

Technical Memo



Responsive partner.
Exceptional outcomes.

To: Michael Hayman, Project Manager, Minnehaha Creek Watershed District

From: Chris Meehan, Wenck Associates, Inc.
Mark Schroeher, Wenck Associates, Inc.
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Date: January 7, 2016

Subject: Storm Water Treatment Concepts at 325 Blake Road

Minnehaha Creek Watershed District (MCWD) is currently working with a development team to evaluate options for site development at 325 Blake Road in Hopkins, MN. Wenck was tasked to have a better understanding of how much, where and to what extents the storm water will be routed to the site.

Verify Storm Water Volumes

The two major diversion inflows planned for the 325 Blake parcel were the Lake Street Diversion Project –(MCES) and the Powell Road Diversion Project (MCWD). The Powell Road Diversion Project has since been constructed and the Lake Street Diversion is entering final design. As these projects progressed design modifications were required which resulted in a change to the stormwater volumes which would be diverted to 325 Blake. As a result there was a need to determine the current volumes and the necessary footprint for a stormwater BMP on the site.

A HydroCAD model was developed with the updated attributes of the each of the projects to determine the runoff volume that can be directed to the 325 Blake Road stormwater BMP (Table 1). The volumes calculated in the analysis were based on the 1.0 and 1.25-inch 24-hour rainfall events. These two events represent water quality depths used for stormwater BMP sizing.

Table 1 – Runoff Volumes and BMP Footprint Size

Storm Event	Runoff Volume (ac-ft)			BMP Footprint (ac)*
	From Powell	From Lake St.	Total	
1.0-inch	3.93	1.92	5.85	1.95
1.25-inch	6.23	2.73	8.96	2.99

*The BMP footprint is based on an assumed depth of 3 ft.

Site Design Refinement

Based on the two rainfall events mentioned above, the footprint of the filtration basins were calculated and placed graphically in Figure 1. The footprints shown in Figure 1 are the overall impact area of each infiltration basin based on side slopes of 4 horizontal to 1 vertical and tie into the existing surface. The BMP depth was assumed as 3 feet from elevation 898.0 to 901.0. These elevations were determined by understanding the approximate groundwater depth (bottom of basin) and the two diversion structure inverts (overflow elevation). The existing site is generally flat with the exception of the

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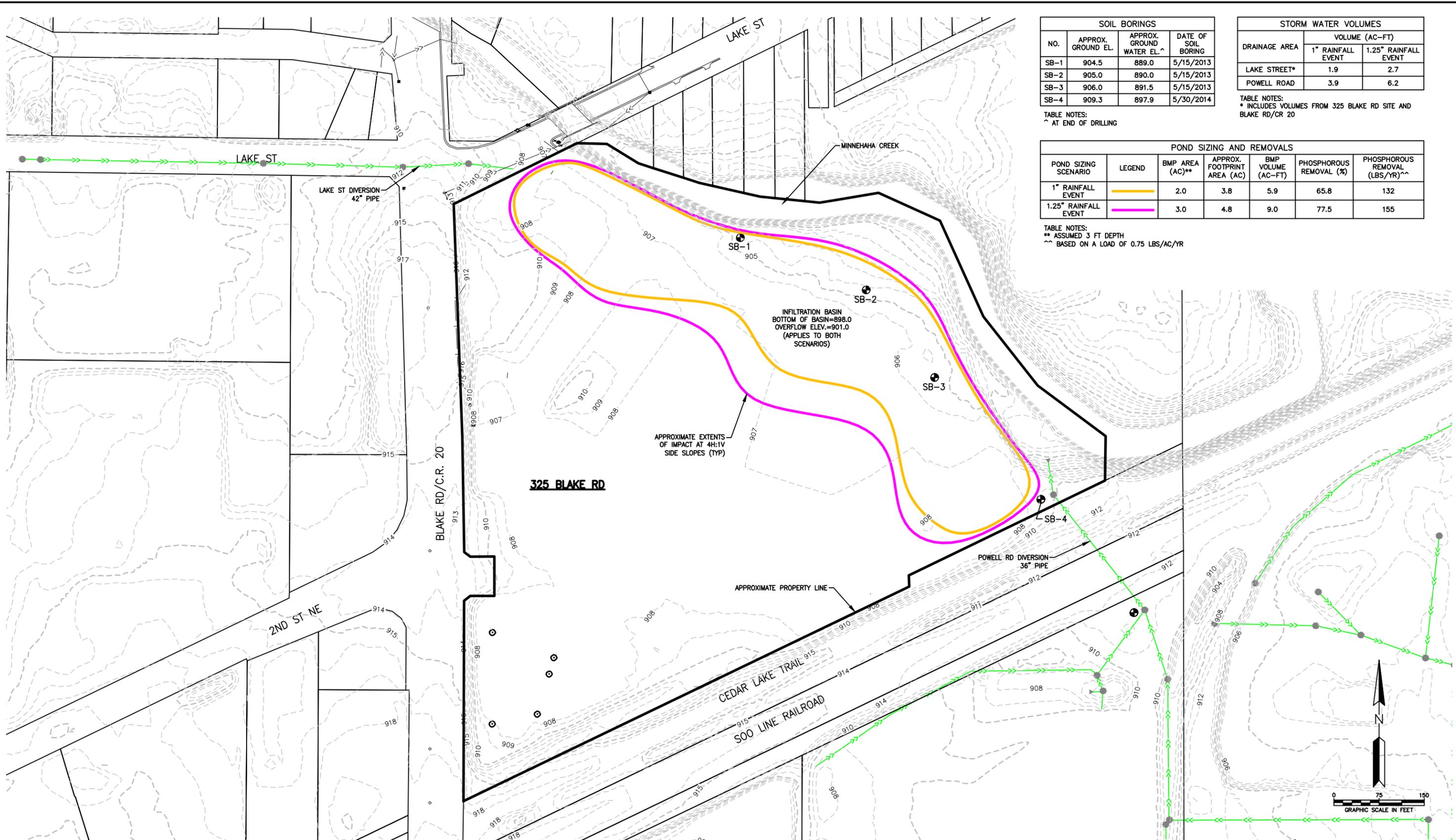


northeastern edge of the site going down to the creek, indicating the exact shape and location of the proposed filtration basin will have minimal effect on the earthwork for the site.

Soil borings from both May of 2013 and May 2014 were reviewed to understand the existing groundwater in the area and to determine the filtration basin bottom elevation. A basin bottom elevation of 898.0 was determined based on three feet of separation from the assumed ground water level. The basin overflow elevation is based on the Lake Street and Powell Road Diversions. Lake Street has an overflow elevation of 902.31 at the diversion structure before water would backup into the system. Powell Road has an overflow elevation of 901.06 at the diversion structure before backing up into the system and thus dictates the overflow elevation for the proposed basin.

Construction Cost Estimate

Both an overall component cost estimate and detailed cost estimate for the storm water treatment concepts were developed. The component cost used a combination of the 2013 Feasibility Study estimates and the 2015 325 Blake Demolition report. Assumptions for the estimates are included in each document. The storm water treatment concept is estimated in the range of \$1,865,550 to \$2,238,660. These costs are higher than the original 2013 feasibility study estimate largely due to the assumed common excavation quantity. The original estimate assumed a common excavation quantity of 34,000 cubic yards based on calculated storm water volumes at the time. The current common excavation quantity is estimated at 62,500 cubic yards and is based on the removing soil material between the bottom of the proposed basin and the existing surface. The common excavation unit cost currently assumes all material will be hauled off site; however, this unit cost could be reduced if some soil material remains on site.



SOIL BORINGS			
NO.	APPROX. GROUND EL.	APPROX. GROUND WATER EL. ^	DATE OF SOIL BORING
SB-1	904.5	889.0	5/15/2013
SB-2	905.0	890.0	5/15/2013
SB-3	906.0	891.5	5/15/2013
SB-4	909.3	897.9	5/30/2014

TABLE NOTES:
^ AT END OF DRILLING

DRAINAGE AREA	VOLUME (AC-FT)	
	1" RAINFALL EVENT	1.25" RAINFALL EVENT
LAKE STREET*	1.9	2.7
POWELL ROAD	3.9	6.2

TABLE NOTES:
* INCLUDES VOLUMES FROM 325 BLAKE RD SITE AND BLAKE RD/CR 20

POND SIZING AND REMOVALS						
POND SIZING SCENARIO	LEGEND	BMP AREA (AC)**	APPROX. FOOTPRINT AREA (AC)	BMP VOLUME (AC-FT)	PHOSPHOROUS REMOVAL (%)	PHOSPHOROUS REMOVAL (LBS/YR)^
1" RAINFALL EVENT		2.0	3.8	5.9	65.8	132
1.25" RAINFALL EVENT		3.0	4.8	9.0	77.5	155

TABLE NOTES:
** ASSUMED 3 FT DEPTH
^ BASED ON A LOAD OF 0.75 LBS/AC/YR

REV	REVISION DESCRIPTION	DWN	APP	REV DATE

SEAL

NOT FOR
CONSTRUCTION

SUB CONSULTANT

PRIME CONSULTANT

Responsive partner. Exceptional outcomes.

PROJECT TITLE
**STORM WATER TREATMENT CONCEPTS
AT 325 BLAKE ROAD**

MINNEHAHA CREEK
WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

SHEET TITLE
POND SIZING CONFIGURATION

DWN BY MJS	CHK'D	APP'D	DWG DATE JAN 2016
PROJECT NO. 0185-0028	SHEET NO. FIGURE 1	SCALE AS SHOWN	REV NO.