

Memorandum

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co. (Karen Chandler, P.E., and Jessica Olson, P.E.)
Subject: Item 5A – Consider Approval of 60% Plans for 2024 Ponderosa Woods Stream Restoration Project (CIP 2024 ML-22) – BCWMC October 17, 2024 Meeting Agenda
Date: October 11, 2024
Project: 23270051.62-6000-648

5A. Consider Approval of 60% Plans for 2024 Ponderosa Woods Stream Restoration Project, Plymouth (CIP 2024 ML-22)

Summary:

Proposed Work: 2024 Ponderosa Woods Stream Restoration Project, Plymouth (CIP 2024 ML-22)

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 2023, 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 is funding the 2024 Ponderosa Woods Stream Restoration (CIP 2024 ML-22) through its ad valorem levy (via Hennepin County). The agreement requires submittal of the 50% and 90% plans and specifications to the Commission for approval, in accordance with the Commission'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.

Feasibility Study Summary

The BCWMC completed the Feasibility Report for Ponderosa Woods Stream Restoration Project (Barr, June 2023) to examine the feasibility of restoration within the project area in the City of Plymouth. The Ponderosa Woods stream channel begins northeast of the intersection of Kirkwood Lane North and 18th Avenue North and flows northeast under West Medicine Lake Drive into West Medicine Lake Park, where it meets up with Plymouth Creek, flows through two water quality ponds, and then flows into Medicine Lake (Figure 1). The Ponderosa Woods Stream Restoration project area extends 1,045 feet downstream from the upstream end of the channel. The feasibility report identified multiple locations where bank erosion repairs were needed, in addition to removal of debris, fallen trees, and invasive buckthorn.

The feasibility report identified 4 design options and a final recommendation for the project. The feasibility report included small, medium, and large footprint alternatives, incorporating bioengineering (or soft armoring) approaches combined with bank and channel grading, and in-stream channel controls using rock and other non-vegetative materials for each alternative. At their June 15, 2023 meeting, the Commission approved the implementation of "alternative 1.5" to stabilize streambanks, improve flow and reduce erosion in stormwater side channels, and remove buckthorn along the riparian buffer and within a 2-acre floodplain area at the downstream end of the project. Alternative 1.5 included stream stabilization

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with a combination of bioengineering and hard armoring, habitat improvement, including removal of dead and dying trees and buckthorn clearing, a stormwater sump structure for trapping sediment, and significant woody debris removal from the stream channel. Figure 1 from the June 8, 2023 memo to the BCWMC is included, highlighting the project area. Figure 5-1 from the Feasibility Study is also included, showing the design elements of the selected alternative.

The feasibility report estimated that this restoration project would require the removal of approximately 27 healthy trees, including 3 ash (a less desirable tree) and 4 buckthorn (an invasive species).

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 3.57 acres of potential floodplain forest wetland (PFO1A) located around the Ponderosa Woods Stream, and approximately 0.36 acres of riverine/stream bed aquatic resources (R4SB). The feasibility study noted that a field wetland delineation may be required to confirm the wetland delineation boundaries, but this would be confirmed with the LGU (City of Plymouth) during consultation.

The feasibility study estimated that project implementation would reduce the total phosphorus load from the site by 7.4 pounds per year and the total suspended sediment load by 14,700 pounds per year.

60% Plans

The 60% plans follow many of the recommendations from the feasibility study and include the use of slope grading with seeding and blanketing, stabilization of stormwater outlets, installation of cross vanes, debris clearing, restoring aquatic and riparian habitats, invasive removal, and replacement of a sediment trap sump structure on 18th Avenue North. Notable differences between the 60% plans and the feasibility study recommendations for the selected alternatives are listed below, as provided in the September 9, 2024 submittal memorandum from the city's consultant (Midwest Wetland Improvements, LLC). Provided that the comments presented later in this memo that apply to the following design features are addressed in future project submittals, the Commission Engineer does not consider any of the following changes to represent a significant departure from the intent of the project as evaluated in the feasibility study.

- Addition of a settling basin where the two side channels east of the creek converge near the creek. The feasibility study recommended defining the stormwater side channels and merging them before they enter the main channel. The 60% plans (sheet C-110) show a circular merging area, and the area is described in the design memo as a settling basin to provide an additional sediment trap that may provide some off-channel habitat.
- Completing less bank regrading and bioengineering at targeted locations than outlined in the feasibility study. The design memo notes that less regrading is needed because the cross vanes are intended to help re-establish the floodplain naturally through stream evolution. Any bank regrading will be intended to capture sediment deposition and revegetation on a natural cycle.
- Proposed rock riprap cross vanes in place of boulder cross vanes in a configuration that extends across the entire existing channel with a trapezoidal notch. This will function in a similar way to the boulder vanes proposed in the feasibility study: concentrating flow in the thalweg, maintaining the channel grade upstream of the structure, and focusing channel flows in the center of the

channel. The main difference is the size of material used in the structures, and the design needs to document appropriate riprap sizing based on a range of design shear stresses.

The feasibility study proposed removal of 27 healthy trees, and replacement with 27 tree plantings. Instead of planting replacement trees, it is the City’s preference to maintain a more open canopy and revegetate areas where trees are removed with native grasses and flowers to help stabilize the riparian zone. The 60% plans show and list the trees that will be removed for the project. Sheet C-101 shows the trees within the project area and those that will be removed. Sheet C-102 lists in a table the trees in the project area that will remain, and sheet C-103 lists in a table the trees that will be removed. The table below provides information about the trees proposed for removal.

Tree Species	Healthy	Dying / Dead	Removal Total
Amur Chokecherry	1	0	1
Ash/Green	3	11	14
Basswood/American	0	1	1
Box Elder	7	24	31
Buckthorn	5	0	5
Cottonwood	4	9	13
Elm/American	7	6	13
Maple/Sugar	1	1	2
Totals	28	52	80

The City’s consultant did not provide pollutant reduction estimates with the 60% submittal.

Six soil samples were taken within the proposed project area near stormwater inflow locations; all six sites are within the upstream half of the project reach. The 60% design memo includes documentation of soil contaminated with PAHs (polycyclic aromatic hydrocarbons) below the MPCA soil reference values (SRV) in each of the six soil samples that were analyzed. Additionally, one sample location includes elevated levels of benzo(a)pyrene exceeding the SRVs and another sample location includes arsenic levels that exceed the SRV. The City evaluated the impacts of the soil contamination on the construction of the project and identified the following soil management options:

- Use of excavated material as unregulated fill when contaminant levels do not exceed referenced SRVs. The sample results from soil borings B-1, B-2, B-3, B-4, and B-6 all fall into the unregulated fill category and can be moved around on site, out of the floodplain as needed, or hauled off site.
- Disposal of excavated material at a municipal solid waste landfill (MSW) when contaminants exceed allowable SRV levels for reuse on site. The sample result from soil boring B-5 indicated

that excavated soil may need to be disposed of at a MSW landfill that has an industrial solid waste management plan. Material excavated from soil boring 5 (downstream of flared end section) to soil boring 4 (downstream of proposed settling basin) would be disposed of offsite at a facility that can accept contaminated material according to applicable rules and regulations.

City staff and the city's consultant observed that an emergent and forested wetland exists on the downstream end of the project where the only project impact is a temporary site access area. The City noted that a wetland delineation will be completed and wetland boundaries shown on the 90% plans.

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 City must address the comments below in the 90% design stage plans and specifications.

The City will host an open house on October 23, 2024 to give residents the opportunity to review proposed plans, provide feedback and ask questions.

Recommendations

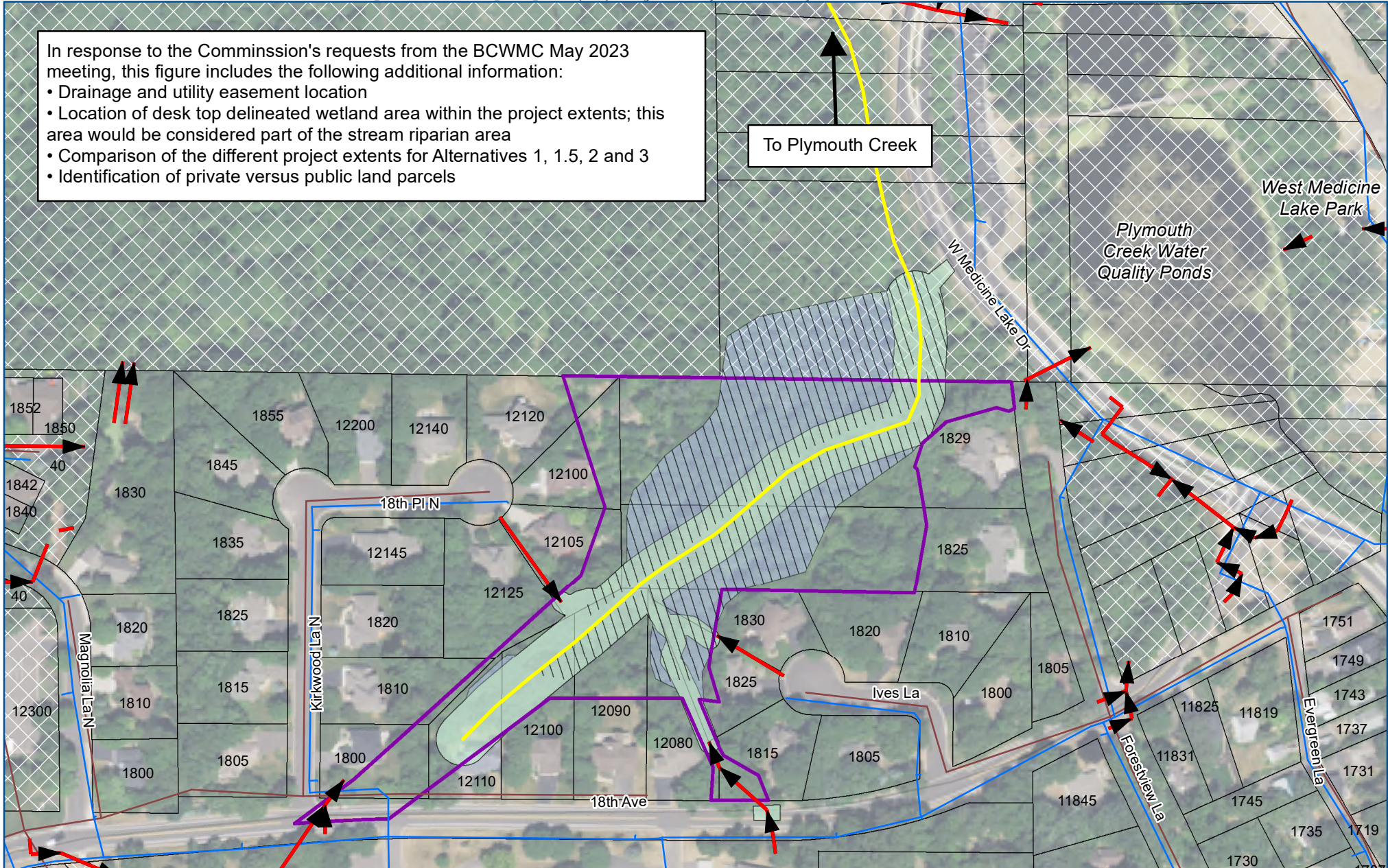
- A) Conditional approval of 60% plans, recognizing that the current plans reflect the 60% level of design. The following comments must be addressed as part of the 90% plans submittal:
- 1) The Plymouth Creek 100-year floodplain elevation is 893.64 NAVD88 in the project area. The BCWMC floodplain elevation should be shown and called out on the plans. If the project results in fill below the BCWMC floodplain, floodplain fill, and mitigation computations must be provided to demonstrate no net fill in the floodplain.
 - 2) The Plymouth Creek 100-year floodplain extends along the downstream portion of the Ponderosa Woods stream channel. The consultant's modeling of the existing and proposed conditions, as currently designed, shows no increase in the Plymouth Creek 100-year flood elevation of 893.64 NAVD88. As the design progresses, the revised model will need to be provided to demonstrate the Plymouth Creek 100-year flood elevation is not impacted.
 - 3) The design memo notes that the shear stresses in the channel during the 100-year flood event do not exceed 0.5 pounds per square foot (psf), falling within the range of permissible shear stresses for bank protection with native grasses. In some cases, maximum shear forces are associated with more frequent events than the 100-year. Modeled shear stress values and velocities must be provided for more frequent flood events that document peak shear stresses and velocities for proposed riprap and vegetated bank areas.
 - 4) Information must be provided that demonstrates how the proposed riffle cross-sectional area aligns with the bankfull cross-section.
 - 5) The drawings must include a typical riprap toe cross section that shows proposed riprap sizes, thickness, filter, and side slopes.
 - 6) The drawings must include a typical bank reshaping cross section that shows proposed maximum slope and stabilization extents (erosion control blanket or other stabilization) and/or a note call-out if grading will be as directed in the field by the inspector.
 - 7) The drawings must call out and include details about the settling basin where the southern tributaries merge.
 - 8) On sheet G-102 of the drawings, erosion control notes must be modified to clarify timing of exposed soil stabilization, per Barr's October 8, 2024 emailed comment.

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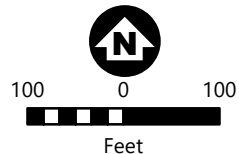
- 9) Sheets C-110 and C-1111 of the drawings must be revised to show erosion and sedimentation control measures, per Barr's October 8, 2024 emailed comment.
 - 10) The drawings must be revised to correlate the tree removals identified in the table on sheet C-103 with trees identified on the sheet C-101 that will be removed as part of the project.
 - 11) The drawings must show the restoration areas and the proposed seed mixes for the restoration areas.
 - 12) The drawings must show the proposed stream buffers and identify the proposed permanent stabilization measures for the project.
 - 13) The drawings and specifications must include details regarding the management of contaminated soil materials.
 - 14) The drawings must show the delineated wetland boundary, and the design must be modified (as required) to comply with applicable wetland rules.
 - 15) Updated pollutant reduction estimates must be provided for total phosphorus and total suspended sediment that reflect the current design.
 - 16) A summary of the expected permitting requirements must be provided.
- B) Authorize the City of Plymouth to continue design and bring 90% plans and specifications to a future Commission meeting.

In response to the Commission's requests from the BCWMC May 2023 meeting, this figure includes the following additional information:

- Drainage and utility easement location
- Location of desk top delineated wetland area within the project extents; this area would be considered part of the stream riparian area
- Comparison of the different project extents for Alternatives 1, 1.5, 2 and 3
- Identification of private versus public land parcels



- Main Stream Path
- ▶ Storm Sewer
- Watermain
- Sanitary Sewer
- Floodplain Forest Wetland
- Drainage and Utility Easement
- Small Project Extents (Alternative 1)
- Large Project Extents (Alternatives 1.5, 2, 3)
- Private Parcel
- Public Parcel



Note: The Commission Engineer performed a desktop evaluation for where the Floodplain Forest Wetland may exist within the project area. A field wetland delineation will be necessary to determine actual extents.

Imagery: USDA, 2021

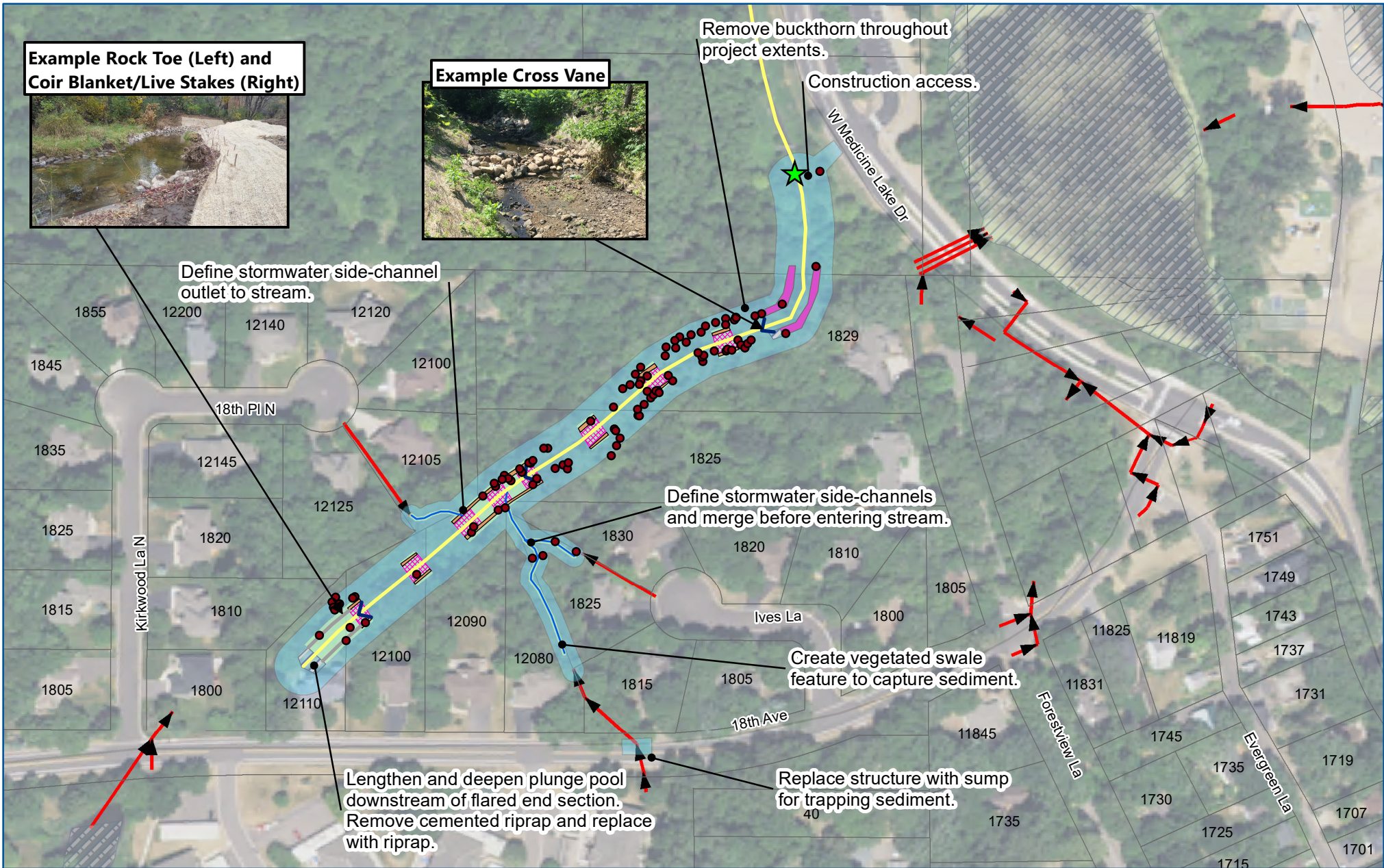
Additional Project Information
 Ponderosa Woods Stream
 Restoration Feasibility Study
 BCWMC

FIGURE 1

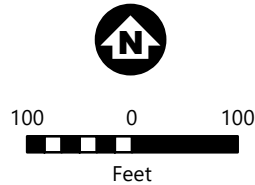
Example Rock Toe (Left) and Coir Blanket/Live Stakes (Right)



Example Cross Vane



- Ponds and Wetlands
- Storm Sewer
- Main Channel
- Project Extents
- Side Channels
- Bank and Channel Grading
- Cross Vanes
- Rock Toe
- Riprap
- Protect and Reinforce Existing Riprap
- Coir Blanket with Live Stakes and Planting
- Debris Removal
- Construction Access
- Remove Tree



Project extents: 2.3 acres

Imagery: USDA, 2021

DESIGN ALTERNATIVE 1
Ponderosa Woods Stream
Restoration Feasibility Study
 BCWMC

FIGURE 5-1