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Memorandum

To: Bassett Creek Watershed Management Commission (BCWMC)
From: Barr Engineering Co. (Barr) (Jim Herbert, PE; Gabby Campagnola)
Subject: Item 4E: BNSF Bridge Replacement – Minneapolis, MN
BCWMC June 20, 2024 Meeting Agenda
Date: June 13, 2024
Project: 23270051 1020 2307

4E BNSF Bridge Replacement– Minneapolis, MN BCWMC 2022-27

Summary:

Proposed Work: Railroad bridge replacement

Project Proposer: BNSF

Project Schedule: Quarter 3 2024 construction

Basis for Review at Commission Meeting: Proposed crossing and work in the floodplain

Impervious Surface Area: No change

Recommendation for Commission Action: Approval

General Project Information

The proposed project is located along the Main Stem of Bassett Creek, northwest of the intersection of Chestnut Avenue West and Penn Avenue North in Minneapolis. The work includes removing the existing super-structure and placing precast concrete structures onto the existing piers with an on-track crane, resulting in 0 acres of disturbance and no change in impervious surface from existing to proposed.

This project was reviewed and conditionally approved at the April 20, 2023 BCWMC meeting based on the following conditions:

1. The following updates must be made to the XPSWMM models:
    a. The cross section of link LBCD041.C in the corrected effective model and proposed model must be modified to include the three individual piers of the bridge, instead of the one pier.
    b. Link LBCD041.OF in the proposed model must be modified to represent the new overflow based on the proposed bridge height.
2. The Requirements Document states that the lowest member of all crossings shall be at least one foot above the floodplain to prevent debris accumulation. The BCWMC is concerned about debris accumulation due to the restriction of flows. We acknowledge that there are limitations regarding the bridge reconstruction and modifying the lowest member to meet the Requirements Document. We request the applicant prepare and submit to the BCWMC

Engineer a maintenance plan to clear accumulated debris from the bridge to minimize potential flooding impacts.

In May 2023 the BCWMC engineer approved the bridge replacement plan because the applicant updated the XPSWMM models as requested and submitted a satisfactory maintenance plan. In April 2024 the BCWMC engineer received revised drawings that included changes to the abutment design, a revised floodplain cut/fill analysis for the project, and a proposed change to the 100-year high water elevation compared to the conditionally approved plans from the April 20, 2023 BCWMC meeting. This memorandum summarizes the new proposed bridge design and how it meets the BCWMC requirements.

Floodplain

The proposed project includes work in the BCWMC 100-year floodplain. The 1% annual-chance (base flood elevation, 100-year) floodplain elevation along the Main Stem of Bassett Creek at the project site is 814.8 feet NAVD88 upstream of the bridge and 814.7 feet downstream of the bridge. The BCWMC Requirements for Improvements and Development Proposals (Requirements) document states that projects must meet the following criteria:

- Projects within the floodplain must maintain no net loss in floodplain storage.
- Projects within the floodplain must maintain no increase in flood level at any point along the trunk system (managed to at least a precision of 0.00 feet).
- The lowest member of all crossings shall be at least 1 foot above the floodplain to prevent debris accumulation unless approved by the BCWMC.

Floodplain Storage

The proposed project will result in approximately 20 cubic yard of floodplain cut due to removing the existing abutments and installing new abutments.

Floodplain Elevation (No Rise)

The BCWMC XPSWMM hydrologic and hydraulic model was used to estimate the existing and proposed conditions to demonstrate no rise in flood level along the creek. The BCWMC XPSWMM model was used to perform a relative comparison of the existing bridge and the new bridge at this location. Table 1 reports the 100-year high water elevation upstream and downstream of the bridge under existing and proposed conditions. The proposed project results in a change to the abutments that increases the conveyance area below the bridge, resulting in a more efficient crossing that slightly lowers the 100-year high water elevation upstream of the bridge. The proposed bridge does not impact the downstream 100-year high water elevation. Results shown in Table 1 demonstrate "no increase in flood level" when comparing the existing and proposed conditions.

Table 1: Comparison of Existing and Proposed 100-Year High Water Elevation

Location	100-Year Existing Flood Elevation (ft)	100-Year Proposed Flood Elevation (ft)	Increase in Flood Level from Proposed to Existing (ft)
Upstream of Bridge	814.79	814.78	-0.01
Downstream of Bridge	814.75	814.75	0.00

Lowest Crossing Member

The Requirements document states the lowest member of all crossings shall be at least 1 foot above the floodplain, unless approved by the BCWMC, to minimize obstruction of flood flows. Portions of the existing bridge deck and the proposed bridge are lower than the 100-year floodplain elevation. For the proposed project, the lowest member is 1.83 feet below the 100-year floodplain (compared to 2.25 feet for existing conditions). The conveyance area under the bridge will increase due to the proposed raising of the super structure by approximately 0.5 feet (the existing pier structures will remain in place). Given the constraints with the existing railroad track grade, it is not feasible for the applicant to raise the lowest member of the bridge to be at least 1 foot above the 100-year floodplain.

At its April 20, 2023 meeting the BCWMC recognized these constraints and approved allowing the lowest member of the bridge deck to be below the 100-year floodplain, but with the condition that the applicant submit a maintenance plan for removing accumulated debris.

Maintenance

The applicant's consultant has provided the following statement regarding maintenance to remove debris from the bridge to address the BCWMC comments:

> "BNSF regularly inspects its track, bridge, and culvert structures following internal, Federal Railroad Administration, and American Railway Engineering and Maintenance-of-Way Association guidelines and standards. The inspections are generally completed weekly (more frequent during periods of predicted high flow) and includes reviewing waterways for debris and ice buildup. If debris or ice is noted, BNSF mobilizes its on-track equipment (crane or backhoe with grapple) to complete removals."

Lakes, Streams, and Wetlands

There are no wetland impacts as part of the project.

Rate Control

The proposed project does not create one or more acres of new or fully reconstructed impervious surfaces; therefore, BCWMC rate control review is not required.

Water Quality

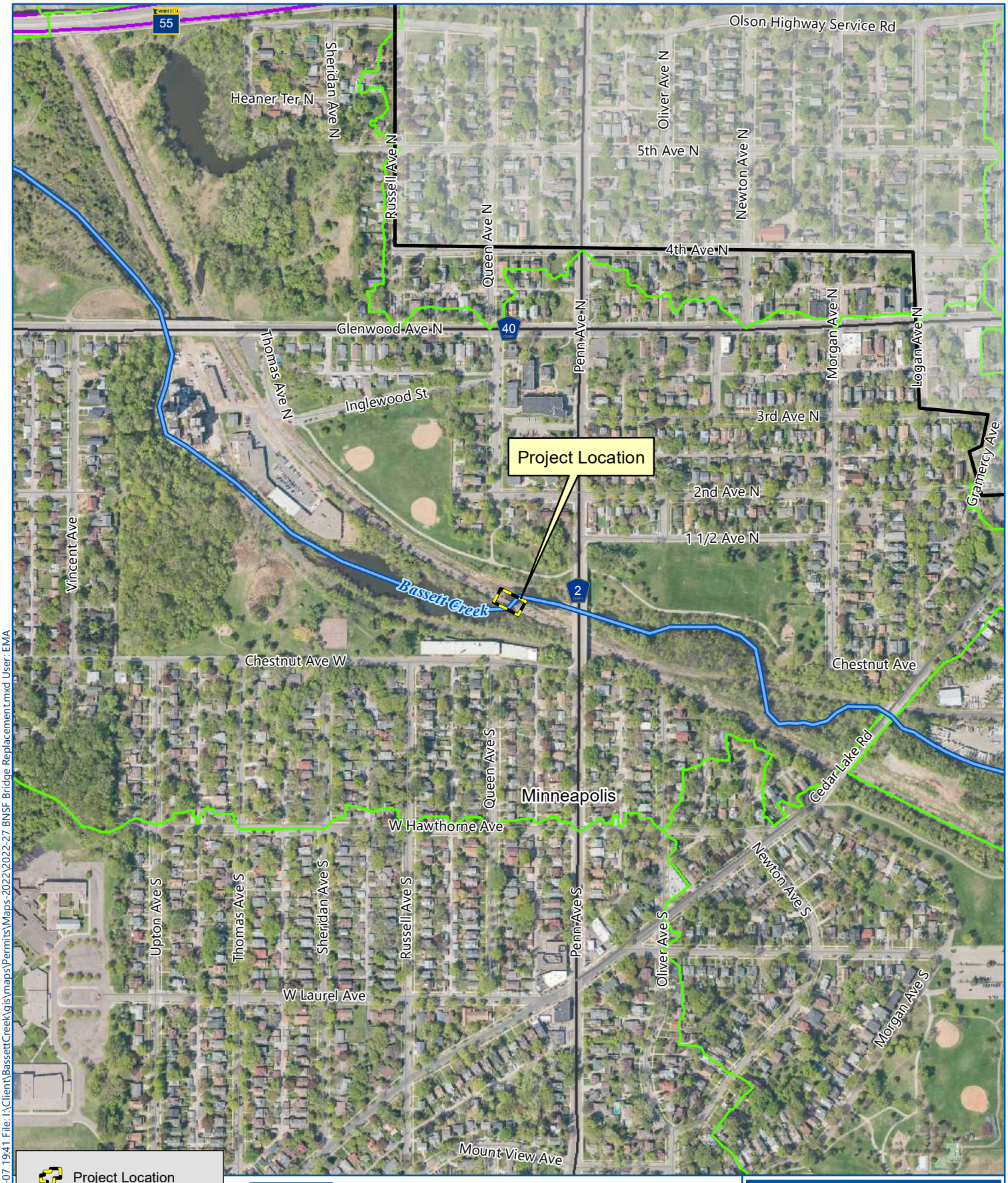
The proposed project does not create one or more acres of new or fully reconstructed impervious surfaces; therefore, BCWMC water quality review is not required.

Erosion and Sediment Control

The proposed project does not result in more than 10,000 square feet of land disturbance; therefore, BCWMC erosion and sediment control review is not required.

Recommendation for Commission Action

Approval



Barr Footer: ArcGIS 10.8.1, 2023-04-07 1941 File: I:\Client\BassettCreek\gis\maps\Permits\Maps-2022\2022-27 BNSF Bridge Replacement.mxd User: EMA