

Certificate of Analysis



Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956753**

Sample **13** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH12 0.50m-1.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.019	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	68	mg/l	Y Mid	53F
Chromium, Soluble	33	ug/l	Y Mid	53F
Copper, Soluble	<10	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	1.6	ug/l	Y Mid	56
Molybdenum, Soluble	0.0084	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	91	mg/l	Y Mid	60
Chloride as Cl	<2.5	mg/l	Y Mid	60
Dissolved Solids	320	mg/l	N Mid	18
Fluoride as F-	0.30	mg/l	Y Mid	20
TOC (Filtered)	2.6	mg/l	Y Mid	41

Analyst Comments for 10956753: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
 Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
 For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
 I/S=insufficient sample

Severn Trent Laboratories Ltd.

Certificate of Analysis



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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956754**

Sample **14** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH12 3.00m-4.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.0033	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	18	mg/l	Y Mid	53F
Chromium, Soluble	<10	ug/l	Y Mid	53F
Copper, Soluble	<10	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	<0.30	ug/l	Y Mid	56
Molybdenum, Soluble	0.031	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	30	mg/l	Y Mid	60
Chloride as Cl	<2.5	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	0.23	mg/l	Y Mid	20
TOC (Filtered)	2.2	mg/l	Y Mid	41

Analyst Comments for 10956754: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
 Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
 For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
 I/S=Insufficient sample

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Report Number: **COV/569308/2008**
Laboratory Number: **10956755**

Issue **1**
Sample **15** of **22**

Sample Source: **O Callaghan Moran & Assoc.**
Sample Point Description: **O Callaghan Moran & Assoc.**
Sample Description: **BH12 4.00m-5.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.0068	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	12	mg/l	Y Mid	53F
Chromium, Soluble	<10	ug/l	Y Mid	53F
Copper, Soluble	<10	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	<0.30	ug/l	Y Mid	56
Molybdenum, Soluble	0.020	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	<11	mg/l	Y Mid	60
Chloride as Cl	<2.5	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	0.29	mg/l	Y Mid	20
TOC (Filtered)	1.9	mg/l	Y Mid	41

Analyst Comments for 10956755: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956756**

Sample **16** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH12 8.00m-10.00m 10:1**

Sample Date: _____ Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation		Method
Leachate BSEN 10:1 extract	Y		N	Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N	Mid	25C
Arsenic, Soluble	<50	ug/l	N	Mid	25C
Barium, Soluble	0.017	mg/l	Y	Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y	Mid	56
Calcium, Soluble	17	mg/l	Y	Mid	53F
Chromium, Soluble	<10	ug/l	Y	Mid	53F
Copper, Soluble	<10	ug/l	Y	Mid	53F
Lead, Soluble	<10	ug/l	Y	Mid	53F
Mercury, Soluble	0.47	ug/l	Y	Mid	56
Molybdenum, Soluble	0.010	mg/l	N	Mid	68
Nickel, Soluble	<10	ug/l	Y	Mid	53F
Selenium, Soluble	7.9	ug/l	N	Mid	25C
Zinc, Soluble	19	ug/l	Y	Mid	53F
Phenol Index	<0.050	mg/l	N	Mid	32A
Sulphate as SO4	25	mg/l	Y	Mid	60
Chloride as Cl	4.1	mg/l	Y	Mid	60
Dissolved Solids	<200	mg/l	N	Mid	18
Fluoride as F-	0.27	mg/l	Y	Mid	20
TOC (Filtered)	1.9	mg/l	Y	Mid	41

Analyst Comments for 10956756: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
 Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
 For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
 I/S=Insufficient sample

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Report Number: **COV/569308/2008**
Laboratory Number: **10956757**

Issue **1**
Sample **17** of **22**

Sample Source: **O Callaghan Moran & Assoc.**
Sample Point Description: **O Callaghan Moran & Assoc.**
Sample Description: **BH14 0.50m-1.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.012	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	89	mg/l	Y Mid	53F
Chromium, Soluble	53	ug/l	Y Mid	53F
Copper, Soluble	24	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	0.51	ug/l	Y Mid	56
Molybdenum, Soluble	0.027	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	19	mg/l	Y Mid	60
Chloride as Cl	<2.5	mg/l	Y Mid	60
Dissolved Solids	290	mg/l	N Mid	18
Fluoride as F-	<0.20	mg/l	Y Mid	20
TOC (Filtered)	5.8	mg/l	Y Mid	41

Analyst Comments for 10956757: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
I/S=Insufficient sample

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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956758**

Sample **18** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 1.00m-2.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.0097	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	69	mg/l	Y Mid	53F
Chromium, Soluble	48	ug/l	Y Mid	53F
Copper, Soluble	44	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	0.68	ug/l	Y Mid	56
Molybdenum, Soluble	0.043	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	82	mg/l	Y Mid	60
Chloride as Cl	2.9	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	0.20	mg/l	Y Mid	20
TOC (Filtered)	6.9	mg/l	Y Mid	41

Analyst Comments for 10956758:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
I/S=insufficient sample

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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956759**

Sample **19** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 2.00m-3.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.013	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	130	mg/l	Y Mid	53F
Chromium, Soluble	17	ug/l	Y Mid	53F
Copper, Soluble	47	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	1.2	ug/l	Y Mid	56
Molybdenum, Soluble	0.034	mg/l	N Mid	68
Nickel, Soluble	12	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	14	mg/l	Y Mid	60
Chloride as Cl	5.4	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	<0.20	mg/l	Y Mid	20
TOC (Filtered)	8.2	mg/l	Y Mid	41

Analyst Comments for 10956759: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
I/S=Insufficient sample

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STL Business Centre, Torrington Avenue, Coventry, CV4 9GU Tel:+44 (0)24 7642 1213 Fax:+44 (0)24 7685 6575 Page 20 of 23

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Report Number: **COV/569308/2008**

Issue **1**

Laboratory Number: **10956760**

Sample **20** of **22**

Sample Source: **O Callaghan Moran & Assoc.**

Sample Point Description: **O Callaghan Moran & Assoc.**

Sample Description: **BH14 3.00m-4.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.0046	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	18	mg/l	Y Mid	53F
Chromium, Soluble	<10	ug/l	Y Mid	53F
Copper, Soluble	<10	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	0.39	ug/l	Y Mid	56
Molybdenum, Soluble	0.018	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	<11	mg/l	Y Mid	60
Chloride as Cl	<2.5	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	0.23	mg/l	Y Mid	20
TOC (Filtered)	2.7	mg/l	Y Mid	41

Analyst Comments for 10956760:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcom.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml. I/S=Insufficient sample

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Report Number: **COV/569308/2008**
 Laboratory Number: **10956761**

Issue **1**
 Sample **21** of **22**

Sample Source: **O Callaghan Moran & Assoc.**
 Sample Point Description: **O Callaghan Moran & Assoc.**
 Sample Description: **BH14 8.00m-10.00m 10:1**

Sample Date: Sample Received **12 December 2008** Analysis Complete: **24 December 2008**

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.027	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	24	mg/l	Y Mid	53F
Chromium, Soluble	<10	ug/l	Y Mid	53F
Copper, Soluble	<10	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	0.36	ug/l	Y Mid	56
Molybdenum, Soluble	0.015	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	42	mg/l	Y Mid	60
Chloride as Cl	3.5	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	0.24	mg/l	Y Mid	20
TOC (Filtered)	2.3	mg/l	Y Mid	41

Analyst Comments for 10956761: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
 Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
 For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
 I/S=insufficient sample

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Report Number: COV/569308/2008

Issue 1

Laboratory Number: 10956762

Sample 22 of 22

Sample Source: O Callaghan Moran & Assoc.

Sample Point Description: O Callaghan Moran & Assoc.

Sample Description: BH9 4.00m-5.00m 10:1

Sample Date: Sample Received 12 December 2008 Analysis Complete: 24 December 2008

Test Description	Result	Units	Accreditation	Method
Leachate BSEN 10:1 extract	Y		N Mid	EN12457-3 10:1
Antimony, Soluble	<0.030	mg/l	N Mid	25C
Arsenic, Soluble	<50	ug/l	N Mid	25C
Barium, Soluble	0.0076	mg/l	Y Mid	54F
Cadmium, Soluble	<0.10	ug/l	Y Mid	56
Calcium, Soluble	10	mg/l	Y Mid	53F
Chromium, Soluble	<10	ug/l	Y Mid	53F
Copper, Soluble	<10	ug/l	Y Mid	53F
Lead, Soluble	<10	ug/l	Y Mid	53F
Mercury, Soluble	0.78	ug/l	Y Mid	56
Molybdenum, Soluble	0.0056	mg/l	N Mid	68
Nickel, Soluble	<10	ug/l	Y Mid	53F
Selenium, Soluble	<6.0	ug/l	N Mid	25C
Zinc, Soluble	<10	ug/l	Y Mid	53F
Phenol Index	<0.050	mg/l	N Mid	32A
Sulphate as SO4	<11	mg/l	Y Mid	60
Chloride as Cl	<2.5	mg/l	Y Mid	60
Dissolved Solids	<200	mg/l	N Mid	18
Fluoride as F-	0.27	mg/l	Y Mid	20
TOC (Filtered)	1.4	mg/l	Y Mid	41

Analyst Comments for 10956762: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
I/S=Insufficient sample

Signed:

Name: G. Smith

Date: 24 December 2008

Title: Inorg and License Chem Manager

Severn Trent Laboratories Ltd.

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Mr Crean
O Callaghan Moran & Associates
Granary House
Rutland Street
Cork Cork

19 December 2008

Test Report: COV/566856/2008

Dear Mr Crean

Analysis of your sample(s) submitted on 03 December 2008 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using STL and we look forward to receiving your next samples.

Yours Sincerely,

Signed: *Susan Clancy*

Name: S. Clancy

Title: Organic Chemistry Manager

STL Coventry

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Fax: +44 (0)24 7685 6575

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Cert. No. 10269
Environmental Management Systems



Certificate No. FS67435



Report Summary



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**Mr Donal Crean
O Callaghan Moran & Associates
Granary House
Rutland Street
Cork
Cork**

Date of Issue: **19 December 2008**

Report Number: **COV/566856/2008**

Issue **1**

Job Description: Chemical Analysis

Job Location: 08-014-05

Number of Samples
included in this report **4**

Job Received: 03 December 2008

Number of Test Results
included in this report **188**

Analysis Commenced: 03 December 2008

Signed:

Name: **S. Clancy**

Date: **19 December 2008**

Title: **Organic Chemistry Manager**

STL was not responsible for sampling unless otherwise stated. Sampling is not covered by our UKAS accreditation.

Information on the methods of analysis and performance characteristics are available on request.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.

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**SEVERN
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Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940877**

Sample **1** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **RC-16S**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Antimony, Soluble	0.00048	mg/l	Y MID	56
Arsenic, Soluble	0.0069	mg/l	Y MID	56
Barium, Soluble	0.056	mg/l	Y MID	54F
Cadmium, Soluble	<0.00010	mg/l	Y MID	56
Hardness, Calcium as CaCO ₃	100	mg/l	N MID	53F
Chromium, Soluble	<0.030	mg/l	Y MID	56
Copper, Soluble	0.025	mg/l	Y MID	56
Iron, Soluble	0.41	mg/l	Y MID	56
Lead, Soluble	0.0033	mg/l	Y MID	56
Magnesium, Soluble	6.6	mg/l	Y MID	53F
Manganese, Soluble	0.17	mg/l	Y MID	53F
Mercury, Soluble	<0.00030	mg/l	Y MID	56
Nickel, Soluble	0.0060	mg/l	Y MID	56
Potassium, Soluble	60	mg/l	Y MID	53F
Sodium, Soluble	100	mg/l	Y MID	53F
Tin, Soluble	<0.010	mg/l	N MID	68
Zinc, Soluble	0.053	mg/l	Y MID	56
Sulphate as SO ₄	<0.011	g/l	Y MID	60
Bicarbonate as CaCO ₃	710	mg/l	N MID	2
Chloride as Cl	150	mg/l	Y MID	60
Sulphide as S	0.14	mg/l	Y MID	38A
TPH >C6 - C10	<100	ug/l	Y MID	318
TPH >C10 - C20	330	ug/l	Y MID	318
TPH >C20 - C40	7700	ug/l	Y MID	318
TPH >C6 - C40, Total	8000	ug/l	Y MID	318
Naphthalene	2.2	ug/l	Y MID	331
Acenaphthene	0.68	ug/l	Y MID	331
Acenaphthylene	0.12	ug/l	Y MID	331
Fluorene	0.78	ug/l	Y MID	331
Phenanthrene	7.6	ug/l	Y MID	331
Anthracene	1.1	ug/l	Y MID	331
Fluoranthene	5.6	ug/l	Y MID	331
Pyrene	4.6	ug/l	Y MID	331
Benzo(a)anthracene	3.6	ug/l	Y MID	331
Chrysene	7.3	ug/l	Y MID	331

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Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940877**

Sample **1** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **RC-16S**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Benzo(b)fluoranthene	0.51	ug/l	Y MID	331
Benzo(k)fluoranthene	0.36	ug/l	Y MID	331
Benzo(a)pyrene	0.91	ug/l	Y MID	331
Dibenz(a,h)anthracene	0.11	ug/l	Y MID	331
Benzo(g,h,i)perylene	0.65	ug/l	Y MID	331
Indeno(1,2,3-c,d)pyrene	0.70	ug/l	Y MID	331
PAH, Total	16	ug/l	Y MID	331
Benzene	<10	ug/l	N MID	329
Toluene	<10	ug/l	N MID	329
Ethylbenzene	<10	ug/l	N MID	329
m&p-Xylene	<20	ug/l	N MID	329
o-Xylene	<10	ug/l	N MID	329

Analyst Comments for 10940877:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Brj = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
I/S=Insufficient sample

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Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940878**

Sample **2** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **RC-16B**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Antimony, Soluble	0.0023	mg/l	Y MID	56
Arsenic, Soluble	0.0059	mg/l	Y MID	56
Barium, Soluble	0.12	mg/l	Y MID	54F
Cadmium, Soluble	0.00024	mg/l	Y MID	56
Hardness, Calcium as CaCO3	210	mg/l	N MID	53F
Chromium, Soluble	<0.030	mg/l	Y MID	56
Copper, Soluble	0.0096	mg/l	Y MID	56
Iron, Soluble	0.55	mg/l	Y MID	56
Lead, Soluble	0.00081	mg/l	Y MID	56
Magnesium, Soluble	28	mg/l	Y MID	53F
Manganese, Soluble	0.070	mg/l	Y MID	53F
Mercury, Soluble	0.00074	mg/l	Y MID	56
Nickel, Soluble	0.0039	mg/l	Y MID	56
Potassium, Soluble	7.6	mg/l	Y MID	53F
Sodium, Soluble	680	mg/l	Y MID	53F
Tin, Soluble	<0.010	mg/l	N MID	68
Zinc, Soluble	0.016	mg/l	Y MID	56
Sulphate as SO4	0.23	g/l	Y MID	60
Bicarbonate as CaCO3	350	mg/l	N MID	2
Chloride as Cl	860	mg/l	Y MID	60
Sulphide as S	0.011	mg/l	Y MID	38A
TPH >C6 - C10	<100	ug/l	Y MID	318
TPH >C10 - C20	<100	ug/l	Y MID	318
TPH >C20 - C40	<100	ug/l	Y MID	318
TPH >C6 - C40, Total	<100	ug/l	Y MID	318
Naphthalene	0.11	ug/l	Y MID	331
Acenaphthene	<0.010	ug/l	Y MID	331
Acenaphthylene	0.016	ug/l	Y MID	331
Fluorene	0.021	ug/l	Y MID	331
Phenanthrene	0.046	ug/l	Y MID	331
Anthracene	<0.010	ug/l	Y MID	331
Fluoranthene	<0.010	ug/l	Y MID	331
Pyrene	0.016	ug/l	Y MID	331
Benzo(a)anthracene	0.011	ug/l	Y MID	331
Chrysene	<0.010	ug/l	Y MID	331

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Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940878**

Sample **2** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **RC-16B**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Benzo(b)fluoranthene	<0.010	ug/l	Y MID	331
Benzo(k)fluoranthene	<0.010	ug/l	Y MID	331
Benzo(a)pyrene	<0.010	ug/l	Y MID	331
Dibenz(a,h)anthracene	<0.010	ug/l	Y MID	331
Benzo(g,h,i)perylene	<0.010	ug/l	Y MID	331
Indeno(1,2,3-c,d)pyrene	<0.010	ug/l	Y MID	331
PAH, Total	0.25	ug/l	Y MID	331
Benzene	<10	ug/l	N MID	329
Toluene	<10	ug/l	N MID	329
Ethylbenzene	<10	ug/l	N MID	329
m&p-Xylene	<20	ug/l	N MID	329
o-Xylene	<10	ug/l	N MID	329

Analyst Comments for 10940878:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.

I/S=Insufficient sample

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Report Number: **COV/566856/2008**
Laboratory Number: **10940879**

Issue **1**
Sample **3** of **4**

Sample Source: **O Callaghan Moran & Associates**
Sample Point Description: **O Callaghan Moran & Associates**
Sample Description: **W1-S**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Antimony, Soluble	0.00017	mg/l	Y MID	56
Arsenic, Soluble	<0.0010	mg/l	Y MID	56
Barium, Soluble	0.015	mg/l	Y MID	54F
Cadmium, Soluble	0.00014	mg/l	Y MID	56
Hardness, Calcium as CaCO3	360	mg/l	N MID	53F
Chromium, Soluble	<0.030	mg/l	Y MID	56
Copper, Soluble	<0.0070	mg/l	Y MID	56
Iron, Soluble	0.045	mg/l	Y MID	56
Lead, Soluble	<0.00050	mg/l	Y MID	56
Magnesium, Soluble	8.8	mg/l	Y MID	53F
Manganese, Soluble	0.022	mg/l	Y MID	53F
Mercury, Soluble	<0.00030	mg/l	Y MID	56
Nickel, Soluble	<0.00050	mg/l	Y MID	56
Potassium, Soluble	11	mg/l	Y MID	53F
Sodium, Soluble	35	mg/l	Y MID	53F
Tin, Soluble	<0.010	mg/l	N MID	68
Zinc, Soluble	<0.0050	mg/l	Y MID	56
Sulphate as SO4	0.15	g/l	Y MID	60
Bicarbonate as CaCO3	200	mg/l	N MID	2
Chloride as Cl	39	mg/l	Y MID	60
Sulphide as S	<0.010	mg/l	Y MID	38A
TPH >C6 - C10	<100	ug/l	Y MID	318
TPH >C10 - C20	<100	ug/l	Y MID	318
TPH >C20 - C40	<100	ug/l	Y MID	318
TPH >C6 - C40, Total	<100	ug/l	Y MID	318
Naphthalene	0.054	ug/l	Y MID	331
Acenaphthene	<0.010	ug/l	Y MID	331
Acenaphthylene	<0.010	ug/l	Y MID	331
Fluorene	<0.010	ug/l	Y MID	331
Phenanthrene	0.017	ug/l	Y MID	331
Anthracene	<0.010	ug/l	Y MID	331
Fluoranthene	<0.010	ug/l	Y MID	331
Pyrene	<0.010	ug/l	Y MID	331
Benzo(a)anthracene	<0.010	ug/l	Y MID	331
Chrysene	<0.010	ug/l	Y MID	331

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Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940879**

Sample **3** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **W1-S**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Benzo(b)fluoranthene	<0.010	ug/l	Y MID	331
Benzo(k)fluoranthene	<0.010	ug/l	Y MID	331
Benzo(a)pyrene	<0.010	ug/l	Y MID	331
Dibenz(a,h)anthracene	<0.010	ug/l	Y MID	331
Benzo(g,h,i)perylene	<0.010	ug/l	Y MID	331
Indeno(1,2,3-c,d)pyrene	<0.010	ug/l	Y MID	331
PAH, Total	<0.10	ug/l	Y MID	331
Benzene	<10	ug/l	N MID	329
Toluene	<10	ug/l	N MID	329
Ethylbenzene	<10	ug/l	N MID	329
m&p-Xylene	<20	ug/l	N MID	329
o-Xylene	<10	ug/l	N MID	329

Analyst Comments for 10940879:

No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
I/S=Insufficient sample

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Report Number: **COV/566856/2008**

Issue **1**

Laboratory Number: **10940880**

Sample **4** of **4**

Sample Source: **O Callaghan Moran & Associates**

Sample Point Description: **O Callaghan Moran & Associates**

Sample Description: **W1-B**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Antimony, Soluble	0.00015	mg/l	Y MID	56
Arsenic, Soluble	<0.0010	mg/l	Y MID	56
Barium, Soluble	0.018	mg/l	Y MID	54F
Cadmium, Soluble	<0.00010	mg/l	Y MID	56
Hardness, Calcium as CaCO ₃	360	mg/l	N MID	53F
Chromium, Soluble	<0.030	mg/l	Y MID	56
Copper, Soluble	<0.0070	mg/l	Y MID	56
Iron, Soluble	0.041	mg/l	Y MID	56
Lead, Soluble	<0.00050	mg/l	Y MID	56
Magnesium, Soluble	8.4	mg/l	Y MID	53F
Manganese, Soluble	<0.010	mg/l	Y MID	53F
Mercury, Soluble	<0.00030	mg/l	Y MID	56
Nickel, Soluble	<0.00050	mg/l	Y MID	56
Potassium, Soluble	10	mg/l	Y MID	53F
Sodium, Soluble	35	mg/l	Y MID	53F
Tin, Soluble	<0.010	mg/l	N MID	68
Zinc, Soluble	<0.0050	mg/l	Y MID	56
Sulphate as SO ₄	0.16	g/l	Y MID	60
Bicarbonate as CaCO ₃	200	mg/l	N MID	2
Chloride as Cl	41	mg/l	Y MID	60
Sulphide as S	<0.010	mg/l	Y MID	38A
TPH >C6 - C10	<100	ug/l	Y MID	318
TPH >C10 - C20	<100	ug/l	Y MID	318
TPH >C20 - C40	<100	ug/l	Y MID	318
TPH >C6 - C40, Total	<100	ug/l	Y MID	318
Naphthalene	0.081	ug/l	Y MID	331
Acenaphthene	0.054	ug/l	Y MID	331
Acenaphthylene	<0.010	ug/l	Y MID	331
Fluorene	0.051	ug/l	Y MID	331
Phenanthrene	0.26	ug/l	Y MID	331
Anthracene	0.034	ug/l	Y MID	331
Fluoranthene	0.16	ug/l	Y MID	331
Pyrene	0.27	ug/l	Y MID	331
Benzo(a)anthracene	0.15	ug/l	Y MID	331
Chrysene	0.12	ug/l	Y MID	331

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Report Number: **COV/566856/2008**
Laboratory Number: **10940880**

Issue **1**
Sample **4** of **4**

Sample Source: **O Callaghan Moran & Associates**
Sample Point Description: **O Callaghan Moran & Associates**
Sample Description: **W1-B**

Sample Date: **01 December 2008** Sample Received **03 December 2008** Analysis Complete: **18 December 2008**

Test Description	Result	Units	Accreditation	Method
Benzo(b)fluoranthene	0.078	ug/l	Y MID	331
Benzo(k)fluoranthene	0.056	ug/l	Y MID	331
Benzo(a)pyrene	0.13	ug/l	Y MID	331
Dibenz(a,h)anthracene	0.023	ug/l	Y MID	331
Benzo(g,h,i)perylene	0.090	ug/l	Y MID	331
Indeno(1,2,3-c,d)pyrene	0.16	ug/l	Y MID	331
PAH, Total	1.7	ug/l	Y MID	331
Benzene	<10	ug/l	N MID	329
Toluene	<10	ug/l	N MID	329
Ethylbenzene	<10	ug/l	N MID	329
m&p-Xylene	<20	ug/l	N MID	329
o-Xylene	<10	ug/l	N MID	329

Analyst Comments for 10940880: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.

Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.

For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected In volume of sample filtered. Relating to Legionella volume analysed 1g is approximately equivalent to 1ml.
I/S=Insufficient sample

Signed: *Susan Clancy*

Name: **S. Clancy**

Date: **19 December 2008**

Title: **Organic Chemistry Manager**

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ANALYST COMMENTS FOR REPORT

COV/566856/2008

Issue 1

Date of Issue: 19 December 2008

Sample No	Analyst Comments
10940877	
10940878	
10940879	
10940880	

Signed:

Susa Clancy

Name: S. Clancy

Date: 19 December 2008

Title: Organic Chemistry Manager

Date of Issue : 19 December 2008

Sample No	Description	Determinand	Comments
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Signed: <i>Susa Clancy</i>	Name: S. Clancy	Date: 19 December 2008
	Title: Organic Chemistry Manager	

APPENDIX 9.1 AMBIENT AIR QUALITY STANDARDS

National standards for ambient air pollutants in Ireland have generally ensued from Council Directives enacted in the EU (& previously the EC & EEC). The initial interest in ambient air pollution legislation in the EU dates from the early 1980s and was in response to the most serious pollutant problems at that time which was the issue of acid rain. As a result of this sulphur dioxide, and later nitrogen dioxide, were both the focus of EU legislation. Linked to the acid rain problem was urban smog associated with fuel burning for space heating purposes. Also apparent at this time were the problems caused by leaded petrol and EU legislation was introduced to deal with this problem in the early 1980s.

In recent years the EU has focused on defining a basis strategy across the EU in relation to ambient air quality. In 1996, a Framework Directive, Council Directive 96/62/EC, on ambient air quality assessment and management was enacted. The aims of the Directive are fourfold. Firstly, the Directive's aim is to establish objectives for ambient air quality designed to avoid harmful effects to health. Secondly, the Directive aims to assess ambient air quality on the basis of common methods and criteria throughout the EU. Additionally, it is aimed to make information on air quality available to the public via alert thresholds and fourthly, it aims to maintain air quality where it is good and improve it in other cases.

As part of these measures to improve air quality, the European Commission has adopted proposals for daughter legislation under Directive 96/62/EC. The first of these directives to be enacted, Council Directive 1999/30/EC, has been passed into Irish Law as S.I. No 271 of 2002 (Air Quality Standards Regulations 2002), and has set limit values which came into operation on 17th June 2002. The Air Quality Standards Regulations 2002 detail margins of tolerance, which are trigger levels for certain types of action in the period leading to the attainment date. The margin of tolerance varies from 60% for lead, to 30% for 24-hour limit value for PM₁₀, 40% for the hourly and annual limit value for NO₂ and 26% for hourly SO₂ limit values. The margin of tolerance commenced from June 2002, and started to reduce from 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by the attainment date. A second daughter directive, EU Council Directive 2000/69/EC, has published limit values for both carbon monoxide and benzene in ambient air. This has also been passed into Irish Law under the Air Quality Standards Regulations 2002.

The most recent EU Council Directive on ambient air quality was published on the 11/06/08 which has been transposed into Irish Law as S.I. 180 of 2011. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive and its subsequent daughter directives. Provisions were also made for the inclusion of new ambient limit values relating to PM_{2.5}. The margins of tolerance specific to each pollutant were also slightly adjusted from previous directives. In regards to existing ambient air quality standards, it is not proposed to modify the standards but to strengthen existing provisions to ensure that non-compliances are removed. In addition, new ambient standards for PM_{2.5} are included in Directive 2008/50/EC. The approach for PM_{2.5} was to establish a target value of 25 µg/m³, as an annual average (to be attained everywhere by 2010) and a limit value of 25 µg/m³, as an annual average (to be attained everywhere by 2015), coupled with a target to reduce human exposure generally to PM_{2.5} between 2010 and 2020. This exposure reduction target will range from 0% (for PM_{2.5} concentrations of less than 8.5 µg/m³ to 20% of the average exposure indicator (AEI) for concentrations of between 18 - 22 µg/m³). Where the AEI is currently greater than 22 µg/m³ all appropriate measures should be employed to reduce this level to 18 µg/m³ by 2020. The AEI is based on measurements taken in urban background locations averaged over a three year period from 2008 - 2010 and again from 2018-2020. Additionally, an exposure concentration obligation of 20 µg/m³ was set to be complied with by 2015 again based on the AEI.

Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions. The Alert Threshold is defined in Council Directive 96/62/EC as "a level beyond which there is a risk to human health from brief exposure and at which immediate steps shall be taken as laid down in Directive 96/62/EC". These steps include undertaking to ensure that the necessary steps are taken to inform the public (e.g. by means of radio, television and the press).

The Margin of Tolerance is defined in Council Directive 96/62/EC as a concentration which is higher than the limit value when legislation comes into force. It decreases to meet the limit value by the attainment date. The Upper Assessment Threshold is defined in Council Directive 96/62/EC as a concentration above which high quality measurement is mandatory. Data from measurement may be supplemented by information from other sources, including air quality modelling.

An annual average limit for both NO_x (NO and NO₂) is applicable for the protection of vegetation in highly rural areas away from major sources of NO_x such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex VI of EU Directive 1999/30/EC identifies that monitoring to demonstrate compliance with the NO_x limit for the protection of vegetation should be carried out distances greater than: -

- 5 km from the nearest motorway or dual carriageway.
- 5 km from the nearest major industrial installation.
- 20 km from a major urban conurbation.

As a guideline, a monitoring station should be indicative of approximately 1,000 km² of surrounding area.

Under the terms of EU Framework Directive on Ambient Air Quality (96/62/EC), geographical areas within member states have been classified in terms of zones. The zones have been defined in order to meet the criteria for air quality monitoring, assessment and management as described in the Framework Directive and Daughter Directives. Zone A is defined as Dublin and its environs, Zone B is defined as Cork City, Zone C is defined as 23 urban areas with a population greater than 15,000 and Zone D is defined as the remainder of the country. The Zones were defined based on among other things, population and existing ambient air quality.

EU Council Directive 96/62/EC on ambient air quality and assessment has been adopted into Irish Legislation (S.I. No. 33 of 1999). The act has designated the Environmental Protection Agency (EPA) as the competent authority responsible for the implementation of the Directive and for assessing ambient air quality in the State. Other commonly referenced ambient air quality standards include the World Health Organisation. The WHO guidelines differ from air quality standards in that they are primarily set to protect public health from the effects of air pollution. Air quality standards, however, are air quality guidelines recommended by governments, for which additional factors, such as socio-economic factors, may be considered.

APPENDIX 9.2 DUST MANAGEMENT PLAN

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland (DCC, 2018), the UK (IAQM (2014), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997).

Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 9.1 for the windrose for Dublin Airport). As the prevailing wind is predominantly south-westerly to westerly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (IAQM, 2014; UK ODPM, 2002). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions: -

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised.
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details.
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses.
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out.
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein.
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 20 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Measures Specific to Demolition

- Prior to demolition blocks should be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).

- During the demolition process, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

Site roads (particularly unpaved) can be a significant source of fugitive dust from construction sites if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK ODPM, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles.
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. If sweeping using a road sweeper is not possible due to the nature of the surrounding area then a suitable smaller scale street cleaning vacuum will be used.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log-book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.

- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be: -

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues.
- The development of a documented system for managing site practices with regard to dust control.
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

APPENDIX 12.1 LANDSCAPE & VISUAL IMPACTS ASSESSMENT – PHOTOMONTAGES

Please refer to the accompanying Photomontages, prepared by ARC Architectural Consultants.

APPENDIX 14.1

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

DCC PLAN NO 2862/21
RECEIVED: 01/06/2021



**CONSTRUCTION &
DEMOLITION WASTE
MANAGEMENT PLAN FOR
A PROPOSED RESIDENTIAL
DEVELOPMENT**

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**MASTERPLAN, SITE 3, SITE 4
AND SITE 5.**

APPENDIX 14.1

Report Prepared For

Dublin Central GP Limited or
shortened to DCGP Ltd.

Report Prepared By

Chonail Bradley, Senior Environmental
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Our Reference

CB/20/11784WMR01

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1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Operational Waste Management Plan (OWMP) on behalf of Dublin Central GP Limited or shortened to DCGP Ltd. The Dublin Central project is an expansive (c.2.3 Ha) and complex regeneration project. It needs to be delivered in stages to overcome site and project constraints. A site wide cumulative masterplan has been prepared by 'the Applicant' to set out the overall development vision for the Dublin Central project. 'The Masterplan' area encompasses almost entirely three urban blocks. The area is bounded generally by O'Connell Street Upper and Henry Place to the east, Henry Street to the south, Moore Street to the west, and O'Rahilly Parade and Parnell Street to the north. Moore Lane extends south from Parnell Street through the centre of the masterplan area, as far as its junction with Henry Place.

This plan will provide information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the current legal and industry standards including the *Waste Management Acts 1996 - 2011* and associated Regulations ¹, *Protection of the Environment Act 2003* as amended ², *Litter Pollution Act 1997* as amended ³ and the *Eastern-Midlands Region Waste Management Plan 2015 - 2021* ⁴.

In particular, this Plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998 known as '*Changing Our Ways*'⁵, which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste*'⁶ concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

In September 2020 the government released a new national policy document outlining a new action plan for Ireland and its waste to cover the period of 2020-2025. This plan 'A Waste Action Plan for a Circular Economy'⁷, was prepared in response to the 'European

Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities. Replacing the previous national waste management plan "A Resource Opportunity (2012)".

It aims to fulfil the commitment in the Programme for Government to publish and start implementing a new National Waste Action Plan. It is intended that this new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. It will be followed later this year by an All of Government Circular Economy Strategy. The policy document shifts focus away from waste disposal and moves it back up the production chain. To support the policy, regulation is already being used (Circular Economy Legislative Package) or in the pipeline (Single Use Plastics Directive). The policy document contains over 200 measures across various waste areas including Circular Economy, Municipal Waste, Consumer Protection & Citizen Engagement, Plastics and Packaging, Construction and Demolition, Textiles, Green Public Procurement and Waste Enforcement.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry, in the Task Force B4 final report. The NCDWC subsequently produced '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*'⁸ in July 2006 in conjunction with the then Department of the Environment, Heritage and Local Government (DoEHLG). The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for waste manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Dublin City Council etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&D Waste Management Plan for developments. This development requires a C&D WMP under the following criterion:

- New residential development of 10 houses or more;
- New developments other than (1) above, including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250 m²; and
- Demolition/renovation/refurbishment projects generating in excess of 100m³ in volume, of C&D waste;

Other guidelines followed in the preparation of this report include '*Construction and Demolition Waste Management – a handbook for Contractors and Site Managers*'⁹ published by FÁS and the Construction Industry Federation in 2002.

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are

2.2 Regional Level

The proposed development is located in the Local Authority area of Dublin City Council (DCC). The *Eastern-Midlands Region Waste Management Plan 2015 – 2021* is the regional waste management plan for the DCC area published in May 2015.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of “70% preparing for reuse, recycling and other recovery of construction and demolition waste” (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130 - €150 per tonne of waste which includes a €75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012*.

The *Dublin City Development Plan 2016 – 2022*¹⁰ sets out a number of policies and objectives for Dublin City in line with the objectives of the regional waste management plan. The plan identifies the development of recycling in order to minimise the use of landfill as the main objective of the City Council. Waste policies and objectives with a particular relevance to the proposed development are:

Policies:

- *SI19: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin City and the region to become self-reliant in terms of waste management.*
- *SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.*
- *SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.*

Objectives:

- *SIO17: To promote the re-use of building materials, recycling of demolition material and the use of materials from renewable sources. In all developments in excess of 10 housing units and commercial developments in excess of 1000 sqm, a materials source and management plan showing type of materials/proportion of re-use/recycled materials to be used shall be implemented by the developer.*
- *SIO18: To implement the current Litter Management Plan through enforcement of the litter laws, street cleaning and education and awareness campaigns.*
- *SIO19: To implement the Eastern-Midlands Waste Management Plan 2015-2021 and achieve the plan targets and objectives.*