



Memorandum

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co.
Subject: Item 5B – Consider Approval of 90% Plans for Crane Lake Improvement Project (CL-1) via Ridgedale Drive – Minnetonka, MN
Date: May 8, 2019
Project: 23/27-0051.45 2019 640

5B. Consider Approval of 90% Plans for Crane Lake Improvement Project (CL-1) in Minnetonka

Summary:

Proposed Work: Crane Lake Improvement Project (CIP 2020 CL-3) as part of Ridgedale Drive Reconstruction

Basis for Review at Commission Meeting: CIP Project Feasibility Study Review

Recommendations: Conditional approval of 90% Plans

Background

The Bassett Creek Watershed Management Commission's (BCWMC) 2015-2025 Watershed Management Plan (Plan) addresses the need to improve the quality of stormwater runoff reaching the Mississippi River by reducing nonpoint source pollution, protecting and enhancing fish and wildlife habitat, reducing stormwater runoff volume to improve water quality, and taking into account aesthetics and recreational opportunities within the watershed. The Plan's 10-year Capital Improvement Program (CIP, Table 5-3 in the Plan, as amended) includes a project for retention of impervious area drainage in the Ridgedale Center area. The BCWMC approved the 5-year (working) CIP at their April 19, 2018 meeting, which included implementation of the Crane Lake Improvement Project (CIP #CL-3), as part of the Ridgedale Drive reconstruction project, in 2020.

Feasibility Study Summary

At their March 21, 2019 meeting, the Commission reviewed the City of Minnetonka's feasibility study (*2020 Crane Lake Improvement Project (Water Quality Improvements to be Incorporated into the 2019 Ridgedale Drive Reconstruction Project)* (WSB, February 22, 2019; updated March 14, 2019)), which examined the feasibility of water quality improvement alternatives to treat runoff from Ridgedale Drive and the Sheraton Minneapolis West Hotel parking lot before discharging to Crane Lake (see red-hatched area on attached Figure 2 from the feasibility study).

The feasibility study identified three water quality improvement options, including:

- Option 1 – Construct an underground treatment system beneath the existing Sheraton Minneapolis West hotel parking lot

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- Option 2 – Construct an underground treatment system beneath a proposed park just east of Ridgedale Drive.
- Option 3 – Construct an underground treatment system beneath a proposed park just east of Ridgedale Drive to act as pre-treatment (Option 2) before being pumped to a sand infiltration/filtration system in the Crane Preserve Park.

The Commission approved the feasibility study, selected Option 3 for implementation, and provided partial BCWMC CIP funding for the project, through the BCWMC's ad valorem levy (via Hennepin County), as proposed by the City of Minnetonka.

90% Design Review Summary

The 90% design plans include the designs for Option 3 from the feasibility study. Option 3 includes the construction of a 12,250 cubic-foot underground stormwater storage and pretreatment system, a wet well with a 30 gallon-per-minute (0.7 cubic-feet-per-second) pump, and a series of infiltration basins. The plans also include granular filter media and underdrains as a backup to allow for filtration if the site conditions are not conducive to infiltration.

The proposed water quality treatment improvements have not significantly changed since the approval of the feasibility study. However, the city's consultant used a modified particle size distribution with a higher particulate phosphorus loading and lower dissolved phosphorus loading in their P8 water quality modeling. The standard particle size distribution when using P8 water quality modeling software is the Nationwide Urban Runoff Program (NURP50) particle size distribution. The BCWMC Engineer evaluated the same system using the standard NURP50 particle size distribution and found that the stormwater treatment system provides slightly lower pollutant removals. The table below compares the total phosphorus (TP) and total suspended solids (TSS) reductions in the feasibility study to the BCWMC Engineer's P8 modeling results, based on the current 90% design plans.

Table 1: Features, Costs, and Benefits of Recommended Options

Submittal		Watershed Area (acre)	Pollutant Addressed	Raw Loading (Pound/Year)	Existing Percent Removal (%)	Proposed Percent Removal ² (%)	Annual Pollutant Removal ² (Pound/Year)	Total Project Capital Cost (\$)	Annualized 30-Year Life Cycle Cost (\$/Year)	Annualized Cost per Pound of Pollutant Removed (\$/Pound/Year)
Feasibility Study	Construct an underground treatment system beneath a proposed park just east of Ridgedale Drive and pump stormwater to a sand infiltration or filtration system in the Crane Preserve Park	13.3	TSS	4,800	0	72 to 75	3,434 to 3,599 ³	\$582,837	\$17,200 ¹	\$4.80 to \$5.00
			TP	17.9	0	47 to 60	8.4 to 10.7 ³			\$1,600 to \$2,050
90% Plans Submittal	Construct an underground treatment system beneath a proposed park just east of Ridgedale Drive and pump stormwater to a sand infiltration or filtration system in the Crane Preserve Park	13.3	TSS	4,800	0	73 to 75	3,530 to 3,616 ³	\$582,837	\$17,200 ¹	\$4.76 to \$4.89
			TP	15.5	0	44 to 60	6.8 to 9.2 ³			\$1,870 to \$2,530

¹ Assumes a 30-year maintenance cost of \$200,000 (annual maintenance cost of \$5,000 to clean the underground structure and full replacement of filtration media twice at \$25,000 per replacement) – estimated costs are in 2019 dollars

² Treating the 13.3 acre, untreated drainage area (7.28 acres of impervious, 6.02 acres of pervious). The watershed's P8 model was provided and used by WSB to model and evaluate the BMP improvement options. The estimates shown were derived from P8.

³ Based on anticipated soil conditions, filtration is more likely than infiltration, which is the lesser of the two numbers shown.

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Recommendations

- A. Conditional approval of 90% drawings based on the following comments:
 - 1) The standard NURP50 particle size distribution must be used for the P8 modeling or documentation must be provided to support the modified particle size distribution.
- B. A maintenance plan must be developed and provided to the BCWMC Engineer for review.
- C. The final plans must be submitted to the BCWMC Engineer for administrative review and approval after modifications have been completed.

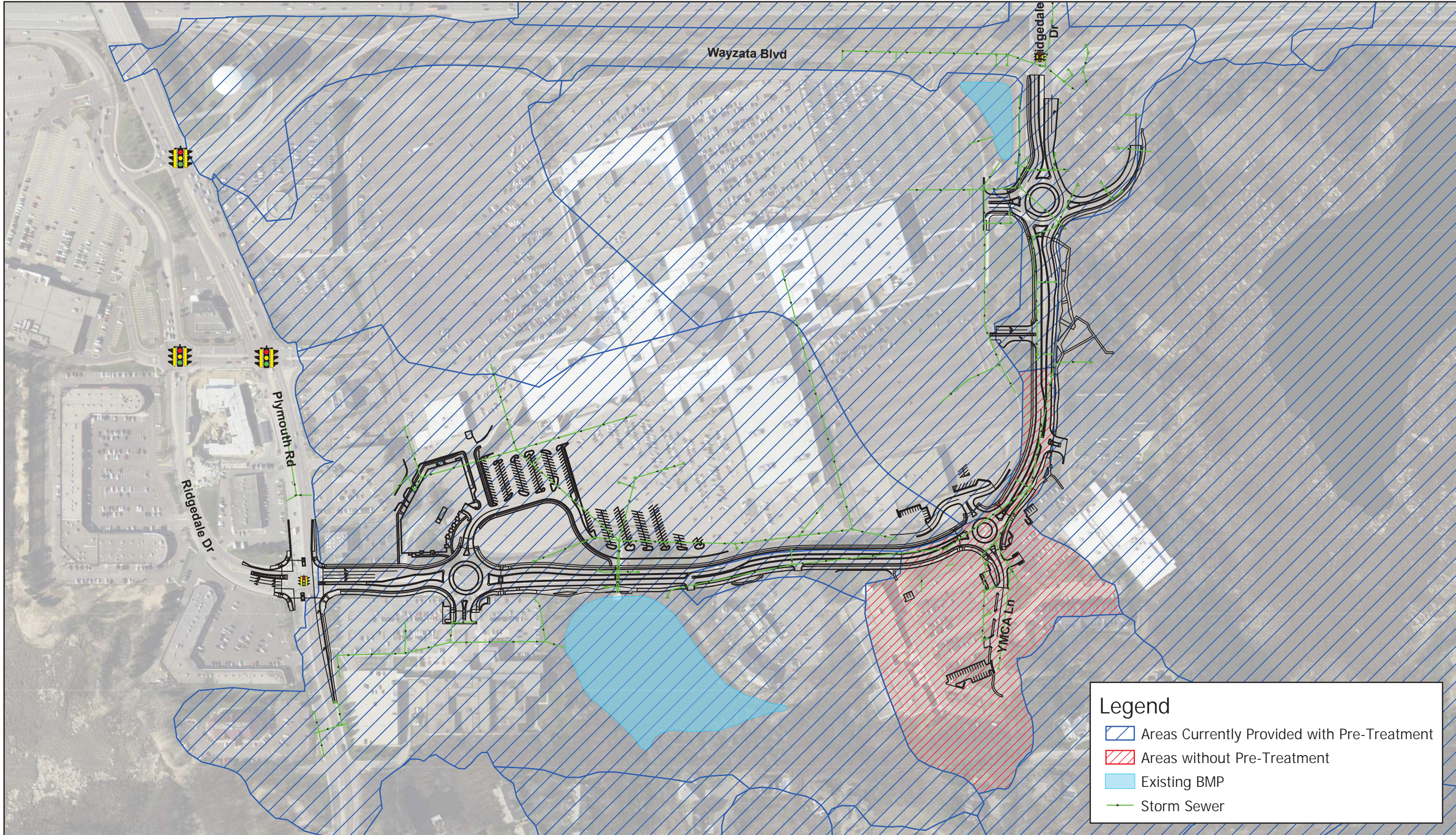


Figure 2: Subwatersheds Served by Ridgedale Drive Drainage System

Ridgedale Drive Improvements (S.A.P. 142-153-008)
City of Minnetonka, Minnesota



0 350
Feet
1 inch = 300 feet

