

Memorandum

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co. (Karen Chandler, P.E., and Jessica Olson, P.E.)
Subject: Item 5C – Consider Approval of 90% Plans for 2024 Ponderosa Woods Stream Restoration Project (CIP 2024 ML-22) – BCWMC November 20, 2024 Meeting Agenda
Date: November 13, 2024
Project: 23270051.62-6000-648

5C. Consider Approval of 90% 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: 90% Plans Review

Change in Impervious Surface: N.A.

Recommendations:

- 1) Conditional approval of 90% drawings
- 2) Authorize the City of Plymouth to provide administrative approval after final plans have been revised and comments have been sufficiently addressed

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.

At their meeting last month, the BCWMC reviewed and approved the 60% design plans for this project. The City of Plymouth provided the 90% design plans and specifications 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

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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 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 green ash and 7 box elders (less desirable trees) 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 design. .

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.

90% Plans

The 90% plans follow many of the recommendations from the feasibility study and include the use of slope grading with seeding and blanketing, stabilizing stormwater outlets, installing cross vanes, clearing debris, restoring aquatic and riparian habitats, removing invasives, and replacing a sediment trap sump structure on 18th Avenue North. Notable differences between the design plans and the feasibility study were noted during the 60% review. The 90% design plans incorporate modifications that are noted below. Based on the 90% design plans, the Commission Engineer does not consider any of the changes noted during the 60% review nor those noted below to represent a significant departure from the intent of the project as evaluated in the feasibility study.

- The 60% design proposed less bank grading, using more cross vanes instead to help re-establish the floodplain. The 90% design updated bank regrading areas that roughly align with the regrading proposed in the feasibility study.
- The 60% design proposed to remove 28 healthy trees and the feasibility study proposed to remove 27 healthy trees. The 90% design includes the removal of 87 healthy trees, including 32 green ash and 12 box elder (less desirable) and 20 buckthorn (invasive). In summary, the 90% design calls for removing 23 desirable, healthy trees compared to the 60% design calling for removing 13 desirable, healthy trees. The City's consultant noted that 2 new trees proposed for removal are within the footprint of a revised construction access route that avoids delineated

wetlands. Other new healthy tree removals include trees near some of the new bank grading areas in the 90% design and trees identified by the City as posing a risk to City infrastructure. Similar to the 60% design, no tree plantings are proposed, based on the City’s desire to revegetate these areas with native grasses and flowers and remove undesirable species and failing/diseased trees. The BCWMC Engineer recommends the final design include 10 or more replacement tree plantings.

Sheets C-102 and C-103 show the trees within the project area and those that will be removed. Sheet C-104 lists in a table the trees in the project area that will remain, and sheet C-105 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	32	12	44
Basswood/American	1	2	3
Birch/River	1	0	1
Box Elder	12	24	36
Buckthorn	20	0	20
Cottonwood	6	9	15
Elm/American	10	6	16
Hackberry	1	0	1
Maple/Sugar	3	1	4
Willow/Black	0	1	1
Totals	87	55	142

For the 90% submittal, the City’s consultant calculated annual pollutant reduction estimates of 14,690 pounds of total suspended solids and 7.3 pounds total phosphorous, which is a slightly lower reduction than calculated for the feasibility study (14,770 pounds of total suspended solids and 7.4 pounds total phosphorus). This difference is related to a slight difference in total bank restoration length and average bank height; the feasibility study assumed a higher stabilized average bank height (2 to 4.5 feet vs. 2 feet) and a shorter stabilized bank length (940 linear feet vs. 1,005 linear feet) than in the 90% plans. As a project moves further along in design, it is reasonable for there to be small changes in the pollutant load reduction estimates.

The City’s consultant included National Wetland Inventory boundaries on the 90% design drawings provided for review on November 5th and replaced those with delineated wetland boundaries on the revised 90% design drawings submitted for review on November 11th. Wetland boundaries are awaiting TEP approval before they can be finalized. The 90% design includes an altered construction access route that avoids wetland impacts.

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

90% Specifications

The BCWMC Engineer reviewed the following technical specifications and noted the following comments:

Specification Section	Comments
Section 01100, Mobilization	Suggest adding Demobilization to this specification title and language
Section 01300, Application of Water	No comments
Section 01400, Erosion Control	No comments
Section 01500, Air, Land and Water Pollution	No comments
Section 01900, Maintenance and Final Cleanup	No comments
Section 02000, Removing Pavement and Miscellaneous Structures	No comments
Section 02010, Clearing and Grubbing	No comments
Section 02020, Excavation and Embankment	Recommend updating “embankment” language to “earth fill” or other to reflect the design plan’s proposed placement of fill rather than embankments
Section 02500, Streambank Stabilization	No comments
Section 02900, Turf Establishment	No comments
Section 02910, Plant Installation	No comments

Previous Reviews

The City of Plymouth submitted the 60% design plans for this project, and the BCWMC conditionally approved the 60% plans at its October 16, 2024 meeting. Following the conditional approval of the 60% design plans, the City’s consultant revised and submitted the 90% design drawings along with responses to the comments from the BCWMC’s review of the 60% design plans. The 90% design drawings and associated submittals sufficiently addressed the BCWMC Engineer’s comments on the 60% design plans. The Commission Engineer’s October 18, 2024 60% design comment letter requested the following additional information. The Commission Engineer’s October 18, 2024 comments are noted below, followed by the City’s consultant’s (Midwest Wetland Improvements) responses dated November 1, 2024 in *italics*, and the Commission Engineer’s comments regarding the City’s consultant’s responses, with remaining comments to be addressed underlined..

- 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.

Midwest Wetland Improvements Response:

- a. *100-year floodplain contour added to plan view sheets of the construction plan set.*

- b. *Almost all of the project is within the floodplain. Only small portions of the tributary side channels are above the floodplain. Floodplain excavation and fill calculations are provided in the final design memo.*

Commission Engineer comment: The version of the 90% design provided on November 5th includes a plunge pool with a normal water level. Storage that is below the normal water level of the proposed plunge pool does not count towards compensatory floodplain storage (because it will be permanently filled with water). The revised version of the 90% design provided on November 11th includes a plunge pool with a “Class III berm” to allow outflow from the basin and eliminate permanent ponding. Call-out label in plan drawing should be updated to reflect whether the berm is Class III fieldstone granite or Class III angular riprap. The revised 90% design memo also includes additional exported excavation that results in a net cut balance (additional floodplain storage) of 7.3 cubic yards below the 100-year 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.

Midwest Wetland Improvements Response:

- a. *Revised model results are summarized in the final design memo showing no increase in the flood elevation. Revised model will be sent separately.*

Commission Engineer comment: The version of the 90% design provided November 5th resulted in a 0.01 to 0.02 feet rise in three cross sections during the 100-year event with backwater conditions. The design and model were updated to increase the cross-sectional area of the 3rd cross-section and a revised version of the 90% design memo provided on November 11th shows a no rise of 0.00 feet for the 100-year event with backwater conditions.

- 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.

Midwest Wetland Improvements Response:

- a. *As discussed, we re-ran the models with updated design cross-sections that matched the existing 2-year elevations. Models run include a 2-year, 20-year, and 100-year events with and without Plymouth Creek tailwater influence.*

Commission Engineer comment: Comment addressed. Proposed stabilization methods meet velocity and shear stress design criteria.

- 4) Information must be provided that demonstrates how the proposed design cross-sectional areas align with the bankfull cross-section.

Midwest Wetland Improvements Response:

- a. *Flow depth elevations added to the channel cross-sections on sheets C-120 and C-121.*

Commission Engineer comment: Comment addressed.

- 5) The drawings must include a typical riprap toe cross section that shows proposed riprap sizes, thickness, filter, and side slopes.

Midwest Wetland Improvements Response:

- a. *Detail added to sheet C-804*

Commission Engineer comment: Comment addressed.

- 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.

Midwest Wetland Improvements Response:

- a. *Detail added to sheet C-803*

Commission Engineer comment: Comment addressed.

- 7) The drawings must call out and include details about the settling basin where the southern tributaries merge.

Midwest Wetland Improvements Response:

- a. *We updated the geometry of the settling basin and added control labels, side slope labels, and control spot elevations.*

Commission Engineer comment: Comment addressed.

- 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.

Midwest Wetland Improvements Response:

- a. *Updated. City provided same comment.*

Commission Engineer comment: Comment addressed.

- 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.

Midwest Wetland Improvements Response:

- a. *Added per comment.*

Commission Engineer comment: Comment addressed.

- 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.

Midwest Wetland Improvements Response:

- a. *Expanded the tree removal plan sheet with two new zoomed in sheets, C-102 and C-103. Removed trees are labeled with their ID numbers. Saved tree and removed tree tables were updated and include the summaries as discussed in earlier emails.*
- b. *Additional trees have been designated for removal based on City desire to remove existing ash trees, moving all buckthorn trees to the removal table, removing additional trees needed for construction access, and removing trees growing on or near storm sewer pipes*

Commission Engineer comment: Comment addressed. As stated above, the BCWMC Engineer recommends the final design include 10 or more replacement tree plantings. Also, as part of final design, the City must consult with residents in the project area to review potential tree removals and consider modifying the design to avoid removing specific trees slated for removal.

- 11) The drawings must show the restoration areas and the proposed seed mixes for the restoration areas.

Midwest Wetland Improvements Response:

- a. *Added sheets C-130 and C-131 to show this information.*

Commission Engineer comment: Comment addressed.

- 12) The drawings and specifications must include details regarding the management of contaminated soil materials.

Midwest Wetland Improvements Response:

- a. *Drawing C-110 updated to call out the area requiring contaminated soil management. Specification 02020 – Excavation and Embankment will be updated to discuss how contaminated soil must be managed and disposed.*

Commission Engineer comment: Update specification to include details related to disposing contaminated soil at a municipal solid waste facility, per applicable rules and regulations.

- 13) The drawings must show the delineated wetland boundary, and the design must be modified (as required) to comply with applicable wetland rules.

Midwest Wetland Improvements Response:

- a. *Desktop boundaries from the MN DNR National Wetland Index (NWI) are included on all plan view drawings. Field delineation is scheduled for the week of November 4, 2024.*

Commission Engineer comment: Revised 90% design drawings issued Nov. 11 include delineated wetland boundary, and the design access route and construction limits were modified so there is no impact to wetlands with this project. Drawings should be updated so that wetland boundaries are easily visible; we recommend shading the wetland areas in addition to showing the boundary line.

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

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Midwest Wetland Improvements Response:

- a. *These estimates are provided in the final design memo.*

Commission Engineer comment: Comment addressed.

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

Midwest Wetland Improvements Response:

- a. *A permitting summary is provided in the final design memo.*

Commission Engineer comment: Comment addressed.

- 16) Revised (90%) plans must be submitted to the BCWMC engineer for review and BCWMC approval at a future Commission meeting.

Midwest Wetland Improvements Response:

- a. *90% design drawings are attached for review.*

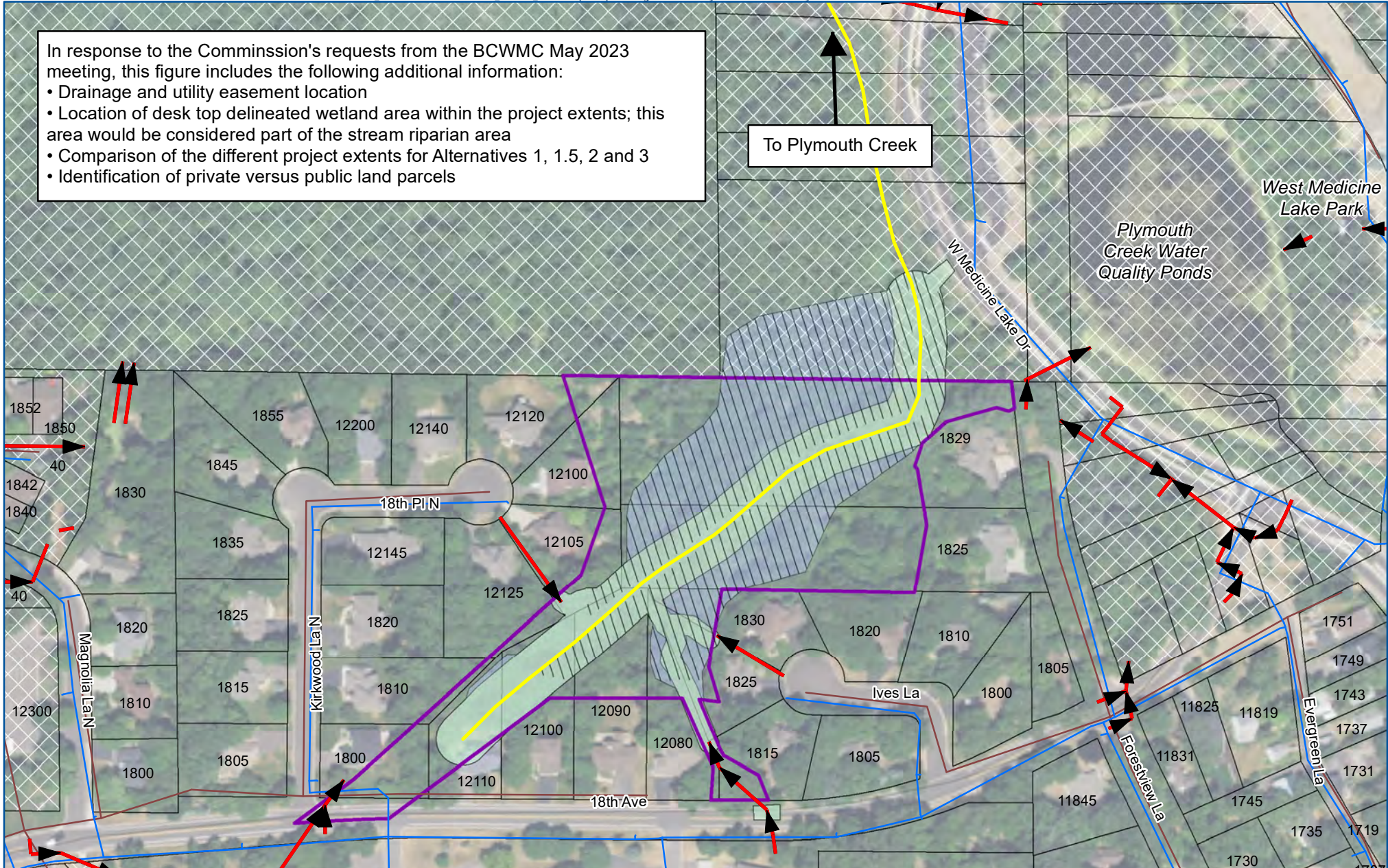
Commission Engineer comment: Comment addressed.

Recommendations

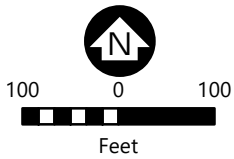
- A) Conditional approval of 90% drawings and specifications based on the following comments:
 - 1) The final plans and specifications must be submitted to the BCWMC Engineer for review and approval after modifications underlined in the engineer's comments above have been completed.
- B) Authorize BCWMC Engineer to provide administrative approval after final plans have been revised and comments have been sufficiently addressed.

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

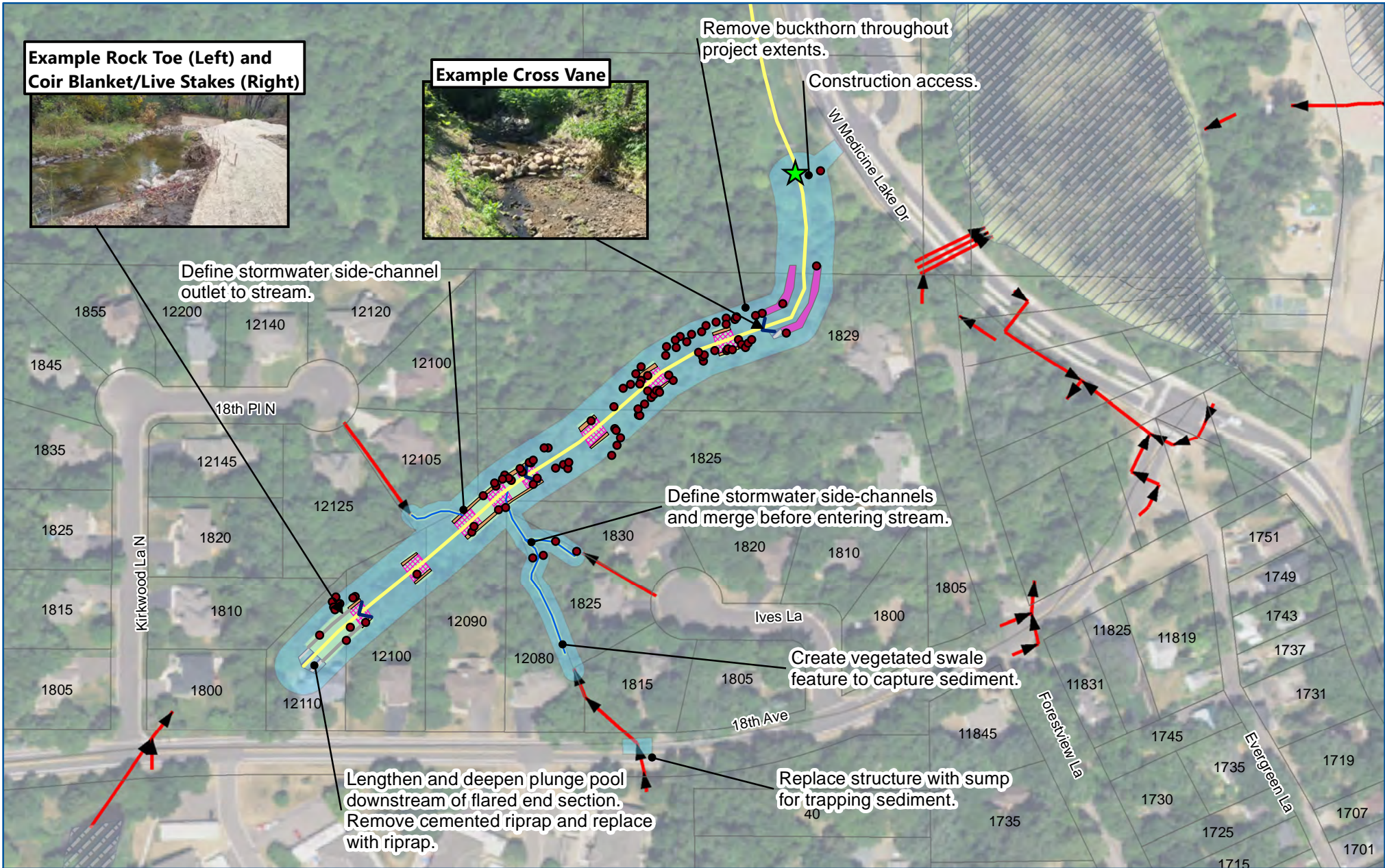
Additional Project Information
 Ponderosa Woods Stream
 Restoration Feasibility Study
 BCWMC

FIGURE 1

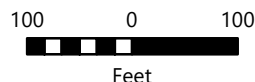
Example Rock Toe (Left) and Coir Blanket/Live Stakes (Right)



Example Cross Vane



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



Project extents: 2.3 acres

Imagery: USDA, 2021

DESIGN ALTERNATIVE 1
Ponderosa Woods Stream
Restoration Feasibility Study
BCWMC

FIGURE 5-1