DeCola Ponds B and C Improvement Project
Feasibility Study

Golden Valley, Minnesota

May 2018

Prepared for
Bassett Creek Watershed Management Commission

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Appendix A

Sediment Sampling and Bathymetric Memo (2015)

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BARR

Technical Memorandum

To: Emily Goellner, City of Golden Valley
From: Kevin Menken, Barr Engineering
Subject: Sediment characterization of stormwater ponds at Liberty Crossing/Pennsylvania Woods site
Date: December 30, 2015
Project: 23/27-1422
c: Mary Finch, Hennepin County

Introduction

This memorandum summarizes sediment characterization and bathymetric survey results for three stormwater ponds associated with the Liberty Crossing and Pennsylvania Woods flood mitigation project. The project location is shown on Figure 1. The work was conducted by Barr Engineering Co. (Barr) on behalf of the City of Golden Valley (City) with funding from Hennepin County. The stormwater ponds, referred to as Decola Pond A, B, and C, are located adjacent to or within the Pennsylvania Woods park area, north of the intersection of Pennsylvania Ave. N and Winnetka Heights Drive in the City of Golden Valley, as shown on Figure 2.

The work is part of a flood mitigation project that will help address regional flooding issues near Medicine Lake Road and Winnetka Avenue, where past flooding has impacted residential and commercial buildings. The City is currently working to incorporate stormwater storage, conveyance, and infrastructure into the redevelopment plan for Liberty Crossing, a proposed redevelopment project located the southeast corner of that intersection. The City's future long term plans for the flood mitigation project also include expanding stormwater storage in the Pennsylvania Woods ponds (Decola Ponds A, B and C), east of the proposed Liberty Crossing redevelopment.

The objectives of the study are to 1) collect bathymetric survey data to assess the current volume of the ponds and identify areas of accumulated sediment; and 2) characterize sediment to determine if sediment within the ponds would be suitable for reuse as fill, or if the sediment is contaminated and would require landfill disposal, if dredged. This memorandum summarizes the results of the bathymetry and sediment characterization work Barr performed, and our conclusions regarding potential reuse of sediment as fill.

Background

The purpose of sediment characterization is to determine whether the sediment, when dredged, could potentially be reused, or if landfill disposal would be required. The appropriate handling and disposal of dredged material is determined based on chemical concentrations in the sediments. Dredged materials that do not exceed the Minnesota Pollution Control Agency's (MPCA) Residential Soil Reference Values

(SRV) are considered unregulated fill and are suitable for use or reuse on properties within all land use categories, including residential (MPCA, 2012). Excavated materials that exceed Residential SRVs are typically disposed at a solid waste landfill.

The sediment characterization work was performed in accordance with the MPCA's June 2015 guidance document "Managing Stormwater Sediment Best Management Practice Guidance" (MPCA, 2015a). This document provides technical guidance for characterizing sediment in stormwater ponds, including determination of the number of samples per pond and potential contaminants to be analyzed.

Sediment Sample Collection Methodology

Sediment sampling was conducted on July 9 and 10, 2015 following the MPCA's guidance (MPCA, 2015a). Barr staff used vibra-coring equipment in Pond B and Pond C, consisting of an aluminum tube attached to a concrete vibrator. Vibra-coring equipment allows for achieving greater depth of sampling when large amounts of sediment are accumulated, such as in Pond B. Push-core sampling equipment was used in Pond A, where accumulated sediment and the required sampling depth was less. A GPS unit was used to record the coordinates of the sampling locations. A physical description of each core was recorded in field logs, and a composite of the full depth of each core was collected and sent to Pace Analytical laboratory in Minneapolis for analyses of potential contaminants. For Pond A, composite samples of five separate coring locations were collected for each of four quadrants, in accordance with MPCA guidance for stormwater ponds over 4 acres in size (MPCA, 2015a).

Sample locations are shown on Figures 3 (Pond A), 4 (Pond B) and 5 (Pond C). The field logs of sediment core descriptions are included as Attachment A. Photographs of sediment sampling are included as Attachment B. Laboratory analytical results are included in Attachment C.

Laboratory Analytical Parameters

The sediment samples were analyzed by Pace Analytical for baseline parameters listed for urban stormwater pond characterization (MPCA, 2015a), which include polycyclic aromatic hydrocarbons (PAHs), arsenic and copper. Additional metals were also analyzed in order to obtain concentrations of the full list of RCRA metals. The parameters analyzed and their laboratory analytical methods are listed below:

- RCRA Metals: arsenic, barium, cadmium, chromium, copper, lead, selenium, silver (method EPA 6010C), and mercury (Method EPA 7471B)
- Polycyclic aromatic hydrocarbons (PAHs) (method EPA 8270D SIM)
- Toxicity characteristic leaching procedure (TCLP) for RCRA metals was performed on composite samples from Ponds A and B.

The laboratory report is included in Attachment C.

PAHs are organic compounds that are formed by the incomplete combustion of organic materials, such as wood, oil, and coal. They are also naturally occurring in crude oil and coal. The MPCA determined that coal tar-based sealants are the largest source of PAHs to stormwater ponds, and a state-wide ban of coal tar-based sealants took effect January 1, 2014. The City of Golden Valley has had a ban on the use of coal tar-based sealants in effect since July 2010.

The PAHs that were analyzed can be grouped into two categories: carcinogenic (i.e. cancer causing) and non-carcinogenic. The non-carcinogenic PAHs are typically found at concentrations well below applicable MPCA soil criteria in stormwater pond sediment samples, but carcinogenic PAHs frequently exceed MPCA soil criteria in stormwater pond sediment. In order to assess the contamination level of the carcinogenic PAHs in stormwater pond sediment, the MPCA requires the calculation of a "BaP equivalents value". The BaP equivalents value is a single value representing the combined potency of 17 individual PAH compounds (list of compounds specified by MPCA guidance document) with BaP (benzo[a]pyrene) acting as the reference compound. Each compound has a potency equivalents factor that is multiplied by the respective compound's concentration for determination of the BaP equivalents value.

Often, the concentrations of one or more PAH compounds are below the laboratory's method detection limit (MDL), complicating the calculation of a BaP equivalents value. Appendix B of the MPCA's guidance (MPCA, 2015a) describes methods for calculating the BaP equivalents value when one or more compounds are below the method detection limit. The BaP equivalents were calculated in accordance with MPCA guidance (MPCA, 2015a), with modifications to the Kaplan-Meier methods listed in the guidance following correspondence with the MPCA concurring with Barr's recommendations (MPCA, 2015b). Below is a summary of the methods used to calculate the BaP equivalents values for the sediment samples.

1. The number of compounds for which there were not detected results were summed to determine the percent of non-detects (% ND). Compounds with estimated values between method detection limit (MDL) and practical quantification limit (PQL) were counted as detections.

2. If the % ND was > 80%, the non-detected results were entered as ½ MDL and the BaP equivalents value was calculated.

3. If the % ND was ≤ 80%, the non-detected results were entered as the MDL value and Kaplan-Meier Statistics were used to calculate the intermediate mean of the BaP equivalents for each sample. The intermediate mean was then multiplied by the number of cPAHs to determine the total BaP equivalent.

The results of BaP equivalent values calculations and % ND of carcinogenic PAHs are summarized in Table 1.

Results of Sediment Characterization

Results of sediment analytical testing were compared to the MPCA's current soil reference values (SRVs) in Table 1. TCLP analytical results are summarized in Table 2.

It should be noted that that MPCA has been considering changes to the SRVs, which may occur late in 2016. Under the most recently proposed June 2015 revision, the most notable change affecting stormwater pond sediment is that the Residential SRV for BaP equivalents would decrease from the current value of 2 mg/kg to 1 mg/kg. The BaP equivalents value is the parameter that most often exceeds the MPCA's Residential SRVs for stormwater pond sediment samples. The status of MPCA's SRV revisions should be reassessed prior to proceeding with the sediment dredging and management.

Decola Pond A

Decola Pond A is the largest of the three ponds, and is approximately 4.3 acres in size. Following the MPCA guidance for ponds greater than 4 acres, composite sediment samples from Pond A were collected from 4 quadrants: northwest, northeast, southwest, and southeast. Five sediment cores were collected in each quadrant (Figure 3), and composited into a single sediment sample. A total of 4 composite sediment samples were collected from Pond A, representing 20 sediment coring locations in all.

In general, sediment cores on the east side of Pond A consisted of approximately 0.5 feet of black, loose, organic silt overlying an olive gray clay with sand and gravel. Sediment cores on the west side of the pond consisted of approximately 0.5 feet of black, loose, organic silt overlying a brown to dark brown silt, with some sand. Some coring locations were a brown to dark brown peaty silt.

Analytical results in all four samples collected from Decola Pond A were below the MPCA's current Residential SRVs. Therefore, sediment in Pond A would be considered reusable as unregulated fill when compared to the MPCA's current SRVs. One sediment sample (S-05_COMP, which is a composite of cores collected from the northwest quadrant of Pond A), had a BaP equivalents value of 1.70 mg/kg, which is just over MCPA's conservative screening soil leaching value (SLV) that is also a criteria for MPCA's Unregulated Fill best practice guidance. Based on the four composite samples from Pond A, which involved 20 sub-sampling locations, the average BaP equivalent concentration in the Pond A sediment is well below the screening SLVs. The average concentration of the Pond A samples is a good indication of the sediment quality that will be generated during the dredge projects when considering the likely mixing of materials during dredging, transport, and reuse activities.

A composite of all Pond A samples was also analyzed for TCLP RCRA metals; all results were below TCLP limits for hazardous waste, indicating the material may be disposed of as non-hazardous.

When compared to the MPCA's proposed June 2015 SRVs, sediment from the northwest quadrant of Pond A does not meet requirements for unregulated fill (although the average concentration of the four Pond A composite samples would be below the proposed SRVs, similar to the above discussions for SLV results). The data should be compared to MPCA Residential SRVs in place at the time of the dredging project and the results used for selecting sediment management options.

Decola Pond B

Decola Pond B is approximately 1.5 acres in size. MPCA guidance requires a minimum of two sediment cores for ponds 2 acres and smaller. Two sediment samples, S-01 and S-02, were collected in Decola Pond B (Figure 4). Decola Pond B receives a large volume of stormwater from a culvert in the northwest corner of the pond. A deep scour hole is present directly in front of this culvert, and a large area of accumulated sediment several feet thick was observed in much of the northern half of the pond. Sediment core S-01 was collected in this area of thickly accumulated sediment, and consisted of a dark brown silty sand for the entire length of the recovered core (0 to 3.4 feet). Sporadic layers of decaying leafy plant matter were also present. Core S-02 was collected in the south half of Pond B, and consisted of loose to soft, black organic silts in the top 2.3 ft, olive gray organic silts from 2.3 to 2.8 ft, and olive gray lean clay 2.8-3.1 ft.

Analytical results in sample S-01 indicate a BaP equivalents value of 6.29 mg/kg, greater than both the current Residential SRV (2 mg/kg) and Industrial SRV (3 mg/kg). Therefore, sediment dredged from the northern portion of Decola Pond B is anticipated to require landfill disposal.

The BaP equivalents value in sample S-02 was 1.30 mg/kg, less than the MPCA's current Residential SRV. Arsenic was present in S-02 at a concentration of 6.0 mg/kg, above the MPCA screening SLV of 5.8 mg/kg. However, arsenic concentration is within the range of naturally occurring concentrations in Minnesota soils (USGS, 2013). Based on the results, the sediment dredged from the southern portion of Decola Pond B is anticipated to meet MPCA's unregulated fill best practices and will not require landfill disposal.

A composite of both Pond B samples was also analyzed for TCLP RCRA metals; all results were below TCLP limits for hazardous waste, indicating the material may be disposed of as RCRA non-hazardous materials, if landfilled.

Decola Pond C

Decola Pond C is approximately 1.7 acres in size. Two sediment samples, S-03 and S-04, were collected in Pond C (see Figure 5). Core S-03 consisted of 0.5 ft of soft, black organic silt overlying black organic clay with trace gravel. Core S-04 consisted of 0.5 ft of soft, black organic silt overlying peaty organic silts.

Concentrations of all compounds analyzed in Pond C sediment were below both the current and proposed MPCA's Residential SRVs and Industrial SRVs. Therefore, it is anticipated that the sediment dredged from Pond C could be reused as unregulated fill and will not require landfill disposal.

Invasive Chinese Mystery Snails

While collecting sediment samples in Decola Pond C, field staff noted large numbers of large round snails in the near shore areas of the pond. The snails were recognized as being an invasive species – the non-native Chinese mystery snail. The Chinese mystery snail has a hard plate attached to its foot that acts like a trap door, allowing the snail to tightly seal itself in its shell. This allows the snail to withstand being out of water for a considerable length of time. Although the snails were discovered in Pond C, it is likely the snails are present in all 3 ponds given their close proximity and connection via ditch or culvert. Ponds A and B were experiencing algae blooms during sediment sampling, and the low water clarity prevented viewing of the pond bottom. Because the snails are an invasive, non-native species that could invade other waterbodies, consideration of the proximity of other waterbodies to the sediment disposal or re-suse sites should be considered if and when the Decola ponds are dredged.

Bathymetry Results

Bathymetry surveys of Decola Ponds A, B, and C were performed on July 2, 2015. Sonar data was collected with a Lowrance HDS Gen3 depth finder with an external global positioning system antenna. Sonar data were uploaded to the ciBioBase cloud software for processing of raw sonar data, and maps of water depth and sediment sampling locations were created in ArcGIS software.

The results of the bathymetry surveys are shown on Figures 3, 4 and 5. The bathymetry survey of Decola Pond B indicated much of the northern portion of the pond is shallow due to a large volume of accumulated sediment. Sediment core S-01 collected from this area of accumulated sediment indicated the material is silty sand, with sporadic layers of decaying plant matter. Bathymetry data and sediment cores from Decola Ponds A and C did not indicate any areas of large sediment accumulation.

Summary and Conclusions

Sediment characterization indicates the sediment from Decola Pond A, the southern portion of Decola Pond B, and Decola Pond C meets guidelines for unregulated fill and is suitable for reuse under MPCA's Unregulated Fill Policy (MPCA, 2012). The BaP equivalents value in one of the sediment cores collected from the northern portion of Decola Pond B exceeded the MPCA's Residential SRV and Industrial SRV; therefore, sediment from that portion of Pond B would require landfill disposal. Based on the location of the sample from the northern portion of Pond B, the PAH impacts are likely associated with accumulated sediments entering the pond through stormwater inflow from the culvert in the northwest corner. For all

the ponds, data should be reevaluated at the time a dredging plan is proposed to verify the data is sufficient and representative of the planned dredge locations and depths, and compared to the MPCA SRVs in effect at that time.

If sediments from any of the three ponds are reused on other properties, the proximity of the sediment placement to other water bodies should be considered to prevent spreading the non-native Chinese Mystery Snail to other water bodies.

Bathymetric survey results may be used to represent existing conditions to calculate stormwater pond volumes and required dredging depths for future design of stormwater pond modifications in Pennsylvania Woods.

References

Minnesota Pollution Control Agency (MPCA), 2015a. Managing Stormwater Sediment, Best Management Practice Guidance, document wq-strm4-16, June 2015.

MPCA, 2015b. Email correspondence from Bonnie Brooks, MPCA, to Terri Olson, Barr Engineering Co. addressing comments on the June 2015 stormwater sediment guidance. December 14, 2015.

MPCA, 2012. Best Management Practices for the Off-Site Reuse of Unregulated Fill. February 2012.

USGS 2013. Smith, D.B., Cannon, W.F., Woodruff, L.G., Solano, Federico, Kilburn, J.E., and Fey, D.L., 2013, Geochemical and mineralogical data for soils of the conterminous United States: U.S. Geological Survey Data Series 801, 19 p., http://pubs.usgs.gov/ds/801/.

Tables

Figures

Attachments

Attachment A – Sediment Core Logs

Attachment B – Photographs

Attachment C – Laboratory Analytical Data

Tables

Table 1
Sediment Analytical Data Summary
Liberty Crossing Pennsylvania Woods
Hennepin County

			Sediment Core ID:	**S-01 Pond B**	**S-02 Pond B**	**S-03 Pond C**	**S-04 Pond C**	**S-05 COMP Pond A**	**S-06 COMP Pond A**	**S-07 COMP Pond A**	**S-08 COMP Pond A**
			Date	**7/09/2015**	**7/09/2015**	**7/09/2015**	**7/09/2015**	**7/10/2015**	**7/10/2015**	**7/10/2015**	**7/10/2015**
			Depth	**0 - 3.5 ft**	**0 - 3.1 ft**	**0 - 1.2 ft**	**0 - 3.6 ft**				
Parameter	Minnesota Screening Soil Leaching Values	Minnesota Residential Soil Reference Values	Minnesota Industrial Soil Reference Values								
Effective Date	06/01/2013	06/22/2009	06/22/2009								
Exceedance Key	**Bold**	Underline	*Italic*								
General Parameters											
Moisture				20.1 %	52.3 %	34.1 %	67.2 %	54.3 %	52.1 %	41.2 %	37.4 %
Metals											
Arsenic	**5.8 mg/kg**	9 mg/kg	20 mg/kg	3.8 mg/kg	**6.0 mg/kg**	1.5 mg/kg	3.5 mg/kg	2.5 mg/kg	3.1 mg/kg	2.1 mg/kg	2.0 mg/kg
Barium	1700 mg/kg	1100 mg/kg	18000 mg/kg	17.0 mg/kg	103 mg/kg	75.5 mg/kg	107 mg/kg	68.9 mg/kg	76.8 mg/kg	73.3 mg/kg	62.1 mg/kg
Cadmium	8.8 mg/kg	25 mg/kg	200 mg/kg	0.15 j mg/kg	0.87 mg/kg	0.33 mg/kg	0.53 mg/kg	0.40 mg/kg	0.40 mg/kg	0.33 mg/kg	0.27 mg/kg
Chromium	36 CR6 mg/kg	87 CR6 mg/kg	650 CR6 mg/kg	10.6 mg/kg	28.2 mg/kg	13.4 mg/kg	19.6 mg/kg	15.5 mg/kg	14.8 mg/kg	12.6 mg/kg	14.4 mg/kg
Copper	700 mg/kg	100 mg/kg	9000 mg/kg	17.8 mg/kg	34.5 mg/kg	14.9 mg/kg	24.1 mg/kg	18.3 mg/kg	18.0 mg/kg	15.3 mg/kg	14.9 mg/kg
Lead	2700 mg/kg	300 mg/kg	700 mg/kg	9.2 mg/kg	170 mg/kg	20.9 mg/kg	27.0 mg/kg	53.8 mg/kg	41.6 mg/kg	29.5 mg/kg	28.0 mg/kg
Mercury	3.3 MC mg/kg	0.5 mg/kg	1.5 mg/kg	0.0086 j mg/kg	0.083 mg/kg	0.043 mg/kg	0.050 j mg/kg	0.039 mg/kg	0.043 mg/kg	0.034 mg/kg	0.030 mg/kg
Selenium	2.6 mg/kg	160 mg/kg	1300 mg/kg	< 0.41 mg/kg	< 0.78 mg/kg	0.57 j mg/kg	1.3 j mg/kg	< 0.86 mg/kg	< 0.65 mg/kg	< 0.66 mg/kg	< 0.55 mg/kg
Silver	7.9 mg/kg	160 mg/kg	1300 mg/kg	< 0.12 mg/kg	< 0.22 mg/kg	< 0.13 mg/kg	< 0.29 mg/kg	< 0.24 mg/kg	< 0.19 mg/kg	< 0.19 mg/kg	< 0.16 mg/kg
PAHs											
3-Methylcholanthrene	T	T	T	< 16.3 * ug/kg	< 27.2 ug/kg	< 2.0 ug/kg	< 4.0 ug/kg	< 28.4 ug/kg	< 2.7 ug/kg	< 2.2 ug/kg	< 2.1 ug/kg
5-Methylchrysene	T	T	T	< 10.5 * ug/kg	< 17.6 ug/kg	< 1.3 ug/kg	< 2.6 ug/kg	< 18.4 ug/kg	< 1.8 ug/kg	< 1.4 ug/kg	< 1.3 ug/kg
7,12-Dimethylbenz(a)anthracene	T	T	T	< 22.4 ug/kg	< 37.4 ug/kg	< 2.7 ug/kg	< 5.5 ug/kg	< 39.1 ug/kg	< 3.7 ug/kg	< 3.0 ug/kg	< 2.9 ug/kg
7h-Dibenzo(c,g)carbazole	T	T	T	< 25.3 ug/kg	< 42.2 ug/kg	< 3.1 ug/kg	< 6.2 ug/kg	< 44.2 ug/kg	< 4.2 ug/kg	< 3.4 ug/kg	< 3.2 ug/kg
Benz(a)anthracene	T	T	T	2530 ug/kg	616 ug/kg	53.0 ug/kg	< 2.5 ug/kg	1030 ug/kg	57.1 ug/kg	22.9 ug/kg	17.4 ug/kg
Benzo(a)pyrene	T	T	T	2690 ug/kg	803 ug/kg	72.4 ug/kg	< 2.4 ug/kg	1100 ug/kg	86.3 ug/kg	33.9 ug/kg	26.6 ug/kg
Chrysene	T	T	T	3250 ug/kg	1100 ug/kg	92.1 ug/kg	< 2.5 ug/kg	1210 ug/kg	107 ug/kg	41.7 ug/kg	31.7 ug/kg
Dibenz(a,h)acridine	T	T	T	< 7.2 * ug/kg	< 12.1 ug/kg	< 0.88 ug/kg	< 1.8 ug/kg	< 12.6 ug/kg	< 1.2 ug/kg	< 0.98 ug/kg	< 0.92 ug/kg
Dibenz(a,h)anthracene	T	T	T	454 * ug/kg	< 40.8 ug/kg	< 3.0 ug/kg	< 5.9 ug/kg	< 42.6 ug/kg	< 4.1 ug/kg	< 3.3 ug/kg	< 3.1 ug/kg
Dibenzo(a,e)pyrene	T	T	T	356 * ug/kg	< 10.7 ug/kg	< 0.78 ug/kg	< 1.6 ug/kg	< 11.2 ug/kg	< 1.1 ug/kg	< 0.87 ug/kg	< 0.82 ug/kg
Dibenzo(a,h)pyrene	T	T	T	188 * ug/kg	< 39.9 ug/kg	< 2.9 ug/kg	< 5.8 ug/kg	< 41.8 ug/kg	< 4.0 ug/kg	< 3.2 ug/kg	< 3.1 ug/kg
Dibenzo(a,i)pyrene	T	T	T	< 12.3 ug/kg	< 20.5 ug/kg	< 1.5 ug/kg	< 3.0 ug/kg	< 21.4 ug/kg	< 2.0 ug/kg	< 1.7 ug/kg	< 1.6 ug/kg
Dibenzo(a,l)pyrene	T	T	T	< 9.3 ug/kg	< 15.5 ug/kg	< 1.1 ug/kg	< 2.3 ug/kg	< 16.2 ug/kg	< 1.5 ug/kg	< 1.3 ug/kg	< 1.2 ug/kg
Indeno(1,2,3-cd)pyrene	T	T	T	1320 ug/kg	441 ug/kg	36.0 ug/kg	< 5.7 ug/kg	479 ug/kg	46.8 ug/kg	18.0 ug/kg	< 3.0 ug/kg
BaP Equivalents calculated using Kaplan-Meier method	**1400 T ug/kg**	2000 T ug/kg	*3000 T ug/kg*	***6290 a ug/kg***	1300 ug/kg	114 ug/kg	165 ug/kg	**1700 ug/kg**	140 ug/kg	55.6 ug/kg	45.4 ug/kg
% Non-detects				46.7 a %	66.7 %	66.7 %	100 %	66.7 %	66.7 %	66.7 %	73.3 %
2-Methylnaphthalene		100000 ug/kg	369000 ug/kg	40.8 j ug/kg	< 14.5 ug/kg	< 1.1 ug/kg	< 2.1 ug/kg	< 15.2 ug/kg	< 1.5 ug/kg	< 1.2 ug/kg	< 1.1 ug/kg
Acenaphthene	81000 ug/kg	1200000 ug/kg	5260000 ug/kg	348 * ug/kg	< 19.5 ug/kg	< 1.4 ug/kg	< 2.8 ug/kg	< 20.4 ug/kg	< 1.9 ug/kg	< 1.6 ug/kg	< 1.5 ug/kg
Acenaphthylene	NA			< 13.8 * ug/kg	< 23.0 ug/kg	< 1.7 ug/kg	< 3.4 ug/kg	< 24.0 ug/kg	< 2.3 ug/kg	< 1.9 ug/kg	< 1.8 ug/kg
Anthracene	1300000 ug/kg	7880000 ug/kg	45400000 ug/kg	784 ug/kg	< 22.0 ug/kg	16.8 ug/kg	< 3.2 ug/kg	340 ug/kg	< 2.2 ug/kg	< 1.8 ug/kg	< 1.7 ug/kg
Benzo(g,h,i)perylene	NA			1380 ug/kg	505 ug/kg	40.1 ug/kg	< 5.2 ug/kg	491 ug/kg	52.3 ug/kg	20.0 ug/kg	< 2.7 ug/kg
Benzofluoranthenes				5340 ug/kg	1850 ug/kg	163 ug/kg	< 21.0 ug/kg	2190 ug/kg	221 ug/kg	88.5 ug/kg	67.3 ug/kg
Fluoranthene	670000 ug/kg	1080000 ug/kg	6800000 ug/kg	10400 ug/kg	2390 ug/kg	171 ug/kg	< 2.6 ug/kg	2970 ug/kg	209 ug/kg	82.4 ug/kg	61.8 ug/kg
Fluorene	110000 ug/kg	850000 ug/kg	4120000 ug/kg	506 ug/kg	< 19.9 ug/kg	< 1.4 ug/kg	< 2.9 ug/kg	< 20.8 ug/kg	< 2.0 ug/kg	< 1.6 ug/kg	< 1.5 ug/kg
Naphthalene	4500 ug/kg	10000 ug/kg	28000 ug/kg	31.5 j ug/kg	< 13.1 ug/kg	< 0.95 ug/kg	< 1.9 ug/kg	< 13.7 ug/kg	< 1.3 ug/kg	< 1.1 ug/kg	< 1.0 ug/kg
Phenanthrene	NA			5900 ug/kg	1040 ug/kg	60.5 ug/kg	< 2.6 ug/kg	1600 ug/kg	62.6 ug/kg	23.1 ug/kg	17.3 ug/kg
Pyrene	440000 ug/kg	890000 ug/kg	5800000 ug/kg	6500 ug/kg	1580 ug/kg	122 ug/kg	< 2.8 ug/kg	2040 ug/kg	135 ug/kg	54.2 ug/kg	42.0 ug/kg

Data Footnotes and Qualifiers

Barr Standard Footnotes and Qualifiers

--	Not analyzed/Not available.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
NA	NA (not applicable) indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound.
Validated	Laboratory data has been evaluated following Barr QA/QC procedures and/or project-specific data review requirements. Field data has been verified for transcription errors, consistency and completeness. Data transferred from the previous database (9/2009) were categorized as validated, but may comprise any of the following data status categories: Validated, SSource, No QC or Legacy.
No QC	Laboratory data has been excluded from Barr QA/QC procedures.
SSource	Laboratory and/or field data obtained from a secondary source external to Barr. Second source QA/QC evaluation procedures may or may not have been performed beyond the original data generator.
Legacy	Historical laboratory data (internal at Barr). QA/QC evaluation procedures may or may not have been performed beyond the original data generator.
a	Estimated value, calculated using some or all values that are estimates.
*	Estimated value, QA/QC criteria not met.
j	Estimated detected value. The reported value is less than the stated laboratory quantitation limit but greater than the laboratory method detection limit.

Minnesota Screening Soil Leaching Values

CR6	Value represents the criteria for Chromium, hexavalent.
MC	Mercury as Mercuric Chloride.
NA	Criterion value is not available for this analyte.
T	Value represents a criteria for the total carcinogenic PAHs as BaP.

Minnesota Soil Reference Values

CR6	Value represents the criteria for Chromium, hexavalent.
T	Value represents a criteria for the total carcinogenic PAHs as BaP.

Table 2
Sediment Toxicity Characteristic Leaching Procedure Analytical Data Summary
Liberty Crossing Pennsylvania Woods
Hennepin County

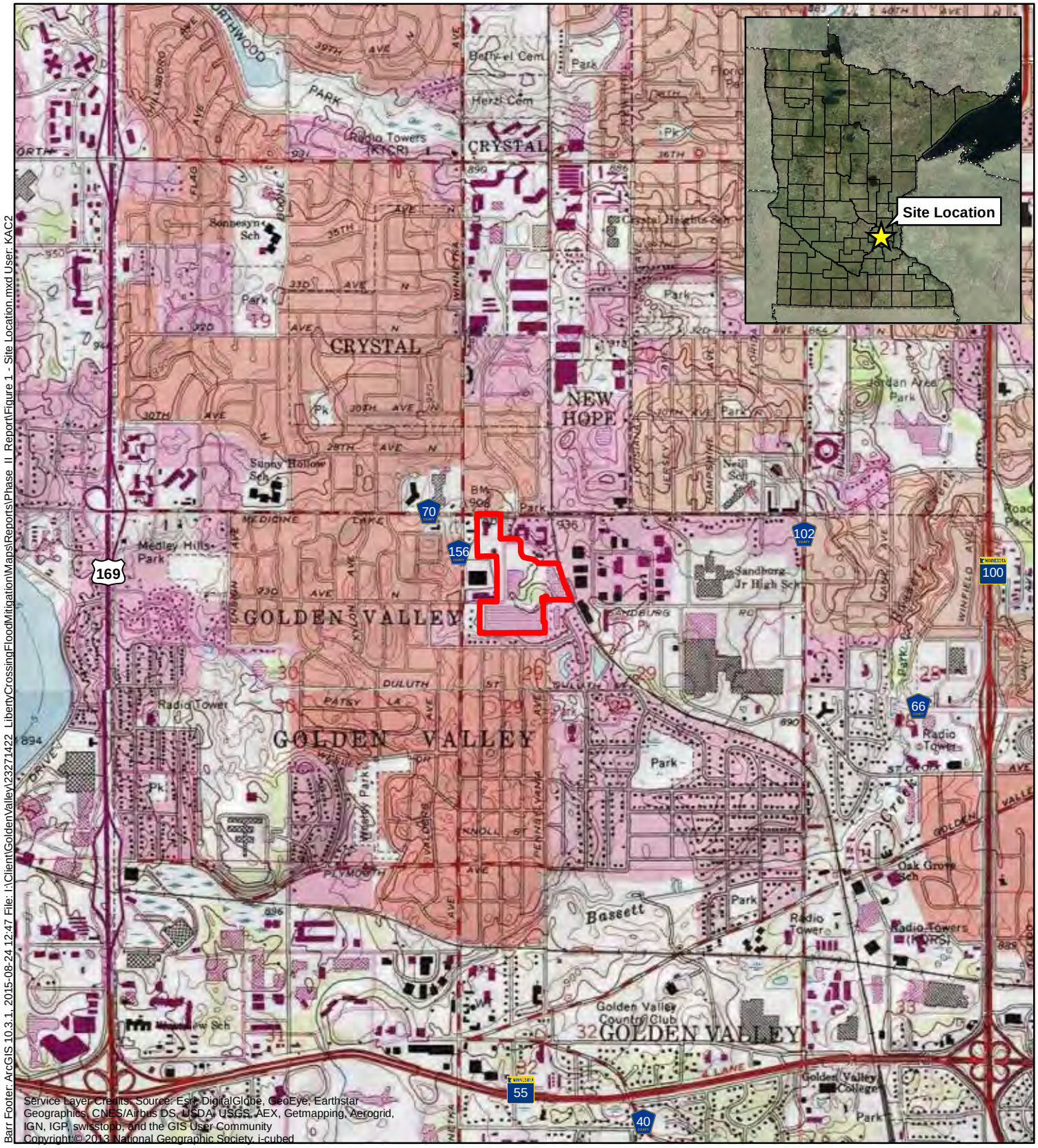
	Location	POND-A COMP	POND-B COMP
	Date	7/10/2015	7/09/2015
	Sample Type	N	N
Parameter	EPA TCLP Regulations		
Effective Date	07/14/2006		
Exceedance Key	No Exceed		
TCLP Metals			
Arsenic	5.0 mg/l	< 0.020 mg/l	< 0.020 mg/l
Barium	100.0 mg/l	0.73 mg/l	0.53 mg/l
Cadmium	1.0 mg/l	< 0.0032 mg/l	0.0047 j mg/l
Chromium	5.0 mg/l	< 0.0044 mg/l	< 0.0044 mg/l
Lead	5.0 mg/l	0.044 jb mg/l	0.15 b mg/l
Mercury	0.2 mg/l	< 0.000065 h mg/l	< 0.000065 h mg/l
Selenium	1.0 mg/l	0.044 j mg/l	< 0.041 mg/l
Silver	5.0 mg/l	< 0.012 mg/l	< 0.012 mg/l

Data Footnotes and Qualifiers

Barr Standard Footnotes and Qualifiers

--	Not analyzed/Not available.
N	Sample Type: Normal
b	Potential false positive value based on blank data validation procedures.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
j	Estimated detected value. The reported value is less than the stated laboratory quantitation limit but greater than the laboratory method detection limit.

Figures



Barr Footer: ArcGIS 10.3.1, 2015-08-24 12:47 File: I:\Client\GoldenValley\23271422_LibertyCrossingFloodMitigation\Maps\Reports\Phase_II_Report\Figure 1 - Site Location.mxd User: KAC2

Proposed Project

N

Feet

0 2,000 4,000

BARR

Figure 1

SITE LOCATION
Liberty Crossing &
Pennsylvania Woods
Golden Valley, MN

Proposed Project Area
Liberty Crossing Development
Approximate Former Wetland Location (1955 Topographic Map)
Parcels
Municipality

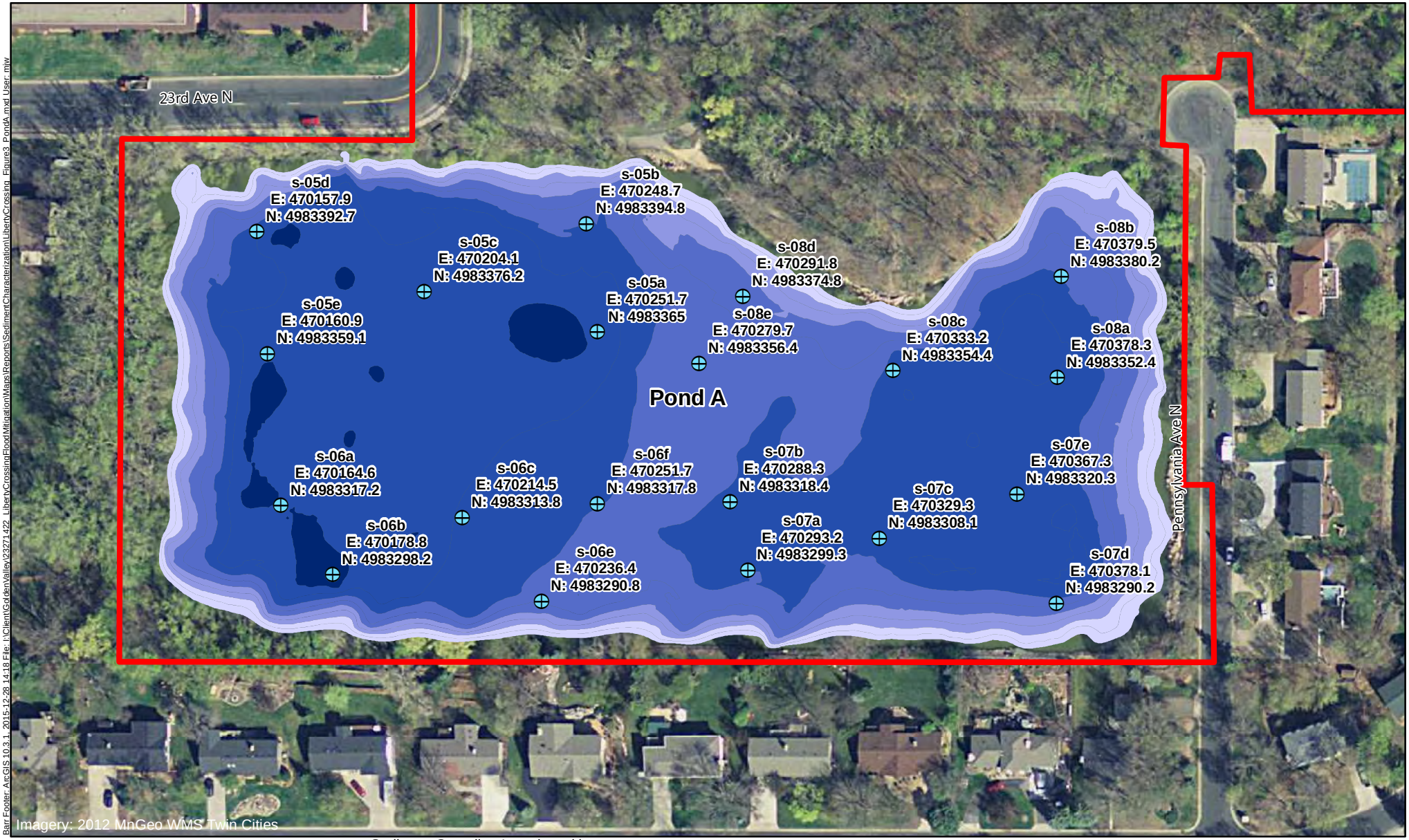
N

Feet
0 300 600

BARR

Figure 2

PROJECT AREA
Liberty Crossing &
Pennsylvania Woods
Golden Valley, MN



⊕ Sediment Sampling Location with Northing-Easting (NAD83, meters)

Proposed Project Area

Depth (ft)

- >6.0
- 5.0 - 6.0
- 4.0 - 5.0
- 3.0 - 4.0
- < 3.0

N

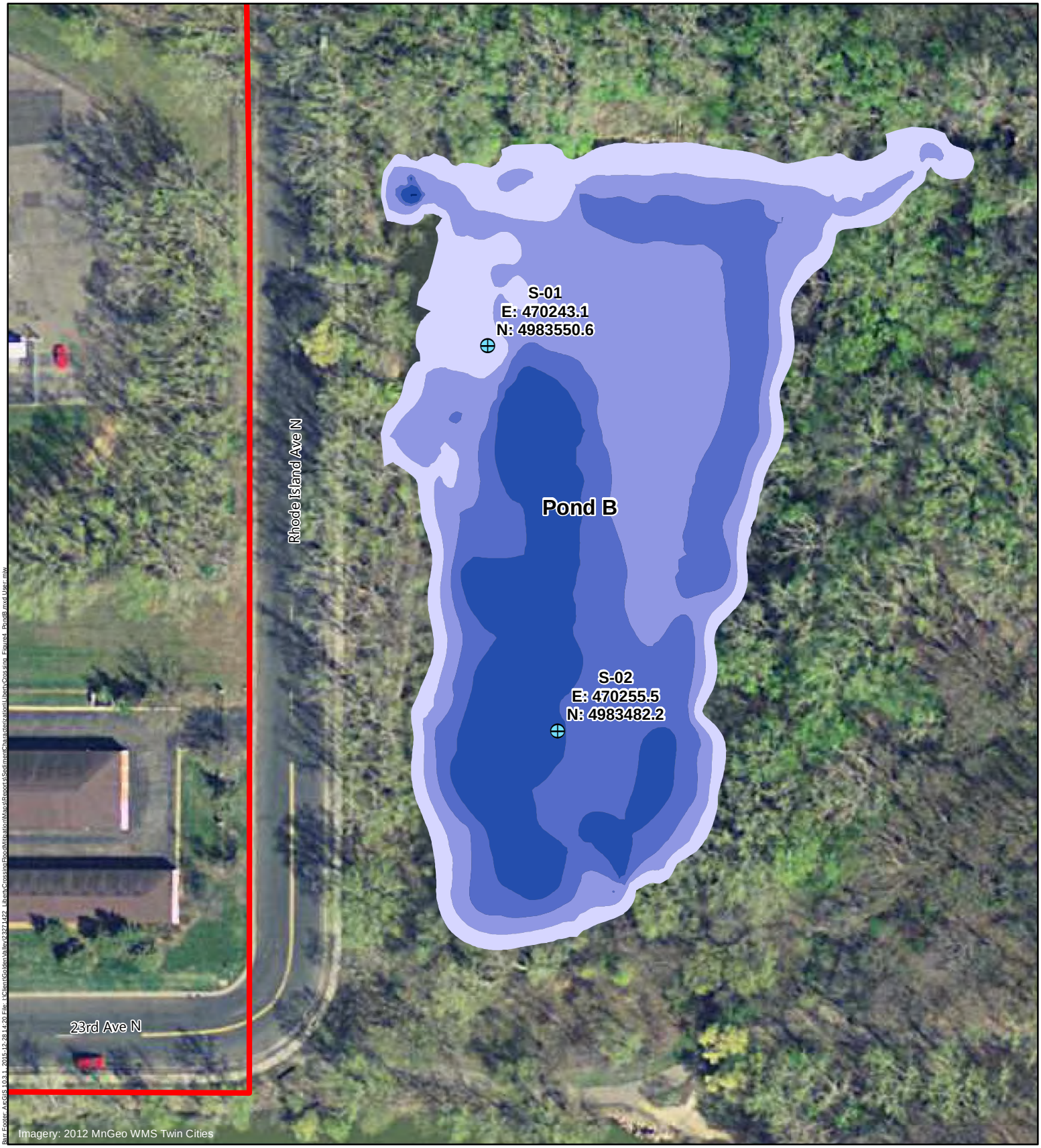
0 60 120 240

Feet

BARR

Figure 3

SEDIMENT SAMPLING: POND A
Liberty Crossing &
Pennsylvania Woods
Golden Valley, MN



Sediment Sampling Location with Northing-Easting (NAD83, meters)

Proposed Project Area

Depth (ft)

- >5.0
- 4.0 - 5.0
- 3.0 - 4.0
- 2.0 - 3.0
- <2.0

N

0 25 50 100

Feet

BARR

Figure 4

SEDIMENT SAMPLING: POND B
Liberty Crossing &
Pennsylvania Woods
Golden Valley, MN

Sediment Sampling Location with Northing-Easting (NAD83, meters)

Proposed Project Area

Depth (ft)

- > 4.0
- 3.0 - 4.0
- 2.0 - 3.0
- 1.0 - 2.0
- < 1.0

N

0 25 50 100

Feet

BARR

Figure 5

SEDIMENT SAMPLING: POND C
Liberty Crossing &
Pennsylvania Woods
Golden Valley, MN

Attachment A – Sediment Core Logs

S-01

Sediment Core/Boring Log

page 1 of 1

Proj#: 23271422 Project: Liberty Crossing

Collection Date(s): 7-9-15 GPS X: 470242.9m E Length of Push (feet): 4.5' Driller: Barr

Ice Thickness (feet): NA GPS Y: 4983552.5m N Recovery (feet): 3.5' Crew: JWJ/KDM

Water Depth (feet): 0.5' GPS Z: 470242.9m % Recovery: 78% Observer: "

VC: vibracore
PC: push core

Core/Boring#: S-01
Drilling Method: VC
Logged by: KDM
Checked by: JWJ

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	PID / Graphic Log 10.6	Description
0	1.8		W	Soft	N	Y	none	none	none	none	MG-CG	0-2	silty sand, dark brown
1.8	3.5	B1 0-3.5'		Soft	N	Y	plant matter					6.7	silty sand, MG-CG sands, leafy plant matter sporadic layering, dark brown
3.5												5.8	
3.4	3.5			Soft	N	Y						2-3.5	higher silt content, more cohesive
												BR=0.3	
												Empty bag =5.1 ppm	

6.5' tube 1.5' after push

S-02

Sediment Core/Boring Log

page 1 of 1

Proj#: 2327422 Project: Liberty Crossing

Collection Date(s): 7/9/15 GPS X: 4702553 E Length of Push (feet): 3.1' Driller: Barr

Ice Thickness (feet): NA GPS Y: 4983483.5 N Recovery (feet): 3.1' Crew: JWJ/KDM

Water Depth (feet): 4.0' GPS Z: % Recovery: 100 Observer: "

VC: vibracore
~~PC: push core~~
Core/Boring#: S-02
Drilling Method: Vibracore
Logged by: KDM
Checked by: JWJ

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	PID Ppm Graphic Log 10.6eV	Description
0	2.3	0-3.1'	W	~~Soft~~ loose	N	N	leaves/roots	Strong	N	N	OL/PT	0-2.3 6.7ppm	0-2.3 = Loose organic silts w/ leaves, roots Black grades to soft consistency
2.3	2.8			soft		Y						2.3 to 3.1 6.3ppm	2.3-2.8 = Same but Olive gray color
2.8	3.1			Med soft	Y	Y					CL	BR-0.5 ppm	2.8-3.1 = Olive gray lean clay
												Empty Bug = 5.1 ppm	Refusal @ 3.1' End of Boring
													Sampled 0-3.1'

8-1
4

Sediment Core/Boring Log

S-03

page 1 of 1

BARR

Proj#: 23271422 Project: Liberty Crossings

Collection Date(s): 7-9-15 GPS X: 470453.83 Length of Push (feet): 1.6' Driller: Barr

Ice Thickness (feet): NA GPS Y: 4983542.98 Recovery (feet): 1.2 Crew: JWJ/KDM

Water Depth (feet): 4.4 GPS Z: — % Recovery: 75% Observer: //

VC: ~~vibracore~~
PC: push core

Core/Boring#: S-03

Drilling Method: PC

Logged by: ~~JWJ~~ KDM

Checked by: JWJ

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	PID ppm Graphic Log 10.6eV	Description
0	1	0-1.2'	W	Soft	N	low	N	N	N	N	ML		0-0.5' = Black organic silts, soft.
1'	1.2'		↓	light stiff	Med ↓	Med ↓	↓	|	↓	↓	CL (Native)	0-1.2 6.0 ppm	0.5'-1.2' = Black organic clay w/ trace gravel (~1" size) NATIVE
												BR=0.3	
												Empty Bag =5.1	

6.0 - 4.4 = 1.6' push

Sediment Core/Boring Log

BARR

VC: vibracore
~~PC: push core~~

Proj#: 23271422 Project: Liberty Crossing

Collection Date(s): 7-9-15 GPS X: 4704987 Length of Push (feet): 3.8' Driller: Barr Core/Boring#: S-04

Ice Thickness (feet): NA GPS Y: 498347.93 Recovery (feet): 3.6' Crew: JWJ/KDM Drilling Method: VC

Water Depth (feet): 4.5 GPS Z: — % Recovery: 95% Observer: II Logged by: KDM

Checked by: JWJ

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	PID ppm ~~Graphic Log~~ 10.6eV	Description
0	1	0-3.6'	W	Loose	N	N	N	Slight	N	N	OL	0-2' = 6.0	0-0.5' = loose to soft Black silts
1	2	0-0.5	M	Soft	N	Med	Fibrous Peaty				Peat		0.5-3.6' = Peaty organic soils (silts)
2	3	~~0.5~~ 1.5-3'									Peaty silts	2-3.6' = 6.3	very fibrous @ 0.5-0.8 ~~ft~~
3	3.6						less fibers						less fibrous w/ depth
												BR = 1.1	End of Boring - Refusal @ 3.8'
												Empty Bag = 5.1	

2.3-4.5 = 3.8'

S-05

page 1 of 1

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23271492 Project: Liberty Crossings
Collection Date(s): 7-10-15 GPS X:
Ice Thickness (feet): — GPS Y:
Water Depth (feet): ~6' GPS Z:
Length of Push (feet): 0.5-1.0' Driller: Barr
Recovery (feet): 1.0' Crew: JWJ/KDM
% Recovery: Observer: "
Core/Boring#: S-05
Drilling Method: PC
Logged by: JWJ
Checked by: KDM

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	0.5	COMPS ABCDE	W	Loose	N	N	N	N	N	N	OL		0.0-0.5 = Loose black organic silts
0.5	1.0		↓	↓ Soft	↓ low	↓ Yes	↓						0.5'-1.0' = soft to medsoft org silts w/ some sand
													Trace gravel @ 1.0'
													refusal @ 1.0'

S-05A - 1' recovery
S-05B - 0.5'
S-05C - 1.0'
S-05D - 0.5'
S-05E - 0.5'

S-06

Sediment Core/Boring Log

page 1 of 1

BARR

VC: vibracore
PC: push core

Proj#: 23271422 Project: Liberty Crossing

Collection Date(s): 7-10-15 GPS X:

Ice Thickness (feet): — GPS Y:

Water Depth (feet): 6.5' GPS Z:

Length of Push (feet): 1.0' Driller: Barr

Recovery (feet): 0.8' Crew: JWS/KDM

% Recovery: Observer: ''

Core/Boring#: S-06

Drilling Method: PC

Logged by: JWS

Checked by: KDM

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0.0	0.3		W	loose	N	N	N	N	N	N	OL/MC		0-0.3 = Loose Black org silts
0.3	0.4		W	soft	N	N	N	N	N	N	SM		0.3-0.4 = Gray vfg-fg Sands w/ trace fine gravel
0.4	0.8		M	moist	N	VE	N	N	N	N	Peat/OL		0.4-0.8 = Dark brown to Peaty silts (decayed) increased peat w/ depth

A = 0.8' D = 0.5'
B = 0.5' E = 0.5'
C = 0.5'

Sediment Core/Boring Log

BARR

VC: ~~vibracore~~ PC: push core

Proj#: 23271422 Project: Liberty Crossings

Collection Date(s): 7-10-15 GPS X:

Ice Thickness (feet): — GPS Y:

Water Depth (feet): 5.5 GPS Z:

Length of Push (feet): ~0.8' Driller: Barr

Recovery (feet): 0.5 Crew: JWJ/KDM

% Recovery: Observer: II

Core/Boring#: ~~S-08~~ SO7 JWS

Drilling Method: PC

Logged by: JWS

Checked by: KDM

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	~~Graphic Log~~ PID	Description
0	0.2		W	Soft	N	light	N	N	N	N	OL/ML		0-0.2 = Black soft org silts
0.2	0.5		M	firm	Med	yes	↓	↓	↓	↓	CL		0.2-0.5 = Olive gray lean clay w/ fg-mg sands

A=0.5', D=0.5
B=0.5', E=0.5
C=0.5'

Sediment Core/Boring Log

BARR

VC: ~~vibracore~~
PC: push core

Proj#: 23271422 Project: Liberty Crossings

Collection Date(s): 7-10-15 GPS X:

Ice Thickness (feet): — GPS Y:

Water Depth (feet): ~5' GPS Z:

Length of Push (feet): ~~1.0~~ 0.8'

Recovery (feet): 0.5

% Recovery:

Driller: Barr

Crew: JWJ/KDM

Observer: //

Core/Boring#: S-08

Drilling Method: PC

Logged by: JWJ

Checked by: KDM

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	0.1	S-08 Comp ABCDE	W	loose	N	#	N	N	N	N	OL		0.0 - 0.1 = Black loose silts
0.1	0.5		Sat	stiff	Yes	Yes	N				CL		0.1 - 0.5 = ~~Dark~~ Olive gray lean clay w/ sand and gravel
													refusal @ 0.8'

A = 0.5 D = 0.5
B = 0.5
C = 1.2 E = 0.5

Attachment B – Photographs

Photograph #1: Barr staff using vibra-core equipment to collect sediment core from Decola Pond B.

Photograph #2: Barr staff using push-core equipment to collect sediment core from Decola Pond A.

Photograph #3: Sediment core S-01 from Decola Pond B.

Photograph #4: Sediment core S-02 from Decola Pond B.

Photograph #5: Sediment core S-03 from Decola Pond C.

Photograph #6: Sediment core S-04 from Decola Pond C.

Photograph #7: Chinese mystery snails attached to stick in Decola Pond C.

Attachment C – Laboratory Analytical Data

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

August 28, 2015

Terri Olson
Barr Engineering
4700 West 77th Street
Minneapolis, MN 55435

RE: Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Dear Terri Olson:
Enclosed are the analytical results for sample(s) received by the laboratory on July 10, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This project was revised on 7/28/15 to add additional metals and to remove the BaP equicalents calculated out.

This report was revised on August 25, 2015 to add TCLP metals at the client's request.

This report was revised on August 28, 2015 to had a holding time flag to the TCLP mercury results.

This project was revised on 8/3/15 to remove some cPAH compounds that were added on the revised report that shouldn't have been reported, report Mercury and report down the the MDL.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Chris Bremer
chris.bremer@pacelabs.com
Project Manager

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

Enclosures

cc: Data Distribution

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

Pace Analytical Services, Inc.
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SAMPLE SUMMARY

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10313820001	**S-01 (0-3.5)**	Solid	07/09/15 11:00	07/10/15 14:13
10313820002	**S-02 (0-3.1)**	Solid	07/09/15 11:30	07/10/15 14:13
10313820003	**S-03 (0-1.2)**	Solid	07/09/15 14:15	07/10/15 14:13
10313820004	**S-04 (0-3.6)**	Solid	07/09/15 14:45	07/10/15 14:13
10313820005	**S-05 COMP**	Solid	07/10/15 09:40	07/10/15 14:13
10313820006	**S-06 COMP**	Solid	07/10/15 10:30	07/10/15 14:13
10313820007	**S-07 COMP**	Solid	07/10/15 11:00	07/10/15 14:13
10313820008	**S-08 COMP**	Solid	07/10/15 11:35	07/10/15 14:13
10313820009	**POND A COMP**	Solid	07/10/15 12:00	07/10/15 14:13
10313820010	**POND B COMP**	Solid	07/09/15 11:35	07/10/15 14:13
10313820011	**POND C COMP**	Solid	07/09/15 14:50	07/10/15 14:13

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SAMPLE ANALYTE COUNT

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10313820001	**S-01 (0-3.5)**	EPA 6010	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	AH3	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10313820002	**S-02 (0-3.1)**	EPA 6010	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	AH3	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10313820003	**S-03 (0-1.2)**	EPA 6010	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	AH3	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10313820004	**S-04 (0-3.6)**	EPA 6010	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	AH3	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10313820005	**S-05 COMP**	EPA 6010	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	AH3	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10313820006	**S-06 COMP**	EPA 6010	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	AH3	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10313820007	**S-07 COMP**	EPA 6010	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	AH3	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10313820008	**S-08 COMP**	EPA 6010	DM	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	AH3	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10313820009	**POND A COMP**	EPA 6010	WBS	7	PASI-M
		EPA 7470A	JDD	1	PASI-M
10313820010	**POND B COMP**	EPA 6010	WBS	7	PASI-M
		EPA 7470A	JDD	1	PASI-M

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Sample: S-01 (0-3.5) **Lab ID: 10313820001** Collected: 07/09/15 11:00 Received: 07/10/15 14:13 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**3.8**	mg/kg	1.0	0.24	1	07/16/15 13:13	07/17/15 10:56	7440-38-2	
Barium	**17.0**	mg/kg	0.51	0.051	1	07/16/15 13:13	07/17/15 10:56	7440-39-3	R1
Cadmium	**0.15J**	mg/kg	0.15	0.039	1	07/16/15 13:13	07/17/15 10:56	7440-43-9	
Chromium	**10.6**	mg/kg	0.51	0.076	1	07/16/15 13:13	07/17/15 10:56	7440-47-3	
Copper	**17.8**	mg/kg	0.51	0.073	1	07/16/15 13:13	07/17/15 10:56	7440-50-8	
Lead	**9.2**	mg/kg	0.51	0.12	1	07/16/15 13:13	07/17/15 10:56	7439-92-1	
Selenium	**<0.41**	mg/kg	1.0	0.41	1	07/16/15 13:13	07/17/15 10:56	7782-49-2	
Silver	**<0.12**	mg/kg	0.51	0.12	1	07/16/15 13:13	07/17/15 10:56	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.0086J**	mg/kg	0.021	0.0075	1	07/17/15 18:19	07/19/15 16:26	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**20.1**	%	0.10	0.10	1		07/20/15 20:31		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
2-Methylnaphthalene	**40.8J**	ug/kg	125	8.7	1	07/15/15 10:55	07/23/15 11:30	91-57-6	
3-Methylcholanthrene	**<16.3**	ug/kg	125	16.3	1	07/15/15 10:55	07/23/15 11:30	56-49-5	M1
5-Methylchrysene	**<10.5**	ug/kg	125	10.5	1	07/15/15 10:55	07/23/15 11:30	3697-24-3	M1
7,12-Dimethylbenz(a)anthracene	**<22.4**	ug/kg	125	22.4	1	07/15/15 10:55	07/23/15 11:30	57-97-6	
7H-Dibenzo(c,g)carbazole	**<25.3**	ug/kg	125	25.3	1	07/15/15 10:55	07/23/15 11:30	194-59-2	
Acenaphthene	**348**	ug/kg	125	11.7	1	07/15/15 10:55	07/23/15 11:30	83-32-9	M1,R1
Acenaphthylene	**<13.8**	ug/kg	125	13.8	1	07/15/15 10:55	07/23/15 11:30	208-96-8	M1
Anthracene	**784**	ug/kg	125	13.1	1	07/15/15 10:55	07/23/15 11:30	120-12-7	M1,R1
Benzo(a)anthracene	**2530**	ug/kg	125	10.2	1	07/15/15 10:55	07/23/15 11:30	56-55-3	M1,R1
Benzo(a)pyrene	**2690**	ug/kg	125	10	1	07/15/15 10:55	07/23/15 11:30	50-32-8	M1,R1
Benzo(g,h,i)perylene	**1380**	ug/kg	125	21.3	1	07/15/15 10:55	07/23/15 11:30	191-24-2	M1,R1
Benzofluoranthenes (Total)	**5340**	ug/kg	375	86.2	1	07/15/15 10:55	07/23/15 11:30		M1,R1
Chrysene	**3250**	ug/kg	125	10.2	1	07/15/15 10:55	07/23/15 11:30	218-01-9	M1,R1
Dibenz(a,h)acridine	**<7.2**	ug/kg	125	7.2	1	07/15/15 10:55	07/23/15 11:30	226-36-8	M1
Dibenz(a,h)anthracene	**454**	ug/kg	125	24.4	1	07/15/15 10:55	07/23/15 11:30	53-70-3	M1,R1
Dibenzo(a,e)pyrene	**356**	ug/kg	125	6.4	1	07/15/15 10:55	07/23/15 11:30	192-65-4	M1,R1
Dibenzo(a,h)pyrene	**188**	ug/kg	125	23.9	1	07/15/15 10:55	07/23/15 11:30	189-64-0	M1,R1
Dibenzo(a,i)pyrene	**<12.3**	ug/kg	125	12.3	1	07/15/15 10:55	07/23/15 11:30	189-55-9	M1
Dibenzo(a,l)pyrene	**<9.3**	ug/kg	125	9.3	1	07/15/15 10:55	07/23/15 11:30	191-30-0	
Fluoranthene	**10400**	ug/kg	625	52.9	5	07/15/15 10:55	07/23/15 13:55	206-44-0	M1,R1
Fluorene	**506**	ug/kg	125	11.9	1	07/15/15 10:55	07/23/15 11:30	86-73-7	M1,R1
Indeno(1,2,3-cd)pyrene	**1320**	ug/kg	125	23.3	1	07/15/15 10:55	07/23/15 11:30	193-39-5	M1,R1
Naphthalene	**31.5J**	ug/kg	125	7.8	1	07/15/15 10:55	07/23/15 11:30	91-20-3	
Phenanthrene	**5900**	ug/kg	625	52.6	5	07/15/15 10:55	07/23/15 13:55	85-01-8	M1,R1
Pyrene	**6500**	ug/kg	625	56.6	5	07/15/15 10:55	07/23/15 13:55	129-00-0	M1,R1
Surrogates									
2-Fluorobiphenyl (S)	70	%.	45-125		1	07/15/15 10:55	07/23/15 11:30	321-60-8	P3
p-Terphenyl-d14 (S)	62	%.	36-131		1	07/15/15 10:55	07/23/15 11:30	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Sample: S-02 (0-3.1) **Lab ID: 10313820002** Collected: 07/09/15 11:30 Received: 07/10/15 14:13 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**6.0**	mg/kg	1.9	0.46	1	07/16/15 13:13	07/17/15 11:12	7440-38-2	
Barium	**103**	mg/kg	0.96	0.096	1	07/16/15 13:13	07/17/15 11:12	7440-39-3	
Cadmium	**0.87**	mg/kg	0.29	0.073	1	07/16/15 13:13	07/17/15 11:12	7440-43-9	
Chromium	**28.2**	mg/kg	0.96	0.14	1	07/16/15 13:13	07/17/15 11:12	7440-47-3	
Copper	**34.5**	mg/kg	0.96	0.14	1	07/16/15 13:13	07/17/15 11:12	7440-50-8	
Lead	**170**	mg/kg	0.96	0.23	1	07/16/15 13:13	07/17/15 11:12	7439-92-1	
Selenium	**<0.78**	mg/kg	1.9	0.78	1	07/16/15 13:13	07/17/15 11:12	7782-49-2	
Silver	**<0.22**	mg/kg	0.96	0.22	1	07/16/15 13:13	07/17/15 11:12	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.083**	mg/kg	0.041	0.014	1	07/17/15 18:19	07/19/15 16:32	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**52.3**	%	0.10	0.10	1		07/20/15 20:32		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
2-Methylnaphthalene	**<14.5**	ug/kg	209	14.5	1	07/15/15 10:55	07/22/15 23:24	91-57-6	
3-Methylcholanthrene	**<27.2**	ug/kg	209	27.2	1	07/15/15 10:55	07/22/15 23:24	56-49-5	
5-Methylchrysene	**<17.6**	ug/kg	209	17.6	1	07/15/15 10:55	07/22/15 23:24	3697-24-3	
7,12-Dimethylbenz(a)anthracene	**<37.4**	ug/kg	209	37.4	1	07/15/15 10:55	07/22/15 23:24	57-97-6	
7H-Dibenzo(c,g)carbazole	**<42.2**	ug/kg	209	42.2	1	07/15/15 10:55	07/22/15 23:24	194-59-2	
Acenaphthene	**<19.5**	ug/kg	209	19.5	1	07/15/15 10:55	07/22/15 23:24	83-32-9	
Acenaphthylene	**<23.0**	ug/kg	209	23.0	1	07/15/15 10:55	07/22/15 23:24	208-96-8	
Anthracene	**<22.0**	ug/kg	209	22.0	1	07/15/15 10:55	07/22/15 23:24	120-12-7	
Benzo(a)anthracene	**616**	ug/kg	209	17.0	1	07/15/15 10:55	07/22/15 23:24	56-55-3	
Benzo(a)pyrene	**803**	ug/kg	209	16.7	1	07/15/15 10:55	07/22/15 23:24	50-32-8	
Benzo(g,h,i)perylene	**505**	ug/kg	209	35.6	1	07/15/15 10:55	07/22/15 23:24	191-24-2	
Benzofluoranthenes (Total)	**1850**	ug/kg	627	144	1	07/15/15 10:55	07/22/15 23:24		
Chrysene	**1100**	ug/kg	209	17.0	1	07/15/15 10:55	07/22/15 23:24	218-01-9	
Dibenz(a,h)acridine	**<12.1**	ug/kg	209	12.1	1	07/15/15 10:55	07/22/15 23:24	226-36-8	
Dibenz(a,h)anthracene	**<40.8**	ug/kg	209	40.8	1	07/15/15 10:55	07/22/15 23:24	53-70-3	
Dibenzo(a,e)pyrene	**<10.7**	ug/kg	209	10.7	1	07/15/15 10:55	07/22/15 23:24	192-65-4	
Dibenzo(a,h)pyrene	**<39.9**	ug/kg	209	39.9	1	07/15/15 10:55	07/22/15 23:24	189-64-0	
Dibenzo(a,i)pyrene	**<20.5**	ug/kg	209	20.5	1	07/15/15 10:55	07/22/15 23:24	189-55-9	
Dibenzo(a,l)pyrene	**<15.5**	ug/kg	209	15.5	1	07/15/15 10:55	07/22/15 23:24	191-30-0	
Fluoranthene	**2390**	ug/kg	209	17.7	1	07/15/15 10:55	07/22/15 23:24	206-44-0	
Fluorene	**<19.9**	ug/kg	209	19.9	1	07/15/15 10:55	07/22/15 23:24	86-73-7	
Indeno(1,2,3-cd)pyrene	**441**	ug/kg	209	38.9	1	07/15/15 10:55	07/22/15 23:24	193-39-5	
Naphthalene	**<13.1**	ug/kg	209	13.1	1	07/15/15 10:55	07/22/15 23:24	91-20-3	
Phenanthrene	**1040**	ug/kg	209	17.6	1	07/15/15 10:55	07/22/15 23:24	85-01-8	
Pyrene	**1580**	ug/kg	209	18.9	1	07/15/15 10:55	07/22/15 23:24	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	72	%.	45-125		1	07/15/15 10:55	07/22/15 23:24	321-60-8	P3
p-Terphenyl-d14 (S)	67	%.	36-131		1	07/15/15 10:55	07/22/15 23:24	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Sample: S-03 (0-1.2) **Lab ID: 10313820003** Collected: 07/09/15 14:15 Received: 07/10/15 14:13 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**1.5**	mg/kg	1.1	0.27	1	07/16/15 13:13	07/17/15 11:21	7440-38-2	
Barium	**75.5**	mg/kg	0.57	0.057	1	07/16/15 13:13	07/17/15 11:21	7440-39-3	
Cadmium	**0.33**	mg/kg	0.17	0.043	1	07/16/15 13:13	07/17/15 11:21	7440-43-9	
Chromium	**13.4**	mg/kg	0.57	0.085	1	07/16/15 13:13	07/17/15 11:21	7440-47-3	
Copper	**14.9**	mg/kg	0.57	0.081	1	07/16/15 13:13	07/17/15 11:21	7440-50-8	
Lead	**20.9**	mg/kg	0.57	0.14	1	07/16/15 13:13	07/17/15 11:21	7439-92-1	
Selenium	**0.57J**	mg/kg	1.1	0.46	1	07/16/15 13:13	07/17/15 11:21	7782-49-2	
Silver	**<0.13**	mg/kg	0.57	0.13	1	07/16/15 13:13	07/17/15 11:21	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.043**	mg/kg	0.028	0.0099	1	07/17/15 18:19	07/19/15 16:34	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**34.1**	%	0.10	0.10	1		07/20/15 20:33		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
2-Methylnaphthalene	**<1.1**	ug/kg	15.2	1.1	1	07/15/15 10:55	07/22/15 23:53	91-57-6	
3-Methylcholanthrene	**<2.0**	ug/kg	15.2	2.0	1	07/15/15 10:55	07/22/15 23:53	56-49-5	
5-Methylchrysene	**<1.3**	ug/kg	15.2	1.3	1	07/15/15 10:55	07/22/15 23:53	3697-24-3	
7,12-Dimethylbenz(a)anthracene	**<2.7**	ug/kg	15.2	2.7	1	07/15/15 10:55	07/22/15 23:53	57-97-6	
7H-Dibenzo(c,g)carbazole	**<3.1**	ug/kg	15.2	3.1	1	07/15/15 10:55	07/22/15 23:53	194-59-2	
Acenaphthene	**<1.4**	ug/kg	15.2	1.4	1	07/15/15 10:55	07/22/15 23:53	83-32-9	
Acenaphthylene	**<1.7**	ug/kg	15.2	1.7	1	07/15/15 10:55	07/22/15 23:53	208-96-8	
Anthracene	**16.8**	ug/kg	15.2	1.6	1	07/15/15 10:55	07/22/15 23:53	120-12-7	
Benzo(a)anthracene	**53.0**	ug/kg	15.2	1.2	1	07/15/15 10:55	07/22/15 23:53	56-55-3	
Benzo(a)pyrene	**72.4**	ug/kg	15.2	1.2	1	07/15/15 10:55	07/22/15 23:53	50-32-8	
Benzo(g,h,i)perylene	**40.1**	ug/kg	15.2	2.6	1	07/15/15 10:55	07/22/15 23:53	191-24-2	
Benzofluoranthenes (Total)	**163**	ug/kg	45.5	10.5	1	07/15/15 10:55	07/22/15 23:53		
Chrysene	**92.1**	ug/kg	15.2	1.2	1	07/15/15 10:55	07/22/15 23:53	218-01-9	
Dibenz(a,h)acridine	**<0.88**	ug/kg	15.2	0.88	1	07/15/15 10:55	07/22/15 23:53	226-36-8	
Dibenz(a,h)anthracene	**<3.0**	ug/kg	15.2	3.0	1	07/15/15 10:55	07/22/15 23:53	53-70-3	
Dibenzo(a,e)pyrene	**<0.78**	ug/kg	15.2	0.78	1	07/15/15 10:55	07/22/15 23:53	192-65-4	
Dibenzo(a,h)pyrene	**<2.9**	ug/kg	15.2	2.9	1	07/15/15 10:55	07/22/15 23:53	189-64-0	
Dibenzo(a,i)pyrene	**<1.5**	ug/kg	15.2	1.5	1	07/15/15 10:55	07/22/15 23:53	189-55-9	
Dibenzo(a,l)pyrene	**<1.1**	ug/kg	15.2	1.1	1	07/15/15 10:55	07/22/15 23:53	191-30-0	
Fluoranthene	**171**	ug/kg	15.2	1.3	1	07/15/15 10:55	07/22/15 23:53	206-44-0	
Fluorene	**<1.4**	ug/kg	15.2	1.4	1	07/15/15 10:55	07/22/15 23:53	86-73-7	
Indeno(1,2,3-cd)pyrene	**36.0**	ug/kg	15.2	2.8	1	07/15/15 10:55	07/22/15 23:53	193-39-5	
Naphthalene	**<0.95**	ug/kg	15.2	0.95	1	07/15/15 10:55	07/22/15 23:53	91-20-3	
Phenanthrene	**60.5**	ug/kg	15.2	1.3	1	07/15/15 10:55	07/22/15 23:53	85-01-8	
Pyrene	**122**	ug/kg	15.2	1.4	1	07/15/15 10:55	07/22/15 23:53	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	70	%.	45-125		1	07/15/15 10:55	07/22/15 23:53	321-60-8	
p-Terphenyl-d14 (S)	69	%.	36-131		1	07/15/15 10:55	07/22/15 23:53	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Sample: S-04 (0-3.6) **Lab ID: 10313820004** Collected: 07/09/15 14:45 Received: 07/10/15 14:13 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**3.5**	mg/kg	2.6	0.62	1	07/16/15 13:13	07/17/15 11:24	7440-38-2	
Barium	**107**	mg/kg	1.3	0.13	1	07/16/15 13:13	07/17/15 11:24	7440-39-3	
Cadmium	**0.53**	mg/kg	0.38	0.097	1	07/16/15 13:13	07/17/15 11:24	7440-43-9	
Chromium	**19.6**	mg/kg	1.3	0.19	1	07/16/15 13:13	07/17/15 11:24	7440-47-3	
Copper	**24.1**	mg/kg	1.3	0.18	1	07/16/15 13:13	07/17/15 11:24	7440-50-8	
Lead	**27.0**	mg/kg	1.3	0.31	1	07/16/15 13:13	07/17/15 11:24	7439-92-1	
Selenium	**1.3J**	mg/kg	2.6	1.0	1	07/16/15 13:13	07/17/15 11:24	7782-49-2	
Silver	**<0.29**	mg/kg	1.3	0.29	1	07/16/15 13:13	07/17/15 11:24	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.050J**	mg/kg	0.059	0.021	1	07/17/15 18:19	07/19/15 16:36	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**67.2**	%	0.10	0.10	1		07/20/15 20:34		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
2-Methylnaphthalene	**<2.1**	ug/kg	30.5	2.1	1	07/15/15 10:55	07/23/15 00:22	91-57-6	
3-Methylcholanthrene	**<4.0**	ug/kg	30.5	4.0	1	07/15/15 10:55	07/23/15 00:22	56-49-5	
5-Methylchrysene	**<2.6**	ug/kg	30.5	2.6	1	07/15/15 10:55	07/23/15 00:22	3697-24-3	
7,12-Dimethylbenz(a)anthracene	**<5.5**	ug/kg	30.5	5.5	1	07/15/15 10:55	07/23/15 00:22	57-97-6	
7H-Dibenzo(c,g)carbazole	**<6.2**	ug/kg	30.5	6.2	1	07/15/15 10:55	07/23/15 00:22	194-59-2	
Acenaphthene	**<2.8**	ug/kg	30.5	2.8	1	07/15/15 10:55	07/23/15 00:22	83-32-9	
Acenaphthylene	**<3.4**	ug/kg	30.5	3.4	1	07/15/15 10:55	07/23/15 00:22	208-96-8	
Anthracene	**<3.2**	ug/kg	30.5	3.2	1	07/15/15 10:55	07/23/15 00:22	120-12-7	
Benzo(a)anthracene	**<2.5**	ug/kg	30.5	2.5	1	07/15/15 10:55	07/23/15 00:22	56-55-3	
Benzo(a)pyrene	**<2.4**	ug/kg	30.5	2.4	1	07/15/15 10:55	07/23/15 00:22	50-32-8	
Benzo(g,h,i)perylene	**<5.2**	ug/kg	30.5	5.2	1	07/15/15 10:55	07/23/15 00:22	191-24-2	
Benzofluoranthenes (Total)	**<21.0**	ug/kg	91.5	21.0	1	07/15/15 10:55	07/23/15 00:22		
Chrysene	**<2.5**	ug/kg	30.5	2.5	1	07/15/15 10:55	07/23/15 00:22	218-01-9	
Dibenz(a,h)acridine	**<1.8**	ug/kg	30.5	1.8	1	07/15/15 10:55	07/23/15 00:22	226-36-8	
Dibenz(a,h)anthracene	**<5.9**	ug/kg	30.5	5.9	1	07/15/15 10:55	07/23/15 00:22	53-70-3	
Dibenzo(a,e)pyrene	**<1.6**	ug/kg	30.5	1.6	1	07/15/15 10:55	07/23/15 00:22	192-65-4	
Dibenzo(a,h)pyrene	**<5.8**	ug/kg	30.5	5.8	1	07/15/15 10:55	07/23/15 00:22	189-64-0	
Dibenzo(a,i)pyrene	**<3.0**	ug/kg	30.5	3.0	1	07/15/15 10:55	07/23/15 00:22	189-55-9	
Dibenzo(a,l)pyrene	**<2.3**	ug/kg	30.5	2.3	1	07/15/15 10:55	07/23/15 00:22	191-30-0	
Fluoranthene	**<2.6**	ug/kg	30.5	2.6	1	07/15/15 10:55	07/23/15 00:22	206-44-0	
Fluorene	**<2.9**	ug/kg	30.5	2.9	1	07/15/15 10:55	07/23/15 00:22	86-73-7	
Indeno(1,2,3-cd)pyrene	**<5.7**	ug/kg	30.5	5.7	1	07/15/15 10:55	07/23/15 00:22	193-39-5	
Naphthalene	**<1.9**	ug/kg	30.5	1.9	1	07/15/15 10:55	07/23/15 00:22	91-20-3	
Phenanthrene	**<2.6**	ug/kg	30.5	2.6	1	07/15/15 10:55	07/23/15 00:22	85-01-8	
Pyrene	**<2.8**	ug/kg	30.5	2.8	1	07/15/15 10:55	07/23/15 00:22	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	66	%.	45-125		1	07/15/15 10:55	07/23/15 00:22	321-60-8	
p-Terphenyl-d14 (S)	75	%.	36-131		1	07/15/15 10:55	07/23/15 00:22	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Sample: S-05 COMP **Lab ID: 10313820005** Collected: 07/10/15 09:40 Received: 07/10/15 14:13 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**2.5**	mg/kg	2.1	0.51	1	07/16/15 13:13	07/17/15 11:27	7440-38-2	
Barium	**68.9**	mg/kg	1.1	0.11	1	07/16/15 13:13	07/17/15 11:27	7440-39-3	
Cadmium	**0.40**	mg/kg	0.32	0.080	1	07/16/15 13:13	07/17/15 11:27	7440-43-9	
Chromium	**15.5**	mg/kg	1.1	0.16	1	07/16/15 13:13	07/17/15 11:27	7440-47-3	
Copper	**18.3**	mg/kg	1.1	0.15	1	07/16/15 13:13	07/17/15 11:27	7440-50-8	
Lead	**53.8**	mg/kg	1.1	0.25	1	07/16/15 13:13	07/17/15 11:27	7439-92-1	
Selenium	**<0.86**	mg/kg	2.1	0.86	1	07/16/15 13:13	07/17/15 11:27	7782-49-2	
Silver	**<0.24**	mg/kg	1.1	0.24	1	07/16/15 13:13	07/17/15 11:27	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.039**	mg/kg	0.037	0.013	1	07/17/15 18:19	07/19/15 16:38	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**54.3**	%	0.10	0.10	1		07/20/15 20:34		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
2-Methylnaphthalene	**<15.2**	ug/kg	219	15.2	1	07/15/15 10:55	07/23/15 00:51	91-57-6	
3-Methylcholanthrene	**<28.4**	ug/kg	219	28.4	1	07/15/15 10:55	07/23/15 00:51	56-49-5	
5-Methylchrysene	**<18.4**	ug/kg	219	18.4	1	07/15/15 10:55	07/23/15 00:51	3697-24-3	
7,12-Dimethylbenz(a)anthracene	**<39.1**	ug/kg	219	39.1	1	07/15/15 10:55	07/23/15 00:51	57-97-6	
7H-Dibenzo(c,g)carbazole	**<44.2**	ug/kg	219	44.2	1	07/15/15 10:55	07/23/15 00:51	194-59-2	
Acenaphthene	**<20.4**	ug/kg	219	20.4	1	07/15/15 10:55	07/23/15 00:51	83-32-9	
Acenaphthylene	**<24.0**	ug/kg	219	24.0	1	07/15/15 10:55	07/23/15 00:51	208-96-8	
Anthracene	**340**	ug/kg	219	23.0	1	07/15/15 10:55	07/23/15 00:51	120-12-7	
Benzo(a)anthracene	**1030**	ug/kg	219	17.8	1	07/15/15 10:55	07/23/15 00:51	56-55-3	
Benzo(a)pyrene	**1100**	ug/kg	219	17.5	1	07/15/15 10:55	07/23/15 00:51	50-32-8	
Benzo(g,h,i)perylene	**491**	ug/kg	219	37.2	1	07/15/15 10:55	07/23/15 00:51	191-24-2	
Benzofluoranthenes (Total)	**2190**	ug/kg	656	151	1	07/15/15 10:55	07/23/15 00:51		
Chrysene	**1210**	ug/kg	219	17.8	1	07/15/15 10:55	07/23/15 00:51	218-01-9	
Dibenz(a,h)acridine	**<12.6**	ug/kg	219	12.6	1	07/15/15 10:55	07/23/15 00:51	226-36-8	
Dibenz(a,h)anthracene	**<42.6**	ug/kg	219	42.6	1	07/15/15 10:55	07/23/15 00:51	53-70-3	
Dibenzo(a,e)pyrene	**<11.2**	ug/kg	219	11.2	1	07/15/15 10:55	07/23/15 00:51	192-65-4	
Dibenzo(a,h)pyrene	**<41.8**	ug/kg	219	41.8	1	07/15/15 10:55	07/23/15 00:51	189-64-0	
Dibenzo(a,i)pyrene	**<21.4**	ug/kg	219	21.4	1	07/15/15 10:55	07/23/15 00:51	189-55-9	
Dibenzo(a,l)pyrene	**<16.2**	ug/kg	219	16.2	1	07/15/15 10:55	07/23/15 00:51	191-30-0	
Fluoranthene	**2970**	ug/kg	219	18.5	1	07/15/15 10:55	07/23/15 00:51	206-44-0	
Fluorene	**<20.8**	ug/kg	219	20.8	1	07/15/15 10:55	07/23/15 00:51	86-73-7	
Indeno(1,2,3-cd)pyrene	**479**	ug/kg	219	40.7	1	07/15/15 10:55	07/23/15 00:51	193-39-5	
Naphthalene	**<13.7**	ug/kg	219	13.7	1	07/15/15 10:55	07/23/15 00:51	91-20-3	
Phenanthrene	**1600**	ug/kg	219	18.4	1	07/15/15 10:55	07/23/15 00:51	85-01-8	
Pyrene	**2040**	ug/kg	219	19.8	1	07/15/15 10:55	07/23/15 00:51	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	87	%.	45-125		1	07/15/15 10:55	07/23/15 00:51	321-60-8	P3
p-Terphenyl-d14 (S)	78	%.	36-131		1	07/15/15 10:55	07/23/15 00:51	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Sample: S-06 COMP **Lab ID: 10313820006** Collected: 07/10/15 10:30 Received: 07/10/15 14:13 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**3.1**	mg/kg	1.6	0.39	1	07/16/15 13:13	07/17/15 11:30	7440-38-2	
Barium	**76.8**	mg/kg	0.81	0.081	1	07/16/15 13:13	07/17/15 11:30	7440-39-3	
Cadmium	**0.40**	mg/kg	0.24	0.061	1	07/16/15 13:13	07/17/15 11:30	7440-43-9	
Chromium	**14.8**	mg/kg	0.81	0.12	1	07/16/15 13:13	07/17/15 11:30	7440-47-3	
Copper	**18.0**	mg/kg	0.81	0.12	1	07/16/15 13:13	07/17/15 11:30	7440-50-8	
Lead	**41.6**	mg/kg	0.81	0.19	1	07/16/15 13:13	07/17/15 11:30	7439-92-1	
Selenium	**<0.65**	mg/kg	1.6	0.65	1	07/16/15 13:13	07/17/15 11:30	7782-49-2	
Silver	**<0.19**	mg/kg	0.81	0.19	1	07/16/15 13:13	07/17/15 11:30	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.043**	mg/kg	0.036	0.012	1	07/17/15 18:19	07/19/15 16:45	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**52.1**	%	0.10	0.10	1		07/20/15 20:36		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
2-Methylnaphthalene	**<1.5**	ug/kg	20.9	1.5	1	07/15/15 10:55	07/23/15 01:20	91-57-6	
3-Methylcholanthrene	**<2.7**	ug/kg	20.9	2.7	1	07/15/15 10:55	07/23/15 01:20	56-49-5	
5-Methylchrysene	**<1.8**	ug/kg	20.9	1.8	1	07/15/15 10:55	07/23/15 01:20	3697-24-3	
7,12-Dimethylbenz(a)anthracene	**<3.7**	ug/kg	20.9	3.7	1	07/15/15 10:55	07/23/15 01:20	57-97-6	
7H-Dibenzo(c,g)carbazole	**<4.2**	ug/kg	20.9	4.2	1	07/15/15 10:55	07/23/15 01:20	194-59-2	
Acenaphthene	**<1.9**	ug/kg	20.9	1.9	1	07/15/15 10:55	07/23/15 01:20	83-32-9	
Acenaphthylene	**<2.3**	ug/kg	20.9	2.3	1	07/15/15 10:55	07/23/15 01:20	208-96-8	
Anthracene	**<2.2**	ug/kg	20.9	2.2	1	07/15/15 10:55	07/23/15 01:20	120-12-7	
Benzo(a)anthracene	**57.1**	ug/kg	20.9	1.7	1	07/15/15 10:55	07/23/15 01:20	56-55-3	
Benzo(a)pyrene	**86.3**	ug/kg	20.9	1.7	1	07/15/15 10:55	07/23/15 01:20	50-32-8	
Benzo(g,h,i)perylene	**52.3**	ug/kg	20.9	3.5	1	07/15/15 10:55	07/23/15 01:20	191-24-2	
Benzofluoranthenes (Total)	**221**	ug/kg	62.6	14.4	1	07/15/15 10:55	07/23/15 01:20		
Chrysene	**107**	ug/kg	20.9	1.7	1	07/15/15 10:55	07/23/15 01:20	218-01-9	
Dibenz(a,h)acridine	**<1.2**	ug/kg	20.9	1.2	1	07/15/15 10:55	07/23/15 01:20	226-36-8	
Dibenz(a,h)anthracene	**<4.1**	ug/kg	20.9	4.1	1	07/15/15 10:55	07/23/15 01:20	53-70-3	
Dibenzo(a,e)pyrene	**<1.1**	ug/kg	20.9	1.1	1	07/15/15 10:55	07/23/15 01:20	192-65-4	
Dibenzo(a,h)pyrene	**<4.0**	ug/kg	20.9	4.0	1	07/15/15 10:55	07/23/15 01:20	189-64-0	
Dibenzo(a,i)pyrene	**<2.0**	ug/kg	20.9	2.0	1	07/15/15 10:55	07/23/15 01:20	189-55-9	
Dibenzo(a,l)pyrene	**<1.5**	ug/kg	20.9	1.5	1	07/15/15 10:55	07/23/15 01:20	191-30-0	
Fluoranthene	**209**	ug/kg	20.9	1.8	1	07/15/15 10:55	07/23/15 01:20	206-44-0	
Fluorene	**<2.0**	ug/kg	20.9	2.0	1	07/15/15 10:55	07/23/15 01:20	86-73-7	
Indeno(1,2,3-cd)pyrene	**46.8**	ug/kg	20.9	3.9	1	07/15/15 10:55	07/23/15 01:20	193-39-5	
Naphthalene	**<1.3**	ug/kg	20.9	1.3	1	07/15/15 10:55	07/23/15 01:20	91-20-3	
Phenanthrene	**62.6**	ug/kg	20.9	1.8	1	07/15/15 10:55	07/23/15 01:20	85-01-8	
Pyrene	**135**	ug/kg	20.9	1.9	1	07/15/15 10:55	07/23/15 01:20	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	69	%.	45-125		1	07/15/15 10:55	07/23/15 01:20	321-60-8	
p-Terphenyl-d14 (S)	71	%.	36-131		1	07/15/15 10:55	07/23/15 01:20	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Sample: S-07 COMP **Lab ID: 10313820007** Collected: 07/10/15 11:00 Received: 07/10/15 14:13 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**2.1**	mg/kg	1.6	0.39	1	07/16/15 13:13	07/17/15 11:34	7440-38-2	
Barium	**73.3**	mg/kg	0.82	0.082	1	07/16/15 13:13	07/17/15 11:34	7440-39-3	
Cadmium	**0.33**	mg/kg	0.25	0.062	1	07/16/15 13:13	07/17/15 11:34	7440-43-9	
Chromium	**12.6**	mg/kg	0.82	0.12	1	07/16/15 13:13	07/17/15 11:34	7440-47-3	
Copper	**15.3**	mg/kg	0.82	0.12	1	07/16/15 13:13	07/17/15 11:34	7440-50-8	
Lead	**29.5**	mg/kg	0.82	0.20	1	07/16/15 13:13	07/17/15 11:34	7439-92-1	
Selenium	**<0.66**	mg/kg	1.6	0.66	1	07/16/15 13:13	07/17/15 11:34	7782-49-2	
Silver	**<0.19**	mg/kg	0.82	0.19	1	07/16/15 13:13	07/17/15 11:34	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.034**	mg/kg	0.031	0.011	1	07/17/15 18:19	07/19/15 16:47	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**41.2**	%	0.10	0.10	1		07/20/15 20:37		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
2-Methylnaphthalene	**<1.2**	ug/kg	16.9	1.2	1	07/15/15 10:55	07/23/15 01:49	91-57-6	
3-Methylcholanthrene	**<2.2**	ug/kg	16.9	2.2	1	07/15/15 10:55	07/23/15 01:49	56-49-5	
5-Methylchrysene	**<1.4**	ug/kg	16.9	1.4	1	07/15/15 10:55	07/23/15 01:49	3697-24-3	
7,12-Dimethylbenz(a)anthracene	**<3.0**	ug/kg	16.9	3.0	1	07/15/15 10:55	07/23/15 01:49	57-97-6	
7H-Dibenzo(c,g)carbazole	**<3.4**	ug/kg	16.9	3.4	1	07/15/15 10:55	07/23/15 01:49	194-59-2	
Acenaphthene	**<1.6**	ug/kg	16.9	1.6	1	07/15/15 10:55	07/23/15 01:49	83-32-9	
Acenaphthylene	**<1.9**	ug/kg	16.9	1.9	1	07/15/15 10:55	07/23/15 01:49	208-96-8	
Anthracene	**<1.8**	ug/kg	16.9	1.8	1	07/15/15 10:55	07/23/15 01:49	120-12-7	
Benzo(a)anthracene	**22.9**	ug/kg	16.9	1.4	1	07/15/15 10:55	07/23/15 01:49	56-55-3	
Benzo(a)pyrene	**33.9**	ug/kg	16.9	1.4	1	07/15/15 10:55	07/23/15 01:49	50-32-8	
Benzo(g,h,i)perylene	**20.0**	ug/kg	16.9	2.9	1	07/15/15 10:55	07/23/15 01:49	191-24-2	
Benzofluoranthenes (Total)	**88.5**	ug/kg	50.8	11.7	1	07/15/15 10:55	07/23/15 01:49		
Chrysene	**41.7**	ug/kg	16.9	1.4	1	07/15/15 10:55	07/23/15 01:49	218-01-9	
Dibenz(a,h)acridine	**<0.98**	ug/kg	16.9	0.98	1	07/15/15 10:55	07/23/15 01:49	226-36-8	
Dibenz(a,h)anthracene	**<3.3**	ug/kg	16.9	3.3	1	07/15/15 10:55	07/23/15 01:49	53-70-3	
Dibenzo(a,e)pyrene	**<0.87**	ug/kg	16.9	0.87	1	07/15/15 10:55	07/23/15 01:49	192-65-4	
Dibenzo(a,h)pyrene	**<3.2**	ug/kg	16.9	3.2	1	07/15/15 10:55	07/23/15 01:49	189-64-0	
Dibenzo(a,i)pyrene	**<1.7**	ug/kg	16.9	1.7	1	07/15/15 10:55	07/23/15 01:49	189-55-9	
Dibenzo(a,l)pyrene	**<1.3**	ug/kg	16.9	1.3	1	07/15/15 10:55	07/23/15 01:49	191-30-0	
Fluoranthene	**82.4**	ug/kg	16.9	1.4	1	07/15/15 10:55	07/23/15 01:49	206-44-0	
Fluorene	**<1.6**	ug/kg	16.9	1.6	1	07/15/15 10:55	07/23/15 01:49	86-73-7	
Indeno(1,2,3-cd)pyrene	**18.0**	ug/kg	16.9	3.2	1	07/15/15 10:55	07/23/15 01:49	193-39-5	
Naphthalene	**<1.1**	ug/kg	16.9	1.1	1	07/15/15 10:55	07/23/15 01:49	91-20-3	
Phenanthrene	**23.1**	ug/kg	16.9	1.4	1	07/15/15 10:55	07/23/15 01:49	85-01-8	
Pyrene	**54.2**	ug/kg	16.9	1.5	1	07/15/15 10:55	07/23/15 01:49	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	66	%.	45-125		1	07/15/15 10:55	07/23/15 01:49	321-60-8	
p-Terphenyl-d14 (S)	69	%.	36-131		1	07/15/15 10:55	07/23/15 01:49	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Sample: S-08 COMP **Lab ID: 10313820008** Collected: 07/10/15 11:35 Received: 07/10/15 14:13 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Arsenic	**2.0**	mg/kg	1.4	0.33	1	07/16/15 13:13	07/17/15 11:37	7440-38-2	
Barium	**62.1**	mg/kg	0.68	0.068	1	07/16/15 13:13	07/17/15 11:37	7440-39-3	
Cadmium	**0.27**	mg/kg	0.20	0.052	1	07/16/15 13:13	07/17/15 11:37	7440-43-9	
Chromium	**14.4**	mg/kg	0.68	0.10	1	07/16/15 13:13	07/17/15 11:37	7440-47-3	
Copper	**14.9**	mg/kg	0.68	0.097	1	07/16/15 13:13	07/17/15 11:37	7440-50-8	
Lead	**28.0**	mg/kg	0.68	0.16	1	07/16/15 13:13	07/17/15 11:37	7439-92-1	
Selenium	**<0.55**	mg/kg	1.4	0.55	1	07/16/15 13:13	07/17/15 11:37	7782-49-2	
Silver	**<0.16**	mg/kg	0.68	0.16	1	07/16/15 13:13	07/17/15 11:37	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.030**	mg/kg	0.030	0.010	1	07/17/15 18:19	07/19/15 16:49	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**37.4**	%	0.10	0.10	1		07/20/15 20:38		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
2-Methylnaphthalene	**<1.1**	ug/kg	16.0	1.1	1	07/15/15 10:55	07/23/15 02:18	91-57-6	
3-Methylcholanthrene	**<2.1**	ug/kg	16.0	2.1	1	07/15/15 10:55	07/23/15 02:18	56-49-5	
5-Methylchrysene	**<1.3**	ug/kg	16.0	1.3	1	07/15/15 10:55	07/23/15 02:18	3697-24-3	
7,12-Dimethylbenz(a)anthracene	**<2.9**	ug/kg	16.0	2.9	1	07/15/15 10:55	07/23/15 02:18	57-97-6	
7H-Dibenzo(c,g)carbazole	**<3.2**	ug/kg	16.0	3.2	1	07/15/15 10:55	07/23/15 02:18	194-59-2	
Acenaphthene	**<1.5**	ug/kg	16.0	1.5	1	07/15/15 10:55	07/23/15 02:18	83-32-9	
Acenaphthylene	**<1.8**	ug/kg	16.0	1.8	1	07/15/15 10:55	07/23/15 02:18	208-96-8	
Anthracene	**<1.7**	ug/kg	16.0	1.7	1	07/15/15 10:55	07/23/15 02:18	120-12-7	
Benzo(a)anthracene	**17.4**	ug/kg	16.0	1.3	1	07/15/15 10:55	07/23/15 02:18	56-55-3	
Benzo(a)pyrene	**26.6**	ug/kg	16.0	1.3	1	07/15/15 10:55	07/23/15 02:18	50-32-8	
Benzo(g,h,i)perylene	**<2.7**	ug/kg	16.0	2.7	1	07/15/15 10:55	07/23/15 02:18	191-24-2	
Benzofluoranthenes (Total)	**67.3**	ug/kg	47.9	11.0	1	07/15/15 10:55	07/23/15 02:18		
Chrysene	**31.7**	ug/kg	16.0	1.3	1	07/15/15 10:55	07/23/15 02:18	218-01-9	
Dibenz(a,h)acridine	**<0.92**	ug/kg	16.0	0.92	1	07/15/15 10:55	07/23/15 02:18	226-36-8	
Dibenz(a,h)anthracene	**<3.1**	ug/kg	16.0	3.1	1	07/15/15 10:55	07/23/15 02:18	53-70-3	
Dibenzo(a,e)pyrene	**<0.82**	ug/kg	16.0	0.82	1	07/15/15 10:55	07/23/15 02:18	192-65-4	
Dibenzo(a,h)pyrene	**<3.1**	ug/kg	16.0	3.1	1	07/15/15 10:55	07/23/15 02:18	189-64-0	
Dibenzo(a,i)pyrene	**<1.6**	ug/kg	16.0	1.6	1	07/15/15 10:55	07/23/15 02:18	189-55-9	
Dibenzo(a,l)pyrene	**<1.2**	ug/kg	16.0	1.2	1	07/15/15 10:55	07/23/15 02:18	191-30-0	
Fluoranthene	**61.8**	ug/kg	16.0	1.4	1	07/15/15 10:55	07/23/15 02:18	206-44-0	
Fluorene	**<1.5**	ug/kg	16.0	1.5	1	07/15/15 10:55	07/23/15 02:18	86-73-7	
Indeno(1,2,3-cd)pyrene	**<3.0**	ug/kg	16.0	3.0	1	07/15/15 10:55	07/23/15 02:18	193-39-5	
Naphthalene	**<1.0**	ug/kg	16.0	1.0	1	07/15/15 10:55	07/23/15 02:18	91-20-3	
Phenanthrene	**17.3**	ug/kg	16.0	1.3	1	07/15/15 10:55	07/23/15 02:18	85-01-8	
Pyrene	**42.0**	ug/kg	16.0	1.4	1	07/15/15 10:55	07/23/15 02:18	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	70	%.	45-125		1	07/15/15 10:55	07/23/15 02:18	321-60-8	
p-Terphenyl-d14 (S)	71	%.	36-131		1	07/15/15 10:55	07/23/15 02:18	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Sample: POND A COMP **Lab ID: 10313820009** Collected: 07/10/15 12:00 Received: 07/10/15 14:13 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 08/19/15 15:45 Initial pH: 6.64; Final pH: 1.87								
Arsenic	**<0.020**	mg/L	0.10	0.020	1	08/19/15 17:39	08/20/15 12:16	7440-38-2	
Barium	**0.73**	mg/L	0.50	0.0061	1	08/19/15 17:39	08/20/15 12:16	7440-39-3	
Cadmium	**<0.0032**	mg/L	0.015	0.0032	1	08/19/15 17:39	08/20/15 12:16	7440-43-9	
Chromium	**<0.0044**	mg/L	0.050	0.0044	1	08/19/15 17:39	08/20/15 12:16	7440-47-3	
Lead	**0.044J**	mg/L	0.050	0.010	1	08/19/15 17:39	08/20/15 12:16	7439-92-1	B
Selenium	**0.044J**	mg/L	0.10	0.041	1	08/19/15 17:39	08/20/15 12:16	7782-49-2	
Silver	**<0.012**	mg/L	0.050	0.012	1	08/19/15 17:39	08/20/15 12:16	7440-22-4	
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A								
	Leachate Method/Date: EPA 1311; 08/19/15 15:45 Initial pH: 6.64; Final pH: 1.87								
Mercury	**<0.065**	ug/L	0.60	0.065	1	08/19/15 19:34	08/20/15 18:38	7439-97-6	H3

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Sample: POND B COMP **Lab ID: 10313820010** Collected: 07/09/15 11:35 Received: 07/10/15 14:13 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 08/19/15 15:45 Initial pH: 6.33; Final pH: 1.82								
Arsenic	**<0.020**	mg/L	0.10	0.020	1	08/19/15 17:39	08/20/15 12:21	7440-38-2	
Barium	**0.53**	mg/L	0.50	0.0061	1	08/19/15 17:39	08/20/15 12:21	7440-39-3	
Cadmium	**0.0047J**	mg/L	0.015	0.0032	1	08/19/15 17:39	08/20/15 12:21	7440-43-9	
Chromium	**<0.0044**	mg/L	0.050	0.0044	1	08/19/15 17:39	08/20/15 12:21	7440-47-3	
Lead	**0.15**	mg/L	0.050	0.010	1	08/19/15 17:39	08/20/15 12:21	7439-92-1	B
Selenium	**<0.041**	mg/L	0.10	0.041	1	08/19/15 17:39	08/20/15 12:21	7782-49-2	
Silver	**<0.012**	mg/L	0.050	0.012	1	08/19/15 17:39	08/20/15 12:21	7440-22-4	
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A								
	Leachate Method/Date: EPA 1311; 08/19/15 15:45 Initial pH: 6.33; Final pH: 1.82								
Mercury	**<0.065**	ug/L	0.60	0.065	1	08/19/15 19:34	08/20/15 18:40	7439-97-6	H3

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

QC Batch: MERP/14543 Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A Analysis Description: 7470A Mercury TCLP
Associated Lab Samples: 10313820009, 10313820010

METHOD BLANK: 2054876 Matrix: Water
Associated Lab Samples: 10313820009, 10313820010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.065	0.60	08/20/15 17:44	

METHOD BLANK: 2052893 Matrix: Water
Associated Lab Samples: 10313820009, 10313820010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.065	0.60	08/20/15 17:49	

METHOD BLANK: 2052894 Matrix: Water
Associated Lab Samples: 10313820009, 10313820010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	<0.065	0.60	08/20/15 17:51	

LABORATORY CONTROL SAMPLE: 2054877

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	15	15.6	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2054969 2054970

Parameter	Units	10313820010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.065	15	15	13.0	12.9	87	86	80-120	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

QC Batch: MERP/14216 Analysis Method: EPA 7471B
QC Batch Method: EPA 7471B Analysis Description: 7471B Mercury Solids
Associated Lab Samples: 10313820001, 10313820002, 10313820003, 10313820004, 10313820005, 10313820006, 10313820007, 10313820008

METHOD BLANK: 2023890 Matrix: Solid
Associated Lab Samples: 10313820001, 10313820002, 10313820003, 10313820004, 10313820005, 10313820006, 10313820007, 10313820008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	<0.0065	0.019	07/19/15 16:22	

LABORATORY CONTROL SAMPLE: 2023891

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.48	0.51	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2023892 2023893

Parameter	Units	10316100001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	ND	.47	.5	0.51	0.53	107	104	75-125	4	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

QC Batch: MPRP/56115 Analysis Method: EPA 6010
QC Batch Method: EPA 3050 Analysis Description: 6010 MET
Associated Lab Samples: 10313820001, 10313820002, 10313820003, 10313820004, 10313820005, 10313820006, 10313820007, 10313820008

METHOD BLANK: 2023886 Matrix: Solid
Associated Lab Samples: 10313820001, 10313820002, 10313820003, 10313820004, 10313820005, 10313820006, 10313820007, 10313820008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	<0.21	0.88	07/17/15 10:50	
Barium	mg/kg	<0.044	0.44	07/17/15 10:50	
Cadmium	mg/kg	<0.033	0.13	07/17/15 10:50	
Chromium	mg/kg	<0.065	0.44	07/17/15 10:50	
Copper	mg/kg	<0.063	0.44	07/17/15 10:50	
Lead	mg/kg	<0.11	0.44	07/17/15 10:50	
Selenium	mg/kg	<0.35	0.88	07/17/15 10:50	
Silver	mg/kg	<0.10	0.44	07/17/15 10:50	

LABORATORY CONTROL SAMPLE: 2023887

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	48.5	47.2	97	80-120	
Barium	mg/kg	48.5	50.0	103	80-120	
Cadmium	mg/kg	48.5	48.1	99	80-120	
Chromium	mg/kg	48.5	50.0	103	80-120	
Copper	mg/kg	48.5	49.4	102	80-120	
Lead	mg/kg	48.5	48.9	101	80-120	
Selenium	mg/kg	48.5	46.4	96	80-120	
Silver	mg/kg	24.3	23.7	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2023888 2023889

Parameter	Units	10313820001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	3.8	60.2	50	58.8	48.5	91	89	75-125	19	20	
Barium	mg/kg	17.0	60.2	50	81.1	65.8	107	98	75-125	21	20	R1
Cadmium	mg/kg	0.15J	60.2	50	57.8	47.6	96	95	75-125	19	20	
Chromium	mg/kg	10.6	60.2	50	70.4	57.8	100	94	75-125	20	20	
Copper	mg/kg	17.8	60.2	50	74.9	71.6	95	108	75-125	4	20	
Lead	mg/kg	9.2	60.2	50	65.5	56.5	94	94	75-125	15	20	
Selenium	mg/kg	<0.41	60.2	50	55.9	46.3	93	93	75-125	19	20	
Silver	mg/kg	<0.12	30	25	28.5	23.7	95	95	75-125	18	20	

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

QC Batch: MPRP/57102 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET TCLP
Associated Lab Samples: 10313820009, 10313820010

METHOD BLANK: 2054868 Matrix: Water
Associated Lab Samples: 10313820009, 10313820010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	<0.020	0.10	08/20/15 11:57	
Barium	mg/L	0.017J	0.50	08/20/15 11:57	
Cadmium	mg/L	<0.0032	0.015	08/20/15 11:57	
Chromium	mg/L	<0.0044	0.050	08/20/15 11:57	
Lead	mg/L	0.022J	0.050	08/20/15 11:57	
Selenium	mg/L	<0.041	0.10	08/20/15 11:57	
Silver	mg/L	<0.012	0.050	08/20/15 11:57	

METHOD BLANK: 2052893 Matrix: Water
Associated Lab Samples: 10313820009, 10313820010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	<0.020	0.10	08/20/15 12:07	
Barium	mg/L	0.030J	0.50	08/20/15 12:07	
Cadmium	mg/L	<0.0032	0.015	08/20/15 12:07	
Chromium	mg/L	<0.0044	0.050	08/20/15 12:07	
Lead	mg/L	<0.010	0.050	08/20/15 12:07	
Selenium	mg/L	<0.041	0.10	08/20/15 12:07	
Silver	mg/L	<0.012	0.050	08/20/15 12:07	

LABORATORY CONTROL SAMPLE: 2054869

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	5	5.6	112	80-120	
Barium	mg/L	5	5.0	100	80-120	
Cadmium	mg/L	5	5.3	105	80-120	
Chromium	mg/L	5	5.0	99	80-120	
Lead	mg/L	5	4.8	95	80-120	
Selenium	mg/L	5	5.7	113	80-120	
Silver	mg/L	2.5	2.6	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2054870 2054871

Parameter	Units	10313820010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	<0.020	5	5	5.5	5.5	110	110	75-125	0	30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2054870 2054871

Parameter	Units	10313820010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/L	0.53	5	5	5.5	5.5	99	99	75-125	0	30	
Cadmium	mg/L	0.0047J	5	5	5.1	5.2	102	104	75-125	2	30	
Chromium	mg/L	<0.0044	5	5	4.9	5.0	99	100	75-125	1	30	
Lead	mg/L	0.15	5	5	5.0	5.1	98	98	75-125	0	30	
Selenium	mg/L	<0.041	5	5	5.6	5.7	112	113	75-125	1	30	
Silver	mg/L	<0.012	2.5	2.5	2.6	2.6	102	103	75-125	1	30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

QC Batch: MPRP/56233 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10313820001, 10313820002, 10313820003, 10313820004, 10313820005, 10313820006, 10313820007, 10313820008

SAMPLE DUPLICATE: 2027538

Parameter	Units	10313918019 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	14.7	15.2	3	30	

SAMPLE DUPLICATE: 2027548

Parameter	Units	10313846005 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	17.7	18.3	3	30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

QC Batch: OEXT/30026 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3550 Analysis Description: 8270D CPAH by SIM MSSV
Associated Lab Samples: 10313820001, 10313820002, 10313820003, 10313820004, 10313820005, 10313820006, 10313820007, 10313820008

METHOD BLANK: 2022920 Matrix: Solid
Associated Lab Samples: 10313820001, 10313820002, 10313820003, 10313820004, 10313820005, 10313820006, 10313820007, 10313820008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
2-Methylnaphthalene	ug/kg	<0.70	10.0	07/22/15 21:56	
3-Methylcholanthrene	ug/kg	<1.3	10.0	07/22/15 21:56	
5-Methylchrysene	ug/kg	<0.84	10.0	07/22/15 21:56	
7,12-Dimethylbenz(a)anthracene	ug/kg	<1.8	10.0	07/22/15 21:56	
7H-Dibenzo(c,g)carbazole	ug/kg	<2.0	10.0	07/22/15 21:56	
Acenaphthene	ug/kg	<0.93	10.0	07/22/15 21:56	
Acenaphthylene	ug/kg	<1.1	10.0	07/22/15 21:56	
Anthracene	ug/kg	<1.0	10.0	07/22/15 21:56	
Benzo(a)anthracene	ug/kg	<0.81	10.0	07/22/15 21:56	
Benzo(a)pyrene	ug/kg	<0.80	10.0	07/22/15 21:56	
Benzo(g,h,i)perylene	ug/kg	<1.7	10.0	07/22/15 21:56	
Benzofluoranthenes (Total)	ug/kg	<6.9	30.0	07/22/15 21:56	
Chrysene	ug/kg	<0.82	10.0	07/22/15 21:56	
Dibenz(a,h)acridine	ug/kg	<0.58	10.0	07/22/15 21:56	
Dibenz(a,h)anthracene	ug/kg	<2.0	10.0	07/22/15 21:56	
Dibenzo(a,e)pyrene	ug/kg	<0.51	10.0	07/22/15 21:56	
Dibenzo(a,h)pyrene	ug/kg	<1.9	10.0	07/22/15 21:56	
Dibenzo(a,i)pyrene	ug/kg	<0.98	10.0	07/22/15 21:56	
Dibenzo(a,l)pyrene	ug/kg	<0.74	10.0	07/22/15 21:56	
Fluoranthene	ug/kg	<0.84	10.0	07/22/15 21:56	
Fluorene	ug/kg	<0.95	10.0	07/22/15 21:56	
Indeno(1,2,3-cd)pyrene	ug/kg	<1.9	10.0	07/22/15 21:56	
Naphthalene	ug/kg	<0.63	10.0	07/22/15 21:56	
Phenanthrene	ug/kg	<0.84	10.0	07/22/15 21:56	
Pyrene	ug/kg	<0.90	10.0	07/22/15 21:56	
2-Fluorobiphenyl (S)	%.	79	45-125	07/22/15 21:56	
p-Terphenyl-d14 (S)	%.	92	36-131	07/22/15 21:56	

LABORATORY CONTROL SAMPLE: 2022921

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Methylnaphthalene	ug/kg	100	75.8	76	39-125	
3-Methylcholanthrene	ug/kg	100	83.4	83	30-125	
5-Methylchrysene	ug/kg	100	89.4	89	68-125	
7,12-Dimethylbenz(a)anthracene	ug/kg	100	79.0	79	30-125	
7H-Dibenzo(c,g)carbazole	ug/kg	100	81.9	82	51-125	
Acenaphthene	ug/kg	100	77.7	78	48-125	
Acenaphthylene	ug/kg	100	79.5	80	47-125	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

LABORATORY CONTROL SAMPLE: 2022921

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Anthracene	ug/kg	100	85.6	86	63-125	
Benzo(a)anthracene	ug/kg	100	83.9	84	60-125	
Benzo(a)pyrene	ug/kg	100	86.8	87	63-125	
Benzo(g,h,i)perylene	ug/kg	100	94.2	94	58-125	
Benzofluoranthenes (Total)	ug/kg	300	261	87	66-125	
Chrysene	ug/kg	100	84.6	85	62-125	
Dibenz(a,h)acridine	ug/kg	100	97.1	97	61-125	
Dibenz(a,h)anthracene	ug/kg	100	98.2	98	59-125	
Dibenzo(a,e)pyrene	ug/kg	100	80.5	81	47-125	
Dibenzo(a,h)pyrene	ug/kg	100	81.1	81	41-128	
Dibenzo(a,i)pyrene	ug/kg	100	74.9	75	34-125	
Dibenzo(a,l)pyrene	ug/kg	100	64.6	65	30-125	
Fluoranthene	ug/kg	100	86.8	87	65-125	
Fluorene	ug/kg	100	80.3	80	57-125	
Indeno(1,2,3-cd)pyrene	ug/kg	100	97.4	97	60-125	
Naphthalene	ug/kg	100	74.5	74	38-125	
Phenanthrene	ug/kg	100	82.5	82	62-125	
Pyrene	ug/kg	100	86.5	86	62-125	
2-Fluorobiphenyl (S)	%.			75	45-125	
p-Terphenyl-d14 (S)	%.			84	36-131	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2022922 2022923

Parameter	Units	10313820001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
2-Methylnaphthalene	ug/kg	40.8J	125	125	141	133	80	73	49-125	6	30	
3-Methylcholanthrene	ug/kg	<16.3	125	125	<16.3	170	0	136	30-150		30	M1
5-Methylchrysene	ug/kg	<10.5	125	125	236	292	188	233	40-125	21	30	M1
7,12-Dimethylbenz(a)anthracene	ug/kg	<22.4	125	125	94.0J	106J	75	85	30-150		30	
7H-Dibenzo(c,g)carbazole	ug/kg	<25.3	125	125	128	116J	103	93	30-133		30	
Acenaphthene	ug/kg	348	125	125	663	421	252	58	30-149	45	30	M1,R1
Acenaphthylene	ug/kg	<13.8	125	125	184	167	147	133	37-125	10	30	M1
Anthracene	ug/kg	784	125	125	1930	992	917	166	33-125	64	30	M1,R1
Benzo(a)anthracene	ug/kg	2530	125	125	4400	2860	1490	258	30-150	42	30	E,M1,R1
Benzo(a)pyrene	ug/kg	2690	125	125	4510	3040	1460	283	30-150	39	30	E,M1,R1
Benzo(g,h,i)perylene	ug/kg	1380	125	125	1990	1280	488	-78	30-150	43	30	M1,R1
Benzofluoranthenes (Total)	ug/kg	5340	375	375	8910	6450	951	295	30-150	32	30	M1,R1
Chrysene	ug/kg	3250	125	125	5150	3510	1520	212	30-150	38	30	E,M1,R1
Dibenz(a,h)acridine	ug/kg	<7.2	125	125	245	187	196	149	30-129	27	30	M1
Dibenz(a,h)anthracene	ug/kg	454	125	125	753	508	239	43	30-140	39	30	M1,R1
Dibenzo(a,e)pyrene	ug/kg	356	125	125	488	342	106	-11	30-150	35	30	M1,R1
Dibenzo(a,h)pyrene	ug/kg	188	125	125	275	192	69	3	30-150	35	30	M1,R1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2022922 2022923

Parameter	Units	10313820001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Dibenzo(a,i)pyrene	ug/kg	<12.3	125	125	161	137	129	110	30-125	16	30	M1
Dibenzo(a,l)pyrene	ug/kg	<9.3	125	125	136	120J	109	96	30-150		30	
Fluoranthene	ug/kg	10400	125	125	13000	9090	2070	-1040	30-150	35	30	E,M1, R1
Fluorene	ug/kg	506	125	125	888	592	305	69	40-125	40	30	M1,R1
Indeno(1,2,3-cd)pyrene	ug/kg	1320	125	125	1960	1280	516	-35	30-139	42	30	M1,R1
Naphthalene	ug/kg	31.5J	125	125	113J	108J	65	61	42-125		30	
Phenanthrene	ug/kg	5900	125	125	7480	4960	1270	-747	30-150	40	30	E,M1, R1
Pyrene	ug/kg	6500	125	125	8050	5610	1240	-715	30-150	36	30	E,M1, R1
2-Fluorobiphenyl (S)	%.						76	78	45-125			P3
p-Terphenyl-d14 (S)	%.						72	72	36-131			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H3	Sample was received or analysis requested beyond the recognized method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
P3	Sample extract could not be concentrated to the routine final volume, resulting in elevated reporting limits.
R1	RPD value was outside control limits.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 23271422 LibertyCrossings-Rev4
Pace Project No.: 10313820

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10313820001	**S-01 (0-3.5)**	EPA 3050	MPRP/56115	EPA 6010	ICP/24601
10313820002	**S-02 (0-3.1)**	EPA 3050	MPRP/56115	EPA 6010	ICP/24601
10313820003	**S-03 (0-1.2)**	EPA 3050	MPRP/56115	EPA 6010	ICP/24601
10313820004	**S-04 (0-3.6)**	EPA 3050	MPRP/56115	EPA 6010	ICP/24601
10313820005	**S-05 COMP**	EPA 3050	MPRP/56115	EPA 6010	ICP/24601
10313820006	**S-06 COMP**	EPA 3050	MPRP/56115	EPA 6010	ICP/24601
10313820007	**S-07 COMP**	EPA 3050	MPRP/56115	EPA 6010	ICP/24601
10313820008	**S-08 COMP**	EPA 3050	MPRP/56115	EPA 6010	ICP/24601
10313820009	**POND A COMP**	EPA 3010	MPRP/57102	EPA 6010	ICP/25001
10313820010	**POND B COMP**	EPA 3010	MPRP/57102	EPA 6010	ICP/25001
10313820009	**POND A COMP**	EPA 7470A	MERP/14543	EPA 7470A	MERC/16979
10313820010	**POND B COMP**	EPA 7470A	MERP/14543	EPA 7470A	MERC/16979
10313820001	**S-01 (0-3.5)**	EPA 7471B	MERP/14216	EPA 7471B	MERC/16590
10313820002	**S-02 (0-3.1)**	EPA 7471B	MERP/14216	EPA 7471B	MERC/16590
10313820003	**S-03 (0-1.2)**	EPA 7471B	MERP/14216	EPA 7471B	MERC/16590
10313820004	**S-04 (0-3.6)**	EPA 7471B	MERP/14216	EPA 7471B	MERC/16590
10313820005	**S-05 COMP**	EPA 7471B	MERP/14216	EPA 7471B	MERC/16590
10313820006	**S-06 COMP**	EPA 7471B	MERP/14216	EPA 7471B	MERC/16590
10313820007	**S-07 COMP**	EPA 7471B	MERP/14216	EPA 7471B	MERC/16590
10313820008	**S-08 COMP**	EPA 7471B	MERP/14216	EPA 7471B	MERC/16590
10313820001	**S-01 (0-3.5)**	ASTM D2974	MPRP/56233		
10313820002	**S-02 (0-3.1)**	ASTM D2974	MPRP/56233		
10313820003	**S-03 (0-1.2)**	ASTM D2974	MPRP/56233		
10313820004	**S-04 (0-3.6)**	ASTM D2974	MPRP/56233		
10313820005	**S-05 COMP**	ASTM D2974	MPRP/56233		
10313820006	**S-06 COMP**	ASTM D2974	MPRP/56233		
10313820007	**S-07 COMP**	ASTM D2974	MPRP/56233		
10313820008	**S-08 COMP**	ASTM D2974	MPRP/56233		
10313820001	**S-01 (0-3.5)**	EPA 3550	OEXT/30026	EPA 8270D by SIM	MSSV/12784
10313820002	**S-02 (0-3.1)**	EPA 3550	OEXT/30026	EPA 8270D by SIM	MSSV/12784
10313820003	**S-03 (0-1.2)**	EPA 3550	OEXT/30026	EPA 8270D by SIM	MSSV/12784
10313820004	**S-04 (0-3.6)**	EPA 3550	OEXT/30026	EPA 8270D by SIM	MSSV/12784
10313820005	**S-05 COMP**	EPA 3550	OEXT/30026	EPA 8270D by SIM	MSSV/12784
10313820006	**S-06 COMP**	EPA 3550	OEXT/30026	EPA 8270D by SIM	MSSV/12784
10313820007	**S-07 COMP**	EPA 3550	OEXT/30026	EPA 8270D by SIM	MSSV/12784
10313820008	**S-08 COMP**	EPA 3550	OEXT/30026	EPA 8270D by SIM	MSSV/12784

10512820

Chain of Custody

BARR

4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

COC 1 of 2

Project Number: 23271422

Project Name: Liberty Crossings

Sample Origination State: MN (use two letter postal state abbreviation)

COC Number: № 45244

Project Manager: Jenni Brekke

Project QC Contact: TAO

Sampled by: JWJ/KDM

Laboratory: PACE

	Location	Start Depth	Stop Depth	Depth Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix: Water	Matrix: Soil	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative: Water: VOCs (HCl) #1	Water: SVOCs (unpreserved) #2	Water: Dissolved Metals (HNO_3)	Water: Total Metals (HNO_3)	Water: General (unpreserved) #3	Water: Diesel Range Organics (HCl)	Water: Nutrients (H_2SO_4) #4	Soil: VOCs (tared MeOH) #1	Soil: GRO, BTEX (tared MeOH) #1	Soil: DRO (tared unpreserved)	Soil: Metals (unpreserved)	Soil: SVOCs (unpreserved) #2	Soil: % Solids (plastic vial, unpres.)	Total Number Of Containers
1.	S-01	0	3.5	ft	07/09/2015	11:00		X		X												1	1		2
2.	S-02	0	3.1			11:30																1	1		2
3.	S-03	0	1.2			14:15																1	1		2
4.	S-04	0	3.6			14:45																1	1		2
5.	S-05 COMP	0			07/10/2015	09:40																1	1		2
6.	S-06 COMP	0				10:30																1	1		2
7.	S07 COMP	0				11:00																1	1		2
8.	S-08 COMP	0				11:35																1	1		2
9.																									
10.																									

Run Arsenic, copper, cPAH (Stormwater ponds)

Call TAO with Questions

Common Parameter/Container - Preservation Key

#1 - Volatile Organics = BTEX, GRO, TPH, 8260 Full List
#2 - Semivolatile Organics = PAHs, PCP, Dioxins, 8270 Full List, Herbicide/Pesticide/PCBs
#3 - General = pH, Chloride, Fluoride, Alkalinity, TSS, TDS, TS, Sulfate
#4 - Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN

Relinquished By:	On Ice?	Date	Time	Received by:	Date	Time
	(Y) N	7/10/15	14:13		7/10/15	14:13
Relinquished By:	On Ice? (Y) N	Date	Time	Received by:	Date	Time

Samples Shipped VIA: ☐ Air Freight ☐ Federal Express ☐ Sampler ☐ Other: _____

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

T=1.1°C

H:RLG\STDFORMS\Chain Of Custody Form 2009 RLG Rev. 09\01\09

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

COC 2 of 2

Project Number: 23271422

Project Name: Liberty Crossing 5

Sample Origination State: MN (use two letter postal state abbreviation)

COC Number: № 45217

Project Manager: Jenni Bretke

Project QC Contact: TAO

Sampled by: JWJ/KDM

Laboratory: PACE

Location	Start Depth	Stop Depth	Depth Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix: Water	Matrix: Soil	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative — Water: VOCs (HCl) #1	SVOCs (unpreserved) #2	Dissolved Metals (HNO_3)	Total Metals (HNO_3)	General (unpreserved) #3	Diesel Range Organics (HCl)	Nutrients (H_2SO_4) #4	Soil: VOCs (tared MeOH) #1	GRO, BTEX (tared MeOH) #1	DRO (tared unpreserved)	Metals (unpreserved)	SVOCs (unpreserved) #2	% Solids (plastic vial, unpres.)	Total Number Of Containers
1. POND A COMP				07/10/2015	12:00		X		X												1			1
2. POND B COMP				07/09/2015	11:35		X		X												1			1
3. POND C Comp				07/09/2015	14:50		X		X												1			1
4.																								
5.																								
6.																								
7.																								
8.																								
9.																								
10.																								

TCLP RCRA Metals
HOLD
Pending

Common Parameter/Container - Preservation Key

#1 - Volatile Organics = BTEX, GRO, TPH, 8260 Full List
#2 - Semivolatile Organics = PAHs, PCP, Dioxins, 8270 Full List, Herbicide/Pesticide/PCBs
#3 - General = pH, Chloride, Fluoride, Alkalinity, TSS, TDS, TS, Sulfate
#4 - Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN

Relinquished By:	On Ice?	Date	Time	Received by:	Date	Time
[signature]	Q N	7/10/15	1413	[signature] PACE	7/10/15	14:13
Relinquished By:	On Ice? Q N	Date	Time	Received by:	Date	Time

Samples Shipped VIA: ☐ Air Freight ☐ Federal Express ☐ Sampler ☐ Other: _____

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

T=1.1°C

Pace Analytical	Document Name: Sample Condition Upon Receipt Form	Document Revised: 23Feb2015 Page 1 of 1
	Document No.: F-MN-L-213-rev.13	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: BARR

Project #: WO#: 10313820

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☐ Yes ☒ No

Thermometer Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.0 **Cooler Temp Corrected (°C):** 1.1 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.1 **Date and Initials of Person Examining Contents:** BM 7/10/15

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)? ☐ Yes ☒ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☒ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: SL	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked? All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes ☐ Yes ☐ Yes	☐ No ☐ No ☐ No	☒ N/A ☒ N/A ☒ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample # Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: AJA **Date:** 7/13/15

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Appendix B

Phase II Investigation – Test Trench Investigation Memo (2018)

resourceful. naturally.
engineering and environmental consultants

BARR

March 28, 2018

Andrew Nichols
Voluntary Investigation and Cleanup Program
Minnesota Pollution Control Agency
520 Lafayette Rd, St Paul, MN 55155

Mark Koplitz
Petroleum Brownfields Program
Minnesota Pollution Control Agency
520 Lafayette Rd, St Paul, MN 55155

Re: Summary for Test Trench Investigation
DeCola Ponds B & C Improvement Project
Liberty Crossing and Pennsylvania Woods Site, Golden Valley, VP32191/PB4865

Dear Mr. Nichols and Mr. Koplitz:

This technical memorandum summarizes supplemental Phase II Investigation activities conducted by Barr Engineering Co. (Barr) in February 2018 for the DeCola Ponds B & C Improvement Project, part of the Liberty Crossing and Pennsylvania Woods Site (Site; VP32191/PB4865). The site location is shown on Figure 1.

SITE BACKGROUND AND INVESTIGATION OBJECTIVES

The investigation was completed as part of a feasibility study being conducted on behalf of the Bassett Creek Watershed Management Commission (BCWMC) for the DeCola Ponds B & C Improvement Project (2019 CIP Project BC-2, BC-3 & BC-8), scheduled for construction by the City of Golden Valley in 2019 and 2020. The project will address regional flooding concerns in the area by expanding stormwater storage capacity in DeCola Ponds B and C, located in Pennsylvania Woods. The work would include removal of accumulated sediment in Pond B and excavation of upland soils north of Pond B and between Ponds B and C in the general area shown on Figure 2.

There is potential for environmental impacts in the proposed DeCola Ponds project area. A Phase I Environmental Assessment (Barr, 2015a), and previous Phase II investigations have been completed for the project area (Peer 2011 and Barr, 2015b). Figure 2 shows the investigation locations in the DeCola Ponds project area.

Wetlands were historically present across most of the Site, but have been filled in some areas overtime with undocumented materials, which may include debris or chemical impacts. Elevated concentrations of arsenic have been identified in some samples of peat collected at the Site. In addition, the pond expansion area is adjacent to a closed leaking underground storage tank (LUST) site, where a former 15,000 gallon fuel oil tank was removed (Barr 2015a and Peer, 2011). Previous investigations in the DeCola Ponds project area included one test trench (TT-5), one soil boring (B-23) and three soil probes (SB-10, SB-11 and SB-12), completed in 2015 for the City, (Barr, 2015), and seven soil probes, completed in 2010 for the LUST site investigation (Peer, 2011). Previous sample locations are shown on Figure 2.

No debris or chemical impacts were identified in soil samples collected from SB-10, SB-11 or SB-12. Debris was observed to about 5 feet below ground surface (bgs) in TT-5, to about 2' bgs at B-23, and soil with creosote odors was observed during re-construction of the roadway south of the Dover Hills Apartments in 2017. Volatile organic compounds (VOCs) were detected in the LUST basin, and the investigation indicated the extent of petroleum impacts was delineated (Peer, 2011).

The objective of the February 2018 test trench investigation was to further assess the nature and extent of potential environmental impacts in the soils in the proposed pond expansion areas to identify soil management and disposal requirements for the planned DeCola Ponds B & C improvement project.

SCOPE OF WORK

The investigation was completed in accordance with the Work Plan for Test Trench Investigation, DeCola Ponds B & C Improvement Project Feasibility Study (Liberty Crossing and Pennsylvania Woods Site, VP32191/PB4865) (Barr, 2017), approved by the MPCA via email on January 16, 2018.

Four test trenches (TT-18 through TT-21) were excavated on February 1, 2018 by Stevens Drilling and Environmental, LLC (SDE) with a small excavator within the project area, north of Pond B. The investigation locations are shown on the attached Figure 2. The trench dimensions were approximately 3 feet wide, 9 to 12 feet long and 9 to 10 feet deep.

Test trenches were continuously logged and samples from the trenches inspected for visual evidence of contamination (i.e. incidental odor, discoloration, and sheen) and tested for headspace volatile organic vapor concentrations, in accordance with Barr's Standard Operating Procedures (SOPs). A 10.6 eV photoionization detector was used for headspace screening and soils were classified in general accordance with American Standard Testing Methods (ASTM) D2488 by a Barr field geologist.

Four 3-point composite samples (TT-18 through TT-21) were collected from each test trench and analyzed for the following parameters:

- Polycyclic aromatic hydrocarbons (PAHs)
- Resource Conservation and Recovery Act (RCRA) metals
- Diesel Range Organics (DRO) with silica gel cleanup

A grab sample (TT-20 Peat) was taken from TT-20 at a depth of 7 to 8 feet bgs, where a layer of peat was identified. This sample was analyzed only for arsenic. The analytical samples were submitted to Legend Technical Services Inc. in St. Paul, MN for chemical analysis.

Following the assessment activities, the excavated soil and fill material was replaced in the excavation at the approximate depth from which it had been removed and was compacted in lifts with the excavator bucket.

RESULTS

Soil analytical results in the DeCola Ponds project area from the 2015 and 2018 Phase II investigations are compared to MPCA Soil Leaching Values (SLVs) and Tier 1 Residential Soil Reference Values (SRVs) in Table 1. The laboratory report is included in Appendix B. Detectable concentrations of PAHs and RCRA metals were reported for all soils samples; however, none were detected at concentrations that exceed the MPCAs SLV or Residential SRV. DRO was also detected, but at concentrations below the MPCA's screening level of 100 mg/kg for unregulated fill (MPCA, 2012).

Test trench logs are included in Appendix A. Headspace readings were 0.0 per million (ppm) at each of the test trenches.

A small amount of debris, including trace metal and plastic, was observed in TT-18 from 0-1 feet bgs. Additionally, debris was observed during the 2015 Phase II investigation, at TT- 5, comprising approximately 50% of the fill from 0 to 4 feet bgs and 25% from 4 to 5 feet bgs.

DISCUSSION AND CONCLUSIONS

The Phase II investigations completed to date in the DeCola Ponds B&C project area indicate the soils meet the MPCA's guidelines for Unregulated fill, with the exception of debris observed at TT-5 and trace amounts at TT-18. Shallow debris was also observed in nearby boring B-23 located on the west side of Rhode Island Avenue. Based on these results, we recommend that soil excavated as part of the DeCola Ponds B&C Improvement Project be managed in accordance with the Response Action Plan and Site Contingency Plan (Barr, 2015b). Debris- containing fill should be disposed at a permitted landfill and debris-free soils with no field evidence of environmental impacts be managed in accordance with MPCA's Best Management Practices for the Off-Site Reuse of Unregulated Fill (MPCA, 2012) and the provisions of the RAP.

Please contact Dan Fetter (952-932-2741; dfetter@barr.com) or me at 952-832-2700 or by email at jbrekken@barr.com with any questions.

Sincerely,

Jennifer Brekken
Senior Environmental Engineer

c:

Laura Jester, BCWMC
Jeff Oliver, City of Golden Valley
Eric Eckman, City of Golden Valley
Karen Chandler, Barr Engineering Co.
Jennifer Koehler, Barr Engineering Co.
Dan Fetter, Barr Engineering Co.

Attachments

Table 1 – Soil Analytical Results
Figure 1 – Site Location
Figure 2 – Investigation Summary
Appendix A – Test Trench Logs
Appendix B – Laboratory Report

References:

Barr, 2017. Work Plan for Test Trench Investigation, DeCola Ponds B & C Improvement Project Feasibility Study (Liberty Crossing and Pennsylvania Woods Site, VP32191/PB4865). November 27, 2017.

Barr, 2015a. Phase I Environmental Site Assessment. 7775 Medicine Lake Rd; 2480 Winnetka Ave N; 2485 Rhode Island Ave N; 2400 Rhode Island Ave N; and Pennsylvania Woods, Golden Valley, Minnesota. Prepared for Hennepin County and the City of Golden Valley. July 31, 2015

Barr, 2015b. Phase II Investigation Report and Response Action Plan, Liberty Crossing/Pennsylvania Woods. Prepared for The City of Golden Valley and Hennepin County, September 2015.

MPCA, 2012. Best Management Practices for the Off-Site Reuse of Unregulated Fill. c-rem1-01. February 2012.

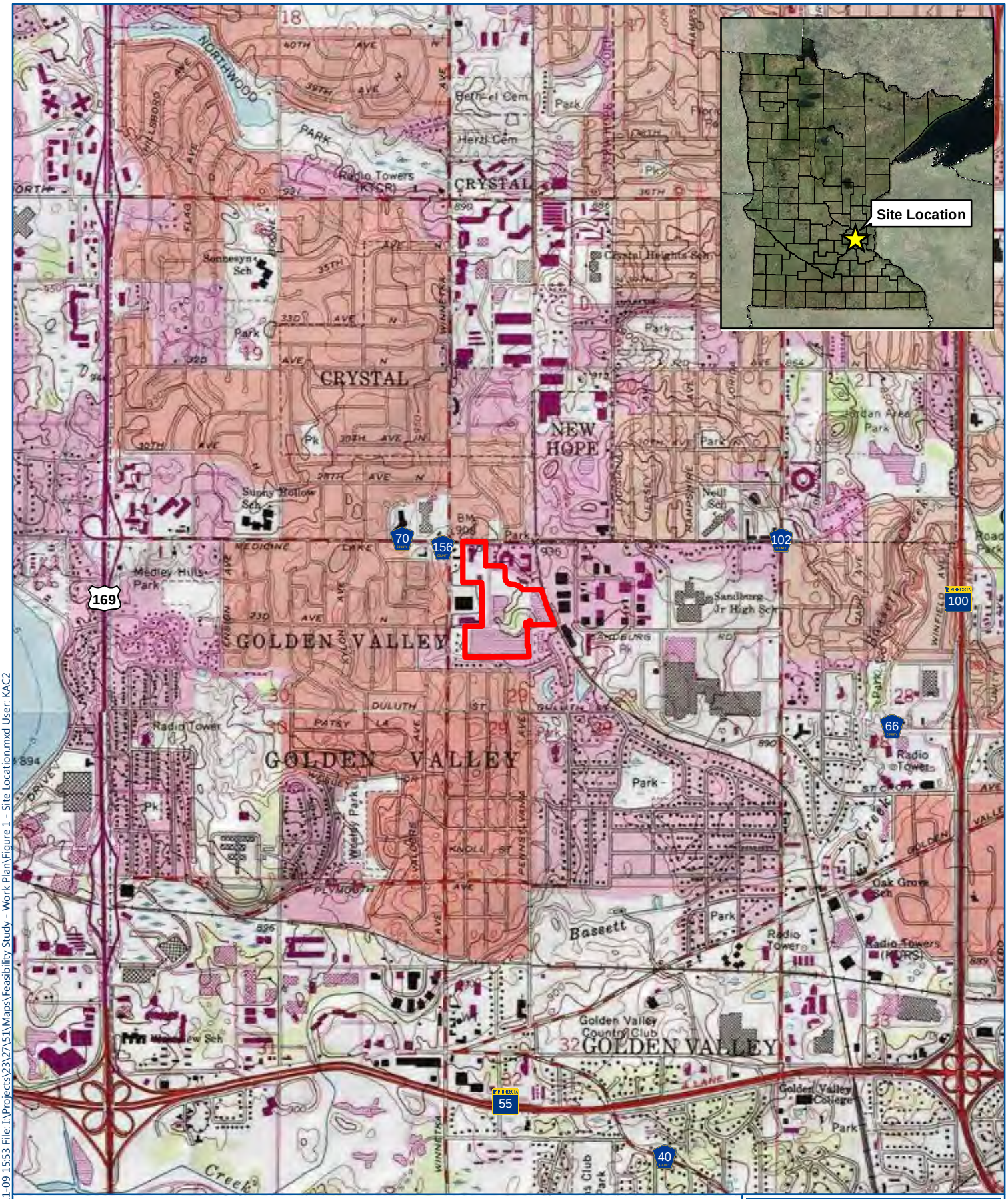
Peer Engineering, Inc, 2011. Investigation Report, Dover Hill Apartment, MPCA Site ID LEAK #18265, February 22, 2011.

Table 1
Soil Analytical Data Results
DeCola Ponds B+C Improvement Project
Golden Valley, Minnesota

				Location	**TT-18**	**TT-19**	**TT-20**	**TT-20 Peat**	**TT-21**	**TT-5**
				Date	**2/01/2018**	**2/01/2018**	**2/01/2018**	**2/01/2018**	**2/01/2018**	**6/23/2015**
				Depth	**1 - 10 ft**	**1 - 10 ft**	**1 - 9 ft**	**7 - 8 ft**	**1 - 10 ft**	**5 - 7 ft**
Parameter	Analysis Location	Units	MPCA Screening Soil Leaching Values	MPCA Tier 1 Residential Soil Reference Values						
Effective Date			06/01/2013	06/22/2009						
Exceedance Key			No Exceedances	No Exceedances						
General Parameters										
Solids, percent	Lab	%			76	80	69	48	84	78
Metals										
Arsenic	Lab	mg/kg	5.8	9	2.1	1.4	< 1.4	2.4	< 1.2	4.7 mg/kg
Barium	Lab	mg/kg	1700	1100	95	82	85	--	56	88 mg/kg
Cadmium	Lab	mg/kg	8.8	25	0.19	0.21	0.35	--	0.15	< 0.32 mg/kg
Chromium	Lab	mg/kg	36 CR6	87 CR6	14	12	17	--	12	14 mg/kg
Lead	Lab	mg/kg	2700	300	7.7	6.8	11	--	10	22 mg/kg
Mercury	Lab	mg/kg	3.3 MC	0.5	< 0.66	< 0.62	< 0.72	--	< 0.60	< 0.64 mg/kg
Selenium	Lab	mg/kg	2.6	160	< 3.3	< 3.1	< 3.6	--	< 3.0	< 1.3 mg/kg
Silver	Lab	mg/kg	7.9	160	< 0.66	< 0.62	< 0.72	--	< 0.60	< 0.32 mg/kg
SVOCs										
2-Chloronaphthalene	Lab	mg/kg			< 0.43	< 0.41	< 0.48	--	< 0.39	0.084 j mg/kg
2-Methylnaphthalene	Lab	mg/kg		100	< 0.43	< 0.41	< 0.48	--	< 0.39	0.13 j mg/kg
Acenaphthene	Lab	mg/kg	81	1200	< 0.43	< 0.41	< 0.48	--	< 0.39	0.13 j mg/kg
Acenaphthylene	Lab	mg/kg	NA		< 0.43	< 0.41	< 0.48	--	< 0.39	< 0.090 mg/kg
Anthracene	Lab	mg/kg	1300	7880	< 0.43	< 0.41	< 0.48	--	< 0.39	0.11 j mg/kg
Benz(a)anthracene	Lab	mg/kg	T	T	< 0.43	< 0.41	< 0.48	--	< 0.39	< 0.11 mg/kg
Benzo(a)pyrene	Lab	mg/kg	T	T	< 0.43	< 0.41	< 0.48	--	< 0.39	< 0.092 mg/kg
Benzo(b)fluoranthene	Lab	mg/kg	T	T	< 0.43	< 0.41	< 0.48	--	< 0.39	0.19 a mg/kg
Benzo(k)fluoranthene	Lab	mg/kg	T	T	< 0.43	< 0.41	< 0.48	--	< 0.39	< 0.087 mg/kg
Chrysene	Lab	mg/kg	T	T	< 0.43	< 0.41	< 0.48	--	< 0.39	< 0.10 mg/kg
Dibenz(a,h)anthracene	Lab	mg/kg	T	T	< 0.43	< 0.41	< 0.48	--	< 0.39	< 0.081 mg/kg
Indeno(1,2,3-cd)pyrene	Lab	mg/kg	T	T	< 0.43	< 0.41	< 0.48	--	< 0.39	< 0.091 mg/kg
B(a)P Equivalent, non-detects at 0, 2002 PEFs	Barr Calculation	mg/kg	1.4 T	2 T	ND	ND	ND	--	ND	< 0.088 mg/kg
Benzo(g,h,i)perylene	Lab	mg/kg	NA		< 0.43	< 0.41	< 0.48	--	< 0.39	< 0.083 mg/kg
Fluoranthene	Lab	mg/kg	670	1080	< 0.43	< 0.41	< 0.48	--	< 0.39	< 0.091 mg/kg
Fluorene	Lab	mg/kg	110	850	< 0.43	< 0.41	< 0.48	--	< 0.39	0.11 j mg/kg
Naphthalene	Lab	mg/kg	4.5	10	< 0.43	< 0.41	< 0.48	--	< 0.39	0.13 j mg/kg
Phenanthrene	Lab	mg/kg	NA		< 0.43	< 0.41	< 0.48	--	< 0.39	
Pyrene	Lab	mg/kg	440	890	< 0.43	< 0.41	< 0.48	--	< 0.39	--
Total Petroleum Hydrocarbons										
Diesel Range Organics, silica gel cleanup	Lab	mg/kg			< 6.5	< 8.0	< 13	--	< 7.1	--
Diesel Range Organics, C10-C28	Lab	mg/kg	--	--	--	--	--	--	--	11 mg/kg
Gasoline Range Organics, C6-C10	Lab	mg/kg	--	--	--	--	--	--	--	--

Table 1
Soil Analytical Data Results
DeCola Ponds B+C Improvement Project
Golden Valley, Minnesota

				Location	**SB-10**	**SB-10**	**SB-11**	**SB-11**	**SB-12**	**SB-12**
				Date	**6/22/2015**	**6/22/2015**	**6/22/2015**	**6/22/2015**	**6/22/2015**	**6/22/2015**
				Depth	**0 - 4 ft**	**4 - 8 ft**	**0 - 4 ft**	**4 - 8 ft**	**0 - 4 ft**	**4 - 8 ft**
Parameter	Analysis Location	Units	MPCA Screening Soil Leaching Values	MPCA Tier 1 Residential Soil Reference Values						
Effective Date			06/01/2013	06/22/2009						
Exceedance Key			No Exceedances	No Exceedances						
General Parameters										
Solids, percent	Lab	%			89 %	89 %	78 %	77 %	83 %	85 %
Metals										
Arsenic	Lab	mg/kg	5.8	9	1.3 mg/kg	2.6 mg/kg	2.7 mg/kg	1.4 mg/kg	1.3 mg/kg	2.5 mg/kg
Barium	Lab	mg/kg	1700	1100	74 mg/kg	56 mg/kg	88 mg/kg	52 mg/kg	47 mg/kg	67 mg/kg
Cadmium	Lab	mg/kg	8.8	25	< 0.28 mg/kg	< 0.28 mg/kg	< 0.32 mg/kg	< 0.32 mg/kg	< 0.30 mg/kg	< 0.29 mg/kg
Chromium	Lab	mg/kg	36 CR6	87 CR6	13 mg/kg	13 mg/kg	14 mg/kg	12 mg/kg	9.8 mg/kg	15 mg/kg
Lead	Lab	mg/kg	2700	300	7.4 mg/kg	6.1 mg/kg	7.7 mg/kg	7.2 mg/kg	5.9 mg/kg	6.6 mg/kg
Mercury	Lab	mg/kg	3.3 MC	0.5	< 0.56 mg/kg	< 0.56 mg/kg	< 0.64 mg/kg	< 0.65 mg/kg	< 0.60 mg/kg	< 0.59 mg/kg
Selenium	Lab	mg/kg	2.6	160	< 1.1 mg/kg	< 1.1 mg/kg	< 1.3 mg/kg	< 1.3 mg/kg	< 1.2 mg/kg	< 1.2 mg/kg
Silver	Lab	mg/kg	7.9	160	< 0.28 mg/kg	< 0.28 mg/kg	< 0.32 mg/kg	< 0.32 mg/kg	< 0.30 mg/kg	< 0.29 mg/kg
SVOCs										
2-Chloronaphthalene	Lab	mg/kg			< 0.073 mg/kg	< 0.073 mg/kg	< 0.083 mg/kg	< 0.084 mg/kg	< 0.078 mg/kg	< 0.076 mg/kg
2-Methylnaphthalene	Lab	mg/kg		100	< 0.079 mg/kg	< 0.079 mg/kg	< 0.090 mg/kg	< 0.091 mg/kg	< 0.084 mg/kg	< 0.082 mg/kg
Acenaphthene	Lab	mg/kg	81	1200	< 0.066 mg/kg	< 0.066 mg/kg	< 0.076 mg/kg	< 0.077 mg/kg	< 0.071 mg/kg	< 0.069 mg/kg
Acenaphthylene	Lab	mg/kg	NA		< 0.079 mg/kg	< 0.079 mg/kg	< 0.090 mg/kg	< 0.091 mg/kg	< 0.084 mg/kg	< 0.082 mg/kg
Anthracene	Lab	mg/kg	1300	7880	< 0.072 mg/kg	< 0.072 mg/kg	< 0.082 mg/kg	< 0.083 mg/kg	< 0.077 mg/kg	< 0.075 mg/kg
Benz(a)anthracene	Lab	mg/kg	T	T	< 0.092 mg/kg	< 0.092 mg/kg	< 0.11 mg/kg	< 0.11 mg/kg	< 0.099 mg/kg	< 0.096 mg/kg
Benzo(a)pyrene	Lab	mg/kg	T	T	< 0.081 mg/kg	< 0.081 mg/kg	< 0.092 mg/kg	< 0.094 mg/kg	< 0.087 mg/kg	< 0.085 mg/kg
Benzo(b)fluoranthene	Lab	mg/kg	T	T	0.081 mg/kg	0.081 mg/kg	0.093 mg/kg	0.094 mg/kg	0.086 mg/kg	0.084 mg/kg
Benzo(k)fluoranthene	Lab	mg/kg	T	T	< 0.076 mg/kg	< 0.076 mg/kg	< 0.087 mg/kg	< 0.088 mg/kg	< 0.082 mg/kg	< 0.080 mg/kg
Chrysene	Lab	mg/kg	T	T	< 0.090 mg/kg	< 0.090 mg/kg	< 0.10 mg/kg	< 0.10 mg/kg	< 0.096 mg/kg	< 0.094 mg/kg
Dibenz(a,h)anthracene	Lab	mg/kg	T	T	< 0.071 mg/kg	< 0.071 mg/kg	< 0.081 mg/kg	< 0.082 mg/kg	< 0.076 mg/kg	< 0.074 mg/kg
Indeno(1,2,3-cd)pyrene	Lab	mg/kg	T	T	< 0.080 mg/kg	< 0.080 mg/kg	< 0.091 mg/kg	< 0.092 mg/kg	< 0.086 mg/kg	< 0.084 mg/kg
B(a)P Equivalent, non-detects at 0, 2002 PEFs	Barr Calculation	mg/kg	1.4 T	2 T	< 0.078 mg/kg	< 0.078 mg/kg	< 0.088 mg/kg	< 0.090 mg/kg	< 0.083 mg/kg	< 0.081 mg/kg
Benzo(g,h,i)perylene	Lab	mg/kg	NA		< 0.073 mg/kg	< 0.073 mg/kg	< 0.083 mg/kg	< 0.084 mg/kg	< 0.078 mg/kg	< 0.076 mg/kg
Fluoranthene	Lab	mg/kg	670	1080	< 0.080 mg/kg	< 0.080 mg/kg	< 0.091 mg/kg	< 0.092 mg/kg	< 0.086 mg/kg	< 0.084 mg/kg
Fluorene	Lab	mg/kg	110	850	< 0.074 mg/kg	< 0.074 mg/kg	< 0.085 mg/kg	< 0.086 mg/kg	< 0.080 mg/kg	< 0.078 mg/kg
Naphthalene	Lab	mg/kg	4.5	10	< 0.066 mg/kg	< 0.066 mg/kg	< 0.076 mg/kg	< 0.077 mg/kg	< 0.071 mg/kg	< 0.069 mg/kg
Phenanthrene	Lab	mg/kg	NA							
Pyrene	Lab	mg/kg	440	890	--	--	--	--	--	--
Total Petroleum Hydrocarbons										
Diesel Range Organics, silica gel cleanup	Lab	mg/kg			--	--	--	--	--	--
Diesel Range Organics, C10-C28	Lab	mg/kg	--	--	< 8.4 mg/kg	< 8.1 mg/kg	29 mg/kg	11 mg/kg	< 7.6 mg/kg	< 6.7 mg/kg
Gasoline Range Organics, C6-C10	Lab	mg/kg	--	--	--	--	--	--	--	--



BARR

SITE LOCATION
DeCola Ponds B & C
Improvement Project
Golden Valley, MN

FIGURE 1

Site
Test Trench Location (Barr, 2018)
Previous Investigation Locations
Push Probe Boring (Barr, 2015)
Geoprobe Location (Peer, 2011)
Geotechnical Boring (Barr, 2015)
Test Trench Location (Barr, 2015)
Wetland Boundary
Easement
Hennepin County Parcels

N
0 90 180
Feet

BARR

INVESTIGATION SUMMARY
DeCola Ponds B & C Improvement Project
Golden Valley, MN

FIGURE 2

Appendix A

Test Trench Logs

Test Trench Log

BARR

Test Trench #:	TT-5						
Proj#:	23271422.01	**Project:**	Liberty Crossings - Test Trenching			**Side wall (N/S/E/W):**	N
Date(s):	6/23/15	**GPS X:**	470252.728	**Trench Depth (feet):**	10	**Driller:** SDE	**Backhoe Type:** Kubota 121-3
Depth to Native (feet):	5	**GPS Y:**	4983681.394	**Trench Width (feet):**	3	**Crew:** Jason	**Logged by:** JWJ
Depth to Water (feet):	NA	**GPS Z:**	~898'	**Trench Length (feet):**	11	**Observer:** JWJ	**Checked by:** JLB3

Depth (ft.)		Sample Interval	Properties					Debris			
			Moisture	Odor	Sheen	Discoloration	PID (ppm)	Total Debris %	Total Concrete %	ASTM / USCS Classification	Description
0	1		Moist	Swampy	No	No	1.2	50%	30%	-	0-0.5' bgs = Black dirt and sod.
1	2	1-5'								SM/SC	0.5-5' bgs = Medium to dark brown. Debris includes wood, plywood, plastic, concrete and steel pipe.
2	3		Moist		No	No	3.1	50%	30%		
3	4										
4	5		Moist		No	No	3.1	25%	15%		
5	6	5-7'						0	0	CL/OL	5-7' bgs = Very dark brown and rusty orange lean clay with trace roots; native.
6	7		Moist		No	No	3.2	0	0		
7	8									CL	7-9' bgs = Olive gray lean clay, trace very fine-grained sand.
8	9		Moist		No	No	3.2	0	0		
9	10										9-10' bgs = Rusty brown and olive gray lean clay.

End of trench

GPS Z Source: MNDNR LiDAR 2011

GPS X and Y Source: UTM Zone 15, NAD 1983

Test Trench Log

BARR

								Test Trench #:	TT-18
Proj#:	23270051.39	**Project:**	DeCola Ponds					**Side wall (N/S/E/W):**	Comp.
Date(s):	2/1/18	**GPS X:**	NA	**Trench Depth (feet):**	10	**Driller:**	SDE	**Backhoe Type:**	Kubota KX040-4
Depth to Native (feet):	~1	**GPS Y:**	NA	**Trench Width (feet):**	3	**Crew:**	Tim	**Logged by:**	PWS
Depth to Water (feet):	NA	**GPS Z:**	NA	**Trench Length (feet):**	9	**Observer:**	PWS	**Checked by:**	EJJ

Depth (ft.)		Sample Interval	Properties					Debris			
			Moisture	Odor	Sheen	Discoloration	PID (ppm)	Total Debris %	Total Concrete %	ASTM / USCS Classification	
0	1	Composite sample collected 1-10 feet	Frozen					< 1 %	0	OL	0-1' bgs = Frost- Trace metal and plastic.
1	2		Moist	No	No	No	0	0	0	OL	1-2' bgs = Black dirt and sod.
2	3		Moist	No	No	No	0	0	0	CL	2-5' bgs = Brown sandy clay with trace gravel.
3	4										
4	5		Moist	No	No	No	0	0	0	CL	5-7' bgs = Brown sandy clay with some rusty organics.
5	6										
6	7										7-10' bgs = Brown sandy clay with trace gray clay.
7	8										
8	9										
9	10										
											End of trench

Test Trench Log

Test Trench #:	TT-19								
Proj#:	23270051.39	**Project:**	DeCola Ponds					**Side wall (N/S/E/W):**	Comp.
Date(s):	2/1/18	**GPS X:**	NA	**Trench Depth (feet):**	9	**Driller:**	SDE	**Backhoe Type:**	Kubota KX040-4
Depth to Native (feet):	~1	**GPS Y:**	NA	**Trench Width (feet):**	3	**Crew:**	Tim	**Logged by:**	PWS
Depth to Water (feet):	NA	**GPS Z:**	NA	**Trench Length (feet):**	10	**Observer:**	PWS	**Checked by:**	EJJ

			Properties					Debris			
Depth (ft.)		Sample Interval	Moisture	Odor	Sheen	Discoloration	PID (ppm)	Total Debris %	Total Concrete %	ASTM / USCS Classification	Description
0	1	Composite sample collected 1-10 feet	Frozen					0	0	OL	0-1' bgs = Frozen black dirt.
1	2		Moist	No	No	No	0	0	0	OL	1-2' bgs = Black dirt.
2	3		Moist	No	No	No	0	0	0	CL	2-4' bgs = Dark brown sandy clay.
3	4										
4	5		Moist	No	No	No	0	0	0	CL	4-10' bgs = Light brown sandy clay with trace organic and trace gravel.
5	6										
6	7										
7	8										
8	9										
9	10										
											End of trench

Test Trench Log

BARR

Proj#:	23270051.39	**Project:**	DeCola Ponds			**Test Trench #:**	TT-20
Date(s):	2/1/18	**GPS X:**	NA	**Trench Depth (feet):**	9	**Driller:**	SDE	**Backhoe Type:**	Kubota KX040-4	**Side wall (N/S/E/W):**	Comp.
Depth to Native (feet):	~1	**GPS Y:**	NA	**Trench Width (feet):**	3	**Crew:**	Tim	**Logged by:**	PWS
Depth to Water (feet):	NA	**GPS Z:**	NA	**Trench Length (feet):**	10	**Observer:**	PWS	**Checked by:**	EJJ

			Properties					Debris			
Depth (ft.)		Sample Interval	Moisture	Odor	Sheen	Discoloration	PID (ppm)	Total Debris %	Total Concrete %	ASTM / USCS Classification	Description
0	1	Frozen						0	0	OL	0-1' bgs = Frozen black dirt.
1	2	Composite sample collected 1-9 feet and grab sample from 7-8 feet	Moist	No	No	No	0	0	0	CL	1-7' bgs = Brown sandy clay. At 3' bgs trace orange organics. At 4' bgs brown sandy clay.
2	3										
3	4										
4	5										
5	6										
6	7										
7	8		Moist	No	No	No	0	0	0	Pt	7-8' bgs = Brown degraded Peat.
8	9		Moist	No	No	No	0	0	0	SM	8-9' bgs = Gray silty sand.
											End of trench

Test Trench Log

BARR

Proj#:	23270051.39	**Project:**	DeCola Ponds					**Test Trench #:**	TT-21
								Side wall (N/S/E/W):	Comp.
Date(s):	2/1/18	**GPS X:**	NA	**Trench Depth (feet):**	9	**Driller:**	SDE	**Backhoe Type:**	Kubota KX040-4
Depth to Native (feet):	~1	**GPS Y:**	NA	**Trench Width (feet):**	3	**Crew:**	Tim	**Logged by:**	PWS
Depth to Water (feet):	NA	**GPS Z:**	NA	**Trench Length (feet):**	10	**Observer:**	PWS	**Checked by:**	EJJ

			Properties					Debris			
Depth (ft.)		Sample Interval	Moisture	Odor	Sheen	Discoloration	PID (ppm)	Total Debris %	Total Concrete %	ASTM / USCS Classification	Description
0	1	Composite sample collected 1-10 feet	Frozen					0	0	OL	0-1' bgs = Frozen black dirt.
1	2		Moist	No	No	No	0	0	0	OL	1-2' bgs = Black dirt.
2	3		Moist	No	No	No	0	0	0	CL	2-9' bgs = Brown sandy clay with trace orange organics.
3	4										
4	5										
5	6										
6	7										
7	8										
8	9										
9	10		Moist	No	No	No	0	0	0	CL	9-10' bgs = Brown sandy clay with trace gray clay.
											End of trench

Appendix B

Laboratory Report

LEGEND
Technical Services, Inc.

88 Empire Drive
St Paul, MN 55103
Tel: 651-642-1150
Fax: 651-642-1239

February 13, 2018

Ms. Terri Olson
Barr Engineering Co.
4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435

Work Order Number: 1800459
RE: 23270051

Enclosed are the results of analyses for samples received by the laboratory on 02/02/18. If you have any questions concerning this report, please feel free to contact me.

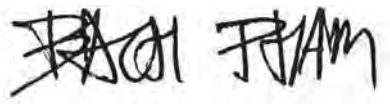
Results are not blank corrected unless noted within the report. Additionally, all QC results meet requirements unless noted.

All samples will be retained by Legend Technical Services, Inc., unless consumed in the analysis, at ambient conditions for 30 days from the date of this report and then discarded unless other arrangements are made. All samples were received in acceptable condition unless otherwise noted.

All test results and QC meet requirements of the 2003 NELAC standard.

MDH (NELAP) Accreditation #027-123-295

Prepared by,
LEGEND TECHNICAL SERVICES, INC



Bach Pham
Client Manager II
bpham@legend-group.com

LEGEND Technical Services, Inc.

88 Empire Drive
St Paul, MN 55103
Tel: 651-642-1150
Fax: 651-642-1239

Barr Engineering Co.	Project:	23270051	
4300 MarketPointe Drive, Suite 200	Project Number:	23270051.39	Work Order #: 1800459
Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TT-18_1-10	1800459-01	Soil	02/01/18 10:35	02/02/18 11:15
TT-19_1-10	1800459-02	Soil	02/01/18 11:50	02/02/18 11:15
TT-20_1-9	1800459-03	Soil	02/01/18 14:00	02/02/18 11:15
TT-20 Peat_7-8	1800459-04	Soil	02/01/18 14:00	02/02/18 11:15
TT-21_1-10	1800459-05	Soil	02/01/18 13:00	02/02/18 11:15

Shipping Container Information

Default Cooler Temperature (°C): 2.4

Received on ice: Yes
Temperature blank was present
Received on ice pack: No
Received on melt water: No
Ambient: No
Acceptable (IH/ISO only): No
Custody seals: Yes

Case Narrative:

The spike recovery for barium was above laboratory acceptance limits in the 6010C batch B8B0818 MS. All remaining spike recoveries were within acceptance limits in the batch LCS/LCSD/MSD. The MS/MSD source sample was TT-18_1-10.

The recovery for 8270 surrogate 2-Fluorobiphenyl in sample TT-18_1-10 was above laboratory acceptance limits. Data was accepted based on the valid recoveries of the remaining surrogates.

LEGEND Technical Services, Inc.

88 Empire Drive
St Paul, MN 55103
Tel: 651-642-1150
Fax: 651-642-1239

Barr Engineering Co.	Project:	23270051	
4300 MarketPointe Drive, Suite 200	Project Number:	23270051.39	Work Order #: 1800459
Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

DRO/8015D
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TT-18_1-10 (1800459-01) Soil Sampled: 02/01/18 10:35 Received: 02/02/18 11:15										
DRO (Silica Gel Cleanup)	<6.5	6.5	1.1	mg/kg dry	1	B8B0505	02/05/18	02/05/18	WI(95)DRO(M)	
Surrogate: Triacontane (C-30) (Silica Gel)	*113*			*70.1-121 %*		"	"	"	"	
TT-19_1-10 (1800459-02) Soil Sampled: 02/01/18 11:50 Received: 02/02/18 11:15										
DRO (Silica Gel Cleanup)	<8.0	8.0	1.3	mg/kg dry	1	B8B0505	02/05/18	02/05/18	WI(95)DRO(M)	
Surrogate: Triacontane (C-30) (Silica Gel)	*114*			*70.1-121 %*		"	"	"	"	
TT-20_1-9 (1800459-03) Soil Sampled: 02/01/18 14:00 Received: 02/02/18 11:15										
DRO (Silica Gel Cleanup)	<13	13	2.1	mg/kg dry	1	B8B0505	02/05/18	02/05/18	WI(95)DRO(M)	
Surrogate: Triacontane (C-30) (Silica Gel)	*107*			*70.1-121 %*		"	"	"	"	
TT-21_1-10 (1800459-05) Soil Sampled: 02/01/18 13:00 Received: 02/02/18 11:15										
DRO (Silica Gel Cleanup)	<7.1	7.1	1.2	mg/kg dry	1	B8B0505	02/05/18	02/05/18	WI(95)DRO(M)	
Surrogate: Triacontane (C-30) (Silica Gel)	*113*			*70.1-121 %*		"	"	"	"	

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4300 MarketPointe Drive, Suite 200	Project Number:	23270051.39	Work Order #: 1800459
Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

TOTAL METALS ANALYSIS
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TT-18_1-10 (1800459-01) Soil Sampled: 02/01/18 10:35 Received: 02/02/18 11:15										
Arsenic	**2.1**	1.3	0.38	mg/kg dry	1	B8B0818	02/08/18	02/12/18	EPA 6010C	
Barium	**95**	1.3	0.13	mg/kg dry	1	"	"	"	"	M1
Cadmium	**0.19**	0.066	0.013	mg/kg dry	1	"	"	"	"	
Chromium	**14**	0.66	0.026	mg/kg dry	1	"	"	"	"	
Lead	**7.7**	0.99	0.24	mg/kg dry	1	"	"	"	"	
Mercury	<0.66	0.66	0.16	mg/kg dry	1	"	"	"	"	
Selenium	<3.3	3.3	0.87	mg/kg dry	1	"	"	"	"	
Silver	<0.66	0.66	0.20	mg/kg dry	1	"	"	"	"	
TT-19_1-10 (1800459-02) Soil Sampled: 02/01/18 11:50 Received: 02/02/18 11:15										
Arsenic	**1.4**	1.2	0.36	mg/kg dry	1	B8B0818	02/08/18	02/12/18	EPA 6010C	
Barium	**82**	1.2	0.12	mg/kg dry	1	"	"	"	"	
Cadmium	**0.21**	0.062	0.012	mg/kg dry	1	"	"	"	"	
Chromium	**12**	0.62	0.025	mg/kg dry	1	"	"	"	"	
Lead	**6.8**	0.94	0.22	mg/kg dry	1	"	"	"	"	
Mercury	<0.62	0.62	0.15	mg/kg dry	1	"	"	"	"	
Selenium	<3.1	3.1	0.82	mg/kg dry	1	"	"	"	"	
Silver	<0.62	0.62	0.19	mg/kg dry	1	"	"	"	"	
TT-20_1-9 (1800459-03) Soil Sampled: 02/01/18 14:00 Received: 02/02/18 11:15										
Arsenic	<1.4	1.4	0.42	mg/kg dry	1	B8B0818	02/08/18	02/12/18	EPA 6010C	
Barium	**85**	1.4	0.14	mg/kg dry	1	"	"	"	"	
Cadmium	**0.35**	0.072	0.014	mg/kg dry	1	"	"	"	"	
Chromium	**17**	0.72	0.029	mg/kg dry	1	"	"	"	"	
Lead	**11**	1.1	0.26	mg/kg dry	1	"	"	"	"	
Mercury	<0.72	0.72	0.17	mg/kg dry	1	"	"	"	"	
Selenium	<3.6	3.6	0.96	mg/kg dry	1	"	"	"	"	
Silver	<0.72	0.72	0.22	mg/kg dry	1	"	"	"	"	
TT-20 Peat_7-8 (1800459-04) Soil Sampled: 02/01/18 14:00 Received: 02/02/18 11:15										
Arsenic	**2.4**	2.1	0.60	mg/kg dry	1	B8B0818	02/08/18	02/12/18	EPA 6010C	
TT-21_1-10 (1800459-05) Soil Sampled: 02/01/18 13:00 Received: 02/02/18 11:15										
Arsenic	<1.2	1.2	0.35	mg/kg dry	1	B8B0818	02/08/18	02/12/18	EPA 6010C	
Barium	**56**	1.2	0.12	mg/kg dry	1	"	"	"	"	
Cadmium	**0.15**	0.060	0.012	mg/kg dry	1	"	"	"	"	
Chromium	**12**	0.60	0.024	mg/kg dry	1	"	"	"	"	
Lead	**10**	0.89	0.21	mg/kg dry	1	"	"	"	"	
Mercury	<0.60	0.60	0.14	mg/kg dry	1	"	"	"	"	
Selenium	<3.0	3.0	0.79	mg/kg dry	1	"	"	"	"	
Silver	<0.60	0.60	0.18	mg/kg dry	1	"	"	"	"	

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4300 MarketPointe Drive, Suite 200	Project Number:	23270051.39	Work Order #: 1800459
Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

PAH 8270D
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TT-18_1-10 (1800459-01) Soil Sampled: 02/01/18 10:35 Received: 02/02/18 11:15										
2-Chloronaphthalene	<0.43	0.43	0.089	mg/kg dry	1	B8B0208	02/02/18	02/05/18	EPA 8270D	
2-Methylnaphthalene	<0.43	0.43	0.11	mg/kg dry	1	"	"	"	"	
Acenaphthene	<0.43	0.43	0.083	mg/kg dry	1	"	"	"	"	
Acenaphthylene	<0.43	0.43	0.093	mg/kg dry	1	"	"	"	"	
Anthracene	<0.43	0.43	0.091	mg/kg dry	1	"	"	"	"	
Benzo(a)anthracene	<0.43	0.43	0.086	mg/kg dry	1	"	"	"	"	
Benzo(a)pyrene	<0.43	0.43	0.092	mg/kg dry	1	"	"	"	"	
Benzo(b)fluoranthene	<0.43	0.43	0.078	mg/kg dry	1	"	"	"	"	
Benzo(g,h,i)perylene	<0.43	0.43	0.093	mg/kg dry	1	"	"	"	"	
Benzo(k)fluoranthene	<0.43	0.43	0.092	mg/kg dry	1	"	"	"	"	
Chrysene	<0.43	0.43	0.084	mg/kg dry	1	"	"	"	"	
Dibenz(a,h)anthracene	<0.43	0.43	0.11	mg/kg dry	1	"	"	"	"	
Fluoranthene	<0.43	0.43	0.089	mg/kg dry	1	"	"	"	"	
Fluorene	<0.43	0.43	0.086	mg/kg dry	1	"	"	"	"	
Indeno (1,2,3-cd) pyrene	<0.43	0.43	0.095	mg/kg dry	1	"	"	"	"	
Naphthalene	<0.43	0.43	0.093	mg/kg dry	1	"	"	"	"	
Phenanthrene	<0.43	0.43	0.087	mg/kg dry	1	"	"	"	"	
Pyrene	<0.43	0.43	0.078	mg/kg dry	1	"	"	"	"	
Surrogate: 2-Fluorobiphenyl	*86.3*			*54.8-85.5 %*		"	"	"	"	*S-BN*
Surrogate: Nitrobenzene-d5	*82.7*			*50.7-84.5 %*		"	"	"	"	
Surrogate: Terphenyl-d14	*89.9*			*36.6-110 %*		"	"	"	"	
TT-19_1-10 (1800459-02) Soil Sampled: 02/01/18 11:50 Received: 02/02/18 11:15										
2-Chloronaphthalene	<0.41	0.41	0.085	mg/kg dry	1	B8B0208	02/02/18	02/06/18	EPA 8270D	
2-Methylnaphthalene	<0.41	0.41	0.10	mg/kg dry	1	"	"	"	"	
Acenaphthene	<0.41	0.41	0.079	mg/kg dry	1	"	"	"	"	
Acenaphthylene	<0.41	0.41	0.089	mg/kg dry	1	"	"	"	"	
Anthracene	<0.41	0.41	0.086	mg/kg dry	1	"	"	"	"	
Benzo(a)anthracene	<0.41	0.41	0.081	mg/kg dry	1	"	"	"	"	
Benzo(a)pyrene	<0.41	0.41	0.088	mg/kg dry	1	"	"	"	"	
Benzo(b)fluoranthene	<0.41	0.41	0.074	mg/kg dry	1	"	"	"	"	
Benzo(g,h,i)perylene	<0.41	0.41	0.089	mg/kg dry	1	"	"	"	"	
Benzo(k)fluoranthene	<0.41	0.41	0.088	mg/kg dry	1	"	"	"	"	
Chrysene	<0.41	0.41	0.080	mg/kg dry	1	"	"	"	"	
Dibenz(a,h)anthracene	<0.41	0.41	0.10	mg/kg dry	1	"	"	"	"	
Fluoranthene	<0.41	0.41	0.085	mg/kg dry	1	"	"	"	"	
Fluorene	<0.41	0.41	0.081	mg/kg dry	1	"	"	"	"	
Indeno (1,2,3-cd) pyrene	<0.41	0.41	0.090	mg/kg dry	1	"	"	"	"	
Naphthalene	<0.41	0.41	0.089	mg/kg dry	1	"	"	"	"	
Phenanthrene	<0.41	0.41	0.082	mg/kg dry	1	"	"	"	"	

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4300 MarketPointe Drive, Suite 200	Project Number:	23270051.39	Work Order #: 1800459
Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

PAH 8270D
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TT-19_1-10 (1800459-02) Soil Sampled: 02/01/18 11:50 Received: 02/02/18 11:15										
Pyrene	<0.41	0.41	0.074	mg/kg dry	1	B8B0208	02/02/18	02/06/18	EPA 8270D	
Surrogate: 2-Fluorobiphenyl	*82.5*			*54.8-85.5 %*		"	"	"	"	
Surrogate: Nitrobenzene-d5	*79.0*			*50.7-84.5 %*		"	"	"	"	
Surrogate: Terphenyl-d14	*87.1*			*36.6-110 %*		"	"	"	"	
TT-20_1-9 (1800459-03) Soil Sampled: 02/01/18 14:00 Received: 02/02/18 11:15										
2-Chloronaphthalene	<0.48	0.48	0.099	mg/kg dry	1	B8B0208	02/02/18	02/06/18	EPA 8270D	
2-Methylnaphthalene	<0.48	0.48	0.12	mg/kg dry	1	"	"	"	"	
Acenaphthene	<0.48	0.48	0.091	mg/kg dry	1	"	"	"	"	
Acenaphthylene	<0.48	0.48	0.10	mg/kg dry	1	"	"	"	"	
Anthracene	<0.48	0.48	0.10	mg/kg dry	1	"	"	"	"	
Benzo(a)anthracene	<0.48	0.48	0.094	mg/kg dry	1	"	"	"	"	
Benzo(a)pyrene	<0.48	0.48	0.10	mg/kg dry	1	"	"	"	"	
Benzo(b)fluoranthene	<0.48	0.48	0.086	mg/kg dry	1	"	"	"	"	
Benzo(g,h,i)perylene	<0.48	0.48	0.10	mg/kg dry	1	"	"	"	"	
Benzo(k)fluoranthene	<0.48	0.48	0.10	mg/kg dry	1	"	"	"	"	
Chrysene	<0.48	0.48	0.093	mg/kg dry	1	"	"	"	"	
Dibenz(a,h)anthracene	<0.48	0.48	0.12	mg/kg dry	1	"	"	"	"	
Fluoranthene	<0.48	0.48	0.099	mg/kg dry	1	"	"	"	"	
Fluorene	<0.48	0.48	0.094	mg/kg dry	1	"	"	"	"	
Indeno (1,2,3-cd) pyrene	<0.48	0.48	0.10	mg/kg dry	1	"	"	"	"	
Naphthalene	<0.48	0.48	0.10	mg/kg dry	1	"	"	"	"	
Phenanthrene	<0.48	0.48	0.096	mg/kg dry	1	"	"	"	"	
Pyrene	<0.48	0.48	0.086	mg/kg dry	1	"	"	"	"	
Surrogate: 2-Fluorobiphenyl	*71.2*			*54.8-85.5 %*		"	"	"	"	
Surrogate: Nitrobenzene-d5	*67.3*			*50.7-84.5 %*		"	"	"	"	
Surrogate: Terphenyl-d14	*74.5*			*36.6-110 %*		"	"	"	"	
TT-21_1-10 (1800459-05) Soil Sampled: 02/01/18 13:00 Received: 02/02/18 11:15										
2-Chloronaphthalene	<0.39	0.39	0.081	mg/kg dry	1	B8B0208	02/02/18	02/06/18	EPA 8270D	
2-Methylnaphthalene	<0.39	0.39	0.095	mg/kg dry	1	"	"	"	"	
Acenaphthene	<0.39	0.39	0.075	mg/kg dry	1	"	"	"	"	
Acenaphthylene	<0.39	0.39	0.085	mg/kg dry	1	"	"	"	"	
Anthracene	<0.39	0.39	0.082	mg/kg dry	1	"	"	"	"	
Benzo(a)anthracene	<0.39	0.39	0.077	mg/kg dry	1	"	"	"	"	
Benzo(a)pyrene	<0.39	0.39	0.083	mg/kg dry	1	"	"	"	"	
Benzo(b)fluoranthene	<0.39	0.39	0.070	mg/kg dry	1	"	"	"	"	
Benzo(g,h,i)perylene	<0.39	0.39	0.085	mg/kg dry	1	"	"	"	"	
Benzo(k)fluoranthene	<0.39	0.39	0.083	mg/kg dry	1	"	"	"	"	
Chrysene	<0.39	0.39	0.076	mg/kg dry	1	"	"	"	"	
Dibenz(a,h)anthracene	<0.39	0.39	0.098	mg/kg dry	1	"	"	"	"	

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Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

PAH 8270D
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TT-21_1-10 (1800459-05) Soil Sampled: 02/01/18 13:00 Received: 02/02/18 11:15										
Fluoranthene	<0.39	0.39	0.081	mg/kg dry	1	B8B0208	02/02/18	02/06/18	EPA 8270D	
Fluorene	<0.39	0.39	0.077	mg/kg dry	1	"	"	"	"	
Indeno (1,2,3-cd) pyrene	<0.39	0.39	0.086	mg/kg dry	1	"	"	"	"	
Naphthalene	<0.39	0.39	0.085	mg/kg dry	1	"	"	"	"	
Phenanthrene	<0.39	0.39	0.079	mg/kg dry	1	"	"	"	"	
Pyrene	<0.39	0.39	0.070	mg/kg dry	1	"	"	"	"	
Surrogate: 2-Fluorobiphenyl	*83.6*			*54.8-85.5 %*		"	"	"	"	
Surrogate: Nitrobenzene-d5	*81.2*			*50.7-84.5 %*		"	"	"	"	
Surrogate: Terphenyl-d14	*88.9*			*36.6-110 %*		"	"	"	"	

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Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

PERCENT SOLIDS
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TT-18_1-10 (1800459-01) Soil Sampled: 02/01/18 10:35 Received: 02/02/18 11:15										
% Solids	**76**			%	1	B8B0707	02/07/18	02/07/18	% calculation	
TT-19_1-10 (1800459-02) Soil Sampled: 02/01/18 11:50 Received: 02/02/18 11:15										
% Solids	**80**			%	1	B8B0707	02/07/18	02/07/18	% calculation	
TT-20_1-9 (1800459-03) Soil Sampled: 02/01/18 14:00 Received: 02/02/18 11:15										
% Solids	**69**			%	1	B8B0707	02/07/18	02/07/18	% calculation	
TT-20 Peat_7-8 (1800459-04) Soil Sampled: 02/01/18 14:00 Received: 02/02/18 11:15										
% Solids	**48**			%	1	B8B0707	02/07/18	02/07/18	% calculation	
TT-21_1-10 (1800459-05) Soil Sampled: 02/01/18 13:00 Received: 02/02/18 11:15										
% Solids	**84**			%	1	B8B0707	02/07/18	02/07/18	% calculation	

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Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

DRO/8015D - Quality Control
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	%RPD	%RPD Limit	Notes
Batch B8B0505 - Sonication (Wisc DRO)											
Blank (B8B0505-BLK1)					Prepared & Analyzed: 02/05/18						
DRO (Silica Gel Cleanup)	< 8.0	8.0	1.3	mg/kg wet							
Surrogate: Triacontane (C-30) (Silica Gel)	*18.0*			*mg/kg wet*	*16.0*		*112*	*70.1-121*			
LCS (B8B0505-BS1)					Prepared & Analyzed: 02/05/18						
DRO (Silica Gel Cleanup)	66.7	8.0	1.3	mg/kg wet	64.0	<8.0	104	70-130			
Surrogate: Triacontane (C-30) (Silica Gel)	*14.5*			*mg/kg wet*	*16.0*		*90.8*	*70.1-121*			
LCS Dup (B8B0505-BSD1)					Prepared & Analyzed: 02/05/18						
DRO (Silica Gel Cleanup)	57.3	8.0	1.3	mg/kg wet	64.0	<8.0	89.5	70-130	15.2	21.9	
Surrogate: Triacontane (C-30) (Silica Gel)	*16.3*			*mg/kg wet*	*16.0*		*102*	*70.1-121*			

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Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

TOTAL METALS ANALYSIS - Quality Control
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	%RPD	%RPD Limit	Notes
Batch B8B0818 - EPA 3050B (M)											
Blank (B8B0818-BLK1)					Prepared: 02/08/18 Analyzed: 02/12/18						
Arsenic	< 1.0	1.0	0.29	mg/kg wet							
Barium	< 1.0	1.0	0.10	mg/kg wet							
Cadmium	< 0.050	0.050	0.010	mg/kg wet							
Chromium	< 0.50	0.50	0.020	mg/kg wet							
Lead	< 0.75	0.75	0.18	mg/kg wet							
Mercury	< 0.50	0.50	0.12	mg/kg wet							
Selenium	< 2.5	2.5	0.66	mg/kg wet							
Silver	< 0.50	0.50	0.15	mg/kg wet							
LCS (B8B0818-BS1)					Prepared: 02/08/18 Analyzed: 02/12/18						
Arsenic	42.7	1.0	0.29	mg/kg wet	39.9	<1.0	107	80-120			
Barium	42.5	1.0	0.10	mg/kg wet	39.9	<1.0	106	80-120			
Cadmium	44.9	0.050	0.010	mg/kg wet	39.9	<0.050	112	80-120			
Chromium	43.0	0.50	0.020	mg/kg wet	39.9	<0.50	108	80-120			
Lead	44.3	0.75	0.18	mg/kg wet	39.9	<0.75	111	80-120			
Mercury	13.5	0.50	0.12	mg/kg wet	12.5	<0.50	108	80-120			
Selenium	42.1	2.5	0.66	mg/kg wet	39.9	<2.5	106	80-120			
Silver	3.86	0.50	0.15	mg/kg wet	3.99	<0.50	96.6	80-120			
LCS Dup (B8B0818-BSD1)					Prepared: 02/08/18 Analyzed: 02/12/18						
Arsenic	42.3	1.0	0.29	mg/kg wet	39.9	<1.0	106	80-120	0.976	20	
Barium	43.0	1.0	0.10	mg/kg wet	39.9	<1.0	108	80-120	1.25	20	
Cadmium	44.7	0.050	0.010	mg/kg wet	39.9	<0.050	112	80-120	0.301	20	
Chromium	43.1	0.50	0.020	mg/kg wet	39.9	<0.50	108	80-120	0.151	20	
Lead	44.4	0.75	0.18	mg/kg wet	39.9	<0.75	111	80-120	0.169	20	
Mercury	13.6	0.50	0.12	mg/kg wet	12.5	<0.50	108	80-120	0.333	20	
Selenium	42.0	2.5	0.66	mg/kg wet	39.9	<2.5	105	80-120	0.190	20	
Silver	3.84	0.50	0.15	mg/kg wet	3.99	<0.50	96.2	80-120	0.390	20	
Matrix Spike (B8B0818-MS1)		**Source: 1800459-01**			Prepared: 02/08/18 Analyzed: 02/12/18						
Arsenic	57.7	1.3	0.38	mg/kg dry	52.2	2.08	107	75-125			
Barium	161	1.3	0.13	mg/kg dry	52.2	94.5	128	75-125			M1
Cadmium	54.5	0.066	0.013	mg/kg dry	52.2	0.189	104	75-125			
Chromium	69.3	0.66	0.026	mg/kg dry	52.2	14.2	106	75-125			
Lead	60.6	0.99	0.24	mg/kg dry	52.2	7.67	101	75-125			
Mercury	16.1	0.66	0.16	mg/kg dry	16.4	<0.66	98.5	75-125			
Selenium	55.4	3.3	0.87	mg/kg dry	52.2	<3.3	103	75-125			
Silver	5.13	0.66	0.20	mg/kg dry	5.22	<0.66	98.2	75-125			
Matrix Spike Dup (B8B0818-MSD1)		**Source: 1800459-01**			Prepared: 02/08/18 Analyzed: 02/12/18						
Arsenic	56.6	1.3	0.38	mg/kg dry	51.9	2.08	105	75-125	2.05	20	
Barium	137	1.3	0.13	mg/kg dry	51.9	94.5	81.5	75-125	16.5	20	

LEGEND Technical Services, Inc.

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Barr Engineering Co.	Project:	23270051	
4300 MarketPointe Drive, Suite 200	Project Number:	23270051.39	Work Order #: 1800459
Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

TOTAL METALS ANALYSIS - Quality Control
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	%RPD	%RPD Limit	Notes
Batch B8B0818 - EPA 3050B (M)											
Matrix Spike Dup (B8B0818-MSD1)		**Source: 1800459-01**			Prepared: 02/08/18		Analyzed: 02/12/18				
Cadmium	53.6	0.066	0.013	mg/kg dry	51.9	0.189	103	75-125	1.64	20	
Chromium	70.9	0.66	0.026	mg/kg dry	51.9	14.2	109	75-125	2.35	20	
Lead	58.9	0.99	0.24	mg/kg dry	51.9	7.67	98.8	75-125	2.79	20	
Mercury	15.9	0.66	0.16	mg/kg dry	16.2	<0.66	97.6	75-125	1.65	20	
Selenium	54.5	3.3	0.87	mg/kg dry	51.9	<3.3	102	75-125	1.72	20	
Silver	5.08	0.66	0.20	mg/kg dry	5.19	<0.66	98.0	75-125	0.930	20	

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4300 MarketPointe Drive, Suite 200	Project Number:	23270051.39	Work Order #: 1800459
Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

PAH 8270D - Quality Control
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	%RPD	%RPD Limit	Notes
Batch B8B0208 - EPA 3545A ASE Extraction											
Blank (B8B0208-BLK1)					Prepared: 02/02/18 Analyzed: 02/05/18						
2-Chloronaphthalene	< 0.33	0.33	0.068	mg/kg wet							
2-Methylnaphthalene	< 0.33	0.33	0.080	mg/kg wet							
Acenaphthene	< 0.33	0.33	0.063	mg/kg wet							
Acenaphthylene	< 0.33	0.33	0.071	mg/kg wet							
Anthracene	< 0.33	0.33	0.069	mg/kg wet							
Benzo(a)anthracene	< 0.33	0.33	0.065	mg/kg wet							
Benzo(a)pyrene	< 0.33	0.33	0.070	mg/kg wet							
Benzo(b)fluoranthene	< 0.33	0.33	0.059	mg/kg wet							
Benzo(g,h,i)perylene	< 0.33	0.33	0.071	mg/kg wet							
Benzo(k)fluoranthene	< 0.33	0.33	0.070	mg/kg wet							
Chrysene	< 0.33	0.33	0.064	mg/kg wet							
Dibenz(a,h)anthracene	< 0.33	0.33	0.082	mg/kg wet							
Fluoranthene	< 0.33	0.33	0.068	mg/kg wet							
Fluorene	< 0.33	0.33	0.065	mg/kg wet							
Indeno (1,2,3-cd) pyrene	< 0.33	0.33	0.072	mg/kg wet							
Naphthalene	< 0.33	0.33	0.071	mg/kg wet							
Phenanthrene	< 0.33	0.33	0.066	mg/kg wet							
Pyrene	< 0.33	0.33	0.059	mg/kg wet							
Surrogate: 2-Fluorobiphenyl	*4.87*			*mg/kg wet*	*6.67*		*73.0*	*54.8-85.5*			
Surrogate: Nitrobenzene-d5	*4.63*			*mg/kg wet*	*6.67*		*69.5*	*50.7-84.5*			
Surrogate: Terphenyl-d14	*5.70*			*mg/kg wet*	*6.67*		*85.4*	*36.6-110*			
LCS (B8B0208-BS1)					Prepared: 02/02/18 Analyzed: 02/05/18						
Acenaphthylene	2.67	0.33	0.071	mg/kg wet	3.33	<0.33	80.1	58.2-95.8			
Anthracene	2.86	0.33	0.069	mg/kg wet	3.33	<0.33	85.7	64-98.3			
Benzo(a)anthracene	2.92	0.33	0.065	mg/kg wet	3.33	<0.33	87.6	65-99.4			
Benzo(a)pyrene	2.85	0.33	0.070	mg/kg wet	3.33	<0.33	85.6	63.7-102			
Benzo(b)fluoranthene	2.72	0.33	0.059	mg/kg wet	3.33	<0.33	81.5	62-99.1			
Benzo(g,h,i)perylene	2.98	0.33	0.071	mg/kg wet	3.33	<0.33	89.4	57.3-109			
Benzo(k)fluoranthene	2.85	0.33	0.070	mg/kg wet	3.33	<0.33	85.6	62.6-101			
Chrysene	2.99	0.33	0.064	mg/kg wet	3.33	<0.33	89.8	67.5-104			
Dibenz(a,h)anthracene	2.95	0.33	0.082	mg/kg wet	3.33	<0.33	88.6	59.8-106			
Fluoranthene	2.78	0.33	0.068	mg/kg wet	3.33	<0.33	83.3	61.8-99			
Fluorene	2.75	0.33	0.065	mg/kg wet	3.33	<0.33	82.6	62.2-99			
Indeno (1,2,3-cd) pyrene	2.92	0.33	0.072	mg/kg wet	3.33	<0.33	87.5	57-110			
Naphthalene	2.62	0.33	0.071	mg/kg wet	3.33	<0.33	78.5	55.5-92.3			
Phenanthrene	2.90	0.33	0.066	mg/kg wet	3.33	<0.33	86.9	63.8-99.9			
Surrogate: 2-Fluorobiphenyl	*4.96*			*mg/kg wet*	*6.67*		*74.3*	*54.8-85.5*			
Surrogate: Nitrobenzene-d5	*4.93*			*mg/kg wet*	*6.67*		*73.9*	*50.7-84.5*			
Surrogate: Terphenyl-d14	*5.72*			*mg/kg wet*	*6.67*		*85.8*	*36.6-110*			

LEGEND Technical Services, Inc.

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Barr Engineering Co.	Project:	23270051	
4300 MarketPointe Drive, Suite 200	Project Number:	23270051.39	Work Order #: 1800459
Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

PAH 8270D - Quality Control
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	%RPD	%RPD Limit	Notes
Batch B8B0208 - EPA 3545A ASE Extraction											
Matrix Spike (B8B0208-MS1)		**Source: 1800450-01**			Prepared: 02/02/18		Analyzed: 02/05/18				
Acenaphthylene	3.66	0.49	0.11	mg/kg wet	4.96	<0.49	73.8	37.7-105			
Anthracene	4.23	0.49	0.10	mg/kg wet	4.96	<0.49	85.2	43.2-110			
Benzo(a)anthracene	3.82	0.49	0.097	mg/kg wet	4.96	<0.49	77.0	33.3-117			
Benzo(a)pyrene	3.92	0.49	0.10	mg/kg wet	4.96	<0.49	79.1	30-120			
Benzo(b)fluoranthene	3.58	0.49	0.088	mg/kg wet	4.96	<0.49	72.2	30-123			
Benzo(g,h,i)perylene	3.76	0.49	0.11	mg/kg wet	4.96	<0.49	75.9	30-122			
Benzo(k)fluoranthene	3.86	0.49	0.10	mg/kg wet	4.96	<0.49	77.7	35.2-116			
Chrysene	4.17	0.49	0.095	mg/kg wet	4.96	<0.49	84.0	38.4-122			
Dibenz(a,h)anthracene	3.79	0.49	0.12	mg/kg wet	4.96	<0.49	76.5	30-115			
Fluoranthene	3.59	0.49	0.10	mg/kg wet	4.96	<0.49	72.4	30-133			
Fluorene	3.92	0.49	0.097	mg/kg wet	4.96	<0.49	79.0	41.4-109			
Indeno (1,2,3-cd) pyrene	3.61	0.49	0.11	mg/kg wet	4.96	<0.49	72.8	30-119			
Naphthalene	3.43	0.49	0.11	mg/kg wet	4.96	<0.49	69.1	32-104			
Phenanthrene	4.12	0.49	0.098	mg/kg wet	4.96	<0.49	83.0	30-128			
Surrogate: 2-Fluorobiphenyl	*7.58*			*mg/kg wet*	*9.92*		*76.4*	*54.8-85.5*			
Surrogate: Nitrobenzene-d5	*7.10*			*mg/kg wet*	*9.92*		*71.6*	*50.7-84.5*			
Surrogate: Terphenyl-d14	*8.15*			*mg/kg wet*	*9.92*		*82.2*	*36.6-110*			
Matrix Spike Dup (B8B0208-MSD1)		**Source: 1800450-01**			Prepared: 02/02/18		Analyzed: 02/05/18				
Acenaphthylene	3.57	0.49	0.11	mg/kg wet	4.95	<0.49	72.1	37.7-105	2.55	25.7	
Anthracene	4.24	0.49	0.10	mg/kg wet	4.95	<0.49	85.6	43.2-110	0.221	24.6	
Benzo(a)anthracene	3.77	0.49	0.097	mg/kg wet	4.95	<0.49	76.2	33.3-117	1.23	24.4	
Benzo(a)pyrene	3.81	0.49	0.10	mg/kg wet	4.95	<0.49	76.9	30-120	3.09	24.1	
Benzo(b)fluoranthene	3.56	0.49	0.088	mg/kg wet	4.95	<0.49	71.9	30-123	0.564	25.7	
Benzo(g,h,i)perylene	3.72	0.49	0.11	mg/kg wet	4.95	<0.49	75.1	30-122	1.25	26.4	
Benzo(k)fluoranthene	3.76	0.49	0.10	mg/kg wet	4.95	<0.49	76.0	35.2-116	2.43	24.8	
Chrysene	4.13	0.49	0.095	mg/kg wet	4.95	<0.49	83.4	38.4-122	0.958	25.7	
Dibenz(a,h)anthracene	3.79	0.49	0.12	mg/kg wet	4.95	<0.49	76.5	30-115	0.164	25.4	
Fluoranthene	3.61	0.49	0.10	mg/kg wet	4.95	<0.49	72.9	30-133	0.412	28	
Fluorene	3.88	0.49	0.097	mg/kg wet	4.95	<0.49	78.3	41.4-109	1.08	25	
Indeno (1,2,3-cd) pyrene	3.60	0.49	0.11	mg/kg wet	4.95	<0.49	72.7	30-119	0.208	24.5	
Naphthalene	3.23	0.49	0.11	mg/kg wet	4.95	<0.49	65.3	32-104	5.91	33.3	
Phenanthrene	4.15	0.49	0.098	mg/kg wet	4.95	<0.49	83.7	30-128	0.656	29.9	
Surrogate: 2-Fluorobiphenyl	*7.05*			*mg/kg wet*	*9.90*		*71.2*	*54.8-85.5*			
Surrogate: Nitrobenzene-d5	*6.28*			*mg/kg wet*	*9.90*		*63.4*	*50.7-84.5*			
Surrogate: Terphenyl-d14	*7.95*			*mg/kg wet*	*9.90*		*80.3*	*36.6-110*			

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Barr Engineering Co.	Project:	23270051	
4300 MarketPointe Drive, Suite 200	Project Number:	23270051.39	Work Order #: 1800459
Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

PERCENT SOLIDS - Quality Control
Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	%RPD	%RPD Limit	Notes
Batch B8B0707 - General Preparation											
Duplicate (B8B0707-DUP1)		**Source: 1800459-05**			Prepared & Analyzed: 02/07/18						
% Solids	82.0			%		84.0			2.41	20	

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Minneapolis, MN 55435	Project Manager:	Ms. Terri Olson	Date Reported: 02/13/18

Notes and Definitions

S-BN	Base/Neutral surrogate recovery outside of control limits. The data was accepted based on valid recovery of remaining two base/neutral surrogates.
M1	Matrix spike recovery was high, the associated blank spike recovery was acceptable.
<	Less than value listed
dry	Sample results reported on a dry weight basis
NA	Not applicable. The %RPD is not calculated from values less than the reporting limit.
MDL	Method Detection Limit; Equivalent to the method LOD (Limit of Detection)
RL	Reporting Limit
RPD	Relative Percent Difference
LCS	Laboratory Control Spike = Blank Spike (BS) = Laboratory Fortified Blank (LFB)
MS	Matrix Spike = Laboratory Fortified Matrix (LFM)

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1800457

Barr Engineering Co. Chain of Custody

BARR ☐ Ann Arbor ☐ Bismarck ☐ Duluth ☐ Hibbing ☐ Jefferson City ☐ Minneapolis

Sample Origination State: ☐ KS ☐ MO ☐ WI ☐ MI ☐ ND Other: ☐ MN ☐ SD

COC Number: 52462
COC 1 of 1

REPORT TO	INVOICE TO
Company: BARR ENG	Company: BARR ENG
Address:	Address:
Name:	Name:
email:	email:
Copy to: datamgt@barr.com	P.O.
Project Name: Dakota Ponds	Barr Project No: 23270051.39

Matrix Code: GW = Groundwater, SW = Surface Water, WW = Waste Water, DW = Drinking Water, S = Soil/Solid, SD = Sediment, O = Other

Preservative Code: A = None, B = HCl, C = HNO_3, D = H_2SO_4, E = NaOH, F = MeOH, G = $NaHSO_4$, H = $Na_2S_2O_3$, I = Ascorbic Acid, J = NH_4Cl, K = Zn Acetate, O = Other

Location	Sample Depth Start	Sample Depth Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: Water: PAH's; RCRA Metals; DRO-Silica Gel Cleanup; Arsenic	Soil: % Solids	Preservative Code	Field Filtered Y/N
1. TT-18	1	10	ft	2/1/18	1035	S		3	✓✓✓			01 PC
2. TT-19	1	10			1150			3	✓✓✓			02
3. TT-20	1	9			1400			3	✓✓✓			03
4. TT-20 Peat	7	8			1406			1	✓			04 A
5. TT-21	1	10			1300			3	✓✓✓			05 PC
6.												
7.												
8.												
9.												
10.												

BARR USE ONLY
Sampled by: PWS
Barr Proj. Manager: JLB3
Barr DQ Manager: TAO
Lab Name: Legend
Lab Location: St. Paul

Relinquished by: — On Ice? (Y) N — Date 2/2/18 — Time 0800 — Received by: — Date 2/1/18 — Time 08:00

Relinquished by: — On Ice? (Y) N — Date 2/2/18 — Time 09:00 — Received by: — Date 2/2/18 — Time 115

Samples Shipped VIA: ☐ Courier ☐ Federal Express ☐ Sampler ☐ Other: — Air Bill Number:

Lab WO: — Temperature on Receipt (°C): — Custody Seal Intact? (Y) ☐ N ☐ None

Requested Due Date: ☐ Standard Turn Around Time ☐ Rush ____ (mm/dd/yyyy)

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 06/16/15

thru 2-4

Appendix C

Wetland Delineation Report (2017)

Wetland Delineation Report

DeCola Ponds B & C Improvement Project

Prepared for
Bassett Creek Watershed Management Commission

October 2017

4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435
Phone: 952.832.2600
Fax: 952.832.2601

Wetland Delineation Report

October 2017

Contents

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1.0 Introduction

On behalf of Bassett Creek Watershed Management Commission (BCWMC), and in partnership with the City of Golden Valley, Barr Engineering Company (Barr) is submitting a Wetland Delineation Report in preparation for the construction of a flood mitigation project—the DeCola Ponds B & C Improvement Project. The project will expand upon the flood storage and conveyance project constructed by the City of Golden Valley on the Liberty Crossing development site and along the Rhode Island Avenue right-of-way, and within the project area evaluated in this report. The proposed project area includes DeCola Ponds B & C and Pennsylvania Woods, a small wooded area north of DeCola Pond B located on property owned by Dover Hill Apartments, and also includes the northern edge of DeCola Pond A. The project area is located east of Rhode Island Avenue N. and south of Medicine Lake Road, in Golden Valley, Hennepin County, Minnesota. The project area is within Section 29 of Township 118 North, Range 21 West (**Figure 1**).

Barr field delineated two wetlands (Wetlands 1 and 2) within the 6-acre project area on October 16, 2015 for the City of Golden Valley. Barr submitted a wetland delineation report, describing Wetlands 1 and 2, to the City of Golden Valley Local Government Unit (LGU) for review (Barr, October 2015). The Golden Valley LGU representative reviewed and approved Wetlands 1 and 2 on June 8, 2016, in relation to the first phase of the project. In 2017 the original 6-acre project area was expanded to approximately 14 acres to reflect the new phase of the flood mitigation work. On September 22, 2017, Barr field delineated two additional wetlands (Wetlands 3 and 4) within the expanded portion of the project area (**Figure 6**). This report combines content from the LGU-approved 2015 wetland delineation report with the 2017 field delineation results.

This Wetland Delineation Report was prepared in accordance with the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual ("1987 Manual", USACE, 1987), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (USACE, 2010) and the requirements of the Minnesota Wetland Conservation Act (WCA) of 1991. Barr delineated wetland boundaries and determined wetland types within the project area on October 16, 2015 and September 22, 2017.

This report includes a project overview (Section 2.0), general environmental information (Section 3.0), descriptions of the delineated wetlands (Section 4.0), and a discussion of regulations and the administering authorities (Section 5.0). The Tables section includes the precipitation data. The Figures section includes the Project Location Map, Topography Map, National Wetland Inventory (NWI), Public Waters Inventory (PWI), Soil Survey Map, and the Wetland Delineation Map. **Appendix A** includes Wetland Data Forms, **Appendix B** includes site photographs**,** and **Appendix C** includes the City of Golden Valley's June 8, 2016 Notice of Decision for Wetlands 1 and 2. The October 2015 wetland delineation report is available from Barr upon request.

2.0 Project Description

The Medicine Lake Road and Winnetka Avenue Area Long Term Flood Mitigation (MLRWA) Plan, completed in partnership by the Cities of Golden Valley, New Hope, and Crystal, identified multiple flood mitigation projects that are needed to help alleviate flooding at the low point on Medicine Lake Road (and adjacent properties) just east of Winnetka Avenue, and downstream around the DeCola Ponds. The first flood mitigation project implemented from this plan was constructed in 2016/2017 by the City of Golden Valley on the Liberty Crossing development site and along the Rhode Island Avenue right-of-way. The DeCola Ponds B & C Improvement Project was also identified as a priority in the MLRWA Plan and is the second phase of the project recently constructed by the City of Golden Valley. The DeCola Ponds B & C Improvement Project is also included in the BCWMC's current Capital Improvement Program (CIP) (BC-2, 3, 8) to mitigate flooding and improve water quality in the Medicine Lake Road and DeCola Ponds area. This project is estimated for construction in 2019-2020.

The City of Golden Valley implemented the first MLRWA project, which included the development of flood storage and conveyance on the Liberty Crossing development site on the west side of Rhode Island Avenue and along the Rhode Island Avenue right-of-way. The BCWMC's DeCola Ponds B & C Improvement Project is the next phase of the City of Golden Valley's recently constructed project and includes the expansion of flood storage around DeCola Ponds B & C and Pennsylvania Woods and the wooded area to the north of DeCola Pond B and the modification to the DeCola Pond C outlet structure and overflow. This expanded flood storage will be connected to the storage and conveyance developed on the Liberty Crossing development site and along the Rhode Island Avenue right-of-way. In addition to expanding flood storage volumes, there is an opportunity for the project to improve water quality treatment by expanding water quality treatment volumes.

The proposed project will develop flood storage volumes within the project area, develop additional water quality treatment volume, and remove accumulated sediment that has collected in the north end of DeCola Pond B. The project will alleviate local flooding around Medicine Lake Road, and downstream at DeCola Ponds A, B, C, and D, and will improve water quality downstream by trapping sediment in the ponds and expanded storage, thus minimizing sediment passing downstream to Bassett Creek. The proposed project will also improve ecology and wildlife habitat, enhance active and passive recreation opportunities, and provide educational opportunities.

3.0 General Environmental Setting

3.1 Site Description

The project area is located on City of Golden Valley right-of-way and park property and private property (easements have been acquired) bordered by a medium density apartment property to the north, stormwater pond/wetland to the south, Rhode Island Ave N and Liberty Crossing Development site to the west, and a railroad and light industrial area to the east. The project area is made up of broadleaf deciduous forest lands and storm water ponds with interlinking walking paths within (**Figure 1**).

3.2 Topography

The northern portion of the project site has moderately undulating topography. Areas near DeCola Ponds A, B, and C have a steep and abrupt topographic break leading into each pond. Central portions of the project area have steeper undulations (**Figure 2**).

3.3 Precipitation

Recent precipitation data were compared to historic data for evaluating annual and monthly deviations from normal conditions. Simulated precipitation data were obtained from the Minnesota Climatology Working Group, Wetland Delineation Precipitation Data Retrieval from a Gridded Database (http://climate.umn.edu/gridded_data/precip/wetland/wetland.asp) for wetlands in Hennepin County, Township 118 North, Range 21 West, Section 29.

In 2015, antecedent moisture conditions were within the normal range based on precipitation for the three months prior to the October 16, 2015 site visit. In 2017, antecedent moisture conditions were within the wet range based on precipitation for the three months prior to the September 22, 2017 site visit. These data were obtained from NRCS climate station 215838, New Hope Weather Station (**Table 1**).

The water year has varied between dry, normal, and wet for the six years prior to 2015, and has varied between normal and wet for the six years prior to 2017. The water year but fell mostly into the wet range for the six years prior to 2015 and 2017 (**Table 2**).

3.4 National Wetland Inventory

The National Wetland Inventory Map has identified two wetland types at the project site. Freshwater pond and forested/shrub wetland were identified (**Figure 3**).

3.5 Water Resources

The Minnesota Department of Natural Resources (MnDNR) Public Waters Inventory (PWI) has identified DeCola Ponds B & C (27-647P) and Decola Pond A (27-630P) as public water wetlands (**Figure 4**). These wetlands are a part of Barr-delineated Wetlands 1, 3 and 4 and are not identified by the Minnesota Pollution Control Agency (MPCA) as impaired waters (MPCA, 2017).

3.6 Soil Resources

Soil information for the project area was obtained from the Natural Resources Conservation Service SSURGO Database (USDA, 2017b). Two soil map units were identified within the project area: Urban land-Udorthents wet substratum, complex (U1A), and Urban-land Lester complex 2 to 18% slopes. These soil map units are not classified as hydric. There were also no other soils in the vicinity that were classified as hydric (**Figure 5**).

4.0 Wetland Delineation

4.1 Wetland Delineation and Classification Methods

Wetlands within the site were delineated and classified during site visits on October 16, 2015 and September 22, 2017. The wetland delineation was established according to the Routine On-Site Determination Method specified in the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987 Edition) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (USACE, 2010).

The delineated wetland boundaries and sample points were surveyed using a Global Positioning System (GPS) with sub-meter accuracy (**Figure 6**).

Wetlands were classified using the U.S. Fish and Wildlife Service (USFWS) Cowardin System (Cowardin et al., 1979), the USFWS Circular 39 system (Shaw and Fredine, 1956), and the Eggers and Reed Wetland Classification System (Eggers and Reed, 1977).

Soil borings were placed in and around the wetland, to a depth of at least 20 inches below the ground surface where possible. Representative soil samples from each boring were examined for the presence of hydric soil indicators using Version 8.1 of the Natural Resources Conservation Service (NRCS) Field Indicators of Hydric Soils in the United States guide (USDA, 2017a). Soil colors (e.g., 7.5YR 4/2, etc.) were determined using a Munsell® soil color chart and noted on the Wetland Data Forms **Appendix A**.

Hydrologic conditions were evaluated at each soil boring, and this information was also noted on the Wetland Data Forms. The dominant plant species were identified, and the corresponding wetland indicator status of each plant species was determined and noted on the Wetland Data Forms (**Appendix A**). Photographs taken at the time of the site visit are provided in **Appendix B**.

4.2 Wetland Descriptions

Four wetlands were delineated within the project area. Descriptions and assessments of each wetland are provided below, with representative photographs in **Appendix B**.

4.2.1 Wetland 1 (DeCola Pond B)

Wetland 1 is a Type 5 (PUBG), shallow open water wetland with a Type 2 (PEMB), wet meadow fringe in some areas that was dominated by reed canary grass (*Phalaris arundinacea*, FACW) (**Figure 6**). Most of the periphery of Wetland 1 has steep and abrupt slopes that lead into open water. There was no dominant emergent vegetation within the shallow open water community. Some submerged macrophytes were present but were not identified because they could not be accessed without a watercraft. Dominant vegetation at Wetland Sample Point 1-1 (SP 1-1 WET) includes Eastern cottonwood (*Populus deltoides*, FAC), ash-leaf maple (*Acer negundo*, FAC) and reed canary grass.

There were no primary indicators of hydrology observed at SP 1-1 WET. Secondary indicators of hydrology present included geomorphic position (D2) and a positive FAC-Neutral test (D5).

Soils mapped at SP 1-1 WET were identified as Urbanland-Udorthents wet substratum, 0-2% slope (U1A). Sampled soils were very dark gray with loamy and clay loam textures down to 5 inches and transitioned to black clays with redoximorphic concentrations and depletions varying between 2 and 5 percent down to 20 inches. Peat soils were present between 20 and 25 inches. The hydric soil indicator at SP 1-1 WET is redox dark surface (F6).

The transition to upland was defined by the lack of hydrology and hydric soil indicators. Dominant vegetation in upland areas was hydrophytic and consisted of Eastern cottonwood trees, ash-leaf maple trees, European buckthorn (*Rhamnus cathartica*, FAC) shrubs, climbing nightshade (*Solanum dulcamara*, FAC), stinging nettle (*Urtica dioica*, FACW), reed canary grass, and green ash (*Fraxinus pennsylvanica*, FACW) saplings.

4.2.2 Wetland 2

Wetland 2 is a non-vegetated Type 1 (PEMA), seasonally flooded basin (**Figure 6**). It is likely flooded during most of the growing season, which would may inhibit the growth of emergent vegetation. Eastern cottonwood, sugar maple (*Acer saccharum*, FACU), and European buckthorn where present along upland areas adjacent to Wetland 2, but were not within the basin delineated as wetland.

Primary indicators of hydrology observed at SP 2-1 WET were sparsely vegetated concave surface (B8) and water-stained leaves (B9). Geomorphic position (D2) was the only secondary indicator of hydrology present at SP 2-1 WET.

Soils mapped at SP 2-1 WET and throughout Wetland 2 were identified as Urbanland-Udorthents wet substratum, 0-2% slope (U1A). Soils were very dark brown with 10 percent faint and 10 percent prominent redoximorphic concentrations with silty clay textures down to 10 inches. Soils transitioned to a black sandy clay loam with faint redoximorphic concentrations varying between 5 and 10 percent of the matrix along with 5 percent prominent depletions down to 24 inches. The hydric soil indicator at SP 2-1 WET is redox dark surface (F6).

The transition to upland was defined by the lack of vegetation, hydrology and hydric soil indicators. Dominant vegetation in upland areas consisted of Eastern cottonwood trees, sugar maple trees, European buckthorn shrubs, red alder (*Sambucus racemosa*, FACU), and Virginia creeper (*Parthenocissus quinquefolia*, FAC).

4.2.3 Wetland 3 (DeCola Pond A)

Wetland 3 is a Type 5 (PUBG), shallow open water wetland with steep and abrupt slopes that lead into open water along the delineated northern edge (**Figure 6**). The purpose of only delineating the northern edge of Wetland 3 was to ensure complete avoidance of any impacts during the construction phase of the project.

There was no dominant emergent vegetation observed within the shallow open water community. Some submerged macrophytes were present but were not identified because they could not be accessed

without a watercraft. Dominant vegetation at SP 3-1 WET includes ash-leaf maple, peach-leaf willow (*Salix amygdaloides*, FACW), and green ash.

Primary indicators of hydrology observed at SP 3-1 WET were high water table (A2), saturation (A3), and aquatic fauna (B13). Secondary indicators of hydrology present included geomorphic position (D2), and a positive FAC-Neutral test (D5).

Soils mapped at SP 3-1 WET were identified as Urbanland-Lester complex 2 to 18% slopes (L52C). Sampled soils were black with mucky modified loam textures down to 8 inches and transitioned to a very dark gray sandy clay loam down to 16 inches. Soils from 16 to 27 inches had a gleyed matrix with silty clay loam textures. The hydric soil indicator at SP 3-1 WET is loamy mucky mineral (F1).

The transition to upland was defined by the lack of hydrology and hydric soil indicators. Dominant vegetation in upland areas was hydrophytic and consisted of green ash trees, peach-leaf willow trees (*Salix amygdaloides*, FACW), and European buckthorn (*Rhamnus cathartica*, FAC) in the herbaceous and shrub layers.

4.2.4 Wetland 4 (DeCola Pond C)

Wetland 4 is a Type 5 (PUBG), shallow open water wetland with a Type 2 (PEMB) wet meadow fringe in some areas (**Figure 6**). Most of the periphery of Wetland 1 has steep and abrupt slopes that lead into open water. There was no dominant emergent vegetation within the shallow open water community. Some submerged macrophytes were present but were not identified because they could not be accessed without a watercraft. Reed canary grass was dominant in open areas along the eastern edge of Wetland 4 in wet meadow community. Dominant vegetation at SP 4-1 WET includes ash-leaf maple, white mulberry (*Morus alba*, FAC), and Canadian clearweed (*Pilea pumila*, FACW).

The only primary indicator of hydrology observed at SP 4-1 WET was aquatic fauna (B13). Secondary indicators of hydrology present included geomorphic position (D2), and a positive FAC-Neutral test (D5).

Soils mapped at SP 4-1 WET were identified as Urbanland-Lester complex 2 to 18% slopes (L52C). Sampled soils were black with loamy textures down to 4 inches and transitioned to a depleted matrix with redoximorphic concentrations at 10 percent down to 10 inches. Soils from 10 to 28 inches were black, with silty clay loam textures down to 15 inches, and mucky modified silt loam down to 28 inches. The hydric soil indicator at SP 4-1 WET is depleted matrix (F3).

The transition to upland was defined by the lack of hydrology and hydric soil indicators. Dominant vegetation in upland areas was hydrophytic and consisted of ash-leaf maple trees, European buckthorn tree and herbaceous layers, lesser burdock (*Arctium minus*, FACU), and Virginia creeper.

5.0 Regulatory Overview

The USACE regulates the placement of dredge or fill materials into wetlands that are located adjacent to or are hydrologically connected to interstate or navigable waters under the authority of Section 404 of the Clean Water Act. If the USACE has jurisdiction over any portion of a project, they may also review impacts to wetlands under the authority of the National Environmental Policy Act.

Filling, excavating, and draining wetlands are also regulated by the Minnesota Wetland Conservation Act (WCA), and the Minnesota Public Waters Inventory Program, which are administered by the City of Golden Valley and the Minnesota Department of Natural Resources (DNR) respectively. The USACE, the City of Golden Valley and the DNR should be contacted before altering any wetlands on the site. In addition, delineated wetland boundaries may be reviewed, if needed, by a Technical Evaluation Panel (TEP) consisting of representatives from the Minnesota Board of Water and Soil Resources, and Hennepin County. The MnDNR and the USACE may also be present at the TEP meeting if requested.

6.0 References

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Tables

Table 1
Antecedent Moisture Conditions Prior to October 16, 2015 Site Visit
DeCola Ponds B & C Improvement Project Wetland Delineation
Golden Valley, MN

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
County: Hennepin **Township Number**: 118N
Township Name: Brooklyn Center **Range Number**: 21W
Nearest Community: Golden Valley **Section Number**: 29

Aerial photograph or site visit date:
Friday, October 16, 2015

Score using 1981-2010 normal period

(value are in inches)	first prior month: **September 2015**	second prior month: **August 2015**	third prior month: **July 2015**
estimated precipitation total for this location:	3.91	3.36	7.25
there is a 30% chance this location will have less than:	2.16	3.47	2.86
there is a 30% chance this location will have more than:	4.03	5.12	4.25
type of month: **dry** **normal** **wet**	**normal**	**dry**	**wet**
monthly score	3 * **2** = 6	2 * **1** = 2	1 ***** **3** **=** 3
multi-month score: 6 to 9 (**dry**) 10 to 14 (**normal**) 15 to 18 (**wet**)	11 (**normal**)		

Table 2
Antecedent Moisture Conditions Prior to September, 22 2017 Site Visit
DeCola Ponds B & C Improvement Project Wetland Delineation
Golden Valley, MN

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

County: Hennepin
Township Name: Brooklyn Center
Nearest Community: Golden Valley
Township Number: 118N
Range Number: 21W
Section Number: 29

Aerial photograph or site visit date:
Friday, September 22, 2017

Score using 1981-2010 normal period

(value are in inches)	first prior month: **August 2017**	second prior month: **July 2017**	third prior month: **June 2017**
estimated precipitation total for this location:	6.78R*	3.81R*	3.75R*
there is a 30% chance this location will have less than:	3.47	2.86	3.46
there is a 30% chance this location will have more than:	5.12	4.25	5.34
type of month: **dry** **normal** **wet**	**wet**	**normal**	**normal**
monthly score	3 * **3** = 9	2 * **2** = 4	1 ***** **2** **=** 2
multi-month score: 6 to 9 (**dry**) 10 to 14 (**normal**) 15 to 18 (**wet**)	15 (**wet**)		

* A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.

Table 3
Precipitation in Comparison to WETS Data
DeCola Ponds B & C Improvement Project Wetland Delineation
Golden Valley, MN

Precipitation data for target wetland location:

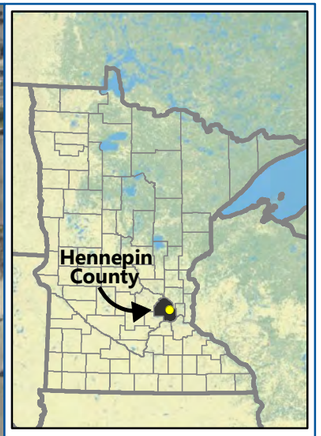
County: Hennepin
Township Number: 118N
Township Name: Brooklyn Center
Range Number: 21W
Nearest Community: Golden Valley
Section Number: 29

Precipitation Totals are in Inches	
Color Key	**Multi-month Totals**:
total is in lowest 30th percentile of the period-of-record distribution	**WARM** = warm season (May thru September)
total is => 30th and <= 70th percentile	**ANN** = calendar year (January thru December)
total is in highest 30th percentile of the period-of-record distribution	**WAT** = water year (Oct. previous year thru Sep. present year)

Period-of-Record Summary Statistics															
	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*WARM*	*ANN*	*WAT*
30%	0.54	0.50	1.14	1.64	2.60	3.19	2.42	2.73	1.84	1.21	0.72	0.56	16.31	25.98	25.86
70%	1.08	1.15	2.07	2.80	4.27	5.41	4.43	4.49	3.84	2.67	1.94	1.36	21.40	32.62	31.98
mean	0.89	0.90	1.66	2.43	3.66	4.46	3.83	3.68	3.05	2.20	1.54	1.05	18.65	29.31	29.33
1981-2010 Summary Statistics															
	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*WARM*	*ANN*	*WAT*
30%	0.54	0.40	1.35	2.29	2.84	3.46	2.86	3.47	2.16	1.24	1.09	0.73	18.45	30.59	27.84
70%	1.25	1.06	2.15	3.02	4.17	5.34	4.25	5.12	4.03	3.70	2.08	1.46	21.99	34.50	35.69
mean	0.89	0.81	1.95	2.80	3.67	4.60	4.31	4.17	3.42	2.56	1.85	1.25	20.17	32.28	32.08
Year-to-Year Data															
Year	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*WARM*	*ANN*	*WAT*
2017	0.78	0.73	0.70	3.54	5.40R*	3.75R*	3.81R*	6.78R*	-	-	-	-	-	-	-
2016	0.30	0.83	1.65	3.79	2.19	3.18	5.68	9.89	6.30	3.18	2.64	2.06	27.24	41.69	42.63
2015	0.32	0.30	0.67	2.08	4.22	3.34	7.25	3.36	3.91	2.75	4.30	1.77	22.08	34.27	28.73
2014	1.20	1.36	0.76	7.17	4.27	10.36	3.05	3.13	1.61	1.11	1.11	1.06	22.42	36.19	39.52
2013	0.71	1.19	2.08	4.61	4.89	7.73	4.64	1.55	1.26	4.37	0.59	1.65	20.07	35.27	32.61
2012	0.52	2.10	1.39	2.93	9.29	4.07	4.30	1.46	0.51	1.36	0.93	1.66	19.63	30.52	28.64
2011	0.96	0.96	2.28	3.19	5.99	4.11	6.93	4.14	0.44	0.94	0.21	0.92	21.61	31.07	36.34
2010	0.62	0.88	0.96	2.07	2.73	6.24	4.10	6.00	5.97	2.00	2.01	3.33	25.04	36.91	38.37
2009	0.50	1.06	1.93	1.43	0.38	3.61	1.05	6.53	0.76	5.97	0.59	2.24	12.33	26.05	21.60
2008	0.14	0.52	2.11	4.23	2.57	4.19	2.10	2.74	2.10	1.58	1.23	1.54	13.70	25.05	27.85
2007	0.58	1.45	3.66	2.37	3.01	2.12	2.56	6.59	4.97	5.21	0.09	1.85	19.25	34.46	31.62
2006	0.74	0.39	1.84	3.36	3.69	4.10	2.44	5.93	3.14	0.66	1.08	2.57	19.30	29.94	33.28
2005	1.28	1.06	1.30	2.63	3.55	6.10	2.85	3.74	6.67	4.47	1.77	1.41	22.91	36.83	34.57
2004	0.55	1.57	2.23	2.82	5.78	4.63	3.82	1.48	4.63	3.80	1.09	0.50	20.34	32.90	30.63
2003	0.30	0.99	1.70	2.94	5.43	8.04	1.69	0.29	2.19	0.96	1.17	0.99	17.64	26.69	27.83
2002	0.59	0.58	2.01	4.13	4.20	8.48	6.40	6.45	4.06	3.91	0.08	0.27	29.59	41.16	41.68
2001	1.39	1.45	1.05	7.26	5.59	4.87	2.36	3.14	4.02	0.92	3.21	0.65	19.98	35.91	37.72
2000	0.96	1.23	1.07	1.50	3.90	3.47	6.31	3.48	2.78	0.96	4.20	1.43	19.94	31.29	26.42
1999	1.39	0.36	1.78	3.44	6.11	5.33	4.59	3.63	2.73	0.55	0.83	0.34	22.39	31.08	34.57
1998	1.37	0.84	3.94	2.21	4.13	4.55	2.93	5.26	1.13	2.82	1.74	0.65	18.00	31.57	29.25

* A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.

Figures



Project Area

N

0 50 100 200

Feet

1 inch = 200 Feet

PROJECT LOCATION
DeCola Ponds B & C
Improvement Project
BCWMC
Golden Valley, MN

FIGURE 1

Barr Footer: ArcGIS 10.4.1, 2017-10-12 13:03 File: I:\Client\GoldenValley\23271422_LibertyCrossingFloodMitigation\Maps\Reports\Wetland_Delineation\Figure1_ProjectLocation.mxd User: EMA

Project Area

Surface Elevation

10-Ft Index Contour

2-Ft Intermediate Contour

N

0 50 100 200

Feet

1 inch = 150 Feet

TOPOGRAPHY
DeCola Ponds B & C
Improvement Project
BCWMC
Golden Valley, MN

FIGURE 2

Imagery: MnGeo 2016

BARR

Barr Footer: ArcGIS 10.4.1, 2017-10-12 13:08 File: I:\Client\GoldenValley\23271422_LibertyCrossingFloodMitigation\Maps\Reports\Wetland_Delineation\Figure2_Topography.mxd User: EMA

NATIONAL WETLANDS INVENTORY MAP
DeCola Ponds B & C Improvement Project
BCWMC
Golden Valley, MN

FIGURE 3

BARR

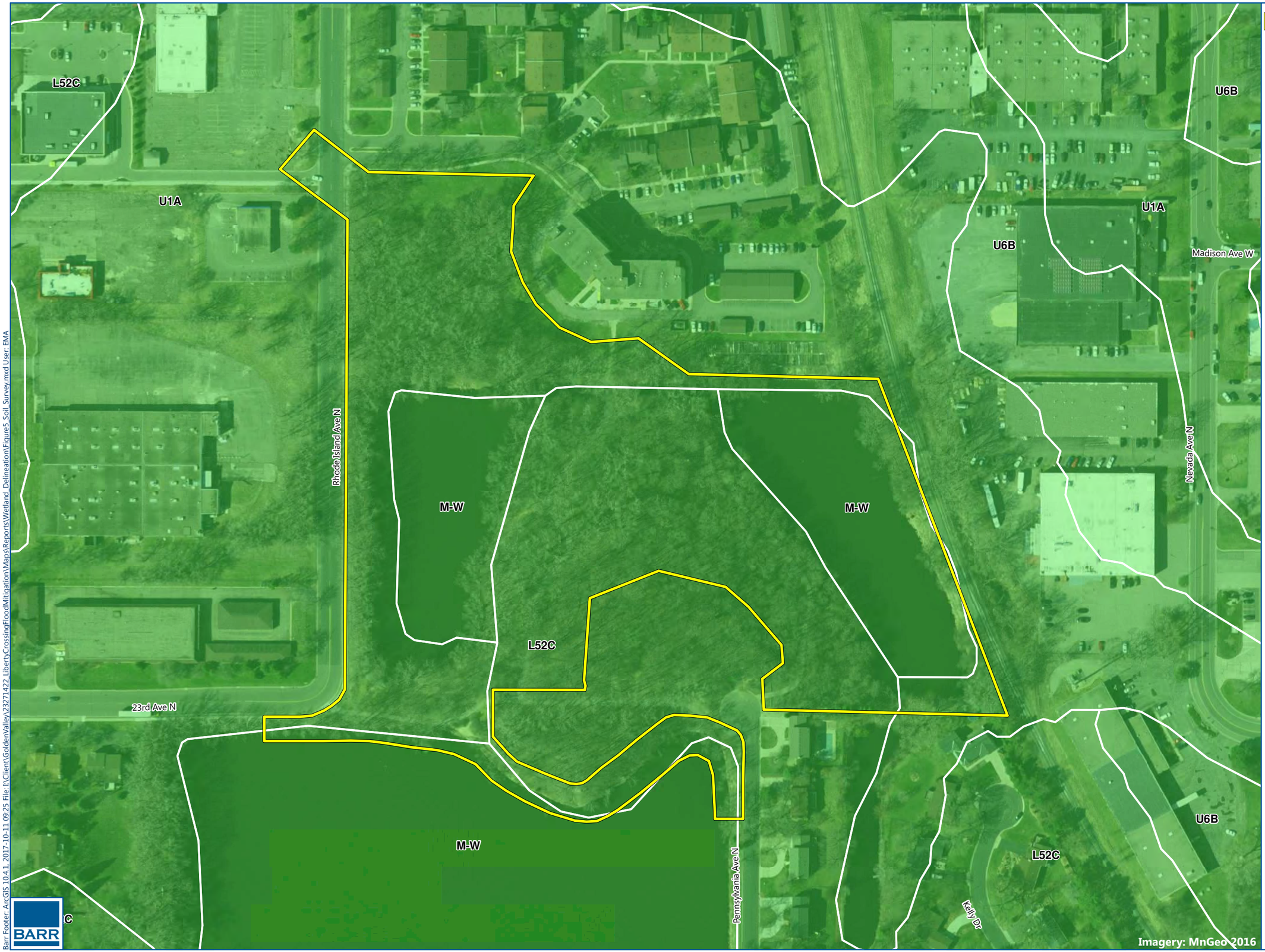
Barr Footer: ArcGIS 10.4.1, 2017-10-12 13:16 File: I:\Client\GoldenValley\23271422_LibertyCrossingFloodMitigation\Maps\Reports\Wetland_Delineation\Figure3_NWI.mxd User: EMA

PUBLIC WATERS INVENTORY MAP
DeCola Ponds B & C Improvement Project
BCWMC
Golden Valley, MN

FIGURE 4

BARR

Barr Footer: ArcGIS 10.4.1, 2017-10-12 13:12 File: I:\Client\GoldenValley\23271422_LibertyCrossingFloodMitigation\Maps\Reports\Wetland_Delineation\Figure4_PWI.mxd User: EMA



Project Area

Soils Hydric Rating*

- Hydric (100%)
- Predominantly Hydric (66 to 99%)
- Partially Hydric (33 to 65%)
- Predominantly Nonhydric (1 to 32%)
- Nonhydric (0%)

Map Unit Symbol	Map Unit Name
L52C	Urban land-Lester complex, 2 to 18% slopes
M-W	Water, miscellaneous
U1A	Urban land-Udorthents, wet substratum, complex, 0 to 2% slopes
U6B	Urban land-Udorthents (cut and fill land) complex, 0 to 6% slopes

***Soil Data: USDA-NRCS Soil Survey Geographic (SSURGO)**

0 50 100 200

Feet

1 inch = 150 Feet

SOIL SURVEY
DeCola Ponds B & C
Improvement Project
BCWMC
Golden Valley, MN

FIGURE 5

BARR

Barr Footer: ArcGIS 10.4.1, 2017-10-11 09:25 File: I:\Client\GoldenValley\23271422_LibertyCrossingFloodMitigation\Maps\Reports\Wetland_Delineation\Figure5_Soil_Survey.mxd User: EMA


Wetland 2
SP 2-1 WET
SP 2-1 UPL
SP 1-1 UPL
SP 1-1 WET
SP 4-1 UPL
SP 4-1 WET
Wetland 1
(DeCola Pond B)
Wetland 4
(DeCola Pond C)
Wetland 3
(DeCola Pond A)
SP 3-1 UPL
SP 3-1 WET
Rhode Island Ave N
Pennsylvania Ave N
Nevada Ave N
Madison Ave W
23rd Ave N
Kelly Dr
Project Area
Wetland Boundary
Soil Sample Points
N
0 30 60 120
Feet
1 inch = 120 Feet
WETLAND DELINEATION
DeCola Ponds B & C
Improvement Project
BCWMC
Golden Valley, MN
FIGURE 6
Imagery: MnGeo 2016
BARR
Barr Footer: ArcGIS 10.4.1, 2017-10-12 11:33 File: I:\Client\GoldenValley\23271422_LibertyCrossingFloodMitigation\Maps\Reports\Wetland_Delineation\Figure6_Wetland_Delineation.mxd User: EMA

Appendix A

Wetland Data Forms

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: DeCola Ponds B & C Improvement Project | Applicant/Owner: BCWMC | City/County: Golden Valley/Hennepin | State: MN | Sampling Date: 10/16/15

Investigator(s): BKB | Section: 29 | Township: 118N | Range: 21W | Sampling Point: 1-1 UPL

Land Form: Hillslope | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: Urbanland-Udorthents wet sub, 0-2% slope

Subregion (LRR): M | Latitude: 4983595 | Longitude: 470272 | Datum: NAD83, UTM Zone 15 meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: PFO1A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Upland
Eggers & Reed (secondary): N/A
Eggers & Reed (tertiary): N/A
Eggers & Reed (quaternary): N/A

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed):

If yes, optional Wetland Site ID: Upland

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus deltoides	25	Yes	FAC
2.	Acer negundo	25	Yes	FAC
3.		0		
4.		0		
	Total Cover:	50		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Rhamnus cathartica	25	Yes	FAC
2.	Sambucus racemosa	2	No	FACU
3.		0		
4.		0		
5.		0		
	Total Cover:	27		
	Herb Stratum (Plot Size: 5 ft)			
1.	Solanum dulcamara	10	Yes	FAC
2.	Urtica dioica	5	Yes	FACW
3.	Phalaris arundinacea	5	Yes	FACW
4.	Fraxinus pennsylvanica	5	Yes	FACW
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	25		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 75 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	10	25
Sapling/Shrub Stratum	5.4	13.5
Herb Stratum	5	12.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	15	X 2	30	
FAC Species	85	X 3	255	
FACU Species	2	X 4	8	
UPL Species	0	X 5	0	
Column Totals:	102	(A)	293	(B)

Prevalence Index = B/A = 2.87

Hydrophytic Vegetation Indicators:

No — Rapid Test for Hydrophytic Vegetation
Yes — Dominance Test is >50%
Yes — Prevalence Index ≤ 3.0 [1]
No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

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WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: 1-1 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 10	2.5Y 3/1						Loam	
2.	10 - 16	2.5Y 3/2	99	10YR 3/3	1	C	M	Silty Loam	
3.	16 - 22	10YR 3/2						Silty Loam	Peat inclu: 5% of matrix
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____ Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

- Surface water present? ☐ Surface Water Depth (inches): _____
- Water table present? ☐ Water Table Depth (inches): _____
- Saturation present? (includes capillary fringe) ☐ Saturation Depth (inches): _____

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: DeCola Ponds B & C Improvement Project | Applicant/Owner: BCWMC | City/County: Golden Valley/Hennepin | State: MN | Sampling Date: 10/16/15

Investigator(s): BKB | Section: 29 | Township: 118N | Range: 21W | Sampling Point: 1-1 WET

Land Form: Toeslope | Local Relief: Concave | Slope %: 0-1 | Soil Map Unit Name: Urbanland-Udorthents wet sub, 0-2% slope

Subregion (LRR): M | Latitude: 4983595 | Longitude: 470272 | Datum: NAD83, UTM Zone 15 meters

Cowardin Classification: PUBG/PEMB | Circular 39 Classification: Type 5/2 | Mapped NWI Classification: PFO1A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Shallow, Open Water

Eggers & Reed (secondary): Fresh (Wet) Meadow

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed):

If yes, optional Wetland Site ID: Wetland 1

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus deltoides	15	Yes	FAC
2.	Acer negundo	15	Yes	FAC
3.		0		
4.		0		
	Total Cover:	30		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		
	Herb Stratum (Plot Size: 5 ft)			
1.	Phalaris arundinacea	99	Yes	FACW
2.	Solanum dulcamara	1	No	FAC
3.	Urtica dioica	1	No	FACW
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	101		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum:

% Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	6	15
Sapling/Shrub Stratum	0	0
Herb Stratum	20.2	50.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	100	X 2	200	
FAC Species	31	X 3	93	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	131	(A)	293	(B)

Prevalence Index = B/A = 2.24

Hydrophytic Vegetation Indicators:

No — Rapid Test for Hydrophytic Vegetation

Yes — Dominance Test is >50%

Yes — Prevalence Index ≤ 3.0 [1]

No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)

No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: 1-1 WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 5	10YR 3/1						Loam	
2.	5 - 10	10YR 3/1		10YR 5/2	5	D	M	Clay Loam	
3.	-			10YR 6/4	2	C	M		
4.	10 - 15	2.5YR 2.5/1		10YR 3/3	2	C	M	Clay	
5.	15 - 20	10YR 2/1		10YR 4/6	2	C	M	Clay	
6.	20 - 25							Peat	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____ Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

- Surface water present? ☐ Surface Water Depth (inches): _____
- Water table present? ☐ Water Table Depth (inches): _____
- Saturation present? (includes capillary fringe) ☐ Saturation Depth (inches): _____

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: DeCola Ponds B & C Improvement Project | Applicant/Owner: BCWMC | City/County: Golden Valley/Hennepin | State: MN | Sampling Date: 10/16/15

Investigator(s): BKB | Section: 29 | Township: 118N | Range: 21W | Sampling Point: 2-1 UPL

Land Form: Terrace | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: Urbanland-Udorthents wet sub, 0-2% slope

Subregion (LRR): M | Latitude: 4983612 | Longitude: 470266 | Datum: NAD83, UTM Zone 15 meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: PFO1A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No

Hydric soil present? No

Indicators of wetland hydrology present? No

Is the sampled area within a wetland? No

General Remarks (explain any answers if needed):

If yes, optional Wetland Site ID: Upland

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Acer saccharum	30	Yes	FACU
2.	Populus deltoides	30	Yes	FAC
3.		0		
4.		0		
	Total Cover:	60		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Sambucus racemosa	5	Yes	FACU
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	5		
	Herb Stratum (Plot Size: 5 ft)			
1.	Parthenocissus quinquefolia	5	Yes	FACU
2.	Rhamnus cathartica	5	Yes	FAC
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	10		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 90

% Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	12	30
Sapling/Shrub Stratum	1	2.5
Herb Stratum	2	5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 40.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	0	X 2	0	
FAC Species	35	X 3	105	
FACU Species	40	X 4	160	
UPL Species	0	X 5	0	
Column Totals:	75	(A)	265	(B)
Prevalence Index = B/A =			3.53	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

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WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: 2-1 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 8	10YR 3/1						Silty Loam	
2.	8 - 15	10YR 3/1	99	10YR 3/3	1	C	M	Silty Loam	
3.	15 - 26	10YR 2/1		10YR 6/3	2	C	M	Sandy Clay	
4.	-			10YR 3/3	2	C	M		
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____ Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

- Surface water present? ☐ Surface Water Depth (inches): _____
- Water table present? ☐ Water Table Depth (inches): _____
- Saturation present? (includes capillary fringe) ☐ Saturation Depth (inches): _____

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: DeCola Ponds B & C Improvement Project | Applicant/Owner: BCWMC | City/County: Golden Valley/Hennepin | State: MN | Sampling Date: 10/16/15

Investigator(s): BKB | Section: 29 | Township: 118N | Range: 21W | Sampling Point: 2-1 WET

Land Form: Flat | Local Relief: None | Slope %: 0 | Soil Map Unit Name: Urbanland-Udorthents wet sub, 0-2% slope

Subregion (LRR): M | Latitude: 4983619 | Longitude: 470267 | Datum: NAD83, UTM Zone 15 meters

Cowardin Classification: PEMA | Circular 39 Classification: Type 1 | Mapped NWI Classification: PFO1A

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Seasonally Flooded Basin

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Eggers & Reed (secondary): N/A

Eggers & Reed (tertiary): N/A

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (quaternary): N/A

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? No

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed):

If yes, optional Wetland Site ID: Wetland 2

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus deltoides	30	Yes	FAC
2.	Acer saccharum	15	Yes	FACU
3.		0		
4.		0		
	Total Cover:	45		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.		5		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	5		
	Herb Stratum (Plot Size: 5 ft)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	0		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 100

% Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	9	22.5
Sapling/Shrub Stratum	1	2.5
Herb Stratum	0	0
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 33.33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	0	X 2	0	
FAC Species	30	X 3	90	
FACU Species	15	X 4	60	
UPL Species	0	X 5	0	
Column Totals:	45	(A)	150	(B)
Prevalence Index = B/A =			3.33	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- Yes — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

Area is a non-vegetated seasonally ponded depression. Ponding during the growing season does not allow vegetation to grow. If seasonal ponding did not occur then it is likely that hydrophytic vegetation would be present and dominant in this area.

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: 2-1 WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 10	10YR 2/2	80	2.5Y 3/2	10	C	M	Silty Clay	
2.	-			10YR 4/6	10	C	M		
3.	10 - 18	10YR 2/1	90	10YR 3/3	10	C	M	Sandy Clay Loam	
4.	18 - 24	N 2.5/0		10YR 6/1	5	D	M	Sandy Clay Loam	
5.	-			10YR 3/3	5	C	M		
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____ Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

- Surface water present? ☐ Surface Water Depth (inches): _____
- Water table present? ☐ Water Table Depth (inches): _____
- Saturation present? (includes capillary fringe) ☐ Saturation Depth (inches): _____

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: DeCola Ponds B & C Improvement Project | Applicant/Owner: BCWMC | City/County: Golden Valley/Hennepin | State: MN | Sampling Date: 09/22/17

Investigator(s): BKB | Section: 29 | Township: 118N | Range: 21W | Sampling Point: 3-1UPL

Land Form: Hillslope | Local Relief: Concave | Slope %: 35 | Soil Map Unit Name: Urbanland-Lester complex 2 to 18% slopes

Subregion (LRR): M | Latitude: 4983414 | Longitude: 470400 | Datum: NAD83, UTM Zone 15 meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary): N/A

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary): N/A

Eggers & Reed (quaternary): N/A

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): In 2017, antecedent moisture conditions were within the wet range based on precipitation for the three months prior to the September 22, 2017 site visit.

If yes, optional Wetland Site ID: Upland

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Fraxinus pennsylvanica	40	Yes	FACW
2.	Salix amygdaloides	40	Yes	FACW
3.	Acer saccharinum	10	No	FACW
4.		0		
	Total Cover:	90		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Rhamnus cathartica	40	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	40		
	Herb Stratum (Plot Size: 5 ft)			
1.	Rhamnus cathartica	15	Yes	FAC
2.	Ribes spp.	2	No	
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	17		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 83 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	18	45
Sapling/Shrub Stratum	8	20
Herb Stratum	3.4	8.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW or FAC: **100.00%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	90	X 2	180	
FAC Species	55	X 3	165	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	**145**	(A)	**345**	(B)

Prevalence Index = B/A = **2.38**

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ***≤ 3.0 [1]***
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

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WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: 3-1UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 14	10YR 4/3	100					sandy loam	
2.	14 - 18	10YR 4/3	55	10YR 3/4	5	C	M	sandy loam	
3.	-	10YR 4/4	40						
4.	18 - 25	10YR 4/3	98	10YR 3/4	2	C	M	loamy sand	
5.	-	10YR 4/2							
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____ Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

- Surface water present? ☐ Surface Water Depth (inches): _____
- Water table present? ☐ Water Table Depth (inches): _____
- Saturation present? (includes capillary fringe) ☐ Saturation Depth (inches): _____

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: DeCola Ponds B & C Improvement Project | Applicant/Owner: BCWMC | City/County: Golden Valley/Hennepin | State: MN | Sampling Date: 09/22/17

Investigator(s): BKB | Section: 29 | Township: 118N | Range: 21W | Sampling Point: 3-1 WET

Land Form: Toeslope | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: Urbanland-Lester complex 2 to 18% slopes

Subregion (LRR): M | Latitude: 4983409 | Longitude: 470399 | Datum: NAD83, UTM Zone 15 meters

Cowardin Classification: PUBG | Circular 39 Classification: Type 5 | Mapped NWI Classification: PUBG

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Shallow, Open Water
Eggers & Reed (secondary): N/A
Eggers & Reed (tertiary): N/A
Eggers & Reed (quaternary): N/A

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): In 2017, antecedent moisture conditions were within the wet range based on precipitation for the three months prior to the September 22, 2017 site visit.

If yes, optional Wetland Site ID: Wetland 3

VEGETATION

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	40	Yes	FACW
2. Salix amygdaloides	40	Yes	FACW
3. Acer saccharinum	20	Yes	FACW
4.	0		
Total Cover:	100		

Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	0		
2.	0		
3.	0		
4.	0		
5.	0		
Total Cover:	0		

Herb Stratum (Plot Size: 5 ft)			
1.	0		
2.	0		
3.	0		
4.	0		
5.	0		
6.	0		
7.	0		
8.	0		
Total Cover:	0		

Woody Vine Stratum (Plot Size: 30 ft)			
1.	0		
2.	0		
Total Cover:	0		

% Bare Ground in Herb Stratum: 100 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

No herb layer present. Bare soil.

50/20 Thresholds:	20%	50%
Tree Stratum	20	50
Sapling/Shrub Stratum	0	0
Herb Stratum	0	0
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	100	X 2	200	
FAC Species	0	X 3	0	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	100	(A)	200	(B)
Prevalence Index = B/A =			2.00	

Hydrophytic Vegetation Indicators:

No — Rapid Test for Hydrophytic Vegetation
Yes — Dominance Test is >50%
Yes — Prevalence Index ≤ 3.0 [1]
No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: 3-1 WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 8	N 2.5/0	100					silt loam	hemic
2.	8 - 16	N 3/0	100					sandy clay loam	
3.	16 - 27	N 5/0	100					silty clay loam	
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☑ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** **Depth (inches):** Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

- Surface water present? ☐ Surface Water Depth (inches):
- Water table present? ☑ Water Table Depth (inches): 7
- Saturation present? (includes capillary fringe) ☑ Saturation Depth (inches): 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: DeCola Ponds B & C Improvement Project | Applicant/Owner: BCWMC | City/County: Golden Valley/Hennepin | State: MN | Sampling Date: 09/22/17

Investigator(s): BKB | Section: 29 | Township: 118N | Range: 21W | Sampling Point: 4-1 UPL

Land Form: Hillslope | Local Relief: Convex | Slope %: 3 | Soil Map Unit Name: Urbanland-Lester complex 2 to 18% slopes

Subregion (LRR): M | Latitude: 4983566 | Longitude: 470403 | Datum: NAD83, UTM Zone 15 meters

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: PFO1A

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary): N/A

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary): N/A

Eggers & Reed (quaternary): N/A

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): In 2017, antecedent moisture conditions were within the wet range based on precipitation for the three months prior to the September 22, 2017 site visit.

If yes, optional Wetland Site ID: Upland

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Acer negundo	15	Yes	FAC
2.	Rhamnus cathartica	15	Yes	FAC
3.		0		
4.		0		
	Total Cover:	30		

	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

	Herb Stratum (Plot Size: 5 ft)			
1.	Parthenocissus quinquefolia	40	Yes	FACU
2.	Arctium minus	20	Yes	FACU
3.	Rhamnus cathartica	20	Yes	FAC
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	80		

	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	6	15
Sapling/Shrub Stratum	0	0
Herb Stratum	16	40
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That Are OBL, FACW or FAC: **60.00%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	0	X 2	0	
FAC Species	50	X 3	150	
FACU Species	60	X 4	240	
UPL Species	0	X 5	0	
Column Totals:	**110**	(A)	**390**	(B)

Prevalence Index = B/A = **3.55**

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- No — Prevalence Index ***≤ 3.0 [1]***
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: 4-1 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 3	10YR 2/1	100					loam	
2.	3 - 20	10YR 3/2	100					sandy loam	
3.	20 - 25	10YR 3/1	15	10YR 6/1	10	D	M	sandy clay loam	
4.	-			10YR 3/4	5	C	M		
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____ Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ Surface Water Depth (inches): _____

Water table present? ☐ Water Table Depth (inches): _____

Saturation present? (includes capillary fringe) ☐ Saturation Depth (inches): _____

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: DeCola Ponds B & C Improvement Project | Applicant/Owner: BCWMC | City/County: Golden Valley/Hennepin | State: MN | Sampling Date: 09/22/17

Investigator(s): BKB | Section: 29 | Township: 118N | Range: 21W | Sampling Point: 4-1 WET

Land Form: Toeslope | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: Urbanland-Lester complex 2 to 18% slopes

Subregion (LRR): M | Latitude: 4983565 | Longitude: 470401 | Datum: NAD83, UTM Zone 15 meters

Cowardin Classification: PUBG/PEMB | Circular 39 Classification: Type 5/2 | Mapped NWI Classification: PFO1A

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Shallow, Open Water
Eggers & Reed (secondary): Fresh (Wet) Meadow
Eggers & Reed (tertiary): N/A
Eggers & Reed (quaternary): N/A

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Indicators of wetland hydrology present? Yes
Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): In 2017, antecedent moisture conditions were within the wet range based on precipitation for the three months prior to the September 22, 2017 site visit.

If yes, optional Wetland Site ID: Wetland 4

VEGETATION

Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	20	Yes	FAC
2. Morus alba	5	Yes	FAC
3.	0		
4.	0		
Total Cover:	25		
Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	0		
2.	0		
3.	0		
4.	0		
5.	0		
Total Cover:	0		
Herb Stratum (Plot Size: 5 ft)			
1. Pilea pumila	25	Yes	FACW
2. Rhamnus cathartica	5	No	FAC
3.	0		
4.	0		
5.	0		
6.	0		
7.	0		
8.	0		
Total Cover:	30		
Woody Vine Stratum (Plot Size: 30 ft)			
1.	0		
2.	0		
Total Cover:	0		

% Bare Ground in Herb Stratum: 70 | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	5	12.5
Sapling/Shrub Stratum	0	0
Herb Stratum	6	15
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	25	X 2	50	
FAC Species	30	X 3	90	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	55	(A)	140	(B)

Prevalence Index = B/A = 2.55

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: 4-1 WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 4	10YR 2/1	100					loam	
2.	4 - 10	10YR 5/1	90	10YR 5/6	10	C	M	clay	
3.	10 - 15	N 2.5/0	100					silty clay loam	
4.	15 - 28	N 2.5/0	100					silt loam	sapric
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** **Depth (inches):** Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

- Surface water present? ☐ Surface Water Depth (inches):
- Water table present? ☐ Water Table Depth (inches):
- Saturation present? (includes capillary fringe) ☑ Saturation Depth (inches): 18

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

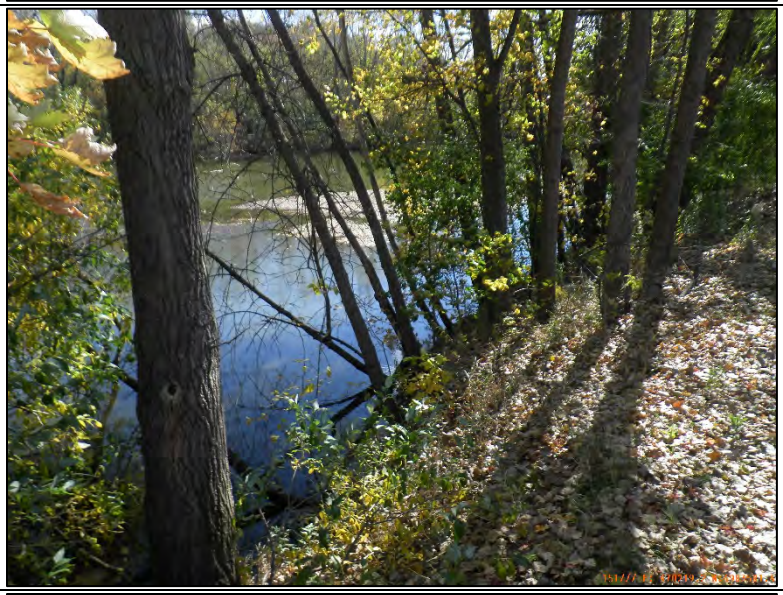
Hydrology Remarks:

10/12/2017 3:56:12 PM

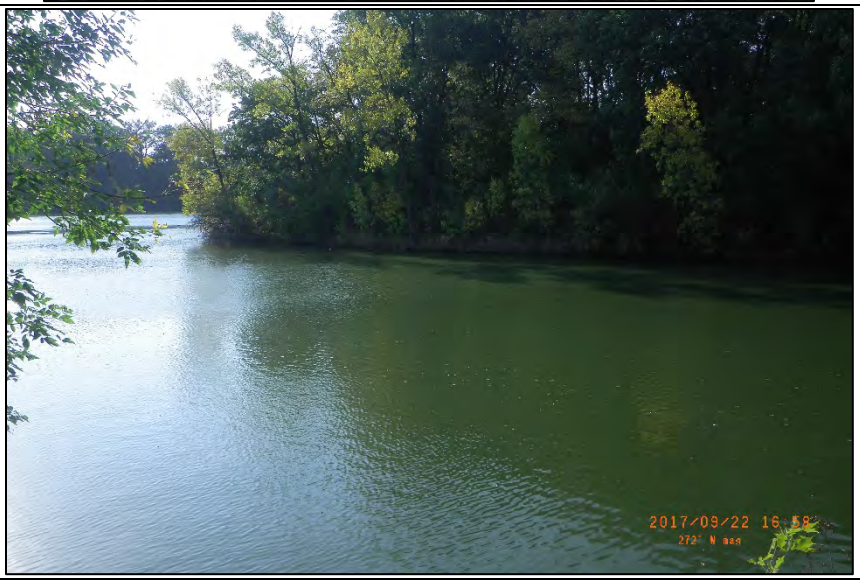
Appendix B

Site Photographs

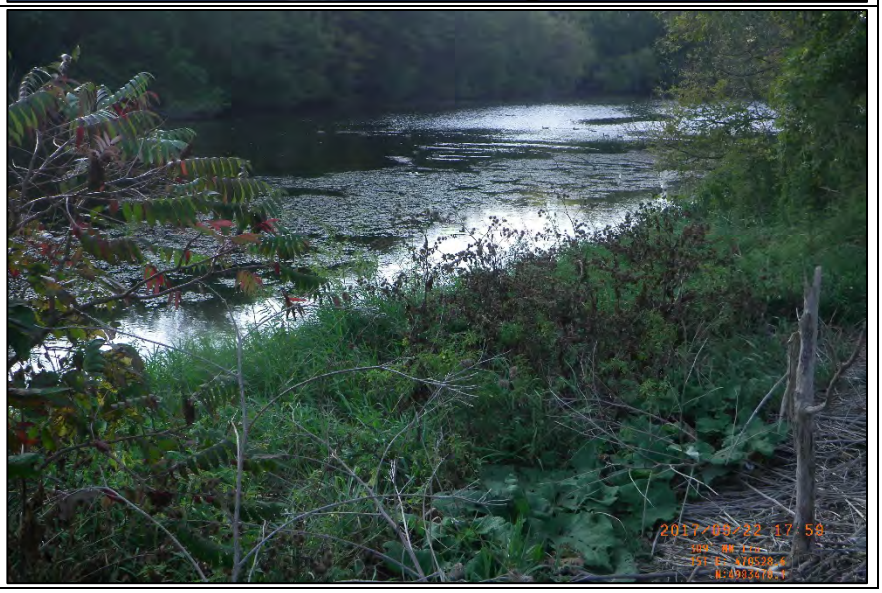
Appendix B – DeCola Ponds B & C Improvement Project
Wetland Delineation Site Photos

Photo 1 – October 16, 2015 Wetland 1 Typical view of Wetland 1 (DeCola Pond B) Facing south on the north side of Wetland 1.	
Photo 2 – October 16, 2015 Wetland 1 Typical view of the steep and abrupt wetland boundary on the west side of Wetland 1 (DeCola Pond B).	
Photo 3 – October 16, 2015 Wetland 1 Type 2, wet meadow fringe at the north end of Wetland 1 (DeCola Pond B) near Sample Transect 1.	

Appendix B – DeCola Ponds B & C Improvement Project
Wetland Delineation Site Photos

Photo 4 – October 16, 2015 Wetland 2 Facing east from the western edge of Wetland 2. This photo shows that Wetland 2 has a lack of herbaceous vegetation due to seasonal flooding. Wetlands 1 and 2 are separated by an upland berm shown on the right side of Photo 4.	
Photo 5 – October 16, 2015 Wetland 2 Facing west looking up the narrow swale section of Wetland 2.	
Photo 6 – September 22, 2017 Wetland 3 General view of Wetland 3 (DeCola Pond A) facing NW.	

Appendix B – DeCola Ponds B & C Improvement Project
Wetland Delineation Site Photos

Photo 7 – September 22, 2017 Wetland 3 Wetland 3 (DeCola Pond A) facing north along the western edge of the delineated boundary. This photo shows an abrupt transition to shallow open water wetland from upland area. This abrupt is transition zone is typical along the delineated portion of Wetland 3.	
Photo 8 – September 22, 2017 Wetland 4 Typical view of Wetland 4 (DeCola Pond C) facing NNW.	
Photo 9 – September 22, 2017 Wetland 4 Wetland 4 (DeCola Pond C) facing NW on the east side of the wetland. This photo shows a narrow Type 2, wet meadow fringing shallow open water wetland. Dominant vegetation in this area is reed canary grass.	

Appendix B – DeCola Ponds B & C Improvement Project
Wetland Delineation Site Photos

Photo 9 – September 22, 2017 Wetland 4 Wetland 4 (DeCola Pond C) facing north on the NW side of the basin at Sample Transect 4-1.	

Appendix C

2015 Liberty Crossing Wetland Delineation NOD

Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit (LGU)	Address
Jeff Oliver (City of Golden Valley)	**7800 Golden Valley Rd** **Golden Valley, MN 55427-4508**

1. PROJECT INFORMATION

Applicant Name	Project Name	Date of Application	Application Number
City of Golden Valley	**Liberty Crossing Flood Mitigation Project**	**6/3/2016**	

☒ Attach site locator map.

Type of Decision:

☒ Wetland Boundary or Type ☐ No-Loss ☐ Exemption ☐ Sequencing
☐ Replacement Plan ☐ Banking Plan

Technical Evaluation Panel Findings and Recommendation (if any):

☒ Approve ☐ Approve with conditions ☐ Deny

Summary (or attach):

2. LOCAL GOVERNMENT UNIT DECISION

Date of Decision: **6/8/2016**

☒ Approved ☐ Approved with conditions (include below) ☐ Denied

LGU Findings and Conclusions (attach additional sheets as necessary):

The wetland delineation performed by Barr Engineering on October 16, 2015 was reviewed on June 8, 2016 by the the City of Golden Valley LGU representative. Two wetlands were delineated - Wetland 1(Decola Pond B) was delineated as a shallow open water wetland and Wetland 2 was delineated as a seasonally flooded basin. Both wetlands were identified accurately on site and in the report.

For Replacement Plans using credits from the State Wetland Bank:

Bank Account #	Bank Service Area	County	Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)

Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

☐ **Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).

☐ **Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR "Declaration of Restrictions and Covenants" and "Consent to Replacement Wetland" forms have been filed with the county recorder's office in which the replacement wetland is located.

☐ **Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

Wetlands may not be impacted until all applicable conditions have been met!

LGU Authorized Signature:

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 5 provides notice that a decision was made by the LGU under the Wetland Conservation Act as specified above. If additional details on the decision exist, they have been provided to the landowner and are available from the LGU upon request.

Name	Title	
Jeff Oliver	**City Engineer/City of Golden Valley**	
Signature	Date	Phone Number and E-mail
	6/13/16	**763-593-8034** **joliver@goldenvalley.gov**

THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

This decision is valid for three years from the date of decision unless a longer period is advised by the TEP and specified in this notice of decision.

3. APPEAL OF THIS DECISION

Pursuant to MN Rule 8420.0905, any appeal of this decision can only be commenced by mailing a petition for appeal, including applicable fee, within thirty (30) calendar days of the date of the mailing of this Notice to the following as indicated:

Check one:

☐ Appeal of an LGU staff decision. Send petition and $_____ fee (if applicable) to:	☐ Appeal of LGU governing body decision. Send petition and $500 filing fee to: Executive Director Minnesota Board of Water and Soil Resources 520 Lafayette Road North St. Paul, MN 55155

4. LIST OF ADDRESSEES

- ☐ SWCD TEP member:
- ☐ BWSR TEP member:
- ☐ LGU TEP member (if different than LGU Contact):
- ☒ DNR TEP member: **Kate Drewry**
- ☐ DNR Regional Office (if different than DNR TEP member)
- ☐ WD or WMO (if applicable):
- ☐ Applicant and Landowner (if different)
- ☐ Members of the public who requested notice:

- ☒ Corps of Engineers Project Manager
- ☐ BWSR Wetland Bank Coordinator (wetland bank plan decisions only)

5. MAILING INFORMATION

➢For a list of BWSR TEP representatives: www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf

➢For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf

➢Department of Natural Resources Regional Offices:

NW Region:	NE Region:	Central Region:	Southern Region:
Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1201 E. Hwy. 2 Grand Rapids, MN 55744	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1200 Warner Road St. Paul, MN 55106	Reg. Env. Assess. Ecol. Div. Ecol. Resources 261 Hwy. 15 South New Ulm, MN 56073

For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf

➢For a list of Corps of Project Managers: www.mvp.usace.army.mil/regulatory/default.asp?pageid=687 or send to:

US Army Corps of Engineers
St. Paul District, ATTN: OP-R
180 Fifth St. East, Suite 700
St. Paul, MN 55101-1678

➢For Wetland Bank Plan applications, also send a copy of the application to:

Minnesota Board of Water and Soil Resources
Wetland Bank Coordinator
520 Lafayette Road North
St. Paul, MN 55155

6. ATTACHMENTS

In addition to the site locator map, list any other attachments:

- ☐
- ☐
- ☐
- ☐
- ☐

Figure 1

SITE LOCATION MAP

Liberty Crossing - Wetland Delineation
City of Golden Valley

Appendix D

Feasibility Level Cost Estimates

PREPARED BY: BARR ENGINEERING COMPANY		SHEET:	1	OF	3
		BY:	KJN2	DATE:	4/5/2018
FEASIBILITY STUDY		CHECKED BY:	JAK2	DATE:	4/10/2018
ENGINEER'S OPINION OF PROBABLE PROJECT COST		APPROVED BY:		DATE:	
PROJECT:	BCWMC DeCola Ponds B & C Feasibility Study	ISSUED:		DATE:	
LOCATION:	City of Golden Valley	ISSUED:		DATE:	
PROJECT #:	23/27-0051.39	ISSUED:		DATE:	
OPINION OF COST - SUMMARY		ISSUED:		DATE:	

Engineer's Opinion of Probable Project Cost
Decola Ponds B & C and Pennsylvania Woods Flood Mitigation Project
Concept 1: Maximize Flood Storage

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization (10%)	LS	1	$303,136.83	$303,136.83	1,2,3,4,5,6
B	Traffic Control	LS	1	$10,000.00	$10,000.00	1,2,3,4,5,6
C	Erosion Control	LS	1	$30,000.00	$30,000.00	1,2,3,4,5,6
D	Inlet Protection	Each	9	$250.00	$2,250.00	1,2,3,4,5,6
E	Trail Removal (Bituminous Pavement Removal)	SY	1,584	$4.00	$6,337.78	1,2,3,4,5,6
F	Sawcut Bituminous Pavement (Full Depth)	LF	40	$3.00	$120.00	1,2,3,4,5,6
G	Tree/Stump Removal (> 4" diameter)	Each	1,156	$300.00	$346,800.00	1,2,3,4,5,6
H	Sod Removal	SY	2,323	$5.00	$11,616.00	1,2,3,4,5,6
I	Excavation & Disposal (clean)	CY	60,619	$15.00	$909,291.90	1,2,3,4,5,6
J	Excavation & Disposal (contaminated)	TON	16,940	$30.00	$508,200.00	1,2,3,4,5,6
K	Grading	SY	37,268	$4.00	$149,072.00	1,2,3,4,5,6
L	Floating/Boardwalk Trail Installation	LF	385	$600.00	$231,000.00	1,2,3,4,5,6
M	Bituminous Trail Installation	SY	1,716	$30.00	$51,466.67	1,2,3,4,5,6
N	Tree Planting	Each	60	$300.00	$17,850.00	1,2,3,4,5,6
O	Wetland Restoration	AC	2.3	$10,000.00	$23,100.00	1,2,3,4,5,6
P	Upland Native Restoration	AC	1.7	$3,000.00	$5,100.00	1,2,3,4,5,6
Q	Turf Re-Establishment (Restoration)	AC	0.5	$2,000.00	$960.00	1,2,3,4,5,6
R	Topsoil	CY	1,811	$30.00	$54,329.00	1,2,3,4,5,6
S	Erosion Control Blanket	SY	21,732	$4.00	$86,926.40	1,2,3,4,5,6
T	Hydromulch	SY	21,732	$2.00	$43,463.20	1,2,3,4,5,6
U	Dewatering	LS	1	$50,000.00	$50,000.00	1,2,3,4,5,6
V	Flotation Silt Curtain (DeCola Ponds B & C)	LF	2,260	$15.00	$33,900.00	1,2,3,4,5,6
W	Sediment Dredging & Disposal (contaminated) (DeCola Pond B)	CY	3,480	$55.00	$191,400.00	1,2,3,4,5,6
X	Raise Overflow Berm (DeCola Pond C)	CY	322	$15.00	$4,833.33	1,2,3,4,5,6
Y	5-foot weir manhole (DeCola Pond C)	Each	1	$10,000.00	$10,000.00	1,2,3,4,5,6
Z	24" RCP Stormsewer Pipe (Furnish and Install)	LF	30	$59.00	$1,770.00	1,2,3,4,5,6,7
AA	12" RCP Stormsewer Pipe (Furnish and Install)	LF	30	$36.00	$1,080.00	1,2,3,4,5,6,7
BB	14' x 4' Box Culvert (Furnish and Install)	LF	160	$1,200.00	$192,000.00	1,2,3,4,5,6,7
CC	14' x 4' Box Culvert Elbow	Each	1	$10,000.00	$10,000.00	1,2,3,4,5,6
DD	14' x 4' Box Culvert Flared End Section	Each	2	$10,000.00	$20,000.00	1,2,3,4,5,6
EE	Weir Installation in 14' x 4' Box Culvert Flared End Sectior	Each	1	$10,000.00	$10,000.00	1,2,3,4,5,6
FF	MnDOT Class IV RipRap with Filter Fabric	TON	124	$100.00	$12,432.00	1,2,3,4,5,6
GG	Remove Existing Stormsewer	LF	115	$18.00	$2,070.00	1,2,3,4,5,6
HH	Modify Existing Stormsewer (Box Culvert Tie-In)	Each	1	$4,000.00	$4,000.00	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				$3,335,000.00	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (30%)				$1,001,000.00	1,5,8
	ESTIMATED CONSTRUCTION COST				$4,336,000.00	1,2,3,4,5,6,7,8
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION OBSERVATION (30%)				$1,301,000.00	1,2,3,4,5,8
	RESIDENTIAL/CONSTRUCTION EASEMENT				$23,400.00	1,2,3,5,8
	ESTIMATED TOTAL PROJECT COST				$5,660,000.00	1,2,3,4,5,6,7,8
	ESTIMATED ACCURACY RANGE	**-20%**			**$4,528,000.00**	5,8
		30%			**$7,358,000.00**	5,8

Notes

[1] Limited Design Work Completed

[2] Quantities Based on Design Work Completed.

[3] Unit Prices Based on Information Available at This Time.

[4] Minimal Soil and Field Investigations Completed.

[5] This feasibility-level (Class 4, 10-15% design completion per ASTM E 2516-06) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -20% to +30%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.

[6] Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following constuction.

[7] Furnish and Install pipe cost per lineal foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials

[8] Estimate costs are reported to nearest thousand dollars.

BARR	**PREPARED BY: BARR ENGINEERING COMPANY**	SHEET:	2	OF	3
		BY:	KJN2	DATE:	4/5/2018
FEASIBILITY STUDY		CHECKED BY:	JAK2	DATE:	4/10/2018
ENGINEER'S OPINION OF PROBABLE PROJECT COST		APPROVED BY:		DATE:	
PROJECT:	BCWMC DeCola Ponds B & C Feasibility Study	ISSUED:		DATE:	
LOCATION:	City of Golden Valley	ISSUED:		DATE:	
PROJECT #:	23/27-0051.39	ISSUED:		DATE:	
OPINION OF COST - SUMMARY		ISSUED:		DATE:	

Engineer's Opinion of Probable Project Cost
Decola Ponds B & C and Pennsylvania Woods Flood Mitigation Project
Concept 2: Maximize Tree Preservation

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization (10%)	LS	1	$187,397.08	$187,397.08	1,2,3,4,5,6
B	Traffic Control	LS	1	$10,000.00	$10,000.00	1,2,3,4,5,6
C	Erosion Control	LS	1	$30,000.00	$30,000.00	1,2,3,4,5,6
D	Inlet Protection	Each	9	$250.00	$2,250.00	1,2,3,4,5,6
E	Trail Removal (Bituminous Pavement Removal)	SY	1,093	$4.00	$4,373.33	1,2,3,4,5,6
F	Sawcut Bituminous Pavement (Full Depth)	LF	40	$3.00	$120.00	1,2,3,4,5,6
G	Tree/Stump Removal (> 3" diameter)	Each	672	$300.00	$201,600.00	1,2,3,4,5,6
H	Sod Removal	SY	2,323	$5.00	$11,616.00	1,2,3,4,5,6
I	Excavation & Disposal (clean)	CY	20,724	$15.00	$310,865.25	1,2,3,4,5,6
J	Excavation & Disposal (contaminated)	TON	16,940	$30.00	$508,200.00	1,2,3,4,5,6
K	Grading	SY	21,780	$4.00	$87,120.00	1,2,3,4,5,6
L	Floating/Boardwalk Trail Installation	LF	0	$600.00	$0.00	1,2,3,4,5,6
M	Bituminous Trail Installation	SY	1,720	$30.00	$51,600.00	1,2,3,4,5,6
N	Tree Planting	Each	40	$300.00	$11,865.00	1,2,3,4,5,6
O	Wetland Restoration	AC	1.4	$10,000.00	$13,700.00	1,2,3,4,5,6
P	Upland Native Restoration	AC	1.1	$3,000.00	$3,390.00	1,2,3,4,5,6
Q	Turf Re-Establishment (Restoration)	AC	0.5	$2,000.00	$960.00	1,2,3,4,5,6
R	Topsoil	CY	1,202	$30.00	$36,058.00	1,2,3,4,5,6
S	Erosion Control Blanket	SY	14,426	$4.00	$57,704.72	1,2,3,4,5,6
T	Hydromulch	SY	14,426	$2.00	$28,852.36	1,2,3,4,5,6
U	Dewatering	LS	1	$50,000.00	$50,000.00	1,2,3,4,5,6
V	Flotation Silt Curtain (DeCola Ponds B & C)	LF	2,260	$15.00	$33,900.00	1,2,3,4,5,6
W	Sediment Dredging & Disposal (contaminated) (DeCola Pond B)	CY	2,757	$55.00	$151,610.80	1,2,3,4,5,6
X	Raise Overflow Berm (DeCola Pond C)	CY	322	$15.00	$4,833.33	1,2,3,4,5,6
Y	5-foot weir manhole (DeCola Pond C)	Each	1	$10,000.00	$10,000.00	1,2,3,4,5,6
Z	24" RCP Stormsewer Pipe (Furnish and Install)	LF	30	$59.00	$1,770.00	1,2,3,4,5,6,7
AA	12" RCP Stormsewer Pipe (Furnish and Install)	LF	30	$36.00	$1,080.00	1,2,3,4,5,6,7
BB	14' x 4' Box Culvert (Furnish and Install)	LF	160	$1,200.00	$192,000.00	1,2,3,4,5,6,7
CC	14' x 4' Box Culvert Elbow	Each	1	$10,000.00	$10,000.00	1,2,3,4,5,6
DD	14' x 4' Box Culvert Flared End Section	Each	2	$10,000.00	$20,000.00	1,2,3,4,5,6
EE	Weir Installation in 14' x 4' Box Culvert Flared End Section	Each	1	$10,000.00	$10,000.00	1,2,3,4,5,6
FF	MnDOT Class IV RipRap with Filter Fabric	TON	124	$100.00	$12,432.00	1,2,3,4,5,6
GG	Remove Existing Stormsewer	LF	115	$18.00	$2,070.00	1,2,3,4,5,6
HH	Modify Existing Stormsewer (Box Culvert Tie-In)	Each	1	$4,000.00	$4,000.00	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				$2,061,000.00	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (30%)				$618,000.00	1,5,8
	ESTIMATED CONSTRUCTION COST				$2,679,000.00	1,2,3,4,5,6,7,8
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION OBSERVATION (30%)				$804,000.00	1,2,3,4,5,8
	RESIDENTIAL/CONSTRUCTION EASEMENT				$23,400.00	1,2,3,5,8
	ESTIMATED TOTAL PROJECT COST				$3,506,000.00	1,2,3,4,5,6,7,8
	ESTIMATED ACCURACY RANGE	**-20%**			**$2,805,000.00**	5,8
		30%			**$4,558,000.00**	5,8

Notes

[1] Limited Design Work Completed

[2] Quantities Based on Design Work Completed.

[3] Unit Prices Based on Information Available at This Time.

[4] Minimal Soil and Field Investigations Completed.

[5] This feasibility-level (Class 4, 10-15% design completion per ASTM E 2516-06) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -20% to +30%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.

[6] Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following constuction.

[7] Furnish and Install pipe cost per lineal foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials

[8] Estimate costs are reported to nearest thousand dollars.

BARR	**PREPARED BY: BARR ENGINEERING COMPANY**	SHEET:	3	OF	3
		BY:	KJN2	DATE:	4/5/2018
FEASIBILITY STUDY		CHECKED BY:	JAK2	DATE:	4/10/2018
ENGINEER'S OPINION OF PROBABLE PROJECT COST		APPROVED BY:		DATE:	
PROJECT:	BCWMC DeCola Ponds B & C Feasibility Study	ISSUED:		DATE:	
LOCATION:	City of Golden Valley	ISSUED:		DATE:	
PROJECT #:	23/27-0051.39	ISSUED:		DATE:	
OPINION OF COST - SUMMARY		ISSUED:		DATE:	

Engineer's Opinion of Probable Project Cost
Decola Ponds B & C and Pennsylvania Woods Flood Mitigation Project
Concept 3: Hybrid Alternative

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization (10%)	LS	1	$202,908.52	$202,908.52	1,2,3,4,5,6
B	Traffic Control	LS	1	$10,000.00	$10,000.00	1,2,3,4,5,6
C	Erosion Control	LS	1	$30,000.00	$30,000.00	1,2,3,4,5,6
D	Inlet Protection	Each	9	$250.00	$2,250.00	1,2,3,4,5,6
E	Trail Removal (Bituminous Pavement Removal)	SY	1,051	$4.00	$4,204.44	1,2,3,4,5,6
F	Sawcut Bituminous Pavement (Full Depth)	LF	40	$3.00	$120.00	1,2,3,4,5,6
G	Tree/Stump Removal (> 3" diameter)	Each	687	$300.00	$206,100.00	1,2,3,4,5,6
H	Sod Removal	SY	2,323	$5.00	$11,616.00	1,2,3,4,5,6
I	Excavation & Disposal (clean)	CY	28,809	$15.00	$432,129.45	1,2,3,4,5,6
J	Excavation & Disposal (contaminated)	TON	16,940	$30.00	$508,200.00	1,2,3,4,5,6
K	Grading	SY	23,861	$4.00	$95,444.80	1,2,3,4,5,6
L	Floating/Boardwalk Trail Installation	LF	0	$600.00	$0.00	1,2,3,4,5,6
M	Bituminous Trail Installation	SY	1,678	$30.00	$50,333.33	1,2,3,4,5,6
N	Tree Planting	Each	35	$300.00	$10,500.00	1,2,3,4,5,6
O	Wetland Restoration	AC	1.7	$10,000.00	$16,900.00	1,2,3,4,5,6
P	Upland Native Restoration	AC	1.0	$3,000.00	$2,850.00	1,2,3,4,5,6
Q	Turf Re-Establishment (Restoration)	AC	0.5	$2,000.00	$960.00	1,2,3,4,5,6
R	Topsoil	CY	1,258	$30.00	$37,752.00	1,2,3,4,5,6
S	Erosion Control Blanket	SY	15,101	$4.00	$60,403.20	1,2,3,4,5,6
T	Hydromulch	SY	15,101	$2.00	$30,201.60	1,2,3,4,5,6
U	Dewatering	LS	1	$50,000.00	$50,000.00	1,2,3,4,5,6
V	Flotation Silt Curtain (DeCola Ponds B & C)	LF	2,260	$15.00	$33,900.00	1,2,3,4,5,6
W	Sediment Dredging & Disposal (contaminated) (DeCola Pond B)	CY	3,037	$55.00	$167,035.00	1,2,3,4,5,6
X	Raise Overflow Berm (DeCola Pond C)	CY	322	$15.00	$4,833.33	1,2,3,4,5,6
Y	5-foot weir manhole (DeCola Pond C)	Each	1	$10,000.00	$10,000.00	1,2,3,4,5,6
Z	24" RCP Stormsewer Pipe (Furnish and Install)	LF	30	$59.00	$1,770.00	1,2,3,4,5,6,7
AA	12" RCP Stormsewer Pipe (Furnish and Install)	LF	30	$36.00	$1,080.00	1,2,3,4,5,6,7
BB	14' x 4' Box Culvert (Furnish and Install)	LF	160	$1,200.00	$192,000.00	1,2,3,4,5,6,7
CC	14' x 4' Box Culvert Elbow	Each	1	$10,000.00	$10,000.00	1,2,3,4,5,6
DD	14' x 4' Box Culvert Flared End Section	Each	2	$10,000.00	$20,000.00	1,2,3,4,5,6
EE	Weir Installation in 14' x 4' Box Culvert Flared End Section	Each	1	$10,000.00	$10,000.00	1,2,3,4,5,6
FF	MnDOT Class IV RipRap with Filter Fabric	TON	124	$100.00	$12,432.00	1,2,3,4,5,6
GG	Remove Existing Stormsewer	LF	115	$18.00	$2,070.00	1,2,3,4,5,6
HH	Modify Existing Stormsewer (Box Culvert Tie-In)	Each	1	$4,000.00	$4,000.00	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				$2,232,000.00	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (30%)				$670,000.00	1,5,8
	ESTIMATED CONSTRUCTION COST				$2,902,000.00	1,2,3,4,5,6,7,8
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION OBSERVATION (30%)				$871,000.00	1,2,3,4,5,8
	RESIDENTIAL/CONSTRUCTION EASEMENT				$23,400.00	1,2,3,5,8
	ESTIMATED TOTAL PROJECT COST				$3,796,000.00	1,2,3,4,5,6,7,8
	ESTIMATED ACCURACY RANGE	**-20%**			**$3,037,000.00**	5,8
		30%			**$4,935,000.00**	5,8

Notes

[1] Limited Design Work Completed

[2] Quantities Based on Design Work Completed.

[3] Unit Prices Based on Information Available at This Time.

[4] Minimal Soil and Field Investigations Completed.

[5] This feasibility-level (Class 4, 10-15% design completion per ASTM E 2516-06) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -20% to +30%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.

[6] Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks

[7] Furnish and Install pipe cost per lineal foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials

[8] Estimate costs are reported to nearest thousand dollars.