatment (Figure 10). About two-thirds of Watershed 7 is HSG D and one-third is HSG A. Raingardens were only placed where there is expected to be HSG A soil according to the NRCS Web Soil Survey. Based on P8 modeling, the pollutant loading from the watershed is 4,818 lbs TSS and 16 lbs TP.

Table 17: Red Lake Watershed 7 Retrofit BMP Annual Performance and Value

Red Lake Watershed 7	Pollutant Removal Relative to Discharge Point				
Alternative	TSS		TP		Size Assumptions
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	53%	2,555	33%	5.3	25 raingardens, 150 ft^2 and 1 ft deep
Water Quality Basin	Insufficient space – outlet is too close to wetland				
Forebay					
HDS	80%	3,268	20%	2.7	

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
Raingardens	$134,701	$1,650	$6,600 (5-yr)	$185,333	$2.42	$1,166
HDS	$300,000	$2,280	N/A	$341,934	$2.96	$3,562

Assumes:

1. City owns and operates all facilities.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.
4. Raingardens
    a. Weeds, sand, and debris removed annually and mulched reapplied every 5-years.

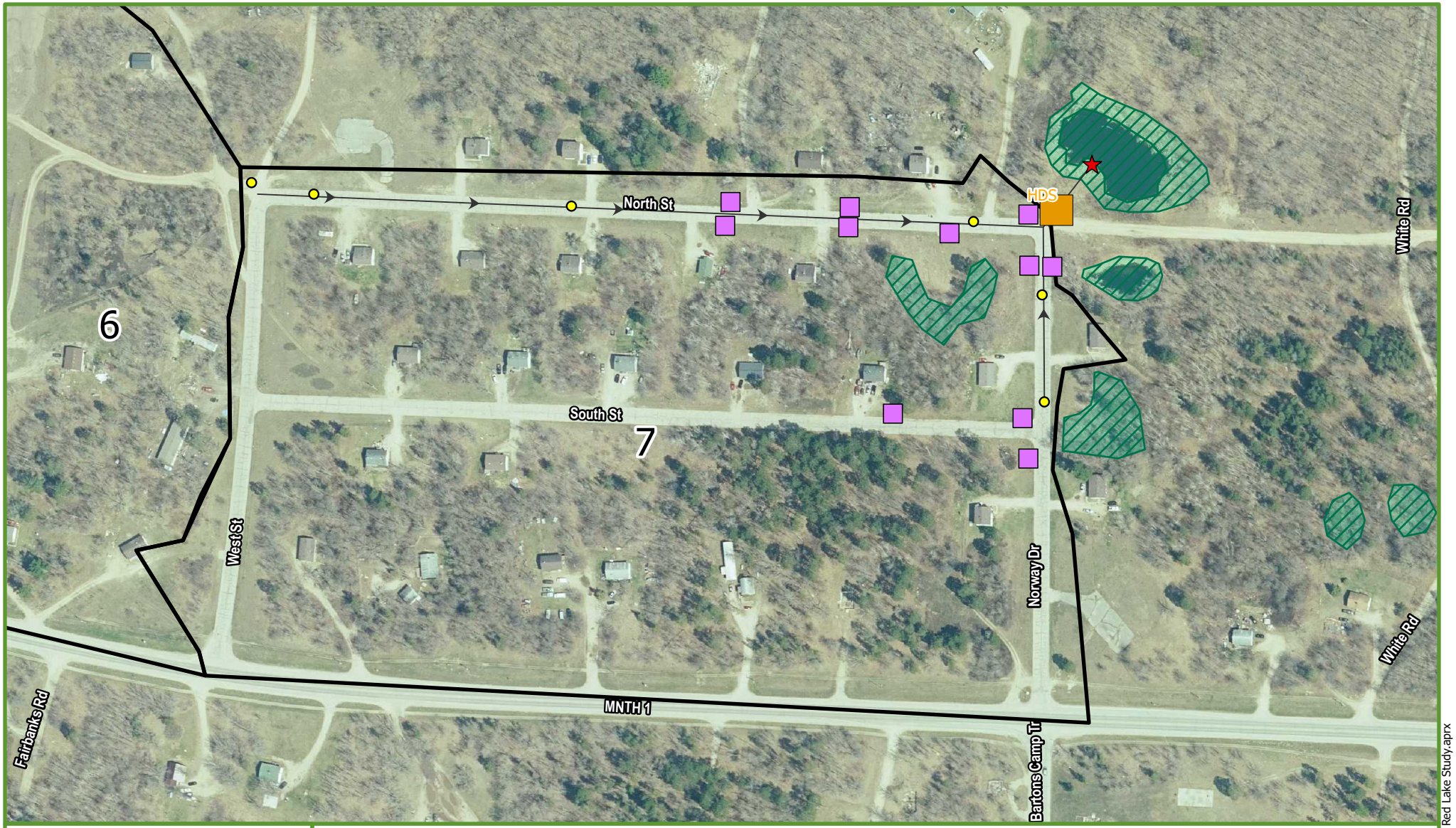

Figure 10
Red Lake Watershed 7 BMP Alternatives

- Storm Node
- Outfall
- StormSewer
- Raingardens
- Infiltration Basin
- Underground Device
- National Wetland Inventory
- Watersheds

N

0 125 250 Feet

1 inch =250 feet

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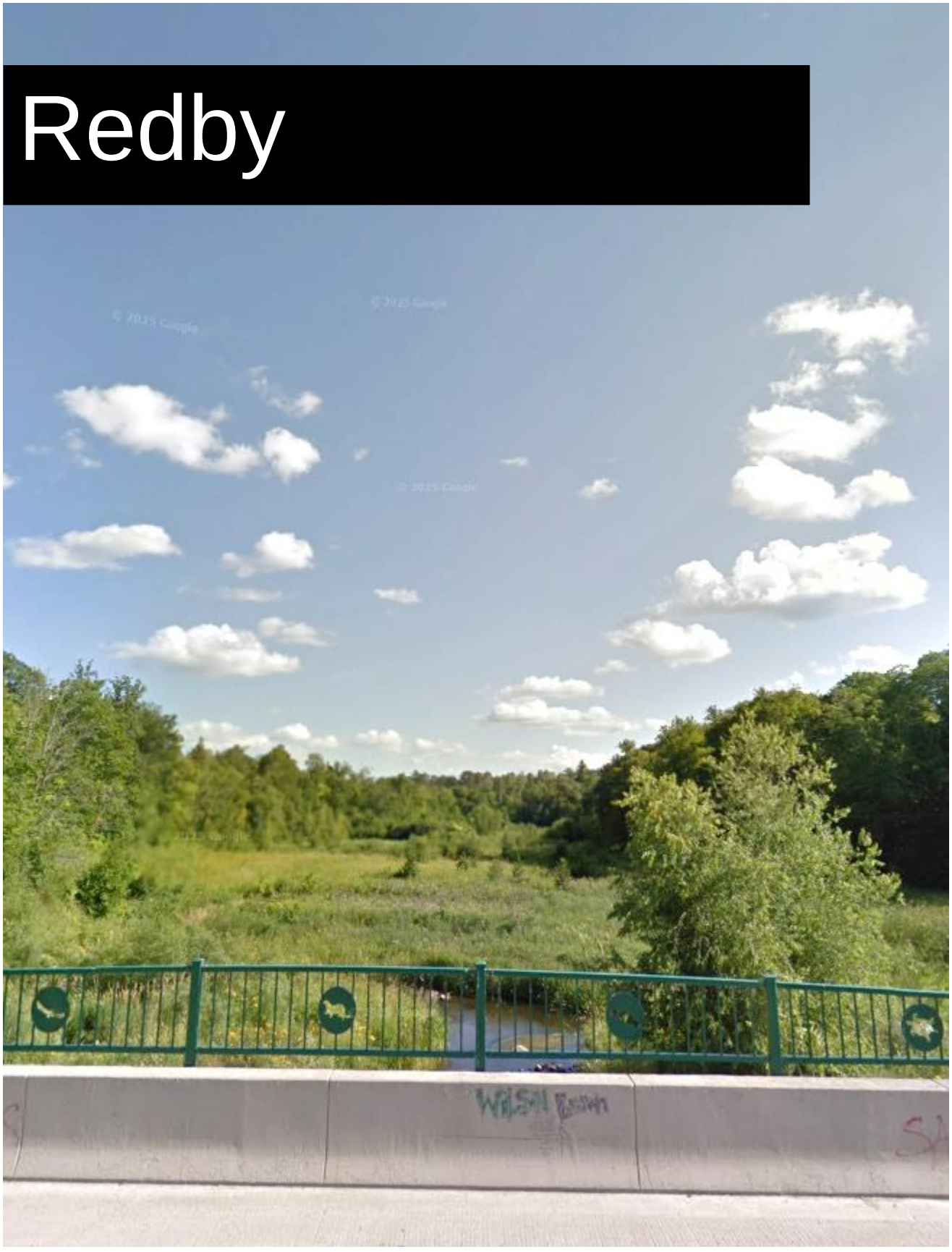
Redby

VI. Redby

A. Watersheds and Drainage Patterns

Redby is located along the southern shoreline of Lower Red Lake, east of the City of Red Lake. The most densely developed portion of Redby is primarily comprised of residential land use. Mud River is just east of downtown and has impairments of TSS and E. coli according to the MPCA. Three watersheds were delineated in areas with curb and gutter and are summarized in Table 18 and Figure 11.

Table 18: Redby Existing Drainage Area Summary

Watershed Number	Runoff Area [acres]	HSG	Targeted Watershed
1	4.9	A & B	Yes
2	18.6	A & B	No
3	71.4	A, B, & D	Yes

- Watershed 1: storm sewer trunkline runs along State Highway 1 and discharges north of Alphena Avenue to a grassy/forested area which drains to a wetland and then to Lower Red Lake.
- Watershed 2: there is a low spot at the southeast corner of State Highway 1 and Winnebago Avenue where runoff is directed to a grassy area by a concrete valley gutter. There is no direct route to storm sewer, so all runoff is contained within the watershed.
- Watershed 3: storm sewer trunkline runs along 4th Street and outlets to Mud River.

Runoff from Watershed 2 is entirely contained within the watershed and does not discharge to any NWI wetlands, therefore was not considered for any BMP retrofits.

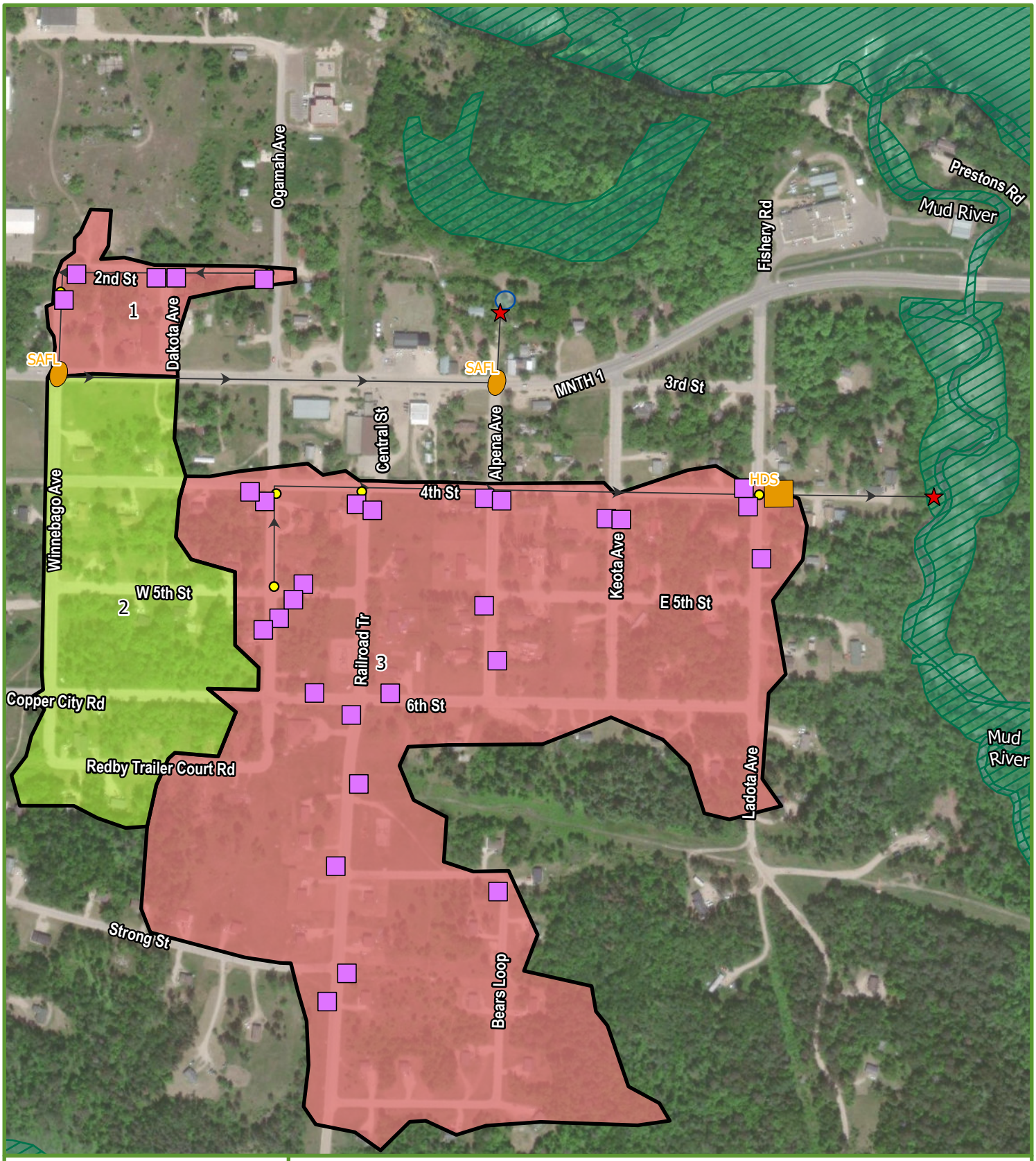

Figure 11
Redby Watershed Overview and BMP Alternatives

Storm Node
Outfall

Watershed Priority
Target Watershed
Sufficient Treatment

StormSewer
Raingardens
Infiltration Basin
Underground Device
National Wetland Inventory

N
0 150 300 450
Feet
1 inch =450 feet

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B. Watershed 1

Watershed 1 is a small residential area north of State Highway 1 with dirt driveways and paved roadways. The main storm sewer trunkline runs east along State Highway 1 and discharges north of the intersection with Alpena Avenue. Due to snow, the exact outlet location could not be identified during the field visit in December. A location was assumed based on information from Red Lake Tribal Engineering. The existing pollutant loading from this watershed is 2,104 lbs TSS and 7 lbs TP.

Table 19: Redby Watershed 1 Retrofit BMP Annual Performance and Value

Redby Watershed 1	Pollutant Removal Relative to Discharge Point				
Alternative	TSS		TP		Size Assumptions
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	88%	377	79%	1.1	15 raingardens, 150 ft^2 and 1 ft deep
Infiltration Basin	99%	421	100%	1.4	Surface area of 0.07 acres and depth of 3 ft
Forebay	Not necessary, infiltration preferred				
Two SAFL Baffles	60%	256	15%	0.2	

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
Raingardens	$61,228	$750	$3,000 (5-yr)	$84,242	$6.01	$2,160
Infiltration Basin	$48,900	$65	$788 (3-yr)	$54,764	$3.50	$1,074
Two SAFL Baffles	$138,000	$1,890	N/A	$172,761	$18.35	$22,583

Assumes:

1. Removal efficiency is the net annual removal divided by the net loading to the site.
2. City owns and operates all facilities.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.
4. Raingardens
    a. Weeds, sand, and debris removed annually and mulched reapplied every 5-years.
5. Infiltration Basin
    a. Seeding and planting completed by contractor (seed mix).
    b. Includes forebay with concrete bottom that is 10% of the total footprint.
    c. Inspected annually and forebay is dredged every 3-years.

C. Watershed 3

Watershed 3 is comprised of residential and park space in downtown Redby with dirt driveways and paved roadways. The storm sewer outlets directly to Mud River, approximately 1,500 feet upstream of Lower Red Lake. Mud River has a TSS impairment, therefore sediment removal is a priority for this watershed. Most of the watershed is HSG type A or B, but there is HSG D near 5th Street E and 6th Street. No raingardens are recommended in HSG D areas. Based on P8 modeling, the pollutant loading from this watershed is 7,959 lbs TSS and 26.5 lbs TP.

Table 20: Redby Watershed 3 Retrofit BMP Annual Performance and Value

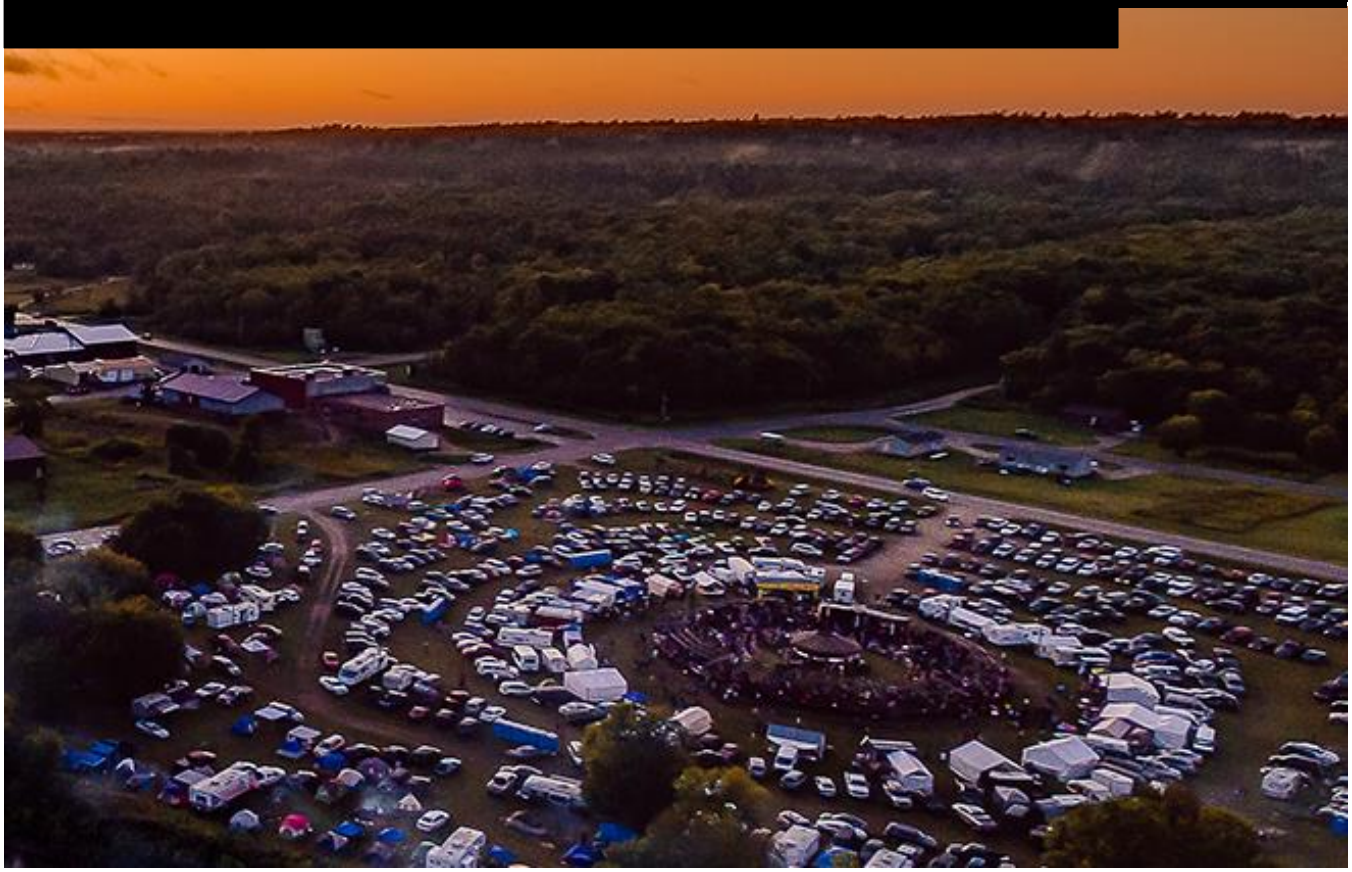
Redby Watershed 3	Pollutant Removal Relative to Discharge Point				
Alternative	TSS		TP		Size Assumptions
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	63%	4,121	43%	9.3	25 raingardens, 150 ft^2 and 1 ft deep
Water Quality Basin	No convenient location				
Forebay	Insufficient space – outlet is too close to wetland/river				
HDS	80%	5,206	20%	4.4	

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
Raingardens	$306,139	$3,750	$15,000 (5-yr)	$421,212	$2.75	$1,210
HDS	$300,000	$2,280	N/A	$341,934	$1.79	$2,151

Assumes:

1. City owns and operates all facilities.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.
4. Raingardens
    a. Weeds, sand, and debris removed annually and mulched reapplied every 5-years.

Ponemah



VII. Ponemah

A. Watersheds and Drainage Patterns

The City of Ponemah is located along the north shoreline of Lower Red Lake. The most densely developed area is between N Ponemah Road and the lakeshore, which is comprised of mostly residential land use with curb and gutter. The residential development north of N Ponemah Road is less dense and has a roadside ditch network instead of curb and gutter. It was assumed these roadside ditches provide sufficient stormwater treatment. There are also ditches alongside N Ponemah Road which feed into a channel and crosses under Lake Drive to Lower Red Lake. There are no impairments in this area according to the MPCA. Four watersheds were delineated in areas with curb and gutter and are summarized in Table 21 and Figure 12.

.

Table 21: Ponemah Existing Drainage Area Summary

Watershed Number	Runoff Area [acres]	HSG	Targeted Watershed
1	7.6	A	Yes
2	32.0	A	Yes
3	7.5	A	Yes
4	14.4	A	No

- Watersheds 1-3: storm sewer network that outlets south of Indian Service Road. Exact location unknown.
- Watershed 4: storm sewer outlets directly to a small basin.

P8 modeling of the basin in Watershed 4 estimates an existing annual TSS removal efficiency greater than 50%, therefore it was not evaluated for BMP retrofit opportunities.

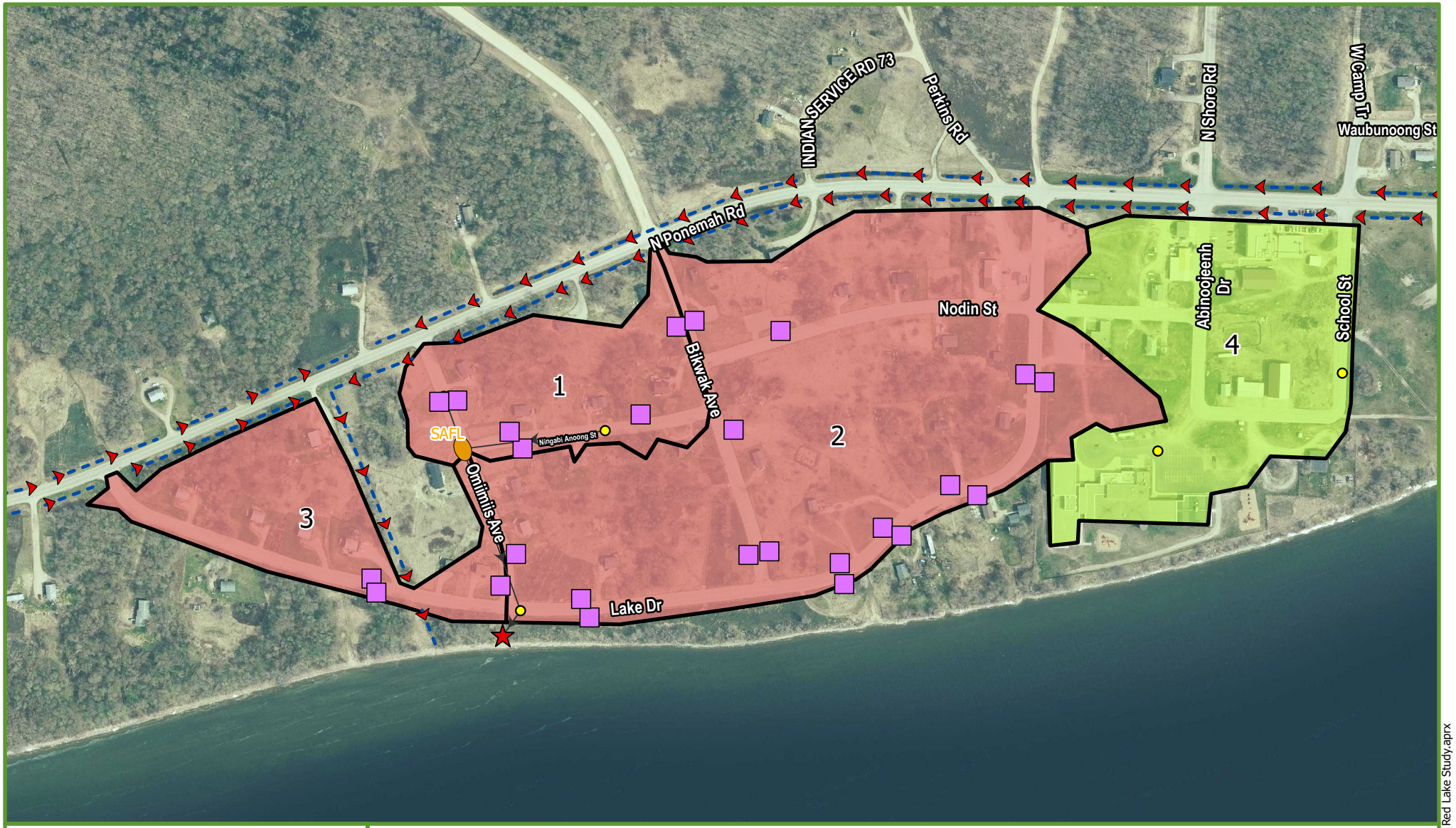


Figure 12
Ponemah Watershed Overview and BMP Alternatives

Raingardens
Grassy slope
Ditch/Channel
Storm Node
Outfall

Underground Device
StormSewer

Watershed Priority
Sufficient Treatment
Target Watershed

N
0 200 400
Feet
1 inch = 400 feet

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B. Watersheds 1-3

Watersheds 1, 2, and 3 contain low density residential lots with dirt driveways. A ditch crosses under Indian Services Road 70 that conveys the flow from N Ponemah Road roadside ditches to Lower Red Lake. It is unclear if the storm sewer for Watersheds 1, 2, and 3 discharges into this ditch or directly to Lower Red Lake. The groundwater near the storm sewer outlet is most likely too high to install an underground device based on LiDAR elevations. The most feasible location for an underground device is at the end of Watershed 1. Watershed 1 is 7.6 acres and therefore should require two SAFL Baffles, however only one was used because there is only one constructable location. The existing annual loading from Watershed 1 is 778 lbs TSS and 2.5 lbs TP, and the total existing annual loading from Watersheds 1, 2, and 3 is 6,014 lbs TSS and 19.5 lbs TP.

Table 22: Ponemah Watersheds 1-3 Retrofit BMP Annual Performance and Value

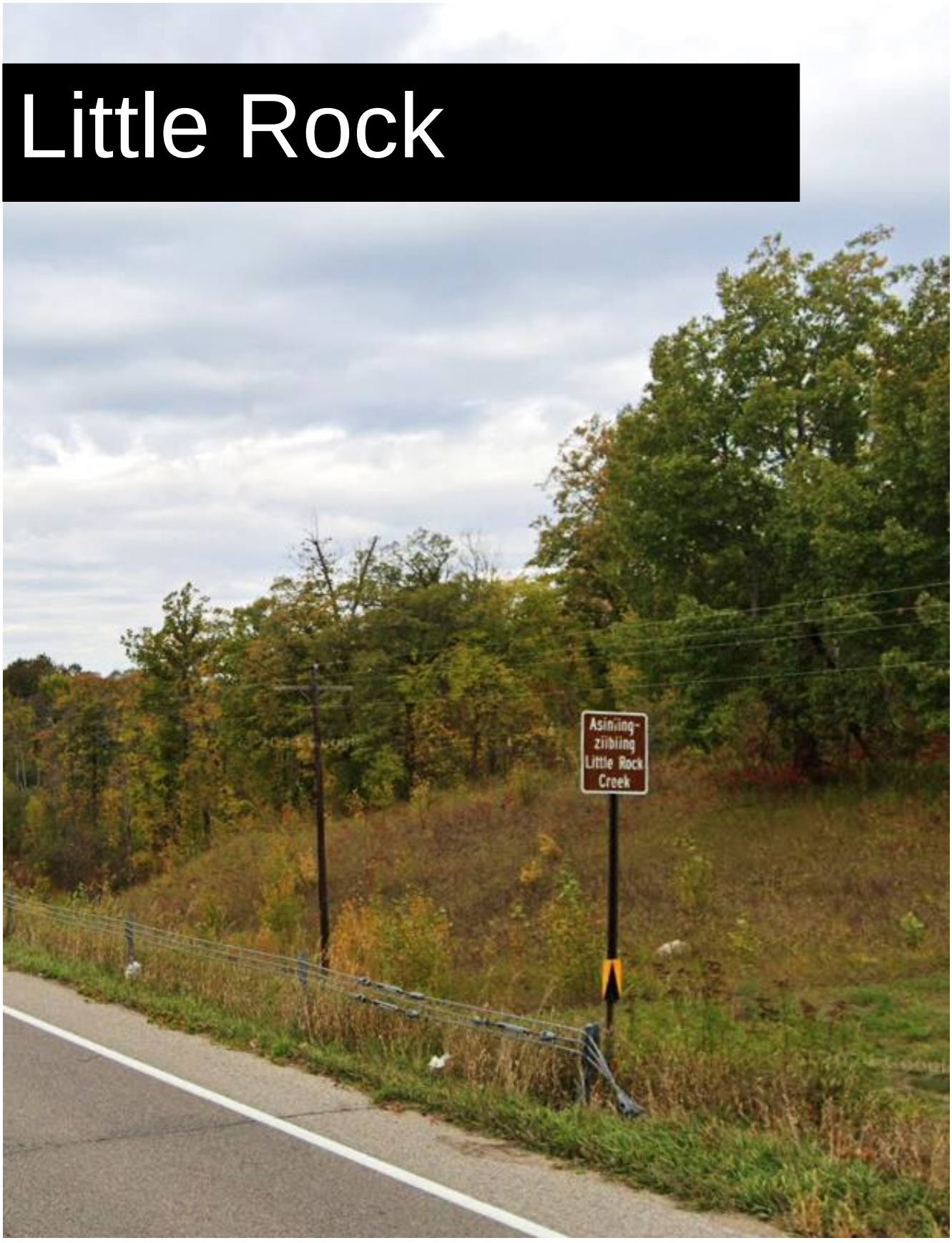
Ponemah Watersheds 1-3	Pollutant Removal Relative to Discharge Point				
Alternative	TSS		TP		Size Assumptions
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]	
Existing	No existing treatment				
Raingardens	72%	4,356	54%	10.9	25 raingardens, 150 ft^2 and 1 ft deep
Water Quality Basin	Constructability concerns				
Forebay	Insufficient space – outlet is too close to wetland/river				
SAFL Baffle	35%	350	5%	0.1	Only treats Watershed 1

	Construction Cost	Maintenance Cost		Present Day Value	$/lb-TSS	$/lb- TP
		Annual	Intermittent			
Raingardens	$306,139	$3,750	$15,000 (5-yr)	$421,212	$3.22	$1,337
SAFL Baffle	$69,000	$1,890	N/A	$103,761	$12.70	$27,670

Assumes:

1. City owns and operates all facilities.
2. Removal efficiency is the net annual removal divided by the net loading to the site.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.
4. Raingardens
    a. Weeds, sand, and debris removed annually and mulched reapplied every 5-years.

Little Rock



VIII. Little Rock

A. Watersheds and Drainage Patterns

Little Rock is located along the southern shoreline of Lower Red Lake, west of the City of Red Lake. It is the smallest community evaluated in this study. The small area of development is mostly made up of homes off State Highway 1. All drainage systems are roadside ditches and there is no curb and gutter in the community. Little Rock Creek flows south to north through Little Rock and under State Highway 1 to Lower Red Lake. It is fed by a chain of small lakes, none of which are impaired according to the MPCA. Watersheds draining to Little Rock Creek were the focus of this analysis because it is the only source of concentrated flow to Lower Red Lake. The drainage area shown in **Figure 13** was modeled in P8 and routed through the total length of its roadside ditches in order to estimate the pollutant loading to the creek. The watershed characteristics are given in Table 23 below. The existing annual loading to Little Rock Creek according to the P8 model is 1,754 lbs TSS and 10.7 lbs TP.

Table 23: Little Rock Existing Drainage Area Summary

Watershed Number	Runoff Area [acres]	HSG	Targeted Watershed
1	74.1	A & D	No

Table 24: Little Rock Watershed 1 Existing Removals

Little Rock Watershed 1	Pollutant Removal Relative to Discharge Point			
Alternative	TSS		TP	
	Removal Efficiency [%]	Annual Removal [lb/yr]	Removal Efficiency [%]	Annual Removal [lb/yr]
Existing	54%	2,072	21%	2.8

Because the existing system does not have curb and gutter, removes more than 50% of annual TSS, and does not discharge to any impaired waters, no BMPs were evaluated.

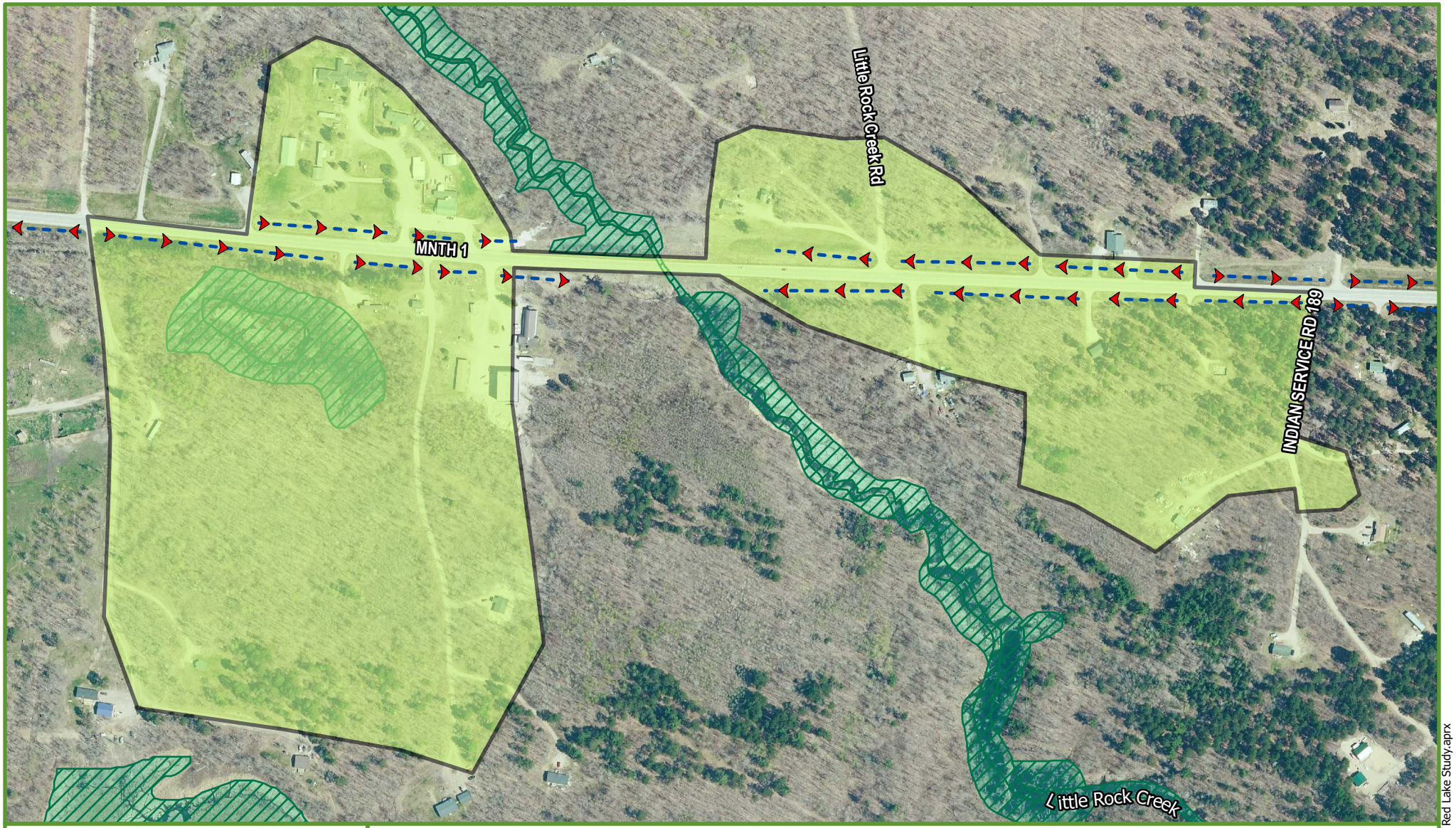


Figure 13
Little Rock Watershed Overview

Ditch/Channel
Watersheds
National Wetland Inventory

N
0 200 400
Feet
1 inch = 400 feet

BELTRAMI SOIL & WATER SWCD CONSERVATION DISTRICT

HRGreen

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IX. Non-Structural Best Management Practices

Structural best management practices are designed to treat polluted stormwater, while non-structural BMPs are practices that could prevent stormwater from becoming polluted in the first place. An identified source of pollution from Red Lake, Redby, and Ponemah is the sediment from residential gravel driveways. Residential areas in these communities with curb and gutter have a large amount of sediment in the curbline, seemly due to dirt driveways that are connected to paved roadways (Figure 14). Sediment is tracked onto the road from vehicles, wind, and washouts and then accumulates in the curbline and is carried to storm sewer inlets (Figure 15).

Figure 14: Sediment loading onto A Street from driveway in Red Lake.

Figure 15: Sediment accumulation in the curbline of 6th Street in Redby.

The most common non-structural BMP is street sweeping. Vacuum street sweepers are more effective at reducing TP loads to water resources than TSS. A precise phosphorus removal rate cannot be estimated for street sweeping without information about the chemical make-up of the pollutants collected and the frequency of the sweeping. Areas with high tree canopy cover produce more TP and therefore have more opportunities for removal. This study did not assess tree cover; however spreadsheets and tools to estimate TP removals are provided by the Minnesota Stormwater Manual.

Another consideration with street sweeping is the disposal of the collected materials. The material does not have to be tested, but it should be screened and categorized as either trash, solid waste, organic debris, or sediment. Trash should be sent to the landfill, solid waste should be disposed of at a

permitted solid waste facility, organic material may be composted, and sediment can be reused as commercial or industrial fill material, aggregate for concrete or asphalt, winter salt/sand mixture, and various other ways. More guidance can be found in the Minnesota Stormwater Manual.

Other forms of non-structural BMPs that could be considered are stream stabilization, smart salt application, and maintaining and repairing existing curb, gutter, and storm sewer infrastructure. Additionally, public education about specific stormwater pollution issues and illicit discharge recognition can be used to bring awareness to the community.

X. Recommendations

A total of 14 watersheds were evaluated for structural BMP retrofit opportunities within the seven communities studied in this report, and 25 alternatives were identified. The alternatives were compared according to the criterion listed below, in order of highest to lowest priority.

1) The watershed discharges directly to TSS impaired waters.
    - Sorted by lowest to highest cost per pound of TSS removal.
2) The watershed discharges directly to nutrient impaired waters
    - Sorted by lowest to highest cost per pound of TP removal.
3) The watershed discharges to a body of water which will eventually flow to a nutrient impaired waterbody.
    - Sorted by lowest to highest cost per pound of TP removal.
4) The watershed runoff never flows to an impaired waterbody.
    - Sorted by lowest to highest cost per pound of removal of TSS.

The highest ranking alternatives tended to be underground devices and raingardens. Underground devices will require a vactor truck for maintenance every 1 to 2 years. If a vactor truck cannot be rented, there may be opportunities to negotiate a cost-share program with other organizations. The cost to purchase a new vactor truck can vary greatly depending on the size and model, but to meet the maintenance requirements of an underground device the purchase price may range from $200,000-$300,000.

Table 25 lists each structural BMP alternative in order of most to least recommended for implementation. The cost per pound of removal ranges from $0.71 to $18.35 for TSS and $244 to $22,583 for TP. BMPs with more pounds of pollutant removal tend to be more cost effective and therefore rank higher than those that remove less.

When selecting projects to implement, the maintenance staff for the community should be involved to discuss their capabilities and the required maintenance for the BMP.

Table 25: Summary of structural BMP alternatives evaluated sorted from highest to lowest priority.

Community	Watershed(s)	Type of BMP Alternative	Description of BMP	Design + Construction Cost	Present Day Value (30-year)	Annual Total TSS Removal [LB]	Annual Total TP Removal [LB]	Annual Net TSS Removal [LB]	Annual Net TP Removal [LB]	$/LB Net TSS Removal	$/LB Net TP Removal	Discharges to Impaired Water	Relevant Impairment
Direct Discharge to Impaired Water – sorted by $/LB-TSS													
Red Lake	4	Infiltration Basin		$139,700	$147,070	6,887	20.1	6,887	20.1	$0.71	$244	Directly	TSS
Red Lake	4	Underground Device	HDS	$300,000	$341,934	9,374	7.5	9,374	7.5	$1.22	$1,512	Directly	TSS
Redby	3	Underground Device	HDS	$300,000	$341,934	6,368	5.3	6,368	5.3	$1.79	$2,151	Directly	TSS
Red Lake	4	Raingardens	19 raingardens	$232,666	$320,121	5,924	10.5	5,924	10.5	$1.80	$1,016	Directly	TSS
Redby	3	Raingardens	25 raingardens	$306,139	$421,212	5,111	11.6	5,111	11.6	$2.75	$1,210	Directly	TSS
Direct Discharge to Impaired Water – sorted by $/LB-TP													
Northome	1-3	Underground Device	Filter Device with SAFL Baffle	$318,000	$385,837	4,344	10.5	4,344	10.5	$2.96	$1,225	Directly	Nutrient
Indirect Discharge to Impaired Water – sorted by $/LB-TP													
Blackduck	6-8	Retention Pond		$339,850	$344,842	13,046	29.2	3,951	17.3	$2.91	$664	Indirectly	Nutrient
Blackduck	6-8	Underground Device	HDS	$300,000	$341,934	12,727	17.6	3,635	5.7	$3.15	$1,983	Indirectly	Nutrient
Blackduck	6-8	Forebay		$98,800	$107,686	9,471	13.2	377	1.3	$9.89	$2,761	Indirectly	Nutrient
Northome	6	Underground Device	Two SAFL Baffles	$138,000	$172,761	2,156	1.7	2,156	1.7	$2.67	$3,310	Indirectly	Nutrient
Blackduck	9	Underground Device	Two SAFL Baffles	$138,000	$172,761	3,018	3.0	1,164	1.2	$4.95	$4,964	Indirectly	Nutrient
Blackduck	2	Underground Device	SAFL Baffle	$69,000	$103,761	473	0.3	437	0.3	$7.92	$12,810	Indirectly	Nutrient
No discharge to Impaired Water – sorted by $/LB-TSS													
Kelliher	4	Underground Device	HDS	$300,000	$341,934	8,070	6.5	5,315	4.8	$2.14	$2,375	N/A	N/A
Red Lake	7	Raingardens	11 raingardens	$134,701	$185,333	2,555	5.3	2,555	5.3	$2.42	$1,166	N/A	N/A
Red Lake	3	Raingardens	6 raingardens	$73,473	$101,091	1,284	2.8	1,284	2.8	$2.62	$1,203	N/A	N/A
Red Lake	7	Underground Device	HDS	$300,000	$341,934	3,855	3.2	3,855	3.2	$2.96	$3,562	N/A	N/A
Ponemah	1-3	Raingardens	25 raingardens	$306,139	$421,212	4,356	10.5	4,356	10.5	$3.22	$1,337	N/A	N/A
Redby	1	Infiltration Basin		$48,900	$54,764	521	1.7	521	1.7	$3.50	$1,074	N/A	N/A
Redby	1	Raingardens	5 raingardens	$61,228	$84,242	467	1.3	467	1.3	$6.01	$2,160	N/A	N/A
Red Lake	3	Underground Device	HDS	$300,000	$341,934	1,774	1.5	1,774	1.5	$6.42	$7,701	N/A	N/A
Kelliher	1	Forebay		$114,450	$120,321	563	1.5	563	1.5	$7.12	$2,674	N/A	N/A
Northome	7	Underground Device	SAFL Baffle	$69,000	$103,761	321	0.3	321	0.3	$10.76	$13,303	N/A	N/A
Ponemah	1-3	Underground Device	SAFL Baffle	$69,000	$103,761	272	0.1	272	0.1	$12.70	$27,670	N/A	N/A
Kelliher	1	Underground Device	Two SAFL Baffles	$138,000	$172,761	428	0.3	428	0.3	$13.46	$16,692	N/A	N/A
Redby	1	Underground Device	Two SAFL Baffles	$138,000	$172,761	314	0.3	314	0.3	$18.35	$22,583	N/A	N/A

Assumes:

1. Construction costs include a 30% contingency and 20% design fee.
2. Annual discount rate of 3.5%.
3. Dollar per pound of removal is the Present Day Value divided by the net removal over 30 years.

XI. References

Google. [Google Streetview of Blackduck, Kelliher, Northome, Red Lake, Redby, Ponemah, and Little Rock]. Google Maps, Accessed November 2024-March 2025.

https://upstreamtechnologies.us/docs/SAFL-Baffle-Design-Guide.pdf

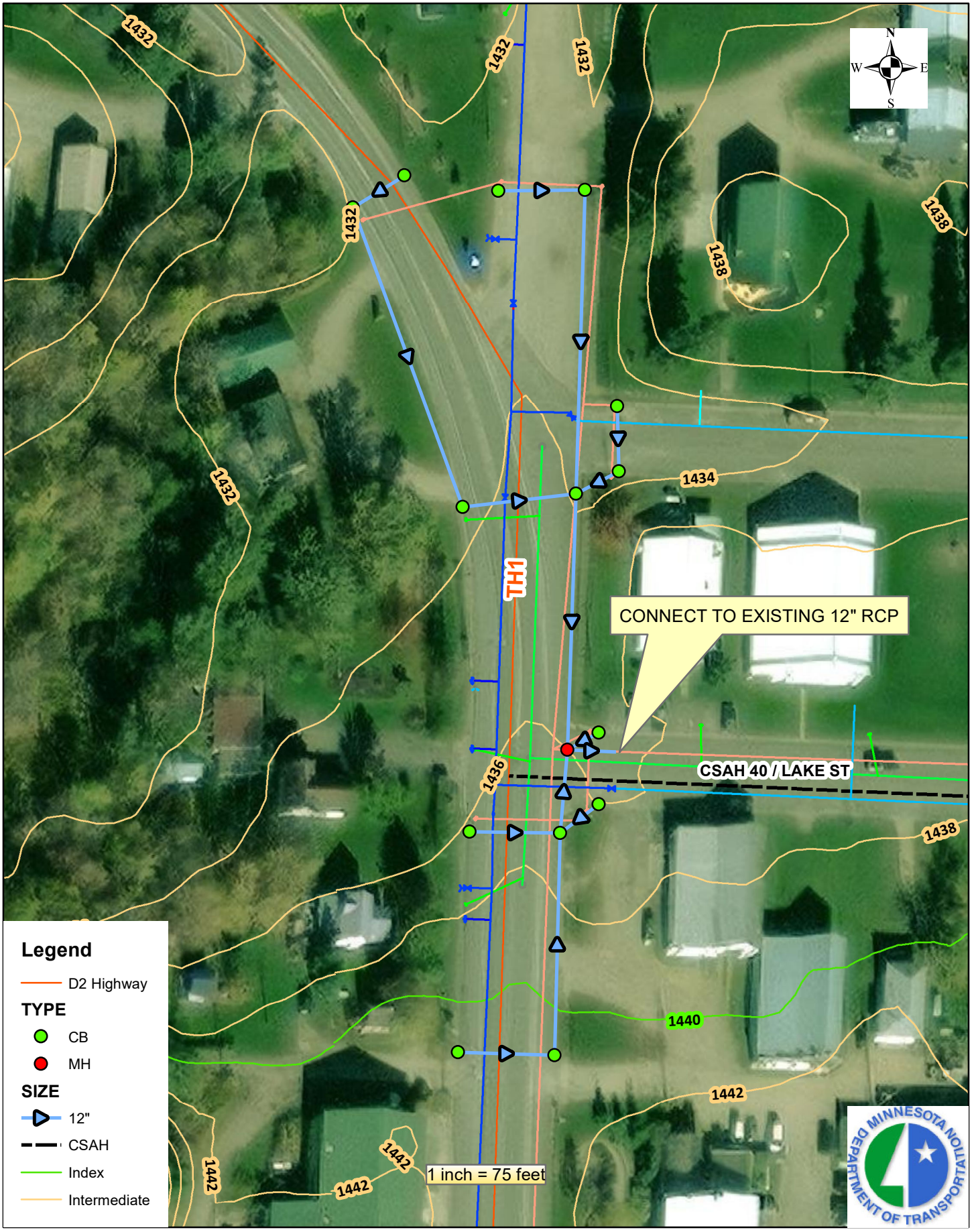
https://stormwater.pca.state.mn.us/index.php?title=Composition,_characterization,_and_management_of_street_sweepings

Appendix A: WinSLAMM Land Use Classifications

CLASSIFICATION	WIN-LU	INDIRECTLY CONNECTED IMPERFVIOUS	DIRECTLY CONNECTED IMPERVIOUS	DEPRESSION AL STORAGE	IMPERVIOUS RUNOFF COEFFICENT
freeways	FREE	0	1	0	1
commercial downtown	CDT	0.001	0.953	0.04	0.88
shopping centers	SHOP	0	0.917	0.023	0.936
strip commercial	SCOM	0.014	0.907	0.025	0.892
hospital	HOSP	0.006	0.763	0.039	0.903
office parks	OFPK	0.006	0.731	0.019	0.91
non manufacturing	LI	0.088	0.707	0.029	0.906
high rise residential	HRR	0.012	0.632	0.032	0.868
misc institutional	INST	0.036	0.6	0.017	0.909
education	SCH	0.014	0.565	0.026	0.908
mobile home park	MOBH	0.011	0.487	0.032	0.913
multiple family residential	MFRNA	0.063	0.474	0.025	0.882
high density residential w/o alleys	HDRNA	0.131	0.399	0.017	0.875
high density residential w alleys	HDRWA	0.138	0.381	0.024	0.817
duplexes	DUP	0.121	0.271	0.02	0.821
medium density residential w/o alleys	MDRNA	0.135	0.242	0.029	0.796
medium density residential w alleys	MDRWA	0.169	0.242	0.026	0.783
medium industrial	MI	0.169	0.242	0.026	0.783
low density residential	LDR	0.079	0.126	0.026	0.79
cemetery	CEM	0.007	0.12	0.008	0.934
parks	PARK	0.041	0.103	0.01	0.873
suburban	SUB	0.04	0.056	0.04	0.726
undeveloped	OSUD	0	0.049	0.027	0.733
	WATER	0	0	0	0

Appendix B: Northome TH 46 Updates

3607-20 North Storm Sewer - Preliminary Layout



3607-20 South Storm Sewer - Preliminary Layout

3607-20 South Storm Sewer - Preliminary Layout