ABERDEEN HARBOUR
EXPANSION PROJECT
November 2015

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Technical
Appendices

APPENDIX 7-A WATER QUALITY MONITORING DATA

Risk assessment of surface water monitoring samples from Nigg Bay, Aberdeen

V2

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Prepared on behalf of	Arch Henderson acting for Aberdeen Harbour Board
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Appendices

1. Introduction

Aberdeen Harbour Board has recognised the need to expand the existing harbour facilities to provide increased capacity and the ability to accommodate larger vessels. Since 2012 an area at Nigg Bay has been identified as the preferred location for this. Feasibility, consultation and design studies have been taking place since then.

In November 2014 Arch Henderson LLP were asked to commence monitoring of two small streams which enter Nigg Bay. These pass an existing sewage treatment works and the closed landfill. Due to the extensive infrastructure works that will be required for this development the need for environmental monitoring has been highlighted within the EIA (Environmental Impact Statement) published in 2013 as part of the feasibility scoping for this development. A similar exercise took place during the re-development of the Torry Quay area of the harbour from 2009-2012 where monitoring of the surface water in the River Dee and groundwater within the harbour too place on a regular basis. This included one year of pre-development monitoring on the site to determine baselines of chemical status in the waters prior to allow clarification when highlighting whether the development itself was having a potential affect on water quality. Clearly in developed areas there are many potential factors that could impact water quality. For these two particular streams the landfill and sewage treatment plant are key external influences.

The Nigg Bay landfill at Ness Farm closed in 2001. It covers 120 acres and has been monitored since closure. Planning is underway to utilise this land for a solar farm producing renewable energy.

The Balnagask Sewage treatment works are operated by Scottish Water. This facility was constructed around 2001 and covers a significant area.

In addition the proposed development area is close to the River Dee, which holds SAC (Special Area of Conservations) status.

Samples are being taken approximately on a monthly basis from the following 2 locations:

- AHP1- known as “smelly burn”- a surface water outfall that emerges from under the coastal road and runs down the cliff face in the SSSI site at the SE end of the development area
- AHP 2- East Tullos Burn – surface water entering the bay just south of the UFP outfall

The locations of the sample points are shown in Appendix C. The method for risk assessment is shown in Appendix D.

1.1 Report Structure

The report will be structured into sections related to the chemical group analysed. The data will be presented showing the comparison to an established acceptable baseline concentration. The justification for these baselines is presented in the first chapter. Analysed.

Section 2 - Metals

Section 3 - TPHs (Total petroleum hydrocarbons)

Section 4 - PAHs (polyaromatic hydrocarbons)

Section 5 - Pesticides

Section 6 – VOC

Section 7 - Miscellaneous

2. Metals

Any results highlighted in blue are potentially in excess of the current acceptable limits for surface waters in the UK.

Table 1: Metals in surface water

		1-30/11/14		2- 6/1/15		3- 25/2/15/15		4- 31/3/15/15	
Location	**ES** ug/l	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**
Arsenic	50	3.1	1.8	5.1	3.5	2.5	2.9	5.4	2.7
Cadmium*	<0.45	0.03	0.03	0.07	0.06	<0.02	0.02	0.04	0.07
Chromium VI	3.4	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
Chromium tot***	8.1***	6	<1	23	4	5	<1	6	<1
Copper*	10*	21	20	7.9	15	13	18	11	21
Lead	7.2	1.8	2	0.6	4.9	0.4	2.3	1	2.4
Mercury	0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	20	11	10	12	9	9	9	10	8
Selenium**	10**	11	1.4	48	5.2	20	2.3	24	4.3
Zinc*	50	25	41	9	53	8	33	12	43

N.B. The results highlighted in blue for Cu and Zn may not be in exceedance of the limits as these metals are assessed with reference to water hardness. It is therefore recommended this is added to future test suites.

3. Total Petroleum Hydrocarbons (TPH)

The table below shows the results from these water samples. As detailed in Appendix D TPH in water has no current limit value and therefore any value above the limit of detection is highlighted in blue.

Table 2: TPH in surface water

		1-30/11/14		2- 6/1/15		3- 25/2/15/15		4- 31/3/15/15	
		AHP1	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**
Aliphatic	**C5-C6**	<10	<10	<10	<10	<10	<10	<10	<10
	C6-C8	<10	<10	<10	<10	<10	<10	<10	<10
	C8-C10	<10	<10	<10	<10	<10	<10	<10	<10
	C10-C12	<10	<10	<10	<10	<10	<10	<10	<10
	C12-C16	<10	<10	<10	<10	<10	<10	<10	<10
	C16-C21	<10	<10	<10	<10	<10	<10	20	<10
	C21-C35	<10	<10	<10	70	<10	<10	20	<10
	C35-44	<10	<10	<10	<10	<10	<10	<10	<10
Aromatic	**C6-C7**	<10	<10	<10	<10	<10	<10	<10	<10
	C7-C8	<10	<10	<10	<10	<10	<10	<10	<10
	C8-C10	<10	<10	<10	<10	<10	<10	<10	<10
	C10-C12	<10	<10	<10	<10	<10	<10	10	<10
	C12-C16	<10	<10	20	<10	<10	<10	60	<10
	C16-C21	<10	<10	50	<10	<10	<10	80	<10
	C21-C35	<10	<10	80	30	<10	<10	<10	<10
	C35-44	<10	<10	20	30	<10	<10	<10	<10
Total	**C5-C44**	<10	<10	170	130	<10	<10	<10	<10

4. Polyaromatic Hydrocarbons (PAH)

The table below shows the results from these water samples, with the respective sampling dates, with potential exceedances highlighted in blue.

Table 3 – PAH in surface water

				1-30/11/14		2- 6/1/15		3- 25/2/15/15		4- 31/3/15/15	
Compound	**ES (ug/l) AA**	**ES (ug/l) MAC**	**IARC toxicity**	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**
Naphthalene	2.4	na	2B	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
Acenaphthylene			unknow n	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
Acenaphthene			3	<0.01	<0.01	0.01	0.01	<0.01	0.03	<0.01	<0.01
Fluorene			4	<0.01	<0.01	0.03	0.03	<0.01	0.01	<0.01	<0.01
Phenanthrene			3	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
Anthracene	0.1	0.4	3	<0.01	<0.01	0.12	0.12	<0.01	0.03	<0.01	<0.01
Fluoranthene	0.1	1	3	<0.01	<0.01	0.02	0.02	<0.01	<0.01	<0.01	<0.01
Pyrene			3	<0.01	<0.01	0.02	0.02	<0.01	0.02	<0.01	<0.01
Benz(a)anthracene			2B	<0.01	<0.01	0.02	0.02	<0.01	<0.01	<0.01	<0.01
Chrysene			2B	<0.01	<0.01	0.02	0.02	<0.01	0.03	<0.01	<0.01
Benzo(b/k)fluoranthene	∑=0.03		2B	<0.01	<0.01	0.08	0.08	<0.01	0.05	<0.01	<0.01
Benzo(a)pyrene	0.05	0.1	2A	<0.01	<0.01	0.05	0.05	<0.01	0.02	<0.01	<0.01
Dibenzo(ah)anthracene			3	<0.01	<0.01	0.03	0.03	<0.01	0.02	<0.01	<0.01
Indeno(123cd)pyrene			2A	<0.01	<0.01	0.03	0.03	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	∑=0.002	na	2B	<0.01	<0.01	0.03	0.03	<0.01	0.02	<0.01	<0.01
PAH 16 Total				<0.5	<0.5	0.46	0.46	<0.01	0.29	<0.01	<0.01

5. Pesticides

The table below shows the results with the respective sampling dates

Table 4– Pesticides in surface water

			1-30/11/14		2- 6/1/15		3- 25/2/15/15		4- 31/3/15/15	
		Limit	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**
organochlorines	Hexachlorocyclohexane	0.04*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Hexachlorobenzene	0.05*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Heptachlor	0.03**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Heptachlor epoxide	0.03**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Chlordane	0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Endosulphan	1*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	DDE	0.002***	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Aldrin	sum<0.03**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Dieldrin		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Endrin	0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	DDD		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	DDT	0.025*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
organophosphates	Dichlorvos		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Mevinphos	0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Dimethoate	0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Diazinon	0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Pirimiphos methyl		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Malathion	0.001***	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Fenitrothion	0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Parathion	0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Azinphos methyl	0.02***	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	total	0.5**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

There were 3 different reference limits used for these samples, as no single database covers the majority:*EQS for freshwater, **Resource Protection Value for groundwater from WAT-Ps-10-01, ***MRV (minimum reporting value) from WAT-PS-10-01 for groundwater where no RPV exists.

6. Volatile Organic Compounds (VOC)

The table below shows the results with the respective sampling dates. There were no detectable compounds.

Table 5 – VOC in surface water

			1-30/11/14		2- 6/1/15		3- 25/2/15/15		4- 31/3/15/15	
Chemical	**Limit ug/l**	**Source**	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**
Dichlorodifluoromethane			<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane			<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	0.5	DWS	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane			<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane			<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane			<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethylene			<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	20	ES	<50	<50	<50	<50	<50	<50	<50	<50
Trans-1,2-Dichloroethene	10****	WSS	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane			<1	<1	<1	<1	<1	<1	<1	<1
Cis-1,2-Dichloroethylene			<1	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane			<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	12	EQS	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane			<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	100	EQS	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	20***	WHO	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Tetrachloride	12	ES	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	10	ES	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	50	ES	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	5	US DWR	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethylene			<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	100*****	DWS	<1	<1	<1	<1	<1	<1	<1	<1
Dibromomethane			<1	<1	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	20	WHO	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	200	EQS	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene			<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	300	EQS	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane			<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	10****	WSS	<1	<1	<1	<1	<1	<1	<1	<1
Dibromochloromethane	100*****	DWS	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	0.4	WHO	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	100	US DWR	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane			<1	<1	<1	<1	<1	<1	<1	<1
Ethyl Benzene	300	WHO	<1	<1	<1	<1	<1	<1	<1	<1
m&p-Xylene	500*	WHO	<1	<1	<1	<1	<1	<1	<1	<1
o-Xylene	500*	WHO	<1	<1	<1	<1	<1	<1	<1	<1
Styrene			<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	100*****	DWS	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene			<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane			<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane			<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene			<1	<1	<1	<1	<1	<1	<1	<1
Bromobenzene			<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene			<1	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene			<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene			<1	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene			<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene			<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene			<1	<1	<1	<1	<1	<1	<1	<1
4-Chlorotoluene			<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene			<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	80	US DWR	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	600	US DWR	<1	<1	<1	<1	<1	<1	<1	<1

7.Miscellaneous indicators

The table below shows the results from these two water samples, with the respective sampling dates:

Table 6– Miscellaneous water quality indicators in surface water

			1-30/11/14		2- 6/1/15		3- 25/2/15/15		4- 31/3/15/15	
Indicator	**unit**	**Limit**	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**	**AHP1**	**AHP2**
Ammonia expressed as N	mg/l	21000*	26	<0.05	81	1.2	0.26	0.82	68	2.2
BOD (ATU)	mg/l	3 TO 6.5*	> 5	<1	<5	<5	2	<1	2	2
COD (Total)	mg/l	5 to 50**	90	30	161	37	106	44	143	91
Chloride	mg/l	250***	290	150	370	290	270	340	360	390
Mecoprop	ug/l	187*	0.3	<0.1	4.5	<0.1	1.9	<0.1	5.8	<0.1
Sulphate	mg/l	250***	46	37	35	41	33	32	39	36
Suspended Solids (Total)	mg/l	<10 to <100*	16	<10	28	38	22	20	36	30
Total Organic Carbon	mg/l	na	40	19	60	16	40	15	41	14
Total Oxidised Nitrogen	mg/l	0.5-10**	21	2.5	18	2.4	13	1.7	3.2	1.9
pH		6.5-9.5***	6.9	6.9	8	7.5	8.1	7.5	7.5	7.3
Phenol	ug/l	46*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

*ES (Environmental Standard), Scottish River Basin Directive

**SEPA document WAT-SG-50- normal ranges for rivers

***Water Quality Standard

8. Summary

- Two samples were taken on four occasions from surface water streams which feed into Nigg Bay. The purpose of this sampling is understood to be to create a baseline of water quality data so that, should significant construction works take place to create additional harbour infrastructure here, interpretation of any impacts this might have on the environment will be possible.
- There is a closed landfill and a sewage treatment works in close proximity to these locations which also may impact water quality.
- The initial results indicate that AHP 1 is of poorer quality than AHP2.

- A significant period of monitoring is required to further determine the baseline condition of these water courses, and further background information on what potential influences there are on them in the surrounding environment.
- There are not actual regulatory limits for all parameters in surface water, and therefore in some cases those for groundwater are used, as well as occasionally those for drinking water. Failing these being available there are ranges of data which are thought to be normal for Scottish surface waters and therefore can be used for trend analysis rather than a specific pass/fail risk assessment.

9. Disclaimer

EnviroSurveying Ltd has prepared this report for the sole use of the Client, in accordance with generally accepted consulting practice and for the intended purpose as stated in the related contract agreement. No other warranty, expressed or implied, is made as to the professional advice included in this report.

To the best of our knowledge, information contained in this report is accurate at the date of issue; however subsurface conditions including contamination concentrations may vary spatially and with time. It should be noted, however, that this report is based on information obtained from the site investigation works. There may be conditions pertaining at the site not disclosed by these investigations, which might have a bearing on the recommendations provided if such conditions were known.

It is important that these implications be clearly recognized when the findings of this study are being interpreted.

10. References

- Environmental Quality Standards, from Scottish River Basin District Directions, 2009 and 2014
- DWS- Directive 98/83/EC Drinking Water Directive
- Water Supply (Water Quality) Scotland Regulations 2001.
- USDWR is the United Stated National Primary Drinking Water Regulations.
- WHO Guidelines on drinking water Quality
- SEPA WAT-PS-10-01 report.- Assigning groundwater criteria for pollutant inputs

APPENDICES

APPENDIX A – SAL lab report numbers

SAL lab report:	Sample date
442763	30/11/2014
447123	06/01/2015
459107	25/02/2015
467421	31/03/2015

APPENDIX B – MOST RECENT LAB REPORT

Scientific Analysis Laboratories Ltd

16 Langlands Place
Kelvin South Business Park
East Kilbride
G75 0YF
Tel : 01355 573340
Fax : 01355 573341

Certificate of Analysis

Report Number: 467421-1

Date of Report: 17-Apr-2015

Customer: Arch Henderson
26 Rubislaw Terrace
Aberdeen
AB10 1XE

Customer Contact: Mr Ian Taylor

Customer Job Reference: 121106
Customer Site Reference: Nigg, Aberdeen
Date Job Received at SAL: 01-Apr-2015
Date Analysis Started: 02-Apr-2015
Date Analysis Completed: 17-Apr-2015

The results reported relate to samples received in the laboratory
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with QP22

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Report checked and authorised by :
Mrs Yasemin Iseri
Project Manager

Issued by :
Mrs Yasemin Iseri
Project Manager

SAL Reference: 467421
Project Site: Nigg, Aberdeen
Customer Reference: 121106

Water Analysed as Water
Miscellaneous

SAL Reference	**467421 001**	**467421 002**
Customer Sample Reference	**AHP 1**	**AHP 2**
Date Sampled	**31-MAR-2015**	**31-MAR-2015**

Determinand	Method	Test Sample	LOD	Units		
BOD (ATU)	T264	AR	1	mg/l	**2**	**2**
pH	T7	AR			**7.5**	**7.3**
COD (Total)	T179	AR	5	mg/l	**143**	**91**
Mecoprop	T16	AR	0.1	µg/l	**5.8**	<0.1
Total Organic Carbon	T21	AR	1	mg/l	**41**	**14**
Suspended Solids (Total)	T2	AR	10	mg/l	**36**	**30**
Ammonia expressed as N	T686	F	0.05	mg/l	**68**	**2.2**
Chloride	T686	F	1	mg/l	**360**	**390**
Chromium VI	T686	F	0.003	mg/l	<0.003	<0.003
Sulphate	T686	F	0.5	mg/l	**39**	**36**
Total Oxidised Nitrogen	T686	F	0.1	mg/l	**3.2**	**1.9**

SAL Reference: 467421
Project Site: Nigg, Aberdeen
Customer Reference: 121106

Water Analysed as Water
Heavy Metals(9)

				SAL Reference	**467421 001**	**467421 002**
				Customer Sample Reference	**AHP 1**	**AHP 2**
				Date Sampled	**31-MAR-2015**	**31-MAR-2015**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
As (Total)	T301	AR	0.2	µg/l	**5.4**	**2.7**
Cd (Total)	T301	AR	0.02	µg/l	**0.04**	**0.07**
Cr (Total)	T301	AR	1	µg/l	**6**	<1
Cu (Total)	T301	AR	0.5	µg/l	**11**	**21**
Pb (Total)	T301	AR	0.3	µg/l	**1.0**	**2.4**
Hg (Total)	T301	AR	0.05	µg/l	<0.05	<0.05
Ni (Total)	T301	AR	1	µg/l	**10**	**8**
Se (Total)	T301	AR	0.5	µg/l	**24**	**4.3**
Zn (Total)	T301	AR	2	µg/l	**12**	**43**

SAL Reference: 467421
Project Site: Nigg, Aberdeen
Customer Reference: 121106

Water Analysed as Water
Organochlorine insecticides

SAL Reference	**467421 001**	**467421 002**
Customer Sample Reference	**AHP 1**	**AHP 2**
Date Sampled	**31-MAR-2015**	**31-MAR-2015**

Determinand	Method	Test Sample	LOD	Units		
Hexachlorocyclohexane	T16	AR	0.01	µg/l	<0.01	<0.01
Hexachlorobenzene	T16	AR	0.01	µg/l	<0.01	<0.01
Heptachlor	T16	AR	0.01	µg/l	<0.01	<0.01
Aldrin	T16	AR	0.01	µg/l	<0.01	<0.01
Heptachlor epoxide	T16	AR	0.01	µg/l	<0.01	<0.01
Chlordane	T16	AR	0.01	µg/l	<0.01	<0.01
Endosulphan	T16	AR	0.01	µg/l	<0.01	<0.01
DDE	T16	AR	0.01	µg/l	<0.01	<0.01
Dieldrin	T16	AR	0.01	µg/l	<0.01	<0.01
Endrin	T16	AR	0.01	µg/l	<0.01	<0.01
DDD	T16	AR	0.01	µg/l	<0.01	<0.01
DDT	T16	AR	0.01	µg/l	<0.01	<0.01

SAL Reference: 467421
Project Site: Nigg, Aberdeen
Customer Reference: 121106

Water Analysed as Water
Organophosphorous insecticides

SAL Reference	**467421 001**	**467421 002**
Customer Sample Reference	**AHP 1**	**AHP 2**
Date Sampled	**31-MAR-2015**	**31-MAR-2015**

Determinand	Method	Test Sample	LOD	Units		
Dichlorvos	T16	AR	0.01	µg/l	<0.01	<0.01
Mevinphos	T16	AR	0.01	µg/l	<0.01	<0.01
Dimethoate	T16	AR	0.01	µg/l	<0.01	<0.01
Diazinon	T16	AR	0.01	µg/l	<0.01	<0.01
Pirimiphos methyl	T16	AR	0.01	µg/l	<0.01	<0.01
Malathion	T16	AR	0.01	µg/l	<0.01	<0.01
Fenitrothion	T16	AR	0.01	µg/l	<0.01	<0.01
Parathion	T16	AR	0.01	µg/l	<0.01	<0.01
Azinphos methyl	T16	AR	0.01	µg/l	<0.01	<0.01

SAL Reference: 467421
Project Site: Nigg, Aberdeen
Customer Reference: 121106

Water Analysed as Water
TPH UKCWG

SAL Reference	**467421 001**	**467421 002**
Customer Sample Reference	**AHP 1**	**AHP 2**
Date Sampled	**31-MAR-2015**	**31-MAR-2015**

Determinand	Method	Test Sample	LOD	Units		
TPH (C5-C6 aliphatic)	T215	AR	10	µg/l	<10	<10
TPH (C6-C8 aliphatic)	T215	AR	10	µg/l	<10	<10
TPH (C8-C10 aliphatic)	T215	AR	10	µg/l	<10	<10
TPH DW(C10-C12 aliphatic)	T81	AR	0.01	mg/l	<0.01	<0.01
TPH DW(C12-C16 aliphatic)	T81	AR	0.01	mg/l	<0.01	<0.01
TPH DW(C16-C21 aliphatic)	T81	AR	0.01	mg/l	**0.02**	<0.01
TPH DW(C21-C35 aliphatic)	T81	AR	0.01	mg/l	**0.02**	<0.01
TPH (C35-C44 aliphatic)	T81	AR	0.01	mg/l	<0.01	<0.01
TPH (C6-C7 aromatic)	T215	AR	10	µg/l	<10	<10
TPH (C7-C8 aromatic)	T215	AR	10	µg/l	<10	<10
TPH (C8-C10 aromatic)	T215	AR	10	µg/l	<10	<10
TPH DW(C10-C12 aromatic)	T81	AR	0.01	mg/l	**0.01**	<0.01
TPH DW(C12-C16 aromatic)	T81	AR	0.01	mg/l	**0.06**	<0.01
TPH DW(C16-C21 aromatic)	T81	AR	0.01	mg/l	**0.08**	<0.01
TPH DW(C21-C35 aromatic)	T81	AR	0.01	mg/l	<0.01	<0.01
TPH (C35-C44 aromatic)	T81	AR	0.01	mg/l	<0.01	<0.01

SAL Reference: 467421
Project Site: Nigg, Aberdeen
Customer Reference: 121106

Water Analysed as Water

Total and Speciated USEPA16 PAH and Phenol

				SAL Reference	**467421 001**	**467421 002**
				Customer Sample Reference	**AHP 1**	**AHP 2**
				Date Sampled	**31-MAR-2015**	**31-MAR-2015**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
Naphthalene	T149	AR	0.01	µg/l	(13) <0.01	(13) <0.01
Acenaphthylene	T149	AR	0.01	µg/l	<0.01	<0.01
Acenaphthene	T149	AR	0.01	µg/l	<0.01	<0.01
Fluorene	T149	AR	0.01	µg/l	<0.01	<0.01
Phenanthrene	T149	AR	0.01	µg/l	(13) <0.01	(13) <0.01
Anthracene	T149	AR	0.01	µg/l	<0.01	<0.01
Fluoranthene	T149	AR	0.01	µg/l	<0.01	<0.01
Pyrene	T149	AR	0.01	µg/l	<0.01	<0.01
Benzo(a)Anthracene	T149	AR	0.01	µg/l	<0.01	<0.01
Chrysene	T149	AR	0.01	µg/l	<0.01	<0.01
Benzo(b/k)Fluoranthene	T149	AR	0.01	µg/l	<0.01	<0.01
Benzo(a)Pyrene	T149	AR	0.01	µg/l	<0.01	<0.01
Indeno(123-cd)Pyrene	T149	AR	0.01	µg/l	<0.01	<0.01
Dibenzo(ah)Anthracene	T149	AR	0.01	µg/l	<0.01	<0.01
Benzo(ghi)Perylene	T149	AR	0.01	µg/l	<0.01	<0.01
PAH(total)	T149	AR	0.01	µg/l	(13) <0.01	(13) <0.01
Phenol	T149	AR	0.5	µg/l	<0.5	<0.5

SAL Reference: 467421
Project Site: Nigg, Aberdeen
Customer Reference: 121106

Water Analysed as Water
Volatile Organic Compounds (USEPA 624)

				SAL Reference	**467421 001**	**467421 002**
				Customer Sample Reference	**AHP 1**	**AHP 2**
				Date Sampled	**31-MAR-2015**	**31-MAR-2015**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
Dichlorodifluoromethane	T54	AR	1	µg/l	<1	<1
Chloromethane	T54	AR	1	µg/l	<1	<1
Vinyl chloride	T54	AR	1	µg/l	<1	<1
Bromomethane	T54	AR	1	µg/l	<1	<1
Chloroethane	T54	AR	1	µg/l	<1	<1
Trichlorofluoromethane	T54	AR	1	µg/l	<1	<1
1,1-Dichloroethylene	T54	AR	1	µg/l	<1	<1
Dichloromethane	T54	AR	50	µg/l	<50	<50
Trans-1,2-Dichloroethene	T54	AR	1	µg/l	<1	<1
1,1-Dichloroethane	T54	AR	1	µg/l	<1	<1
Cis-1,2-Dichloroethylene	T54	AR	1	µg/l	<1	<1
2,2-Dichloropropane	T54	AR	1	µg/l	<1	<1
Chloroform	T54	AR	1	µg/l	<1	<1
Bromochloromethane	T54	AR	1	µg/l	<1	<1
1,1,1-Trichloroethane	T54	AR	1	µg/l	<1	<1
1,1-Dichloropropene	T54	AR	1	µg/l	<1	<1
Carbon tetrachloride	T54	AR	1	µg/l	<1	<1
1,2-Dichloroethane	T54	AR	1	µg/l	<1	<1
Benzene	T54	AR	1	µg/l	(13) <1	(13) <1
1,2-Dichloropropane	T54	AR	1	µg/l	<1	<1
1,1,2-Trichloroethylene	T54	AR	1	µg/l	<1	<1
Bromodichloromethane	T54	AR	1	µg/l	<1	<1
Dibromomethane	T54	AR	1	µg/l	<1	<1
Cis-1,3-Dichloropropene	T54	AR	1	µg/l	<1	<1
Toluene	T54	AR	1	µg/l	<1	<1
Trans-1,3-Dichloropropene	T54	AR	1	µg/l	<1	<1
1,1,2-Trichloroethane	T54	AR	1	µg/l	<1	<1
1,3-Dichloropropane	T54	AR	1	µg/l	<1	<1
Tetrachloroethene	T54	AR	1	µg/l	<1	<1
Chlorodibromomethane	T54	AR	1	µg/l	<1	<1
1,2-dibromoethane	T54	AR	1	µg/l	<1	<1
Chlorobenzene	T54	AR	1	µg/l	<1	<1
1,1,1,2-Tetrachloroethane	T54	AR	1	µg/l	<1	<1
EthylBenzene	T54	AR	1	µg/l	<1	<1
M/P Xylene	T54	AR	1	µg/l	<1	<1
O Xylene	T54	AR	1	µg/l	<1	<1
Styrene	T54	AR	1	µg/l	<1	<1
Bromoform	T54	AR	1	µg/l	<1	<1
Isopropyl benzene	T54	AR	1	µg/l	<1	<1
1,1,2,2-Tetrachloroethane	T54	AR	1	µg/l	<1	<1
1,2,3-Trichloropropane	T54	AR	1	µg/l	<1	<1
n-Propylbenzene	T54	AR	1	µg/l	<1	<1
Bromobenzene	T54	AR	1	µg/l	<1	<1
1,3,5-Trimethylbenzene	T54	AR	1	µg/l	<1	<1
T-Butylbenzene	T54	AR	1	µg/l	<1	<1
1,2,4-Trimethylbenzene	T54	AR	1	µg/l	<1	<1
S-Butylbenzene	T54	AR	1	µg/l	<1	<1
p-Isopropyltoluene	T54	AR	1	µg/l	<1	<1
2-Chlorotoluene	T54	AR	1	µg/l	<1	<1
4-Chlorotoluene	T54	AR	1	µg/l	<1	<1
1,3-Dichlorobenzene	T54	AR	1	µg/l	<1	<1
1,4-Dichlorobenzene	T54	AR	1	µg/l	<1	<1
1,2-Dichlorobenzene	T54	AR	1	µg/l	<1	<1

Index to symbols used in 467421-1

Value	Description
AR	As Received
F	Filtered
13	Results have been blank corrected.
W	Analysis was performed at another SAL laboratory
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Method Index

Value	Description
T264	Probe (Incubation Carbonaceous) (5 Days)
T81	GC/FID (LV)
T2	Grav
T179	Colorimetry (XION 500)
T54	GC/MS (Headspace)
T301	ICP/MS (Total)
T16	GC/MS
T149	GC/MS (SIR)
T215	GC/MS (Headspace)(LV)
T7	Probe
T686	Discrete Analyser
T21	OX/IR

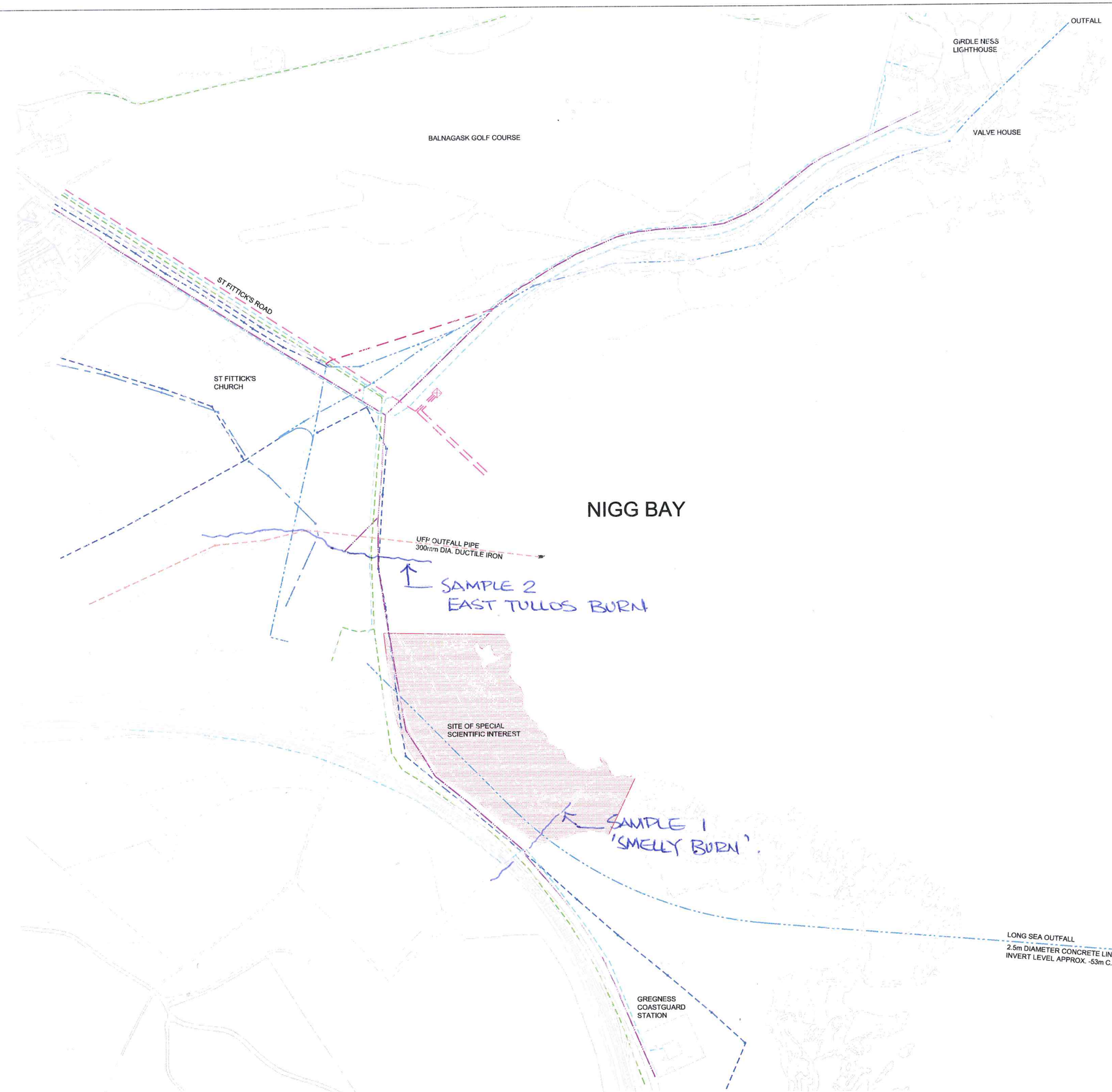
Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
BOD (ATU)	T264	AR	1	mg/l	N	001-002
pH	T7	AR			U	001-002
COD (Total)	T179	AR	5	mg/l	U	001-002
Mecoprop	T16	AR	0.1	µg/l	N	001-002
Total Organic Carbon	T21	AR	1	mg/l	U	001-002
Suspended Solids (Total)	T2	AR	10	mg/l	U	001-002
Ammonia expressed as N	T686	F	0.05	mg/l	U	001-002
Chloride	T686	F	1	mg/l	U	001-002
Chromium VI	T686	F	0.003	mg/l	U	001-002
Sulphate	T686	F	0.5	mg/l	U	001-002
Total Oxidised Nitrogen	T686	F	0.1	mg/l	U	001-002
As (Total)	T301	AR	0.2	µg/l	WU	001-002
Cd (Total)	T301	AR	0.02	µg/l	WU	001-002
Cr (Total)	T301	AR	1	µg/l	WU	001-002
Cu (Total)	T301	AR	0.5	µg/l	WU	001-002
Pb (Total)	T301	AR	0.3	µg/l	WU	001-002
Hg (Total)	T301	AR	0.05	µg/l	WU	001-002
Ni (Total)	T301	AR	1	µg/l	WU	001-002
Se (Total)	T301	AR	0.5	µg/l	WU	001-002
Zn (Total)	T301	AR	2	µg/l	WU	001-002
Hexachlorocyclohexane	T16	AR	0.01	µg/l	N	001-002
Hexachlorobenzene	T16	AR	0.01	µg/l	N	001-002
Heptachlor	T16	AR	0.01	µg/l	N	001-002
Aldrin	T16	AR	0.01	µg/l	N	001-002
Heptachlor epoxide	T16	AR	0.01	µg/l	N	001-002
Chlordane	T16	AR	0.01	µg/l	N	001-002
Endosulphan	T16	AR	0.01	µg/l	N	001-002
DDE	T16	AR	0.01	µg/l	N	001-002
Dieldrin	T16	AR	0.01	µg/l	N	001-002
Endrin	T16	AR	0.01	µg/l	N	001-002
DDD	T16	AR	0.01	µg/l	N	001-002
DDT	T16	AR	0.01	µg/l	N	001-002
Dichlorvos	T16	AR	0.01	µg/l	N	001-002
Mevinphos	T16	AR	0.01	µg/l	N	001-002
Dimethoate	T16	AR	0.01	µg/l	N	001-002
Diazinon	T16	AR	0.01	µg/l	N	001-002
Pirimiphos methyl	T16	AR	0.01	µg/l	N	001-002
Malathion	T16	AR	0.01	µg/l	N	001-002
Fenitrothion	T16	AR	0.01	µg/l	N	001-002

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Parathion	T16	AR	0.01	µg/l	N	001-002
Azinphos methyl	T16	AR	0.01	µg/l	N	001-002
TPH (C5-C6 aliphatic)	T215	AR	10	µg/l	N	001-002
TPH (C6-C8 aliphatic)	T215	AR	10	µg/l	N	001-002
TPH (C8-C10 aliphatic)	T215	AR	10	µg/l	N	001-002
TPH DW(C10-C12 aliphatic)	T81	AR	0.01	mg/l	N	001-002
TPH DW(C12-C16 aliphatic)	T81	AR	0.01	mg/l	N	001-002
TPH DW(C16-C21 aliphatic)	T81	AR	0.01	mg/l	N	001-002
TPH DW(C21-C35 aliphatic)	T81	AR	0.01	mg/l	N	001-002
TPH (C35-C44 aliphatic)	T81	AR	0.01	mg/l	N	001-002
TPH (C6-C7 aromatic)	T215	AR	10	µg/l	N	001-002
TPH (C7-C8 aromatic)	T215	AR	10	µg/l	N	001-002
TPH (C8-C10 aromatic)	T215	AR	10	µg/l	N	001-002
TPH DW(C10-C12 aromatic)	T81	AR	0.01	mg/l	N	001-002
TPH DW(C12-C16 aromatic)	T81	AR	0.01	mg/l	N	001-002
TPH DW(C16-C21 aromatic)	T81	AR	0.01	mg/l	N	001-002
TPH DW(C21-C35 aromatic)	T81	AR	0.01	mg/l	N	001-002
TPH (C35-C44 aromatic)	T81	AR	0.01	mg/l	N	001-002
Naphthalene	T149	AR	0.01	µg/l	U	001-002
Acenaphthylene	T149	AR	0.01	µg/l	U	001-002
Acenaphthene	T149	AR	0.01	µg/l	U	001-002
Fluorene	T149	AR	0.01	µg/l	U	001-002
Phenanthrene	T149	AR	0.01	µg/l	U	001-002
Anthracene	T149	AR	0.01	µg/l	U	001-002
Fluoranthene	T149	AR	0.01	µg/l	U	001-002
Pyrene	T149	AR	0.01	µg/l	U	001-002
Benzo(a)Anthracene	T149	AR	0.01	µg/l	U	001-002
Chrysene	T149	AR	0.01	µg/l	U	001-002
Benzo(b/k)Fluoranthene	T149	AR	0.01	µg/l	U	001-002
Benzo(a)Pyrene	T149	AR	0.01	µg/l	U	001-002
Indeno(123-cd)Pyrene	T149	AR	0.01	µg/l	U	001-002
Dibenzo(ah)Anthracene	T149	AR	0.01	µg/l	U	001-002
Benzo(ghi)Perylene	T149	AR	0.01	µg/l	U	001-002
PAH(total)	T149	AR	0.01	µg/l	U	001-002
Phenol	T149	AR	0.5	µg/l	U	001-002
Dichlorodifluoromethane	T54	AR	1	µg/l	U	001-002
Chloromethane	T54	AR	1	µg/l	U	001-002
Vinyl chloride	T54	AR	1	µg/l	U	001-002
Bromomethane	T54	AR	1	µg/l	U	001-002
Chloroethane	T54	AR	1	µg/l	U	001-002
Trichlorofluoromethane	T54	AR	1	µg/l	U	001-002
1,1-Dichloroethylene	T54	AR	1	µg/l	U	001-002
Dichloromethane	T54	AR	50	µg/l	N	001-002
Trans-1,2-Dichloroethene	T54	AR	1	µg/l	U	001-002
1,1-Dichloroethane	T54	AR	1	µg/l	U	001-002
Cis-1,2-Dichloroethylene	T54	AR	1	µg/l	U	001-002
2,2-Dichloropropane	T54	AR	1	µg/l	U	001-002
Chloroform	T54	AR	1	µg/l	U	001-002
Bromochloromethane	T54	AR	1	µg/l	U	001-002
1,1,1-Trichloroethane	T54	AR	1	µg/l	U	001-002
1,1-Dichloropropene	T54	AR	1	µg/l	U	001-002
Carbon tetrachloride	T54	AR	1	µg/l	U	001-002
1,2-Dichloroethane	T54	AR	1	µg/l	U	001-002
Benzene	T54	AR	1	µg/l	U	001-002
1,2-Dichloropropane	T54	AR	1	µg/l	U	001-002
1,1,2-Trichloroethylene	T54	AR	1	µg/l	U	001-002
Bromodichloromethane	T54	AR	1	µg/l	U	001-002
Dibromomethane	T54	AR	1	µg/l	U	001-002
Cis-1,3-Dichloropropene	T54	AR	1	µg/l	U	001-002
Toluene	T54	AR	1	µg/l	U	001-002
Trans-1,3-Dichloropropene	T54	AR	1	µg/l	U	001-002
1,1,2-Trichloroethane	T54	AR	1	µg/l	U	001-002
1,3-Dichloropropane	T54	AR	1	µg/l	U	001-002
Tetrachloroethene	T54	AR	1	µg/l	U	001-002
Chlorodibromomethane	T54	AR	1	µg/l	U	001-002
1,2-dibromoethane	T54	AR	1	µg/l	U	001-002
Chlorobenzene	T54	AR	1	µg/l	U	001-002
1,1,1,2-Tetrachloroethane	T54	AR	1	µg/l	U	001-002
EthylBenzene	T54	AR	1	µg/l	U	001-002
M/P Xylene	T54	AR	1	µg/l	U	001-002

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
O Xylene	T54	AR	1	µg/l	U	001-002
Styrene	T54	AR	1	µg/l	U	001-002
Bromoform	T54	AR	1	µg/l	U	001-002
Isopropyl benzene	T54	AR	1	µg/l	U	001-002
1,1,2,2-Tetrachloroethane	T54	AR	1	µg/l	U	001-002
1,2,3-Trichloropropane	T54	AR	1	µg/l	U	001-002
n-Propylbenzene	T54	AR	1	µg/l	U	001-002
Bromobenzene	T54	AR	1	µg/l	U	001-002
1,3,5-Trimethylbenzene	T54	AR	1	µg/l	U	001-002
T-Butylbenzene	T54	AR	1	µg/l	U	001-002
1,2,4-Trimethylbenzene	T54	AR	1	µg/l	U	001-002
S-Butylbenzene	T54	AR	1	µg/l	U	001-002
p-Isopropyltoluene	T54	AR	1	µg/l	U	001-002
2-Chlorotoluene	T54	AR	1	µg/l	U	001-002
4-Chlorotoluene	T54	AR	1	µg/l	U	001-002
1,3-Dichlorobenzene	T54	AR	1	µg/l	U	001-002
1,4-Dichlorobenzene	T54	AR	1	µg/l	U	001-002
1,2-Dichlorobenzene	T54	AR	1	µg/l	U	001-002

APPENDIX C – SAMPLE LOCATIONS



N

LEGEND:-

- COMBINED SEWER
- SURFACE WATER
- NATURAL WATER
- PFI SEWER
- MAINS (ABANDONED)
- TELECOM
- ELECTRIC
- UFP OUTFALL
- MARINE AQUARIUM INTAKE

NOTES:

ALIGNMENT OF ALL SERVICES TAKING FROM UTILITY RECORDS, NO SURVEY WORK HAS BEEN CARRIED OUT TO OBTAIN THIS INFORMATION

REV	DATE	REVISION	DRN	CHK
C	14/11/14	HRW option 6 HARBOUR LAYOUT ADDED	K.M.	GWA
B	15/03/13	UFP LINE ADDED, MS INTAKE UPDATED	A.S.	GWA
A	06/03/13	ISSUED FOR TENDER	A.S.	GWA

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PROJECT :
ABERDEEN HARBOUR BOARD
Aberdeen Harbour Expansion : Nigg Bay.

TITLE :
EXISTING SERVICES PLAN

DRAWN :	DATE :	CHECKED :	DATE :
KWM	15/02/13	GWA	17/11/14

SCALE : (A1)	DRAWING STATUS :
1:2500	INFORMATION

DRAWING No :	REV :
121106 - 10	C

APPENDIX D – RISK ASSESSMENT

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1.1 Metals Risk assessment

Risk assessment for metals is undertaken to the Environmental Standards (ES) set out in SEPA guidance WAT-PS-SG53. This largely comprises of the Environmental Quality Standards (EQS) for freshwater. These can be an AA (annual average) or MAC (Maximum Allowable concentration) and are listed in ug/l. For cadmium, copper and zinc these are further defined by the water hardness (measured in mg/l of calcium carbonate) as this affects the bioavailability of the metal.

1.2 TPH Risk assessment

There is no actual acceptable baseline figure for the assessment of TPH compounds in water in the UK at present. Initially the Drinking Water Standard of 10ug/l was used but this was revoked in 2010 and no suitable replacement has yet been made. Therefore risk assessment is commonly made with reference to the ES (Environmental Standards) from the 2009 Scotland River Basin report and EQS (Environmental Quality Standards, Water Framework Directive) using reference compounds as follows:

Benzene – ES=50ug/l (Maximum allowable concentration=MAC) – freshwater & marine

Toluene- ES= 50ug/l (annual mean – freshwater) and 40ug/l (annual mean- marine)

Ethylbenzene – no ES value exists so reference has been made to EQS values where a MAC of 200ug/l is applied for both freshwater and marine

Xylenes – again no ES value has been published as yet so reference is made to the EQS values where xylenes are assessed as a sum of all 3 isomers (m, p, o) and a limit of 300ug/l applies to both freshwater and marine.

Reference was made to the Environment Agency Chemical database for mineral oils and hydrocarbons but no actual standard has been set, just advice on “limit and prevent” actions. Assessment of the TPH fractions remains very challenging in the current void of guidance values that exist in the UK. The former DWS (Drinking water standard) of 10ug/l remains the only available tool and provides a very conservative assessment for TPH fractions.

1.3 PAH Risk assessment

Risk assessment has been made with reference to the ES (Environmental Standards) from the 2009 Scotland River Basin report and are shown as the maximum allowable concentration (MAC) for anthracene, fluoranthene and benzo(a)pyrene, and as the annual mean for naphthalene, the sum of benzo(b)fluoranthene and benzo(k)fluoranthene and also for the sum of benzo(ghi)perylene and indeno(ghi)pyrene (as no MAC exists for these compounds)

Reference was made to the Environment Agency Chemical database for the other PAH compounds but no mention was made of them. As there are limited values all IARC 2A - ranked compounds (i.e. probable carcinogens) were assessed using the value for benzo(a)pyrene, and

all 2B compounds (i.e. possible carcinogens) using that for naphthalene (only where no specific value exists for that single compound). There are two values sets for category 3 compounds (i.e. unclassifiable with relation to carcinogenicity) and the lower one of 0.4 ug/l will be used to assess other non-specified category 3 compounds. For indeno(1234cd)pyrene and benzo(ghi)perylene the value is the sum of the two. However, it is very low at 2ng/l and is below the normal limit of detection for most labs. This is a well-discussed problem within Scotland at present and no clear resolution has been found. Therefore these have not been highlighted as exceedances on the tables as with other values unless above 0.03 ug/l (the other published limit for 2B compounds).

1.4 VOC risk assessment

Risk assessment of VOC compounds uses a number of different resources as there are a wide number of compounds. These include:

- EQS
- DWS
- WSS is the Water Supply (Water Quality) Scotland Regulations 2001.
- USDWR is the United Stated Drinking Water Regulations.
- WHO

Much of these are from the SEPA WAT-PS-10-01 report.
Annotation in the table refers to:
*sum of all xylenes
** for all isomers
***any isomer of dichloropropene
****tri and tetra chloroethene combined

1.5 Pesticides risk assessment

Risk assessment of all pesticides on a specific basis is not possible. Some individual chemicals have an EQS value for freshwater for AA (annual average) and MAC (maximum allowable concentration) as described earlier. However as there are limited numbers of these reference is also made to the acceptable limits for clean groundwater as detailed in the SEPA WAT-PS-10-01 report. These include the RPV (resource protection value) and failing that, an MRV (minimum reporting value).

1.6 Miscellaneous risk assessment

The remaining chemical parameters were assessed as indicators commonly used by SEPA when monitoring the quality of water. They indicate both the biological and chemical health of a water sample.
These are: Ammonia, Chloride, sulphate, total oxidised N, BOD (biological Oxygen Demand), COD (Chemical Oxygen Demand), mecoprop, suspended solids, phenol, and TOC (Total organic carbon)