Your Ref: EAWML30058
Our Ref: 332510236/49428/3501/CBH/VKR/NC/AREA1GW

10th November 2021

PPC Team
Natural Resources Wales
Rivers House
Fortran Road
St. Mellons Business Park
Cardiff
CF3 0EY

Attn: Tyrone Ward

Dear Tyrone,

Re: EAWML30058 - DOCKSWAY DISPOSAL SITE. AREA 1 GROUNDWATER & LEACHATE MONITORING REPORT, ANNUAL SCREEN – SEPTEMBER 2021

Please find enclosed a summary of the results for the groundwater and leachate quality annual screen 2021, carried out at Area 1 of Docksway Disposal Site, in accordance with the aftercare plan, following definitive closure of Area 1 in October 2014. The monitoring was undertaken during September 2021.

We enclose with this letter report, a plan showing the locations of the primary groundwater monitoring points, (Figure A) and the results of the laboratory testing carried out on the three groundwater compliance wells (GW03_05, GW07_07 and GW03_02), and five leachate sampling locations.

Field Observations

Details of the field testing results obtained during the 2021 annual screen are presented in Table 1.

Table 1 Field Testing Observations

Monitoring Point	Groundwater/Leachate Level Dip (m)	pH	Electrical Conductivity (µS/cm)	Temperature (°C)	Dissolved Oxygen (%)
GW07_07	5.54	9.1	6093	13.60	19.9
GW03_02	10.17	8.5	2083	13.20	45.5
GW03_05	9.8	8.2	1230	13.50	18.1
LF11_02	12.97	8.4	6878	15.01	33
LF11_03	9.74	8.6	9323	16.03	28.2
LF11_04	12.18	8.9	25380	20.06	29.6
LF11_06	8.5	8.5	9804	17.79	27.6
LF11_07	26.79	8.9	19030	29.80	0.2

The monitoring undertaken was an annual screen which comprises the following determinands (* denotes groundwater only):

Caversham Bridge House
Waterman Place
Reading
Berkshire RG1 8DN

Telephone: +44 (0)118 950 0761
email: PBA.Reading@stantec.com

Registered Office:
Stantec UK Ltd
Buckingham Court
Kingsmead Business Park
Frederick Place, London Road
High Wycombe HP11 1JU
Registered in England No. 1188070

Table 2 Testing Determinands

Total Alkalinity*	Chromium*	Total Oxidised Nitrogen*	Total Organic Carbon*
Ammoniacal Nitrogen	Copper*	Calcium*	VOCs
COD*	Lead*	Magnesium*	SVOCs
Conductivity*	Manganese*	Potassium	Organochlorine and Organophosphorous Pesticides
EPH	Nickel	Sodium*	
Mercury	Zinc*	pH*	Cyanide Total
Arsenic	Chloride*	Organotins*	Cyanide Free
Cadmium*	Sulphate*	Phenols	

Groundwater

Control Levels and Compliance Limits

The Hydrogeological Risk Assessment (HRA) for Area 1 was revised and issued in October 2011, and contains the Control Levels and Compliance Limits that were set and used to assess the groundwater quality across the Area 1 site, prior to formal closure. The annual screen results for the Area 1 groundwater have been assessed against the well specific Compliance Limits contained in the HRA.

The current laboratory limit of detection (LDL) has been used as the Control level and Compliance limit for Benzene, Naphthalene, Xylene, Phenols and Mercury (and in some cases this is different from the Compliance Limits in the HRA). This may however be subject to change as the laboratory limit of detection changes.

Hazardous Substances (formerly List I substances)

All the priority contaminants specified as 'hazardous substances' in the Area 1 Hydrogeological Risk Assessment (EPH, Arsenic, Benzene, Naphthalene, Xylene and Mercury) were monitored at the compliance wells in September 2021 and all were recorded below the well specific Compliance Limits. The exception to this is for EPH at GW03_02, with a recorded concentration of 244ug/l which exceeds the Compliance Limit of 142.5ug/l, and GW03_05 where the recorded concentration of 179ug/l exceeds the Compliance Limit for this location of 161.3ug/l. Both of these concentrations are lower than the previous years results and are within the range of the overall dataset.

Other Hazardous Substances

The results of the testing for hazardous substances other than the priority contaminants undertaken during September 2021 are presented in the enclosed analytical certificates and are summarised below.

In general, volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), pesticides and organotins were not detected above the LDL in the majority of the Area 1 groundwater samples tested with the exception of the following.

Table 3 Additional Exceedances of the LDL

Monitoring Point	Contaminant	Lab Detection Limit	Recorded Value
GW03_02	Dichlobenil (pesticide/herbicide)	<0.01 ug/l	>1.38 ug/l
GW03_05	Dichlobenil (pesticide/herbicide)	<0.01 ug/l	0.66 ug/l
GW03_02	4-Methylphenol (SVOC)	<1 ug/l	11 ug/l
GW03_02	n-Dibutyl phthalate (SVOC)	<1 ug/l	5.37 ug/l
GW07_07	n-Dibutyl phthalate (SVOC)	<1 ug/l	196 ug/l
GW07_07	SVOC TIC (unknown)	<10 ug/l	146 ug/l

Dichlobenil was also recorded marginally above the LDL at GW03_02 during the previous six annual monitoring rounds. Given the general groundwater flow direction at the site (towards the south / south east), it is considered that the presence of these parameters in GW03_02 (up hydraulic gradient of the landfills) indicates that the source of these specific parameters is off site.

Non-Hazardous Substances

All of the "priority contaminants" specified as non-hazardous substances in the Area 1 Hydrogeological Risk Assessment (Ammoniacal Nitrogen, Nickel, Potassium and Phenols) were monitored at the compliance wells as part of the annual screen and were recorded below the well specific Compliance limits with the exception of a marginal exceedance of Nickel at GW03_05 (recorded concentration 19.6 ug/l / Compliance limit 18.8 ug/l).

Chloride and Chemical Oxygen Demand (COD)

Chloride concentrations at GW03_02 and GW03_05 were recorded at 120mg/l and 31mg/l respectively during this round and these are within the range of data recorded for these monitoring wells. Chloride concentrations at GW07_07 were recorded at 998mg/l which is the highest Chloride concentration recorded at this location.

COD concentrations of 39.7mg/l, 71mg/l and 230mg/l were recorded at GW03_02, GW03_05 and GW07_07 respectively during this round. The concentrations recorded are within the range of results that have been recorded at these locations.

Leachate Dip Measurements and Laboratory Test Results

The level of leachate across Area 1 was monitored in LF03_01, LF03_03 and LF11_01 to LF11_07 in September 2021 and was recorded at levels of between about 6.5m AOD and 21.75 m AOD.

An annual hazardous substance screen was carried out during September 2021 in accordance with the aftercare plan (EAWML 30058). Samples of leachate were obtained and submitted for laboratory testing, from LF11_02 to LF11_07. There are no Compliance Limits for the leachate at Area 1, and the results of the testing undertaken during September 2021 are presented in the enclosed analytical certificates and are summarised below.

Free Cyanide was not detected at concentrations above the LDL in the leachate wells sampled during this round. However, Phenols were detected at LF11_02, LF11_03 and LF11_06 above the LDL with a maximum concentration detected at LF11_03 of 0.09 mg/l.

A small number of pesticides were detected above the laboratory method detection limit (MDL) in some of the Area 1 leachate samples tested.

Table 4 Summary of Poesticides/Herbicides above the LDL

Monitoring Point	Contaminant	Lab Detection Limit	Recorded Value
LF11_06	1,2,4-Trichlorobenzene	<0.01 ug/l	0.0586 ug/l
LF11_02	1,2,4-Trichlorobenzene	<0.01 ug/l	0.0484 ug/l
LF11_04	Atrazine	<0.01 ug/l	0.423 ug/l
LF11_07	Atrazine	<0.01 ug/l	0.652 ug/l
LF11_07	Simazine	<0.01 ug/l	3 ug/l

A number of results were recorded above the lab limit of detection for volatile organic compounds (VOCs) and semi volatile organic compounds (SVOCs) at each of the monitoring locations, as shown in the table below.

Table 4 Summary of Parameters Recorded above the MDL in Leachate Samples

Parameter	Concentrations (ug/l)				
(MDL <1ug/l)	**LF11_02**	**LF11_03**	**LF11_04**	**LF11_06**	**LF11_07**
Bis(2-Ethylhexyl)phthalate (SVOC)			35.7		89.2
Acenaphthene (SVOC)				4.16	
Methyl Tertiary Butyl Ether (VOC)			1.50	1.65	2.96
Cis-1,2-Dichloroethene (VOC)					2.46
Benzene (VOC)	5.49	5.56	7.05	4.80	6.07
Toluene (VOC)			7.31		2.79
Chlorobenzene (VOC)	5.25	3.65		2.80	1.58
Ethylbenzene (VOC)		1.01	7.72		16.80
m,p-xylene (VOC)	13.4	6.61	16.20		8.27
o-xylene (VOC)	2.09	2.30	10.70		14.60
Isopropylbenzene (VOC)	3.01	11.40		4.07	2.76
Propylbenzene	1.73	1.03		1.41	1.59
1,3,5-Trimethylbenzene (VOC)			2.93		3.44
1,2,4-Trimethylbenzene (VOC)	5.12	3.44	9.89		10.90
4-iso-Propyltoluene (VOC)			13.0		1.21
1,4-Dichlorobenzene (VOC)	2.34	1.25	1.46	2.46	1.03
Naphthalene (VOC)	2.73	9.01	2.31		9.78
Carbon disulphide					9.51

A number of tentively identified compounds were also detected within a number of the samples, as shown in the table below.

Table 5 Summary of Tentively Indentified Compounds Detected within Leachate Samples

Parameter	Concentrations (ug/l)				
	LF11_02	LF11_03	LF11_04	LF11_06	LF11_07
Total SVOC TIC	492	2340	5930	2370	10100
Benzothiazolone	176	146		127	
Butyl-Benzenesulfonamide		396			
Ditert-Butyl-hydroxyphenylpropionic acid		161		250	
Trimethyl hexanoic acid	130	704		1020	5200
Terbutyl benzoic acid		109		153	
Ethylmethylbenzenesulfonamide				58.2	
Isomer of Bis(methylethylidene) Phenol					857
Isomer of Dimethylbenzoic acid	192				
Isomer of Ditert-Butyl-hydroxyphenylpropionic acid	534				563
Isomer of Tert butyl benzoic acid	361				472
Triisopropylphosphate				68.3	
Unknowns (SVOC) (upto)	186	827	2540	476	1160

In previous reports (Sept 2015-2020), we reported a fluctuating trend of significant EPH concentrations in LF11_05. This location was not sampled in September 2021. The table below shows the concentrations of EPH within LF11_05 during the last six years.

Table 6 Summary of EPH Concentrations in LF11_05

Monitoring Date	EPH Concentration ug/l
Sept 2015	460,000
Sept 2016	45,700,000
Sept 2017	1,160,000,000
Sept 2018	3,700,000
Sept 2019	137,000
Sept 2020	1,420,000

During the field monitoring this location has also been noted to have an oily sheen on the water.

Concluding Remarks

NCC will continue to monitor the Area 1 groundwater quality in accordance with the aftercare plan and Stantec will comment on the general water quality within subsequent reports.

If you have any questions regarding the data, then please do not hesitate to contact us.

Yours sincerely

Kate Riley
Associate
on behalf of Stantec UK Ltd

CC:Robert Hughes – NCC (Docksway Disposal Site) Silvia Gonzalez Lopez, Luke Embrey - NCC