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05/15/2024

Nine Mile Creek Watershed District
City of Bloomington

Subject: Bloomington Ice Garden Renovations

Depending on methods reclaim may be considered fully reconstructed and therefore subject to stormwater management

INTRODUCTION:

The City of Bloomington is proposing to construct a building addition at the Bloomington Ice Garden located in Bloomington, Minnesota. Associated construction activities also include reconfiguring the existing parking lot, mechanical equipment concrete pads, utility improvements, and reconstruction of pavement near the building addition. The overall site is 10.60 acres and limits of subgrade disturbance is approximately 0.60 acres. Areas of the existing parking lot that are proposed to be reclaimed and repaved in place are not considered disturbed areas. The existing impervious within our scope of work is 98,700 square feet and the proposed impervious in the same area is 101,200 square feet for a net addition of 2,500 square feet. The overall new and fully reconstructed impervious is 24,600 square feet which is considered the regulated impervious area. See regulated impervious exhibit for reference.

STORMWATER MANAGEMENT REQUIREMENTS:

City stormwater standards also apply

The proposed construction activities must follow the rules and regulations of Nine Mile Creek Watershed Stormwater Management and Erosion Control ordinance. Below is the post-construction stormwater management requirements that apply to the site.

4.3.1 Except for sites qualifying as "restricted" under subsection 4.3.2, an applicant for a permit under this rule must demonstrate that the implementation of its stormwater management plan will:
a. Provide for the retention onsite of 1.1 inches of runoff from the regulated impervious surface of the site; i Where infiltration or filtration facilities, practices or systems are proposed, pretreatment of runoff must be provided. ii Drawdown of water levels in infiltration and filtration facilities must be within 48 hours.
b. Limit peak runoff flow rates to that from existing conditions for the 2-, 10- and 100-year frequency storm events using a nested 24-hour rainfall distribution for all collection points where stormwater discharge leaves the site; and
c. Provide for at least 60 percent annual removal efficiency for total phosphorus and at least 90 percent annual removal efficiency for total suspended solids from site runoff.

EXISTING CONDITIONS:

The site is currently The Bloomington Ice Garden Arena with associated parking lot, drive aisles, and sidewalks. The existing parcel drains is split into 3 subbasin drainage areas that drain to a large wetland complex and ultimately nine mile creek. The north half of the parking lot drains to an existing stormwater pond. The southeast portion of the parking lot and eastern drive aisle drain to storm sewer that discharges directly into a wetland complex. The southwest portion of the parking lot and western drive aisle drains to storm sewer that discharges into a wetland complex. The soils on site are predominately silty sands and clayey sands. Refer to the Existing Drainage Map and Geotechnical Report located in the appendices for reference.

PROPOSED CONDITIONS:

The proposed project consists of a building addition, associated pavement reconstruction, reclaiming and repaving the existing parking lot, concrete equipment pad, and underground stormwater management chambers. There are four drainage subbasins in the proposed conditions with a majority of the northern parking lot being routed to the proposed underground infiltration system. The eastern subbasin area remains the same with slightly more impervious surface added. The western subbasin remains the same. Although a majority of the new and reconstructed impervious are located on the eastern drive aisle, existing utility infrastructure and wetland buffers make it infeasible to provide stormwater management on the east side of the site. However, we will be overcompensating for this by constructing a larger than necessary underground chamber system to capture the northern half of the parking lot. Refer to the proposed drainage map located in the appendices for reference.

RATE CONTROL:

Nine Mile Creek requires that rate control be provided for the 2, 10, and 100 year storm events. Rate control was modeled using Atlas 14 rainfall data and HydroCAD modeling software. Because the three drainage subbasins ultimately discharge to the same wetland complex, rate control was analyzed as one point of discharge. The proposed conditions will utilize underground storage chambers to provide rate control for the overall disturbed area. Refer to the existing and proposed hydrocad models located in the appendices for reference.

Table 2: Rate Control

	2 year (2.84")	10 year (4.23")	100 year (7.47")
Existing (cfs)	9.58	14.74	26.59
Proposed (cfs)	7.40	11.40	23.91

VOLUME REDUCTION/ WATER QUALITY:

Nine Mile Creek Watershed District requires a water quality volume of 1.1" over new and fully reconstructed impervious. The total regulated impervious is equal to 24,600 square feet. The existing soils within the underground footprint are silty sands (SM) and silts (ML) and are assumed to have an infiltration rate of 0.3"/hr. The bottom of the underground system will be at elevation 809.5 and the primary outlet will be set at 810.70. This allows for the system to achieve the 48 hour drawdown requirement. Groundwater elevation was found to be approximately 801.50 which leaves 8 feet of separation.

Water Quality Volume Required:
24,600 * (1.1"/12) = 2,253 CF

Water Quality Volume Provided:
Underground Chambers (Between chamber bottom (809.50) and outlet (810.70)) = 2,680 CF

Pretreatment of the underground chambers will be met by providing a sump manhole with SAFL BAFFLE as well as a pretreatment sediment row within the underground system.

Table 3: Pollutant Removals

	TSS	Phosphorus
Removal (lbs)	184 lbs	1.01 lbs
Removal Efficiency (%)	98%	95%

Submit wetland application for boundary determination

WETLAND

The site has been delineated by Pinnacle Engineering. There will be no impacts to the existing wetland. Refer to appendices for wetland report.

FLOODPLAIN

The 100 year floodplain for the site is elevation 807.0. The building has 3 separate floor elevations. Rink 3 (north) has a finished floor of 815.50, Rink 2 (center) has a finished floor elevation of 813.50, and Rink 1 (south) has a finished floor elevation of 812.90.

CONCLUSION:

In conclusion, the proposed stormwater management BMP meets and exceeds the rules and regulations applied to the project.

Sincerely,

Matt Isakson, PE
Civil Engineer
Bolton & Menk, Inc.

Attachments:

1. Existing Drainage Map Exhibit
2. Existing Hydrocad Model
3. Proposed Drainage Map Exhibit
4. Proposed Hydrocad Model
5. Regulated Impervious Exhibit
6. MIDS Model
7. Geotechnical Report
8. Wetland Report

EXISTING DRAINAGE MAP

EXISTING HYDROCAD MODEL

PROPOSED DRAINAGE MAP

PROPOSED HYDOCAD MODEL

MIDS MODEL

GEOTECHNICAL REPORT

WETLAND REPORT