Item 5D. BCWMC 5-17-18 Appendices Only, Report Separate



DeCola Ponds B and C Improvement Project Feasibility Study

Golden Valley, Minnesota

May 2018



Prepared for Bassett Creek Watershed Management Commission



Appendices

Appendix A Sediment Sampling and Bathymetric Memo (2015)

Appendix B Phase II Investigation – Test Trench Investigation Memo (2018)

Appendix C Wetland Delineation Report (2017)

Appendix D Feasibility-Level Cost Estimates

Appendices

Appendix A

Sediment Sampling and Bathymetric Memo (2015)

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

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(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.

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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.

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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.

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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.

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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 resuse 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

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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

Table 1 – Sediment Analytical Data Summary

Table 2 – Sediment Toxicity Characteristic Leaching Procedure Analytical Data Summary

Figures

Figure 1 – Site Location

Figure 2 – Project Area

Figure 3 – Sediment Sampling: Pond A

Figure 4 – Sediment Sampling: Pond B

Figure 5 – Sediment Sampling: Pond C

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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

	Tiermephi Godiny										
			Sediment Core ID:	S-01	S-02	S-03	S-04	S-05 COMP	S-06 COMP	S-07 COMP	S-08 COMP
				Pond B	Pond B	Pond C	Pond C	Pond A	Pond A	Pond A	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
								7/10/2013	7/10/2013	7/10/2013	7/10/2013
			Depth	0 - 3.5 ft	0 - 3.1 ft	0 - 1.2 ft	0 - 3.6 ft				
		Minnesota	Minnesota Industrial								
	Minnesota	Residential Soil	Soil Reference								
	Screening Soil	Reference Values	Values								
Parameter	Leaching Values										
Effective Date	06/01/2013	06/22/2009	06/22/2009								
Exceedance Key	Bold	<u>Underline</u>	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	Т	Т	Т	< 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	Т	Т	Т	< 10.5 * ug/kg	< 17.6 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	Т	Т	T	< 22.4 ug/kg	< 37.4 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	Т	Т	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	Т	Т	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	Т	Т	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	Т	Т	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	Т	Т	Т	< 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	Т	Т	Т	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	Т	Т	Т	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	Т	Т	Т	188 * ug/kg	< 39.9 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	Т	Т	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	Т	Т	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	Т	Т	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			< 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		16.8 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		< 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		< 1.9 ug/kg	< 13.7 ug/kg	< 1.3 ug/kg	< 1.1 ug/kg	< 1.0 ug/kg
Phenanthrene	NA 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
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Data Footnotes and Qualifiers

Barr Standard Footnotes and Qualifiers

	Bail stalladia restrictes and Edalliers
	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.
а	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		
Parameter	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.
	Estimated detected value. The reported value is less than the stated laboratory quantitation limit but greater than the laboratory method
	detection limit.

Figures

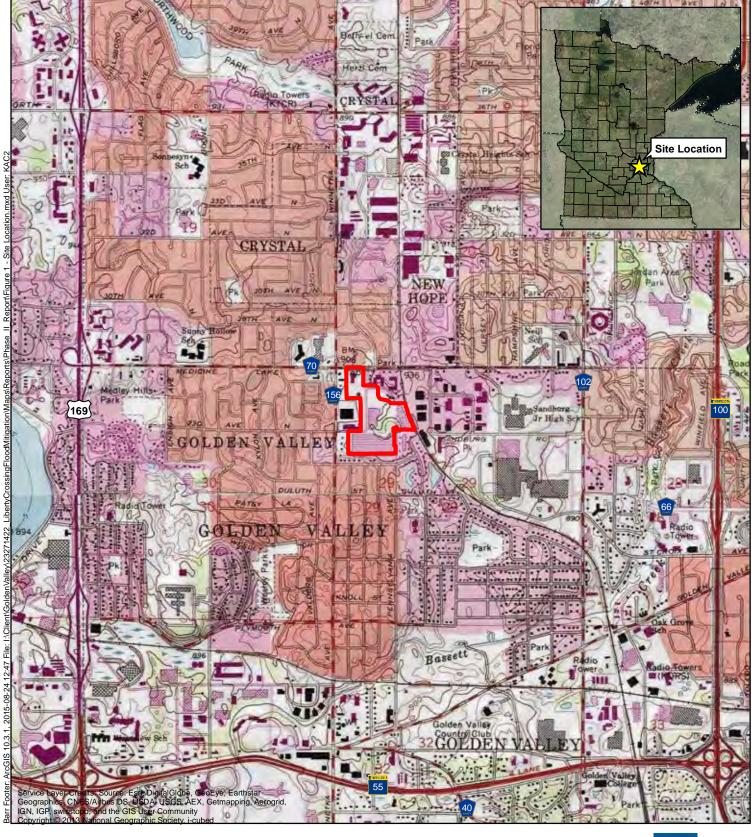


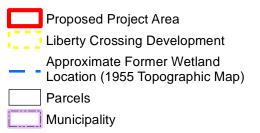




Figure 1

SITE LOCATION Liberty Crossing & Pennsylvania Woods Golden Valley, MN





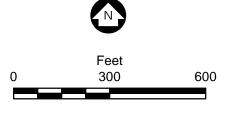




Figure 2

PROJECT AREA Liberty Crossing & Pennsylvania Woods Golden Valley, MN





Proposed Project Area

Depth (ft)

>6.0

5.0 - 6.0

4.0 - 5.0

3.0 - 4.0

< 3.0

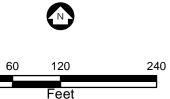
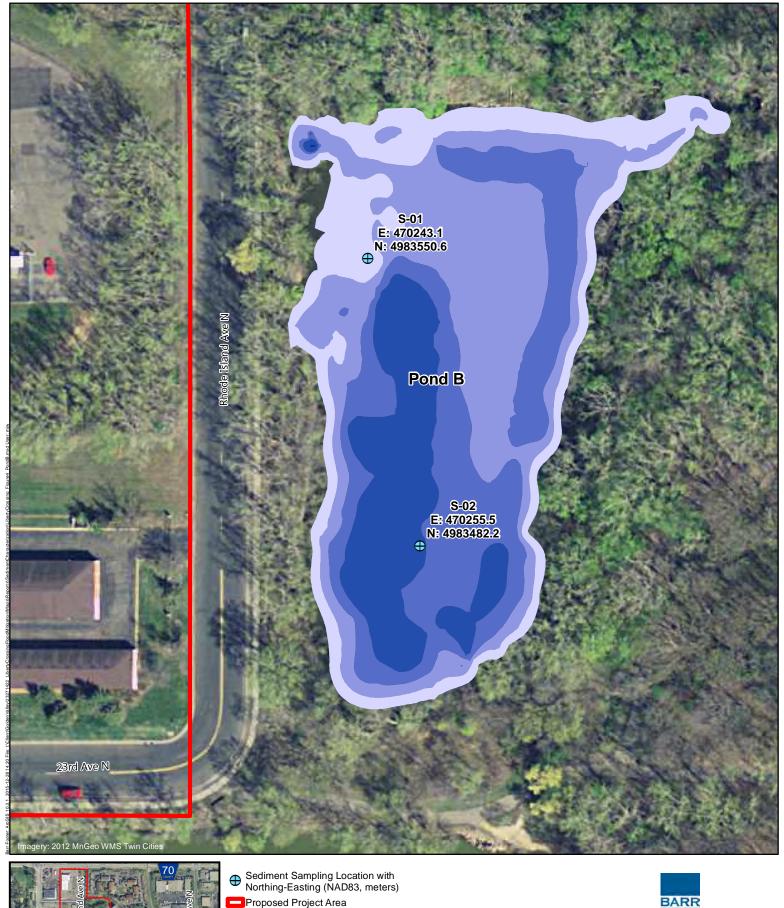




Figure 3

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





Depth (ft)

>5.0

4.0 - 5.0

3.0 - 4.0 2.0 - 3.0

<2.0

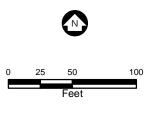




Figure 4

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



Attachment A – Sediment Core Logs

Sediment Core/Boring Log

Project:

Proj#: 2327 1422

BARR

Ice Thickness (feet): Water Depth (feet):

Collection Date(s):

GPS X:470 Z42/4m & Lengan
GPS Y:498 355 Z4 5 5 m // Recovery (feet): 3 65 den E Length of Push (feet): 4.5

Observer: Driller: 3 . Crew:

Core/Boring#: **Drilling Method:** PC: push core VC: vibracore

Logged by: Checked by:

	Sifty sand Me- Co-sands sifty sand Me- Co-sands leafy plant matter sporadic layering. Agile brown Might silt content, more cokesine	
	Classification Classification Classification	
	gninis? \$ 5 neen	
Properties	10PO \$ 040r	
P	Particles 20 Particles	
	Cohesiveness	
	Plasticity Consistency	
	S S Density or	
	enutrioM 3	
	Sample Interval and number 0-2,57	
	Depth (ft.) 0 1.8 1.8 3.5 3.4 3.5	

6.5' tabe 1.5' after push

5-0

Sediment Core/Boring Log

page of

MILLI	-		
VC: vibracore RC: push core Core/Boring#: 5-02 Drilling Method: 1000	Cilecked by:	Description Re organics. Hs wy leaves, acts grades to soot to consistency we but olive givey color inegray leavelay That of Borton	
Driller: Ban Crew: <u>JUST/K</u> DM Observer:		0-2,3=10080 8lack gran 2,3-8,8= same B Refit	
100/		AND AND CONTRACTOR OF THE LOG OF	
GPS X: 4702 55.3 Elength of Push (feet): GPS Y: 4983483.5 M Recovery (feet): GPS Z: % Recovery (feet):		ASTM / USCS Classification	Name of Street
rf Push Covery % Rec	1	иээчу 2	
SS/y ngth o	S	3ninist2	
Co 3ELe	Properties	JOPO STATE OF THE	
Viberty Crossing 20255.3 Elength of Pu 983483.5 M Recove	Pro	Salpined 3 E Particles	
1.16 470 4783		Cohesiveness	-
Project: Liberty C. GPS X: 4702.55.3 E GPS Y: 4983483.5 M GPS Z:		Plasticity	1
E		EEE ST Density or	
4,07	1	enutaioM 5	
37/93 ate(s): 5 (feet): 1 (feet):		Sample Interval and number	
Proj#: 2327/423 Collection Date(s): Ice Thickness (feet): Water Depth (feet):		Depth (ft.) 0 7.3 2.3 2.8 2.4 3.1	

1-8-1

Sediment Core/Boring Log

Core/Boring#: Drilling Method: VC: vibracore PC: push core Driller: Recovery (feet): (13) % Recovery: 757 GPS X: 470453.43 Length of Push (feet): Project: Liberty Cross. MyS GPS Y: 49 8354299 GPS Z: Proj#: 23271422 Water Depth (feet): Ice Thickness (feet): Collection Date(s):

Checked by: Logged by: Observer:

	Description	5.0,5=8lack,	
	1990) Giaphic Log ?	8 R=0.3 6-00 6-00 6-00 7-5-1 7-5-1	
	LIUDBUILGEBIU	\$ 132 W	
	иәәиѕ	2	
(0)	gninist	2	
Properties	Odor	2	
Pro	Particles		
	Cohesiveness	337	+
I	Plasticity	5 2 3 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
	Density or Consistency	***	
I	Moisture		
	Sample Interval and number		
	Sample Sample Interval and Depth (ft.), number		

6,0-4,4= 1,6 gush

page l of

Sediment Core/Boring Log

Logged by: Checked by: Core/Boring#: Drilling Method: PC: push core VC: vibracore Observer: Driller: Crew: Recovery (feet): 36 % Recovery: 95% 47 Length of Push (feet): 3,8 Project: L. hocky (S GPS X: 4704984 GPS Y: 498 GPS Z: Water Depth (feet): Ice Thickness (feet): Collection Date(s): Proj#:

	Description	0.5-3.6= Peaty "gent Soils (2/18) very Extras @ 0.5-0.8 at less & boars of depth. End of Boring - Retusola 3.8
	PID AON Dasphietog USS.di	23.6. 23.6. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.
	ASTM / USCS Classification	335
	Zyeeu	2
S	gninist2	
Properties	Odor	
Pro	Particles	2 2
	Cohesiveness	No.
	Plasticity	22
	Density or Consistency	No.
	Moisture	3 2
	Sample Interval and number	0-36-0-36-0-0-36-0-0-36-0-0-36-0-0-36-0-0-36-0-0-36-0-0-36-0-0-36-0-0-36-0-0-36-0-0-36-0-0-0-36-0-0-0-36-0-0-0-36-0-0-0-0
	Depth (ft.)	2

23-45-3,8

5-05

	VC: vibracore	rc. push core	Core/ Boring#:	Drilling Method:	Logged by:	Checked by:
Core/Boring Log		(1015/145	Length of Push (feet): 0,5-10 Driller:	Recovery (feet): 100 Crew.	% Recovery: Observe	Operation (Construction)
PADD Seulinent Core/E		7	Collection Date(s): 7=(0-15 GPS X:	Ice Thickness (feet): GPS Y:	Water Depth (feet): $\sim C$ GPS Z:	

	Description 0.0 -0.5 = Lesse glack engines, ths 0.5 - (co = 50ft to malsopt 51/15 w/ somesmuls Trave grave (co i.o. Fetusal (co i.o.)	
	Graphic Log	
	neerla Sozu / MTSA Series Sozia Sozi	
Properties	Particles TobO	0.5.0
	Plasticity Cohesiveness Cohesiveness	5-05D - 0 S-05E - 0
	A Single of the state of the st	recovery 0
	Sample Interval and Depth (ft.) number 0.5 (20MP5 0.5 (5-054 - 1' r 5.05 B - 0.5' 5-056 -1.0'

90-5

Sediment Core/Boring Log

VC: vibracore PC: push core Core/Boring#: 5-06 Drilling Method: PC Logged by: CDA		Description Leose Black org 5.14s = tray Utg-fa Scubs wy trace fine grand Dark brain & Perty 5.14s (decayed) Frecensed peaty / Depty	
Driller: But Crew: Dast/Low		Desc 0-0.3 - Leone Blace 0.3 - 6.4 = bray Ja Grand Sauce 0.4-0.8 = Dark bran, (decayed)	
Project: Libery Cross Was Gest): 10 descovery: Recovery: 8.86.00.87	Properties	Moisture Consistency Consistency Consistency Cohesiveness Cohesiveness Codor Staining Scheining Cheen Codor Co	
Proj#: 23,7/422 Collection Date(s): Ice Thickness (feet): Water Depth (feet):		Sample Interval and Depth (ft.) number 0.0 0.2 0.4 0.2 0.4 0.5	

VC: vibracore

Sediment Core/Boring Log

+ 0 1 1 1	Г			T
X 4 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			m. 80	
PC: push core Core/Boring#: 5-6 Drilling Method: 6C Logged by: 7503 Checked by: 604			19 51/18	
PC.		: : : :	Soft org	
Bail The 5/kg		-	0-0-2= Black 508+ 619 51/145 0-0-0-5= Dire gray lean chay ey	
Length of Push (feet): ~0.4 Driller: Recovery (feet): 0.5 Crew: % Recovery: Observer:			6.4-0.5	
20.4		C)() raphic Łóg		
th of Push (feet): Recovery (feet): % Recovery:		STM / USCS		
of Pusi		рееп		
85% Re	SS	gniniet	\$2	
Cho	roperties	Jobo	2->	
Length of P	Pre	29dicles	2	
		cohesiveness	· 基 8	
Project: GPS X: GPS Y: GPS Z:		Plasticity	2 28	
5.5		Density or Consistency	+ 2	
VW.		Moisture		
37 143 ate(s): (feet): (feet):		Sample Interval and number		
Proj#: 1377/43 Collection Date(s): Ice Thickness (feet): Water Depth (feet):		Depth (ft.)	6 S O O O O O O O O O O O O O O O O O O	

page of

Logged by: Checked by:

Crew: Observer:

Recovery (feet): 0,5 % Recovery:

Driller:

Project: L.b.thy (1955).45

GPS X: Length of Push (feet).+

GPS Y:

Collection Date(s): Ice Thickness (feet): Water Depth (feet):

Proj#: 2327 1422

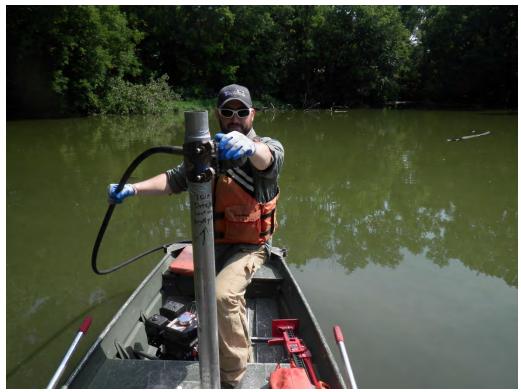
Core/Boring#: Drilling Method:

VC: vibracore PC: push core

Sediment Core/Boring Log

		D.O - D.M Black losse 5. 145 D.I - O.S Date gray lear clay cut sand grade of the Control	
	ворје год	19	
	STM / USCS assification	13 8 A	
	иәәі	455	
es	gninis		
Properties	dor		
P	articles		
	seanevisado		
$ \cdot $	Consistency Plasticity		
-	o yaisneO	29 52 60	pir
Ц	Sample Interval and number	X ACC CONTRACTOR OF THE CONTRA	0 9
	Depth (ft.)	010	A=0.5 6=0.5 6=1.2

Attachment B - Photographs



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



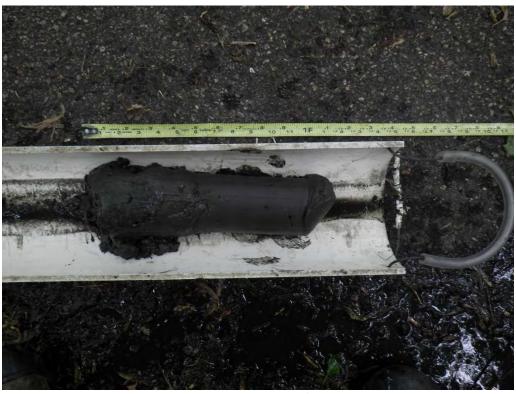
Photograph #2: Barr staff using push-core equipment to collect sediment core from Decola Pond A.



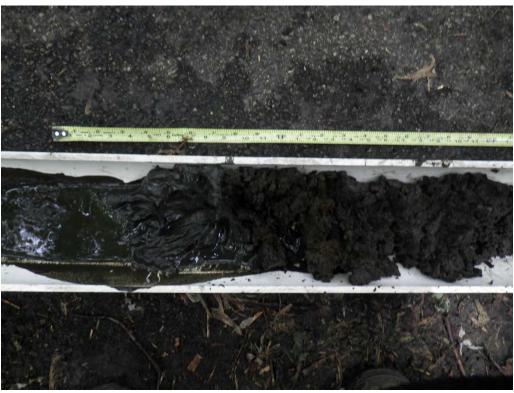
Photograph #3: Sediment core S-01 from Decola Pond B.



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



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,

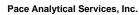
Chr De

Chris Bremer

chris.bremer@pacelabs.com

Project Manager







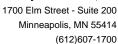
1700 Elm Street - Suite 200 Minneapolis, MN 55414 (612)607-1700

August 28, 2015 Page 2

Enclosures

cc: Data Distribution







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





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

(612)607-1700



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	
0313820003	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	
0313820004	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	
0313820005	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	
0313820006	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	
0313820007	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	
0313820008	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	
0313820009	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	



Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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.

Arsanic 3.8 mg/kg 1.0 0.24 1 07/16/15 13:13 07/17/15 10.56 7440-3-2 Right Market Mark	Parameters	Results	Units	PQL _	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Bathum	6010 MET ICP	Analytical	Method: EP	A 6010 Prepar	ation Meth	od: EP	A 3050			
Cadmium 0.15J mg/kg 0.15 0.039 1 07/16/16 13:13 07/11/15 10:56 7440-43-3 Value Chromium 1.6 mg/kg 0.51 0.076 1 07/16/15 13:13 07/17/15 10:56 7440-57-3 Value Value Value 0.1 0.071 1 07/16/15 13:13 07/17/15 10:56 7440-50-3 Value Value 0.0 0.0 1 07/16/15 13:13 07/17/15 10:56 7440-52-4 Value Value Value Value Value 0.0 <td>Arsenic</td> <td>3.8</td> <td>mg/kg</td> <td>1.0</td> <td>0.24</td> <td>1</td> <td>07/16/15 13:13</td> <td>07/17/15 10:56</td> <td>7440-38-2</td> <td></td>	Arsenic	3.8	mg/kg	1.0	0.24	1	07/16/15 13:13	07/17/15 10:56	7440-38-2	
Chromium	Barium	17.0	mg/kg	0.51	0.051	1	07/16/15 13:13	07/17/15 10:56	7440-39-3	R1
Chromium	Cadmium	0.15J		0.15	0.039	1	07/16/15 13:13	07/17/15 10:56	7440-43-9	
Lead 9.2 mg/kg 0.51 0.12 1 07/16/15 13:13 07/17/15 10:56 7439-92-1 Selenium 40.41 mg/kg 1.0 0.12 1 07/16/15 13:13 07/17/15 10:56 7439-92-1 Selenium 40.41 mg/kg 1.0 0.01 1 07/16/15 13:13 07/17/15 10:56 7439-92-1 7471B Mercury Analyticate the test of t	Chromium	10.6		0.51	0.076	1	07/16/15 13:13	07/17/15 10:56	7440-47-3	
Selenium Q-141 mg/kg	Copper	17.8	mg/kg	0.51	0.073	1	07/16/15 13:13	07/17/15 10:56	7440-50-8	
Selentium		9.2	mg/kg	0.51	0.12	1	07/16/15 13:13	07/17/15 10:56	7439-92-1	
Name	Selenium	<0.41		1.0	0.41	1	07/16/15 13:13	07/17/15 10:56	7782-49-2	
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 Wethod: ASTM D2974 Vertical STM D2974 Vertical STM D2974 Vertical STM D2974 Vertical STM D2974 8270D MSSV CPAH by SIM Analytical Wethod: EPA 8270D by SIM Preparative Method: EPA 3550 Vertical STM D2974 Vertical STM D2974 2-Methylohaphthalene 40.8 J ug/kg 125 8.7 Image 10.07/15/15 10:55 07/23/15 11:30 91-57-6 M1 3-Methylohaphthalene 410.5 ug/kg 125 10.5 Image 10.07/15/15 10:55 07/23/15 11:30 91-57-6 M1 3-Methylohaphthalene 410.5 ug/kg 125 10.5 Image 10.07/15/15 10:55 07/23/15 11:30 3697-24-3 Image 10.07/15/15 10:55 M1 3-Methylohaphthalene 410.5 ug/kg 125 12.5 Image 10.07/15/15 10:55 07/23/15 11:30 3697-24-3 Image 10.07/15/15 10:55 M1 7-1/12-Dimentylbenz(a)anthracene 425.3 ug/kg 125 12.5 Image 11.7 ug/kg 10.7/15/15 10:55 07/23/15 11:30 363-29 MI NR1 Anthracene	Silver	<0.12		0.51	0.12	1	07/16/15 13:13	07/17/15 10:56	7440-22-4	
Percent Moisture 20.1 % 0.10 0.10 1	7471B Mercury	Analytical	Method: EP	A 7471B Prepa	aration Met	hod: E	PA 7471B			
Percent Moisture 20.1 % 0.10 0.10 1 07/20/15 20:31 Verball 8270D MSSV CPAH by SIM Analytical Method: EPA 8270 by SIM Preparation the thod: EPA 3550 Verball 10 (1) (2) (2) (3) (3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	Mercury	0.0086J	mg/kg	0.021	0.0075	1	07/17/15 18:19	07/19/15 16:26	7439-97-6	
2-Methylnaphthalene	Dry Weight	Analytical	Method: AS	TM D2974						
2-Methylnaphthalene	Percent Moisture	20.1	%	0.10	0.10	1		07/20/15 20:31		
3-Methylcholanthrene <16.3 ug/kg 125 16.3 1 07/15/15 10:55 07/23/15 11:30 56-49-5 M1	8270D MSSV CPAH by SIM	Analytical	Method: EP	A 8270D by SIM	// Prepara	tion Me	ethod: EPA 3550			
S-Methylohrysene <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 38-32-9 M1, R1 Acenaphthylene <13.8 ug/kg 125 11.7 1 07/15/15 10:55 07/23/15 11:30 38-32-9 M1, R1 Anthracene 784 ug/kg 125 13.1 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 11:30 208-96-8 M1 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 10.2 1 07/15/15 10:55 07/23/15 11:30 56-55-3 M1, R1 Benzo(gh,h.i)perylene 1380 ug/kg 125 10.2 1 07/15/15 10:55 07/23/15 11:30 50-32-8 M1, R1 Benzofluoranthenes (Total) 5340 ug/kg 375 86.2 1 07/15/15 10:55 07/23/15 11:30 191-24-2 M1, R1 Benzo(gh,hi)perylene 3250 ug/kg 125 7.2 1 07/15/15 10:55 07/23/15 11:30 218-01-9 M1, R1 Dibenzo(a,h)parthracene 454 ug/kg 125 7.2 1 07/15/15 10:55 07/23/15 11:30 226-36-8 M1 Dibenzo(a,e)pyrene 356 ug/kg 125 24.4 1 07/15/15 10:55 07/23/15 11:30 226-36-8 M1 Dibenzo(a,h)pyrene 41.3 ug/kg 125 23.9 1 07/15/15 10:55 07/23/15 11:30 39-65-4 M1, R1 Dibenzo(a,h)pyrene 42.3 ug/kg 125 23.9 1 07/15/15 10:55 07/23/15 11:30 191-30-0 Dibenzo(a,h)pyrene 49.3 ug/kg 125 23.9 1 07/15/15 10:55 07/23/15 11:30 191-30-0 Dibenzo(a,h)pyrene 49.3 ug/kg 125 23.3 1 07/15/15 10:55 07/23/15 11:30 193-30-5 M1, R1 Dibenzo(a,h)pyrene 49.3 ug/kg 25 25.9 5 07/15/15 10:55 07/23/15 11:30 39-30-5 M1, R1 Dibenzo(a,h)pyrene 49.3 ug/kg	2-Methylnaphthalene	40.8J	ug/kg	125	8.7	1	07/15/15 10:55	07/23/15 11:30	91-57-6	
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	3-Methylcholanthrene	<16.3	ug/kg	125	16.3	1	07/15/15 10:55	07/23/15 11:30	56-49-5	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	5-Methylchrysene	<10.5	ug/kg	125	10.5	1	07/15/15 10:55	07/23/15 11:30	3697-24-3	M1
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		<22.4	ug/kg	125	22.4	1	07/15/15 10:55	07/23/15 11:30	57-97-6	
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	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	
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 10.2 1 07/15/15 10:55 07/23/15 11:30 56-32-8 M1,R1 Benzo(g,h,i)perylene 1380 ug/kg 125 21.3 1 07/15/15 10:55 07/23/15 11:30 59-2-8 M1,R1 Benzofluoranthenes (Total) 5340 ug/kg 375 86.2 1 07/15/15 10:55 07/23/15 11:30 191-24-2 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 Dibenzo(a,h)acridine <7.2	Acenaphthene	348	ug/kg	125	11.7	1	07/15/15 10:55	07/23/15 11:30	83-32-9	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 11:30 191-24-2 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	Acenaphthylene	<13.8		125	13.8	1	07/15/15 10:55	07/23/15 11:30	208-96-8	M1
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 Benzofluoranthenes (Total) 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 11:30 191-24-2 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	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)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 11:30 218-01-9 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	Benzo(a)anthracene	2530		125	10.2	1	07/15/15 10:55	07/23/15 11:30	56-55-3	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 L94-2 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		2690		125	10	1	07/15/15 10:55	07/23/15 11:30	50-32-8	M1,R1
Benzolluoranthenes (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 47.2 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 412.3 ug/kg 125 12.3 1 07/15/15 10:55 07/23/15 11:30 189-55-9 M1 Dibenzo(a,i)pyrene 49.3 ug/kg 125 9.3 1		1380		125	21.3	1	07/15/15 10:55	07/23/15 11:30	191-24-2	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		5340		375	86.2	1	07/15/15 10:55	07/23/15 11:30		-
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 11:30 189-64-0 M1,R1 Dibenzo(a,i)pyrene 41.3 ug/kg 125 12.3 1 07/15/15 10:55 07/23/15 11:30 189-64-0 M1,R1 Dibenzo(a,i)pyrene 49.3 ug/kg 125 9.3 1 07/15/15 10:55 07/23/15 11:30 189-65-9 M1 Pluoranthene 10400 ug/kg 125 11.9	, ,	3250		125		1			218-01-9	
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	•	<7.2		125	7.2	1	07/15/15 10:55			
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	* * *	454		125	24.4	1	07/15/15 10:55	07/23/15 11:30	53-70-3	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	* * *	356		125	6.4	1	07/15/15 10:55	07/23/15 11:30	192-65-4	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	* * * * * * * * * * * * * * * * * * * *				23.9	1	07/15/15 10:55	07/23/15 11:30	189-64-0	•
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 11:30 191-30-0 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		<12.3		125	12.3	1	07/15/15 10:55	07/23/15 11:30	189-55-9	
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		<9.3		125	9.3	1	07/15/15 10:55	07/23/15 11:30	191-30-0	
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		10400		625	52.9	5	07/15/15 10:55	07/23/15 13:55	206-44-0	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	Fluorene	506		125	11.9	1	07/15/15 10:55			•
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						1				•
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	, , , , , , , , , , , , , , , , , , , ,									•
Pyrene 6500 ug/kg 625 56.6 5 07/15/15 10:55 07/23/15 13:55 129-00-0 M1,R1	•									M1,R1
,										
- uniogato	Surrogates		- 3- 3			-	, , , ,			,
2-Fluorobiphenyl (S) 70 %. 45-125 1 07/15/15 10:55 07/23/15 11:30 321-60-8 P3		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	p-Terphenyl-d14 (S)	62	%.	36-131		1	07/15/15 10:55	07/23/15 11:30	1718-51-0	



Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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 Prepa	ration Meth	od: EP	A 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 Prep	aration Met	hod: E	PA 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: AST	M 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 SI	M Prepara	ion Me	thod: 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		07/22/15 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		07/22/15 23:24		
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		07/22/15 23:24		
Dibenzo(a,l)pyrene	<15.5	ug/kg	209	15.5	1		07/22/15 23:24		
Fluoranthene	2390	ug/kg	209	17.7	1		07/22/15 23:24		
Fluorene	<19.9	ug/kg	209	19.9	1		07/22/15 23:24		
Indeno(1,2,3-cd)pyrene	441	ug/kg	209	38.9	1		07/22/15 23:24		
Naphthalene	<13.1	ug/kg	209	13.1	1	07/15/15 10:55			
Phenanthrene	1040	ug/kg	209	17.6	1		07/22/15 23:24		
Pyrene	1580	ug/kg	209	18.9	1		07/22/15 23:24		
Surrogates			_00		•	11.12.70			
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	



Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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 Prepar	ation Meth	od: EP/	A 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 Prepa	aration Met	hod: E	PA 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: AST	M 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 SII	M Preparat	ion Me	ethod: 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		07/22/15 23:53		
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		
Dibenzo(a,e)pyrene	<0.78	ug/kg	15.2	0.78	1		07/22/15 23:53		
Dibenzo(a,h)pyrene	<2.9	ug/kg	15.2	2.9	1	07/15/15 10:55	07/22/15 23:53		
Dibenzo(a,i)pyrene	<1.5	ug/kg	15.2	1.5	1				
Dibenzo(a,l)pyrene	<1.1	ug/kg	15.2	1.1	1		07/22/15 23:53		
Fluoranthene	171	ug/kg	15.2	1.3	1		07/22/15 23:53		
Fluorene	<1.4	ug/kg	15.2	1.4	1		07/22/15 23:53		
Indeno(1,2,3-cd)pyrene	36.0	ug/kg	15.2	2.8	1		07/22/15 23:53		
Naphthalene	<0.95	ug/kg	15.2	0.95	1	07/15/15 10:55			
Phenanthrene	60.5	ug/kg	15.2	1.3	1		07/22/15 23:53		
Pyrene	122	ug/kg	15.2	1.4	1		07/22/15 23:53		
Surrogates		~9, Ng	10.2	17	•	37,10,10 10.00	51,22,10 20.00	.20 00 0	
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		07/22/15 23:53		



Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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.

Arsenic 3.5 mg/kg 2.6 0.62 1 0.7/16/15 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 7440-38-3 Cadmium 0.53 mg/kg 0.38 0.097 1 0.7/16/15 13:13 07/17/15 11:24 7440-43-9 10.00 11 0	Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Barium	6010 MET ICP	Analytical	Method: EPA	6010 Prepa	ration Meth	od: EP/	A 3050			
Barium	Arsenic	3.5	mg/kg	2.6	0.62	1	07/16/15 13:13	07/17/15 11:24	7440-38-2	
Cadmium	Barium	107		1.3	0.13	1	07/16/15 13:13	07/17/15 11:24	7440-39-3	
Chromium	Cadmium	0.53		0.38	0.097	1	07/16/15 13:13	07/17/15 11:24	7440-43-9	
Copper 24.1 mg/kg 1.3 0.18 1 07/16/15 13:13 07/16/15 13:13 07/17/15 11:24 740-90-9 Selenium 1.3J mg/kg 1.3 0.3I 1.0 1/10 (7)16/15 13:13 07/17/15 11:24 743-99-21 743-99-21 Silver -0.29 mg/kg 1.3 0.29 1 07/16/15 13:13 07/17/15 11:24 7440-92-4 7471B 7440-92-9 7474B 7440-92-9 7471B 7471B 7471B 7440-92-9 7471B 7471B 7471B	Chromium	19.6		1.3	0.19	1	07/16/15 13:13	07/17/15 11:24	7440-47-3	
Lead	Copper			1.3	0.18	1	07/16/15 13:13	07/17/15 11:24	7440-50-8	
Selenium	• •	27.0	0 0			1	07/16/15 13:13	07/17/15 11:24	7439-92-1	
Silver 40.29 mg/kg 1.3 0.29 1 07/16/15 13:31 07/17/15 11:24 7440-22-4 7471B Mercury 0.050 J 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 DUSTAN DUSTAND 0.10 0.10 0.10 0.10 0.70/17/15 18:19 07/20/15 20:34 349-97-6 B270D MSSV CPAH by SIM Analytical Method: EPA 870D by SIM Preparation Method: EPA 850D by SIM 707/15/15 10:55 07/23/15 00:22 91-57-6 2-Methylinaphthalene 4.1 ug/kg 30.5 2.1 1 07/15/15 10:55 07/23/15 00:22 91-57-6 3-Methylichylorysene 4.2 ug/kg 30.5 2.6 1 07/15/15 10:55 07/23/15 00:22 93-7-6 71-Dibenzo(c,g)carbazole 4.5 ug/kg 30.5 2.6 1 07/15/15 10:55 07/23/15 00:22 93-7-6 71-Dibenzo(c,g)carbazole 4.5 ug/kg 30.5 2.8 1 07/15/15 10:55 07/23/15 00:22 93	Selenium	1.3J		2.6		1	07/16/15 13:13	07/17/15 11:24	7782-49-2	
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 For any 10 or	Silver	<0.29			0.29	1	07/16/15 13:13	07/17/15 11:24	7440-22-4	
Percent Moisture 67.2 % 0.10 0.10 1 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 4.1 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 2.6 1 07/15/15 10:55 07/23/15 00:22 56-49-5 5-Methylchylchysene 7.12-Dimethylbenz(a)anthracene 4.5 ug/kg 30.5 2.6 1 07/15/15 10:55 07/23/15 00:22 57-97-6 7H-Dibenzo(c,g)carbazole 4.2 ug/kg 30.5 2.8 1 07/15/15 10:55 07/23/15 00:22 57-97-6 7H-Dibenzo(c,g)carbazole 4.2 ug/kg 30.5 2.8 1 07/15/15 10:55 07/23/15 00:22 57-97-6 7H-Dibenzo(c,g)carbazole 4.2 ug/kg 30.5 2.8 1 07/15/15 10:55 07/23/15 00:22 28-32-9 Acenaphthene 4.2 ug/kg 30.5 2.8 1 07/15/15 10:55 07/23/15 00:22 28-32-9 Acenaphthylene 4.3 ug/kg 30.5 3.2 1 07/15/15 10:55 07/23/15 00:22 28-32-9 Acenaphthylene 4.3 ug/kg 30.5 3.2 1 07/15/15 10:55 07/23/15 00:22 28-32-9 Acenaphthene 4.2 ug/kg 30.5 2.5 1 07/15/15 10:55 07/23/15 00:22 28-32-9 Benzo(a)pyrene 4.2 ug/kg 30.5 2.5 1 07/15/15 10:55 07/23/15 00:22 50-32-8 Benzo(a)pyrene 4.2 ug/kg 30.5 5.2 1 07/15/15 10:55 07/23/15 00:22 50-32-8 Benzo(a)pyrene 4.2 ug/kg 30.5 5.2 1 07/15/15 10:55 07/23/15 00:22 50-32-8 Benzo(a)pyrene 4.2 ug/kg 30.5 5.2 1 07/15/15 10:55 07/23/15 00:22 50-32-8 Benzo(a)pyrene 4.5 ug/kg 30.5 5.2 1 07/15/15 10:55 07/23/15 00:22 50-32-8 Benzo(a)pyrene 4.5 ug/kg 30.5 5.2 1 07/15/15 10:55 07/23/15 00:22 50-32-8 Benzo(a)pyrene 4.5 ug/kg 30.5 5.5 1 07/15/15 10:55 07/23/15 00:22 50-32-8 Benzo(a)pyrene 4.5 ug/kg 30.5 5.2 1 07/15/15 10:55 07/23/15 00:22 50-32-8 Benzo(a)pyrene 4.5 ug/kg 30.5 5.2 1 07/15/15 10:55 07/23/15 00:22 50-32-8 Benzo(a)pyrene 4.5 ug/kg 30.5 5.8 1 07/15/15 10:55 07/23/15 00:22 192-65-4 Dibenzo(a,h)pyrene 4.5 ug/kg 30.5 5.8 1 07/15/15 10:55 07/23/15 00:22 192-65-4 Dibenzo(a,h)pyrene 4.6 ug/kg 30.5 5.8 1 07/15/15 10:55 07/23/15 00:22 192-65-4 Dibenzo(a,h)pyrene 4.5 ug/kg 30.5 5.8 1 07/15/15 10:55 07/23/15 00:22 192-65-4 Dibenzo(a,h)pyrene 4.6 ug/kg 30.5 5.8 1 07/15/15 10:55 07	7471B Mercury	Analytical	Method: EPA	7471B Prep	aration Met	hod: El	PA 7471B			
Percent Moisture 67.2 % 0.10 0.10 1 07/20/15 20:34	Mercury	0.050J	mg/kg	0.059	0.021	1	07/17/15 18:19	07/19/15 16:36	7439-97-6	
8270D MSSV CPAH by SIM Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550 2-Methylnaphthalene	Dry Weight	Analytical	Method: AST	M D2974						
2-Methylnaphthalene	Percent Moisture	67.2	%	0.10	0.10	1		07/20/15 20:34		
3-Methylicholanthrene	8270D MSSV CPAH by SIM	Analytical	Method: EPA	8270D by SI	M Prepara	ion Me	thod: EPA 3550			
3-Methylcholanthrene	2-Methylnaphthalene	<2.1	ug/kg	30.5	2.1	1	07/15/15 10:55	07/23/15 00:22	91-57-6	
5-Methylchrysene		<4.0		30.5	4.0	1	07/15/15 10:55	07/23/15 00:22	56-49-5	
7,12-Dimethylbenz(a)anthracene 7,12-Dimethylbenz(c,g)carbazole 7,11-Dibenzo(c,g)carbazole 7,12-Dibenzo(c,g)carbazole 7,12-Dibenzo(a)anthracene 7,12-Dibenzo(a)anthrac	-	<2.6	ug/kg	30.5	2.6	1	07/15/15 10:55	07/23/15 00:22	3697-24-3	
7H-Dibenzo(c,g)carbazole		<5.5		30.5	5.5	1	07/15/15 10:55	07/23/15 00:22	57-97-6	
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				30.5	6.2	1	07/15/15 10:55	07/23/15 00:22	194-59-2	
Acenaphthylene				30.5		1	07/15/15 10:55	07/23/15 00:22	83-32-9	
Anthracene	Acenaphthylene			30.5		1	07/15/15 10:55	07/23/15 00:22	208-96-8	
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(f), in)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 30.5 2.5 1 07/15/15 10:55 07/23/15 00:22 181-24-2 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 00:22 226-36-8 Dibenzo(a,e)pyrene <1.6 ug/kg 30.5 5.8 1 07/15/15 10:55 07/23/15 00:22 189-64-0 Dibenzo	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)pyrene 42.4 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 45.2 ug/kg 30.5 5.2 1 07/15/15 10:55 07/23/15 00:22 191-24-2 Benzofluoranthenes (Total) 421.0 ug/kg 91.5 21.0 1 07/15/15 10:55 07/23/15 00:22 218-01-9 Chrysene 42.5 ug/kg 30.5 2.5 1 07/15/15 10:55 07/23/15 00:22 218-01-9 Dibenz(a,h)acridine 41.8 ug/kg 30.5 1.8 1 07/15/15 10:55 07/23/15 00:22 226-36-8 Dibenz(a,h)anthracene 45.9 ug/kg 30.5 5.9 1 07/15/15 10:55 07/23/15 00:22 253-70-3 Dibenzo(a,e)pyrene 41.6 ug/kg 30.5 5.8 1 07/15/15 10:55 07/23/15 00:22 192-65-4 Dibenzo(a,h)pyrene 43.0 ug/kg 30.5 5.8 1 07/15/15 10:55 07/23/15 00:22 189-65-9 Dibenz	Benzo(a)anthracene			30.5	2.5	1	07/15/15 10:55	07/23/15 00:22	56-55-3	
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	` '				2.4	1	07/15/15 10:55	07/23/15 00:22	50-32-8	
Benzofluoranthenes (Total)		<5.2			5.2	1	07/15/15 10:55	07/23/15 00:22	191-24-2	
Chrysene										
Dibenz(a,h)acridine	• • •								218-01-9	
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	•									
Dibenzo(a,e)pyrene										
Dibenzo(a,h)pyrene										
Dibenzo(a,i)pyrene	, , , , ,									
Dibenzo(a,l)pyrene										
Fluoranthene										
Fluorene										
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										
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										
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	, , , , , , , , , , , , , , , , , , , ,									
Pyrene	•									
Surrogates 2-Fluorobiphenyl (S) 66 %. 45-125 1 07/15/15 10:55 07/23/15 00:22 321-60-8										
2-Fluorobiphenyl (S) 66 %. 45-125 1 07/15/15 10:55 07/23/15 00:22 321-60-8	•	\Z.U	ug/Ng	30.3	2.0	'	37/10/10 10:00	31/20/10 00.22	.20 00 0	
		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				



Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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	A 6010 Prepai	ration Meth	od: EP/	A 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 Prep	aration Met	hod: El	PA 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: AST	TM 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 SII	M Preparat	ion Me	thod: 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		07/23/15 00:51		
Fluorene	<20.8	ug/kg	219	20.8	1		07/23/15 00:51		
Indeno(1,2,3-cd)pyrene	479	ug/kg	219	40.7	1		07/23/15 00:51		
Naphthalene	<13.7	ug/kg	219	13.7	1	07/15/15 10:55	07/23/15 00:51		
Phenanthrene	1600	ug/kg	219	18.4	1	07/15/15 10:55			
Pyrene	2040	ug/kg	219	19.8	1	07/15/15 10:55	07/23/15 00:51		
Surrogates		5 5							
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	



Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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.

Arsenic Barium Cadmium Chromium Copper Lead Selenium Silver 7471B Mercury Mercury Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene Acenaphthylene	3.1 76.8 0.40 14.8 18.0	Method: EPA mg/kg mg/kg	.6010 Prepar	ation Metho	od: EP/	A 3050			
Barium Cadmium Chromium Chromium Copper Lead Selenium Silver 7471B Mercury Mercury Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	76.8 0.40 14.8		16						
Barium Cadmium Chromium Chromium Copper Lead Selenium Silver 7471B Mercury Mercury Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	76.8 0.40 14.8		0.1	0.39	1	07/16/15 13:13	07/17/15 11:30	7440-38-2	
Chromium Copper Lead Selenium Silver 7471B Mercury Mercury Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	14.8		0.81	0.081	1	07/16/15 13:13	07/17/15 11:30	7440-39-3	
Copper Lead Selenium Silver 7471B Mercury Mercury Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	14.8	mg/kg	0.24	0.061	1	07/16/15 13:13	07/17/15 11:30	7440-43-9	
Lead Selenium Silver 7471B Mercury Mercury Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene		mg/kg	0.81	0.12	1	07/16/15 13:13	07/17/15 11:30	7440-47-3	
Lead Selenium Silver 7471B Mercury Mercury Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	10.0	mg/kg	0.81	0.12	1		07/17/15 11:30		
Selenium Silver 7471B Mercury Mercury Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	41.6	mg/kg	0.81	0.19	1		07/17/15 11:30		
Silver 7471B Mercury Mercury Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	< 0.65	mg/kg	1.6	0.65	1		07/17/15 11:30		
Mercury Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	<0.19	mg/kg	0.81	0.19	1		07/17/15 11:30		
Dry Weight Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	Analytical I	Method: EPA	7471B Prepa	aration Met	nod: El	PA 7471B			
Percent Moisture 8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	0.043	mg/kg	0.036	0.012	1	07/17/15 18:19	07/19/15 16:45	7439-97-6	
8270D MSSV CPAH by SIM 2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	Analytical	Method: AST	M D2974						
2-Methylnaphthalene 3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	52.1	%	0.10	0.10	1		07/20/15 20:36		
3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	Analytical I	Method: EPA	8270D by SI	M Preparat	ion Me	thod: EPA 3550			
3-Methylcholanthrene 5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	<1.5	ug/kg	20.9	1.5	1	07/15/15 10:55	07/23/15 01:20	91-57-6	
5-Methylchrysene 7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	<2.7	ug/kg	20.9	2.7	1	07/15/15 10:55	07/23/15 01:20	56-49-5	
7,12-Dimethylbenz(a)anthracene 7H-Dibenzo(c,g)carbazole Acenaphthene	<1.8	ug/kg	20.9	1.8	1	07/15/15 10:55	07/23/15 01:20	3697-24-3	
7H-Dibenzo(c,g)carbazole Acenaphthene	<3.7	ug/kg	20.9	3.7	1	07/15/15 10:55	07/23/15 01:20	57-97-6	
Acenaphthene	<4.2	ug/kg	20.9	4.2	1	07/15/15 10:55	07/23/15 01:20	194-59-2	
	<1.9	ug/kg	20.9	1.9	1	07/15/15 10:55	07/23/15 01:20	83-32-9	
	<2.3	ug/kg	20.9	2.3	1		07/23/15 01:20		
Anthracene	<2.2	ug/kg	20.9	2.2	1	07/15/15 10:55			
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		07/23/15 01:20		
Benzo(g,h,i)perylene	52.3	ug/kg	20.9	3.5	1	07/15/15 10:55	07/23/15 01:20		
Benzofluoranthenes (Total)	221	ug/kg	62.6	14.4	1	07/15/15 10:55			
Chrysene	107	ug/kg	20.9	1.7	1	07/15/15 10:55		218-01-9	
Dibenz(a,h)acridine	<1.2	ug/kg	20.9	1.2	1		07/23/15 01:20		
Dibenz(a,h)anthracene	<4.1	ug/kg	20.9	4.1	1		07/23/15 01:20		
Dibenzo(a,e)pyrene	<1.1	ug/kg	20.9	1.1	1	07/15/15 10:55	07/23/15 01:20		
Dibenzo(a,h)pyrene	<4.0	ug/kg	20.9	4.0	1		07/23/15 01:20		
Dibenzo(a,i)pyrene	<2.0	ug/kg	20.9	2.0	1	07/15/15 10:55			
Dibenzo(a,l)pyrene	<1.5	ug/kg	20.9	1.5	1	07/15/15 10:55	07/23/15 01:20		
Fluoranthene	209	ug/kg ug/kg	20.9	1.8	1	07/15/15 10:55	07/23/15 01:20		
Fluorene	<2.0	ug/kg ug/kg	20.9	2.0	1		07/23/15 01:20		
Indeno(1,2,3-cd)pyrene	46.8	ug/kg ug/kg	20.9	3.9	1		07/23/15 01:20		
Naphthalene	<1.3	ug/kg ug/kg	20.9	1.3	1	07/15/15 10:55	07/23/15 01:20		
Phenanthrene	62.6	ug/kg ug/kg	20.9	1.8	1	07/15/15 10:55	07/23/15 01:20		
Pyrene	135	ug/kg ug/kg	20.9	1.9	1		07/23/15 01:20		
Surrogates	133	ug/kg	20.9	1.9	ı	07/10/10 10.00	01/23/13 01.20	123-00-0	
2-Fluorobiphenyl (S)	60	%.	45-125		1	07/15/15 10:55	07/23/15 01:20	321-60-8	
p-Terphenyl-d14 (S)	69								



Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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.

Arsanic 2.1 mg/kg 1.6 0.39 1 07/16/15 13:13 07/17/15 11:34 7440-38-3 arg/kg 0.82 0.082 1 07/16/15 13:13 07/17/15 11:34 7440-38-3 0.04minum 0.33 mg/kg 0.82 0.082 1 07/16/15 13:13 07/17/15 11:34 7440-38-3 0.04minum 0.33 mg/kg 0.82 0.102 1 07/16/15 13:13 07/17/15 11:34 7440-38-3 0.04minum 0.33 mg/kg 0.82 0.12 1 07/16/15 13:13 07/17/15 11:34 7440-38-3 0.04minum 0.33 mg/kg 0.82 0.12 1 07/16/15 13:13 07/17/15 11:34 7440-38-3 0.04minum 0.34 mg/kg 0.82 0.12 1 07/16/15 13:13 07/17/15 11:34 7440-38-3 0.04minum 0.04.66 mg/kg 0.82 0.12 1 07/16/15 13:13 07/17/15 11:34 7440-38-3 0.04minum 0.04.66 mg/kg 0.82 0.10 1 07/16/15 13:13 07/17/15 11:34 7440-38-3 0.04minum 0.04.66 mg/kg 0.82 0.10 1 07/16/15 13:13 07/17/15 11:34 7439-92-1 0.04minum 0.04.66 mg/kg 0.82 0.10 1 07/16/15 13:13 07/17/15 11:34 7439-92-1 0.04minum 0.04.66 mg/kg 0.82 0.10 1 07/16/15 13:13 07/17/15 11:34 7440-22-4 0.04minum 0.04.66 mg/kg 0.82 0.10 1 07/16/15 13:13 07/17/15 11:34 7440-22-4 0.04minum 0.04.66 mg/kg 0.82 0.10 1 07/16/15 13:13 07/17/15 11:34 7440-22-4 0.04minum 0.04.66 mg/kg 0.82 0.10 1 07/16/15 13:13 07/17/15 11:34 7440-22-4 0.04minum 0.04.66 mg/kg 0.031 0.010 1 07/17/15 18:19 07/19/15 16:47 7439-92-1 0.04minum 0.04.66 mg/kg 0.031 0.010 1 07/17/15 18:19 07/19/15 16:47 7439-92-1 0.04minum 0.04.66 mg/kg 0.031 0.010 1 07/17/15 18:19 07/19/15 16:47 7439-92-1 0.04minum 0.04.66 mg/kg 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.0	Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Barium 73.3 mg/kg 0.82 0.082 1 0.71/16/15 13:13 07/17/15 11:34 7440-39-3 Cadmium 13.3 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 13:33 07/17/15 11:34 7440-47-3 Copper 15.3 mg/kg 0.82 0.12 1 07/16/15 13:33 07/17/15 11:34 7440-92-9 Selenium 0.66 mg/kg 0.82 0.19 0 07/16/15 13:33 07/17/15 11:34 7440-92-2 7471B Mercury Analytical Mercurb EPAT71B Preparation Mercurb 0.01 0.01 0.01 0.71/17/15 11:30 07/19/15 16:47 7439-97-6 Dry Weight Analytical Mercurb Set TM Depart Depart 0.01 0.10 0.10 0.71/17/15 11:30 07/19/15 16:47 7439-97-6 Dry Weight Analytical Mercurb EPA J 0.01 0.10 0.10 0.10	6010 MET ICP	Analytical	Method: EPA	6010 Prepa	ration Meth	od: EP	A 3050			
Bartum 73.3 mg/kg 0.82 0.082 1 0.71/F/51 5133 07/17/15 1134 7440-39-3 Cadamium 0.33 mg/kg 0.82 0.012 1 0.71/I6/15 1313 07/17/15 11134 7440-47-3 Copper 15.3 mg/kg 0.82 0.12 1 0.71/I6/15 1313 07/17/15 11134 7440-47-3 Copper 15.3 mg/kg 0.82 0.12 1 0.71/I6/15 1313 07/17/15 11134 7440-92-9 Selenium -0.66 mg/kg 0.82 0.19 0.71/I6/15 1313 07/17/15 11134 7440-92-9 Analytical Method: EPA 7471B Preparation Method: EPA 7471B Promotion Mill 0.01 0.71 0.71/15/15 1313 07/17/15 11134 7440-92-4 Analytical Method: EPA 7471B Preparation Method 0.71 0.71 0.71/15 1134 07/17/15 1134 7440-92-4 Analytical Method: EPA 7471B Preparation Method 0.21 0.01 0.71 0.71/15/15 1331 07/17/15 11349 7440-92-4 D	Arsenic	2.1	mg/kg	1.6	0.39	1	07/16/15 13:13	07/17/15 11:34	7440-38-2	
Cadmium 0.33 mg/kg 0.25 0.025 1 07/16/15 13:13 07/17/15 11:34 7440-49-9 Chromium 16.5 mg/kg 0.82 0.12 1 07/16/15 13:13 07/17/15 11:34 7440-50-8 Copper 15.3 mg/kg 0.82 0.12 1 07/16/15 13:13 07/17/15 11:34 7440-50-8 Stelenium -0.66 mg/kg 1.6 0.66 1 0.71/16/15 13:13 07/17/15 11:34 7440-50-8 Stelenium -0.91 mg/kg 0.82 0.19 1 07/16/15 13:13 07/17/15 11:34 7440-52-4 7471B Mercury Analytical Method: EFR 7471B Preparation Method: EFR 7471B EFR 7471B 07/16/15 10:50 07/19/15 16:47 7439-97-6 Dry Weight Analytical Method: EFR 8770D MSSV OPAH by SIM Analytical Method: EFR 8270D by SIM Preparation Method: EFR 8350 07/20/15 10:49 91-57-6 2-Methylnaphthalene -1.2 ug/kg 16.9 1.2 1 07/15/15 10:55 07/23/15 01:49 96-49-5 S-Methylcholanthrace <td< td=""><td>Barium</td><td>73.3</td><td></td><td>0.82</td><td>0.082</td><td>1</td><td>07/16/15 13:13</td><td>07/17/15 11:34</td><td>7440-39-3</td><td></td></td<>	Barium	73.3		0.82	0.082	1	07/16/15 13:13	07/17/15 11:34	7440-39-3	
Chromium 12.6 mg/kg	Cadmium	0.33		0.25	0.062	1	07/16/15 13:13	07/17/15 11:34	7440-43-9	
Copper 15.3 mg/kg 0.82 0.12 1 07/16/16 13:13 07/17/16 11:34 740-50-8 Selenium 40.66 mg/kg 0.6 0.82 0.20 1 07/16/15 13:13 07/17/15 11:34 7439-92-1 Silver 40.19 mg/kg 0.62 0.19 1 07/16/15 13:13 07/17/15 11:34 7430-92-1 A74TB Mercury Analysical Wethoric FPX 747TB Preparation Method: EPX 747TB EPX 747TB Preparation Method: EPX 747TB Procent Moisture 41.2 Mg/kg 0.01 0.10 1 77/15/15 18:19 74/39-97-6 2-Methylnaphithalene 41.2 ug/kg 16.9 1.2 1 07/15/15 10:55 07/23/15 01:49 91-57-6 3-Methylcholanthrene 4.1.2 ug/kg 16.9 1.2 1 07/15/15 10:55 07/23/15 01:49 91-57-6 S-Methylchopanthracene 4.1.4 ug/kg 16.9 1.4 07/15/15 10:55 07/23/15 01:49 91-7-6 S-Methylchopanthracene 4.1.4 ug/kg 16.9 <th< td=""><td>Chromium</td><td>12.6</td><td></td><td>0.82</td><td>0.12</td><td>1</td><td>07/16/15 13:13</td><td>07/17/15 11:34</td><td>7440-47-3</td><td></td></th<>	Chromium	12.6		0.82	0.12	1	07/16/15 13:13	07/17/15 11:34	7440-47-3	
Lead	Copper			0.82		1	07/16/15 13:13	07/17/15 11:34	7440-50-8	
Selenium			0 0			1	07/16/15 13:13	07/17/15 11:34	7439-92-1	
Silver	Selenium	<0.66		1.6		1	07/16/15 13:13	07/17/15 11:34	7782-49-2	
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 For process of the proce	Silver	<0.19				1	07/16/15 13:13	07/17/15 11:34	7440-22-4	
Percent Moisture 41.2 % 0.10 0.10 1 0.710 1.75 1.055 07/23/15 01:49 91-57-6 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 1.2 1 07/15/15 10:55 07/23/15 01:49 91-57-6 3-Methylcholanthrene <1.4 ug/kg 16.9 1.4 1 07/15/15 10:55 07/23/15 01:49 85-49-5 5-Methylchylchyesne <1.4 ug/kg 16.9 1.4 1 07/15/15 10:55 07/23/15 01:49 85-79-6 7-H-Dibenzo(c,g)carbazole <3.4 ug/kg 16.9 1.6 1 07/15/15 10:55 07/23/15 01:49 85-79-6 7-H-Dibenzo(c,g)carbazole <1.4 ug/kg 16.9 1.6 1 07/15/15 10:55 07/23/15 01:49 85-92-43 Acenaphthene <1.6 ug/kg 16.9 1.6 1 07/15/15 10:55 07/23/15 01:49 83-32-9 Acenaphthene <1.8 ug/kg 16.9 1.8 1 07/15/15 10:55 07/23/15 01:49 80-88-8 Anthracene <1.8 ug/kg 16.9 1.8 1 07/15/15 10:55 07/23/15 01:49 80-88-8 Benzo(a)pyrene 33.9 ug/kg 16.9 1.8 1 07/15/15 10:55 07/23/15 01:49 80-32-8 Benzo(a)pyrene 33.9 ug/kg 16.9 1.8 1 07/15/15 10:55 07/23/15 01:49 80-32-8 Benzo(g),hi)perylene 20.0 ug/kg 16.9 1.4 1 07/15/15 10:55 07/23/15 01:49 80-32-8 Benzo(g),hi)perylene 30.9 ug/kg 16.9 2.9 1 07/15/15 10:55 07/23/15 01:49 80-32-8 Benzo(g),hi)perylene 41.7 ug/kg 16.9 3.3 1 07/15/15 10:55 07/23/15 01:49 80-32-8 Benzo(g),hi)perylene 41.7 ug/kg 16.9 3.3 1 07/15/15 10:55 07/23/15 01:49 81-24-2 Benzo(g),hi)perylene 43.3 ug/kg 16.9 3.3 1 07/15/15 10:55 07/23/15 01:49 80-32-8 Dibenz(a,h)parthracene 43.3 ug/kg 16.9 3.2 1 07/15/15 10:55 07/23/15 01:49 80-32-8 Dibenz(a,h)pyrene 43.2 ug/kg 16.9 3.2 1 07/15/15 10:55 07/23/15 01:49 80-32-8 Dibenz(a,h)pyrene 43.1 ug/kg 16.9 1.3 1 07/15/15 10:55 07/23/15 01:49 80-32-8 Dibenz(a,h)pyrene 41.3 ug/kg 16.9 3.2 1 07/15/15 10:55 07/23/15 01:49 80-40-0 Dibenz(a,h)pyrene 41.3 ug/kg 16.9 1.3 1 07/15/15 10:55 07/23/15 01:49 80-40-0 Dibenz(a,h)pyrene 41.0 ug/kg 16.9 1.3 1 07/15/15 10:55 07/23/15 01:49 80-40-0 Dibenz(a,h)pyrene 41.0 ug/kg 16.9 1.4 1 07/15/15 10:55 07/23/15 01:49 80-40-0 Dibenz(a,h)pyrene 41.0 ug/kg 16.9 1.4	7471B Mercury	Analytical	Method: EPA	7471B Prep	aration Met	hod: E	PA 7471B			
Percent Moisture	Mercury	0.034	mg/kg	0.031	0.011	1	07/17/15 18:19	07/19/15 16:47	7439-97-6	
8270D MSSV CPAH by SIM Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550 2-Methylnaphthalene <1.2	Dry Weight	Analytical	Method: AST	M D2974						
2-Methylnaphthalene	Percent Moisture	41.2	%	0.10	0.10	1		07/20/15 20:37		
3-Methylcholanthrene	8270D MSSV CPAH by SIM	Analytical	Method: EPA	8270D by SI	M Prepara	ion Me	thod: EPA 3550			
3-Methylcholanthrene	2-Methylnaphthalene	<1.2	ug/kg	16.9	1.2	1	07/15/15 10:55	07/23/15 01:49	91-57-6	
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(c,g)carbazole <3.0				16.9		1	07/15/15 10:55	07/23/15 01:49	56-49-5	
7,12-Dimethylbenz(a)anthracene 71-Dibenzo(c,g)carbazole 23.4 ug/kg 16.9 3.4 1 07/15/15 10:55 07/23/15 01:49 194-59-2 Acenaphthene 21.6 ug/kg 16.9 3.4 1 07/15/15 10:55 07/23/15 01:49 194-59-2 Acenaphthylene 21.9 ug/kg 16.9 11.8 1 07/15/15 10:55 07/23/15 01:49 83-32-9 Acenaphthylene 21.9 ug/kg 16.9 11.8 1 07/15/15 10:55 07/23/15 01:49 208-96-8 Anthracene 22.9 ug/kg 16.9 11.4 1 07/15/15 10:55 07/23/15 01:49 208-96-8 Benzo(a)anthracene 22.9 ug/kg 16.9 11.4 1 07/15/15 10:55 07/23/15 01:49 56-55-3 Benzo(a)pyrene 20.0 ug/kg 16.9 11.4 1 07/15/15 10:55 07/23/15 01:49 56-55-3 Benzo(g),hi)perylene 20.0 ug/kg 16.9 20.0 ug/kg 16.9 20.1 107/15/15 10:55 07/23/15 01:49 56-55-3 Benzo(g),hi)perylene 20.0 ug/kg 16.9 20.1 ug/kg 16.9 20.1 ug/kg 20.1 ug/kg 20.1 ug/kg 20.2 ug/kg 20.3 ug/kg 20.4 11.7 ug/kg 20.5 11.7 1 07/15/15 10:55 07/23/15 01:49 191-24-2 Benzofluoranthenes (Total) 20.8 ug/kg 20.8 ug/kg 20.8 ug/kg 20.8 11.7 1 07/15/15 10:55 07/23/15 01:49 191-24-2 Benzofluoranthenes (Total) 20.8 ug/kg 20.8 ug/kg 20.8 11.7 1 07/15/15 10:55 07/23/15 01:49 191-24-2 Benzofluoranthenes (Total) 20.8 ug/kg 20.8 ug/kg 20.8 11.7 1 07/15/15 10:55 07/23/15 01:49 191-24-2 Benzofluoranthenes (Total) 20.8 ug/kg 20.8 ug/kg 20.8 11.7 1 07/15/15 10:55 07/23/15 01:49 191-24-2 Benzofluoranthenes (Total) 20.8 ug/kg 20.8 16.9 0.8 1 07/15/15 10:55 07/23/15 01:49 191-24-2 Benzofluoranthenes (Total) 20.8 ug/kg 20.8 ug/kg 20.8 16.9 0.8 1 07/15/15 10:55 07/23/15 01:49 191-24-2 Benzofluoranthene 20.8 ug/kg 20.8 ug/kg 20.8 16.9 0.8 1 07/15/15 10:55 07/23/15 01:49 191-24-2 Benzofluoranthene 20.8 ug/kg 20.8 16.9 0.8 1 07/15/15 10:55 07/23/15 01:49 191-24-2 Benzofluoranthene 20.8 ug/kg 20.8 16.9 0.8 1 07/15/15 10:55 07/23/15 01:49 191-30-0 Bibenzofluoranthene 20.8 ug/kg 20.8 16.9 0.8 1 07/15/15 10:55 07/23/15 01:49 191-30-0 Bibenzofluoranthene 20.8 ug/kg 20.8 16.9 0.8 1 07/15/15 10:55 07/23/15 01:49 191-30-0 Bibenzofluoranthene 20.8 ug/kg 20.8 16.9 0.8 1 07/15/15 10:55 07/23/15 01:49 191-30-0 Bibenzofluoranthene 20.8 ug/kg 20.8 16.9 0.8 1 07/15/15 10:55 07/23/15 0	-	<1.4	ug/kg	16.9		1	07/15/15 10:55	07/23/15 01:49	3697-24-3	
7H-Dibenzo(c,g)carbazole 43.4 ug/kg 16.9 3.4 1 07/15/15 10:55 07/23/15 01:49 194-59-2 Acenaphthene <1.6		<3.0		16.9	3.0	1	07/15/15 10:55	07/23/15 01:49	57-97-6	
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				16.9	3.4	1	07/15/15 10:55	07/23/15 01:49	194-59-2	
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		<1.6		16.9	1.6	1	07/15/15 10:55	07/23/15 01:49	83-32-9	
Anthracene	Acenaphthylene			16.9	1.9	1	07/15/15 10:55	07/23/15 01:49	208-96-8	
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 01:49 191-24-2 Benzofluoranthenes (Total) 88.5 ug/kg 16.9 1.3 1 07/15/15 10:55 07/23/15 01:49 218-01-9 Dibenz(a,h)acridine <0.98	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)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 01:49 218-01-9 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	Benzo(a)anthracene	22.9		16.9	1.4	1	07/15/15 10:55	07/23/15 01:49	56-55-3	
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 01:49 218-01-9 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	` '	33.9		16.9	1.4	1	07/15/15 10:55	07/23/15 01:49	50-32-8	
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					2.9	1			191-24-2	
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				50.8		1	07/15/15 10:55	07/23/15 01:49		
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	• • •					1			218-01-9	
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	•	<0.98		16.9	0.98	1				
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		<3.3		16.9		1	07/15/15 10:55	07/23/15 01:49	53-70-3	
Dibenzo(a,h)pyrene					0.87	1				
Dibenzo(a,i)pyrene										
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 01:49 206-44-0 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 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										
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										
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										
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										
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										
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	7. 3									
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	•									
Surrogates 2-Fluorobiphenyl (S) 66 %. 45-125 1 07/15/15 10:55 07/23/15 01:49 321-60-8										
2-Fluorobiphenyl (S) 66 %. 45-125 1 07/15/15 10:55 07/23/15 01:49 321-60-8	•	U-1.E	~ 9 ,1\9	10.0	1.0	•	31,10,10 10.00	51720710 01.40	.20 00 0	
\cdot		66	%.	45-125		1	07/15/15 10:55	07/23/15 01:49	321-60-8	
propriorition (o) /0. 00 /0. 1 01/10/10/10/10/10/10/10/10/10/10/10/10/1	p-Terphenyl-d14 (S)	69	%.	36-131		1				



Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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 Prepa	ration Meth	od: EP	A 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 Prep	aration Met	hod: E	PA 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: AST	M 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 SI	M Prepara	ion Me	thod: 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		07/23/15 02:18		
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		07/23/15 02:18		
Dibenzo(a,l)pyrene	<1.2	ug/kg	16.0	1.2	1		07/23/15 02:18		
Fluoranthene	61.8	ug/kg	16.0	1.4	1		07/23/15 02:18		
Fluorene	<1.5	ug/kg	16.0	1.5	1		07/23/15 02:18		
Indeno(1,2,3-cd)pyrene	<3.0	ug/kg	16.0	3.0	1		07/23/15 02:18		
Naphthalene	<1.0	ug/kg	16.0	1.0	1	07/15/15 10:55			
Phenanthrene	17.3	ug/kg	16.0	1.3	1		07/23/15 02:18		
Pyrene	42.0	ug/kg	16.0	1.4	1		07/23/15 02:18		
Surrogates	0	~ອ∵ອ			•	2.7.07.00	21,20,10 02.10	0 00 0	
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		07/23/15 02:18		

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ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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	,		. 6010 Prepa			A 3010 ial 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			
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	В
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 Prep	aration Met	hod: El	PA 7470A			
	Leachate I	Method/Date	: EPA 1311; 0	8/19/15 15:4	45 Init	ial 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	НЗ

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ANALYTICAL RESULTS

Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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	,		. 6010 Prepa : EPA 1311; 0			A 3010 ial 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	В
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 Prep	aration Met	nod: E	PA 7470A			
	Leachate I	Method/Date	: EPA 1311; 0	8/19/15 15:	45 Init	ial 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	НЗ

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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

Blank Reporting

Parameter Units Result 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

Blank Reporting

 Parameter
 Units
 Result
 Limit
 Analyzed
 Qualifiers

 Mercury
 ug/L
 <0.065</td>
 0.60
 08/20/15 17:49

METHOD BLANK: 2052894 Matrix: Water

Associated Lab Samples: 10313820009, 10313820010

Blank Reporting
Parameter Units Result Limit Analyzed Qualifiers

Mercury ug/L <0.065 0.60 08/20/15 17:51

<0.065

LABORATORY CONTROL SAMPLE: 2054877

Mercury

Date: 08/28/2015 06:26 AM

Parameter Units Spike LCS LCS % Rec Conc. Result % Rec Limits Qualifiers

15

Mercury ug/L 15 15.6 104 80-120

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2054969 2054970

ug/L

MSD MS 10313820010 Spike Spike MS MSD MS MSD % Rec Max Parameter Units Result % Rec % Rec **RPD** RPD Qual Result Conc. Conc. Result Limits

15

13.0

12.9

87

80-120

86

20

REPORT OF LABORATORY ANALYSIS

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.

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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

MercuryParameterUnitsBlank Reporting ResultLimitAnalyzedQualifiers0.00650.01907/19/15 16:22

LABORATORY CONTROL SAMPLE: 2023891

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2023892 2023893

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

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.



QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% 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 DUPLICA	TE: 20238	88		2023889							
ъ.		0313820001	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Max	0 1
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	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	

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.

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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

		Blank	Reporting		
Parameter	Units	Result	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	

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Arsenic	mg/L		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 S	PIKE DUPLICA	ATE: 20548	70		2054871							
	1	10313820010	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD		Qual
Arsenic	mg/L	<0.020	5	5	5.5	5.5	110	110	75-125	0	30	

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.





QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

MATRIX SPIKE & MATRIX S	SPIKE DUPLICA	ATE: 20548	70		2054871							
			MS	MSD					_			
	1	0313820010	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	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	

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.

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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

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

SAMPLE DUPLICATE: 2027548

Date: 08/28/2015 06:26 AM

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

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.



QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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

		Blank	Reporting		
Parameter	Units	Result	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,I)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					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% 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	

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.



QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

LABORATORY CONTROL SAMPLE:	2022921					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Anthracene	ug/kg	100	85.6	86	63-125	
Benzo(a)anthracene	ug/kg	100	83.9	84	60-125	
Senzo(a)pyrene	ug/kg	100	86.8	87	63-125	
enzo(g,h,i)perylene	ug/kg	100	94.2	94	58-125	
enzofluoranthenes (Total)	ug/kg	300	261	87	66-125	
hrysene	ug/kg	100	84.6	85	62-125	
ibenz(a,h)acridine	ug/kg	100	97.1	97	61-125	
benz(a,h)anthracene	ug/kg	100	98.2	98	59-125	
ibenzo(a,e)pyrene	ug/kg	100	80.5	81	47-125	
benzo(a,h)pyrene	ug/kg	100	81.1	81	41-128	
benzo(a,i)pyrene	ug/kg	100	74.9	75	34-125	
benzo(a,l)pyrene	ug/kg	100	64.6	65	30-125	
uoranthene	ug/kg	100	86.8	87	65-125	
uorene	ug/kg	100	80.3	80	57-125	
deno(1,2,3-cd)pyrene	ug/kg	100	97.4	97	60-125	
aphthalene	ug/kg	100	74.5	74	38-125	
nenanthrene	ug/kg	100	82.5	82	62-125	
rene	ug/kg	100	86.5	86	62-125	
Fluorobiphenyl (S)	%.			75	45-125	
-Terphenyl-d14 (S)	%.			84	36-131	

MATRIX SPIKE & MATRIX SPI	KE DUPLICA	ATE: 20229	22		2022923	·					
			MS	MSD							
	1	0313820001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	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.

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QUALITY CONTROL DATA

Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

MATRIX SPIKE & MATRIX SI	PIKE DUPLICA	TE: 20229	22		2022923							
			MS	MSD								
	10	0313820001	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	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.



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

Date: 08/28/2015 06:26 AM

В	Analyte was detected in the associated method blank.
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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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 23271422 LibertyCrossings-Rev4

Pace Project No.: 10313820

Date: 08/28/2015 06:26 AM

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

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Chain of 4700 West 77th						DARKON THIO MACHINES	desir de la companya	lumbei Vater	of Cont	ainers/P	reservativ	/e	l co	c 1	of	
Minneapolis, MN (952) 832-2600						No. of the local division in	Newson possession	vater			Soil		Name and an assume the state of			n Li
Project Number: 2327142)												Mana	iger:	enni i	Brekke.	
Project Name: / ANATY	(((())))			4				(HCI)		1		3:)	si Proje	ct **	TLI)
	Crossims				······································	d) #2		76	##	t) #1 eOH) #1	erved)) 1)#2	Solids (plastic vial, unpres.)	Of Containers OC C	Contact:_	1/10	
Sample Origination State /Y /V (use two letter posta	state abbreviation)	A. 1			#1 eserved)	Metals (Jals (HNO	reserved)#	(H2SO4)	d MeOH) #1 (tared MeOH)	(unpreserved) (unpreserved)			led by:	NU)	KIM
COC Number:	Dep	oth	N	Matrix	244 Type	(HCl) #I	ed Me	(unp Range		(tared 3TEX (ta	ared 1 (unpre	(plast	umbe	ica oy	~	
Location	Start Stop Un Depth Depth (m./	it Collection ft. Date	Collection Time (hh:mm)	Water	Grab Comp.	Cs (Dissolved Metals (HN Total Metals (HNO ₃)	General (unpreserved) Diesel Range Organics	Nutrients	VOCs (tare GRO, BTEX		% Solids	Samp Labor	atory:	HLE	
1. S-D	0 35 F	H07/09/205	11:00	N	χ		**************************************						2/ R.	n Ars	2012, C	a president
2. 502	0 311		11:30										a_	CIMA	Porm	5)
3.5-03	0 la 1		14:15								Ti		7	11	Paragraphical Policy Spirited	CONTRACTOR OF THE PROPERTY OF
4.5-04	0 3.6 V		14:45								N				M	
5-05 COMP	8//	10710/2015	0940											Nh	Dues	לימא
5-06 COMP	0//		10:30												- 1.3X	C
7.507 COMP	2//		[] = 00								1))			a
"5-08 COMP	0//		11:35	V	V									4		O4
9.				1			4			Λ			1	/	1 ,	1
10.				W			V		M		14		V	1	U	
Common Parameter/Container -	Preservation Key	Relinquished By:	<u>L</u>	On (Ŷ)		Date	1	me	Receive	l by:			Ale	Date	- /	Time Y:13
#1 - Volatile Organics = BTEX, GRO, #2 - Semivolatile Organics = PAHs, PC Full List, Herbicide/Pesticide/PCBs	CP, Dioxins, 8270	Relinquished By:		On 1	ce? I	Date		ime	Receive	i by:	<u>E-E</u>		1-1-12	1/10/15 Date		Time
# - General = pH, Chloride, Fluoride, TDS, TS, Sulfate - Nutrients = COD, TOC, Phenols,	Alkalinity, TSS,	Samples Shipped V		eight 🗆 F		xpress		mpler	Air Bill	Number	*	TOTAL TOWNS COMES AND		doch de Svendouder englingsverengengengengengen gr		
of Nitrogen, TKN		Distribution: White-C	Other:		ipment to	Dab;	Yellow	- Field	ГСору; І	Pink - L	ab Coordi	nator		**		

Chain of Custody		Numbe	Number of Containers/Preservative Water Soil COC 2 of 2				
4700 West 77th Street Minneapolis, MN 55435-4803 (952) 832-2600		Water	Soil				
				Project Manager: Tennibretke			
Project Number: 23271422		23 33 63 (HCI)	.)	Project TAA			
Project Name: Liberty Crossing		NO ₃) #3	# # # # # # # # # # # # # # # # # # #	Project QC Contact: 1A0			
Sample Origination State (use two letter posta	al state abbreviation)	erved Is (H: HNO ₃) served	O4) #. eOH) cd Mec preser preser preser pred) rial, 1	TO THE DAY			
COC Number:	Nº 452	CI) #1 Unpreserved); Metals (HNO3) (unpreserved) ange Organics	tared McOH)#1 TEX (tared McOH)#1 TEX (tared moDH) (unpreserved) (unpreserved)#2 (plastic vial, unp	Sampled by: Sample			
Location Start Stop Unit (m. or i		Comp. G L L L L L L L L L L L L L L L L L L	Nutrients (H2SO4) #4 VOCs (tared MeOH) #1 GRO, BTEX (tared MeOH) #1 DRO (tared unpreserved) Metals (unpreserved) SVOCs (unpreserved) #2 % Solids (plastic vial, unpres.)	Laboratory: PACS			
1. POND A COMP	07/10/2015 12:00 X	X		FUP RURA			
2 POND B COMP	07/09/2015 11-35 X			HAID OU			
3. POND C Comp	0409/2015 14:50 8	X		100			
4.				7			
5.							
6.							
7.							
8.							
9.							
10.							
Common Parameter/Container - Preservation Key	Relinquished By: On Ice	Pate Time 1413	Received by:	Date Time Vight 14:13			
#1 - Volatile Organics = BTEX, GRO, TPH, 8260 Full List #2 - Semivolatile Organics = PAHs, PCP, Dioxins, 8270 Full List, Herbicide/Pesticide/PCBs	? Date Time	Received by:	Date Time				
#∰ - General = pH, Chloride, Fluoride, Alkalinity, TSS, TDS, TS, Sulfate #∰ - Nutrients = COD, TOC, Phenols, Ammonia	Samples Shipped VIA: Air Freight Fee	deral Express Sampler	Air Bill Number:	Date Time 14:13 Date Time			
9. Nitrogen, TKN	Distribution: White-Original Accompanies Ships	ment to Lab; Yellow - Fiel	d Copy; Pink - Lab Coordinator	TIII			

Pace Analytical*

Document Name: Sample Condition Upon Receipt Form

Document No.: F-MN-L-213-rev.13 Document Revised: 23Feb2015 Page 1 of 1

Issuing Authority:
Pace Minnesota Quality Office

Sample Condition Upon Receipt BARC Courier: Fed Ex UPS [Commercial Pace SpeeDee [Tracking Number:	USPS Other:_	Sh.	Project lient	#: WO#: 10313820
Custody Seal on Cooler/Box Present? Yes	;	Seals Inta	act?	Yes No Optional: Proj. Due Date: Proj. Name:
Packing Material: Bubble Wrap Bubble Bags	None	e 🔲 (Other:	Temp Blank? Yes
Thermometer	IVI	e of Ice:	_ J We	t Blue None Samples on ice, cooling process has begun
Used: Cooler Temp Read (°C): Temp should be above freezing to 6°C USDA Regulated Soil (N/A, water sample) Did samples originate in a quarantine zone within the United S MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)?	ected (°C) or: <u>†</u> &). Î		Biological Tissue Frozen? Yes No N/A te and Initials of Person Examining Contents: 3/1///////////////////////////////////
	ılated Soil	Checklis		-Q-338) and include with SCUR/COC paperwork.
				COMMENTS:
Chain of Custody Present?	YZJYes	□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	√Z No	□N/A	7.
Sufficient Volume?	Ýes	 □No	□N/A	8.
Correct Containers Used?	Yes	□No	□n/a	9.
-Pace Containers Used?	Yes	No	□N/A	
Containers Intact?	XYes	□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?	¥Yes	□No	□N/A	12.
-Includes Date/Time/ID/Analysis Matrix:	Cq cc	laund 1 1 1	Linux - 1	
All containers needing acid/base preservation have been checked? All containers needing preservation are found to be in	Yes	□No	⊠ N/A	13.
compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease,	Yes	□No	□ n/a	Initial when Lot # of added
DRO/8015 (water) DOC	Yes	□No	A/N	completed: preservative:
Headspace in VOA Vials (>6mm)?	Yes	□No		14.
Trip Blank Present?	∐Yes	□No	ℚ N/A	15.
Trip Blank Custody Seals Present?	□Yes	□No	ØN/A	
Pace Trip Blank Lot # (if purchased):				
CLIENT NOTIFICATION/RESOLUTION				Field Data Required? Yes No
Person Contacted:				Date/Time:
Comments/Resolution:				
- tan				7/3/15

Project Manager Review:

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)

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; <u>dfetter@barr.com</u>) or me at 952-832-2700 or by email at <u>jbrekken@barr.com</u> with any questions.

Sincerely,

Jennifer Brekken

Senior Environmental Engineer

Jeruf Bukk

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:

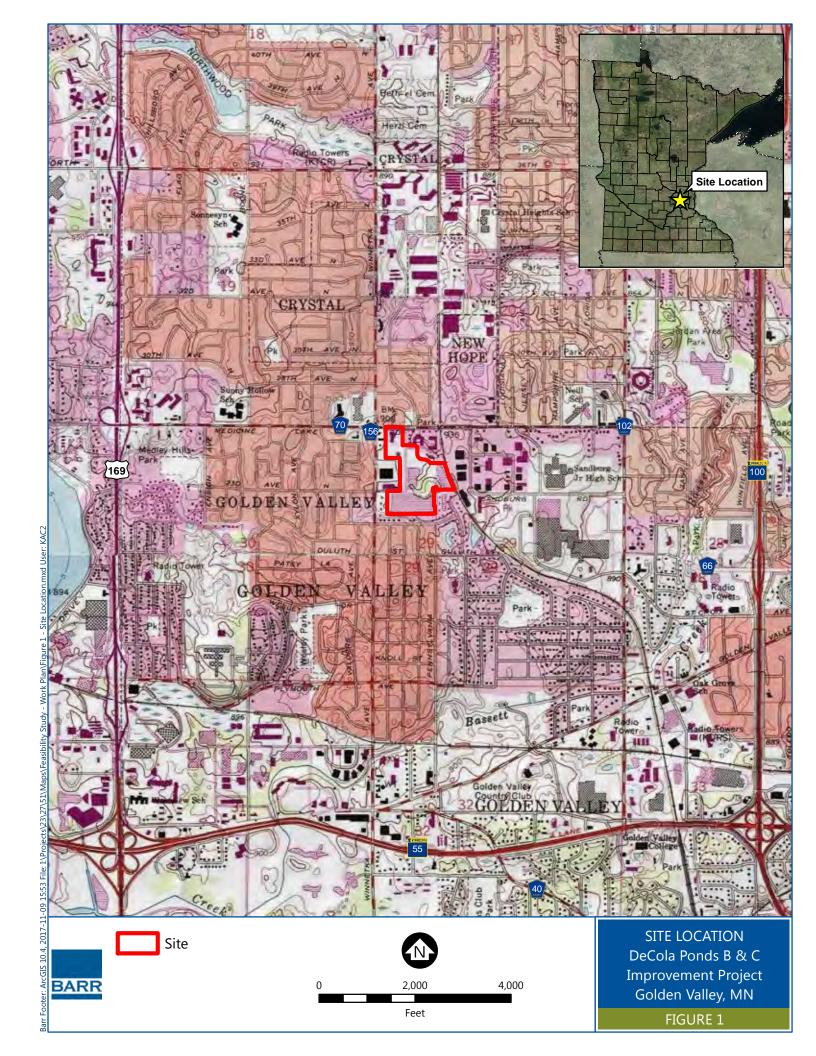
- Barr, 2017. Work Plan for Test Trench Investigation, DeCola Ponds B & C Improvement Project Feasibility Study (Liberty Crossing and Pennsylvania Woods Site, VP32191/PB4865). November 27, 2017.
- Barr, 2015a. Phase I Environmental Site Assessment. 7775 Medicine Lake Rd; 2480 Winnetka Ave N; 2485 Rhode 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
	I		MPCA Screening	MPCA Tier 1					1 10 11	
Parameter	Analysis	Units	Soil Leaching	Residential Soil						
	Location		Values	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										one mgmg
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	1200	< 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	Ť	< 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	Ť	< 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	Barr									
PEFs	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
	Analysis		MPCA Screening	MPCA Tier 1						
Parameter	Location	Units	Soil Leaching	Residential Soil						
	Location		Values	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					<u> </u>					0 0
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	Т	Т	< 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	Т	Т	< 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	Т	Т	< 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	Т	Т	< 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	Barr	- 0				0 0	0 0	0 0	0 0	0 0
PEFs	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		2.2.2.2.1.3/Ng				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Pyrene	Lab	mg/kg	440	890						
Total Petroleum Hydrocarbons										
Diesel Range Organics, silica gel cleanup	Lab	mg/kg								
Diesel Range Organics, Silica ger cleanup	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			< 6.4 mg/kg		29 Hig/kg 		< 7.0 mg/kg	< 0.7 mg/kg



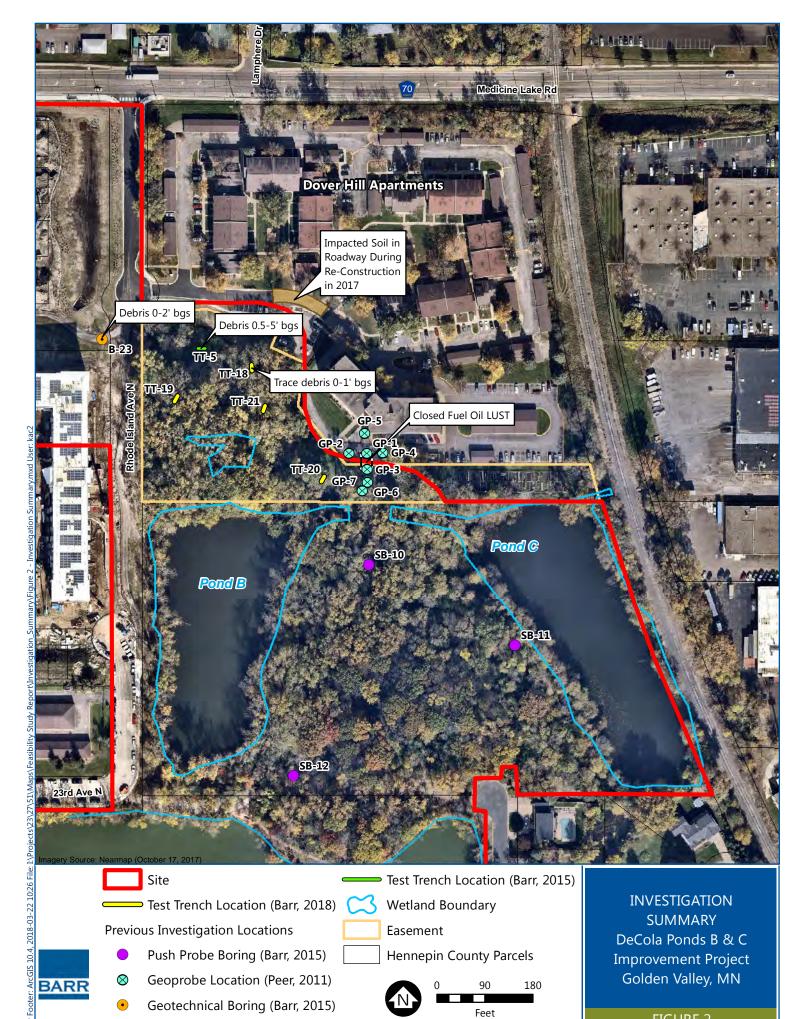


FIGURE 2

Appendix A

Test Trench Logs



GPS Z: ~898'

NA

Proj#: Side wall (N/S/E/W): Ν 23271422.01 **Project:** Liberty Crossings - Test Trenching

Date(s): 6/23/15 GPS X: 470252.728 **Trench Depth (feet): Driller:** Backhoe Type: Kubota 121-3 SDE 10 Depth to Native (feet): Trench Width (feet): 3 Logged by: 5 **GPS Y:** 4983681.394 Crew: Jason JWJ Depth to Water (feet): Trench Length (feet): 11 Checked by:

Properties Debris Total Concrete % Fotal Debris % ASTM / USCS Classification Discoloration PID (ppm) Moisture Sheen Sample Odor Interval Depth (ft.) Description 0-0.5' bgs = Black dirt and sod. Swampy 1 1.2 50% 30% Moist No No SM/SC 0.5-5' bgs = Medium to dark brown. Debris includes 2 1 wood, plywood, plastic, concrete and steel pipe. 2 3 1-5' 50% 30% Moist No No 3.1 3 4 4 5 25% 15% Moist No No 3.1 5-7' bgs = Very dark brown and rusty orange lean clay CL/OL 5 6 0 5-7' with trace roots: native. 7 6 0 0 Moist No No 3.2 CL7-9' bgs = Olive gray lean clay, trace very fine-grained 7 8 sand. 8 9 3.2 0 0 Moist No No 9-10' bgs = Rusty brown and olive gray lean clay. 9 10

End of trench

JWJ

Observer:

GPS Z Source: MNDNR LiDAR 2011

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

Test Trench #:

TT-5

JLB3



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): GPS Y: NA Trench Width (feet): Logged by: **PWS** ~1 3 Tim Crew: **Depth to Water (feet):** NA GPS Z: NA Trench Length (feet): 9 Observer: PWS Checked by: EJJ

					Properties			Dek	oris		
Dept	h (ft.)	Sample Interval	Moisture	Odor	Sheen	Discoloration	PID (ppm)	Total Debris %	Total Concrete %	ASTM / USCS Classification	
0	1				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	Composite									
4	5	sample									5-7' bgs = Brown sandy clay with some rusty
5	6	collected 1- 10 feet									organics.
6	7	10 (66)	Moist	No	No	No	0	0	0	CL	
7	8		1410130	110	110	140	· ·	v		CL	7-10' bgs = Brown sandy clay with trace gray clay.
8	9										
9	10										

End of trench

Test Trench #:



Proj#:23270051.39Project:DeCola PondsSide wall (N/S/E/W):Comp.Date(s):2/1/18GPS X:NATrench Depth (feet):9Driller:SDEBackhoe Type:Kubota KXO.

Date(s):2/1/18GPS X:NATrench Depth (feet):9Driller:SDEBackhoe Type:Kubota KX040-4Depth to Native (feet):~1GPS Y:NATrench Width (feet):3Crew:TimLogged by:PWS

Depth to Water (feet): NA GPS Z: NA French Length (feet): 10 Observer: PWS Checked by: EJJ

					Propertie	S		De	bris		
Dept	:h (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		Moist	No	No	No	0	0	0	OL	1-2' bgs = Black dirt.
2	3 4	Composite	Moist	No	No	No	0	0	0	CL	2-4' bgs = Dark brown sandy clay.
4	5	sample									4-10' bgs = Light brown sandy clay with trace
5	6	collected 1-10 feet									organic and trace gravel.
6	7	icet	D.4 - : - +	NI -	NI -	NI -	0	0	0	CI	
7	8		Moist	No	No	No	0	0	0	CL	
8	9										
9	10										

End of trench

Test Trench #:



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

				Р	roperties			Deb	ris		
Deptl			Moisture	Odor	Sheen	Discoloration	PID (ppm)	Total Debris %	Total Concrete %	ASTM / USCS Classification	Description
0	1			Frozer	1			0	0	OL	0-1' bgs = Frozen black dirt.
1	2										1-7' bgs = Brown sandy clay. At 3' bgs trace orange organics. At 4' bgs brown sandy clay.
2	3	Composite sample									
3	4	collected 1-9	Moist	No	No	No	0	0	0	CL	
4	5	feet and									
5	6	grab sample									
6	7	from 7-8 feet									
7	8	reet	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 #:



Proj#: 23270051.39 Project: DeCola Ponds Side wall (N/S/E/W): Comp.

Backhoe Type: Kubota KX040-4 2/1/18 Date(s): GPS X: NA Trench Depth (feet): 9 **Driller:** SDE **Depth to Native (feet):** ~1 GPS Y: NA Trench Width (feet): 3 Tim Logged by: **PWS** Crew: Checked by: Depth to Water (feet): GPS Z: NA Trench Length (feet): 10 **Observer:** PWS NA EJJ

				P	roperties			Del	bris		
Depti	Sample street of the street of			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		Moist	No	No	No	0	0	0	OL	1-2' bgs = Black dirt.
2	3										2-9' bgs = Brown sandy clay with trace orange
3	4										organics.
4	5	Composite sample									
5	6	collected 1-	Moist	No	No	No	0	0	0	CL	
6	7	10 feet									
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

Test Trench #:

Appendix B

Laboratory Report



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



Fax: 651-642-1239

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

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 Acceptable (IH/ISO only): No Received on melt water: No Ambient: 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.



Fax: 651-642-1239

Barr Engineering Co.Project:232700514300 MarketPointe Drive, Suite 200Project Number:23270051.39Work Order #: 1800459Minneapolis, MN 55435Project Manager:Ms. Terri OlsonDate 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 Sample	ed: 02/01/18	3 10:35	Receive	d: 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 Sample	ed: 02/01/18	3 11:50	Receive	d: 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 Sample	d: 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 Sample	ed: 02/01/18	3 13:00	Receive	d: 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 %		"	"	"	"	



Fax: 651-642-1239

Work Order #:

Date Reported:

1800459

02/13/18

Barr Engineering Co. Project: 23270051
4300 MarketPointe Drive, Suite 200 Project Number: 23270051.39
Minneapolis, MN 55435 Project Manager: Ms. Terri Olson

TOTAL METALS ANALYSIS
Legend Technical Services, Inc.

Analyte Result RL Units Dilution Prepared Method Batch Analyzed 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 0.066 0.013 Cadmium 0.19 1 mg/kg dry Chromium 14 0.66 0.026 1 mg/kg dry Lead 7.7 0.99 0.24 1 mg/kg dry Mercury < 0.66 0.66 0.16 mg/kg dry 1 Selenium <3.3 3.3 0.87 mg/kg dry 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 1.2 0.36 B8B0818 02/08/18 02/12/18 **EPA 6010C** Arsenic 1.4 mg/kg dry 1 82 **Barium** 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 0.62 < 0.62 0.15 1 Mercury mg/kg dry 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** 1.4 Barium 85 0.14 mg/kg dry 1 0.35 0.072 Cadmium 0.014 1 mg/kg dry 17 0.72 0.029 Chromium mg/kg dry 1 Lead 11 1.1 0.26 mg/kg dry 1 < 0.72 0.72 0.17 1 Mercury mg/kg dry 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 2.1 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 <1.2 1.2 0.35 B8B0818 02/08/18 02/12/18 EPA 6010C Arsenic mg/kg dry 1 56 1.2 Barium 0.12 mg/kg dry 1 Cadmium 0.15 0.060 0.012 1 mg/kg dry Chromium 12 0.60 0.024 mg/kg dry 1 10 0.89 0.21 1 Lead mg/kg dry 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



Fax: 651-642-1239

Barr Engineering Co. Project: 23270051
4300 MarketPointe Drive, Suite 200 Project Number: 23270051.39
Minneapolis, MN 55435 Project Manager: Ms. Terri Olson

Work Order #: 1800459
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	3 10:35	Receive	d: 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	"	"	"	п	
Acenaphthylene	< 0.43	0.43	0.093	mg/kg dry	1	"	"	п	"	
Anthracene	<0.43	0.43	0.091	mg/kg dry	1	"	"	п	п	
Benzo(a)anthracene	< 0.43	0.43	0.086	mg/kg dry	1	"	"	п	"	
Benzo(a)pyrene	< 0.43	0.43	0.092	mg/kg dry	1	"	n .	II .	п	
Benzo(b)fluoranthene	< 0.43	0.43	0.078	mg/kg dry	1	"	n .	II .	п	
Benzo(g,h,i)perylene	< 0.43	0.43	0.093	mg/kg dry	1	"	II .	"	II .	
Benzo(k)fluoranthene	< 0.43	0.43	0.092	mg/kg dry	1	"	II .	II .	"	
Chrysene	<0.43	0.43	0.084	mg/kg dry	1	"	n .	II .	п	
Dibenz(a,h)anthracene	<0.43	0.43	0.11	mg/kg dry	1	"	n .	II .	п	
Fluoranthene	< 0.43	0.43	0.089	mg/kg dry	1	"	II .	"	II .	
Fluorene	< 0.43	0.43	0.086	mg/kg dry	1	"	II .	II .	m m	
Indeno (1,2,3-cd) pyrene	<0.43	0.43	0.095	mg/kg dry	1	"	II .	"	II .	
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	3 11:50	Receive	d: 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	"	"	II .	"	
Benzo(g,h,i)perylene	<0.41	0.41	0.089	mg/kg dry	1	"	"	II .	"	
Benzo(k)fluoranthene	<0.41	0.41	0.088	mg/kg dry	1	"	II .	II .	п	
Chrysene	<0.41	0.41	0.080	mg/kg dry	1	"	II .	II .	п	
Dibenz(a,h)anthracene	<0.41	0.41	0.10	mg/kg dry	1	"	"	"	II .	
Fluoranthene	<0.41	0.41	0.085	mg/kg dry	1	"	"	"	"	
Fluorene	<0.41	0.41	0.081	mg/kg dry	1	"	"	"	"	
		0.44	0.090	mg/kg dry	1	"	"	m m	"	
Indeno (1,2,3-cd) pyrene	<0.41	0.41	0.090	mg/kg dry						
Indeno (1,2,3-cd) pyrene Naphthalene	<0.41 <0.41	0.41	0.089	mg/kg dry	1	"	"	"	"	



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

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	3 11:50	Receive	d: 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	"	п	п	"	
Acenaphthylene	<0.48	0.48	0.10	mg/kg dry	1	"	п	п	"	
Anthracene	<0.48	0.48	0.10	mg/kg dry	1	"	п	п	"	
Benzo(a)anthracene	<0.48	0.48	0.094	mg/kg dry	1	"	п	п	"	
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	"	II .	II .	"	
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	"	II .	II .	"	
Indeno (1,2,3-cd) pyrene	<0.48	0.48	0.10	mg/kg dry	1	"	II .	II .	"	
Naphthalene	<0.48	0.48	0.10	mg/kg dry	1	"	II .	II .	"	
Phenanthrene	<0.48	0.48	0.096	mg/kg dry	1	"	II .	II .	"	
Pyrene	<0.48	0.48	0.086	mg/kg dry	1	"	II .	II .	"	
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	3 13:00	Receive	d: 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	"	II .	п	"	
Acenaphthene	< 0.39	0.39	0.075	mg/kg dry	1	"	II .	II .	"	
Acenaphthylene	<0.39	0.39	0.085	mg/kg dry	1	"	"	"	"	
Anthracene	<0.39	0.39	0.082	mg/kg dry	1	"	"	II .	"	
Benzo(a)anthracene	<0.39	0.39	0.077	mg/kg dry	1	"	"	II .	"	
Benzo(a)pyrene	<0.39	0.39	0.083	mg/kg dry	1	II .	II .	ı	"	
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	н	II .	II .	II .	
•										



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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 Legend Technical Services, Inc.

Analyte	Result	RL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TT-21_1-10 (1800459-05) Soil	Sampled: 02/01/1	8 13:00	Receive	d: 02/02/18 1	I: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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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 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 1	1:15					
% 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 1	1:15					
% Solids	80			%	1	B8B0707	02/07/18	02/07/18	% calculation	
TT-20_1-9 (1800459-03) Soil	Sampled: 02/01/18 1	4:00	Received:	02/02/18 11	:15					
% Solids	69			%	1	B8B0707	02/07/18	02/07/18	% calculation	
TT-20 Peat_7-8 (1800459-04) S	Soil Sampled: 02/01	I/18 14	:00 Recei	ved: 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 1	1:15		_			
% Solids	84			%	1	B8B0707	02/07/18	02/07/18	% calculation	



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Barr Engineering Co.Project:232700514300 MarketPointe Drive, Suite 200Project Number:23270051.39Work Order #: 1800459Minneapolis, MN 55435Project Manager:Ms. Terri OlsonDate 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)				F	Prepared	ł & Analyze	ed: 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)				F	repared	ł & Analyze	ed: 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)				F	repared	ł & Analyze	ed: 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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Barr Engineering Co.Project:232700514300 MarketPointe Drive, Suite 200Project Number:23270051.39Work Order #:1800459Minneapolis, MN 55435Project Manager:Ms. Terri OlsonDate Reported:02/13/18

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

					Spike	Source		%REC		%RPD	
Analyte	Result	RL	MDL	Units	Level	Result	%REC	Limits	%RPD	Limit	Notes
Batch B8B0818 - EPA 3050B (M)											
Blank (B8B0818-BLK1)				ı	Prepared	l: 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)				I	repared	l: 02/08/18	Analyzed	l: 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)				I	Prepared	I: 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)	S	ource:	1800459-	01	Prepared	I: 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)	S	ource:	1800459-	01	Prepared	l: 02/08/18	Analyzed	l: 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	



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Barr Engineering Co.Project:232700514300 MarketPointe Drive, Suite 200Project Number:23270051.39Work Order #:1800459Minneapolis, MN 55435Project Manager:Ms. Terri OlsonDate 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)	S	ource: 1	800459-	01	Prepared	I: 02/08/18	Analyzed	d: 02/12/18	1		
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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Barr Engineering Co.Project:232700514300 MarketPointe Drive, Suite 200Project Number:23270051.39Work Order #: 1800459Minneapolis, MN 55435Project Manager:Ms. Terri OlsonDate 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 AS	SE Extraction										
Blank (B8B0208-BLK1)				1	Prepared	: 02/02/18	Analyzed	l: 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	l: 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		mg/kg wet	3.33	< 0.33	82.6	62.2-99			
Indeno (1,2,3-cd) pyrene	2.92	0.33		mg/kg wet	3.33	< 0.33	87.5	57-110			
Naphthalene	2.62	0.33		mg/kg wet		< 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			



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Barr Engineering Co.Project:232700514300 MarketPointe Drive, Suite 200Project Number:23270051.39Work Order #: 1800459Minneapolis, MN 55435Project Manager:Ms. Terri OlsonDate 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
,		IXL	IVIDL	Offics	Level	IXESUIT	/orceo	LIIIIII	701KI D	Liiiiii	140163
Batch B8B0208 - EPA 3545A ASE Ex											
Matrix Spike (B8B0208-MS1)			1800450-		•		•	d: 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)	S	ource:	1800450-	01	Prepared	l: 02/02/18	Analyzed	d: 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			



Fax: 651-642-1239

Barr Engineering Co.Project:232700514300 MarketPointe Drive, Suite 200Project Number:23270051.39Work Order #: 1800459Minneapolis, MN 55435Project Manager:Ms. Terri OlsonDate 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)	S	ource: 1	800459-0	5	Prepared	l & Analyze	ed: 02/07/1	8			
% Solids	82.0			%		84.0			2.41	20	



Fax: 651-642-1239

Barr Engineering Co.Project:232700514300 MarketPointe Drive, Suite 200Project Number:23270051.39Work Order #: 1800459Minneapolis, MN 55435Project Manager:Ms. Terri OlsonDate 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)



Fax: 651-642-1239

arr Engineering Co. (Chain	of	Cust	O G Y	ole Origination		П		An	alysis Request	ed		COC Numbe	524	62	AL IN
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Appendix C

Wetland Delineation Report (2017)



Wetland Delineation Report

DeCola Ponds B & C Improvement Project

Prepared for Bassett Creek Watershed Management Commission

October 2017

Wetland Delineation Report

October 2017

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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: HennepinTownship Number: 118NTownship Name: Brooklyn CenterRange Number: 21WNearest Community: Golden ValleySection 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:	second prior month:	third prior month:
	September 2015	August 2015	July 2015
estimated precipitation total for this location:	3.91	3.36	7.25
there is a 30% chance this location will have less	2.16	3.47	2.86
than:	2.10	5.47	2.00
there is a 30% chance this location will have	4.03	5.12	4.25
more than:	4.03	3.12	4.23
type of month: dry normal wet	normal	dry	wet
monthly score	3 * 2 = 6	2 * 1 = 2	1 * 3 = 3
multi-month score:		11 (
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:HennepinTownship Number:118NTownship Name:Brooklyn CenterRange Number:21WNearest Community:Golden ValleySection 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:	second prior month:	third prior month:
	August 2017	July 2017	June 2017
estimated precipitation total for this location:	6.78R*	3.81R*	3.75R*
there is a 30% chance this location will have less	3.47	2.86	3.46
than:	5.47	2.00	5.40
there is a 30% chance this location will have	5.12	4.25	5.34
more than:	5.12	4.23	3.34
type of month: dry normal wet	wet	normal	normal
monthly score	3 * 3 = 9	2 * 2 = 4	1 * 2 = 2
multi-month score:		1E (west)	_
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:HennepinTownship Number:118NTownship Name:Brooklyn CenterRange Number:21WNearest Community:Golden ValleySection Number:29

Precipitation Totals a	re 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)

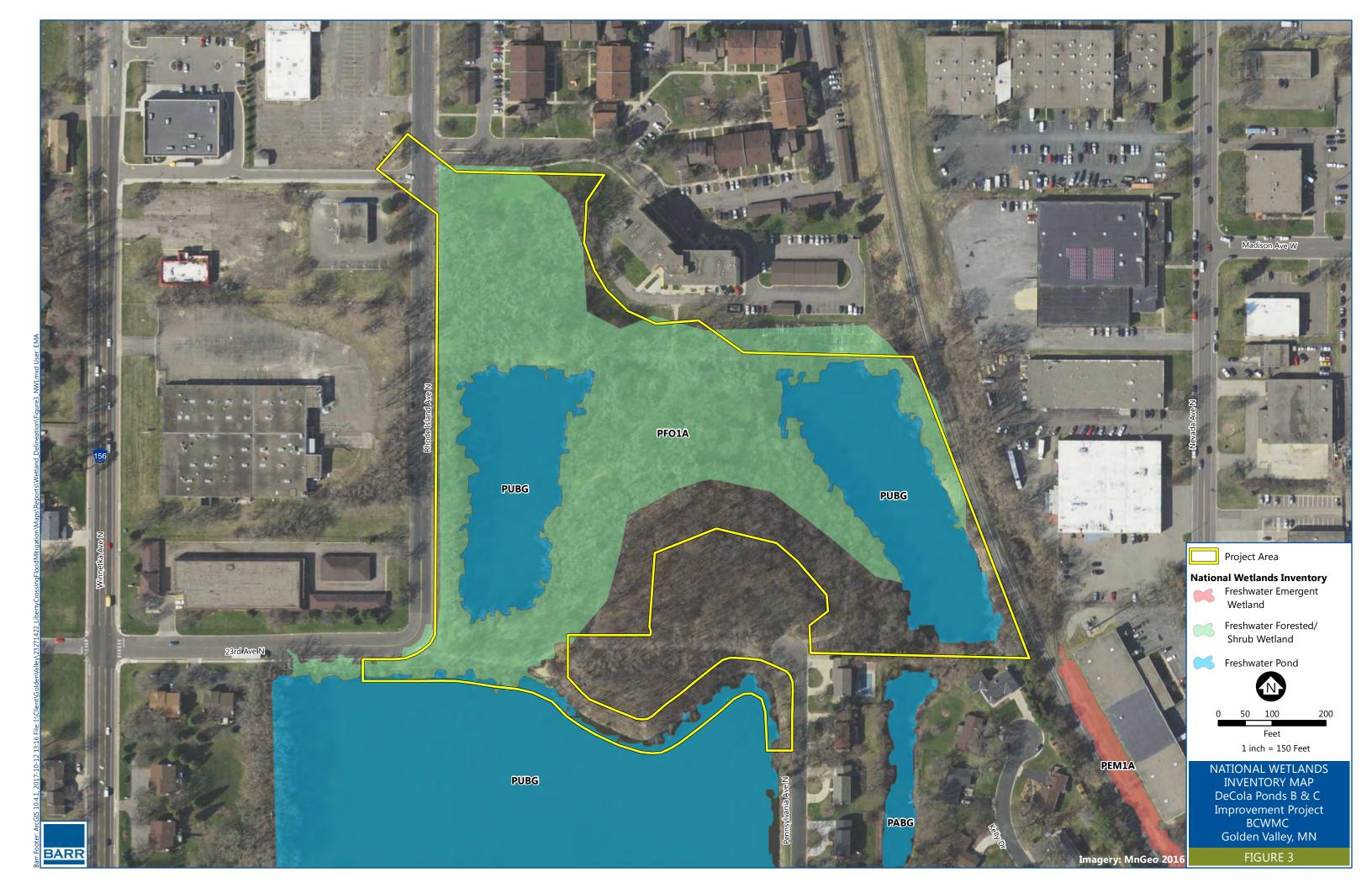
						Period-of	-Record S	Summary S	Statistic	s					
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
30%	0.54	0.50	1.14	1.64	2.60	3.19	2.42	2.73	1.84	1.21	0.72	0.56	16.31	25.98	25.86
70%	1.08	1.15	2.07	2.80	4.27	5.41	4.43	4.49	3.84	2.67	1.94	1.36	21.40	32.62	31.98
mean	0.89	0.90	1.66	2.43	3.66	4.46	3.83	3.68	3.05	2.20	1.54	1.05	18.65	29.31	29.33
						1981-	2010 Sum	mary Stati	stics						
	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

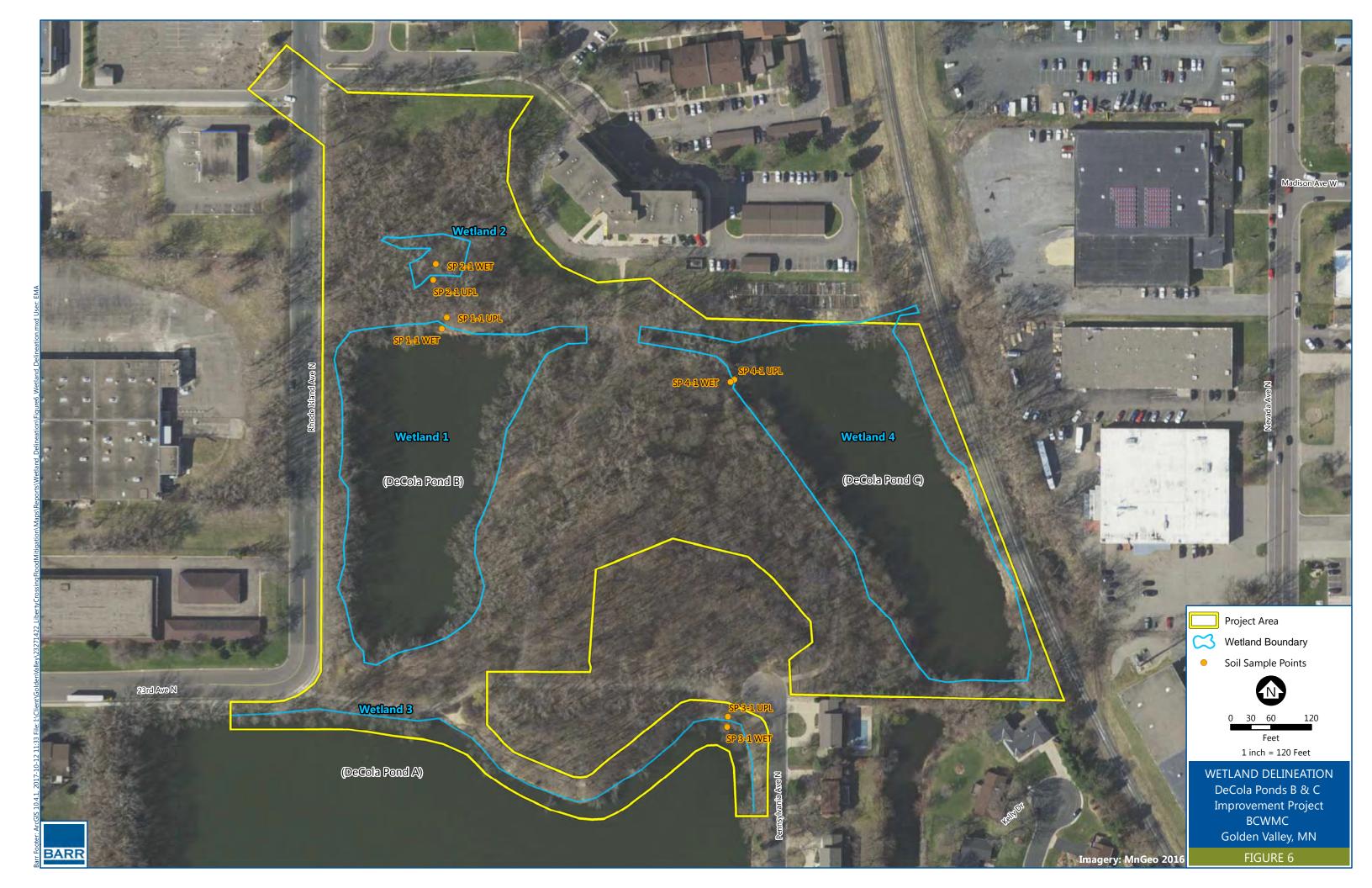












Appendix A Wetland Data Forms

WETLAND DETERN	MINATION D	ATA FORI	M - Midwest Regioi	n
Project/Site: DeCola Ponds B & C Improvement Applicant/Own Project	er: BCWMC	City/County: Gold Valle	l <u>en</u> State: <u>MN</u> Sam _{2Y} /Hennepin	npling Date: 10/16/15
Investigator(s): BKB Section:	<u>29</u>	Township: 118N	Range: <u>21W</u> Sam	npling Point: <u>1-1 UPL</u>
Land Form: <u>Hillslope</u> Local Relief:	<u>Concave</u>	Slope %: <u>2</u>	Soil Map Unit Name: <u>Urbanland-</u>	Udorthents wet sub, 0-2% slope
Subregion (LRR): M Latitude:	<u>4983595</u>	Longitude: 47027	Datum: NAD83, UTM	1 Zone 15 meters
Cowardin Classification: Upland Circular 39 Cla	assification: <u>Upland</u>		Mapped NWI Classification:	PFO1A
Are climatic/hydrologic conditions on the site typical for this time of year?	Yes (If no, expla	ain in remarks)	Eggers & Reed (primary):	<u>Upland</u>
Are vegetation No Soil No Hydrology No sign	nificantly disturbed?	Are "normal circumstances"		<u>N/A</u>
	urally problematic?	present?	. , ,,	N/A N/A
	3.	! . [] [] .		_
SUMMARY OF FINDINGS - Attach site map shov	ving sampling p	point location	ns, transects, important i	teatures, etc.
Hydrophytic vegetation present? Hydric soil present? Indicators of wetland hydrology present? Is the sampled area within a wetland? Yes General Remarks (explain any answers if needed). No If yes, optional W		<u>and</u>		
VEGETATION				
	Absolute Dominan	t Indicator	50/20 Thresholds:	<u>20%</u> <u>50%</u>
<u>Tree Stratum</u> (Plot Size: <u>30 ft</u>)	% Cover Species?		Tree Stratum	10 25
Populus deltoides	25 Yes	FAC	Sapling/Shrub Stratum	5.4 13.5
Acer negundo	25 Yes	FAC	Herb Stratum	5 12.5
3.	0		Woody Vine Stratum	0 0
4.	0		<u>Dominance Test Worksheet:</u>	
Total Cover:	<u>50</u>		Number of Dominant Species That Are OBL, FACW or FAC:	7 (A)
<u>Sapling/Shrub Stratum</u> (Plot Size: <u>15 ft</u>)			Total Number of Dominant	
1. Rhamnus cathartica	25 Yes	FAC	Species Across All Strata:	7 (B)
2. Sambucus racemosa	2 No	FACU	Percent of Dominant Species	400 000/ (A/D)
3. 4.	0		That Are OBL, FACW or FAC:	100.00% (A/B)
5.	0		Prevalence Index Worksheet:	
Total Cover:	27		Total % Cover of:	Multiply by:
Herb Stratum (Plot Size: 5 ft			OBL Species 0	X 1 0
Solanum dulcamara	10 Yes	FAC	FACW Species15	X 2 30
2. Urtica dioica	5 Yes	FACW	FAC Species85	X 3 255
3. Phalaris arundinacea	5 Yes	FACW	FACU Species2	X 48
4. Fraxinus pennsylvanica	5 Yes	FACW	UPL Species0	X 5 0
5.	0		Column Totals: 102	(A) 293 (B)
6	0		Prevalence Index =	B/A = 2.87
8.	0		Hydrophytic Vegetation Indicators	<u> </u>
Total Cover:	<u>25</u>		No Rapid Test for Hydroph	nytic Vegetation
Woody Vine Stratum (Plot Size: 30 ft)	<u>20</u>		Yes Dominance Test is >50	%
1.	0		Yes Prevalence Index ≤ 3.0	• •
2.	0		No Morphological Adaptat in vegetation remarks o	tions [1] (provide supporting data or on a separate sheet)
Total Cover:	<u>0</u>		ŭ .	tic Vegetation [1] (Explain)
% Bare Ground in Herb Stratum: 75	% Sphagnum Moss Co	over:	[1] Indicators of hydric soil & wetland hy disturbed or problematic.	ydrology must be present, unless
Vegetation Remarks: (include photo numbers here or on a separate s	sheet)		Hydrophytic vegetation present?	<u>Yes</u>

OIL						<i>Sampii</i>	ing Point:	7
rofile Description: (Describe to the depth n	eeded to do	ocument the indicator or	confirm th	ne abscence	of indicators	5).		
Depth Matrix		Re	edox Featu	res				
(inches) Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Rem	arks
0 - 10 2.5Y 3/1						Loam		
10 - 16 2.5Y 3/2	99	10YR 3/3	1	С	М	Silty Loam		
16 - 22 10YR 3/2						Silty Loam	Peat inclu: 5%	of matrix
<u> </u>					-	· -		
· —					-	· 		
Type: C=Concentration, D=Depletion, RM	======================================	Matrix, MS=Masked San	d Grains	[2] Locatio	n: PL=Pore I	Lining, M=Matrix.		
dric Soil Indicators: (applicable to all LRR	?s, unless o	therwise noted)			Inc	dicators for Problematic Hydri	ic Soils [3]:	
Histosol (A1)		Sandy (Gleyed Matr	ix (S4)		Coast Prairie Redox (A16)		
Histic Epipedon (A2)		_	Redox (S5)			Dark Surface (S7)		
Black Histic (A3)			d Matrix (S6	.)		Iron-Manganese Masses (F12))	
						_		
Hydrogen Sulfide (A4)			Mucky Mine			Very Shallow Dark Surface (TF	- 12)	
Stratified Layers (A5)			Gleyed Mati			Other (explain in soil remarks)		
2 cm Muck (A10)		<u> </u>	d Matrix (F3					
Depleted Below Dark Surface (A11)			Dark Surfac					
Thick Dark Surface (A12)		Deplete	d Dark Surf	face (F7)	[3]	Indicators of hydrophytic veg	netation and wetlan	d hydroloi
Sandy Mucky Mineral (S1)		Redox I	Depressions	s (F8)		ust be present, unless disturb		a rry ar orog
5 cm Mucky Peat or Peat (S3)								
estrictive Layer (if present): Type:		Dep	oth (inches	s):		Hydric soil present?	<u>No</u>	
oil Remarks:								
m Kemarks.								
/DROLOGY								
etland Hydrology Indicators:								
imary Indicators (minimum of one required	t; check all	that apply)			Se	condary Indicators (minimum	of two required)	
Surface Water (A1)		☐ Water-Stained Lea	ves (B9)			Surface Soil Cracks (B6)		
High Water Table (A2)		Aquatic Fauna (B1	3)			Drainage Patterns (B10)		
Saturation (A3)		☐ True Aquatic Plant.				Dry-Season Water Table (C2)		
Water Marks (B1)		Hydrogen Sulfide (Crayfish Burrows (C8)		
			, ,	na Poots (C3)	-	agany (CO)	
Sediment Deposits (B2)		Oxidized Rhizosph		-	<i>)</i>	Saturation Visible on Aerial Im-		
Drift Deposits (B3)		Presence of Reduc				Stunted or Stressed Plants (D2	1)	
Algal Mat or Crust (B4)		Recent Iron Reduc		a Soils (C6)		Geomorphic Position (D2)		
Iron Deposits (B5)		Thin Muck Surface	(C7)		✓	FAC-Neutral Test (D5)		
Inundation Visible on Aerial Imagery (B7)		Gauge or Well Date	a (D9)					
Sparsely Vegetated Concave Surface (B8)		Other (explain in re	emarks)					
eld Observations:						Indicators of wetland hyd	rology present?	<u>No</u>
ırface water present?		Surface Water Depth	(inches):			Describe Recorded Data:	'	_
ater table present?		Water Table Depth (in	ches):					
turation present? (includes capillary fringe	e)	Saturation Depth (inc						
				Davida I				
ecorded Data: Aerial Photo	Monitoring	g Well Stream Gau	uge F	Previous Ins	vections			
ydrology Remarks:								

WETLAND DETER	MINATION D	ATA FOR	RM - Midwest Regio	n
Project/Site: DeCola Ponds B & C Improvement Applicant/Over Project Applicant/Over Project	vner: <u>BCWMC</u>	City/County: Gol Val	<u>den</u> State: <u>MN</u> San ley/Hennepin	mpling Date: <u>10/16/15</u>
Investigator(s): BKB Section:	<u>29</u>	Township: 118N	<u>l</u> Range: <u>21W</u> Sar	mpling Point: <u>1-1 WET</u>
Land Form: Toeslope Local Relief.	<u>Concave</u>	Slope %: <u>0-1</u>	Soil Map Unit Name: <u>Urbanland</u>	-Udorthents wet sub, 0-2% slope
Subregion (LRR): M Latitude:	<u>4983595</u>	Longitude: 4702	72 Datum: NAD83, UTN	M Zone 15 meters
Cowardin Classification: PUBG/PEMB Circular 39 C	Classification: Type 5/2		Mapped NWI Classification:	PFO1A
Are climatic/hydrologic conditions on the site typical for this time of year?	Yes (If no, expla	ain in remarks)	Eggers & Reed (primary):	Shallow, Open Water
Are vegetation No Soil No Hydrology No s	ignificantly disturbed?	Are "normal circumstances"	Yes Eggers & Reed (secondary):	Fresh (Wet) Meadow
Are vegetation No Soil No Hydrology No na	aturally problematic?	present?	Eggers & Reed (tertiary): Eggers & Reed (quaternary):	
SUMMARY OF FINDINGS - Attach site map sho	3.1	naint lacatic	31	footures etc
,	0 1 01		ліз, панзесіз, інірогіані	Tealures, etc.
Hydrophytic vegetation present? Yes General Remark Hydric soil present? Yes (explain any answers if neede				
Is the sampled area within a wetland? Yes If yes, optional	Wetland Site ID: <u>Wet</u>	tland 1		
VEGETATION				
	Absolute Dominan	t Indicator	50/20 Thresholds:	<u>20%</u> <u>50%</u>
<u>Tree Stratum</u> (Plot Size: 30 ft) % Cover Species?		Tree Stratum	6 15
Populus deltoides	15 Yes	FAC	Sapling/Shrub Stratum	0 0
Acer negundo	15 Yes	FAC	Herb Stratum	20.2 50.5
3.	0		Woody Vine Stratum	0
4.	0		<u>Dominance Test Worksheet:</u>	
Total Cover:	<u>30</u>		Number of Dominant Species That Are OBL, FACW or FAC:	3 (A)
Sapling/Shrub Stratum (Plot Size: 15 ft)		1	
1.	0		Total Number of Dominant Species Across All Strata:	3 (B)
2.	0		Percent of Dominant Species	(4/5)
3.	0		That Are OBL, FACW or FAC:	100.00% (A/B)
5.	0		Prevalence Index Worksheet:	
Total Cover:	0		Total % Cover of:	Multiply by:
Herb Stratum (Plot Size: 5 ft	<u>=</u>		OBL Species 0	X1 0
1. Phalaris arundinacea	99 Yes	FACW	FACW Species 100	X 2 200
Solanum dulcamara	1 No	FAC	FAC Species 31	X 3 93
3. Urtica dioica	1 No	FACW	FACU Species 0	X 4 0
4.	0		UPL Species 0	X 5 0
5.	0		Column Totals: 131	(A) 293 (B)
6	0		Prevalence Index =	= B/A = 2.24
8.	0		Hydrophytic Vegetation Indicators	<u>S:</u>
Total Cover:	101		No Rapid Test for Hydrop	hytic Vegetation
Woody Vine Stratum (Plot Size: 30 ft)		Yes Dominance Test is >50	0%
1.	0		Yes Prevalence Index ≤ 3.0	• •
2.	0			tions [1] (provide supporting data or on a separate sheet)
Total Cover:	0		II ~	tic Vegetation [1] (Explain)
% Bare Ground in Herb Stratum:	% Sphagnum Moss Co	over:	[1] Indicators of hydric soil & wetland h disturbed or problematic.	ydrology must be present, unless
Vegetation Remarks: (include photo numbers here or on a separate	e sheet)		Hydrophytic vegetation present?	<u>Yes</u>
			<u> </u>	

10YR 3/1	Texture Remarks Loam Clay Loam Clay Clay Clay Peat
0 - 5	Clay Loam Clay Clay Clay Peat
Type: Typ	Clay Loam Clay Clay Peat
10 - 15 2.5YR 2.5/1	Clay Clay Peat
15 - 20 10YR 2/1 10YR 4/6 2 C M C 20 - 25 F 1 Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lini Ardric Soil Indicators: (applicable to all LRRs, unless otherwise noted) Indicators: Indicators: (applicable to all LRRs, unless otherwise noted) Indicators: Indic	Clay Peat
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lini varic Soil Indicators: (applicable to all LRRs, unless otherwise noted) Indicators: (applicators: (applica	Peat
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lini ydric Soil Indicators: (applicable to all LRRs, unless otherwise noted) Indicators (applicable to all LRRs, unless otherwise noted) Indicators: (applicators: (applicable to all LRRs, unless otherwise noted) Indicators: (applicable to all LRRs, unless otherwise noted) Indicators: (application (applicators: (application (application (applicators: (application (ap	
ydric Soil Indicators: (applicable to all LRRs, unless otherwise noted) Histosol (A1)	
Histosol (A1)	пу, м=маттх.
Histic Epipedon (A2)	ators for Problematic Hydric Soils [3]:
Black Histic (A3)	oast Prairie Redox (A16)
Hydrogen Sulfide (A4)	ark Surface (S7)
Stratified Layers (A5)	on-Manganese Masses (F12)
Stratified Layers (A5)	ery Shallow Dark Surface (TF12)
2 cm Muck (A10) □ Depleted Matrix (F3) □ Depleted Below Dark Surface (A11) ☑ Redox Dark Surface (F6) □ Thick Dark Surface (A12) □ Depleted Dark Surface (F7) □ Sandy Mucky Mineral (S1) □ Redox Depressions (F8) □ 5 cm Mucky Peat or Peat (S3) **PROLOGY **Vetland Hydrology Indicators:** **rimary Indicators (minimum of one required; check all that apply) *□ Surface Water (A1) □ Water-Stained Leaves (B9) □ Staturation (A3) □ High Water Table (A2) □ Aquatic Fauna (B13) □ Dr. □ Water Marks (B1) □ Hydrogen Sulfide Odor (C1) □ Cr.	ther (explain in soil remarks)
Depleted Below Dark Surface (A11) Thick Dark Surface (A12) Sandy Mucky Mineral (S1) Som Mucky Peat or Peat (S3) Depth (inches): Depth (inches): Depth (inches): Depth (inches): Second Properties of the Surface (B1) Depth (inches): Second Properties of the Surface (B1) Second Prope	
Thick Dark Surface (A12)	
Sandy Mucky Mineral (S1) Redox Depressions (F8) must [3] Inc must [3]	
estrictive Layer (if present): Type:	dicators of hydrophytic vegetation and wetland hydrol
estrictive Layer (if present): Type:	be present, unless disturbed or problematic.
YDROLOGY Vetland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply) Secon Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Hydrogen Sulfide Odor (C1) Wetland Hydrology Applications: Secon Aquatic Fauna (B13) Dr True Aquatic Plants (B14) Dr Hydrogen Sulfide Odor (C1)	
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply) Secon Surface Water (A1) High Water Table (A2) Saturation (A3) True Aquatic Plants (B14) Water Marks (B1) Hydrogen Sulfide Odor (C1)	Hydric soil present? Yes
YDROLOGY Vetland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply) Secon Surface Water (A1) High Water Table (A2) Aquatic Fauna (B13) Saturation (A3) True Aquatic Plants (B14) Water Marks (B1) Hydrogen Sulfide Odor (C1)	
Vetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply) Second Surface Water (A1) High Water Table (A2) Aquatic Fauna (B13) Saturation (A3) True Aquatic Plants (B14) Water Marks (B1) Hydrogen Sulfide Odor (C1)	
Vetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply) Second Surface Water (A1) High Water Table (A2) Aquatic Fauna (B13) Saturation (A3) True Aquatic Plants (B14) Water Marks (B1) Hydrogen Sulfide Odor (C1)	
Second Surface Water (A1) Water-Stained Leaves (B9) Surface Water Table (A2) Aquatic Fauna (B13) Dr. Saturation (A3) True Aquatic Plants (B14) Dr. Water Marks (B1) Hydrogen Sulfide Odor (C1) Cr.	
Surface Water (A1) High Water Table (A2) Saturation (A3) Water-Stained Leaves (B9) Aquatic Fauna (B13) Dr True Aquatic Plants (B14) Water Marks (B1) Hydrogen Sulfide Odor (C1)	ndary Indicators (minimum of two required)
High Water Table (A2) Aquatic Fauna (B13) Dr Saturation (A3) True Aquatic Plants (B14) Dr Water Marks (B1) Hydrogen Sulfide Odor (C1) Cr	urface Soil Cracks (B6)
Saturation (A3) True Aquatic Plants (B14) Di Water Marks (B1) Hydrogen Sulfide Odor (C1) Cr	
Water Marks (B1) Hydrogen Sulfide Odor (C1)	rainage Patterns (B10)
	ry-Season Water Table (C2)
Codiment Denocite (B2)	rayfish Burrows (C8)
Sediment Deposits (B2) Oxidized Rhizospheres on Living Roots (C3) Sediment Deposits (B2)	aturation Visible on Aerial Imagery (C9)
Drift Deposits (B3) Presence of Reduced Iron (C4) St	tunted or Stressed Plants (D1)
Algal Mat or Crust (B4) Recent Iron Reduction in Tilled Soils (C6)	eomorphic Position (D2)
Iron Deposits (B5) ☐ Thin Muck Surface (C7) ✔ FA	AC-Neutral Test (D5)
	, ,
☐ Inundation Visible on Aerial Imagery (B7) ☐ Gauge or Well Data (D9) ☐ Sparsely Vegetated Concave Surface (B8) ☐ Other (explain in remarks)	
eld Observations:	Indicators of wetland hydrology present? Yes
urface water present? Surface Water Depth (inches):	Describe Recorded Data:
/ater table present? Water Table Depth (inches):	DESCRIBE RECUIDED DATA.
aturation present? (includes capillary fringe) Saturation Depth (inches):	
aturation presents (includes capillary minge)	

WETLAND DETERI	MINATION D	ATA FORM -	Midwest Region	1
Project/Site: DeCola Ponds B & C Improvement Applicant/Ow Project	ner: <u>BCWMC</u>	City/County: Golden Valley/Her		pling Date: <u>10/16/15</u>
Investigator(s): BKB Section:	<u>29</u>	Township: 118N	Range: <u>21W</u> Sam	pling Point: 2-1 UPL
Land Form: Terrace Local Relief:	<u>Concave</u>	Slope %: <u>2</u> Si	oil Map Unit Name: <u>Urbanland-L</u>	Jdorthents wet sub, 0-2% slope
Subregion (LRR): \underline{M} Latitude:	<u>4983612</u>	Longitude: 470266	Datum: NAD83, UTM	Zone 15 meters
Cowardin Classification: Upland Circular 39 C	lassification: <u>Upland</u>		Mapped NWI Classification:	<u>PF01A</u>
Are climatic/hydrologic conditions on the site typical for this time of year?	Yes (If no, expla	ain in remarks)	Eggers & Reed (primary):	<u>Upland</u>
Are vegetation No Soil No Hydrology No si	gnificantly disturbed?	Are "normal Yes circumstances"	Eggers & Reed (secondary):	
	turally problematic?	present?	Eggers & Reed (tertiary): Eggers & Reed (quaternary):	
	· ·	! . [] []	37	C
SUMMARY OF FINDINGS - Attach site map sho	wing sampling p	point locations, i	transects, important t	teatures, etc.
Hydrophytic vegetation present? Hydric soil present? Indicators of wetland hydrology present? Is the sampled area within a wetland? No General Remarks (explain any answers if neede	d):	and.		
VEGETATION				
	Absolute Dominan	t Indicator 50,	/20 Thresholds:	<u>20%</u> <u>50%</u>
<u>Tree Stratum</u> (Plot Size: <u>30 ft</u>)	% Cover Species?	Ctatus	ee Stratum	12 30
Acer saccharum	30 Yes	FACU Sa	pling/Shrub Stratum	1 2.5
Populus deltoides	30 Yes	FAC He	erb Stratum	2 5
3.	0		oody Vine Stratum	0
4.	0	<u>Dc</u>	minance Test Worksheet:	
Total Cover:	<u>60</u>		ımber of Dominant Species at Are OBL, FACW or FAC:	2 (A)
<u>Sapling/Shrub Stratum</u> (Plot Size: <u>15 ft</u>)				
1. Sambucus racemosa	5 Yes		ital Number of Dominant vecies Across All Strata:	5 (B)
2.	0		rcent of Dominant Species	40 000/ (A/D)
3.	0 0	Th	at Are OBL, FACW or FAC:	40.00% (A/B)
4. <u></u>		Pre	evalence Index Worksheet:	
Total Cover:	<u>5</u>		Total % Cover of:	Multiply by:
Herb Stratum (Plot Size: <u>5 ft</u>		OE	BL Species 0	X 1 0
Parthenocissus quinquefolia	5 Yes	FACU FA	CW Species0	X 2 <u>0</u>
2. Rhamnus cathartica	5 Yes	FAC FA	C Species35	X 3 105
3.	0	FA	CU Species 40	X 4 160
4.	0	UF	PL Species0	X 5 0
5.	0	Cc	olumn Totals: 75	(A) 265 (B)
6	0 0		Prevalence Index =	B/A = 3.53
8.	0	Hyc	drophytic Vegetation Indicators:	
Total Cover:	10		No Rapid Test for Hydroph	ytic Vegetation
Woody Vine Stratum (Plot Size: 30 ft)	<u></u>		No Dominance Test is >509	
1.	0		No Prevalence Index ≤ 3.0	• •
2.	0	-	No Morphological Adaptati in vegetation remarks o	ions [1] (provide supporting data or on a separate sheet)
Total Cover:	<u>0</u>		No Problematic Hydrophyti	ic Vegetation [1] (Explain)
% Bare Ground in Herb Stratum: 90	% Sphagnum Moss Co	over: [1] li	ndicators of hydric soil & wetland hydurbed or problematic.	drology must be present, unless
Vegetation Remarks: (include photo numbers here or on a separate	sheet)	Ну	drophytic vegetation present?	<u>No</u>

ofile Description: (Describe to the depth ne Depth Matrix			dox Featu	res			
(inches) Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0 - 8 10YR 3/1						Silty Loam	
8 - 15 10YR 3/1	99	10YR 3/3	1	С	М	Silty Loam	
15 - 26 10YR 2/1		10YR 6/3	2	C	M	Sandy Clay	
-		10YR 3/3	2	C	M		
Type: C=Concentration, D=Depletion, RM	=Reducea	 Matrix, MS=Masked Sand	d Grains	[2] Location	n: PL=Pore	Lining, M=Matrix.	
vdric Soil Indicators: (applicable to all LRR:	s, unless (otherwise noted)			Inc	dicators for Problematic Hydric So	ils [3]:
Histosol (A1)		☐ Sandy G	leyed Matr	ix (S4)		Coast Prairie Redox (A16)	
] Histic Epipedon (A2)		☐ Sandy R	edox (S5)			Dark Surface (S7)	
Black Histic (A3)		☐ Stripped	Matrix (S6,)		Iron-Manganese Masses (F12)	
] Hydrogen Sulfide (A4)		☐ Loamy N	lucky Mine	ral (F1)		Very Shallow Dark Surface (TF12)	
Stratified Layers (A5)		Loamy (Gleyed Matr	rix (F2)		Other (explain in soil remarks)	
] 2 cm Muck (A10)		☐ Depleted	d Matrix (F3	3)			
Depleted Below Dark Surface (A11)		Redox E	ark Surface	e (F6)			
Thick Dark Surface (A12)		Depleted	l Dark Surf	ace (F7)			
Sandy Mucky Mineral (S1)		Redox E	epressions	s (F8)		Indicators of hydrophytic vegetati ust be present, unless disturbed or	
- , , , , ,		_			1110	ust be present, unless disturbed of	рговлентанс.
5 cm Mucky Peat or Peat (S3)							
5 cm Mucky Peat or Peat (S3)							
•		Dep	th (inches	s):		Hydric soil present?	<u>No</u>
Pestrictive Layer (if present): Type:		Dep	th (inches	s):		Hydric soil present?	<u>No</u>
Pestrictive Layer (if present): Type:		Dep	th (inches	s):		Hydric soil present?	<u>No</u>
Pestrictive Layer (if present): Type:		Dep	th (inches	s):		Hydric soil present?	<u>No</u>
estrictive Layer (if present): Type: Dil Remarks: /DROLOGY		Dep	th (inches	s):		Hydric soil present?	<u>No</u>
Destrictive Layer (if present): Type: oil Remarks: YDROLOGY Vetland Hydrology Indicators:	; check alı		th (inches	s):	Se	Hydric soil present? econdary Indicators (minimum of tv	
restrictive Layer (if present): Type: oil Remarks: YDROLOGY Vetland Hydrology Indicators: rimary Indicators (minimum of one required)	; check ali	I that apply)		s):		econdary Indicators (minimum of tv	
estrictive Layer (if present): Type: oil Remarks: YDROLOGY /etland Hydrology Indicators: rimary Indicators (minimum of one required] Surface Water (A1)	; check ali	I that apply) Water-Stained Leav	ves (B9)	s):	Se	econdary Indicators (minimum of tv Surface Soil Cracks (B6)	
restrictive Layer (if present): Type: oil Remarks: YDROLOGY Vetland Hydrology Indicators: rimary Indicators (minimum of one required) Surface Water (A1) High Water Table (A2)	; check ali	I that apply) Water-Stained Leav	ves (B9)	s):	Se	econdary Indicators (minimum of tv Surface Soil Cracks (B6) Drainage Patterns (B10)	
estrictive Layer (if present): Type: oil Remarks: YDROLOGY Vetland Hydrology Indicators: rimary Indicators (minimum of one required Surface Water (A1) High Water Table (A2) Saturation (A3)	; check ali	I that apply) Water-Stained Leav Aquatic Fauna (B13	ves (B9) 3) : (B14)	s):	Se	econdary Indicators (minimum of tv Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2)	
estrictive Layer (if present): Type: oil Remarks: YDROLOGY /etland Hydrology Indicators: rimary Indicators (minimum of one required] Surface Water (A1)] High Water Table (A2)] Saturation (A3)] Water Marks (B1)	; check ali	I that apply) Water-Stained Leav Aquatic Fauna (B13) True Aquatic Plants Hydrogen Sulfide O	ves (B9) 3) : (B14) dor (C1)			econdary Indicators (minimum of tw Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8)	vo required)
Pestrictive Layer (if present): Type: oil Remarks: YDROLOGY Vetland Hydrology Indicators: Irimary Indicators (minimum of one required) Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	; check ali	I that apply) Water-Stained Leav Aquatic Fauna (B13) True Aquatic Plants Hydrogen Sulfide O Oxidized Rhizosphe	ves (B9) 3) : (B14) dor (C1) eres on Livi	ng Roots (C3,		Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery	vo required)
Pestrictive Layer (if present): Type: Foil Remarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required) Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)	; check ali	I that apply) Water-Stained Leav Aquatic Fauna (B13) True Aquatic Plants Hydrogen Sulfide O Oxidized Rhizosphe	ves (B9) 3) : (B14) dor (C1) eres on Livinged Iron (C4)	ng Roots (C3,		Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery	vo required)
Pestrictive Layer (if present): Type: Foil Remarks: YDROLOGY Vetland Hydrology Indicators: Frimary Indicators (minimum of one required) Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4)	'; check alı	I that apply) Water-Stained Leave Aquatic Fauna (B13) True Aquatic Plants Hydrogen Sulfide O Oxidized Rhizosphe Presence of Reduce	ves (B9) 3) c (B14) dor (C1) eres on Livinged Iron (C4) ion in Tilled	ng Roots (C3,		Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery Stunted or Stressed Plants (D1) Geomorphic Position (D2)	vo required)
Pestrictive Layer (if present): Type: Foil Remarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required) Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)	l; check al.	I that apply) Water-Stained Leav Aquatic Fauna (B13) True Aquatic Plants Hydrogen Sulfide O Oxidized Rhizosphe Presence of Reduce Recent Iron Reduct Thin Muck Surface	res (B9) 3) 5 (B14) 6 (C1) 6 on Living the linitial living the living the living the living the living the liv	ng Roots (C3,		Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery	vo required)
restrictive Layer (if present): Type: oil Remarks: YDROLOGY Vetland Hydrology Indicators: rimary Indicators (minimum of one required. 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)	'; check al.	I that apply) Water-Stained Leave Aquatic Fauna (B13) True Aquatic Plants Hydrogen Sulfide O Oxidized Rhizosphe Presence of Reduct Recent Iron Reduct Thin Muck Surface Gauge or Well Data	ves (B9) B) dor (C1) eres on Livinged Iron (C4) ion in Tillect (C7) In (D9)	ng Roots (C3,		Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery Stunted or Stressed Plants (D1) Geomorphic Position (D2)	vo required)
estrictive Layer (if present): Type: oil Remarks: YDROLOGY /etland Hydrology Indicators: rimary Indicators (minimum of one required 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)	'; check al.	I that apply) Water-Stained Leav Aquatic Fauna (B13) True Aquatic Plants Hydrogen Sulfide O Oxidized Rhizosphe Presence of Reduce Recent Iron Reduct Thin Muck Surface	ves (B9) B) dor (C1) eres on Livinged Iron (C4) ion in Tillect (C7) In (D9)	ng Roots (C3,		Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery Stunted or Stressed Plants (D1) Geomorphic Position (D2)	vo required)
restrictive Layer (if present): Type: oil Remarks: YDROLOGY Vetland Hydrology Indicators: rimary Indicators (minimum of one required 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) ield Observations:	'; check al.	I that apply) Water-Stained Leave Aquatic Fauna (B13) True Aquatic Plants Hydrogen Sulfide O Oxidized Rhizosphe Presence of Reduct Recent Iron Reduct Thin Muck Surface Gauge or Well Data Other (explain in red	ves (B9) B) c (B14) dor (C1) eres on Living ed Iron (C4) ion in Tilled (C7) in (D9) marks)	ng Roots (C3,		Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery Stunted or Stressed Plants (D1) Geomorphic Position (D2)	vo required)
Pestrictive Layer (if present): Type: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required) 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)	l; check al.	I that apply) Water-Stained Leave Aquatic Fauna (B13) True Aquatic Plants Hydrogen Sulfide O Oxidized Rhizosphe Presence of Reduct Recent Iron Reduct Thin Muck Surface Gauge or Well Data	ves (B9) B) c (B14) dor (C1) eres on Living ed Iron (C4) ion in Tilled (C7) in (D9) marks)	ng Roots (C3,		Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)	vo required)
Pestrictive Layer (if present): Type: Coll Remarks: Type:	l; check al.	I that apply) Water-Stained Leave Aquatic Fauna (B13) True Aquatic Plants Hydrogen Sulfide O Oxidized Rhizosphe Presence of Reduct Recent Iron Reduct Thin Muck Surface Gauge or Well Data Other (explain in red	res (B9) 3) dor (C1) eres on Livinged Iron (C4, ion in Tilled (C7) a (D9) marks) inches):	ng Roots (C3,		Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)	vo required)

WETLAND DETERM	MINATION E	DATA FOR	M - Midwest Regio	on	
Project/Site: DeCola Ponds B & C Improvement Applicant/Own Project	ner: <u>BCWMC</u>	City/County: Gold	<u>den</u> State: <u>MN</u> Sa ey/Hennepin	ampling Date: 10/16	<u>/15</u>
Investigator(s): BKB Section:	<u>29</u>	Township: 118N		ampling Point: 2-1 W	<u>/ET</u>
<u> </u>	<u>None</u>	Slope %: <u>0</u>	Soil Map Unit Name: <u>Urbanlan</u>	d-Udorthents wet sub	o, 0-2% slope
Subregion (LRR): M Latitude:	<u>4983619</u>	Longitude: 4702	67 Datum: NAD83, UT	TM Zone 15 meters	
Cowardin Classification: PEMA Circular 39 CI	assification: Type 1	_	Mapped NWI Classification:	PFO1A	
Are climatic/hydrologic conditions on the site typical for this time of year?	Yes (If no, ex	plain in remarks)	Eggers & Reed (primary):	Seasonally Floode	d Basin
		Are "normal	Yes Eggers & Reed (secondary):	N/A	<u></u>
Are vegetation No Soil No Hydrology No sign	gnificantly disturbed?	circumstances" present?	Eggers & Reed (tertiary):	<u>N/A</u>	
Are vegetation No Soil No Hydrology No nat	furally problematic?	presenti	Eggers & Reed (quaternary):	<u>N/A</u>	
SUMMARY OF FINDINGS - Attach site map sho	wing sampling	point locatio	ns, transects, importan	t features, etc	2.
Hydrophytic vegetation present? Hydric soil present? Indicators of wetland hydrology present? Is the sampled area within a wetland? No General Remarks (explain any answers if needed answer	1):	/etland 2			
VEGETATION					
	Absolute Domina	ant Indicator	50/20 Thresholds:	<u>209</u>	<u>50%</u>
<u>Tree Stratum</u> (Plot Size: 30 ft)	% Cover Species		Tree Stratum	9	22.5
Populus deltoides	30 Yes	FAC	Sapling/Shrub Stratum	1	2.5
Acer saccharum	15 Yes	FACU	Herb Stratum	0	0
3.	0	17.00	Woody Vine Stratum	0	0
4.	0		<u>Dominance Test Worksheet:</u>		
Total Cover: Sapling/Shrub Stratum (Plot Size: 15 ft)	45		Number of Dominant Species That Are OBL, FACW or FAC:	1	(A)
1.	5		Total Number of Dominant Species Across All Strata:	3	(B)
2.	0		Percent of Dominant Species		
3.4.	0		That Are OBL, FACW or FAC:	33.33%	(A/B)
5.	0		Prevalence Index Worksheet:		
Total Cover:	<u>5</u>		Total % Cover of:	Multip	oly by:
Herb Stratum (Plot Size: <u>5 ft</u>)	_		OBL Species (X 1	0
1.	0		FACW Species () X 2	0
2.	0		FAC Species 30	X 3	90
3.	0		FACU Species 15	5 X 4	60
4.	0			 0 X 5	0
5.	0				150 (B)
6.	0		Column Totals:4; Prevalence Index	- '''	3.33
7.	0		Hydrophytic Vegetation Indicato		0.00
8. Total Cover:	0				
	<u>0</u>		No Rapid Test for Hydro No Dominance Test is >:		
Woody Vine Stratum (Plot Size: 30 ft)			No Prevalence Index ≤ 3		
1.	0		No Morphological Adapt		
2. Total Cover:	0		in vegetation remark.		
	<u>0</u> % Sphagnum Moss (Cover	Yes Problematic Hydroph [1] Indicators of hydric soil & wetland	-	
% Bare Ground in Herb Stratum: 100	% Sphagnum Moss (JUVEI	disturbed or problematic.	NI -	
Vegetation Remarks: (include photo numbers here or on a separate	STIEET)	and all and a second	Hydrophytic vegetation present?	<u>No</u>	along the rate of the Co

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.

SOIL						Sampling P	oint:	<u>2-1</u>
Profile Description: (Describe to the depth nee	eded to do	ocument the indicator or	confirm th	ne abscence	of indicator	rs).		
Depth Matrix			edox Featui		or marcator	<i>9</i> j.		
(inches) Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Remark	ks
1. 0 - 10 10YR 2/2	80	2.5Y 3/2	10	С	M	Silty Clay		
2. <u>-</u>		10YR 4/6	10	С	М			
3. 10 - 18 10YR 2/1		10YR 3/3	10	C	M	Sandy Clay Loam		
4. <u>18 - 24</u> N 2.5/0		10YR 6/1 10YR 3/3	<u>5</u> 5	D	M	Sandy Clay Loam		
5		1011/3/3			IVI			
b [1] Type: C=Concentration, D=Depletion, RM=F	Reduced I	Matrix, MS=Masked San	d Grains	[2] Locatio	n: PL=Pore	Lining, M=Matrix.		
Hydric Soil Indicators: (applicable to all LRRs,	unless of	therwise noted)			In	dicators for Problematic Hydric So	ils [3]:	
Histosol (A1)		☐ Sandy G	Gleyed Matri	ix (S4)		Coast Prairie Redox (A16)		
Histic Epipedon (A2)		☐ Sandy R	Redox (S5)			Dark Surface (S7)		
Black Histic (A3)		Stripped	Matrix (S6))		Iron-Manganese Masses (F12)		
Hydrogen Sulfide (A4)		Loamy N	Mucky Minei	ral (F1)		Very Shallow Dark Surface (TF12)		
Stratified Layers (A5)			Gleyed Matr			Other (explain in soil remarks)		
2 cm Muck (A10)		<u></u>	d Matrix (F3			· · · · · (- · · · · · · · · · · · · · · · · · · · ·		
Depleted Below Dark Surface (A11)			Dark Surface					
Thick Dark Surface (A12)		<u></u>	d Dark Surfa					
Sandy Mucky Mineral (S1)			Depressions] Indicators of hydrophytic vegetat		nydrology
5 cm Mucky Peat or Peat (S3)		☐ Kedox L	zepi essiuris	(10)	m	ust be present, unless disturbed o	r problematic.	
Restrictive Layer (if present): Type:		Dep	oth (inches	s):		Hydric soil present?	<u>Yes</u>	
Soil Remarks:								
Suil Remarks.								
HYDROLOGY								
Wetland Hydrology Indicators:								
Primary Indicators (minimum of one required; c	check all t	hat apply)			Se	econdary Indicators (minimum of t	wo required)	
Surface Water (A1)		✓ Water-Stained Lear	vos (RO)			Surface Soil Cracks (B6)		•
						_		
High Water Table (A2)		Aquatic Fauna (B1)				Drainage Patterns (B10)		
Saturation (A3)		True Aquatic Plants				Dry-Season Water Table (C2)		
Water Marks (B1)		Hydrogen Sulfide C				Crayfish Burrows (C8)		
Sediment Deposits (B2)		Oxidized Rhizosphe	eres on Livir	ng Roots (C3)	Saturation Visible on Aerial Imager	y (C9)	
Drift Deposits (B3)		Presence of Reduc	ed Iron (C4,)		Stunted or Stressed Plants (D1)		
Algal Mat or Crust (B4)		Recent Iron Reduct	tion in Tillea	Soils (C6)	✓	Geomorphic Position (D2)		
Iron Deposits (B5)		Thin Muck Surface	(C7)			FAC-Neutral Test (D5)		
Inundation Visible on Aerial Imagery (B7)		Gauge or Well Data	a (D9)					
✓ Sparsely Vegetated Concave Surface (B8)		Other (explain in re	marks)					
Field Observations:						Indicators of wetland hydrolog	gy present?	<u>Yes</u>
Surface water present?		Surface Water Depth ((inches):			Describe Recorded Data:		
Water table present?		Water Table Depth (in				Describe Recorded Data.		
Saturation present? (includes capillary fringe)		Saturation Depth (incl						
		<u> </u>						
	Monitoring	ŋ Well ☐ Stream Gau	ıge ☐ F	Previous Ins	pections			
Hydrology Remarks:								

Project/Site:	<u>DeCola F</u> <u>Project</u>	onds E	3 & C Impro	<u>vement</u>	Applicant/Ow	ner: <u>BCWM</u>	<u>IC</u>	City/County:		<u>1</u> ' <u>Hennepin</u>	State:	MN	Sampling Date:	09/22/17
Investigator(s):	<u>BKB</u>				Section:	<u>29</u>		Township:	<u>118N</u>		Range:	<u>21W</u>	Sampling Point:	<u>3-1UPL</u>
Land Form:	<u>Hillslope</u>				Local Relief:	<u>Concave</u>		Slope %:	<u>35</u>	Soil Map L	Init Name	: <u>Urbanl</u>	land-Lester comp	olex 2 to 18% slopes
Subregion (LRR).	: <u>M</u>				Latitude:	<u>4983414</u>		Longitude:	<u>470400</u>		Datum:	NAD83,	UTM Zone 15 m	<u>eters</u>
Cowardin Classifi	ication:	<u>Uplar</u>	<u>nd</u>		Circular 39 C	lassification:	<u>Upland</u>			Маррес	d NWI Cla	ssification	: <u>Upland</u>	
Are climatic/hydro	ologic condi	tions o	n the site ty	pical for this	time of year?	<u>No</u>	(If no, expla	ain in remarks	s)	Eggers	& Reed	(primary):	<u>Upland</u>	
Are vegetation	<u>No</u>	Soil	<u>No</u>	Hydrology	<u>No</u> si	gnificantly dis	sturbed?	Are "normal circumstance	_		& Reed ((secondary (tertiary):	y): <u>N/A</u> N/A	
Are vegetation	No	Soil	<u>No</u>	Hydrology	<u>No</u> na	turally proble	matic?	present?		Eggers	& Reed	quaternar	· 	
SUMMARY (OF FINE	DING	S - Atta	ach site	map sho	wing sa	mpling _l	ooint loc	ation	s, transe	ects, ii	mporta	ant features	s, etc.

Hydrophytic vegetation present? Hydric soil present? Indicators of wetland hydrology present?	<u>Yes</u> <u>No</u> <u>No</u>	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.
Is the sampled area within a wetland?	<u>No</u>	If yes, optional Wetla	nd Site ID: <u>Upland</u>

VEGETATION

			<u>Absolute</u>	<u>Dominant</u>	<u>Indicator</u>	50/20 Thresholds:	<u>20%</u>	<u>50%</u>
<u>Tree Stratum</u>	(Plot Size: <u>30 ft</u>	.)	<u>% Cover</u>	Species?	<u>Status</u>	Tree Stratum	18	45
Fraxinus pennsylvanic	3		40	Yes	FACW	Sapling/Shrub Stratum	8	20
Salix amygdaloides			40	Yes	FACW	Herb Stratum	3.4	8.5
Acer saccharinum			10	No	FACW	Woody Vine Stratum	0	0
			0			<u>Dominance Test Worksheet:</u>		
Sapling/Shrub Stratum	<u>ı</u> (Plot Size: <u>15 f</u> t	Total Cover:	<u>90</u>			Number of Dominant Species That Are OBL, FACW or FAC:	4 (A)	
Rhamnus cathartica	<u>i</u> (1 101 3126. <u>13 11</u>	. ,	40	Yes	FAC	Total Number of Dominant Species Across All Strata:	4 (B)	
			0			Percent of Dominant Species That Are OBL, FACW or FAC: 100.0)0% (A/B)	
			0			Prevalence Index Worksheet:		
		Total Cover:	<u>40</u>			Total % Cover of:	Multiply by:	
<u>Herb Stratum</u>	(Plot Size: <u>5 ft</u>)				OBL Species 0 X 1		0
Rhamnus cathartica			15	Yes	FAC	FACW Species90 X 2	18	30
Ribes spp.			2	No		FAC Species55 X 3	16	ì5
			0			FACU Species 0 X 4		0
			0			UPL Species 0 X 5		0
			0			Column Totals: 145 (A)	34	- 15 (
			0			Prevalence Index = B/A =	2.3	
			0			Hydrophytic Vegetation Indicators:		
Woody Vine Stratum	(Plot Size: <u>30 f</u> l	Total Cover:	<u>17</u>			No Rapid Test for Hydrophytic Vege Yes Dominance Test is >50%	tation	
woody vine Stratum	(Fiet elizer <u>56 / 1</u>		0			Yes Prevalence Index ≤ 3.0 [1]		
			0			No Morphological Adaptations [1] (principle in vegetation remarks or on a se		ting d
1		Total Cover:	0			No Problematic Hydrophytic Vegeta	,	رر)
Bare Ground in Herb Stra	atum: 83		% Sphagnur	m Moss Cove	er:	[1] Indicators of hydric soil & wetland hydrology mudisturbed or problematic.	ist be present, un	less
getation Remarks: (inclu	de photo numbers her	e or on a separate :	sheet)			Hydrophytic vegetation present? Yes		

OIL						
rofile Description: (Describe to the depth ne	eded to document the indicator o	r confirm th	ne abscence	of indicators	·).	
Depth Matrix		edox Featu				
(inches) Color (moist)	% Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0 - 14 10YR 4/3	100				sandy loam	
14 - 18 10YR 4/3	55 10YR 3/4	5	C	М	sandy loam	-
- 10YR 4/4	40 10VD 3/4				loomy cond	<u> </u>
18 - 25 10YR 4/3 - 10YR 4/2	98 10YR 3/4	2		M	loamy sand	
- 1011(412						-
Type: C=Concentration, D=Depletion, RM=		nd Grains	[2] Location	: PL=Pore L	ining, M=Matrix.	-
lydric Soil Indicators: (applicable to all LRRs	s, unless otherwise noted)			Inc	licators for Problematic Hydric S	oils [3]:
Histosol (A1)	Sandy	Gleyed Matr	ix (S4)		Coast Prairie Redox (A16)	
] Histic Epipedon (A2)	Sandy	Redox (S5)			Dark Surface (S7)	
Black Histic (A3)		d Matrix (S6,	,)		Iron-Manganese Masses (F12)	
Hydrogen Sulfide (A4)		Mucky Mine			Very Shallow Dark Surface (TF12))
Stratified Layers (A5)		Gleyed Matr			Other (explain in soil remarks)	
	_	-			Other (explain in soil remarks)	
2 cm Muck (A10)		ed Matrix (F3				
Depleted Below Dark Surface (A11)	_	Dark Surface				
☐ Thick Dark Surface (A12)		ed Dark Surf		[3]	Indicators of hydrophytic vegeta	ation and wetland hydrolo
	Redox	Depressions	s (F8)		ist be present, unless disturbed o	
5 cm Mucky Peat or Peat (S3)						
5 cm Mucky Peat or Peat (S3)				-	Harling at Harana (2)	
5 cm Mucky Peat or Peat (S3)		pth (inches	s):		Hydric soil present?	<u>No</u>
5 cm Mucky Peat or Peat (S3)	De	pth (inches	s):		Hydric soil present?	<u>No</u>
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if present): Type:	De	pth (inches	s):		Hydric soil present?	<u>No</u>
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if present): Type: Soil Remarks:		pth (inches	s):		Hydric soil present?	<u>No</u>
5 cm Mucky Peat or Peat (S3) Pestrictive Layer (if present): Type: Soil Remarks: YDROLOGY	De	pth (inches	s):		Hydric soil present?	<u>No</u>
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Wetland Hydrology Indicators:		pth (inches	s):	Se	Hydric soil present?	
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required:	check all that apply)		s):		condary Indicators (minimum of	
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; Surface Water (A1)	check all that apply)	aves (B9)	s):	Se.	condary Indicators (minimum of Surface Soil Cracks (B6)	
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required: Surface Water (A1) High Water Table (A2)	check all that apply) Water-Stained Lea	aves (B9)	s):	Se.	condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10)	
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required: Surface Water (A1) High Water Table (A2) Saturation (A3)	check all that apply) Water-Stained Lea Aquatic Fauna (B1	aves (B9) 3) 's (B14)	s):		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2)	
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required: Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	check all that apply) Water-Stained Lea Aquatic Fauna (B1) True Aquatic Plant	aves (B9) 3) s (B14) Odor (C1)			condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8)	two required)
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required; Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	check all that apply) Water-Stained Lea Aquatic Fauna (B1 True Aquatic Plant Hydrogen Sulfide (C) Oxidized Rhizosph	aves (B9) 3) 's (B14) Odor (C1) eres on Livi	ng Roots (C3,		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Image.	two required)
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required: Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	check all that apply) Water-Stained Lea Aquatic Fauna (B1) True Aquatic Plant	aves (B9) 3) 's (B14) Odor (C1) eres on Livi	ng Roots (C3,		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8)	two required)
sestrictive Layer (if present): Type: Pestrictive Layer (if present): Type: Soil Remarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	check all that apply) Water-Stained Lea Aquatic Fauna (B1 True Aquatic Plant Hydrogen Sulfide (C) Oxidized Rhizosph	aves (B9) 3) Is (B14) Odor (C1) eres on Livin ced Iron (C4)	ng Roots (C3,		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Image.	two required)
Soil Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required: Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)	check all that apply) Water-Stained Lea Aquatic Fauna (B1 True Aquatic Plant Hydrogen Sulfide of Oxidized Rhizosph	aves (B9) (3) (5) (B14) (2) (C1) (3) (C2) (4) (C3) (5) (C4) (5) (C4) (6) (C4) (7) (C4) (7) (C4) (7) (C4)	ng Roots (C3,		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Image. Stunted or Stressed Plants (D1)	two required)
Destrictive Layer (if present): Type: Soil Remarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; 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)	check all that apply) Water-Stained Lea Aquatic Fauna (B1) True Aquatic Plant Hydrogen Sulfide of Oxidized Rhizosph Presence of Reduce	aves (B9) (S) (B14) (C1) (C1) (C2) (C3) (C4) (C4) (C7)	ng Roots (C3,		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Image. Stunted or Stressed Plants (D1) Geomorphic Position (D2)	two required)
2 5 cm Mucky Peat or Peat (S3) 2 Pestrictive Layer (if present): Type: 2 Soil Remarks: 2 YDROLOGY 2 Vetland Hydrology Indicators: 2 Primary Indicators (minimum of one required; 2 Surface Water (A1) 3 High Water Table (A2) 3 Saturation (A3) 4 Water Marks (B1) 5 Sediment Deposits (B2) Drift Deposits (B3) 4 Algal Mat or Crust (B4)	check all that apply) Water-Stained Lea Aquatic Fauna (B1 True Aquatic Plant Hydrogen Sulfide of Oxidized Rhizosph Presence of Reduct Recent Iron Reduct Thin Muck Surface	aves (B9) 3) Is (B14) Odor (C1) Ineres on Livin Ced Iron (C4) It (C7) In (D9)	ng Roots (C3,		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Image. Stunted or Stressed Plants (D1) Geomorphic Position (D2)	two required)
Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required: 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)	check all that apply) Water-Stained Lea Aquatic Fauna (B1 True Aquatic Plant Hydrogen Sulfide (Oxidized Rhizosph Presence of Reduct Recent Iron Reduct Thin Muck Surface	aves (B9) 3) Is (B14) Odor (C1) Ineres on Livin Ced Iron (C4) It (C7) In (D9)	ng Roots (C3,		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Image. Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)	two required)
Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required; 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)	check all that apply) Water-Stained Lea Aquatic Fauna (B1 True Aquatic Plant Hydrogen Sulfide (Oxidized Rhizosph Presence of Reduct Recent Iron Reduct Thin Muck Surface	aves (B9) 3) S (B14) Odor (C1) eres on Livi ced Iron (C4) ction in Tillec	ng Roots (C3,		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Image. Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)	two required)
Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required): 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) Field Observations: Surface water present?	check all that apply) Water-Stained Lea Aquatic Fauna (B1 True Aquatic Plant Hydrogen Sulfide o Oxidized Rhizosph Presence of Reduce Recent Iron Reduce Thin Muck Surface Gauge or Well Date Other (explain in re	aves (B9) (3) (5) (B14) (Codor (C1) (Ceed Iron (C4) (Ction in Tillect (C7) (a) (D9) (emarks) (inches):	ng Roots (C3,		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Image. Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)	two required)
Restrictive Layer (if present): Type: Soil Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required; 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)	check all that apply) Water-Stained Lea Aquatic Fauna (B1 True Aquatic Plant Hydrogen Sulfide (Oxidized Rhizosph Presence of Reduce Recent Iron Reduce Thin Muck Surface Gauge or Well Date Other (explain in research) Surface Water Depth	aves (B9) 3) S (B14) Odor (C1) eres on Livin ced Iron (C4) ction in Tilled c (C7) a (D9) emarks) (inches):	ng Roots (C3,		condary Indicators (minimum of Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Image. Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)	two required)

WETLAND DETERI	MINATION D	ATA FOR	M - Midwest Region	n
Project/Site: DeCola Ponds B & C Improvement Applicant/Ow Project	ner: <u>BCWMC</u>	City/County: Gold Vall	<u>den</u> State: <u>MN</u> San ey/Hennepin	npling Date: 09/22/17
Investigator(s): BKB Section:	<u>29</u>	Township: 118N	. Range: <u>21W</u> San	npling Point: 3-1 WET
Land Form: Toeslope Local Relief:	<u>Concave</u>	Slope %: <u>1</u>	Soil Map Unit Name: <u>Urbanland</u> -	Lester complex 2 to 18% slopes
Subregion (LRR): M Latitude:	<u>4983409</u>	Longitude: 4703	99 Datum: NAD83, UTN	1 Zone 15 meters
Cowardin Classification: PUBG Circular 39 C	lassification: <u>Type 5</u>		Mapped NWI Classification:	PUBG
Are climatic/hydrologic conditions on the site typical for this time of year?	No (If no, expla	ain in remarks)	Eggers & Reed (primary):	Shallow, Open Water
Are vegetation No Soil No Hydrology No si	gnificantly disturbed?	Are "normal circumstances"		N/A N/A
Are vegetation <u>No</u> Soil <u>No</u> Hydrology <u>No</u> na	turally problematic?	present?		<u>N/A</u>
SUMMARY OF FINDINGS - Attach site map sho	wing sampling p	ooint locatio	ns, transects, important	features, etc.
Hydrophytic vegetation present? Hydric soil present? Indicators of wetland hydrology present? Is the sampled area within a wetland? Yes General Remarks (explain any answers if neede	In 2017, antecede months prior to the	nt moisture condition	ons were within the wet range based on	
VEGETATION				
	Absolute Dominani	t Indicator	50/20 Thresholds:	<u>20%</u> <u>50%</u>
<u>Tree Stratum</u> (Plot Size: <u>30 ft</u>)	% Cover Species?		Tree Stratum	20 50
Fraxinus pennsylvanica	40 Yes	FACW	Sapling/Shrub Stratum	0 0
Salix amygdaloides	40 Yes	FACW	Herb Stratum	0 0
3. Acer saccharinum	20 Yes	FACW	Woody Vine Stratum	0
4.	0		<u>Dominance Test Worksheet:</u>	
Total Cover: <u>Sapling/Shrub Stratum</u> (Plot Size: 15 ft)	100		Number of Dominant Species That Are OBL, FACW or FAC:	3 (A)
1.	0		Total Number of Dominant Species Across All Strata:	3 (B)
2. 3.	0 0		Percent of Dominant Species That Are OBL, FACW or FAC:	100.00% (A/B)
4. 5.	0 0		Prevalence Index Worksheet:	
Total Cover:	0		Total % Cover of:	Multiply by:
<u>Herb Stratum</u> (Plot Size: <u>5 ft</u>			OBL Species 0	X 1 0
1.	0		FACW Species100	X 2 200
2.	0		FAC Species0	X 3 0
3.	0		FACU Species0	X 4 0
4.	0		UPL Species 0	X 5 0
5.	0		Column Totals: 100	(A) 200 (B)
6.	0		Prevalence Index =	= B/A = 2.00
8.	0 0		Hydrophytic Vegetation Indicators	2.
Total Cover:	0		No Rapid Test for Hydropl	
Woody Vine Stratum (Plot Size: 30 ft)	ū		Yes Dominance Test is >50	-
1	0		Yes Prevalence Index ≤ 3.0	
2.				tions [1] (provide supporting data or on a separate sheet)
Total Cover:	<u>0</u>		<u> </u>	tic Vegetation [1] (Explain)
% Bare Ground in Herb Stratum: 100	% Sphagnum Moss Co	ver:	[1] Indicators of hydric soil & wetland hy disturbed or problematic.	ydrology must be present, unless

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

No herb layer present. Bare soil.

Hydrophytic vegetation present?

Depth	on: (Describe to the depth ne		Re	edox Feature	es			_	
(inches)	Color (moist)	<u></u> %	Color (moist)	<u></u> %	Type [1]	Loc [2]	Texture	Rem	narks
0 - 8	N 2.5/0	100					silt loam	hemic	
8 - 16 16 - 27	N 3/0 N 5/0	<u>100</u> _					sandy clay loam silty clay loam		
-	14 0/0						- Sing day loam	 -	
-				:					
Type: C=Con	centration, D=Depletion, RM	=Reduced M	atrix, MS=Masked San	d Grains [[2] Locatior	n: PL=Pore L	ining, M=Matrix.		
ric Soil Indica	ators: (applicable to all LRR:	s, unless oth	erwise noted)			Inc	licators for Problematic Hyd	Iric Soils [3]:	
Histosol (A1)			Sandy 0	Gleyed Matrix	(S4)		Coast Prairie Redox (A16)		
Histic Epipedo	n (A2)		☐ Sandy F	Redox (S5)			Dark Surface (S7)		
Black Histic (A	3)		Stripped	Matrix (S6)			Iron-Manganese Masses (F1	2)	
Hydrogen Sulf	iide (A4)		✓ Loamy N	Mucky Minera	al (F1)		Very Shallow Dark Surface (TF12)	
Stratified Laye	rs (A5)		Loamy (Gleyed Matrix	((F2)		Other (explain in soil remarks	s)	
2 cm Muck (A	10)		Depleted	d Matrix (F3)					
Depleted Belo	w Dark Surface (A11)		Redox E	Dark Surface ((F6)				
Thick Dark Su	rface (A12)		☐ Depleted	d Dark Surfac	ce (F7)				
Candy Muslay	Minoral (S1)		□ Redox [Depressions (I	(F8)		Indicators of hydrophytic vist be present, unless distur		d hydrol
Sandy Mucky	iviirierar (31)			.1					
	eat or Peat (S3)			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
5 cm Mucky P	eat or Peat (S3)								
	eat or Peat (S3)			oth (inches):	:		Hydric soil present	? <u>Yes</u>	
5 cm Mucky P	eat or Peat (S3)				:		Hydric soil present	? <u>Yes</u>	
5 cm Mucky P	eat or Peat (S3)				:		Hydric soil present	? <u>Yes</u>	
5 cm Mucky P	eat or Peat (S3) (if present): Type:				:		Hydric soil present	? <u>Yes</u>	
5 cm Mucky P strictive Layer il Remarks: DROLOG	eat or Peat (S3) (if present): Type: gy Indicators:		Dep_		:				
5 cm Mucky P strictive Layer il Remarks: DROLOG	reat or Peat (S3) Type: SY	: check all th	Dep_		:	Se	Hydric soil present		
5 cm Mucky P strictive Layer il Remarks: DROLOG	eat or Peat (S3) (if present): Type: GY gy Indicators: rs (minimum of one required	; check all th	Dep_	oth (inches):	:	Sea			
5 cm Mucky P strictive Layer il Remarks: DROLOGetland Hydrologethand Hydrologetha	eat or Peat (S3) (if present): Type: GY gy Indicators: rs (minimum of one required		Dep	oth (inches): ves (B9)	:		condary Indicators (minimu		
5 cm Mucky P strictive Layer il Remarks: 'DROLOGetland Hydrologimary Indicator Surface Water	eat or Peat (S3) (if present): Type: GY gy Indicators: rs (minimum of one required to the content of the con		Dep nat apply) ☐ Water-Stained Lea	ves (B9)	:		condary Indicators (minimu Surface Soil Cracks (B6)	m of two required)	
5 cm Mucky P strictive Layer il Remarks: DROLOG etland Hydrolog imary Indicator Surface Water High Water Ta	eat or Peat (S3) Type: GY gy Indicators: rs (minimum of one required (A1)) able (A2)		nat apply) □ Water-Stained Lear ✓ Aquatic Fauna (B1:	ves (B9) 3) 5 (B14)	:		condary Indicators (minimu Surface Soil Cracks (B6) Drainage Patterns (B10)	m of two required)	
5 cm Mucky P strictive Layer il Remarks: 'DROLOGetland Hydrologetland Hydrologetland Surface Water High Water Ta Saturation (A3	reat or Peat (S3) Type: GY Gy gy Indicators: rs (minimum of one required of (A1) able (A2) g) B1)		nat apply) ☐ Water-Stained Lear ✔ Aquatic Fauna (B1.	ves (B9) 3) 5 (B14) Odor (C1)			condary Indicators (minimu Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2	m of two required)	
5 cm Mucky P strictive Layer il Remarks: DROLOG etland Hydrolog mary Indicator Surface Water High Water Ta Saturation (A3 Water Marks (eat or Peat (S3) f (if present): Type: gy Indicators: rs (minimum of one required f (A1) hble (A2) h) B1) osits (B2)		at apply) □ Water-Stained Lea ✓ Aquatic Fauna (B1: □ True Aquatic Plants □ Hydrogen Sulfide C	ves (B9) 3) s (B14) Odor (C1) eres on Living			condary Indicators (minimu Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2 Crayfish Burrows (C8)	m of two required) 2) magery (C9)	
5 cm Mucky P strictive Layer il Remarks: 'DROLOG etland Hydrolog mary Indicator Surface Water High Water Ta Saturation (A3 Water Marks (A) Sediment Dep	eat or Peat (S3) Type: GY gy Indicators: rs (minimum of one required right) thick (A2) thick (A2) thick (B2) (B3)		mat apply) Water-Stained Lear ✓ Aquatic Fauna (B1. True Aquatic Plants Hydrogen Sulfide C Oxidized Rhizosphe	ves (B9) 3) s (B14) Odor (C1) eres on Living	g Roots (C3)		condary Indicators (minimu. Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2 Crayfish Burrows (C8) Saturation Visible on Aerial In	m of two required) 2) magery (C9)	
5 cm Mucky P strictive Layer il Remarks: DROLOG etland Hydrolog mary Indicator Surface Water High Water Ta Saturation (A3 Water Marks (Sediment Dep	eat or Peat (S3) (if present): Type: gy Indicators: (M1) able (A2) (B1) posits (B2) (B3) rust (B4)		Depart apply) Water-Stained Lear ✓ Aquatic Fauna (B1: True Aquatic Plants Hydrogen Sulfide C Oxidized Rhizosphe Presence of Reduc	ves (B9) 3) 5 (B14) Odor (C1) eres on Living ed Iron (C4) tion in Tilled S	g Roots (C3)		condary Indicators (minimul Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2 Crayfish Burrows (C8) Saturation Visible on Aerial II Stunted or Stressed Plants (I	m of two required) 2) magery (C9)	
5 cm Mucky P strictive Layer il Remarks: DROLOG etland Hydrolog mary Indicator Surface Water High Water Ta Saturation (A3 Water Marks (Sediment Dep Drift Deposits Algal Mat or C Iron Deposits (eat or Peat (S3) Type: (if present): Type: gy Indicators: (A1) able (A2) (B1) posits (B2) (B3) rust (B4) (B5)		mat apply) Water-Stained Lear ✓ Aquatic Fauna (B1. True Aquatic Plants Hydrogen Sulfide C Oxidized Rhizosphe Presence of Reduc	ves (B9) 3) 5 (B14) Odor (C1) eres on Living ed Iron (C4) tion in Tilled S	g Roots (C3)		condary Indicators (minimul Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2 Crayfish Burrows (C8) Saturation Visible on Aerial In Stunted or Stressed Plants (I Geomorphic Position (D2)	m of two required) 2) magery (C9)	
5 cm Mucky P strictive Layer il Remarks: 'DROLOG etland Hydrolog mary Indicator Surface Water High Water Ta Saturation (A3 Water Marks (Sediment Dep Drift Deposits Algal Mat or C Iron Deposits (Inundation Vis	eat or Peat (S3) Type: (if present): Type: gy Indicators: rs (minimum of one required r (A1) able (A2) b) B1) osits (B2) (B3) trust (B4) (B5) ible on Aerial Imagery (B7)		at apply) Water-Stained Lear Aquatic Fauna (B1. True Aquatic Plants Hydrogen Sulfide C Oxidized Rhizosphe Presence of Reduct Recent Iron Reduct Thin Muck Surface Gauge or Well Data	ves (B9) 3) 5 (B14) Odor (C1) eres on Living ed Iron (C4) tion in Tilled S (C7) a (D9)	g Roots (C3)		condary Indicators (minimul Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2 Crayfish Burrows (C8) Saturation Visible on Aerial In Stunted or Stressed Plants (I Geomorphic Position (D2)	m of two required) 2) magery (C9)	
strictive Layer il Remarks: DROLOG etland Hydrolog surface Water High Water Ta Saturation (A3 Water Marks (Sediment Dep Drift Deposits Algal Mat or C Iron Deposits (Inundation Vis Sparsely Vege	eat or Peat (S3) (if present): Type: gy Indicators: rs (minimum of one required of (A1) able (A2) (B3) rust (B4) (B5) eible on Aerial Imagery (B7) etated Concave Surface (B8)		mat apply) Water-Stained Lea Aquatic Fauna (B1: True Aquatic Plants Hydrogen Sulfide C Oxidized Rhizosphe Presence of Reduc Recent Iron Reduct Thin Muck Surface	ves (B9) 3) 5 (B14) Odor (C1) eres on Living ed Iron (C4) tion in Tilled S (C7) a (D9)	g Roots (C3)		condary Indicators (minimul Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2 Crayfish Burrows (C8) Saturation Visible on Aerial II Stunted or Stressed Plants (I Geomorphic Position (D2) FAC-Neutral Test (D5)	m of two required) 2) magery (C9) D1)	Yas
5 cm Mucky P strictive Layer il Remarks: 'DROLOG etland Hydrolog mary Indicator Surface Water High Water Ta Saturation (A3 Water Marks (Sediment Dep Drift Deposits Algal Mat or C Iron Deposits (Inundation Vis	eat or Peat (S3) If (if present): Type: Type: Ty		at apply) Water-Stained Lear Aquatic Fauna (B1. True Aquatic Plants Hydrogen Sulfide C Oxidized Rhizosphe Presence of Reduct Recent Iron Reduct Thin Muck Surface Gauge or Well Data	ves (B9) 3) 5 (B14) Odor (C1) eres on Living ed Iron (C4) tion in Tilled S (C7) a (D9) marks)	g Roots (C3)		condary Indicators (minimulars Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial In Stunted or Stressed Plants (I Geomorphic Position (D2) FAC-Neutral Test (D5)	m of two required) 2) magery (C9) D1)	<u>Yes</u>
strictive Layer il Remarks: DROLOG etland Hydrolog mary Indicator Surface Water High Water Ta Saturation (A3 Water Marks (Sediment Dep Drift Deposits Algal Mat or C Iron Deposits (Inundation Vis Sparsely Vege	eat or Peat (S3) (if present): Type: gy Indicators: rs (minimum of one required (A1) able (A2) b) B1) osits (B2) (B3) rust (B4) (B5) ible on Aerial Imagery (B7) etated Concave Surface (B8) as: eseent?		Depart apply) Water-Stained Lear ✓ Aquatic Fauna (B1. True Aquatic Plants Hydrogen Sulfide C Oxidized Rhizosphe Presence of Reduc Recent Iron Reduct Thin Muck Surface Gauge or Well Data Other (explain in re	ves (B9) 3) s (B14) bdor (C1) eres on Living ed Iron (C4) tion in Tilled S (C7) a (D9) marks)	g Roots (C3)		condary Indicators (minimul Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2 Crayfish Burrows (C8) Saturation Visible on Aerial II Stunted or Stressed Plants (I Geomorphic Position (D2) FAC-Neutral Test (D5)	m of two required) 2) magery (C9) D1)	Yes

			WET	LAND L	DETERI	MINAT	ION DA	ATA FO	ORM -	· Mid	west	Reg	ion		
Projec	ct/Site:	<u>DeCola P</u> <u>Project</u>	onds B & C In	nprovement_	Applicant/Ow	ner: <u>BCWM</u>	<u>C</u> (City/County:	Golden Valley/He	nnepin	State:	MN	Sampling Date:	09/22/17	
Invest	tigator(s): [BKB			Section:	<u>29</u>		Township:	118N		Range:	<u>21W</u>	Sampling Point:	<u>4-1 UPL</u>	
Land	Form:	<u>Hillslope</u>			Local Relief:	<u>Convex</u>		Slope %:	<u>3</u> 5	Soil Map U	nit Name	<u>Urbanl</u>	and-Lester comp	lex 2 to 18%	slopes
Subre	egion (LRR):	<u>M</u>			Latitude:	<u>4983566</u>		Longitude:	<u>470403</u>		Datum:	NAD83,	UTM Zone 15 m	eters	
Cowa	ardin Classifi	cation:	<u>Upland</u>		Circular 39 C	Classification:	<u>Upland</u>			Маррео	l NWI Cla	ssification	: PFO1A		
Are cl	imatic/hydro	logic condi	ions on the si	te typical for this	s time of year?	No No	(If no, explain	n in remarks,)	Eggers	& Reed (orimary):	<u>Upland</u>		
Aro v	egetation	No	Soil <u>No</u>	Hydrology	/ <u>No</u> si	ignificantly dis	turbad?	Are "normal	<u>Yes</u>	Eggers	& Reed (secondary	/): <u>N/A</u>		
AIC V	egetation	110	_	-		,	(circumstance present?	es"		& Reed (<u>N/A</u>		
Are ve	egetation	<u>No</u>	Soil <u>No</u>	Hydrology	/ <u>No</u> na	aturally proble	matic?	present:		Eggers	& Reed (quaternar	y): <u>N/A</u>		
SUM	MARY C	OF FINE	DINGS - A	Attach site	map sho	owing sa	mpling p	oint loca	ations,	transe	cts, ir	nporta	nt features	s, etc.	
Hydrid	ophytic veget c soil presen tors of wetla	t? [']		No (ex	eneral Remark: xplain any swers if neede	mont	17, anteceden ns prior to the				the wet ra	inge base	d on precipitation	n for the three)
Is the	sampled are	ea within a i	wetland?	No If	yes, optional l	Wetland Site	ID: <u>Uplar</u>	<u>nd</u>							
VEG	ETATIC	DN													
						<u>Absolute</u>	<u>Dominant</u>	<u>Indicator</u>	<u>50</u>)/20 Thres	sholds:			<u>20%</u>	<u>50%</u>
-	Tree Stratur	<u>m</u>	(Plot S	Size: <u>30 ft</u>)	% Cover	Species?	<u>Status</u>	Tr	ee Stratu	m			6	15
1.	Acer negun	ndo				15	Yes	FAC		apling/Shi		um		0	0
2.	Rhamnus c	athartica				15	Yes	FAC		erb Stratu 'a a du Via		_		16	40
3.						0				oody Vin	e Stratur	I		0	0
4.						0			<u>Do</u>	<u>ominance</u>	Test Wo	rksheet:			
_				-					—'II						

OIL				Sampling Po	oint:
rofile Description: (Describe to the depth nee	eded to document the indicator or	confirm the abscence	of indicators).	
Depth Matrix		edox Features			
(inches) Color (moist)	% Color (moist)	% Type [1]	Loc [2]	Texture	Remarks
0 - 3 10YR 2/1	100			loam	
3 - 20 10YR 3/2	100 15 10YR 6/1			sandy loam	
20 - 25 10YR 3/1	15 10YR 6/1 10YR 3/4		M 	sandy clay loam	
	1011(3/4				
Type: C=Concentration, D=Depletion, RM=I	Reduced Matrix, MS=Masked Sand	d Grains [2] Location	: PL=Pore L	ining, M=Matrix.	
vdric Soil Indicators: (applicable to all LRRs,	unless otherwise noted)		Ind	licators for Problematic Hydric Soi	ils [3]:
Histosol (A1)	Sandy G	Gleyed Matrix (S4)		Coast Prairie Redox (A16)	
Histic Epipedon (A2)	☐ Sandy R	Redox (S5)		Dark Surface (S7)	
Black Histic (A3)	☐ Stripped	Matrix (S6)		Iron-Manganese Masses (F12)	
Hydrogen Sulfide (A4)	Loamy N	Mucky Mineral (F1)		Very Shallow Dark Surface (TF12)	
Stratified Layers (A5)	_	Gleyed Matrix (F2)		Other (explain in soil remarks)	
2 cm Muck (A10)	_	d Matrix (F3)		(
Depleted Below Dark Surface (A11)		Park Surface (F6)			
Thick Dark Surface (A12)	<u> </u>	d Dark Surface (F7)			
. ,	_ ,	• •		Indicators of hydrophytic vegetati	
Sandy Mucky Mineral (S1) 5 cm Mucky Peat or Peat (S3)	Redox D	Pepressions (F8)	mu	ist be present, unless disturbed or	problematic.
estrictive Layer (if present): Type:	Dep	oth (inches):		Hydric soil present?	<u>No</u>
oil Remarks:					
YDROLOGY					
etland Hydrology Indicators:					
imary Indicators (minimum of one required; o	check all that apply)		Sec	condary Indicators (minimum of tw	vo required)
Surface Water (A1)	☐ Water-Stained Leav	ves (B9)		Surface Soil Cracks (B6)	
] High Water Table (A2)	Aquatic Fauna (B13	3)		Drainage Patterns (B10)	
Saturation (A3)	True Aquatic Plants	s (B14)		Dry-Season Water Table (C2)	
Water Marks (B1)	☐ Hydrogen Sulfide O			Crayfish Burrows (C8)	
Sediment Deposits (B2)		eres on Living Roots (C3)		Saturation Visible on Aerial Imagery	· (C9)
Drift Deposits (B3)	Presence of Reduce	_		Stunted or Stressed Plants (D1)	(0.)
Algal Mat or Crust (B4)		ion in Tilled Soils (C6)		Geomorphic Position (D2)	
Iron Deposits (B5)	☐ Thin Muck Surface			FAC-Neutral Test (D5)	
Inundation Visible on Aerial Imagery (B7)	Gauge or Well Data	•			
Sparsely Vegetated Concave Surface (B8)	Other (explain in rei	marks)		_	
eld Observations:		<i>"</i>		Indicators of wetland hydrolog	gy present? <u>No</u>
urface water present?	Surface Water Depth (Describe Recorded Data:	
/ater table present?	Water Table Depth (inc	ches):			
aturation present? (includes capillary fringe)	Saturation Depth (inch	nes):			
ecorded Data: Aerial Photo	Monitoring Well Stream Gau	ıge 🔲 Previous Insp	ections	1	
lydrology Remarks:					

	WETL	AND DI	ETERN	IINAT	ION DA	ATA F	ORM	- Mia	west	Reg	ion		
Project/Site:	DeCola Ponds B & C Impi Project	rovement A	pplicant/Own	er: <u>BCWM</u>	I <u>C</u>	City/County:		lennepin	State:	MN	Sampling Dat	te: <u>09/22/17</u>	
Investigator(s):	<u>BKB</u>	9	Section:	<u>29</u>		Township:	<u>118N</u>		Range:	<u>21W</u>	Sampling Pol	int: <u>4-1 WET</u>	
Land Form:	<u>Toeslope</u>	L	ocal Relief:	<u>Concave</u>		Slope %:	1	Soil Map	Jnit Name	: <u>Urbar</u>	nland-Lester co	mplex 2 to 189	<u>% slopes</u>
Subregion (LRR): <u>M</u>	L	atitude:	<u>4983565</u>		Longitude:	<u>470401</u>		Datum:	NAD83	, UTM Zone 15	meters	
Cowardin Classi	fication: PUBG/PEMB	C	Circular 39 Cla	assification:	Type 5/2			Марре	d NWI Cla	ssificatio	n: PFO1A		
Are climatic/hydr	ologic conditions on the site	typical for this ti	me of year?	<u>No</u>	V C	in in remarks	•	Eggers	& Reed ((primary):	Shallow,	Open Water	
Are vegetation	No Soil No	Hydrology	<u>No</u> sig	nificantly dis	sturbed?	Are "normal circumstance		_ 00	s & Reed (s & Reed (y): <u>Fresn (w</u> N/A	/et) Meadow	
Are vegetation	No Soil No	Hydrology	No natu	urally problei	matic?	present?		00	s & Reed (
SUMMARY	OF FINDINGS - At	tach site n	nap shou	ving sa	mpling p	oint loc	ations				-	es, etc.	
Hydrophytic vege Hydric soil prese Indicators of wetl		Yes (expl	ral Remarks ain any ers if needed	month	17, anteceder hs prior to the				the wet ra	ange bas	ed on precipita	tion for the thre	96
	rea within a wetland?		s, optional W	etland Site	ID: Wetl	and 4							
VEGETATI	ON												
				Absolute	Dominant	Indicato	r 🖁	50/20 Thre	sholds:			<u>20%</u>	<u>50%</u>
Tree Stratu	<u>ım</u> (Plot Siz	e: <u>30 ft</u>)	<u>% Cover</u>	Species?	<u>Status</u>	_	Tree Strati	ım			5	12.5
Acer negu	undo.			20	Yes	FAC		Sapling/SI	nrub Strat	um		0	0
Morus alb.				5	Yes	FAC		Herb Strat	um			6	15
2. IVIOLUS AID	u			0	103	1 AC	<u> </u>	Woody Vii	ne Stratur	n		0	0

ee Stratum cer negundo forus alba pling/Shrub Stratum	(Plot Size: 30 ft	Total Cover:	% Cover 20 5 0 25 0 25	Yes Yes	FAC FAC	Tree Stratum Sapling/Shrub Stratum Herb Stratum Woody Vine Stratum Dominance Test Worksh Number of Dominant Spe That Are OBL, FACW or	ecies	- - -	5 0 6 0	1	2.5 0 15 0
forus alba	(Plot Size: 15ft		5 0 0 25		-	Herb Stratum Woody Vine Stratum Dominance Test Worksh Number of Dominant Spe	ecies	- - -	6 0	1	5
forus alba	(Plot Size: <u>15 f</u> t		5 0 0 25		-	Woody Vine Stratum Dominance Test Worksh Number of Dominant Spe	ecies	-	0		
	(Plot Size: <u>15 f</u> t		0 0 25			Dominance Test Worksh Number of Dominant Spe	ecies	_			0
pling/Shrub Stratum	(Plot Size: <u>15 f</u> t		25			Number of Dominant Spe	ecies		3 (A)		
pling/Shrub Stratum	(Plot Size: <u>15 f</u> t		0						3 (A)		
pling/Shrub Stratum	(Plot Size: 15 ft)				I nat Are OBL, FACW or	-AC:				
						H					
			i——			Total Number of Domina Species Across All Strate			3 (B)		
			0			Percent of Dominant Spe					
			0			That Are OBL, FACW or		100.00	% (A/E	3)	
			0			Prevalence Index Worksh	ant.				_
			0				<u>eer:</u>				
		Total Cover:	<u>0</u>			Total % Cover of:			Multiply by		
<u>rb Stratum</u>	(Plot Size: <u>5 ft</u>)				OBL Species	0	X 1		0	
ilea pumila			25	Yes	FACW	FACW Species	25	X 2		50	
hamnus cathartica			5	No	FAC	FAC Species	30	X 3		90	
			0			FACU Species	0	X 4		0	
			0			· · · · · · · · · · · · · · · · · · ·	0	X 5		0	
			0				55	(A)		140	(B
			0								(=
			0					B/A =	2	.၁၁	
			0								
			<u>30</u>			III			ion		
oody Vine Stratum	(Plot Size: 30 ft)									
			0				-	-	vido cunn	ortina	, do
			0			in vegetation i	Auaptatit emarks oi	r on a sepai	rate supp	orung	ua
		Total Cover:	0			-					
Ground in Herb Stratun	n: 70		% Sphagnui	m Moss Cove	r:	[1] Indicators of hydric soil & disturbed or problematic.	vetland hyd	drology must	be present,	unless	
tion Remarks: (include p	ohoto numbers here	or on a separate	sheet)			Hydrophytic vegetation pre	sent?	<u>Yes</u>			
(Ground in Herb Stratun	Ground in Herb Stratum: 70	Total Cover: Ground in Herb Stratum: 70	O O O O O O O O O O	O	O	Total Cover: 30 O Vine Stratum (Plot Size: 30 ft) Total Cover: 0 O Vine Stratum (Plot Size: 30 ft) Total Cover: 0 O Vine Stratum (Plot Size: 30 ft) Total Cover: 0 Sphagnum Moss Cover: Indicators of hydric soil & Vine disturbed or problematic. Indicators of pydric soil & Vine disturbed or problematic. Indicators of hyd	Total Cover: 0	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Total Cover: Q	Total Cover: $\underline{0}$

ofile Descriptic	on: (Describe to the depth i	needed to	document the indicator or	confirm th	ne abscence	of indicators	·).		
Depth	Matrix		Re	dox Featu					
(inches)	Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]	Texture	Rem	arks
0 - 4	10YR 2/1	100					loam		
4 - 10	10YR 5/1	90	10YR 5/6	10	С	M	clay		
10 - 15	N 2.5/0	100					silty clay loam		
15 - 28	N 2.5/0	100					silt loam	sapric	
Type: C=Con	centration, D=Depletion, RI	M=Reduced		d Grains	[2] Location	n: PL=Pore L	ining, M=Matrix.		
ydric Soil Indica	ators: (applicable to all LR	Rs, unless	otherwise noted)			Inc	licators for Problematic Hyd	ric Soils [3]:	
Histosol (A1)			Sandy G	Gleyed Matri	ix (S4)		Coast Prairie Redox (A16)		
] Histic Epipedo	on (A2)		_	Redox (S5)			Dark Surface (S7)		
Black Histic (A			_	Matrix (S6))		Iron-Manganese Masses (F1	2)	
] Hydrogen Sulf				Лиску Mine			Very Shallow Dark Surface (
							_		
Stratified Laye				Gleyed Matr			Other (explain in soil remarks	5)	
2 cm Muck (A1			<u> </u>	d Matrix (F3					
_	w Dark Surface (A11)		Redox E	ark Surface	e (F6)				
Thick Dark Sui	rface (A12)		Depleted	d Dark Surfa	ace (F7)	[3]	Indicators of hydrophytic ve	egetation and wetlan	d hydrold
] Sandy Mucky i	Mineral (S1)		Redox E	epressions	(F8)		ist be present, unless distur		u riyuroic
5 cm Mucky P	Peat or Peat (S3)								
estrictive Layer	(if present): Type:			oth (inches	s):		Hydric soil present	? <u>Yes</u>	
estrictive Layer oil Remarks:	(if present): Type:		<i>Dер</i>	oth (inches	s):		Hydric soil present	? <u>Yes</u>	
	r (if present): Type:		— — — — — — — — — — — — — — — — — — —	oth (inches	s):		Hydric soil present	? <u>Yes</u>	
			Dep	th (inches	s):		Hydric soil present	? <u>Yes</u>	
oil Remarks:	GY _		Дер	th (inches	s):		Hydric soil present	? <u>Yes</u>	
pil Remarks: /DROLOG	GY _	rd; check a		oth (inches	s):	Se	Hydric soil present		
pil Remarks: /DROLOG	GY gy Indicators: rs (minimum of one require	rd; check a			s):	Se			
oil Remarks: /DROLOGietland Hydrologietimary Indicator	GY gy Indicators: rs (minimum of one require r (A1)	rd; check a	Il that apply)	ves (B9)	s):	Se	condary Indicators (minimul		
oil Remarks: /DROLOG etland Hydrolog rimary Indicator Surface Water High Water Ta	GY gy Indicators: rs (minimum of one require r (A1) able (A2)	rd; check a	II that apply) ☐ Water-Stained Lean ☑ Aquatic Fauna (B13	/es (B9) 3)	s):	Se	condary Indicators (minimul Surface Soil Cracks (B6) Drainage Patterns (B10)	m of two required)	
oil Remarks: /DROLOG /etland Hydrolog rimary Indicator] Surface Water] High Water Ta] Saturation (A3	GY gy Indicators: rs (minimum of one require r (A1) able (A2)	rd; check a	II that apply) ☐ Water-Stained Leav ☑ Aquatic Fauna (B1: ☐ True Aquatic Plants	ves (B9) 3) 5 (B14)	s):	Se	condary Indicators (minimul Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2	m of two required)	
oil Remarks: /DROLOG fetland Hydrolog rimary Indicator Surface Water High Water Ta Saturation (A3) Water Marks (A3)	gy Indicators: rs (minimum of one require r (A1) able (A2) (B1)	rd; check a	Il that apply) □ Water-Stained Leav ✔ Aquatic Fauna (B1: □ True Aquatic Plants □ Hydrogen Sulfide C	/es (B9) 3) 5 (B14) Odor (C1)			condary Indicators (minimul Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2 Crayfish Burrows (C8)	m of two required)	
oil Remarks: /DROLOG fetland Hydrolog rimary Indicator Surface Water High Water Ta Saturation (A3) Water Marks (i	GY gy Indicators: rs (minimum of one require r (A1) able (A2) (B1) posits (B2)	rd; check a	II that apply) □ Water-Stained Leav ✔ Aquatic Fauna (B1: □ True Aquatic Plants □ Hydrogen Sulfide C □ Oxidized Rhizosphe	ves (B9) 3) 5 (B14) Odor (C1) eres on Livir	ng Roots (C3		condary Indicators (minimul Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2 Crayfish Burrows (C8) Saturation Visible on Aerial In	m of two required) 2) magery (C9)	
Poll Remarks: /DROLOG fetland Hydrolog rimary Indicator] Surface Water] High Water Ta] Saturation (A3] Water Marks (i)] Sediment Dep] Drift Deposits (i)	gy Indicators: rs (minimum of one require r (A1) able (A2) (B1) posits (B2) (B3)	rd; check a	Il that apply)	ves (B9) 3) 5 (B14) Odor (C1) eres on Livir ed Iron (C4,	ng Roots (C3		condary Indicators (minimul Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2 Crayfish Burrows (C8) Saturation Visible on Aerial In Stunted or Stressed Plants (L	m of two required) 2) magery (C9)	
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Appendix B Site Photographs

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.



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.



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.



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) Jeff Oliver (City of Gold	len Valley)	Address 7800 Golder Golden Vall	n Valley Rd ley, MN 55427	-4508
1.	PROJECT INFORMA	ATION		
Applicant Name City of Golden Valley	Project Name Liberty Crossing Floor Project		Date of Application 6/3/2016	Application Number
Attach site locator map.				
Type of Decision:				
	☐ No-Loss	Exemption	n 🗆	Sequencing
☐ Replacement	Plan [Banking Pl	an	
Technical Evaluation Panel Findings	and Recommendation (if	anv).		
Approve Summary (or attach):	Approve with conditi			☐ Deny
2. LOCAL	GOVERNMENT UN	IT DECISIO)N	
Date of Decision: 6/8/2016				
X Approved ☐ Ap	proved with conditions (in	nclude below)		☐ Denied
LGU Findings and Conclusions (attack	h additional sheets as nece	essary);		
The wetland delineation performed by 2016 by the the City of Golden Valley 1(Decola Pond B) was delineated as a seasonally flooded basin. Both wetland	LGU representative. Two shallow open water wetla	wetlands wer nd and Wetlan	e delineated - V d 2 was delinea	Wetland

BWSR Forms 7-1-10

For Replacement Pla	ns using credits from t	he State W	etland Bank:	
Bank Account #	Bank Service Area	County		Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)
Replacement Plan approval of a Wetland	Approval Conditions d Replacement Plan is	. In addi	tion to any con l upon the follo	nditions specified by the LGU, the wing:
assurance specifi	ssurance: For projectied by the LGU must 9 (List amount and ty	t be subn	nitted to the L	hat is not in-advance, a financial GU in accordance with MN Rule
the BWSR "Dec	laration of Restriction	and Co	venants" and "	e must be provided to the LGU that Consent to Replacement Wetland" he replacement wetland is located.
Credit With BWSR has with replacement plan.	idrawn the credits fr	nent consi om the st	isting of wetlar ate wetland b	nd bank credits, confirmation that ank as specified in the approved
Wetland	s may not be impacted	d until all	applicable con	ditions have been met!
LGU Authorized Sign				
Subp. 5 provides notice	ce that a decision was r Iditional details on the	made by th	e LGU under th	ats in accordance with 8420.0255, the Wetland Conservation Act as seen provided to the landowner and
Name			Title	
Jeff Oliver			City Engineer	r/City of Golden Valley
Signature	\overline{Z}		Date 6/13/16	Phone Number and E-mail 763-593-8034
W		·	खा अ। ५	joliver@goldenvalley.gov
Additional approvals	NLY APPLIES TO To or permits from local, s before commencing v	state, and	federal agencie	TLAND CONSERVATION ACT. s may be required. Check with all
for appeal (30 days) h	their own risk if work as expired. If this decis ng or replacing all wet	sion is reve	ersed or revised	on is started before the time period under appeal, the applicant may be
This decision is valid TEP and specified in t	for three years from this notice of decision.	the date of	decision unles	s a longer period is advised by the
	2 ADDE A	LOPE		
Pursuant to MN Rule petition for appeal, inc this Notice to the follo	e 8420.0905, any appeluding applicable fee,	eal of this	decision can only (30) calenda	N only be commenced by mailing a r days of the date of the mailing of
Check one:				
Appeal of an LGU petition and \$ fe	staff decision. Send to the (if applicable) to:		etition and \$500 Executive Dire Minnesota Bo	ector ard of Water and Soil Resources
			St. Paul, MN	e Road North

BWSR Forms 7-1-10

4. LIST OF ADDRESSEES

NR TEP member: Kate	different than DNR TEP 1 ble): r (if different)						
Corps of Engineers Proje BWSR Wetland Bank Co	ct Manager oordinator (wetland bank p	lan decisions only)					
	5. MAILING INF	ORMATION					
>For a list of BWSR TEP repre			brancas/SVC A				
➤For a list of DNR TEP represe		mn.us/wetlands/wca/DN	VR TEP contacts.pdf				
Department of Natural Resou							
Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	NW Region:NE Region:Central Region:Southern Region:Reg. Env. Assess. Ecol.Reg. Env. Assess. Ecol.Reg. Env. Assess. Ecol.Reg. Env. Assess. Ecol.Div. Ecol. ResourcesDiv. Ecol. ResourcesDiv. Ecol. Resources2115 Birchmont Beach Rd.1201 E. Hwy. 21200 Warner Road261 Hwy. 15 SouthNEGrand Rapids, MN 55744St. Paul, MN 55106New Ulm. MN 56073						
For a map of DNR Administra							
>For a list of Corps of Project I	Managers: www.mvp.usace	e.army.mil/regulatory/de	efault.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. ATTACHN	MENTS					
In addition to the site locator n							
		walter.					

BWSR Forms 7-1-10 Page 3 of 3



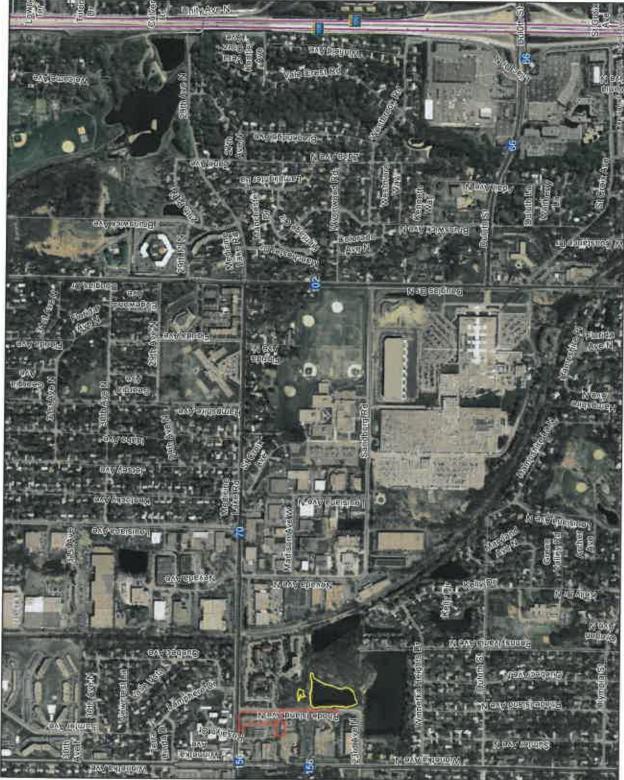


BARR

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
BARR		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.			ESTIMATED			
No.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	ITEM COST	NOTE
Α	Mobilization/Demobilization (10%)	LS	1	\$303,136.83	\$303,136.83	1,2,3,4,5,6
В	Traffic Control	LS	1	\$10,000.00	\$10,000.00	1,2,3,4,5,6
С	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
Н	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
0	Wetland Restoration	AC	2.3	\$10,000.00	\$23,100.00	1,2,3,4,5,6
Р	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	
U	Dewatering	LS	1	\$50,000.00	\$50,000.00	
V	Flotation Silt Curtain (DeCola Ponds B & C)	LF	2,260	\$15.00	\$33,900.00	
	Sediment Dredging & Disposal (contaminated)		,		, ,	7 7 7 7 7 7
W	(DeCola Pond B)	CY	3,480	\$55.00	\$191,400.00	1.2.3.4.5.6
Х	Raise Overflow Berm (DeCola Pond C)	CY	322	\$15.00	\$4,833.33	
Υ	5-foot weir manhole (DeCola Pond C)	Each	1	\$10,000.00	\$10,000.00	
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		1,2,3,4,5,6,7
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
НН	Modify Existing Stormsewer (Box Culvert Tie-In)	Each	1	\$4,000.00	\$4,000.00	1,2,3,4,5,6
	I ADVICTOR OF THE TOTAL OF THE				42 225 255 25	
	CONSTRUCTION SUBTOTAL				\$3,335,000.00	
	CONSTRUCTION CONTINGENCY (30%)				\$1,001,000.00	
	ESTIMATED CONSTRUCTION COST				\$4,336,000.00	1,2,3,4,5,6,7,
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION	-				
	OBSERVATION (30%)				\$1,301,000.00	123459
					Ç1,301,000.0C	,,2,3,4,3,0
	RESIDENTIAL/CONSTRUCTION EASEMENT	1			\$23,400.00	1,2,3,5,8
					•	
	ESTIMATED TOTAL PROJECT COST				\$5,660,000.00	
	ESTIMATED ACCURACY RANGE	-20%			\$4,528,000.00	5,8
	ESTIMATED ACCURACT KANGE	30%			\$7,358,000.00	5.0

Notes

- ¹ Limited Design Work Completed
- ² Quantities Based on Design Work Completed.
- ³ Unit Prices Based on Information Available at This Time.
- $^{\rm 4}$ 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 construction.

⁷Furnish 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.

	PREPARED BY: BARR ENGINEERING COMPANY	SHEET:	2	OF	3
BARR		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:	
PROJE	CT: BCWMC DeCola Ponds B & C Feasibility Study	ISSUED:		DATE:	
LOCAT	ION: City of Golden Valley	ISSUED:		DATE:	
PROJE	CT #: 23/27-0051.39	ISSUED:		DATE:	
OPINIO	ON 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	NOTE
А	Mobilization/Demobilization (10%)	LS	1	\$187,397.08	\$187,397.08	1,2,3,4,5,6
В	Traffic Control	LS	1	\$10,000.00	\$10,000.00	1,2,3,4,5,6
С	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
Н	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
М	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
0	Wetland Restoration	AC	1.4	\$10,000.00	\$13,700.00	1,2,3,4,5,6
Р	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	
S	Erosion Control Blanket	SY	14,426	\$4.00	\$57,704.72	
T	Hydromulch	SY	14,426	\$2.00	\$28,852.36	
U	Dewatering	LS	1	\$50,000.00	\$50,000.00	
V	Flotation Silt Curtain (DeCola Ponds B & C)	LF	2.260	\$15.00	\$33,900.00	
	Sediment Dredging & Disposal (contaminated)		,	, , , , ,	, ,	, , , , , , , , ,
W	(DeCola Pond B)	CY	2.757	\$55.00	\$151,610.80	1.2.3.4.5.6
Х	Raise Overflow Berm (DeCola Pond C)	CY	322	\$15.00	\$4,833.33	
Y	5-foot weir manhole (DeCola Pond C)	Each	1	\$10,000,00	\$10,000.00	
Z	24" RCP Stormsewer Pipe (Furnish and Install)	LF	30	\$59.00	\$1,770.00	
AA	12" RCP Stormsewer Pipe (Furnish and Install)	LF	30	\$36.00	\$1,080.00	
BB	14' x 4' Box Culvert (Furnish and Install)	LF	160	\$1,200.00	\$192,000.00	
СС	14' x 4' Box Culvert Elbow	Each	1	\$10,000.00	\$10,000.00	
DD	14' x 4' Box Culvert Flared End Section	Each	2	\$10,000.00	\$20,000.00	
EE	Weir Installation in 14' x 4' Box Culvert Flared End Section	Each	1	\$10,000.00	\$10,000.00	
FF	MnDOT Class IV RipRap with Filter Fabric	TON	124	\$100.00	\$12,432.00	
GG	Remove Existing Stormsewer	LF	115	\$18.00	\$2,070.00	
HH	Modify Existing Stormsewer (Box Culvert Tie-In)	Each	1	\$4,000.00	\$4,000.00	
	, , , , , , , , , , , , , , , , , , , ,			. ,	, ,	, , , , , , , ,
	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	
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION					
	OBSERVATION (30%)				\$804,000.00	1,2,3,4,5,8
	DECIDENTIAL /CONCEDUCTION FACEMENT				¢22.400.00	10050
	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
	-20% \$2.805.000.0				\$2,805,000.00	
	ESTIMATED ACCURACY RANGE	30%			\$4,558,000.00	

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 construction.
	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.

		ARED BY: BARR ENGINEERING COMPANY	SHEET:	3	OF	3
BARR			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:		
PROJE	CT:	BCWMC DeCola Ponds B & C Feasibility Study	ISSUED:		DATE:	
LOCA	TION:	City of Golden Valley	ISSUED:		DATE:	
PROJE	CT #:	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.			ESTIMATED			
No.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	ITEM COST	NOTE
Α	Mobilization/Demobilization (10%)	LS	1	\$202,908.52	\$202,908.52	1,2,3,4,5,6
В	Traffic Control	LS	1	\$10,000.00	\$10,000.00	1,2,3,4,5,6
С	Erosion Control	LS	1	\$30,000.00	\$30,000.00	
D	Inlet Protection	Each	9	\$250.00	\$2,250.00	
E	Trail Removal (Bituminous Pavement Removal)	SY	1,051	\$4.00	\$4,204.44	
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	
Н	Sod Removal	SY	2,323	\$5.00	\$11,616.00	
I	Excavation & Disposal (clean)	CY	28,809	\$15.00	\$432,129.45	
J	Excavation & Disposal (contaminated)	TON	16,940	\$30.00	\$508,200.00	
K	Grading	SY	23,861	\$4.00	\$95,444.80	
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	
N	Tree Planting	Each	35	\$300.00	\$10,500.00	1,2,3,4,5,6
0	Wetland Restoration	AC	1.7	\$10,000.00	\$16,900.00	1,2,3,4,5,6
Р	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
Т	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
	Sediment Dredging & Disposal (contaminated)					
W	(DeCola Pond B)	CY	3,037	\$55.00	\$167,035.00	1,2,3,4,5,6
Х	Raise Overflow Berm (DeCola Pond C)	CY	322	\$15.00	\$4,833.33	1,2,3,4,5,6
Υ	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
НН	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
	CONSTRUCTION CONTINGENCY (30%)	+			\$670,000.00	
		+	+			
	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
		-20%	1		\$3,037,000.00	
	FSTIMATED ACCURACY RANGE			\$4,935,000.00		

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.