

Stormwater Memorandum

Bluff View Subdivision – Phase I



To: Paul Reiland, Johnson-Reiland Builders & Remodelers
From: Reese Sudtelgte, P.E.
Date: August 31, 2022
Subject: Bluff View Subdivision – Phase I
cc: Paul Reiland (Johnson-Reiland Builders & Remodelers)

INTRODUCTION

This memorandum was prepared as an addendum to the Bluff View Stormwater Management Report dated March 11, 2020. The Bluff View subdivision is a multi-phase development that will be located at the south edge of Northfield city limits, as a western extension of Ford Street. Phase I of the development includes the construction of three quadplexes and 17 duplexes for a total of 46 units. The final plans for Phase I of the development include changes to the impervious distribution per lot such that the quadplexes are greater in impervious area and the duplexes are smaller than what was designed in the preliminary development plans. The impacts from the changes in impervious area, which are summarized below in Table 1, have been analyzed to ensure that the project still meets the City of Northfield stormwater regulations. Please note that drainage areas five through seven (DA-5 to DA-7) are not included as they consist solely of Phases II and III of the development.

Table 1. Phase I Proposed Impervious Areas vs. Designed Impervious Areas

Drainage Area	Drains To	Designed Impervious Area [ac]	Proposed Impervious Area (Phase 1) [ac]	Difference [ac]
DA-1	Spring Creek	0.88	0.77	-0.11
DA-2	Existing N Basin	0.70	0.69	-0.01
DA-3	Biofiltration Basin	0.53	0.65	+0.12
DA-4	Existing S Basin	7.32	6.79	-0.53
Total		9.43	8.90	-0.53

Rate Control

The City of Northfield requires that the proposed discharge rates for the project cannot exceed the existing (pre-settlement) discharge rates for the 2-, 10-, and 100-year 24-hour storm events and 100-year 10-day snowmelt event. Please see Tables 2 and 3 for a summary of the changes in discharge rates and biofiltration high water levels (HWLs) respectively. There are negligible changes to the designed discharge rates, and the project still provides an overall decrease in discharge from existing conditions. Similarly, the biofiltration basin HWLs have risen less than an inch from the designed HWLs and still provide more than two feet of freeboard from the lowest floor of the lowest nearby unit. Block 3, Units 17-20 (eastern quadplex) have the lowest floor elevation of 971.00, so 2.94 feet of freeboard has been provided.

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Table 2. Rate Control

Storm Event	Existing Peak Discharge [cfs]	Designed Peak Discharge [cfs]	Phase I Proposed Peak Discharge [cfs]
2-Year 24-Hour	41.73	14.29	14.30
10-Year 24-Hour	90.54	27.42	27.42
100-Year 24-Hour	211.85	54.02	54.02
100-Year 10-Day Snowmelt	57.71	20.83	20.82

Table 3. Biofiltration High Water Level

Storm Event	Designed HWL [ft]	Phase I Proposed HWL [ft]
2-Year 24-Hour	965.72	965.75
10-Year 24-Hour	967.01	967.02
100-Year 24-Hour	968.04	968.06
100-Year 10-Day Snowmelt	967.37	967.38

Water Quality Volume

The City of Northfield requires that one inch of runoff from impervious surfaces should be infiltrated. As the site consists of poor soils, infiltration is not viable and a biofiltration basin is proposed to provide the water quality volume. Although portions of Phase I of the development drain offsite to other basins, the entire water quality volume for Phase I has been provided by the biofiltration basin. Please see Table 4 below for a summary of the required and provided water quality volume using the proposed impervious areas.

Table 4. Water Quality Volume

Impervious Area [ac]	8.90
Required Water Quality Volume [cf]	32,307
Biofiltration Provided Water Quality Volume [cf]	34,408

Water Quality

To meet the City of Northfield requirements, the total suspended solids (TSS) load must be reduced by 90% and the total phosphorus load must be reduced by 60%. The P8 model was updated to calculate the proposed removal efficiency of the biofiltration basin as the impervious area being routed to this basin has increased. Please see Table 5 below for the biofiltration basin removal rates.

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Table 5. Phase I Proposed Impervious Areas vs. Designed Impervious Areas

Pollutant	Designed Biofiltration Removal Efficiency	Phase I Proposed Biofiltration Removal Efficiency
TSS	100%	100%
TP	67%	68%

