

July 6, 2017

Buckingham Group Contracting Ltd
Silverstone Road
Stowe, Bucks
MK18 5LJ

For the attention of Bob Dixon (Project Manager)

NOVA PROJECT NO. L15-5034

Dear Bob,

GROUNDWATER MONITORING, ISLAND ROAD, READING, RG2 0RP

Please find below our report on the groundwater monitoring works undertaken at the Island Road site located in Reading ("the Site").

1. INTRODUCTION

Nova CGI Limited (Nova) has undertaken groundwater monitoring works on three deep boreholes before, during and following construction works at the above Site, on behalf of Buckingham Group. Monitoring works were carried out between October 2015 to June 2017 and the results are detailed below.

1.1. Site Background

The 7.5 hectare Site is located off Island Road and is bounded to the north by large mature trees and the River Kennet, to the east by the A33 road, to the south by Island Road and to the west by further disused land. The land is known to have been landfilled historically, with filling operations occurring between 1973 and 1979. Surrounding land use is also reported to comprise historical landfills.

The development comprises of three industrial/warehouse units with office spaces and loading bays. The largest building will be located in the western half of the Site and two smaller ones to the east.

1.2. Previous Works

A number of intrusive ground investigations have been undertaken at the Site, the results of which are summarised in the following reports:

- Peter Brett Associates LLP report titled *"2002 Geo-environmental Investigation Report for Reading Greyhound and Speedway Stadium, Island Road, Reading"*;
- Peter Brett Associates LLP report titled *"2007 Gas Control Measures Specification for Reading Greyhound and Speedway Stadium, Island Road, Reading"*;

Cornwall Buildings, 45 Newhall Street, Birmingham, B3 3QR. Phone: +44 (0) 121 213 6359

Web: www.novaconsulting.com

- Nova Consulting Limited memo titled “Phase II Ground Investigation Memo for Proposed Distribution Park, Island Road, Reading”, dated 5 February 2014;
- Nova Consulting Limited report titled “Phase II Factual Report. Island Road Phase II, Reading, RG2 ORP”, dated 5 October 2015. Ref: L15-5034.

The geology beneath the Site has been found to comprise made ground and landfill materials (between 3.3m and 9.3m thickness), underlain by Alluvium and River Terrace Deposits. These are underlain by Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated).

2. SITE MONITORING WORKS

Laboratory chemical analysis results from groundwater monitoring and sampling rounds were assessed to determine the potential risk to controlled waters. Controlled waters were identified as the River Kennet, located adjacent to the northern boundary of the Site, and the underlying aquifers (both the superficial deposits and the bedrock deposits). No continuous groundwater was noted in the waste material, which was relatively dry, and the likelihood of run off to the River Kennet was considered minimal. The deep groundwater results have been compared to UK Drinking Water Quality Standards (UK DWQS) where available. In the absence of any current UK total petroleum hydrocarbon standards, the World Health Organization (WHO) Guidance Values for petroleum products in drinking water have been used.

Before and during the construction works, groundwater monitoring and sampling was undertaken from three deep monitoring wells (CP1 to CP3 logs included within Appendix A). These wells were all installed into the underlying Chalk at the following depths:

TABLE 1 Deep well installations (Pre-Construction and Construction Phase Monitoring)	
CP1	Screened between 22m and 35m bGL in the Chalk
CP2	Screened between 25m and 35m bGL in the Chalk
CP3	Screened between 20m and 35m bGL in the Chalk

During construction works, monitoring wells CP1 – CP3 became damaged and three new boreholes (CP101 – CP103) were constructed for monitoring and sampling in March 2017. The new borehole locations (CP101 – CP103) are shown in Drawing 1. Borehole logs for CP101 to CP103 are included within Appendix A and were installed into the underlying chalk at the following depths:

TABLE 1 Deep well installations (Post Construction Phase Monitoring)	
CP101	Screened between 20m and 35m bGL in the Chalk
CP102	Screened between 22m and 30m bGL in the Chalk
CP103	Screened between 20m and 30m bGL in the Chalk

During the monitoring rounds, groundwater samples were analysed for the following determinands:

- Suite of metals (arsenic, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc);
- pH;
- Total biochemical oxygen demand (BOD);
- Total chemical oxygen demand (COD);
- Dissolved oxygen;
- Ammoniacal nitrogen;
- Total organic carbon (TOC);
- Total petroleum hydrocarbons with benzene, toluene, ethylbenzene and xylene (TPH CWG with BTEX); and
- Speciated polycyclic aromatic hydrocarbons (PAHs).

2.1. Pre-Construction Monitoring Works

One round of groundwater monitoring was undertaken prior to the construction works.

The chemical analysis (Report 15-47873 included as Appendix B) showed elevated concentrations of ammoniacal nitrogen and PAHs when compared to the screening criterion (UK DWS). There are also elevated concentrations of BOD and COD. Concentrations of total petroleum hydrocarbons were found to be below the laboratory detection limit.

2.2. During Construction Monitoring Works

One round of groundwater monitoring was undertaken during the construction works. This included sampling from deep well installations (CP1-CP3) and testing for the same chemical testing suite.

The chemical analysis (Reports 16-26728 and 16-30343 included as Appendix C) again showed elevated concentrations of ammoniacal nitrogen when compared to a screening criterion (DWS). Concentrations of copper, mercury and selenium were detected but at concentrations below UK DWQS concentrations. Concentrations of PAHs and BOD were found to be below the laboratory detection limit, and BOD was found to have reduced significantly. Concentrations of total petroleum hydrocarbons were found to be below the laboratory detection limit.

2.3. Following Construction Monitoring Works

Three rounds of groundwater monitoring were undertaken following construction works. This included sampling from deep wells (CP101-CP103). It should be noted that during the first post-construction groundwater monitoring round, CP102 could not be accessed, therefore no sample was taken from this location during this monitoring round.

The chemical analysis (Report 17-47231, Report 17-48095 and Report 17-5552) showed the following:

- PAH concentrations in groundwater were less than laboratory detection limits during all monitoring rounds;
- Where detected, BTEX and metal concentrations in groundwater were all found to have concentrations below the relevant UK DWQS;
- Petroleum hydrocarbon concentrations were generally found to be below laboratory detection limits, with the exception of the first post-construction monitoring round where TPH-CWG – *Aliphatic* concentrations of 230 µg/l were detected in CP101 and TPH-CWG – *Aromatic* concentrations of 11 µg/l were detected in CP103. Both results were below the WHO guidelines for petroleum products in drinking water of 300 µg/l and on the subsequent two monitoring rounds the concentrations were less than laboratory detection levels;
- As in previous monitoring rounds, chemical oxygen demand was found to be variable during monitoring rounds and ranged between 6.2 mg/l to 350 mg/l.

3. CONCLUSIONS

Given the landfill history of the Site and the surrounding area, it is likely that the groundwater chemical composition will vary over time. Based on the chemical analysis results from pre-construction works and results from sampling undertaken during and following the construction works, there is little evidence to suggest deteriorating groundwater quality at the Site.

If you have any questions, please contact us at +44 (0) 121 213 6359.

Sincerely,

NOVA CGI LIMITED



Jim Gott
Director
Email Jim.Gott@novaconsulting.com

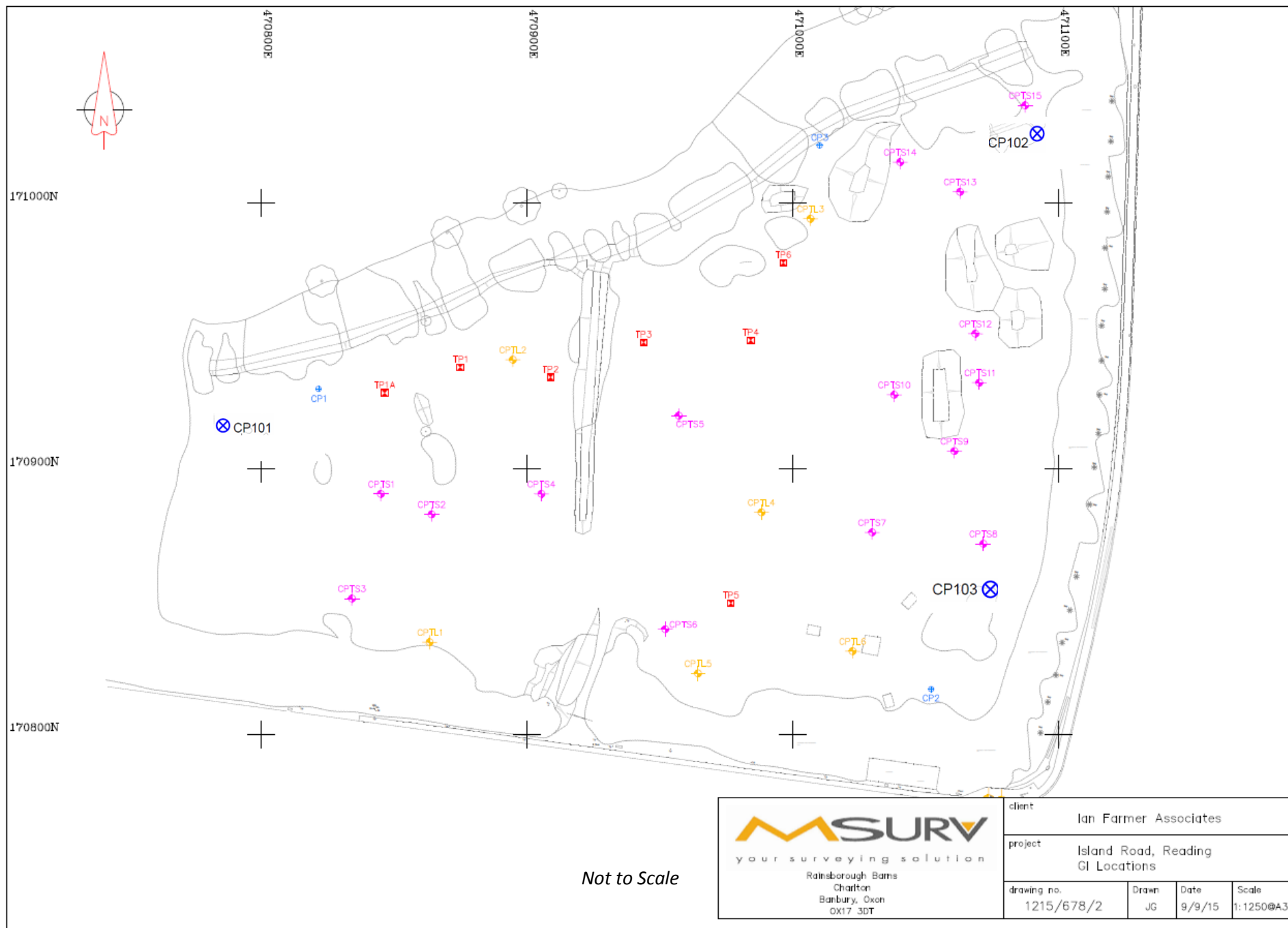
Copy to: Neil Dickson (Peel Logistics)

Enc:

Drawings	Ground Investigation Exploratory Hole Location Plan
Appendix A	Exploratory Hole Logs
Appendix B	Pre-Construction Monitoring Data
Appendix C	During Construction Monitoring Data
Appendix D	Post Construction Monitoring Data

FIGURES

GROUND INVESTIGATION EXPLORATORY HOLE LOCATION PLAN



APPENDIX A

EXPLORATORY HOLE LOGS

ID: CP1		Project No: L15-5034			Location: Island Road, Phase II		Sheet 1 of 2			
Date:		01/09/2015 – 02/09/2015			Ground Level:					
Total Depth:		35.00m			Method:				Cable Percussive	
Client:		Evander Properties			Engineer:				JW	
Depth (m)	Sample	Casing (m)	Water (m)	Field Records	Depth (m)	Description	Leg	Inst all		
			Dry		0.20	MADE GROUND: Grass over soft yellow brown, silty, sandy, gravelly, clay topsoil. Gravel is fine to coarse, angular to subrounded flint, concrete, brick and chalk.				
					0.90	MADE GROUND: Soft to firm, orange, brown, silty, clayey, gravelly, medium sand.				
		1.20 2.00	Dry Dry		1.30	MADE GROUND: Firm, grey brown, silty, gravelly clay. Gravel is fine to medium, angular to subangular chalk, coal, flint and brick.				
		3.00	Dry		3.00	MADE GROUND: Firm, grey mottled brown, silty, gravelly clay. Gravel is fine to medium, angular to subrounded chalk, coal and flint.				
		4.00 5.00 6.00	Dry Dry Dry		6.30	MADE GROUND: Firm, black, grey, gravelly silty, clayey medium sand landfill. Gravel is fine to coarse, angular to subangular brick, decayed wood, asphalt, coal, metal, chalk, and plastic				
				Water struck at 7.30m rose to 6.30m	7.30	Soft, dark grey brown, silty clay PEAT with occasional fine rootlets.				
		7.50	6.30		8.70	Black cream, fine to coarse, angular to subrounded sandy flint GRAVEL.				
		9.00 10.00 11.00	6.30 6.30 6.30		11.00	Firm to stiff, blue grey, very sandy, gravelly CLAY. Gravel is fine to medium, angular to subangular flint.				
		12.50 14.00	6.30 6.30		14.40	Grey, medium SAND.				

		15.50	6.30		15.30	Firm to stiff, dark grey very clayey SILT with very frequent large shelly fragments		
		17.00			35.00	White cream, very soft, gravelly, clayey, sandy silty DM CHALK. Gravel is fine to medium, subangular chalk. Gravel is fine to medium, angular to subangular flint.		
		18.50						
		20.00						
		21.50						
		23.00						
		24.50						
		26.00						
		27.50						
		29.00						
		30.50						
		32.00						
		33.50						
		35.00						
Casing – 200mm to 11.00m, 150mm to 19.50m								

ID: CP2		Project No: L15-5034			Location: Island Road, Phase II		Sheet 1 of 2			
Date:		03/09/2015 – 07/09/2015			Ground Level:					
Total Depth:		35.00m			Method:				Cable Percussive	
Client:		Evander Properties			Engineer:				JW	
Depth (m)	Sample	Casing (m)	Water (m)	Field Records	Depth (m)	Description	Leg	Inst all		
			Dry		0.20	MADE GROUND: Rough grass over clayey, silty, gravelly medium sand topsoil. Gravel is fine to coarse, angular to subrounded flint and chalk				
		1.20	Dry		1.40	MADE GROUND: Firm, grey brown, silty, sandy, gravelly clay. Gravel is fine to coarse, angular to subrounded flint, chalk, brick, concrete, plastic and tile.				
		2.00 3.00 4.00 5.00 6.00	Dry Dry	Struck at 4.00m, Dropped to 6.30m	6.10	MADE GROUND: Black, clayey, silty, sandy gravel (landfill) Gravel is fine to coarse, angular to subangular, decayed wood, brick, paper, corroded metal, plastic.				
		7.50	6.30		6.90	MADE GROUND: Soft, dark grey brown, silty, sandy, gravelly clay. Gravel is fine to coarse, angular to subangular flint and wood.				
					8.00	Grey, silty, medium to coarse sand and GRAVEL. Gravel is fine to medium, angular to subangular flint.				
		9.00 10.50 12.00	6.30 6.30 6.30		12.90	Grey, silty, gravelly, medium to coarse SAND. Gravel is fine to medium, angular to subangular flint.				
		13.50 15.00	6.30 6.30		13.30	Stiff, grey, silty, gravelly CLAY. Gravel is medium to coarse, subangular to subrounded siltstone.				

					15.70	Grey, coarse SAND		
		16.50	6.30		16.50	Dark grey, coarse, sandy GRAVEL. Gravel is medium to coarse, subangular to subrounded sandstone, siltstone and very poor grade coal.		
					17.40	Soft, silty, very sandy, gravelly CLAY. Gravel is fine to medium, angular to subangular flint and occasional chalk.		
		19.50	6.30		35.00	White cream, very soft, gravelly, clayey silty DM CHALK. Gravel is fine to medium, subangular to subrounded chalk. Gravel is fine to medium, angular to subangular flint.		
Casing – 200mm to 12.00m, 150mm to 19.50m								

ID: CP3		Project No: L15-5034			Location: Island Road, Phase II		Sheet 1 of 2			
Date:		08/09/2015 – 09/09/2015			Ground Level:					
Total Depth:		35.00m			Method:				Cable Percussive	
Client:		Evander Properties			Engineer:				JW	
Depth (m)	Sample	Casing (m)	Water (m)	Field Records	Depth (m)	Description	Leg	Inst all		
			Dry		0.20	MADE GROUND: Grass over brown, clayey, silty, gravelly medium sand topsoil. Gravel is fine to coarse, angular to subrounded quartz, flint and brick.				
		1.20	Dry		1.60	MADE GROUND: Firm, dark brown, silty, sandy, gravelly clay. Gravel is fine to coarse, angular to subrounded, flint, brick, concrete, chalk, siltstone and coal.				
		2.00 3.00 4.00 5.00 6.00			6.90	MADE GROUND: Black, clayey, sandy, gravelly silt (landfill). Gravel is fine to coarse, angular to subangular, plastic, paper, glass, corroded metal and tile.				
		7.50		Stuck at 8.10m, rose to 6.80m	8.1	Soft, green blue grey, clayey SILT with frequent rootlets.				
		9.00	6.80		10.20	Cream grey, sandy, fine to coarse, angular to subangular flint GRAVEL.				
		10.50 12.00	6.80 6.80		10.50	Soft, grey, silty CLAY.				
		13.50	6.80		13.90	Grey, clayey, gravelly, medium SAND. Gravel is fine to medium, angular to subangular flint.				
		15.00	6.80		15.20	Stiff, blue grey, silty, sandy, CLAY with frequent gravel size pockets of silt.				

		16.50	6.80		35.00	White cream, very soft, gravelly clayey, silty DM CHALK. Gravel is fine to coarse, subrounded chalk. Gravel is fine to coarse, subangular flint.		
		18.00	6.80					
		19.50	6.80					
		21.00	6.80					
		22.50	6.80					
		24.00	6.80					
		25.50	6.80					
		27.00	6.80					
		28.50	6.80					
		30.00	6.80					
		31.50	6.80					
		33.00	6.80					
		34.00	6.80					
		35.00	6.80					
Casing – 200mm to 12.00m, 150mm to 35m								

Instrumentation

CP1

Start Depth	End Depth	Instrumentation	Material
0	22	Plain 50mm	Bentonite
22	35	Slotted 50mm	10mm Gravel

CP2

Start Depth	End Depth	Instrumentation	Material
0	25	Plain 50mm	Bentonite
25	35	Slotted 50mm	10mm Gravel

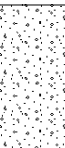
CP3

Start Depth	End Depth	Instrumentation	Material
0	20	Plain 50mm	Bentonite
20	35	Slotted 50mm	10mm Gravel

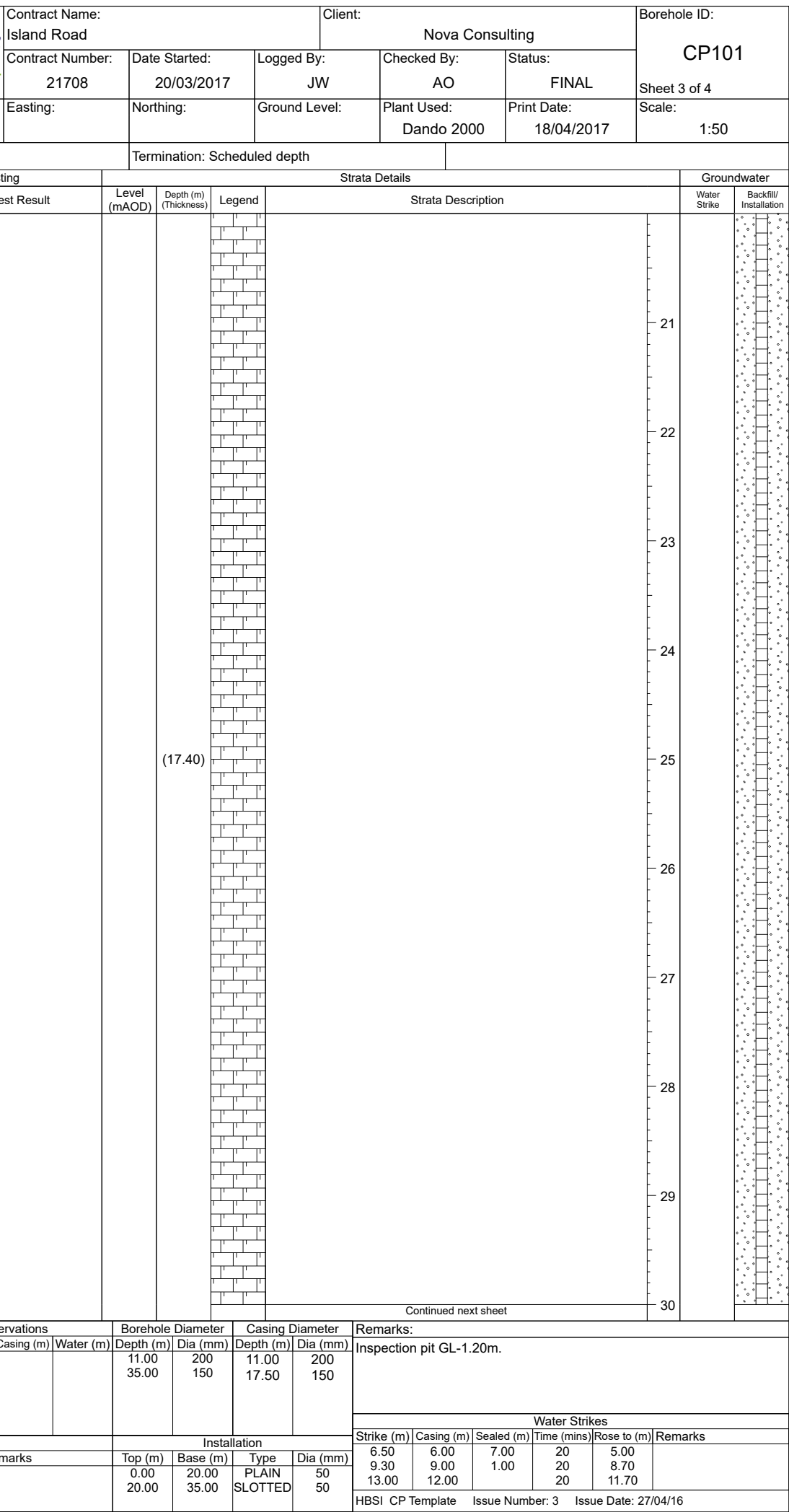
Note: All boreholes were installed with end cap, geosock, gas valve and raised cover.

	Contract Name: Island Road		Client: Nova Consulting			Borehole ID: CP101	
	Contract Number: 21708	Date Started: 20/03/2017	Logged By: JW	Checked By: AO	Status: FINAL		
Cable Percussion Borehole Log	Easting:	Northing:	Ground Level:	Plant Used: Dando 2000	Print Date: 18/04/2017	Sheet 1 of 4	
					Scale: 1:50		
Weather:			Termination: Scheduled depth				
Samples & In Situ Testing			Strata Details				Groundwater
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike
1.00	D1			(3.50)		MADE GROUND: Firm, brown, slightly sandy, gravelly clay. Gravel is fine to medium angular to subrounded chalk, brick and flint	1
							2
							3
4.00	D2			3.50 (0.50)		MADE GROUND: Soft, dark brown, slightly gravelly clay. Gravel is fine to medium, angular to subrounded sandstone, brick, glass, plastic and flint	4
				4.00		MADE GROUND: Dark brown, landfill, with soft clay inclusions. Landfill contains plastic and decayed wood	
5.00	D3						5
							6
							7
							8
8.50	D4			8.00 (1.00)		MADE GROUND: Soft to firm, greyish brown, with occasional black, silty clay, with organic odour and rare decayed wood	9
9.00	D5			9.00 (0.30)		MADE GROUND: Soft, bluish grey mottled brown and dark brown clay, with landfill, containing plastic, flint, decayed wood, glass and metal	
9.50	D6			9.30		Greyish brown, gravelly, fine to coarse SAND. Gravel is fine to medium flint (Lambeth Group)	
Continued next sheet							10
Start & End of Shift Observations					Borehole Diameter		Casing Diameter
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)
					11.00	200	11.00
					35.00	150	17.50
					Remarks:		
					Inspection pit GL-1.20m.		
					Water Strikes		
					Strike (m)	Casing (m)	Sealed (m)
					6.50	6.00	7.00
					9.30	9.00	1.00
					13.00	12.00	
					Time (mins)	Rose to (m)	Remarks
					20	5.00	
					20	8.70	
					20	11.70	
Chiselling					Installation		
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)
4.50	4.70	00:30		0.00	20.00	PLAIN	50
5.20	5.40	00:30		20.00	35.00	SLOTTED	50
7.50	7.80	01:00					
HBSI CP Template Issue Number: 3 Issue Date: 27/04/16							

	Contract Name: Island Road		Client: Nova Consulting			Borehole ID: CP101	
	Contract Number: 21708	Date Started: 20/03/2017	Logged By: JW	Checked By: AO	Status: FINAL	Sheet 2 of 4	
Cable Percussion Borehole Log	Easting:	Northing:	Ground Level:	Plant Used: Dando 2000	Print Date: 18/04/2017	Scale: 1:50	
	Weather:		Termination: Scheduled depth				

Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation
12.00	D7			(1.70)		Stiff, dark bluish grey CLAY, with occasional calcareous concretions (<3mm) (Lambeth Group)	11	
				11.00			11	
14.00	D8			(2.00)		Light grey, medium SAND (Lambeth Group)	12	
				13.00			13	
18.00	D9			(4.60)		Extremely to very weak, medium density, white, with rare black specks CHALK, recovered as cobbles (Chalk Group)	14	
				17.60			18	
						Continued next sheet	20	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:																															
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Inspection pit GL-1.20m.																															
					11.00	200	11.00	200																																
					35.00	150	17.50	150																																
					<table border="1"> <thead> <tr> <th colspan="5">Water Strikes</th> </tr> <tr> <th>Strike (m)</th> <th>Casing (m)</th> <th>Sealed (m)</th> <th>Time (mins)</th> <th>Rose to (m)</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>6.50</td> <td>6.00</td> <td>7.00</td> <td>20</td> <td>5.00</td> <td></td> </tr> <tr> <td>9.30</td> <td>9.00</td> <td>1.00</td> <td>20</td> <td>8.70</td> <td></td> </tr> <tr> <td>13.00</td> <td>12.00</td> <td></td> <td>20</td> <td>11.70</td> <td></td> </tr> </tbody> </table>							Water Strikes					Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks	6.50	6.00	7.00	20	5.00		9.30	9.00	1.00	20	8.70		13.00	12.00		20	11.70	
Water Strikes																																								
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks																																			
6.50	6.00	7.00	20	5.00																																				
9.30	9.00	1.00	20	8.70																																				
13.00	12.00		20	11.70																																				
Chiselling					Installation																																			
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)																																	
4.50	4.70	00:30		0.00	20.00	PLAIN	50																																	
5.20	5.40	00:30		20.00	35.00	SLOTTED	50																																	
7.50	7.80	01:00																																						
HBSI CP Template Issue Number: 3 Issue Date: 27/04/16																																								



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Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Inspection pit GL-1.20m.					
					9.00	200	9.00	200						
					30.00	150	15.00	150						
									Water Strikes					
Chiselling					Installation				Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	9.20	9.00		20	8.60	
3.00	3.20	00:30			0.00	22.00	PLAIN	50	HBSI CP Template Issue Number: 3 Issue Date: 27/04/16					
4.20	4.40	01:00			22.00	30.00	SLOTTED	50						
5.50	5.70	00:30												

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Inspection pit GL-1.20m.					
					9.00 30.00	200 150	9.00 15.00	200 150						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
3.00	3.20	00:30			0.00	22.00	PLAIN	50	9.20	9.00		20	8.60	
4.20	4.40	01:00			22.00	30.00	SLOTTED	50						
5.50	5.70	00:30												
HBSI CP Template Issue Number: 3 Issue Date: 27/04/16														

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Inspection pit GL-1.20m.					
					9.00	200	9.00	200						
					30.00	150	15.00	150						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks	
3.00	3.20	00:30		0.00	22.00	PLAIN	50	9.20	9.00		20	8.60		
4.20	4.40	01:00		22.00	30.00	SLOTTED	50							
5.50	5.70	00:30												
HBSI CP Template								Issue Number: 3		Issue Date: 27/04/16				

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Inspection pit GL-1.20m.					
					10.00	200	10.00	200						
					30.00	150	30.00	150						
									Water Strikes					
Chiselling					Installation				Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	10.50	10.50	13.10	20	10.20	
5.00	5.20	00:30			0.00	20.00	PLAIN	50	HBSI CP Template Issue Number: 3 Issue Date: 27/04/16					
6.40	6.50	01:00			20.00	30.00	SLOTTED	50						
7.30	7.50	01:00												

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:						
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Inspection pit GL-1.20m.						
					10.00	200	10.00	200							
					30.00	150	30.00	150							
									Water Strikes						
Chiselling					Installation				Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks	
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	10.50	10.50	13.10	20	10.20		
5.00	5.20	00:30			0.00	20.00	PLAIN	50							
6.40	6.50	01:00			20.00	30.00	SLOTTED	50							
7.30	7.50	01:00													
										HBSI CP Template		Issue Number: 3		Issue Date: 27/04/16	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Inspection pit GL-1.20m.					
					10.00 30.00	200 150	10.00 30.00	200 150						
									Water Strikes					
Chiselling					Installation				Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	10.50	10.50	13.10	20	10.20	
5.00	5.20	00:30			0.00	20.00	PLAIN	50						
6.40	6.50	01:00			20.00	30.00	SLOTTED	50						
7.30	7.50	01:00												
									HBSI CP Template		Issue Number: 3		Issue Date: 27/04/16	

APPENDIX B

PRE-CONSTRUCTION MONITORING DATA



Certificate of Analysis

Certificate Number 15-47873

27-Oct-15

Client Ian Farmer Associates
Unit 1 Fairfield Court
Seven Stars Industrial Estate
Wheler Road
Coventry
West Midlands
CV3 4LJ

Our Reference 15-47873

Client Reference 21457

Order No 20845

Contract Title ISLAND ROAD, PHASE II

Description 6 Water samples.

Date Received 19-Oct-15

Date Started 19-Oct-15

Date Completed 27-Oct-15

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Water Samples

Our Ref 15-47873

Client Ref 21457

Contract Title ISLAND ROAD, PHASE II

Lab No	885599	885600	885601	885602	885603	885604
Sample ID	CP1	CP2	CP3	BHN2A	BHN4A	BHN5A
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	14/10/15	14/10/15	14/10/15	14/10/15	14/10/15	14/10/15
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	< 0.16	< 0.16	0.22	2.6	3.6	2.1
Boron	DETSC 2123	100	ug/l	210	250	170	3600	2500	1300
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	3.4	1.0	0.98
Hexavalent Chromium	DETSC 2203	3	ug/l	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	4.0	1.0	1.6	13	4.3	4.6
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	3.7
Zinc, Dissolved	DETSC 2306	1.25	ug/l	2.15	2.99	2.71	3.39	3.54	< 1.25
Inorganics									
pH	DETSC 2008			7.4	7.3	7.5	7.2	7.3	7.0
Total Biochemical Oxygen Demand	DETSC 2031	1	mg/l	4.4	400	8.1	< 1.0	800	1600
Total Chemical Oxygen Demand	DETSC 2032	10	mg/l	11	960	18	< 10	1600	3300
Dissolved Oxygen	DETSC 2048*	0.1	mg/l	6.8	6.9	7.2	7.0	6.8	7.3
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.73	1.9	0.26	250	180	100
Total Organic Carbon	DETSC 2033	2	mg/l	5.8	4.0	3.7	190	220	290
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	3.6
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	30	< 1.0	8.9
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	130	< 1.0	56
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	1200	< 1.0	120
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	5500	340	790
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	6800	340	970
Aromatic C5-C7	DETSC 3322	0.1	ug/l	0.5	< 0.1	< 0.1	1.6	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	32	2.8	7.7
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	51	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	92	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	530	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	2400	160	340
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	3100	160	350
TPH Ali/Aro	DETSC 3072*	10	ug/l	< 10	< 10	< 10	9900	500	1300
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	1.6	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 15-47873

Client Ref 21457

Contract Title ISLAND ROAD, PHASE II

Lab No	885599	885600	885601	885602	885603	885604
Sample ID	CP1	CP2	CP3	BHN2A	BHN4A	BHN5A
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	14/10/15	14/10/15	14/10/15	14/10/15	14/10/15	14/10/15
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
PAHs									
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.17	< 0.01	0.13
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.01	0.21	0.02	0.07
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02	< 0.01	0.07
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.11
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.08
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.06	0.34	0.09	0.19
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.02	0.35	< 0.01	0.14
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.06
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.04	0.63	0.03	0.17
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.10	1.2	0.15	0.36
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.05	0.26	0.08	0.29
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	0.29	3.2	0.39	1.8

Information in Support of the Analytical Results

Our Ref 15-47873
Client Ref 21457
Contract ISLAND ROAD, PHASE II

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
885599	CP1 WATER	14/10/15	GB 1L x2, GV x2	BOD (2 days), Hexavalent Chromium (4 days), Dissolved Oxygen (2 days)	
885600	CP2 WATER	14/10/15	GB 1L x2, GV x2	BOD (2 days), Hexavalent Chromium (4 days), Dissolved Oxygen (2 days)	
885601	CP3 WATER	14/10/15	GB 1L x2, GV x2	BOD (2 days), Hexavalent Chromium (4 days), Dissolved Oxygen (2 days)	
885602	BHN2A WATER	14/10/15	GB 1L x2, GV x2	BOD (2 days), Hexavalent Chromium (4 days), Dissolved Oxygen (2 days)	
885603	BHN4A WATER	14/10/15	GB 1L x2, GV x2	BOD (2 days), Hexavalent Chromium (4 days), Dissolved Oxygen (2 days)	
885604	BHN5A WATER	14/10/15	GB 1L x2, GV x2	BOD (2 days), Hexavalent Chromium (4 days), Dissolved Oxygen (2 days)	

Key: G-Glass B-Bottle V-Vial

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

APPENDIX C

DURING CONSTRUCTION MONITORING DATA

**Anthony Owen**

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e: reception@i2analytical.com

Analytical Report Number : 16-26728

Replaces Analytical Report Number : 16-26728, issue no. 1

Project / Site name:	Island Road, Reading	Samples received on:	01/09/2016
Your job number:	21618	Samples instructed on:	02/09/2016
Your order number:	21585	Analysis completed by:	30/09/2016
Report Issue Number:	2	Report issued on:	03/10/2016
Samples Analysed:	2 water samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 16-26728

Project / Site name: Island Road, Reading

Your Order No: 21585

Lab Sample Number				623701	623702			
Sample Reference				CP1	CP3			
Sample Number				1	1			
Depth (m)				3.87	5.90			
Date Sampled				31/08/2016	31/08/2016			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	8.0	7.8			
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	4300	1100			
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	5.84	2.58			
Dissolved Oxygen	mg/l	1	NONE	< 1.0	< 1.0			

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01			

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16			
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.55	1.26			
Boron (dissolved)	µg/l	10	ISO 17025	280	66			
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02			
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0			
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.3	< 0.2			
Copper (dissolved)	µg/l	0.5	ISO 17025	3.0	0.8			
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2			
Mercury (dissolved)	µg/l	0.05	ISO 17025	0.10	0.09			
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.2	6.5			
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	< 0.6			
Zinc (dissolved)	µg/l	0.5	ISO 17025	17	17			



Analytical Report Number: 16-26728

Project / Site name: Island Road, Reading

Your Order No: 21585

Lab Sample Number				623701	623702			
Sample Reference				CP1	CP3			
Sample Number				1	1			
Depth (m)				3.87	5.90			
Date Sampled				31/08/2016	31/08/2016			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10			

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 16-26728

Project / Site name: Island Road, Reading

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Dissolved Oxygen in water	Determination of dissolved oxygen.	In-house method	L086-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L0102B-PL	W	NONE
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report



Sample ID	Other ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
CP1	1	W	16-26728	623701	c	Dissolved Oxygen in water	L086-PL	c
CP3	1	W	16-26728	623702	c	Dissolved Oxygen in water	L086-PL	c

**Anthony Owen**

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e: reception@i2analytical.com

Analytical Report Number : 16-30343

Replaces Analytical Report Number : 16-30343, issue no. 1

Project / Site name:	Island Road, Reading	Samples received on:	14/10/2016
Your job number:	21618	Samples instructed on:	17/10/2016
Your order number:	21665	Analysis completed by:	31/10/2016
Report Issue Number:	2	Report issued on:	31/10/2016
Samples Analysed:	2 water samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 16-30343

Project / Site name: Island Road, Reading

Your Order No: 21665

Lab Sample Number				644845	644846			
Sample Reference				CP1	CP2			
Sample Number				2	1			
Depth (m)				4.00	5.01			
Date Sampled				14/10/2016	14/10/2016			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	-	7.4			
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	-	730			
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	-	3.52			
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	3.8	7.4			
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	< 1.0	< 1.0			
Dissolved Oxygen	mg/l	1	NONE	-	4.7			

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	-	< 0.01			
Acenaphthylene	µg/l	0.01	ISO 17025	-	< 0.01			
Acenaphthene	µg/l	0.01	ISO 17025	-	< 0.01			
Fluorene	µg/l	0.01	ISO 17025	-	< 0.01			
Phenanthrene	µg/l	0.01	ISO 17025	-	< 0.01			
Anthracene	µg/l	0.01	ISO 17025	-	< 0.01			
Fluoranthene	µg/l	0.01	ISO 17025	-	< 0.01			
Pyrene	µg/l	0.01	ISO 17025	-	< 0.01			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	-	< 0.01			
Chrysene	µg/l	0.01	ISO 17025	-	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	-	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	-	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	-	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	-	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	NONE	-	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	NONE	-	< 0.01			

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	-	< 0.16			
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	-	0.63			
Boron (dissolved)	µg/l	10	ISO 17025	-	130			
Cadmium (dissolved)	µg/l	0.02	ISO 17025	-	< 0.02			
Chromium (hexavalent)	µg/l	5	ISO 17025	-	< 5.0			
Chromium (dissolved)	µg/l	0.2	ISO 17025	-	0.3			
Copper (dissolved)	µg/l	0.5	ISO 17025	-	0.7			
Lead (dissolved)	µg/l	0.2	ISO 17025	-	< 0.2			
Mercury (dissolved)	µg/l	0.05	ISO 17025	-	0.12			
Nickel (dissolved)	µg/l	0.5	ISO 17025	-	2.2			
Selenium (dissolved)	µg/l	0.6	ISO 17025	-	< 0.6			
Zinc (dissolved)	µg/l	0.5	ISO 17025	-	6.5			



Analytical Report Number: 16-30343

Project / Site name: Island Road, Reading

Your Order No: 21665

Lab Sample Number				644845	644846			
Sample Reference				CP1	CP2			
Sample Number				2	1			
Depth (m)				4.00	5.01			
Date Sampled				14/10/2016	14/10/2016			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/l	1	ISO 17025	-	< 1.0			
Toluene	µg/l	1	ISO 17025	-	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	-	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	-	< 1.0			
o-xylene	µg/l	1	ISO 17025	-	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	-	< 1.0			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	-	< 10			
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	-	< 10			
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	-	< 10			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	-	< 10			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	-	< 10			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	-	< 10			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	-	< 10			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	-	< 10			

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	-	< 10			
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	-	< 10			
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	-	< 10			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	-	< 10			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	-	< 10			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	-	< 10			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	-	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	-	< 10			

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 16-30343

Project / Site name: Island Road, Reading

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Dissolved Oxygen in water	Determination of dissolved oxygen.	In-house method	L086-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L0102B-PL	W	NONE
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report



Sample ID	Other ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
CP1	2	W	16-30343	644845	c	Biological oxygen demand of water	L086-PL	c
CP2	1	W	16-30343	644846	c	Ammoniacal Nitrogen as N in water	L082-PL	c
CP2	1	W	16-30343	644846	c	Biological oxygen demand of water	L086-PL	c
CP2	1	W	16-30343	644846	c	Dissolved Oxygen in water	L086-PL	c
CP2	1	W	16-30343	644846	c	pH at 20oC in water (automated)	L099-PL	c

APPENDIX D

POST-CONSTRUCTION MONITORING DATA

**Anthony Owen**

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Analytical Report Number : 17-47231

Project / Site name:	Island Road, Reading	Samples received on:	02/05/2017
Your job number:	21708	Samples instructed on:	03/05/2017
Your order number:	22168	Analysis completed by:	10/05/2017
Report Issue Number:	1	Report issued on:	10/05/2017
Samples Analysed:	2 water samples		

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 17-47231

Project / Site name: Island Road, Reading

Your Order No: 22168

Lab Sample Number				742917	742918			
Sample Reference				CP101	CP103			
Sample Number				1	1			
Depth (m)				None Supplied	None Supplied			
Date Sampled				28/04/2017	28/04/2017			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.2	7.4			
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	410	2400			
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	12.1	3.18			
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	260	350			
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	2.5	9.8			
Dissolved Oxygen	mg/l	1	NONE	1.4	1.0			

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01			

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16			
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.39	0.73			
Boron (dissolved)	µg/l	10	ISO 17025	67	130			
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02			
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0			
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2			
Copper (dissolved)	µg/l	0.5	ISO 17025	0.5	0.6			
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2			
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05			
Nickel (dissolved)	µg/l	0.5	ISO 17025	6.4	3.9			
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	0.9			
Zinc (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5			



Analytical Report Number: 17-47231

Project / Site name: Island Road, Reading

Your Order No: 22168

Lab Sample Number				742917	742918			
Sample Reference				CP101	CP103			
Sample Number				1	1			
Depth (m)				None Supplied	None Supplied			
Date Sampled				28/04/2017	28/04/2017			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	10.7			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	NONE	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	NONE	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	NONE	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	87	< 10			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	140	< 10			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	230	< 10			

TPH-CWG - Aromatic >C5 - C7	µg/l	1	NONE	< 1.0	< 1.0			
TPH-CWG - Aromatic >C7 - C8	µg/l	1	NONE	< 1.0	11			
TPH-CWG - Aromatic >C8 - C10	µg/l	1	NONE	< 1.0	< 1.0			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	11			

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 17-47231

Project / Site name: Island Road, Reading

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Dissolved Oxygen in water	Determination of dissolved oxygen.	In-house method	L086-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L0102B-PL	W	NONE
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
CP101	1	W	17-47231	742917	c	Ammoniacal Nitrogen as N in water	L082-PL	c
CP101	1	W	17-47231	742917	c	Biological oxygen demand of water	L086-PL	c
CP101	1	W	17-47231	742917	c	Dissolved Oxygen in water	L086-PL	c
CP101	1	W	17-47231	742917	c	pH at 20oC in water (automated)	L099-PL	c
CP103	1	W	17-47231	742918	c	Ammoniacal Nitrogen as N in water	L082-PL	c
CP103	1	W	17-47231	742918	c	Biological oxygen demand of water	L086-PL	c
CP103	1	W	17-47231	742918	c	Dissolved Oxygen in water	L086-PL	c
CP103	1	W	17-47231	742918	c	pH at 20oC in water (automated)	L099-PL	c

**Anthony Owen**

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Analytical Report Number : 17-48095

Project / Site name:	Island Road, Reading	Samples received on:	11/05/2017
Your job number:	21708	Samples instructed on:	11/05/2017
Your order number:	22183	Analysis completed by:	19/05/2017
Report Issue Number:	1	Report issued on:	19/05/2017
Samples Analysed:	3 water samples		

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 17-48095

Project / Site name: Island Road, Reading

Your Order No: 22183

Lab Sample Number				747541	747542	747543		
Sample Reference				CP101	CP102	CP103		
Sample Number				2	1	2		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				09/05/2017	09/05/2017	09/05/2017		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.3	7.4	7.6		
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	440	1200	1200		
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	2.09	2.41	3.00		
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	12	6.2	8.0		
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	1.7	1.3	1.6		
Dissolved Oxygen	mg/l	1	NONE	1.5	1.6	1.6		

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16	< 0.16		
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.59	0.51	0.99		
Boron (dissolved)	µg/l	10	ISO 17025	79	92	110		
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02	< 0.02		
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0		
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	0.3	0.5		
Copper (dissolved)	µg/l	0.5	ISO 17025	0.7	1.0	0.7		
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2		
Mercury (dissolved)	µg/l	0.05	ISO 17025	0.20	0.06	< 0.05		
Nickel (dissolved)	µg/l	0.5	ISO 17025	3.6	4.3	2.3		
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.1	< 0.6	< 0.6		
Zinc (dissolved)	µg/l	0.5	ISO 17025	24	29	5.8		



Analytical Report Number: 17-48095

Project / Site name: Island Road, Reading

Your Order No: 22183

Lab Sample Number				747541	747542	747543		
Sample Reference				CP101	CP102	CP103		
Sample Number				2	1	2		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				09/05/2017	09/05/2017	09/05/2017		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		

TPH-CWG - Aromatic >C5 - C7	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C7 - C8	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C8 - C10	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 17-48095

Project / Site name: Island Road, Reading

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Dissolved Oxygen in water	Determination of dissolved oxygen.	In-house method	L086-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L0102B-PL	W	NONE
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report



Sample ID	Other ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
CP101	2	W	17-48095	747541	c	Biological oxygen demand of water	L086-PL	c
CP101	2	W	17-48095	747541	c	Dissolved Oxygen in water	L086-PL	c
CP102	1	W	17-48095	747542	c	Biological oxygen demand of water	L086-PL	c
CP102	1	W	17-48095	747542	c	Dissolved Oxygen in water	L086-PL	c
CP103	2	W	17-48095	747543	c	Biological oxygen demand of water	L086-PL	c
CP103	2	W	17-48095	747543	c	Dissolved Oxygen in water	L086-PL	c

**Anthony Owen**

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Analytical Report Number : 17-51552

Project / Site name:	Island Road, Reading	Samples received on:	15/06/2017
Your job number:	21708	Samples instructed on:	15/06/2017
Your order number:	22288	Analysis completed by:	Not complete
Report Issue Number:	1	Report issued on:	23/06/2017
Samples Analysed:	3 water samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 17-51552

Project / Site name: Island Road, Reading

Your Order No: 22288

Lab Sample Number				767116	767117	767118		
Sample Reference				CP101	CP102	CP103		
Sample Number				3	2	3		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				14/06/2017	14/06/2017	14/06/2017		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.6	7.5	7.5		
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	400	590	730		
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	0.73	3.71	0.62		
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	54	27	80		
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	7.5	7.8	6.5		
Dissolved Oxygen	mg/l	1	NONE	1.7	1.6	1.3		

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16	< 0.16		
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Analytical Report Number: 17-51552

Project / Site name: Island Road, Reading

Your Order No: 22288

Lab Sample Number				767116	767117	767118		
Sample Reference				CP101	CP102	CP103		
Sample Number				3	2	3		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				14/06/2017	14/06/2017	14/06/2017		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.26	0.89	0.52		
Boron (dissolved)	µg/l	10	ISO 17025	110	13	130		
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.02	< 0.02	< 0.02		
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0		
Chromium (dissolved)	µg/l	0.2	ISO 17025	1.7	1.1	2.2		
Copper (dissolved)	µg/l	0.5	ISO 17025	2.6	1.0	1.7		
Lead (dissolved)	µg/l	0.2	ISO 17025	0.5	< 0.2	< 0.2		
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05		
Nickel (dissolved)	µg/l	0.5	ISO 17025	4.8	3.0	3.0		
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	< 0.6	< 0.6		
Zinc (dissolved)	µg/l	0.5	ISO 17025	17	11	8.5		

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		

TPH-CWG - Aromatic >C5 - C7	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C7 - C8	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C8 - C10	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 17-51552

Project / Site name: Island Road, Reading

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Dissolved Oxygen in water	Determination of dissolved oxygen.	In-house method	L086-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L0102B-PL	W	NONE
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report



Sample ID	Other ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
CP101	3	W	17-51552	767116	c	Biological oxygen demand of water	L086-PL	c
CP101	3	W	17-51552	767116	c	Dissolved Oxygen in water	L086-PL	c
CP102	2	W	17-51552	767117	c	Biological oxygen demand of water	L086-PL	c
CP102	2	W	17-51552	767117	c	Dissolved Oxygen in water	L086-PL	c
CP103	3	W	17-51552	767118	c	Biological oxygen demand of water	L086-PL	c
CP103	3	W	17-51552	767118	c	Dissolved Oxygen in water	L086-PL	c