

Memorandum

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co.
Subject: Item 6B – Northwood South Area Infrastructure Improvements Project – New Hope BCWMC February 18, 2016 Meeting Agenda
Date: February 10, 2016
Project: 23270051 2016 2069

6B Northwood South Area Infrastructure Improvements – New Hope

Summary:

Proposed Work: Road reconstruction in the Northwood South neighborhood

Basis for Commission Review: Road construction project disturbing over 5 acres

Impervious Surface Area: Decrease approximately 2,600 square feet (0.06 acres)

Recommendation: Conditional approval

General Background & Comments

The proposed project includes street reconstruction, water main and sanitary sewer replacement, and storm sewer improvements in the Northwood South neighborhood bounded by Northwood Parkway to the north, Highway 169 to the west, 36th Avenue North to the south, and Boone Avenue North to the east. This project will be completed in a similar time frame to the Northwood Lake CIP project (NL-1), which will involve construction of an underground stormwater reuse system near the intersection of Boone Avenue North and Ensign Avenue North to be used for irrigation of the ballfields in Northwood Park and construction of a pond west of Jordan Avenue North. Northwood Lake is downgradient from the Northwood South neighborhood. The project is in the Northwood Lake subwatershed and 11.81 acres will be graded as part of the project. The proposed project results in a decrease of approximately 2,600 square feet (0.06 acres) of impervious surface and a total proposed impervious area of 6.54 acres.

Floodplain

The project does not involve work in the Bassett Creek floodplain.

Wetlands

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

Stormwater Management

Under existing conditions, the project drains to Northwood Lake. Under proposed conditions, the drainage patterns will ultimately remain similar; however, stormwater treatment will be provided within the project area by diverting water to underground filtration trenches.

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Water Quality Management

There is currently little to no water quality treatment in the Northwood South neighborhood. Because the project is a linear redevelopment that creates one acre or greater of new and/or fully reconstructed impervious surfaces, the September 2015 BCWMC Requirements for Improvements and Development Proposals (Requirements) document requires that the project capture and retain the larger of 1) 0.55 inches of runoff from the new and fully reconstructed impervious surfaces, or 2) 1.1 inches of runoff from the net increase in impervious area. In this case, 0.55 inches of runoff from the new and fully reconstructed impervious surfaces is the larger volume, resulting in a required treatment volume of 0.30 acre-feet (13,057 cubic feet). If the performance goal is unable to be met due to site restrictions, the Requirements document requires that the MIDS flexible treatment options approach be used, following the MIDS design sequence flow chart.

The city proposes to construct underground filtration trenches with iron enhanced media to provide water quality treatment for the project. The underground filtration trenches will provide a storage volume of 641 cubic feet. This is equivalent to 0.03 inches of runoff from the new and fully reconstructed impervious surfaces (5% of the required volume).

Because the city is not able to meet the MIDS performance goal, the city's consultant provided a sequencing analysis following the MIDS design sequence flow chart and indicating what treatment options were explored and feasible on the site. Based on the flow chart, the first alternative to be considered for this project is Flexible Treatment Option #2 (FTO 2). The flow chart analysis indicates that FTO 2 is feasible on the site. FTO 2 requires volume reduction to the maximum extent practicable, removal of 60% of the annual total phosphorus (TP) load, and discussion of options considered toward relocating elements and addressing varying soil conditions and constraints across the site.

The applicant has limited right of way area in which to construct stormwater BMPs because the project is primarily road reconstruction. The project area has Type D soils with low infiltration rates, which do not allow significant infiltration. The project area also has steep grades, which limit the areas where BMPs can be implemented. Based on limited right of way, soils with low infiltration rates, and steep grades within the project area, the applicant has demonstrated volume reduction to the maximum extent practicable by maximizing the size of the underground filtration trenches.

To meet the removal of 60% of the annual TP load requirement (7.0 pounds), the applicant is using treatment provided by the underground filtration trenches with iron enhanced media and taking credit for the portion of the Jordan Avenue North Pond project that the city is funding; this is similar to the approach approved by the BCWMC for the Douglas Drive project. The Jordan Avenue North pond project is part of the BCWMC Northwood Lake CIP (partially funded by the BCWMC), and was intended to improve water quality in the watershed beyond required practices, not to provide required water quality treatment for proposed projects. Based on the Northwood Lake CIP project costs provided previously to the commission, the city's share/credit would be 21.1% of the project cost (\$300,000 from the city and a total project cost of \$1,420,000). The Jordan Avenue North pond is expected to remove 5.67 lbs. of TP annually. The city is contributing 21.1% of the Jordan Avenue North pond project costs. Therefore, using the same approach as the Douglas Drive project, the city is taking credit for 21.1% of the TP treatment

provided by the Jordan Avenue North pond project. Using treatment provided by the underground filtration trenches with iron enhanced media and the city contribution to the Jordan Avenue North pond project, the applicant demonstrated that the project removes 65% of the annual TP load (7.56 pounds), and is therefore in compliance with the FTO 2 criteria. The TP removal provided by the Jordan Avenue North pond project and the underground filtration trenches with iron enhanced media is summarized below.

	TP Removed (lbs/yr)	City Contribution (%)	City Credited TP Removal (lbs/yr)
Jordan Avenue North Pond	5.67	21.1	1.20
Underground Filtration Trenches with Iron Enhanced Media	6.36	100	6.36
Totals	12.03		7.56¹

¹TP load removal requirement = 7.00 pounds

Erosion and Sediment Control

Since the area to be graded is greater than 10,000 square feet, the proposed project must meet the BCWMC erosion control requirements. Proposed temporary erosion control features include silt fence, bioroll, rock construction entrances, and inlet protection.

Recommendation

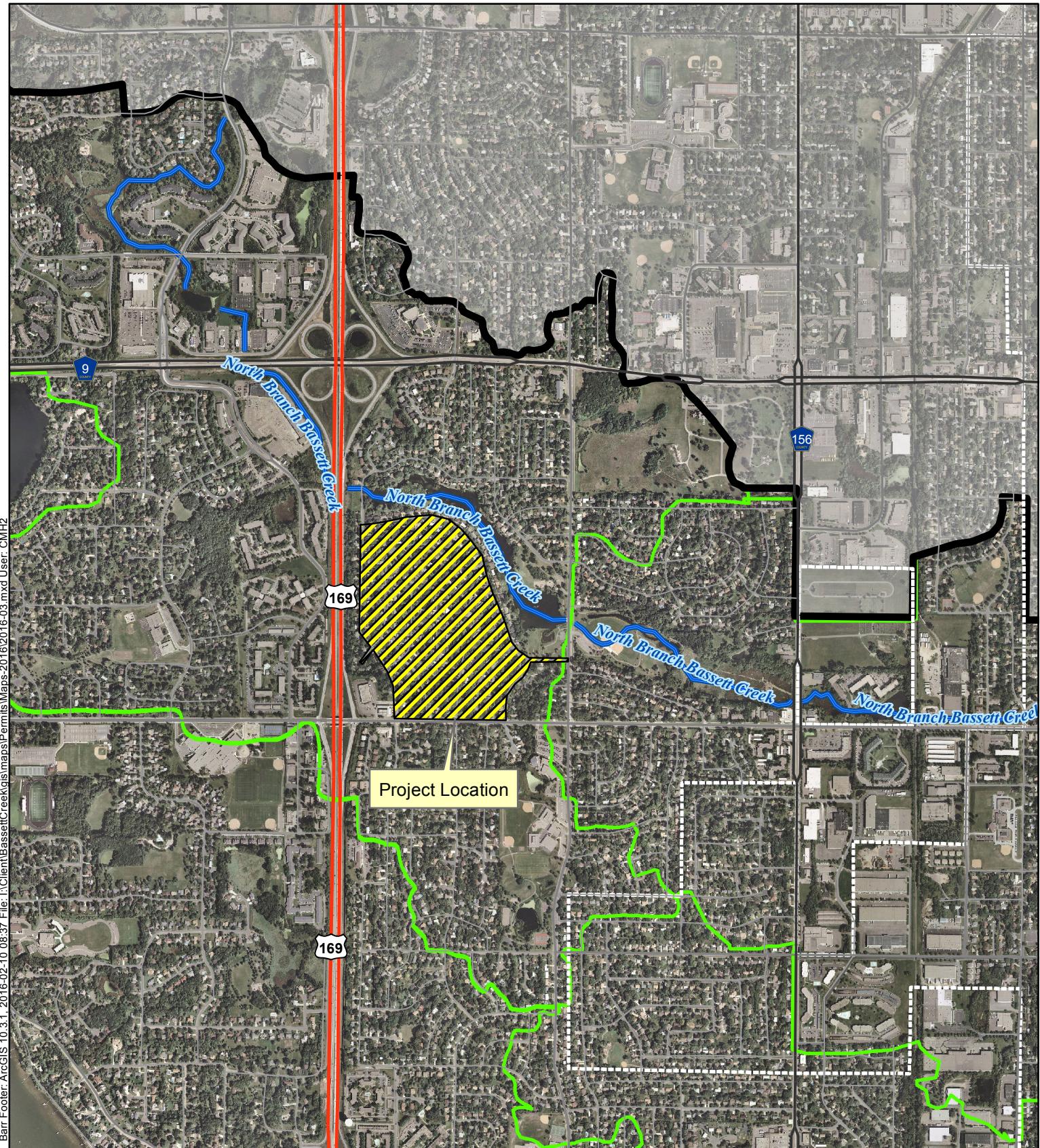
Conditional approval based on the following comments:

1. Add the following erosion control notes to the plans:

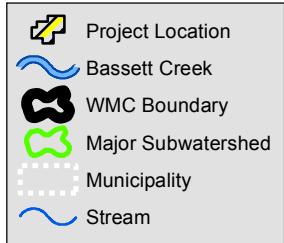
A temporary vegetative cover must be provided consisting of a suitable, fast-growing, dense grass-seed mix spread at a minimum at the MnDOT-specified rate per acre. If temporary cover is to remain in place beyond the present growing season, two-thirds of the seed mix shall be composed of perennial grasses.
2. Inlet protection should be shown on all proposed catch basins.
3. Perimeter control should be added as necessary where curb and gutter or trees or shrubs will be removed and the surrounding area does not drain toward the roadway corridor, for instance on the east side of Jordan Avenue.
4. The cut off berm on the rock construction entrance shall have a minimum height of 2 feet above the adjacent roadway.
5. Revised erosion control plans must be provided matching the revised storm sewer layout shown in the plans received on February 9, 2016.
6. A watershed figure for the underground filtration trenches should be provided.
7. The impervious area listed in the plan set for the project is larger than the impervious area used in the MIDS calculator. Applicant must revise and clarify.

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8. Tree planting locations in accordance with the inputs used in the MIDS calculator must be shown on the plans.
9. The "media field capacity – wilting point" and "media porosity – field capacity" fields in the MIDS calculator must be representative of the filter media used, likely sand if iron is to be mixed into the filtration system.
10. The MIDS calculator should represent that a soil amendment is used to attenuate phosphorus.
11. The MIDS calculator indicates that Media Mix D is used. Based on the cross section, 6" of topsoil and an iron enhanced media will be used. It appears that the sand filter BMP may be a better BMP selection in the MIDS calculator based on the filtration trench details provided. Additional calculations could then be provided representing that it can be assumed that 60% of the dissolved phosphorus load will be removed based on documentation in the Minnesota Stormwater Manual.
12. More information on the iron enhanced filter media must be provided, including the material type and the amount of iron in the media mix.
13. Iron enhanced filter media should not be placed below the draintile.
14. A detail should be provided representing the cross section of the underground filtration system when the surface of the system will be a driveway instead of green space. Reductions in treatment volume must be accounted for in the MIDS calculator.
15. A minimum of 18 inches of filter media is recommended for iron enhanced filters. Applicant should provide documentation on how water will fill the underground filter to at least 18 inches and drain within 48 hours.
16. Draintile should be embedded in a gravel bed or otherwise protected from the iron enhanced media migrating into the draintile. Based on the Minnesota Stormwater Manual, use of filter fabric around the draintile is discouraged due to clogging and aeration suppression effects.
17. Three feet of separation is required between the bottom of the underground filtration system and the seasonally high groundwater table.
18. A maintenance plan for the underground filtration trenches must be developed.
19. Revised drawings (paper copy and final electronic files) must be provided to the BCWMC Engineer for final review and approval.



Imagery Source: Aerial Express (2009)



Feet

0 1,000 2,000 3,000



**LOCATION MAP
APPLICATION 2016-03
Northwood Lake South Area
Infrastructure Improvements
New Hope, MN**