MINNEHAHA CREEK WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

Meeting: Board of Managers
Meeting date: 9/23/2021
Agenda Item #: 11.3
Item type: Action Item

Title:	Directing Notice of Public Hearing to Consider Ordering the Maple Creek Drainage Improvement Project
Resolution number:	21-064
Prepared by:	Name: Kate Moran Phone: 952-641-4520 kmoran@minnehahacreek.org
Reviewed by:	Name/Title: Becky Christopher, Policy Planning Manager
Recommended action:	Directing Notice of a Public Hearing for the Ordering of the Maple Creek Drainage Improvement Project
Schedule:	October 21, 2021: Public Hearing and Consideration of Project Ordering November 4, 2021: 2022 Budget Amendment and Approval of Funding Agreement January 2022: Anticipated construction start by City
Budget considerations:	N/A
Past Board action:	Res # 21-053: Concurrence with Staff Recommendations for Project Opportunities Reviewed through Pilot Responsive Program

Summary

Background

The Minnehaha Creek Watershed District (MCWD or District) is focused on the protection and improvement of natural resources in ways that support thriving communities. Since what happens on the land is the primary driver of the health of our natural resources, MCWD's Balanced Urban Ecology Policy (BUE Policy) recognizes that the District can deliver the most value to its communities by working in partnership with those who change the landscape. Since adopting its BUE Policy in 2014, and building its 2017 Watershed Management Plan (WMP) around the same principles, MCWD outlined its intention to remain responsive to opportunities created through land use change.

The District's 2017 WMP broadly framed this approach of opportunity-driven implementation and incorporated opportunity-based stormwater management projects into the capital improvement plan (CIP) for each of the eleven subwatersheds. Through coordination with partners, these opportunity-based implementation projects are intended to make progress toward District goals and address Total Maximum Daily Loads (TMDLs). In order to be able to capitalize on these land use changes, the District is developing a Responsive Program to guide the District's process for identifying, evaluating and responding to opportunities.

The purpose of this program is to provide support for public and private projects that are well-coordinated and align with the District's goals and priorities. The District aims to carry out this approach in a way that provides value to its communities while making efficient use of District resources to allow the District to maintain focus on its highest priority projects and initiatives. In July 2021, staff presented recommendations for the Responsive Program scope, structure, schedule, and process to the Board of Managers. Staff have been operating the Responsive Program in a pilot phase

while continuing to develop supporting materials and refine the program recommendations before vetting the program with external stakeholders in early 2022 and then seeking Board adoption.

Request: Project Description

The City of Plymouth (City) has several projects in its capital improvement plan (CIP) within the Gleason Lake drainage area that are focused on addressing drainage and flooding issues. Because Gleason Lake is impaired for nutrients, the City has been exploring opportunities to incorporate water quality improvements into these projects with the Minnehaha Creek Watershed District (MCWD or District). On June 30, 2021, the City submitted a funding request for $405,500 and preliminary cost-benefit information for the Maple Creek Drainage Improvement Project (Project). Project elements include iron enhanced sand filtration, expanded flood storage, and stabilization and restoration efforts. The Project is separated into two components - Maple Creek Pond area and Steeplechase Development Wetland area (refer to Attachment 1 – Overview Map).

The Project was originally anticipated to achieve 41 lbs of total phosphorus (TP) reduction based on the June 2021 estimates. District staff requested additional feasibility information from the City to vet estimated water quality benefit and cost-effectiveness of the proposed Project by the District Engineer. Based on the District Engineer's review, the City revised its modeling, and the estimated water quality benefit has been reduced to 25 lbs/yr of TP reduction (refer to Attachment 2 – City of Plymouth's Funding Request and Project Summary). The anticipated timeline for beginning construction is January 2022.

Project Evaluation

Evaluation under Pilot Phase of Responsive Program

Under the pilot phase of the Responsive Program, staff have been evaluating partnership requests using the following four criteria categories: resource need and priority, project benefits, cost effectiveness, and strength of the partner's coordination and commitment to working with the District. Staff evaluated the City's request by applying the four criteria categories, ranking as Low, Medium, or High, and then vetting it through a cross-departmental staff team to inform the recommended response to Board of Managers.

As part of the evaluation, District staff conducted a review of past projects in the area as well as load reduction requirements under the TMDL. Past District projects include the installation of stormwater treatment ponds and expansion of a pond on the north inlet of Gleason Lake in 1995 and 2008, respectively. In 2012, the District and City partnered on the Chelsea Woods Channel Restoration Project. In 2014, the TMDL for Gleason Lake was approved and called for a reduction in external phosphorus loading of 207 lbs/yr, of which 185 lbs/yr is assigned to the City of Plymouth.

The Project was first discussed with the Board at the July 8th Operations and Programs Committee (OPC) Meeting followed by the July 22nd Board meeting requesting concurrence of staff recommendations to further explore the opportunity with the City (Resolution 21-053). District staff updated the Board at the September 9th OPC Meeting, based on the revised water quality benefit and cost-effectiveness provided to District staff on August 30th (refer to Attachment 2).

The submitted Project Summary from August 30th breaks the Project into two components:

- Maple Creek Pond Area (northern area)
- Steeplechase Wetland Area (southern area)

Staff evaluated each component of the Project by applying the four criteria categories and vetting it through a cross-departmental staff team to inform the recommended response. Below is a summary of District staff's evaluation conducted for each component, including ranking of criteria.

Maple Creek Pond Area

- Resource Need and Priority: Ranked High

    - The project is intended to address local drainage issues and reduce stormwater nutrient loading to downstream Gleason Lake. Gleason Lake is impaired, and the District's CIP includes a project targeting volume and load reduction projects to Gleason Lake.
- Project Benefits: Ranked Medium
    - Based on revised benefit information provided by the City's consultant, the project is estimated to provide 19 pounds of TP removal annually which is considered to be a reasonable load reduction based on staff experience and past projects.
- Cost Effectiveness: Ranked Medium
    - The project component has a reasonable cost/benefit, with an estimated ~$1,100 per pound of TP removal annually over the 20- year lifecycle of the project. Based on the District Engineer's review and recommendation this is considered within the reasonable cost effective range of $500 to $2,000 per pound of TP removal over a 20-year project lifecycle (Refer to Attachment 3).
- Partnership and Coordination: Ranked Medium
    - The City has made efforts to coordinate early with the District regarding project opportunities in its CIP. However, the preliminary cost/benefit information and funding request for this particular project has been submitted quite late in the District's budget and CIP planning process to be considered for 2022 funding and would require a budget amendment.

<u>Steeplechase Wetland Area</u>

- Resource Need and Priority: Ranked Medium
    - The project is primarily intended to address local drainage issues and storage capacity within Steeplechase Development area. The project area provides limited water quality benefit to the impaired Gleason Lake.
- Project Benefits: Ranked Low
    - Based on benefit information provided by the City's consultant, the project is estimated to provide 6 pounds of TP removal annually which is considered low based on staff experience and past projects.
- Cost Effectiveness: Ranked Low
    - The project component is outside of a reasonable cost/benefit range, with an estimated ~$2,100 per pound of TP removal annually over the 20- year lifecycle of the project. Based on the District Engineer's review and recommendation this is considered outside of the reasonable cost effectiveness range over a 20-year project lifecycle (Refer to Attachment 3).
- Partnership and Coordination: Ranked Medium
    - Same as the Maple Creek Pond area (see above).
- Additional considerations
    - As it's not yet clear how the City will meet Wetland Conservation Act (WCA) and District rule requirements for the proposed wetland excavation, District staff have flagged this as an area of uncertainty with the City.

<u>Recommendation under Pilot Phase of Responsive Program</u>

Based on District staff's evaluation, the preliminary recommendation is for the District to fund $100,000, approximately 50 percent, for the Maple Creek Pond project component and decline funding for the Steeplechase Wetland component. The District Engineer has reviewed the water quality calculations and cost estimates provided by the City and verified that the August 30th estimates for the Maple Creek Pond area are reasonable (see Attachment 3).

Requested Action

The District may not commit levy funds to the Project until it has provided for a public hearing; considered the views of the District engineer, staff, and public; and formally ordered the project. In addition, District funding would be contingent on the Board's approval of an agreement with the City establishing terms and conditions for use of funds.

Therefore, staff, with input from District Legal Counsel, are requesting that the Board direct the Administrator to notice a Public Hearing to consider ordering the Maple Creek Drainage Improvement Project.

Next Steps

District staff, with input from Legal Counsel, propose the following next steps:

- October 21, 2021: Public hearing and consideration of project ordering under the Stormwater Volume and Pollutant Load Reduction Project within Gleason Lake Subwatershed CIP
    - Term sheet will be provided to outline expectations of the partnership
- November 4, 2021: Budget amendment for 2022 and Approval of Funding Agreement

Supporting Documents

Attachment 1: Overview Map
Attachment 2: City of Plymouth's Funding Request and Project Summary (Revised August 30, 2021 submittal)
Attachment 3: Draft District Engineer Review Memo (Updated based on City's revised August 30th submittal)

MINNEHAHA CREEK
WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

RESOLUTION

Resolution number: 21-064

Title: Directing Notice of Public Hearing to Consider Ordering the Maple Creek Drainage Improvement Project

WHEREAS, the Minnehaha Creek Watershed District (District) 2017 Watershed Management Plan outlines its intention to remain responsive to opportunities created through land use change and includes opportunity-based projects in the capital improvement plan that target reduction of stormwater volume and nutrient loads to impaired waters;

WHEREAS**,** District staff are in the process of developing formal policy for Board adoption that will guide how the District identifies, evaluates, and responds to project opportunities, referred to as the Responsive Program;

WHEREAS**,** in the interim, staff have been operating this approach in pilot phase and evaluating project opportunities using four criteria categories: resource need and priority, project benefits, cost-effectiveness, and partnership/coordination;

WHEREAS, the City of Plymouth (City) has requested financial assistance from the District to support implementation of the Maple Creek Drainage Improvement Project (Project) to reduce total phosphorus (TP) loads to Gleason Lake, a waterbody designated as impaired pursuant to state law;

WHEREAS, the Project is responsive to the Watershed Management Plan and described therein under the Stormwater Volume and Pollutant Load Reduction project prescribed in the capital improvement program for the Gleason Lake subwatershed;

WHEREAS**,** on June 30, 2021, the City submitted a funding request for $405,500 and preliminary cost-benefit information for the Project which the City separated into two project components - Maple Creek Pond area and Steeplechase Development Wetland area;

WHEREAS**,** at the District's request, additional feasibility information and refined project benefit estimates were provided on August 9 and August 30, 2021, and the project is estimated to achieve a TP reduction of 25 lbs/yr (19 lbs/yr for Maple Creek Pond area and 6 lbs/yr for Steeplechase Development Wetland area);

WHEREAS**,** District staff evaluated the City's request using the aforementioned criteria and has provided a preliminary recommendation that the District contribute funding for the Maple Creek Pond project in an amount of $100,000 (approximately 50 percent of project cost), and that the District decline to contribute funding for the Steeplechase Wetland component;

WHEREAS, the District engineer has reviewed the water quality calculations and cost estimates provided by the City and verified that the estimates for the Maple Creek Pond area are reasonable;

WHEREAS, the District Board of Managers ("Board") has considered the District engineer's assessment and the recommendation of District staff, and concurs that the Maple Creek Pond project should be considered for project ordering and that the District should not further consider funding for the Steeplechase Wetland component;

WHEREAS, the District may not commit funds derived from *ad valorem* levy to the Maple Creek Pond project until it has provided for public hearing; considered the views of the District engineer and staff, and comments provided; and formally ordered the project, all pursuant to Minnesota Statutes §103B.251;

WHEREAS**,** in addition, District funding would be contingent on the Board's approval of an agreement with the City establishing terms and conditions for use of funds;

NOW, THEREFORE, BE IT RESOLVED that the Minnehaha Creek Watershed District Board of Managers hereby directs the District Administrator to notice a public hearing for the ordering of the Maple Creek Drainage Improvement Project in accordance with Minnesota Statutes §103B.251; and

BE IT FURTHER RESOLVED that the District Administrator is to present at the hearing proposed terms of a funding agreement with the City.

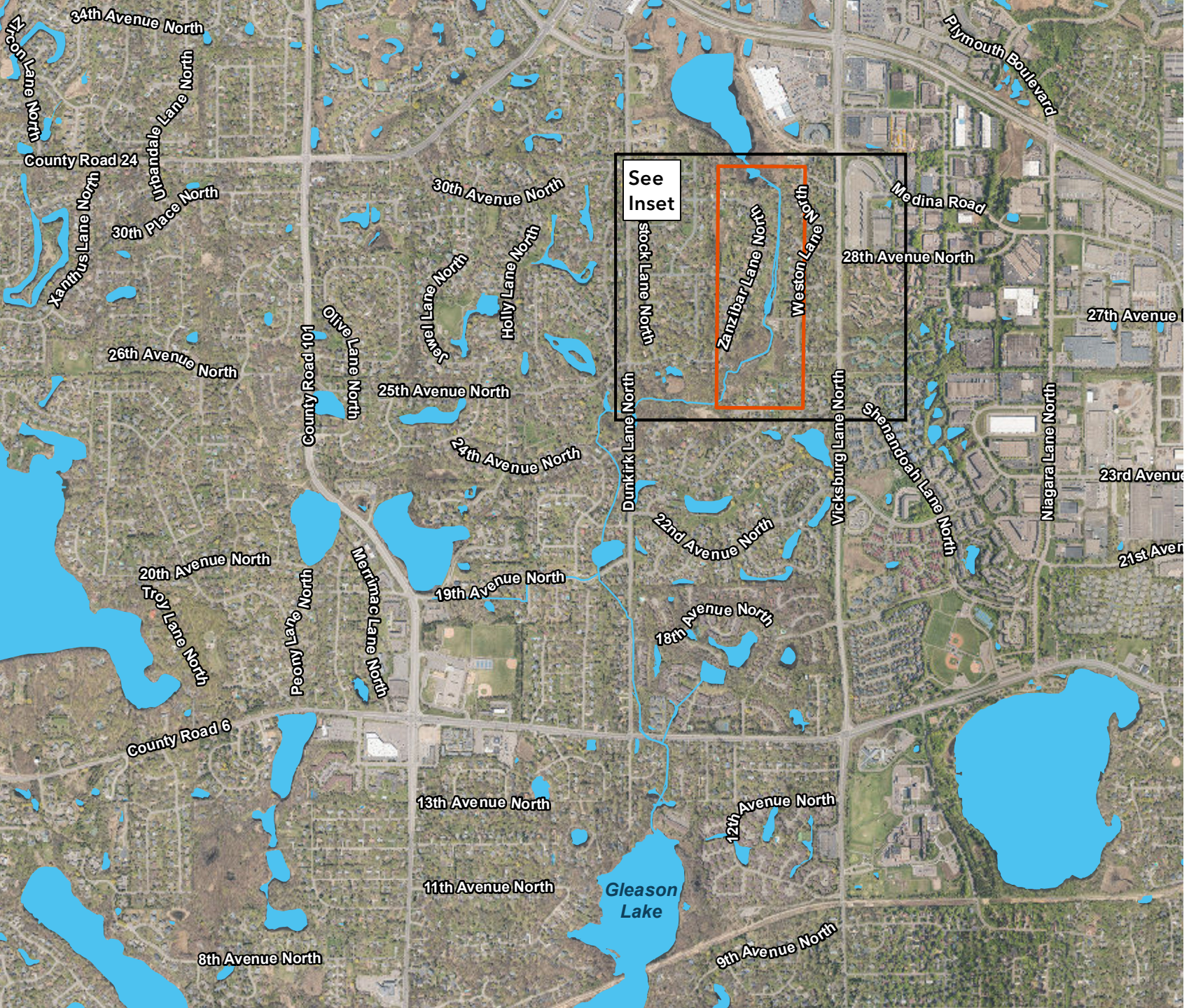
Resolution Number 21-064 was moved by Manager _____, seconded by Manager _____. Motion to adopt the resolution ___ ayes, ___ nays, ___abstentions. Date: 9/23/2021

_____ Date: _____

Secretary

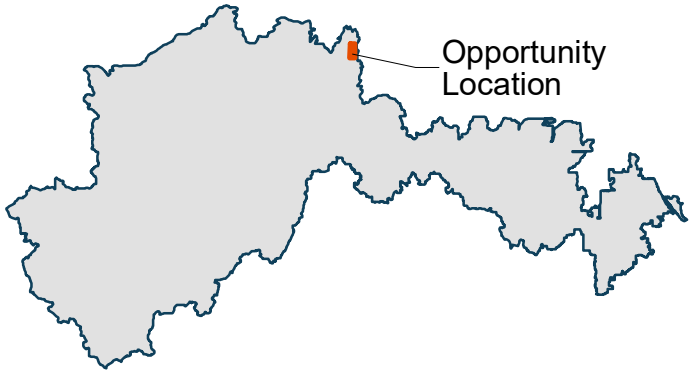
PILOT PHASE RESPONSIVE PROGRAM

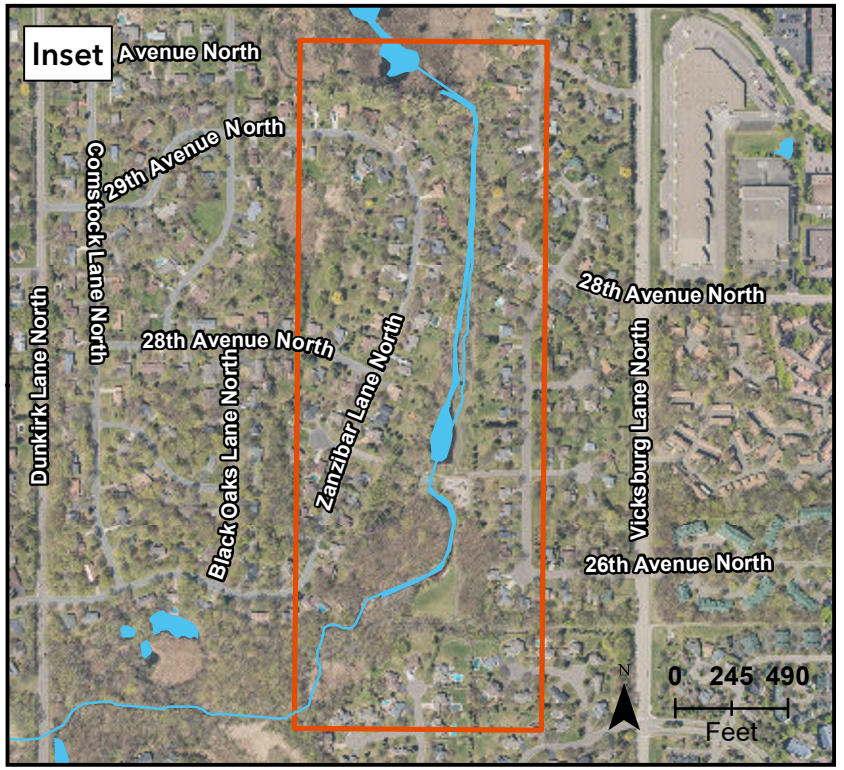
MAPLE CREEK DRAINAGE IMPROVEMENT PROJECT



LEGEND

Responsive Program Opportunity





Memorandum

To: Ben Scharenbroich, City of Plymouth
Chris McKenzie, PE, City of Plymouth

From: Jake Newhall, PE
Kendra Fallon, PE

Date: August 30, 2021

Re: Maple Creek Drainage Improvement Project Summary
WSB Project No. 016858-000

This memo summarizes the drainage proposed improvements along Maple Creek within the City of Plymouth. Approximately 360 acres of drainage within the City is routed through Maple Creek in this area. An analysis was completed to evaluate possible stormwater management improvements. A description of the proposed improvements, the anticipated pollutant removals, secondary benefits, and the estimated life-cycle costs are included in this summary. A figure is included with the memo which shows the location of the proposed improvements as described below. Historic aerials are included with the memo where the basins south of Maple Creek Park playground appear to be present but the basin north of the Maple Creek Park playground does not appear to be present. Based on this initial desktop investigation, the Maple Creek Park basin is referenced to as a pond and the basins south of the Maple Creek Park playground are referenced to as wetlands.

MAPLE CREEK POND IMPROVEMENTS

Improvements to the pond area north of 27th Place North near Maple Creek Park include a dredging project to excavate the settled sediment within the permanent pool of the pond, construction of an iron enhanced sand filtration (IESF) bench at the pond's normal water level, and reconstruction of the existing outlet structure for the pond. The reconstructed outlet would be designed to allow the basin to bounce so water will filter through the IESF bench without increasing the pond's high water level. Realigning the existing trail in the area is proposed with these improvements in order to maximize the footprint of the proposed filtration bench on the southeast side of the existing pond.

The improvements to the Maple Creek Park Pond area are anticipated to remove an additional 1,900 lbs/yr of total suspended solids (TSS) and 19 lbs/yr of total phosphorus (TP). The improvements will also help to create additional flood storage within the Maple Creek subwatershed.

STEEPLECHASE WETLAND IMPROVEMENTS

Improvements to the Steeplechase Development Wetland area include ditch maintenance on the Zanzibar Ditch, wetland enhancements/expansion, and construction of a diversion structure near the Steeplechase Development. Erosion in the Zanzibar Ditch would be proposed to be fixed with stabilization measures and removal of sediments which have settled in the bottom of the ditch. These improvements would help to reduce the pollutant loading into the Maple Creek Wetlands.

A ponding area in the upland area between Maple Creek and the turf grass open area just north of the trail crossing is proposed. In addition, it is proposed to enhance and expand portions of the

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existing wetlands adjacent to the Steeplechase Development to improve the wetlands and the habitat in the area.

The existing primary outlet for the Steeplechase Development wetland is a wooden weir routed to a 36-inch pipe which conveys stormwater southeast from the wetland and connects into the trunk storm sewer. Currently water bypasses the wooden weir and simply drains through the 36-inch pipe. When flows are high enough the water spills over the weir and is routed through a 12-inch culvert outletting southwest from the wetland. This acts as a secondary outlet and takes drainage further downstream to another wetland complex. A diversion structure is proposed to replace the existing outlet configuration and control how much water is routed to the Steeplechase development and allow a split flow that meets the needs of the area. Discharge rates for the Maple Creek drainage system were analyzed at the proposed Steeplechase Diversion Structure to confirm reductions to both downstream systems.

All the Steeplechase improvements together would help to remove an additional 4,430 lbs/yr of TSS and 6 lbs/yr of TP from Maple Creek. The work within and around the existing wetlands would be restored with a native seed mix and live stakes to enhance the wetland habitat. In addition to water quality and habitat benefits, the additional storage created by the proposed pond and wetland enhancements would provide additional flood storage and help control rates throughout this portion of the Maple Creek subwatershed.

ANTICIPATED COSTS

The anticipated costs and water quality cost benefit for the improvements are broken out for the Maple Creek Park Pond Improvements and the Steeplechase Wetland Improvements and are outlined in **Table 1**. The expected 20-year life cycle costs are broken down in **Table 2** and the Opinion of Probable Cost Tables for the project can be found in the attachments.

It is recommended the City request $405,500 in funding from MCWD for all projects costs excluding payment for the dredging of the Maple Creek Park Pond.

Table 1: Improvement Cost Benefit

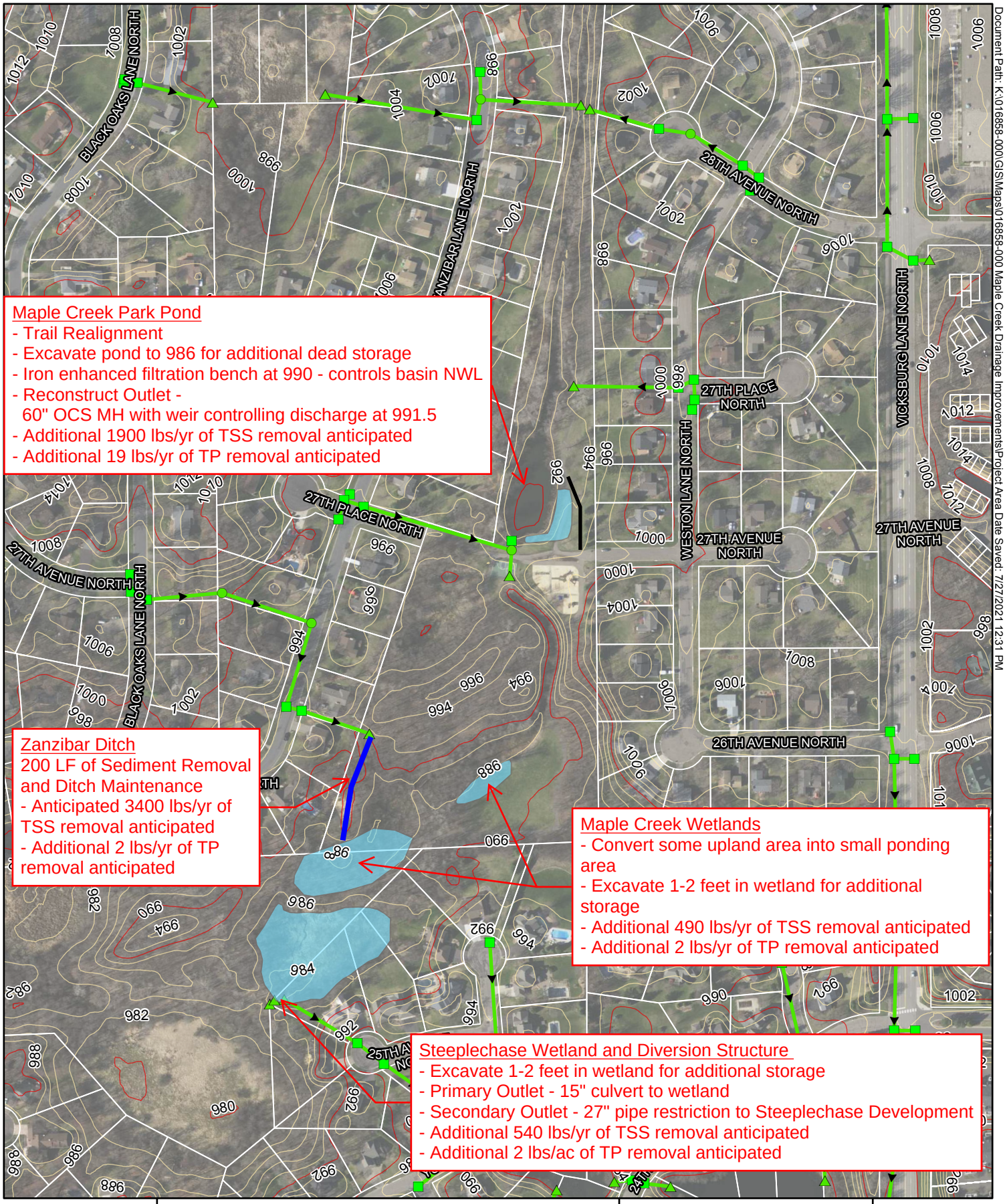
	Construction + Contingency + Indirect Costs	20-Yr Life Cycle Costs	Overall Project Costs	TP Removals (lbs/yr)	TP Removals Over 20-Yr Life Cycle (lbs)	Life Cycle Cost Benefit ($/lb TP)
Schedule A. Maple Creek Park Pond	$241,000	$175,000	$416,000	19	380	$1,094.73
Schedule B. Steeplechase Wetland Improvements	$209,000	$40,000	$249,000	6	120	$2,075.00
Project Total	**$450,000.00**	**$215,000.00**	**$665,000**	**25**	**500**	**$1,330.00**

Table 2: 20-Year Life-Cycle Costs

	Occurrences Over 20-Yr Life Cycle	Cost Per Occurrence	20-Yr Life Cycle Cost
Schedule A. Maple Creek Park Pond			
Tilling of Media	**10**	**$2,500**	**$25,000**
Media Replacement	**3**	**$50,000**	**$150,000**
	Schedule A. Total Life 20-Yr Cycle Cost		**$175,000**
Schedule B. Steeplechase Wetland Improvements			
Sediment Delta Removal ($5,000 per wetland)	**1**	**$15,000**	**$15,000**
Vegetation Maintenance	**10**	**$2,500**	**$25,000**
	Schedule B. Total Life 20-Yr Cycle Cost		**$40,000**

Attachments

- Proposed Improvements Figure
- Opinions of Probable Cost Tables
- Historic Aerials



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City of Plymouth

Project Location

Maple Creek Drainage Improvements
City of Plymouth, MN

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1 inch = 300 feet

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Maple Creek Drainage Improvements

WSB Project: Maple Creek Drainage Improvements
Project Location: City of Plymouth
WSB Project No: 016858-000

Design By: KJF
Checked By: JHN
Date: 8/6/2021

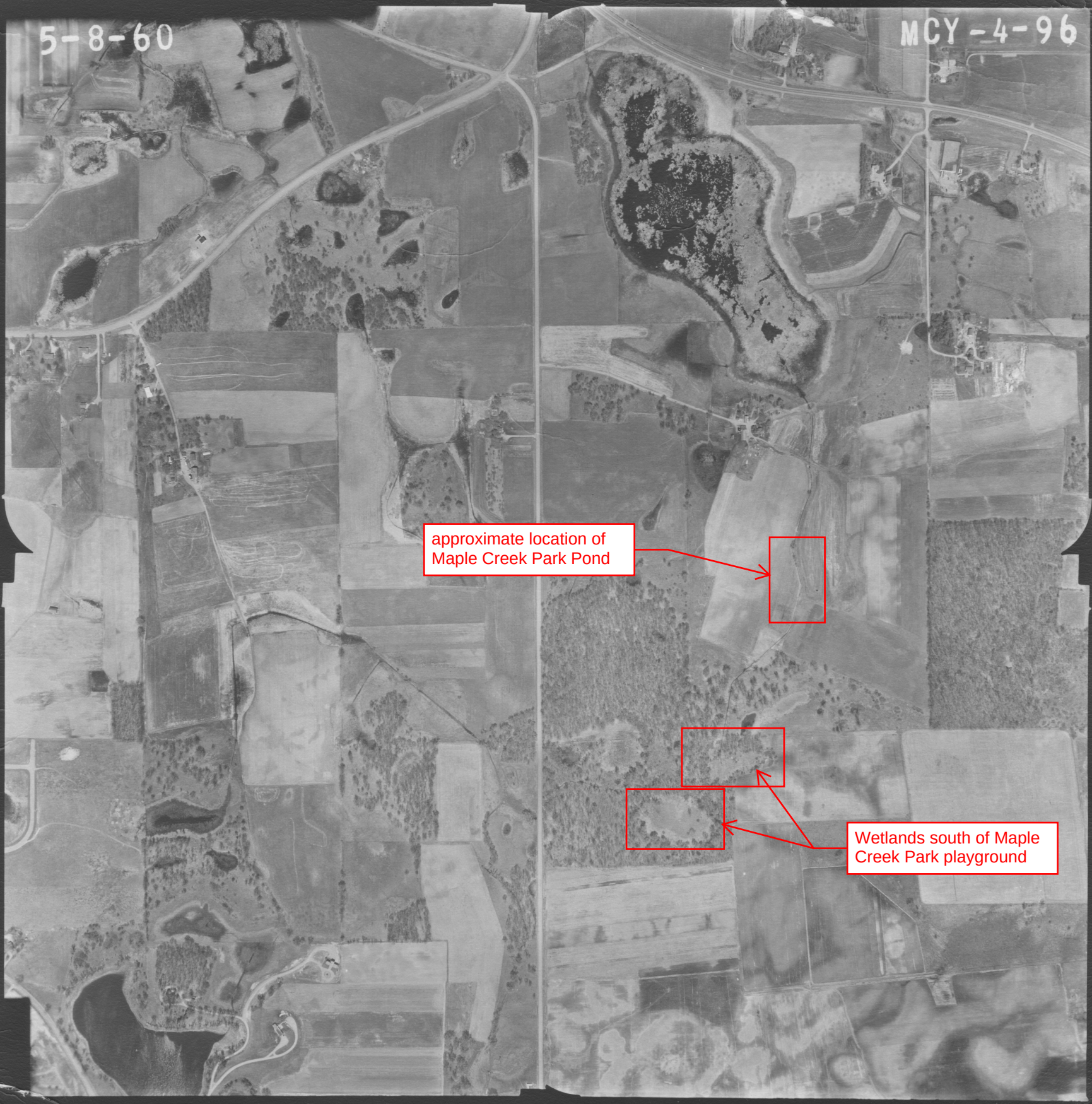
Item No.	MN/DOT Specification No.	Description	Unit	Estimated Total Quantity	Estimated Unit Price	Estimated Total Cost
SCHEDULE A. MAPLE CREEK PARK POND						
1	2021.501	MOBILIZATION	LS	1	$10,000.00	$10,000.00
2	2101.524	CLEARING & GRUBBING	TREE	5	$800.00	$4,000.00
3	2104.503	REMOVE SEWER PIPE (STORM)	L F	10	$25.00	$250.00
4	2104.502	REMOVE DRAINAGE STRUCTURE	EACH	1	$1,500.00	$1,500.00
5	2104.503	REMOVE BITUMINOUS PAVEMENT	S Y	170	$15.00	$2,550.00
6	2105.601	DEWATERING	LS	1	$7,500.00	$7,500.00
7	2105.604	COMPOSITE LINER	S Y	500	$30.00	$15,000.00
8	2105.507	POND EXCAVATION (LV)	C Y	1700	$25.00	$42,500.00
9	2105.504	GEOTEXTILE FABRIC TYPE 4	S Y	20	$5.00	$100.00
10	2360.504	3 INCH THICK BITUMINOUS TRAIL	S Y	190	$45.00	$8,550.00
11	2451.507	COARSE FILTER AGGREGATE (CV)	C Y	100	$50.00	$5,000.00
12	2451.607	FILTER MEDIA SPECIAL	C Y	300	$175.00	$52,500.00
13	2501.502	24" RC PIPE APRON	EACH	1	$1,750.00	$1,750.00
14	2502.503	6" PERF PVC PIPE DRAIN	L F	400	$18.00	$7,200.00
15	2502.503	6" PVC PIPE DRAIN	L F	30	$20.00	$600.00
16	2502.602	6" PVC PIPE DRAIN CLEANOUT	EACH	4	$350.00	$1,400.00
17	2503.503	24" RC PIPE SEWER DES 3006 CL III	L F	24	$100.00	$2,400.00
18	2503.602	CONNECT TO EXISTING STORM SEWER	EACH	1	$2,500.00	$2,500.00
19	2506.503	CONST DRAINAGE STRUCTURE DESIGN SPEC 1	EACH	1	$8,000.00	$8,000.00
20	2511.507	RANDOM RIPRAP CLASS III (FIELDSTONE)	C Y	10	$150.00	$1,500.00
21	2571.524	DECIDUOUS TREE 2.5" CAL B&B	TREE	3	$900.00	$2,700.00
22	2573.503	FLOTATION SILT CURTAIN TYPE MOVING WATER	L F	30	$40.00	$1,200.00
23	2573.502	TEMPORARY ROCK CONSTRUCTION ENTRANCE	EACH	1	$1,000.00	$1,000.00
24	2575.504	EROSION CONTROL BLANKETS CATEGORY 3N	S Y	500	$3.00	$1,500.00
25	2575.505	SEEDING	ACRE	0.1	$6,000.00	$600.00
26	2575.509	SEED MIXTURE 25-131	LB	10	$15.00	$150.00
27	2575.509	SEED MIXTURE 34-171	LB	3	$50.00	$150.00
					CONSTRUCTION TOTAL	**$182,100.00**
					CONTINGENCY TOTAL (15%)	**$27,315.00**
					SUBTOTAL	**$209,415.00**
					INDIRECT COST TOTAL (15%)	**$31,412.25**
					SCHEDULE A. TOTAL	**$240,827.25**

Maple Creek Drainage Improvements

WSB Project: Maple Creek Drainage Improvements
Project Location: City of Plymouth
WSB Project No: 016858-000

Design By: KJF
Checked By: JHN
Date: 8/6/2021

Item No.	MN/DOT Specification No.	Description	Unit	Estimated Total Quantity	Estimated Unit Price	Estimated Total Cost
SCHEDULE B. STEEPLECHASE WETLAND IMPROVEMENTS						
1	2021.501	MOBILIZATION	LS	1	$15,000.00	$15,000.00
2	2101.505	CLEARING & GRUBBING	TREE	15	$800.00	$12,000.00
3	2104.503	REMOVE SEWER PIPE (STORM)	L F	25	$25.00	$625.00
4	2104.502	REMOVE DRAINAGE STRUCTURE	EACH	1	$750.00	$750.00
5	2104.502	SALVAGE DRAINAGE STRUCTURE	EACH	1	$1,000.00	$1,000.00
6	2105.507	COMMON EXCAVATION (LV)	C Y	4600	$18.00	$82,800.00
7	2105.504	GEOTEXTILE FABRIC TYPE 4	S Y	60	$5.00	$300.00
8	2501.502	15" RC PIPE APRON	EACH	1	$1,500.00	$1,500.00
9	2503.503	15" RC PIPE SEWER DES 3006 CL V	L F	20	$60.00	$1,200.00
10	2503.503	36" RC PIPE SEWER DES 3006 CL III	L F	8	$150.00	$1,200.00
11	2503.602	CONNECT TO EXISTING STORM SEWER	EACH	1	$2,500.00	$2,500.00
12	2506.503	CONST DRAINAGE STRUCTURE DESIGN SPEC 2	EACH	1	$8,000.00	$8,000.00
13	2511.507	RANDOM RIPRAP CLASS III (FIELDSTONE)	C Y	45	$150.00	$6,750.00
14	2571.524	DECIDUOUS TREE 2.5" CAL B&B	TREE	7	$900.00	$6,300.00
15	2573.503	FLOTATION SILT CURTAIN TYPE MOVING WATER	L F	30	$40.00	$1,200.00
16	2573.503	SEDIMENT CONTROL LOG TYPE WOOD FIBER	L F	200	$3.00	$600.00
17	2573.502	TEMPORARY ROCK CONSTRUCTION ENTRANCE	EACH	2	$1,000.00	$2,000.00
18	2573.602	ROCK DITCH CHECK	EACH	1	$1,500.00	$1,500.00
19	2575.504	EROSION CONTROL BLANKETS CATEGORY 3N	S Y	1000	$3.00	$3,000.00
20	2575.505	SEEDING	ACRE	1.8	$4,000.00	$7,200.00
21	2575.509	SEED MIXTURE 25-131	LB	15	$15.00	$225.00
22	2575.509	SEED MIXTURE 34-171	LB	15	$50.00	$750.00
23	2577.502	LIVE STAKES, DOGWOOD	EACH	200	$8.00	$1,600.00
					CONSTRUCTION TOTAL	**$158,000.00**
					CONTINGENCY TOTAL (15%)	**$23,700.00**
					SUBTOTAL	**$181,700.00**
					INDIRECT COST TOTAL (15%)	**$27,255.00**
					SCHEDULE B. TOTAL	**$208,955.00**
					PROJECT TOTAL	**$449,782.25**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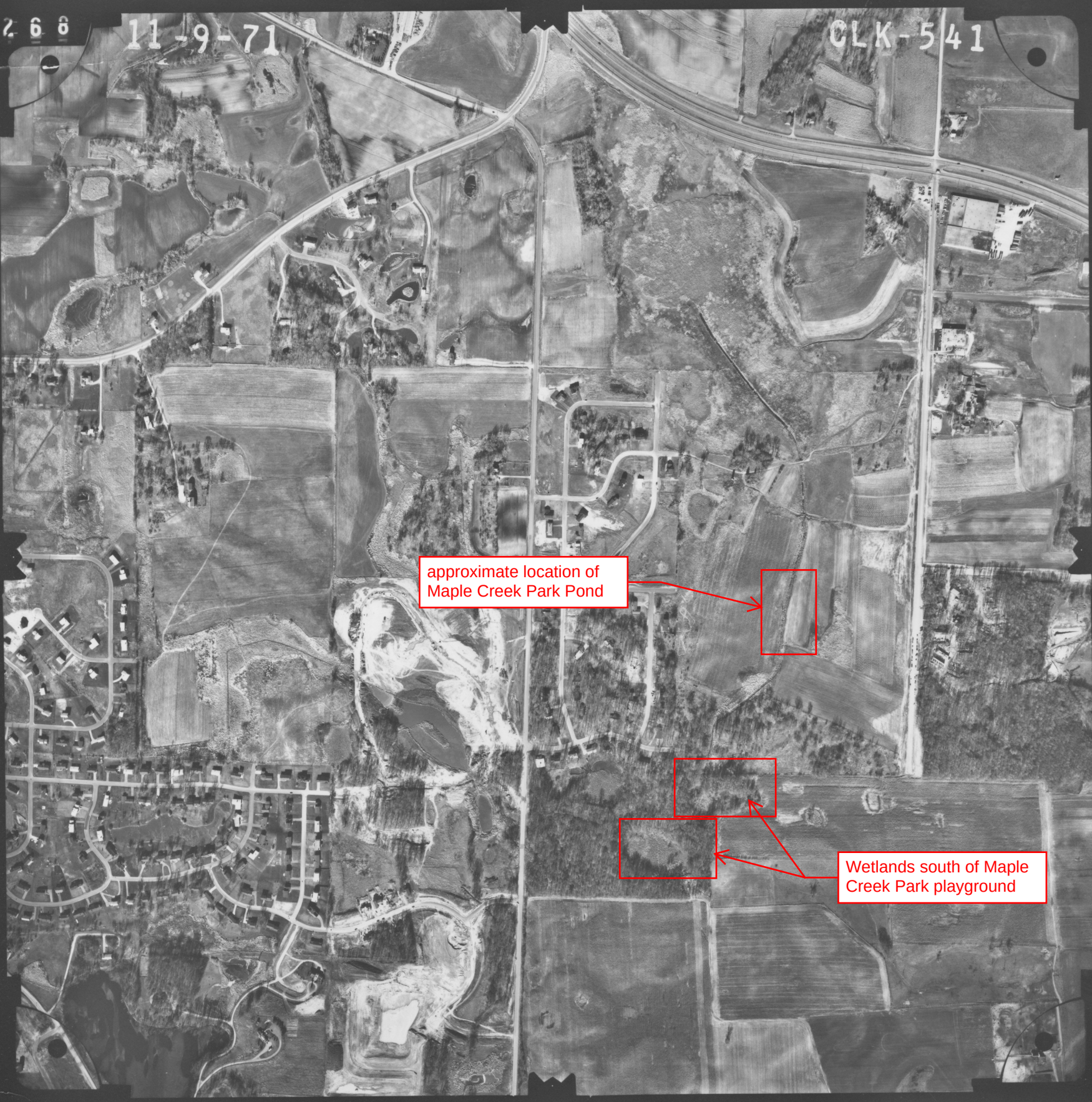
approximate location of Maple Creek Park Pond
Wetlands south of Maple Creek Park playground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approximate location of Maple Creek Park Pond
Wetlands south of Maple Creek Park playground

Stantec

Draft Memo

To:	Becky Christopher, MCWD Kate Moran, MCWD	From:	Rena Weis Chris Meehan, PE (MN)
File:	227703140	Date:	August 26, 2021; revised September 20, 2021

Reference: DRAFT Maple Creek Drainage Review

INTRODUCTION

The City of Plymouth has several projects in its capital improvement plan (CIP) within the Gleason Lake drainage area that are focused on addressing local drainage and flooding issues. Because Gleason Lake is impaired for nutrients, the City has been exploring opportunities to incorporate water quality improvements into these projects and has approached Minnehaha Creek Watershed District (MCWD or District) for cost-share funds under the Pilot-Responsive Model. One project area that has been identified as having potential for water quality improvement is in the Maple Creek Drainage Improvement Project, which includes the following components:

1. Maple Creek Pond Improvements:
    a. Dredging pond to excavate settled sediment within permanent pool of pond
    b. Construction of an iron enhanced sand filtration (IESF) bench at pond's normal water level
    c. Reconstruction of existing outlet structure for the pond to facilitate use of filtration bench
    d. Realignment of existing trail to maximize filtration bench footprint
2. Steeplechase Wetland Improvements:
    a. Ditch maintenance on Zanzibar Ditch including sediment removal and stabilization measures
    b. Wetland expansion
    c. Construction of diversion structure near Steeplechase Development

This memorandum serves to document our review of the materials provided by the City of Plymouth and their consultant (WSB). The review was completed with the goals of identifying if any supplemental materials are required to review before further considering cost-share, confirming if load reduction and cost estimates are reasonable, and identifying any potential permitting challenges that need to be addressed. The following materials were reviewed:

- Maple Creek Drainage Improvements MCWD Summary Memo (dated 8/30/2021)
- Maple Creek Existing Conditions and Grading Plan (dated 8/6/2021)
- Maple Creek Inundation Maps (dated 8/9/2021)
- Bathymetric survey figure for the Maple Creek Park Pond (dated 10/28/2020)

Reference: **Maple Creek Drainage Review**

- Existing and Proposed HydroCAD models
- Existing and Proposed Conditions P8 models
- Maple Creek Water Quality Assumptions (dated 8/9/2021)

REVIEW OF MODELING AND SUPPLEMENTAL DATA - ISSUES IDENTIFIED

Design plans, HydroCAD, and P8 models were reviewed for design, maintenance feasibility, and alignment with the goals of the District's pilot responsive model, to help the District make an informed decision about the partnership opportunity.

1. Maple Creek Pond Improvements:

The review of the Maple Creek Pond Improvements focused on the proposed iron enhanced filter bench, as the pond dredging is a regular maintenance activity that the City has not requested cost-share dollars for.

The current design shows that the normal water level will be set by the filter bench at 990.0-ft. The overflow elevation, set by the weir at the pond outlet, is at 991.5-ft. The City has shown that the outlet modifications will not impact high water levels for the area. In the event the filter media forms a crust, or the filter/drain tile becomes clogged, it will be difficult to drain the water from the pond to perform maintenance activities on the filter. We recommend installing a small (i.e. 1-inch) orifice with a sluice gate in the weir wall of the pond's outlet structure to allow maintenance personnel to drain the filter and perform maintenance. This item does not need to be addressed prior to the District making a cost-share decision and can be considered as the project moves through the final design and permitting phase.

We recommend requesting an operation & maintenance plan. Depending on the equipment that is intended to be used for maintenance, the designer should consider designing the reconstructed trail to accommodate maintenance equipment. This item does not need to be addressed prior to the District making a cost-share decision and can be considered as the project moves through the final design and permitting phase.

The plans currently show two 6-inch perforated drain tiles routed to a single 6-inch perforated drain tile prior to filtered water entering the outlet structure. Confirm that the pipe receiving the 6-inch drain tiles will have enough hydraulic capacity (i.e. consider routing the two 6-inch drain tiles to a single 8-inch pipe prior to the outlet structure). This item does not need to be addressed prior to the District making a cost-share decision and can be considered as the project moves through the final design and permitting phase.

2. Zanzibar Ditch:

The ditch appears to receive inputs directly from the City storm sewer, so in our opinion, the proposed cleanout activities should be considered a regular maintenance activity rather than construction of a BMP. No clarification is necessary for this item.

3. Steeplechase Wetland Improvements:

It appears that the City's intent is to regularly remove sediment from the Steeplechase wetlands, essentially converting them to BMPs. We suggest requesting clarification on this intent and reviewing the

operation & maintenance plan. It may be more efficient to focus efforts on one wetland, rather than three, to reduce maintenance needs. We recommend receiving clarification on this item prior to the District making a cost-share decision, if this portion of the project will be included as part of District funding.

EVALUATION OF WATER QUALITY BENEFITS

After reviewing the water quality calculations provided for the various project components, we have the following comments:

1. Maple Creek Pond Improvements:

P8 modeling for Maple Creek Pond indicates that the BMP (iron enhanced sand filter bench) will result in a TP removal of 19 lbs/year. P8 modeling has been revised by WSB since the initial review to more accurately represent the filtration efficiency by particle size that would be provided by the filter bench. To better align with MPCA recommendations for modeling, the City could further revise the P8 particle parameters to show 25% removal of the P10% fraction; the model currently shows 75% removal of this particle size range, but has underestimated removals for the other particle size ranges.

2. Zanzibar Ditch:

The Zanzibar Ditch water quality benefits were evaluated by WSB using the BWSR Water Resource Pollution Reduction Estimator 2.0. We reviewed the assumptions used for the Estimator as outlined in the Maple Creek Water Quality Assumptions document. Based on our experience, the pollutant removals appear significantly larger than we would expect. We suggest requesting more detailed information about how the removals were calculated, including estimated flow velocities through the ditch. We recommend receiving clarification on this item prior to the District making a cost-share decision, if this portion of the project will be included as part of District funding.

3. Steeplechase Wetland Improvements:

Based on our review, we understand that the City intends to excavate three existing wetlands to increase the permanent pool volume and promote sedimentation, essentially converting them into regularly maintained BMPs. The water quality benefits presented in the provided P8 modeling are reasonable.

PERMITTING REQUIREMENTS

Based on our review, we've identified the following items that will need to be addressed in the permitting phase. This list is not necessarily comprehensive.

- We understand that the City plans to pursue a no-loss determination under the Wetland Conservation Act (WCA) on the basis that accumulated sediments are proposed to be removed from the wetlands. If this determination is not achieved, then the project will be subject to the District's Wetland Protection Rule, which states that excavation of wetlands not subject to the WCA shall be replaced at the ratio of 2:1. The City will need to address WCA and/or District requirements prior to excavating within the Steeplechase Wetlands.

- Verify that the Maple Creek Park Pond is a constructed stormwater basin, rather than a wetland.

Reference: **Maple Creek Drainage Review**

- The City will need to show that there will not be hydraulic impacts upstream, and we recommend confirming that inundation areas and durations will not be significantly increased for upstream or adjacent properties for the 1-, 10-, and 100-year events.
- The City's memo indicates that modeling shows that the proposed Steeplechase Diversion work will not increase rates to any downstream location. The existing and proposed HydroCAD models have been reviewed and following rates were extracted from the models. The models show that the discharge from Maple Creek Park Pond will increase for the 10-year event, and that rates to 19th & Dunkirk downstream of Steeplechase Wetlands will increase for the 2-, 10-, and 100-year events. The applicant should show that rate control is met during the final design and permitting phases.

Table 1: Rate table for selected discharge locations; based on HydroCAD models provided by City

Discharge Location	2-year		10-year		100-year	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
Maple Creek Park Pond Outlet	33.3	6.1	14.9	24.5	96.2	83.6
Steeplechase Wetland Outlet	32.2	24.8	53.2	38.4	123.4	117.9
Flow to 19th & Dunkirk	0	6.05	6.5	8.8	65.8	80.2
Flow to Storm System	32.2	18.7	46.7	29.6	57.6	37.7

COST / BENEFIT AND RECOMMENDATIONS

Water quality benefits are typically cost effective if they can be implemented for $500 to $2,000 per pound of TP removed over the project lifecycle (20 years). Additional factors may be considered when evaluating a cost / benefit analysis such as project location and additional ancillary benefits of the project (i.e. floodplain creation, bank stabilization, educational / outreach opportunities).

The two components of this project (Maple Creek Park Pond and Steeplechase Wetland Improvements) have been evaluated independently from the cost / benefit perspective.

Reference: Maple Creek Drainage Review

1. The City has estimated that the lifecycle cost benefit of the proposed work in the Maple Creek Park Pond is approximately $1,100 per pound of TP removed. Over the project's 20-year lifecycle, the improvements included in this component are estimated to result in 380 pounds of TP removal.

2. The City has estimated that the Steeplechase Wetland Improvements (including Zanzibar Ditch work) has a lifecycle cost benefit of approximately $2,100 per pound of TP removed. Over the project's 20-year lifecycle, the improvements included in this component are estimated to result in 120 pounds of TP removal.

Based on the proposed cost effectiveness of TP removal, as well as our understanding of the project designs, it is our recommendation that the District pursue partial cost-share for the proposed work.

1. Maple Creek Park Pond component; recommend consideration of partial cost-share;

    a. Water quality modeling has been reviewed and the estimated removal of total phosphorus is reasonable (estimated 19 pounds of TP removal per year).

    b. Reasonable cost / benefit ($1,100 per pound of TP) over the lifecycle of the proposed project for this component; within recommended cost / benefit range.

    c. Not recommended to provide cost-share for the pond dredging / excavation portion of this component, as this is a regular pond maintenance activity.

2. Steeplechase Wetland component, including Zanzibar Ditch; do not recommend cost-share consideration:

    a. Unclear water quality benefit calculations related to TSS removals for work within Zanzibar Ditch; likely over estimated.

    b. Minimal water quality benefit related to TP removals due to wetland excavation and work within Zanzibar Ditch (estimated 4 pounds of TP removal per year due to wetland excavation; estimated 2 pounds of TP removal per year due to Zanzibar Ditch maintenance).

    c. Permitting challenges related to wetland excavation.

    d. Higher cost / benefit over the lifecycle of the proposed project for this component; outside of recommended cost / benefit range.