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Memorandum

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co. (Stephanie Johnson, PhD, P.E., and Jessica Olson, P.E.)
Subject: Item 5A – Consider Approval of 60% Plans for 2025 Plymouth Creek Stream Restoration Project (CIP 2025 CR-P) – BCWMC November 18, 2026 Meeting Agenda
Date: November 12, 2026
Project: 23270051.72-6000-650

5A. Consider Approval of 60% Plans for Phase II of 2025 Plymouth Creek Stream Restoration Project, Plymouth (CIP 2025 CR-P)

Summary:

Proposed Work: Phase II of 2025 Plymouth Creek Stream Restoration Project, Plymouth (CIP 2025 CR-P)
Basis for Commission Review: 60% Plans Review
Change in Impervious Surface: N.A.
Recommendations:

1) Conditional approval of 60% drawings
2) Authorize the City of Plymouth to continue design and bring 90% plans to a future Commission meeting

At their meeting in September 2024, the BCWMC ordered this BCWMC CIP project and entered into an agreement with the City of Plymouth to design and construct the project. The BCWMC received a $400,000 Clean Water Fund grant from the Minnesota Board of Water and Soil Resources for the 2025 Plymouth Creek Stream Restoration (CIP 2025 CR-P). The BCWMC will fund the remainder of the project costs from BCWMC Capital Improvement Project funds paid with Hennepin County property taxes levied on all BCWMC residents. The agreement requires submittal of the 50% and 90% plans and specifications to the BCWMC for approval, in accordance with the BCWMC's CIP project review process. For the 50% review of the project, the City of Plymouth provided 60% plans to the BCWMC for review and comment. As described in more detail later in this memo, the City of Plymouth decided to split the project into two parts, completing the upstream portion first.

This memorandum summarizes the Commission Engineer's review and comments on the 60% design plans for Phase II of the project, covering the lower portion of the targeted stream reach.

Feasibility Study Summary

The BCWMC completed the Feasibility Report for the Plymouth Creek Restoration Project (Barr, May 2024) to examine the feasibility of restoration within the project area in the City of Plymouth. The Plymouth Creek Stream Restoration project area is located along Plymouth Creek from Dunkirk Lane North, on the upstream end, to 38th Avenue North behind Plymouth Ice Center, on the downstream end (Figure 1). The feasibility report identified multiple measures for implementation including:

- Removing trees and invasive vegetation (e.g., buckthorn) and planting native species to restore riparian areas and improve habitat

- Incorporating a variety of stream restoration measures to reduce erosion including streambank grading for improved floodplain connectivity and stability along with vegetation establishment; hard armoring like riprap; and bioengineering techniques such as installing root wads and toe wood, coir logs, vegetated reinforced soil stabilization (VRSS), rock or log j-hook vanes and cross vanes, brush mattresses, and live stakes
- Removing accumulated sediment in targeted areas near culvert crossings
- Constructing a new meandering channel segment to replace a straightened segment of channel near Plymouth Creek Elementary School
- Establishing new vegetation in areas disturbed by construction

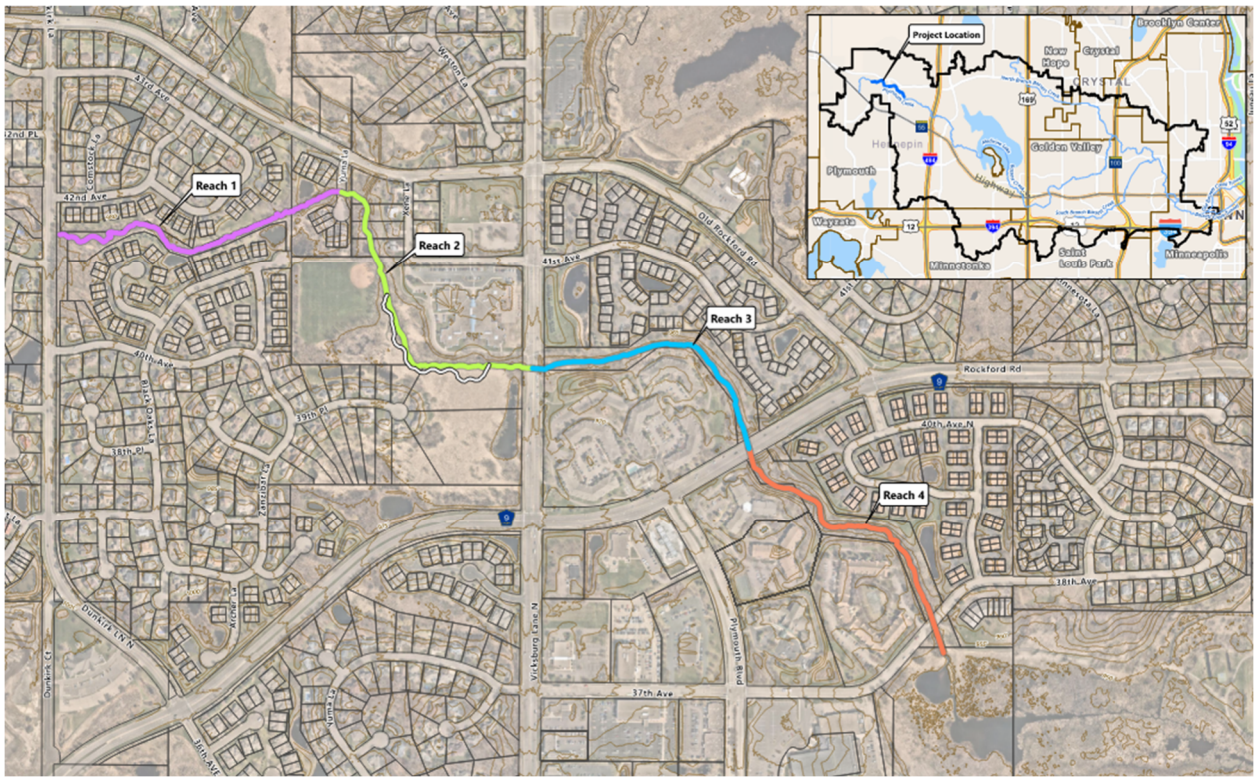


Figure 1: Plymouth Creek Stream Restoration Reach (CIP 2025 CR-P)

The feasibility report also identified, mapped, and prioritized stream sections in need of restoration along the 7,000-foot section of Plymouth Creek. The study identified 26 restoration areas, defined as areas of similar erosion properties and prioritization metrics, within the approximate 7,000-foot assessed reach. The restoration areas are ranked from low to high priority. At their May 15, 2024 meeting, the BCWMC approved the implementation of "Option 3a" to restore and stabilize all identified high, medium, and low priority areas along the stream, improve vegetated buffers along the stream, and create a meander of the stream channel in one section.

The feasibility report estimated that this restoration project would require the removal of approximately 208 trees, 140 of which are buckthorn, box elder, green ash, or Siberian elm (species that are invasive or prone to disease or infestation).

To avoid impacts to nesting northern long-eared bats, the feasibility study recommended that tree removal should occur in the period from October 15 to early April, outside of the bat's active season (mid-April –October 14). If tree clearing would be required during the bat's active season, the feasibility study recommended additional consultation with the US Fish and Wildlife Service.

The feasibility study included a desktop (Level 1) wetland delineation that identified 17.02 acres of wetland within the project area. Most of the delineated wetlands were adjacent to Plymouth Creek and are likely Type 1, Floodplain Forest wetlands. A large wetland complex is located at the northwest intersection of Rockford Road and Vicksburg Lane and is likely a combination of Type 2, Fresh (wet) meadow, and Type 3, Shallow marsh.

The feasibility study estimated that project implementation would reduce the total phosphorus load from the site by 148.4 pounds per year and the total suspended sediment load by 296,720 pounds per year.

At the time the project was ordered, the total cost of the project, including the feasibility study, design, construction, and administration was $2,600,000. Of this cost, the construction costs were estimated at $1,440,000 ($1,728,000 with 20% construction contingency).

60% Plans

The City of Plymouth decided to break out Plymouth Creek 2025 CR-P into two phases due to the level of effort needed to complete the design and construction. The first phase (about one-third of the overall project stream reach) focused on the stream reach from Dunkirk Lane North to the trail crossing near 41st Avenue North, as shown in Figure 2 below. Construction of the first phase was substantially complete October 23, 2026.



Figure 2: Project Area for Phase 1 of 2025 Plymouth Creek Stream Restoration

The second phase of the project will focus on the remainder of the stream reach, from the trail crossing near 41st Avenue North to just south of 38th Avenue North, as seen in Figure 3. The City's goal is to design and permit the second phase of the project in fall/winter 2026 and construct in 2027.

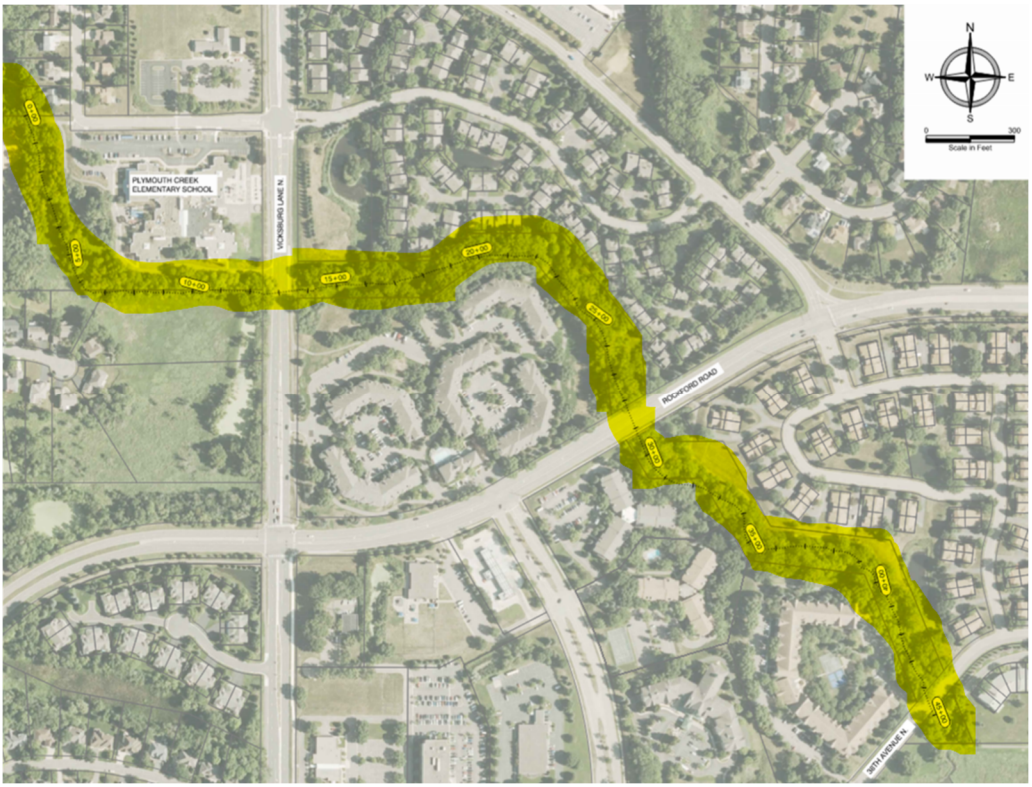


Figure 3: Project Area for Phase 2 of 2025 Plymouth Creek Stream Restoration

The 60% plans for phase two of the project follow many of the recommendations from the feasibility study, including the use of slope grading with seeding and blanketing, vegetative riprap, coir toe, and brush mattress. Notable differences between the 60% plans and the feasibility study recommendations for the selected alternatives are listed below, as provided in the October 6, 2026 design memorandum and November 3, 2026 response to comments from the City's consultant (Moore Engineering).

- The City's consultant conducted a field assessment of the reach to assess changes since the 2023 field work conducted for the feasibility study. The updated field assessment identified additional erosion progression, which resulted in the design including increased stream restoration lengths (for example, more linear feet of vegetated riprap) in some areas. To address the additional identified erosion progression, the 60% design plans show more robust practices such as coir toe or riprap toe to provide increased protection in some areas where the feasibility study recommended using bank grading with vegetation. For specific examples see below:
    - STA 20+18 to 20+82 additional bank grading and brush mat proposed due to the channel being over widened due to deadfall in channel
    - STA 22+87 to 23+47 additional bank grading to address active erosion that was found during field investigation.

- STA 29+58 to 40+07, the feasibility study only identified grading and riprap near station 30+00 to 32+00, 35+50 to 37+00, and 38+00 to 40+00. The City's consultant proposes additional bank grade between 30+00 to 37+00 specifically along the south bank and additional vegetated riprap between 38+00 to 40+00 due to taller steeper banks in the area with active erosion likely due to the higher velocities through this section.

- The feasibility study called for implementation of rock/boulder j-hook vanes. The 60% design plans propose using stream-width rock vanes instead to simplify construction in a relatively small channel.

- The approved project called for re-meandering a section of previously straightened channel. The City's consultant proposes to include a re-meander within the general limits of the feasibility study. Instead of excavating a new channel off-line of the existing channel, the City's consultant proposed an alignment that follows the general existing stream alignment but increases sinuosity by adding meanders. The proposed profile and cross-sectional geometry design is still in progress, but the City's consultant has noted that final design will balance ecological function and hydraulic performance by reestablishing floodplain connectivity while meeting a no-rise condition.

The City's consultant provided a list of trees with a diameter at breast height (DBH) of 6 inches or greater, proposed for removal as part of phase 2 of the project. These trees are proposed for removal because their location overlaps the footprint of the new proposed stream stabilization measures, removal will open the canopy for vegetation establishment, and/or because the tree species are undesirable. The feasibility study proposed removal of 109 healthy trees through this reach. Of the 109 healthy trees proposed for removal in the feasibility study, 36 are desirable species (species that are not invasive or prone to disease or infestation,). The 60% plans propose to remove 526 healthy trees, 52 are desirable species (species that are not invasive or prone to disease or infestation). The City's consultant has indicated that the substantially increased tree removals are generally for the purpose of opening the canopy for vegetation establishment within the riparian area. The City's consultant has also indicated that tree removal numbers in the 60% design may be reduced as the design progresses, and the consultant works with City of Plymouth staff on the need for planting trees within the project footprint to make up for the loss of healthy trees. The 90% design drawings will include updated figures to highlight where specific trees are planned for removal.

Tree Species	60% Plans Healthy (Proximity or Undesirable Species)	60% Plans Dying/Dead	60% Plans Removal Total
Apple	0	3	3
Ash/Green	97	3	100
Aspen	3	0	3
Box Elder	350	7	357
Buckthorn	22	0	22
Cottonwood	3	3	6
Elm/American	3	2	5
Lombardy Poplar	12	1	13
Mountain Ash	5	1	6
Mulberry	3	0	3

Spruce/White	0	1	1
Willow/Black	28	55	83
Totals	**526**	**76**	**602**

The City's consultant did not provide pollutant reduction estimates with the 60% submittal. These calculations should be provided with the 90% design documentation.

The City will host an open house December 1 to give residents the opportunity to review proposed plans, provide feedback and ask questions. The 90% plans should be revised to address feedback received at the open house.

The submitted drawings were at a 60% design stage, which means there are a number of details yet to be worked out before the design is final. The current estimated construction cost for Phase 2 is $923,185. This estimate includes approximately 295 square yards of trail reconstruction at an estimated cost of $8,850. However, since this trail is not essential to construction access, these costs are considered a city improvement and are not eligible for BCWMC reimbursement. Based on the amount of work proposed for Phase 2 and the 90% cost estimate for Phase 1, the 60% Phase 2 construction cost is generally aligned with the remaining estimated total project cost in the feasibility study. Total costs will be reviewed again during the 90% design phase.

As the design progresses, the City must address the comments below in the 90% design plans and specifications, which must be submitted to the BCWMC for review and approval.

Recommendations

A) Conditional approval of 60% plans, recognizing that the current plans reflect the 60% level of design. The following comments must be addressed as part of the 90% plans submittal:

1) The Plymouth Creek 100-year floodplain elevation ranges from 966.0 to 954.7 feet NAVD88 in the project area. The BCWMC floodplain elevation should be shown and called out on the plans. If the project results in fill below the BCWMC floodplain, floodplain fill and cut computations must be provided to demonstrate no net fill in the floodplain.

2) As part of the 90% design the City's consultant must provide an existing and proposed conditions model to show no increase in the Plymouth Creek 100-year flood elevation as a result of the project.

3) Survey, computations, and other field/watershed indicators need to be provided for the 90% design to justify the proposed bankfull width, bankfull depth, bottom width, and channel cross section.

4) Elevations and upstream/downstream stationing must be provided in the 90% design plans for all proposed toe stabilization features. Similarly, if the channel invert will be graded the proposed profile must be provided.

5) Computations must be submitted for the 90% design to justify the riprap and boulder sizing for the project features.

6) Updated pollutant reduction estimates must be provided for total phosphorus and total suspended sediment that reflect the current design.

7) Provide additional justification regarding the proposed increased numbers of healthy tree removals.

8) A summary of the expected permitting requirements must be provided.

9) Areas that have vegetated riprap within the submitted design do not include either a brush mattress or VRSS above the riprap on the bank. This could be a concern because these areas have the potential for high velocity flows during the 10-yr and 100-yr storm events and a robust vegetation establishment will be necessary. Please provide documentation justifying that the revegetation plan above the riprap will achieve the velocity and shear stress requirements to prevent erosion.

10) Please provide the design details for the inlets that are discharging stormwater to the stream. Include details related to design velocities and riprap sizing to protect the outlets and bank protection that will achieve the restoration goals.

11) Please include design details for the new meandered segment that justify the stream restoration and bank stabilization methods that will be provided in the 90% design. Note that constructing the channel off-line could allow for a longer window for vegetation establishment before connecting it to channel flows.

B) Authorize the City of Plymouth to continue design and bring 90% plans and specifications to a future BCWMC meeting.