Item 4F.
BCWMC 6-15-17

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Memorandum

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co.
Subject: Item 4F – Creekside Woods I & II – Plymouth, MN
BCWMC June 15, 2017 Meeting Agenda
Date: June 7, 2017
Project: 23270051 2017 2128

4F Creekside Woods I & II – Plymouth, MN BCWMC 2017-21

Summary:

Proposed Work: Subdivision development

Basis for Commission Review: Work in the floodplain

Impervious Surface Area: Increase 0.6 acres

Recommendation: Conditional Approval

General Background & Comments

The proposed project includes the construction of 10 new single family homes, 11 new driveways, sidewalks, grading, stormwater treatment, and utilities. The project is located in the Plymouth Creek subwatershed. The project results in 3.85 acres of disturbance (grading), 1.37 acres of new/fully reconstructed impervious, and an increase of 0.60 acres of impervious surfaces from 0.77 acres in existing conditions to 1.37 acres in proposed conditions.

Floodplain

The proposed project includes work in the floodplain of Bassett Creek. The September 2015 BCWMC Requirements for Improvements and Development Proposals (Requirements) document requires that projects within the floodplain maintain no net loss in floodplain storage and no increase in flood level at any point along the trunk system (managed to at least a precision of 0.00 feet). At its May 18, 2017 meeting, the BCWMC approved the XP-SWMM Phase II (Atlas 14) model and adopted the revised (Atlas 14) floodplain elevations for Bassett Creek. Based on this approval and adoption, the floodplain elevation of Bassett Creek at the project site is approximately 986.2 feet NAVD88.

Prior to the adoption of the revised floodplain elevations, it appears the proposed project was outside of the floodplain, therefore the applicant did not provide documentation to demonstrate floodplain compliance. Floodplain compliance documentation must be provided as noted in the Recommendation Section.

Wetlands

The project appears to involve work adjacent to wetlands. The City of Plymouth is the LGU for administering the Minnesota Wetland Conservation Act of 1991.

Stormwater Management

The BCWMC Requirements document requires that projects that contain more than one (1) acre of new or fully reconstructed impervious area must manage stormwater such that peak flow rates leaving the site are equal to or less than the existing rate leaving the site for the 2-, 10-, and 100-year events, based on Atlas 14 precipitation amounts and using a nested 24-hour rainfall distribution. As discussed below, the proposed peak flows meet the BCWMC requirement.

Under existing conditions, stormwater runoff flows to an existing wetland on the southeast corner of the site and eventually discharges into Plymouth Creek.

The proposed stormwater management system includes a grassed swale, overland flow, and a stormwater pond. Drainage from a portion of the northwest corner of the site drains to the north to Old Rockford Road. Drainage from the majority of the proposed development site as well as a portion of offsite area flows to the proposed stormwater pond. Overflows from the stormwater pond are routed into the existing wetland and eventually to Plymouth Creek. Drainage from the southwest and a portion of the proposed development flows overland to the existing wetland and eventually to Plymouth Creek.

The following table summarizes the existing and proposed peak discharges from the project area to the existing wetland on the southeast corner of the site.

Storm Event	Existing Peak Discharge (cfs)	Proposed Peak Discharge (cfs)
2-year	6.07	2.97
10-year	11.51	6.29
100-year	24.31	23.98

Water Quality Management

The BCWMC Requirements document requires that projects that contain more than one (1) acre of new or fully reconstructed impervious area must treat stormwater in accordance with the MPCA's Minimal Impact Design Standards (MIDS) performance goals. If the MIDS performance goal is not feasible and/or is not allowed for a proposed project, then the project proposer must implement MIDS flexible treatment options.

The proposed project results in 1.37 acres of new/fully reconstructed impervious surfaces. Flexible Treatment Option (FTO) #2 was selected for the proposed project due to the presence of tight clay soils that are not conducive to infiltration. FTO #2 requires that the project provide 60% removal of total phosphorus (TP). The proposed stormwater pond was modeled in P8 to quantify TP removal rates. The stormwater pond was then plugged into MIDS as an "other" device along with the iron-enhanced sand filter bench, overland flow, and grassed swale.

The following table summarizes the proposed TP removal rates for the proposed BMPs.

BMP	TP Removal (lbs/year)	Percent Removal (%)
Stormwater Pond (from P8)	1.90	64
Iron-Enhanced Sand Filter Bench (within Stormwater Pond)	0.47	43
Overland Flow	0.05	14
Grassed Swale	0.26	43
Total	2.68	64

Erosion and Sediment Control

Since the area to be graded for the project is greater than 10,000 square feet, the proposed project must meet the BCWMC erosion and sediment control requirements. Proposed temporary erosion and sediment control features include silt fence, a rock construction entrance, and inlet protection. Permanent erosion and sediment control features include stabilization through seeding and sod.

Recommendation

Conditional approval based on the following comments:

1. Documentation must be provided demonstrating compliance with BCWMC floodplain policies.
2. Detail 2 on sheet C7.6 shows a proposed sand filter bench, but the grading plan on Sheet C3.1 does not appear to show a bench within the pond. In addition, contours around the proposed plan on Sheet C3.1 are not clearly labeled and the elevation associated with each contour is unclear. Please revise and clarify.
3. Detail 2 on sheet C7.6 shows an existing clay layer of separation dividing the iron-enhanced sand filtration bench from the rest of the proposed stormwater pond. However, this existing clay layer is lower than the normal water elevation of the pond, therefore it appears that the pond would continue to draw down to the elevation of the existing clay layer of separation, lowering the normal water level of the pond. This may affect the stormwater pond's ability to effectively treat runoff. Please revise and clarify.
4. FES 300 should be extended to discharge at or below the normal water level of the receiving wetland. As an alternative, adequate erosion protection must be provided between FES 300 and the receiving wetland to prevent channelization and erosion.
5. We recommend using the MSE 3 nested distribution for the HydroCAD rainfall events.
6. In the proposed conditions HydroCAD model, the Pond 5P stage storage areas do not appear to match the grading plan on Sheet C3.1. Please revise and clarify.
7. A P8 model was run to determine phosphorus removals from the proposed pond. These results were then input into an "Other" BMP in MIDS. However the outputs in P8 do not match what was input into MIDS. The inputs in MIDS must be revised to match what was calculated in the P8 model.

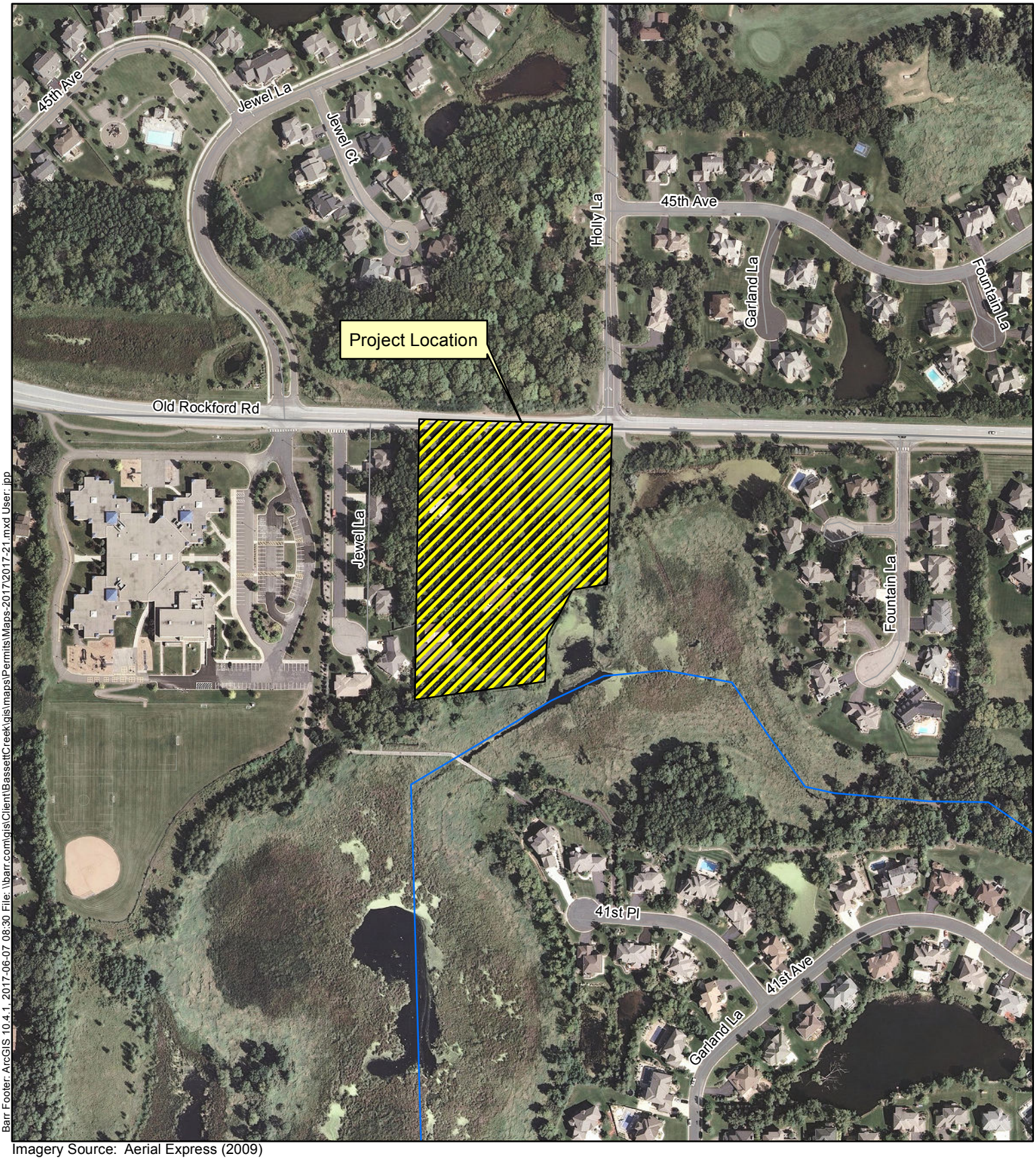
   a. MIDS Calculator shows 25% dissolved phosphorus removal for the proposed pond, but P8 does not indicate any dissolved phosphorus removal.

   b. MIDS Calculator shows 95.3% particulate phosphorus removal for the proposed pond, but P8 indicates 69.3% particulate phosphorus removal for the proposed pond

8. Revise *Erosion Prevention and Sediment Control Note #5* on Sheet C3.2 to require that all exposed soil areas be stabilized as soon as possible, but in no case later than 7 days after the construction activity has temporarily or permanently ceased, due to the project's location within 1 mile of an impaired water.

9. For *Erosion Prevention and Sediment Control Note #10* on Sheet C3.2, require that soils tracked from the site be removed from all paved surfaces within 24 hours of discovery throughout the duration of construction.

10. Revised Drawings (paper copy and final electronic files) must be provided to the BCWMC Engineer for final review and approval.



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Imagery Source: Aerial Express (2009)

- Project Location
- Bassett Creek
- WMC Boundary
- Major Subwatershed
- Municipality
- Stream

N

Feet

0 300 600

Bassett Creek Watershed Management Commission

LOCATION MAP
APPLICATION 2017-21
Creekside Woods I & II
Plymouth, MN