



Title:	Ordering of the Maple Creek Pond Improvement Project
Resolution number:	21-069
Prepared by:	Name: Kate Moran Phone: 952-641-4520 k Moran@minnehahacreek.org
Reviewed by:	Name/Title: Becky Christopher, Policy Planning Manager
Recommended action:	Ordering of the Maple Creek Pond Improvement Project
Schedule:	October 21, 2021: MCWD Public Hearing and Consideration of Project Ordering November 4, 2021: Approval of Funding Agreement and Amendment of 2022 Budget January 2022: Anticipated construction commencement by City of Plymouth
Budget considerations:	Fund name and code: Responsive CIP, 3-3500 2022 fund budget: \$0 with \$250,000 held assigned (requires budget amendment) Expenditures to date: \$0 Requested amount of funding: \$0
Past Board action:	Res # 21-053: Concurrence with Staff Recommendations for Project Opportunities Reviewed through Pilot Responsive Program Res # 21-064: Directing Notice of Public Hearing to Consider Ordering the Maple Creek Drainage Improvement Project

Summary:

Background

The Minnehaha Creek Watershed District (District or MCWD) recognizes that protection and improvement of water resources is best achieved through close coordination with its cities and others acting on the landscape. Therefore, the District seeks to leverage opportunities created through land-use change and partner projects to make measurable progress toward District goals, such as addressing water quality impairments. The District's 2017 Watershed Management Plan (WMP) identifies opportunity-based stormwater management projects in the Capital Improvement Plan (CIP), including for the Gleason Lake subwatershed, with the purpose of reducing stormwater volume and nutrient loads to impaired waters.

Pilot Phase of Responsive Program

The District is developing the Responsive Program to guide the District's process for identifying, evaluating and responding to opportunity-based stormwater management projects as identified in the 2017 WMP. 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.

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 (i.e., Technical Advisory Committee) in early 2022 and then seeking Board adoption. Under this pilot phase, the City of Plymouth coordinated

with the District to identify opportunities in the City's CIP to integrate water quality improvements to benefit impaired Gleason Lake.

City of Plymouth's Request for Funding Support

Based on this coordination, the District received a request from the City for funding assistance for the Maple Creek Drainage Improvement Project on June 30, 2021. The project was first discussed with the Board at the July 8th Operations and Programs Committee (OPC) Meeting followed by the July 22nd Board concurrence of staff recommendations to further explore the opportunity with the City (Resolution 21-053). In an updated Project Summary Memo received on August 30th (see Attachment 1), the City requested funding assistance of up to \$405,500 for the project, which is separated into two distinct project components – the Maple Creek Pond area and Steeplechase Development Wetland area. The project is estimated to achieve a total phosphorus (TP) reduction of 25 lbs/yr (19 lbs/yr for Maple Creek Pond area and 6 lbs/yr for Steeplechase Development Wetland area). District staff updated the Board at the September 9th OPC Meeting, based on the revised water quality benefit and cost-effectiveness estimates provided.

Project Evaluation and Recommendation

These two project components were evaluated separately through the District's review process under the pilot phase of the Responsive Program. Based on the review of staff and the District Engineer (refer to Attachment 2), staff has recommended that the District provide funding support for the Maple Creek Pond area and decline funding for the Steeplechase Development Wetland area. On September 23, 2021, the MCWD Board of Managers concurred with staff's recommendation and directed notice of a public hearing to consider ordering of the Maple Creek Pond Improvement Project (Project) ([Resolution 21-064](#)).

Ordering of Maple Creek Pond Improvement Project

The Project includes construction of an iron-enhanced sand filtration system to improve water quality by addressing phosphorus loading in downstream Gleason Lake. The Project is estimated to achieve a TP load reduction of 19 lbs/yr. The total Project cost is \$241,000, with proposed District funding of 50 percent of project design and construction costs, not to exceed \$100,000.

In accordance with Minnesota Statutes 103B.251, before entering into a commitment to incur project costs for construction of a capital project, the Board of Managers must hold a public hearing and order the project on the basis of a finding that the project will advance the District's water resource goals and should proceed. The public hearing has been duly noticed for October 21, 2021 (Agenda Item 10.1) and will be held prior to Board's consideration of this request for project ordering. Pending public input, staff is requesting project ordering of the Maple Creek Pond Improvement Project under Resolution 21-069.

Under this resolution, District funding will be contingent on the Board's approval of a Funding Agreement with the City establishing terms and conditions for use of funds. In coordination with District Counsel, a draft term sheet (Attachment 3) has been developed to outline key terms and conditions that would be incorporated into the Funding Agreement between MCWD and the City. Staff will be seeking Board input on the proposed terms to inform further discussion with the City.

The proposed next steps for the Project are provided below:

- November 4, 2021:
 - Approval of Funding Agreement between City and MCWD
 - Amendment of 2022 Budget
- January 2022:
 - Anticipated construction commencement by City

Supporting Documents:

Attachment 1: City of Plymouth's Funding Request and Project Summary

Attachment 2: District Engineer Review Memo

Attachment 3: Draft Term Sheet for Funding Agreement between City and MCWD



RESOLUTION

Resolution number: 21-069

Title: Ordering of Maple Creek Pond Improvement Project

- WHEREAS, the Minnehaha Creek Watershed District (District) 2017 Watershed Management Plan (WMP) outlines the District's 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 consistent with the goals and priorities of the WMP 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, 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, District staff evaluated the City's request using the aforementioned criteria and recommended that the District contribute funding for the Maple Creek Pond component in an amount of 50 percent of project design and construction, not to exceed \$100,000, and that the District decline to contribute funding for the Steeplechase Wetland component;
- WHEREAS, on September 23, 2021, the District Board of Managers (Board) concurred that the Maple Creek Pond component should be considered for project ordering and that the District should not further consider funding for the Steeplechase Wetland component;

WHEREAS, District staff have outlined terms of a funding agreement with the City that include expectations for District review and concurrence in final plans for the Maple Creek Pond Improvement Project, and for City construction and maintenance of the project, and the Board finds those terms to be reasonable and sufficient to support District investment in the project;

WHEREAS, in accordance with Minnesota Statutes §103B.251, subdivision 3, the District held a duly noticed public hearing on ordering of the Maple Creek Pond Improvement Project on October 21, 2021, at which time all interested parties had the opportunity to speak; and

WHEREAS, the Board of Managers has considered the recommendations of the District staff and District Engineer and the comments of interested parties and finds the Maple Creek Pond Improvement Project, implemented consistent with the proposed funding agreement terms, will be conducive to public health and promote the general welfare, and is in compliance with Minnesota Statutes §§103B.205 to 103B.255 and District's WMP; and

NOW, THEREFORE, BE IT RESOLVED that pursuant to Minnesota Statutes §103B.251 and the WMP, the Minnehaha Creek Watershed District Board of Managers hereby orders the Maple Creek Pond Improvement Project; and

BE IT FURTHER RESOLVED that District funding will be established through a funding agreement that District and City staff will prepare and present to the Board and to the City Council for approval.

Resolution Number 21-069 was moved by Manager _____, seconded by Manager _____. Motion to adopt the resolution ___ ayes, ___ nays, ___ abstentions. Date: 10/21/2021

Secretary Date: _____

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

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

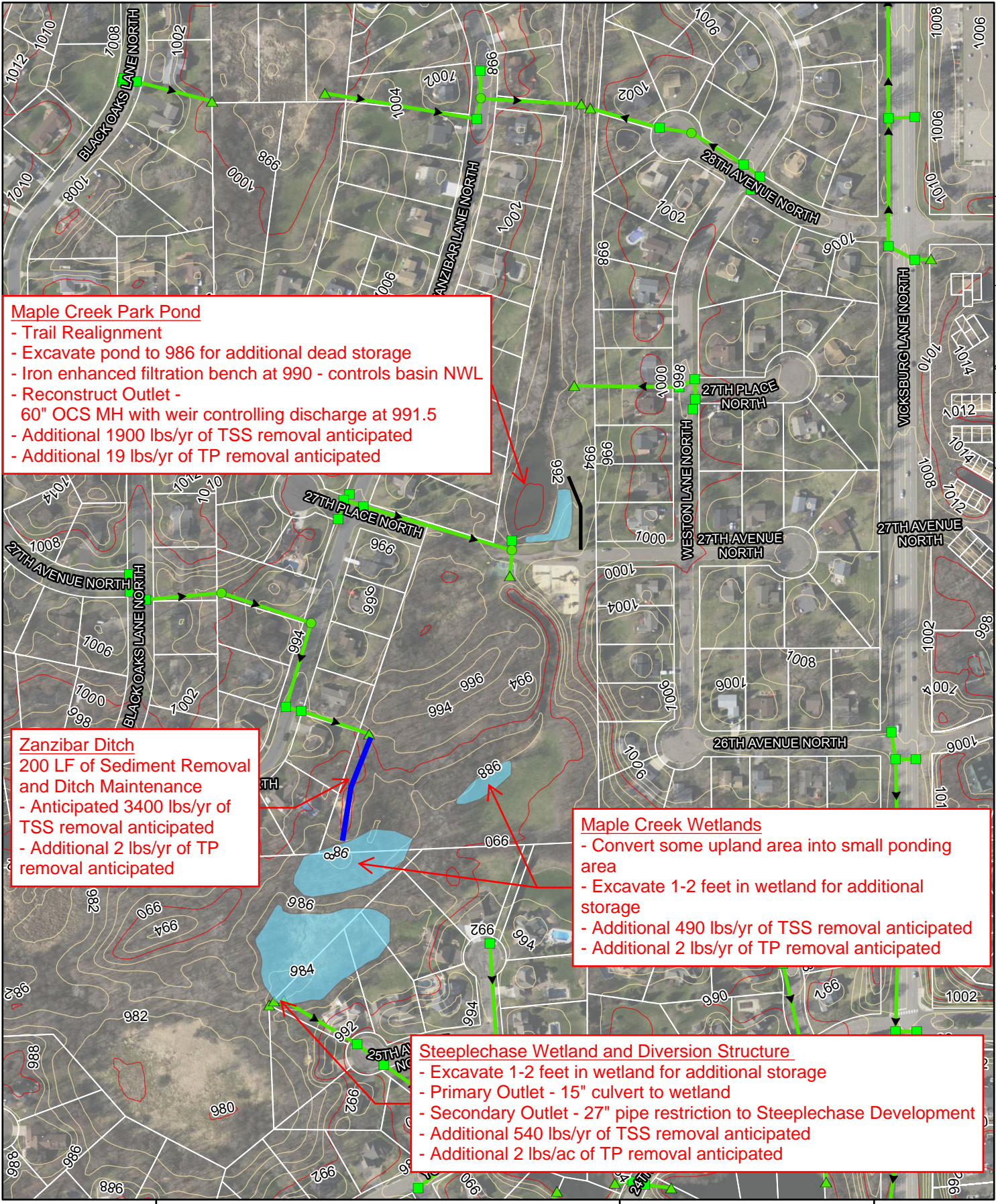
	Construction + Contingency + Indirect Costs	20-Yr Life Cycle Costs	Overall Project Costs	TP Removals (lbs/yr)	TP Removals Over 20-Yr Life Cycle (lbs)	Life Cycle Cost Benefit (\$/lb TP)
Schedule A. Maple Creek Park Pond	\$241,000	\$175,000	\$416,000	19	380	\$1,094.73
Schedule B. Steeplechase Wetland Improvements	\$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



Maple Creek Park Pond

- Trail Realignment
- Excavate pond to 986 for additional dead storage
- Iron enhanced filtration bench at 990 - controls basin NWL
- Reconstruct Outlet - 60" OCS MH with weir controlling discharge at 991.5
- Additional 1900 lbs/yr of TSS removal anticipated
- Additional 19 lbs/yr of TP removal anticipated

Zanzibar Ditch

200 LF of Sediment Removal and Ditch Maintenance

- Anticipated 3400 lbs/yr of TSS removal anticipated
- Additional 2 lbs/yr of TP removal anticipated

Maple Creek Wetlands

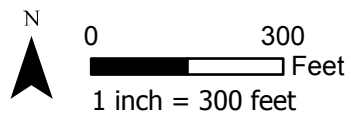
- Convert some upland area into small ponding area
- Excavate 1-2 feet in wetland for additional storage
- Additional 490 lbs/yr of TSS removal anticipated
- Additional 2 lbs/yr of TP removal anticipated

Steeplechase Wetland and Diversion Structure

- Excavate 1-2 feet in wetland for additional storage
- Primary Outlet - 15" culvert to wetland
- Secondary Outlet - 27" pipe restriction to Steeplechase Development
- Additional 540 lbs/yr of TSS removal anticipated
- Additional 2 lbs/ac of TP removal anticipated



Project Location
Maple Creek Drainage Improvements
City of Plymouth, MN



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

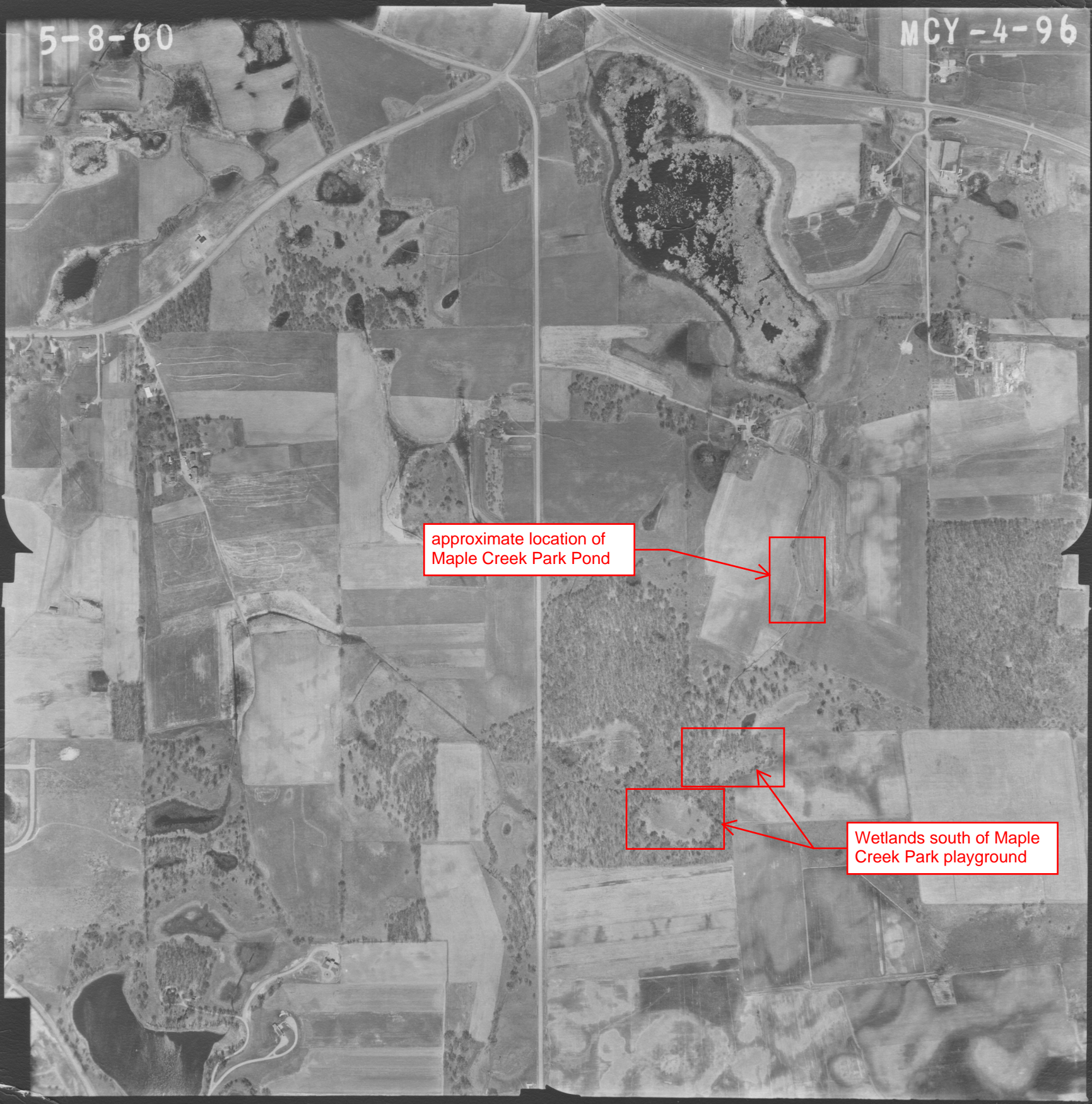
Item No.	MN/DOT Specification No.	Description	Unit	Estimated Total Quantity	Estimated Unit Price	Estimated Total Cost
SCHEDULE B. STEEPLECHASE WETLAND IMPROVEMENTS						
1	2021.501	MOBILIZATION	LS	1	\$15,000.00	\$15,000.00
2	2101.505	CLEARING & GRUBBING	TREE	15	\$800.00	\$12,000.00
3	2104.503	REMOVE 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

5-8-60

MCY-4-96

approximate location of
Maple Creek Park Pond

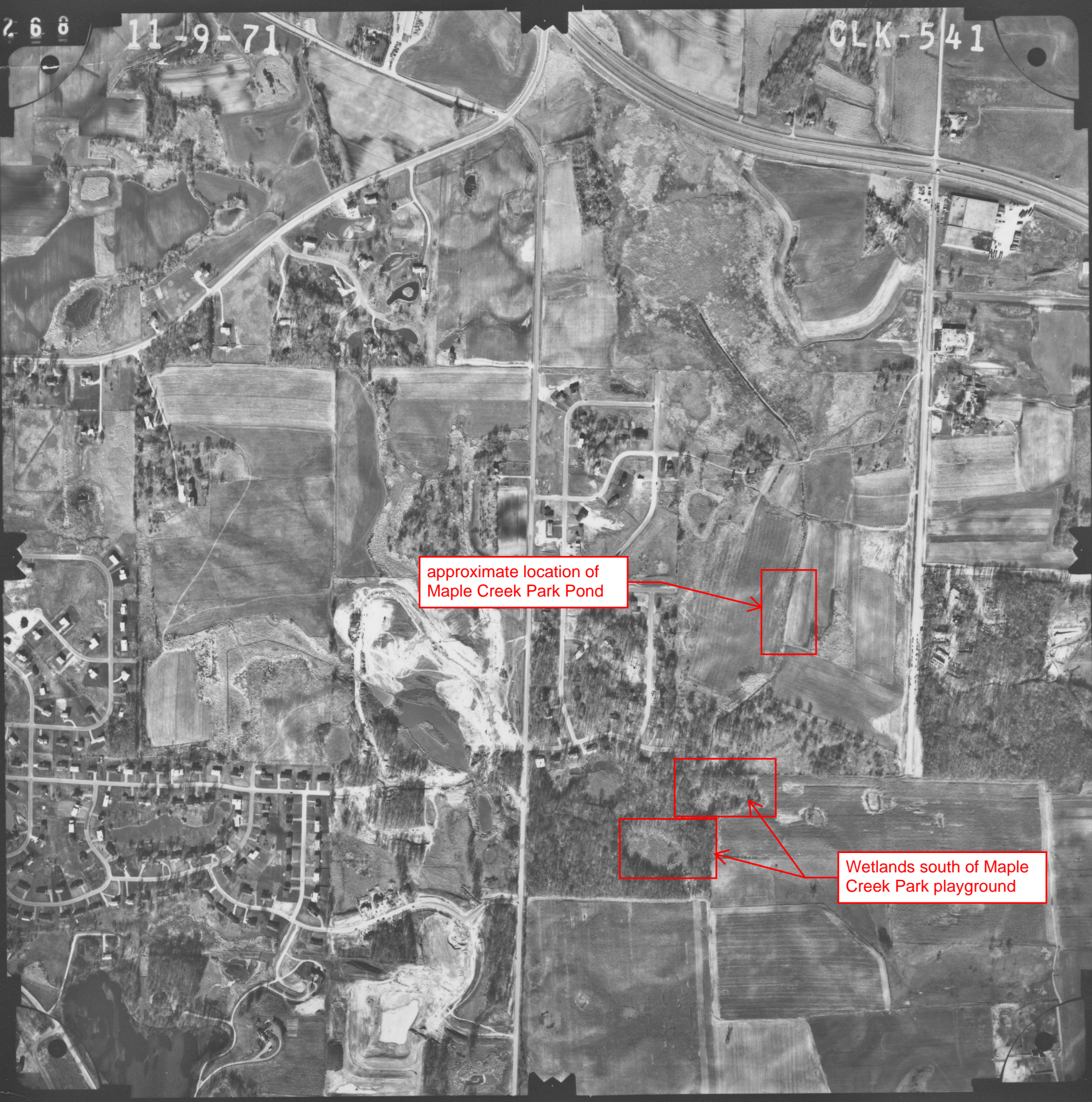
Wetlands south of Maple
Creek Park playground



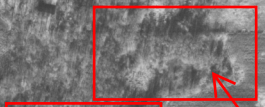
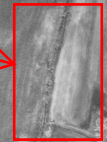
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approximate location of
Maple Creek Park Pond



Wetlands south of Maple
Creek Park playground

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

Reference: Maple Creek Drainage Review

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 19 th & 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.

**DRAFT – Funding Term Sheet for the Maple Creek Pond Improvement Project
MCWD and City of Plymouth**

- District must concur in plans
- Funding:
 - 50% of contracted design and construction cost, NTE \$100K
 - Disbursement on submittal of:
 - certificate of substantial completion,
 - design/construction invoices and as-builts,
 - demonstration of performance
 - Retained: 10% until site vegetation reestablished
- District must be notified with opportunity to inspect:
 - before placement of bed;
 - when bed material is being placed on site;
 - on substantial completion; and
 - when vegetation reestablished.
- Contract Requirements: Contractor must submit sand analysis after materials is placed on-site
- Operations & Maintenance Plan:
 - Project shall be maintained for 20 years
 - Not recorded, but must assign or retain access right if land ownership changes
 - Maintenance terms explicitly including medium tilling and replacement
 - Plan drafted or reviewed by Public Works staff (or other responsible party)
- Performance Monitoring and Reporting:
 - Pond and effluent samples for minimum of 4-5 storm events per year, and level logger
 - Annual monitoring for first 4 years followed by biannual monitoring for project life
 - Reporting: All performance monitoring will be submitted to District
- Performance Standard:
 - Performance standard of 20 lbs/yr of TP removed (+/- 20 percent, or establish removal rate)
 - Percentage reimbursement (based on 20-year project life) of District for period installation not meeting performance standard (if performance is reinstated, can extend project lifetime beyond 20 years rather than reimburse)
- District indemnified and held harmless for project design & construction
- Cooperate on public communications
- Maintain informational signage