TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	79	COBBLES
63	67	
50	60	GRAVEL
37.5	44	
28	38	
20	32	
14	29	
10	27	
6.3	24	
5	23	
3.35	22	
2	21	
1.18	20	SAND
0.6	18	
0.425	17	
0.3	16	
0.15	15	
0.063	12	SILT/CLAY

Contract No: 21322 Report No. R95755

Contract: Nangor Road , Clondalkin,Dublin 22

BH/TP : BH02

Sample No. AA91692 Lab. Sample No. A18/9051

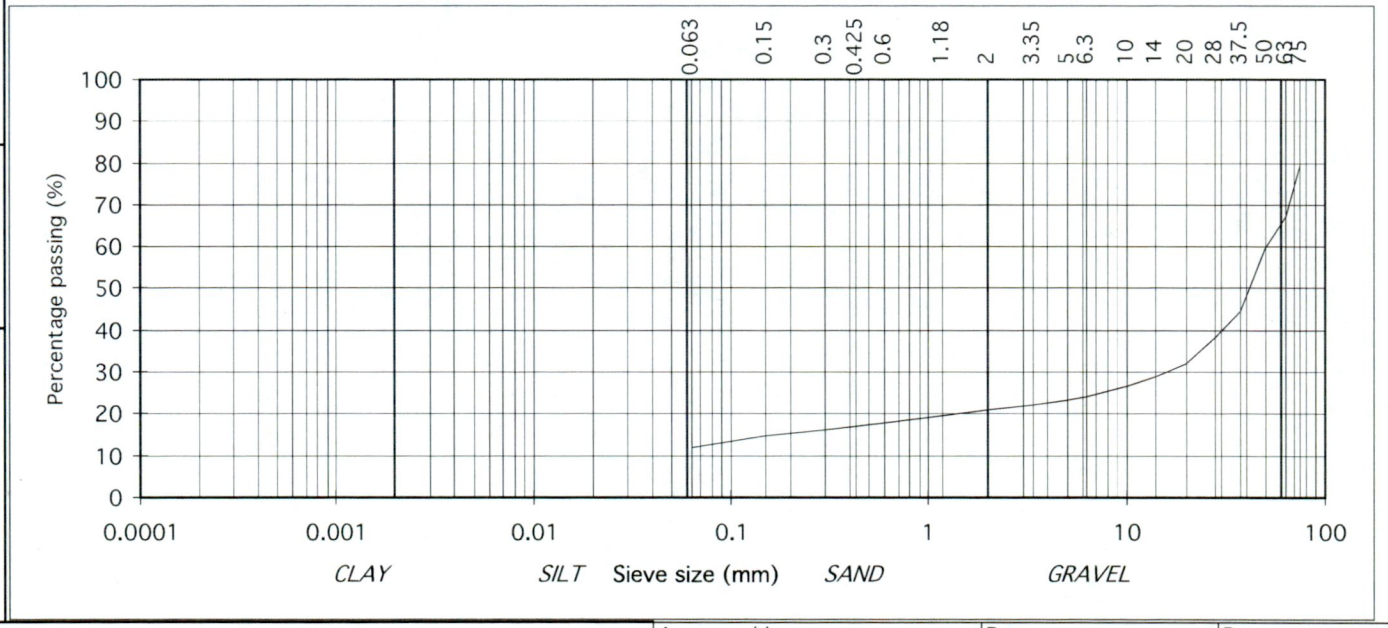
Sample Type: B

Depth (m) 2.00 Customer: 2HP

Date Received 29/10/2018 Date Testing started 07/11/2018

Description: Brown/grey clayey, sandy, GRAVEL with many cobbles

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO 17892-4:2016 Sample size did not meet the requiremets of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	15/11/18	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	94	GRAVEL
37.5	81	
28	73	
20	65	
14	64	
10	63	
6.3	61	
5	61	
3.35	59	
2	58	
1.18	56	SAND
0.6	55	
0.425	54	
0.3	52	
0.15	48	
0.063	41	SILT/CLAY
0.039	36	
0.028	33	
0.018	30	
0.010	27	
0.007	24	
0.005	22	
0.002	17	

Contract No: 21322 Report No. R95611

Contract: Nangor Road , Clondalkin,Dublin 22

BH/TP : BH03

Sample No. AA91686 Lab. Sample No. A18/9052

Sample Type: B

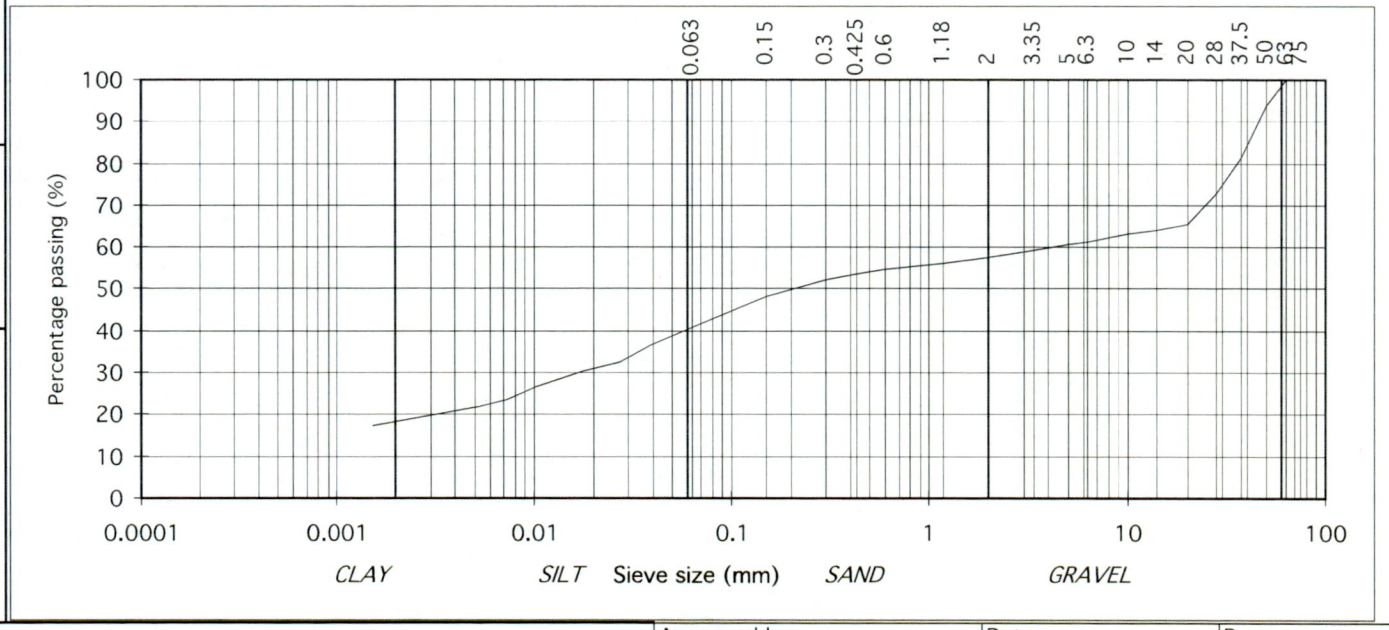
Depth (m) 2.00 Customer: 2HP

Date Received 29/10/2018 Date Testing started 07/11/2018

Description: Grey/black slightly sandy, gravelly, CLAY

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO 17892-4:2016



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	13/11/18	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

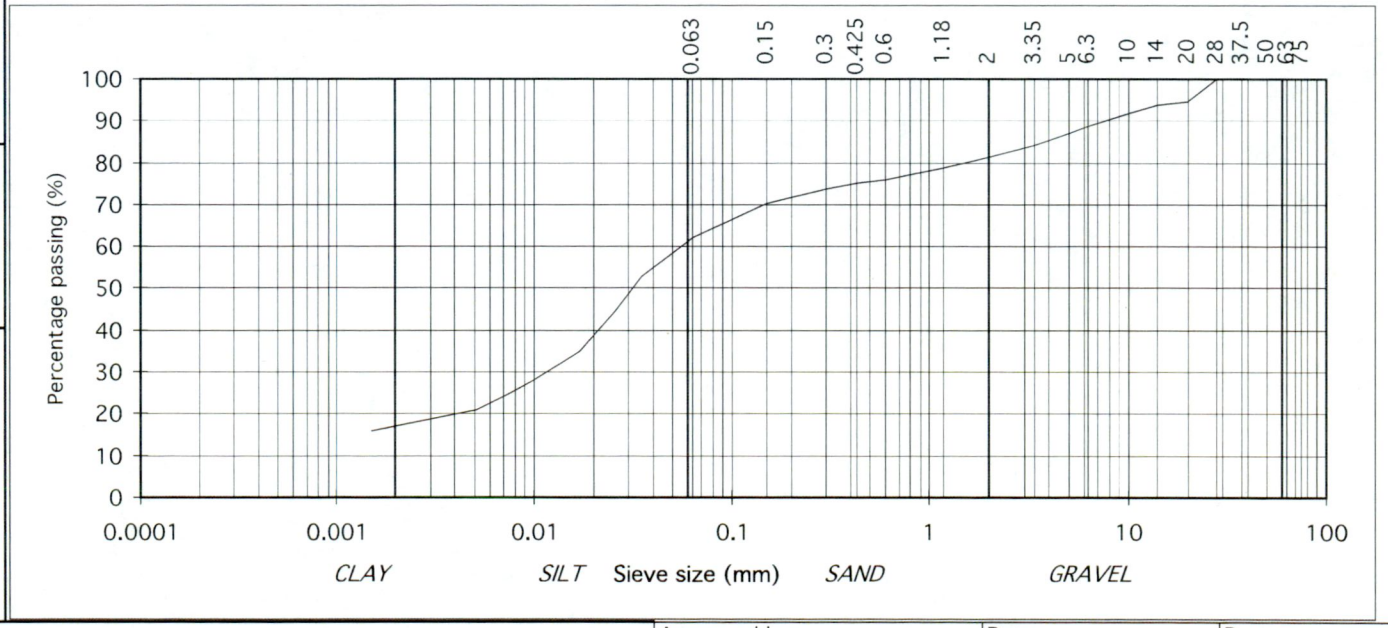
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	95	
14	94	
10	92	
6.3	89	
5	87	
3.35	84	
2	81	
1.18	79	SAND
0.6	76	
0.425	75	
0.3	74	
0.15	70	
0.063	62	SILT/CLAY
0.035	53	
0.026	44	
0.017	35	
0.010	28	
0.007	24	
0.005	21	
0.002	16	

Contract No:	21322	Report No.	R95612
Contract:	Nangor Road , Clondalkin,Dublin 22		
BH/TP :	BH04		
Sample No.	AA91696	Lab. Sample No.	A18/9053
Sample Type:	B		
Depth (m)	1.40	Customer:	2HP
Date Received	29/10/2018	Date Testing started	07/11/2018
Description:	Brown slightly sandy, slightly gravelly, CLAY		

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO 17892-4:2016



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

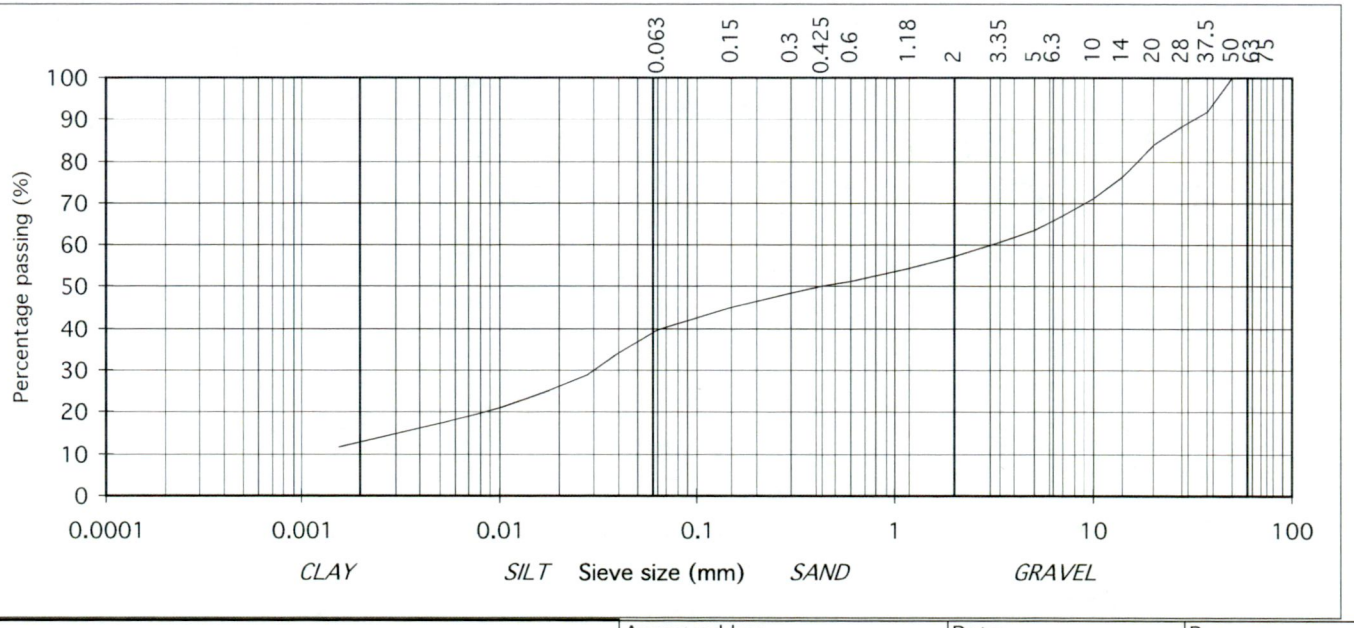
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	92	
28	88	
20	84	
14	76	
10	71	
6.3	66	
5	63	
3.35	61	
2	57	
1.18	54	SAND
0.6	51	
0.425	50	
0.3	48	
0.15	45	
0.063	40	SILT/CLAY
0.039	34	
0.028	29	
0.018	25	
0.010	21	
0.007	19	
0.005	17	
0.002	12	

Contract No:	21322	Report No.	R95613
Contract:	Nangor Road , Clondalkin,Dublin 22		
BH/TP :	BH05		
Sample No.	AA91689	Lab. Sample No.	A18/9054
Sample Type:	B		
Depth (m)	3.00	Customer:	2HP
Date Received	29/10/2018	Date Testing started	07/11/2018
Description:	Brown/Grey slightly sandy, gravelly, CLAY		

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO 17892-4:2016



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
	13/11/18	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	**R95614**
Contract No.	21322
Contract Name:	Nangor Road , Clondalkin,Dublin 22
Customer:	2HP
BH/TP	BH02
Sample No.	AA91692
Depth (m)	2.00
Sample Type:	B
Lab Sample No.	A18/9051
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	29/10/18
Date Tested:	07/11/18
Sample Cert:	N/A
Moisture Content (%):	9.0
% Particles > 20mm (By dry mass):	80
MCV:	2.1
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown/grey clayey, sandy, GRAVEL with many cobbles

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	HA Byrne	13/11/18	1 of 1

IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	**R95764**
Contract No.	21322
Contract Name:	Nangor Road , Clondalkin,Dublin 22
Customer:	2HP
BH/TP	BH03
Sample No.	AA91685
Depth (m)	2.00
Sample Type:	B
Lab Sample No.	A18/9052
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	29/10/18
Date Tested:	07/11/18
Sample Cert:	N/A
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	12
MCV:	8.3
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Grey/black slightly sandy, gravelly, CLAY

The result relates to the specimen tested.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	13/11/18	1 of 1

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	18-33375-1
Initial Date of Issue:	02-Nov-2018
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	Clondalkin

Quotation No.:		**Date Received:**	29-Oct-2018
Order No.:		**Date Instructed:**	29-Oct-2018
No. of Samples:	5		
Turnaround (Wkdays):	5	**Results Due:**	02-Nov-2018
Date Approved:	02-Nov-2018		

Approved By:

Details: Martin Dyer, Laboratory Manager

Chemtest
The right chemistry to deliver results

Results - Leachate

Project: Clondalkin

Client: IGSL		**Chemtest Job No.:**			18-33375	18-33375	18-33375	18-33375	18-33375
Quotation No.:		**Chemtest Sample ID.:**			714244	714245	714246	714247	714248
		Client Sample ID.:			BH1	BH2	BH3	BH4	BH5
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			1.00	1.00	1.00	1.00	1.00
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Ammonium	U	1220	mg/l	0.050	0.16	0.20	0.13	0.21	0.28
Ammonium	N	1220	mg/kg	0.10	1.6	2.0	1.3	2.1	2.8
Boron (Dissolved)	U	1450	µg/l	20	< 20	< 20	< 20	< 20	< 20
Boron (Dissolved)	U	1450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20

Chemtest
The right chemistry to deliver results

Results - Soil

Project: Clondalkin

Client: IGSL					Chemtest Job No.:	18-33375	18-33375	18-33375	18-33375	18-33375
Quotation No.:					Chemtest Sample ID.:	714244	714245	714246	714247	714248
					Client Sample ID.:	BH1	BH2	BH3	BH4	BH5
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.00	1.00	1.00	1.00	1.00
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
ACM Type	U	2192		N/A	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	20	18	18	18
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.53	0.51	0.59	< 0.40	1.1
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] 2.4	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] 17
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 7.0	[A] 13	[A] 9.1	[A] 13	[A] 10
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.085	[A] < 0.010	[A] 0.053	[A] < 0.010	[A] 0.081
Arsenic	U	2450	mg/kg	1.0	27	30	26	23	35
Barium	U	2450	mg/kg	10	80	52	60	38	130
Cadmium	U	2450	mg/kg	0.10	2.8	2.7	3.0	2.0	2.4
Chromium	U	2450	mg/kg	1.0	13	13	13	11	16
Molybdenum	U	2450	mg/kg	2.0	5.9	8.8	5.8	9.2	7.1
Antimony	N	2450	mg/kg	2.0	3.1	4.6	3.5	3.4	2.8
Copper	U	2450	mg/kg	0.50	38	38	40	28	54
Mercury	U	2450	mg/kg	0.10	0.20	0.17	0.27	< 0.10	0.16
Nickel	U	2450	mg/kg	0.50	48	73	51	66	61
Lead	U	2450	mg/kg	0.50	55	47	51	24	410
Selenium	U	2450	mg/kg	0.20	0.50	0.83	1.4	1.8	0.86
Zinc	U	2450	mg/kg	0.50	110	120	100	62	86
Chromium (Trivalent)	N	2490	mg/kg	1.0	13	13	13	11	16
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	U	2625	%	0.20	[A] 0.98	[A] 0.98	[A] 1.4	[A] 0.69	[A] 1.4
Mineral Oil	N	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: Clondalkin

Client: IGSL					Chemtest Job No.:	18-33375	18-33375	18-33375	18-33375	18-33375
Quotation No.:					Chemtest Sample ID.:	714244	714245	714246	714247	714248
					Client Sample ID.:	BH1	BH2	BH3	BH4	BH5
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.00	1.00	1.00	1.00	1.00
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		[A] < 10	[A] < 10	[A] < 10	[A] < 10	[A] < 10
Benzene	U	2760	µg/kg	1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Toluene	U	2760	µg/kg	1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
o-Xylene	U	2760	µg/kg	1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Naphthalene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 52	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 90+101	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 118	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 153	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 138	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 180	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10		[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10
Total Phenols	U	2920	mg/kg	0.30		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Chemtest
The right chemistry to deliver results

Results - Single Stage WAC

Project: Clondalkin

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-33375						
Chemtest Sample ID:	714244						
Sample Ref:							
Sample ID:	BH1						
Sample Location:							
Top Depth(m):	1.00						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.98	3	5	6
Loss On Ignition	2610	U	%	3.6	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.14	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0034	< 0.050	0.5	2	25
Barium	1450	U	0.0026	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0017	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0031	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	1.4	14	800	15000	25000
Fluoride	1220	U	0.17	1.7	10	150	500
Sulphate	1220	U	9.1	91	1000	20000	50000
Total Dissolved Solids	1020	N	65	650	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	5.9	59	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	20

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Chemtest
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Results - Single Stage WAC

Project: Clondalkin

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-33375						
Chemtest Sample ID:	714245						
Sample Ref:							
Sample ID:	BH2						
Sample Location:							
Top Depth(m):	1.00						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.98	3	5	6
Loss On Ignition	2610	U	%	3.9	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.10	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0056	0.056	0.5	2	25
Barium	1450	U	0.0020	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0018	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.010	0.10	0.5	10	30
Nickel	1450	U	0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	0.0010	0.010	0.06	0.7	5
Selenium	1450	U	0.0013	0.013	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	2.4	24	800	15000	25000
Fluoride	1220	U	0.16	1.6	10	150	500
Sulphate	1220	U	4.7	47	1000	20000	50000
Total Dissolved Solids	1020	N	78	780	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	4.6	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	20

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Chemtest
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Results - Single Stage WAC

Project: Clondalkin

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-33375						
Chemtest Sample ID:	714246						
Sample Ref:							
Sample ID:	BH3						
Sample Location:							
Top Depth(m):	1.00						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 1.4	3	5	6
Loss On Ignition	2610	U	%	3.6	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		8.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.082	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0030	< 0.050	0.5	2	25
Barium	1450	U	0.0024	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0012	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0031	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	2.3	23	800	15000	25000
Fluoride	1220	U	0.15	1.5	10	150	500
Sulphate	1220	U	4.4	44	1000	20000	50000
Total Dissolved Solids	1020	N	72	710	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	4.9	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	18

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Chemtest
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Results - Single Stage WAC

Project: Clondalkin

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-33375						
Chemtest Sample ID:	714247						
Sample Ref:							
Sample ID:	BH4						
Sample Location:							
Top Depth(m):	1.00						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.69	3	5	6
Loss On Ignition	2610	U	%	3.3	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		8.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.054	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0033	< 0.050	0.5	2	25
Barium	1450	U	0.0031	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0015	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0082	0.082	0.5	10	30
Nickel	1450	U	0.0011	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	0.0015	0.015	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	2.2	22	800	15000	25000
Fluoride	1220	U	0.27	2.7	10	150	500
Sulphate	1220	U	3.6	36	1000	20000	50000
Total Dissolved Solids	1020	N	78	780	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	6.5	65	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	18

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Results - Single Stage WAC

Project: Clondalkin

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-33375						
Chemtest Sample ID:	714248						
Sample Ref:							
Sample ID:	BH5				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample Location:							
Top Depth(m):	1.00						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	U	%	[A] 1.4	3	5	6
Loss On Ignition	2610	U	%	2.6	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		8.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.11	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0028	< 0.050	0.5	2	25
Barium	1450	U	0.0024	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0017	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0049	< 0.050	0.5	10	30
Nickel	1450	U	0.0018	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0019	< 0.50	4	50	200
Chloride	1220	U	3.1	31	800	15000	25000
Fluoride	1220	U	0.18	1.8	10	150	500
Sulphate	1220	U	20	200	1000	20000	50000
Total Dissolved Solids	1020	N	98	970	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	4.3	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	18

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
714244		BH1			A	Amber Glass 250ml
714244		BH1			A	Amber Glass 60ml
714245		BH2			A	Amber Glass 250ml
714245		BH2			A	Amber Glass 60ml
714246		BH3			A	Amber Glass 250ml
714246		BH3			A	Amber Glass 60ml
714247		BH4			A	Amber Glass 250ml
714247		BH4			A	Amber Glass 60ml
714248		BH5			A	Amber Glass 250ml
714248		BH5			A	Amber Glass 60ml

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Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection

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Test Methods

SOP	Title	Parameters included	Method summary
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix 6

Site Plan

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Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
714244		BH1			A	Amber Glass 250ml
714244		BH1			A	Amber Glass 60ml
714245		BH2			A	Amber Glass 250ml
714245		BH2			A	Amber Glass 60ml
714246		BH3			A	Amber Glass 250ml
714246		BH3			A	Amber Glass 60ml
714247		BH4			A	Amber Glass 250ml
714247		BH4			A	Amber Glass 60ml
714248		BH5			A	Amber Glass 250ml
714248		BH5			A	Amber Glass 60ml

Chemtest
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Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection

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Test Methods

SOP	Title	Parameters included	Method summary
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

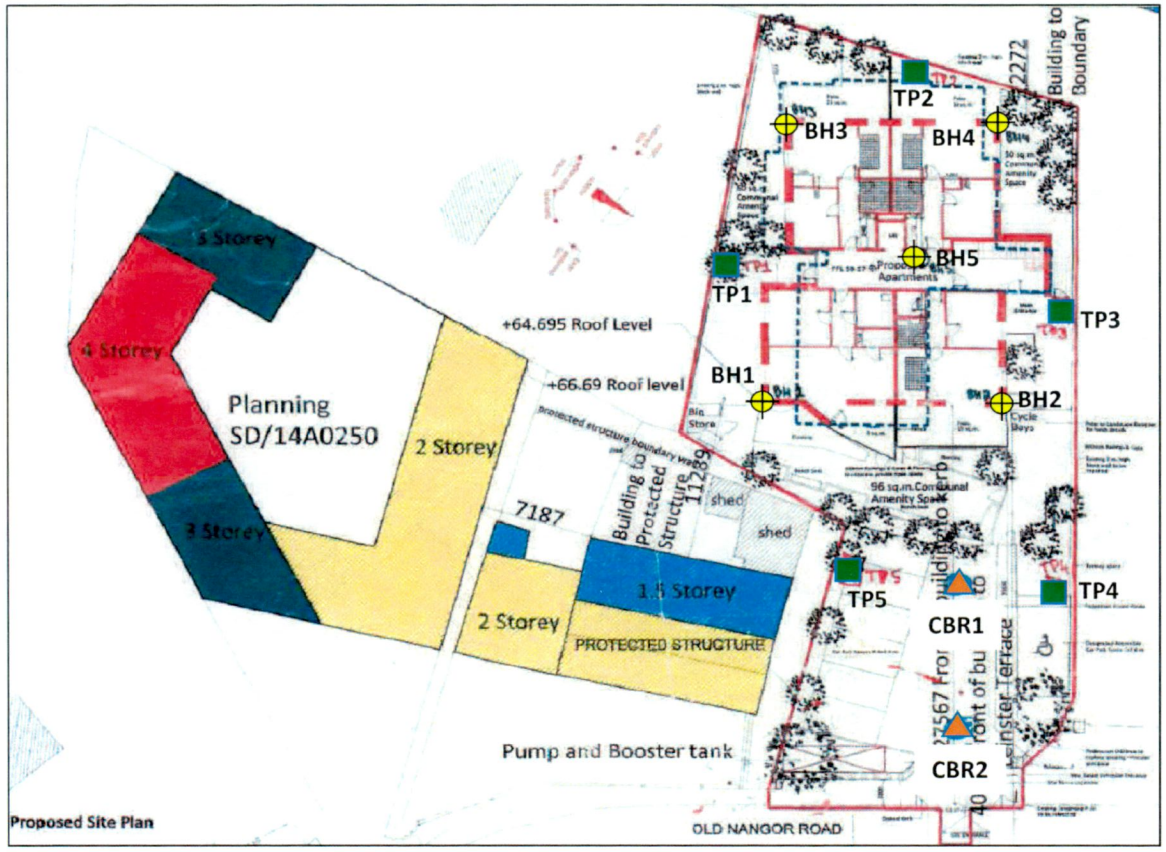
Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix 6

Site Plan



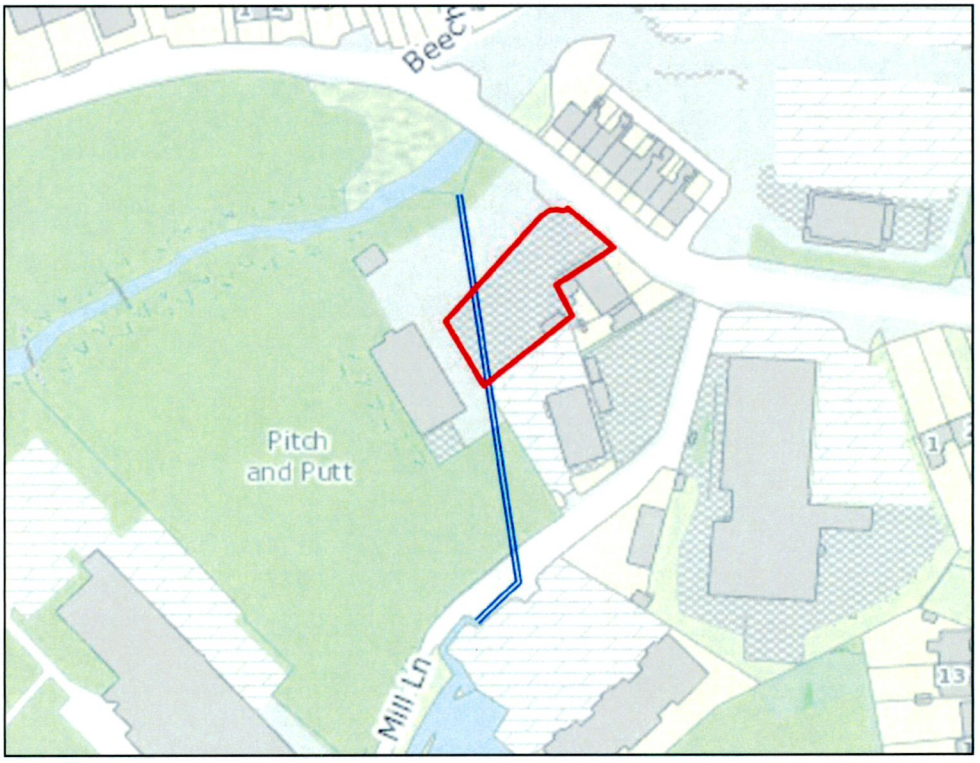
Project No:	21332	**Drawing No.**	Plan 01
Project Title:	Old Nangor Road, Clondalkin	**Drawn By:**	DEG
Client:	Hayes Higgins	**Date:**	16/11/2018
		Scale:	NTS

Appendix G – Culvert Hydraulic Assessment Report

DUBLIN SIMON COMMUNITY

PROPOSED DEVELOPMENT SITE, OLD NANGOR ROAD, DUBLIN 22

EXISTING CULVERT HYDRAULIC ASSESSMENT REPORT



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DUBLIN SIMON COMMUNITY

PROPOSED DEVELOPMENT SITE, OLD NANGOR ROAD, DUBLIN 22

EXISTING CULVERT HYDRAULIC ASSESSMENT REPORT

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Client :-
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Document No:	IE1978-4525
Issue No:	01-ISSUE
Project No:	IE1978
Date:	27th March 2020
Revision:	2.0
Prepared By:	N O'Malley BE CEng MIEI
Checked By:	P McShane BEng(Hons) MIEI

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Table of Contents

1 Introduction

IE Consulting was requested by Hayes Higgins Partnership, on behalf of the Dublin Simon Community, to assess the hydraulic capacity of an existing culvert located beneath a site to be developed for social housing at Old Nangor Road, Dublin 22. The proposed development was granted planning permission by South Dublin County Council on the 17th of May 2017 for a three-storey apartment building and all associated works. It is proposed to divert the existing culvert within the boundary of the site to enable to development to proceed in accordance with the planning permission granted.

The culvert is a stone arch culvert, which was constructed as part of a paper mill that is no longer in operation. It is approximately 2.47m wide and 1.56m high. Waters spill from the Camac River into the Mill Pond located upstream of the culvert. These waters discharge to a concrete tank, which in turn discharges to a stone channel located on Mill Lane and into the culvert inlet via a large sump. The location of the culvert is shown on *Figure 1* below.

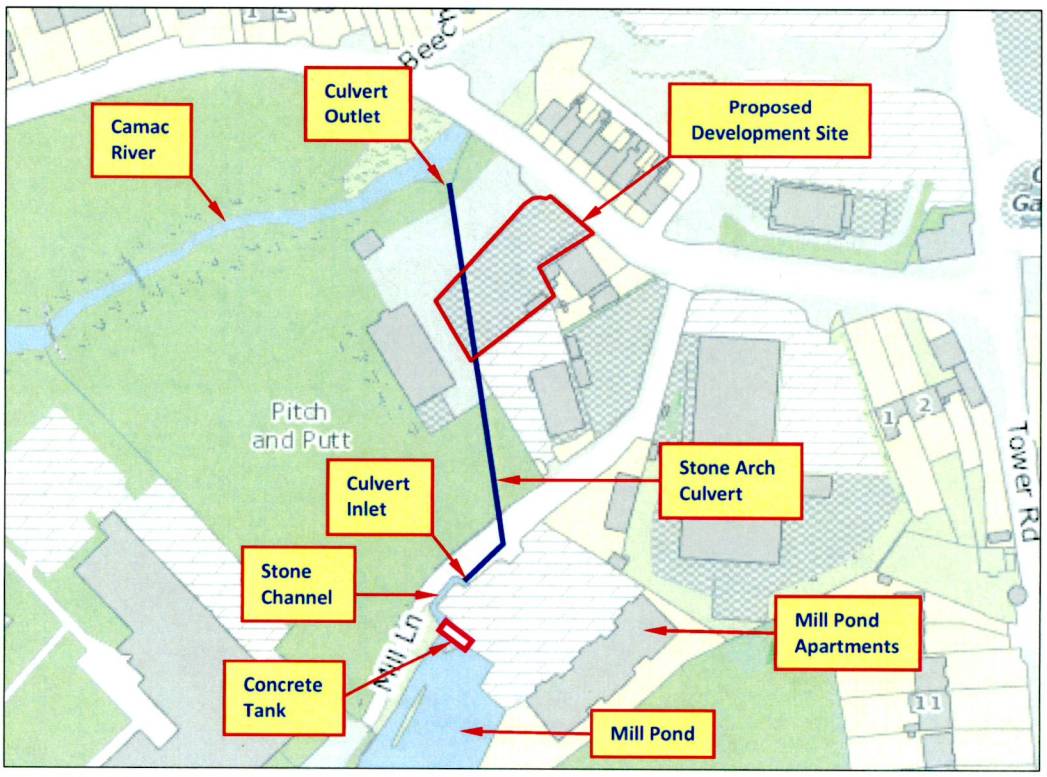

Figure 1 - Culvert Layout Plan

2 Site Investigation Works

A site walkover survey was carried out by an Engineer from IE Consulting on the 31st of January 2020. This included meeting with the Area Engineer Graham Murphy from South Dublin County Council (SDCC). A visual inspection was carried out of the culvert inlet and culvert outlet as well as the lake feeding the culvert, upstream concrete tank and stone channel. Refer to *Appendix A* for photographs of the visual inspection carried out.

A topographical survey and culvert inspection survey were procured by IE Consulting and the works were awarded to Murphy Surveys. The purpose of these surveys was to determine the culvert structural condition, any surface water connections from adjacent developments and to determine the flows catered for by the culvert.

The surveys were carried out by Murphy Surveys on the 6th of March 2020, an Engineer from IE Consulting and Graham Murphy from SDCC were also present on site. The culvert inspection was carried out at the culvert inlet which included man-entry. Access into the culvert was however not possible as the culvert was almost completely full of stone. It was noted by the surveyor that a manhole chamber was constructed with the culvert aperture a short distance (estimated by the surveyor to be approximately 8m) downstream of the culvert inlet.

There was no evidence of a manhole from the road surface in this location and therefore the manhole was likely to have been paved over. The SDCC Area Engineer subsequently located the manhole from the surface with a metal detector and plans to have the cover level raised. Refer to *Appendix A* for the location of the manhole identified.

No further access to the culvert was possible and no attempt to access the culvert from the outlet was carried out due to the risk of collapse identified during a previous inspection survey carried out in 2019. The topographical survey of the culvert inlet and outlet was completed with no issue. Refer to *Appendix B* for the culvert inspection report and topographical survey prepared by Murphy Surveys.

3 Existing Culvert Flow Estimation

3.1 *Contributing Flow from Mill Pond*

The culvert was originally constructed as part of a paper mill, which is no longer in existence. It does however provide a hydraulic conveyance function to allow waters that spill into the Mill Pond from the Camac River to flow back into the river downstream. The rate of discharge from the pond is limited by an opening in the side of the concrete tank located upstream of the culvert inlet as shown in *Figure 2* below.

Figure 2 – Concrete Tank Outlet

In order to determine the peak flow discharging from the Mill Pond a hydraulic model was developed using HEC RAS software of the outlet from the concrete tank, the stone channel and the inlet into the sump at the culvert inlet. The existing stone arch culvert has not been included in the hydraulic assessment. It is currently significantly blocked with stone, however if it was free from blockage the capacity of the culvert would be significantly greater than the rate of discharge from the Mill Pond. The extent of the model is shown in *Figure 3* below:

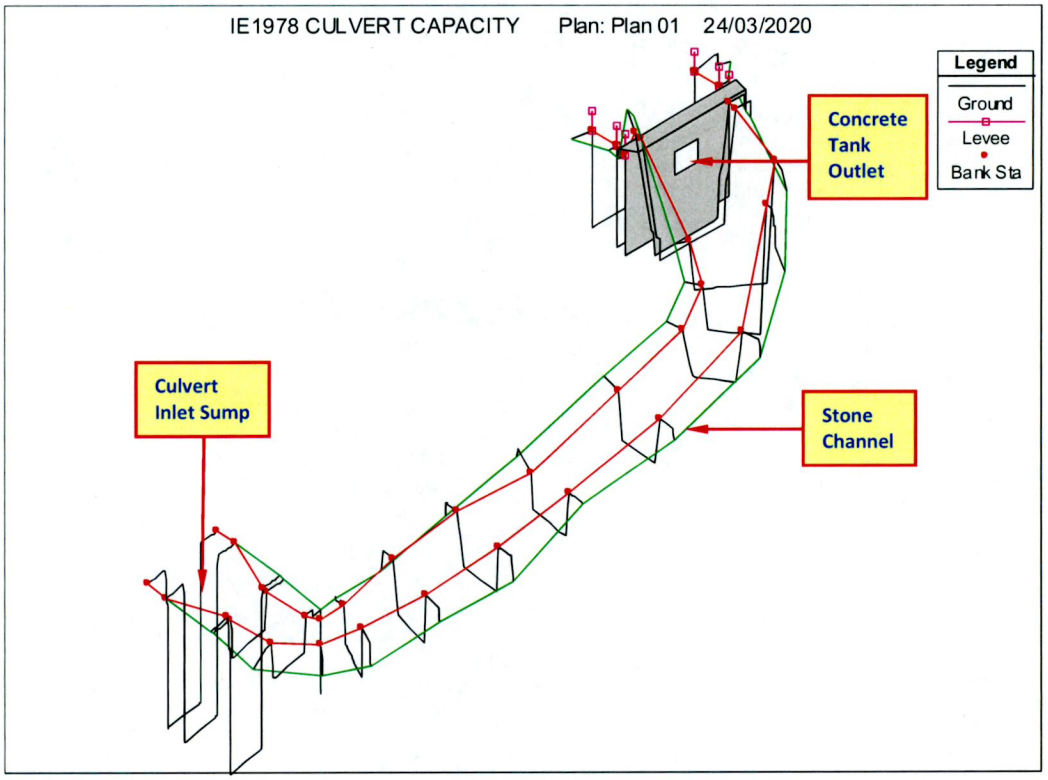

Figure 3 – Hydraulic Model

The flow limiting factor into the culvert is likely to be the Concrete tank outlet, which was assessed by increasing the flow into the hydraulic model until such time that the water levels surcharge above the top of the concrete tank roof level.

A peak flow of 0.695m^3/s was determined to be the peak flow that may discharge from the outlet of the concrete tank.

The model simulation is represented by a longitudinal profile through the modelled reach as shown in *Figure 4* below.

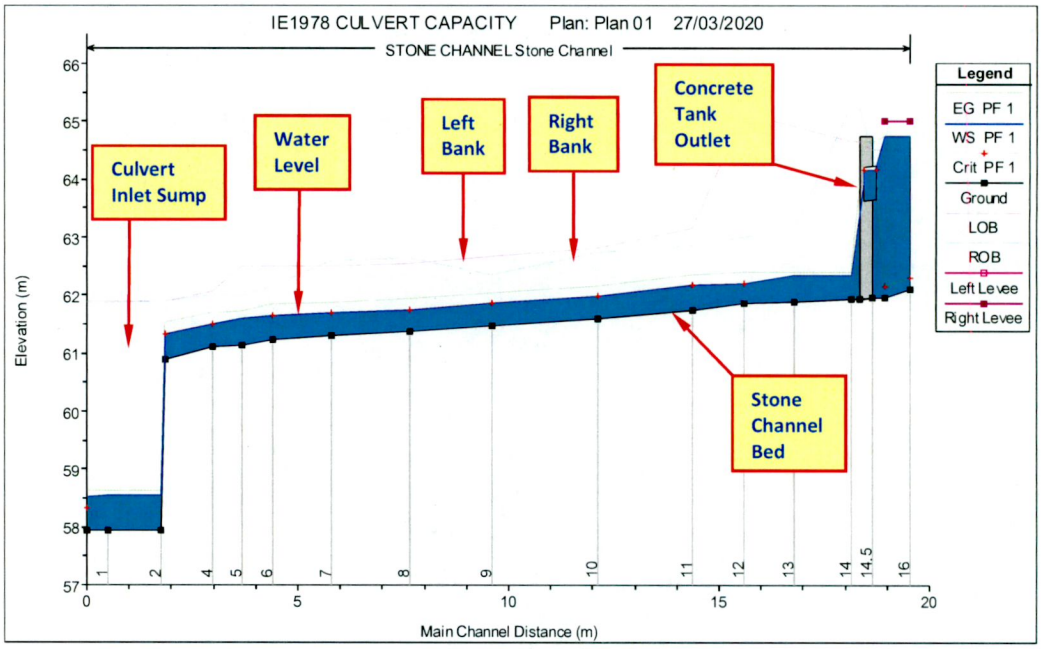

Figure 4 – Model Longitudinal Profile

3.2 Contributing Flow from Stormwater Connections

Drainage records were obtained from SDCC and Irish Water to determine the location of any stormwater connections to the culvert. These records do not show the presence of any connections to the culvert. The SDCC online planning system was utilised to review planning applications in the vicinity of the culvert. There was no information available that showed any stormwater connections to the culvert. Refer to *Appendix C* for details of the drainage records obtained.

The culvert inspection survey was not able to determine the location of any stormwater connections discharging to the culvert from adjacent properties due to significant blockage at the culvert inlet. It is likely however that the Mill Pond Apartments and the Pitch and Putt facility may have a stormwater connection to the culvert. The manhole identified within the culvert is likely to be the connection point from the Mill Pond apartments. There are also two stormwater gullies located within the car park of the Pitch and Putt. It is possible given their location that these are connected to the stone arch culvert. The anticipated location of these connections is shown in *Figure 5* below. Although the stormwater connection from the Pitch and Putt is likely to be located downstream of the proposed development site for the purposes of this assessment it is assumed to be located upstream of the site as a possible manhole was identified upstream of the site as shown in *Figure 5* below.

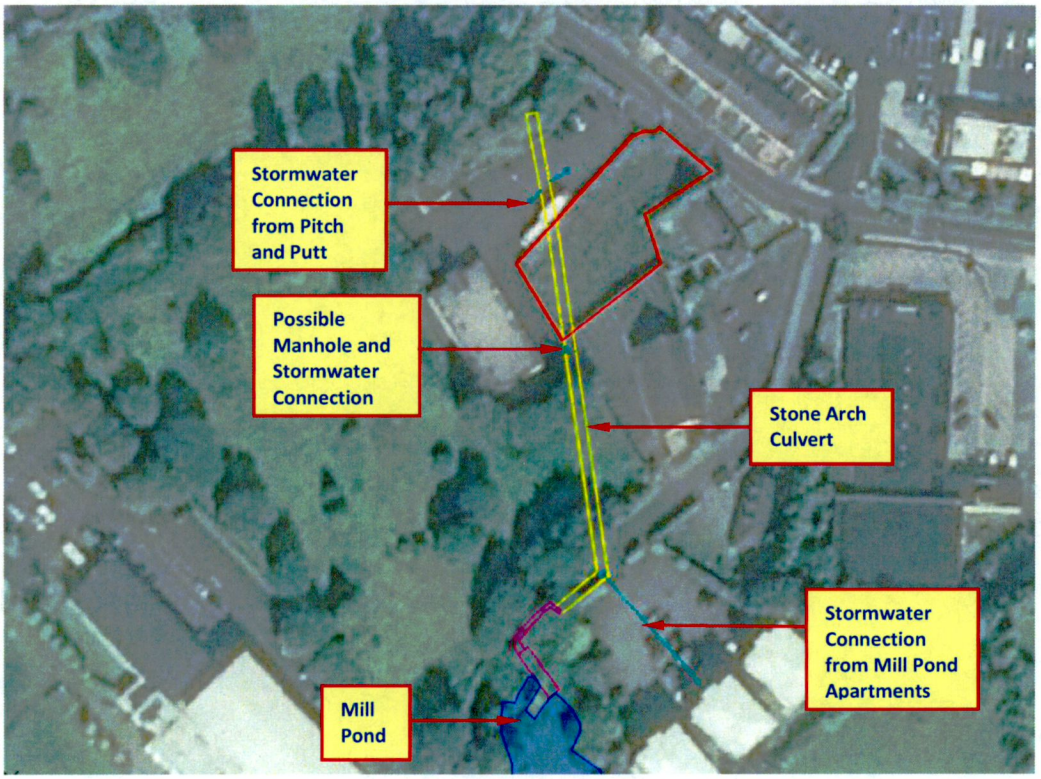

Figure 5 – Potential Stormwater Connections

Hard standing and paved areas have been divided into two categories of surface areas which can drain into the existing stormwater drainage system from the Mill Pond apartments and the Pitch and Putt. The contributing catchment areas from each area are as follows:

Mill Pond Apartments

Roof Area = 801m^2

Paved Area = 1180m^2

Total Area = 1981m^2

Pitch and Putt

Roof Area = 423m^2

Paved Area = 1455m^2

Total Area = 1878m^2

Typical rainfall runoff co-efficents are applied to hard standing areas of 90% for roofs and 85% for roads and paved areas. However, for the purposes of this assessment it is assumed that 100% rainfall runoff drains from these surfaces to the existing stormwater drainage system.

3.3 *Peak Flow Discharging into Existing Culvert*

In order to determine the combined peak flow discharging into the existing stone arch culvert from the Mill Pond and the existing developments of the Mill Pond apartments and the Pitch and Putt, a stormwater drainage model was developed using Micro Drainage software.

The following assumptions have been made in the drainage model assessment:

- 100% rainfall runoff from paved and roof areas;
- Rainfall return period simulations included 5, 30, and 100 year event for durations ranging from 15 minutes to 6 hours;
- 20% increase in rainfall depths to allow for future climate change;
- 20% factor of safety applied to flow discharging from Mill Pond;
- Existing culvert dimensions are 2.5m wide and 1.5m high arch culvert;
- The culvert is free from obstructions, blockages or collapse;
- The outfall to the Camac River is not restricted or impeded by high river levels.

The peak flow in the stone arch culvert is estimated to be 1.02m^3/s.

Refer to the Micro Drainage output sheets enclosed in *Appendix D* for further details.

4 Conclusions and Recommendations

The above hydraulic assessment shows the estimated peak flow in the existing stone arch culvert is significantly greater than what may currently flow through this culvert. There are a number of obstructions within the culvert at present that would likely impede a flow rate of 1.02m^3/s from discharging to the Camac River, therefore this flow rate is considered to be conservative. It is recommended that the proposed culvert should be designed in consideration of this flow rate rather than the existing full bore capacity of the stone arch culvert. The existing full bore capacity is no longer required or appropriate as the paper mill is no longer in existence.

APPENDIX A

Visual Inspection Photographs

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Photo 1: Mill Pond

Photo 2: Pond Outlet into Concrete Tank

Photo 3: Concrete Tank Outlet

Photo 4: Stone Channel Upstream End

Photo 5: Stone Channel Downstream End

Photo 6: Sump Inlet & Grill

Photo 7: Culvert Outlet to Camac River

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APPENDIX B

Culvert Condition Inspection Report & Topographical Survey

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Confined Space Inspection Survey Report

Old Nangor Road, Clondalkin, Dublin 22

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GLOBAL CONSULTING SURVEYORS

Submitted: March 2020

TABLE OF CONTENTS

	Name	Date
Inspection Team:	Brian Keegan Conor Lee	06/03/2020
Prepared by:	Brian Keegan	10/03/2020
Reviewed by:	Paraic Quirke	12/03/2020

CLIENT:
IE CONSULTING
INNOVATION CENTRE
GREEN ROAD
CARLOW

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

CONSULTANTS:
MURPHY SURVEYS
KILCULLEN BUSINESS CAMPUS
KILCULLEN
CO. KILDARE

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1.0 PROJECT DETAILS

Project Name: 35588 Old Nangor Road, Clondalkin

Project Description: Confined Space Survey of Culvert

Project Number: 35588

Project Date: 6/03/2020

Standard: Sewer Rehabilitation Manual, 5th Edition

2.0 PROJECT DESCRIPTION

A confined space inspection was carried out on a surface water culvert connecting a landscaped lake with the River Camac in Clondalkin. The culvert is approximately 110 m in length. The upstream end is accessed via a steel grate while the downstream end is an open-ended culvert discharging into the River Camac. A previous sewer survey carried out by McBreen Environmental in February 2019 commenced at the downstream end and detected a blockage approximately 8 m from the downstream end that could not be passed.

Murphy Surveys accessed the culvert from the upstream end via the steel grate that was opened by representatives from South Dublin County Council.

3.0 CULVERT LOCATION MAP

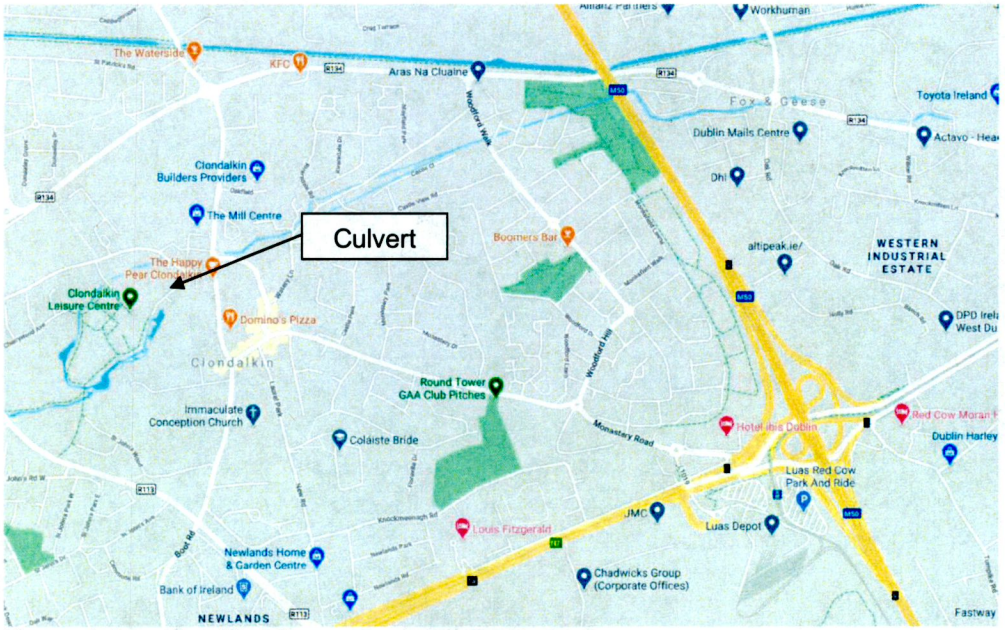

Figure 1: Location Map (Map courtesy of Google Maps)

The culvert is located between a storm attenuation tank and the river Camac. It crosses under the The Mill Pond Road, off the Old Nangor Road in Clondakin, Dublin 22.

4.0 INSPECTION FINDINGS

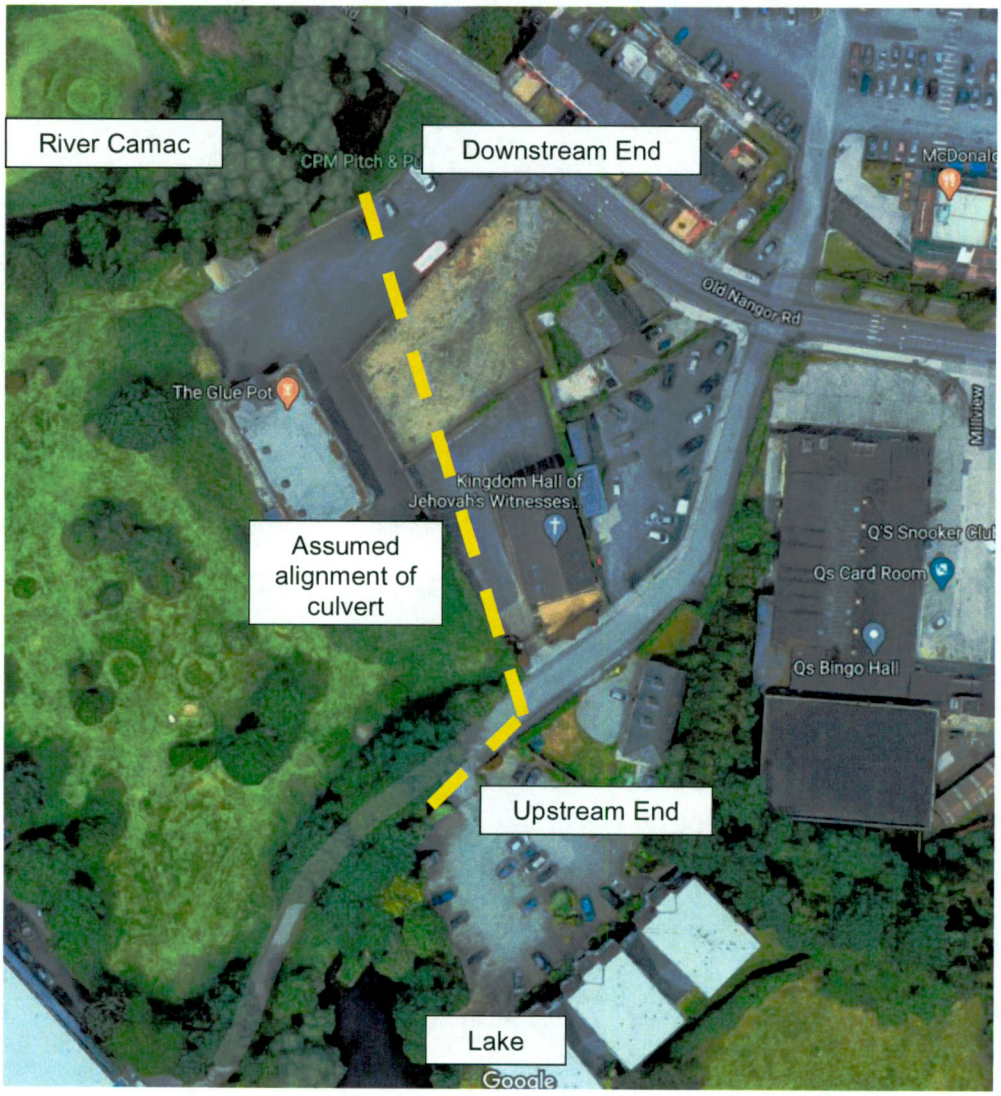

Figure 2: Location Plan

The inspection commenced at the upstream end via a steel grate. Confined space operatives attempted to walk down the culvert but were unable to proceed beyond a blockage in the culvert at the upstream end.

There is a small sized chamber between the steel grate and what appears to be the fascia of an old masonry arch bridge. The water level is up to approximately 300 mm of the arch barrel soffit. A build up of coarse gravel material and debris is present at the old bridge fascia. This blockage, and high-water level prevented progress further downstream. There is a block chamber approximately 8m downstream from the

upstream fascia of the culvert. The chamber can been seen in photograph number three below. South Dublin County Council stated they were going to go back and scan the road, to see if they can find a manhole lid under the road carriageway.

Appendix A: Photographs

Photograph No. 1 Upstream end. Old bridge fascia.

Photograph No. 2 Upstream End @ 2 m. Blockage in Arch Barrel

Photograph No. 3 Upstream End @ 2 m. Arch Barrel

Photograph No. 4 Upstream End @ 2 m. Arch Barrel

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The user or recipient of this survey data understands and acknowledges this data may be inaccurate or contain errors or omissions and the user or recipient assumes full responsibility for any risks or damages resulting from, arising from, or in connection with any use of or reliance upon data displayed herein. Although significant care has been exercised to produce surveys that satisfy survey accuracy standards, these surveys are only as accurate as the source data from which they were compiled. Although all reasonable steps have been taken to locate all features visible at the time of the survey, there is no guarantee that all will be shown on the drawing, as some above ground features may have obstructed the survey. Wherever possible, areas unable to be surveyed will be labelled as "UTS".

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North

Site Location

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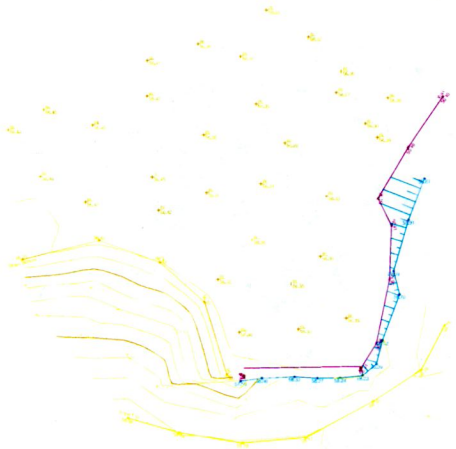
Email: info@murphysurveys.ie

Client :	IE Consulting Engineers
Project :	35588 Old Nangor Road, Clondalkin, Dublin 22
Date : 09.03.2020	**Scale :** 1:50@A1
Description :	Topographical Survey
Drawing Number :	MSL35588_clondalkin_PLAN_01



LEGEND

Street furniture & Services

Natural Features

Built Features

Roads & Road Markings

Other

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North

Site Location

Map Street Layout

Surveyed by	MS	Date	MARCH 2020	Datum	Main Area
Drawn by	CB	Date	MARCH 2020	Grid System	
Checked by	JB	Date	09/03/2020	Sub Feature Grid	ITM

Revisions

No	Date	Description
1	30.03.2020	First Drawing
2	31.03.2020	Added in Chainlink

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Client : IE Consulting Engineers

Project : 35588 Old Nangor Road, Clondalkin, Dublin 22

Date : 09.03.2020 **Scale :** 1:50@A1

Description : Topographical Survey

Drawing Number : MSL35588_clondalkin_PLAN_02

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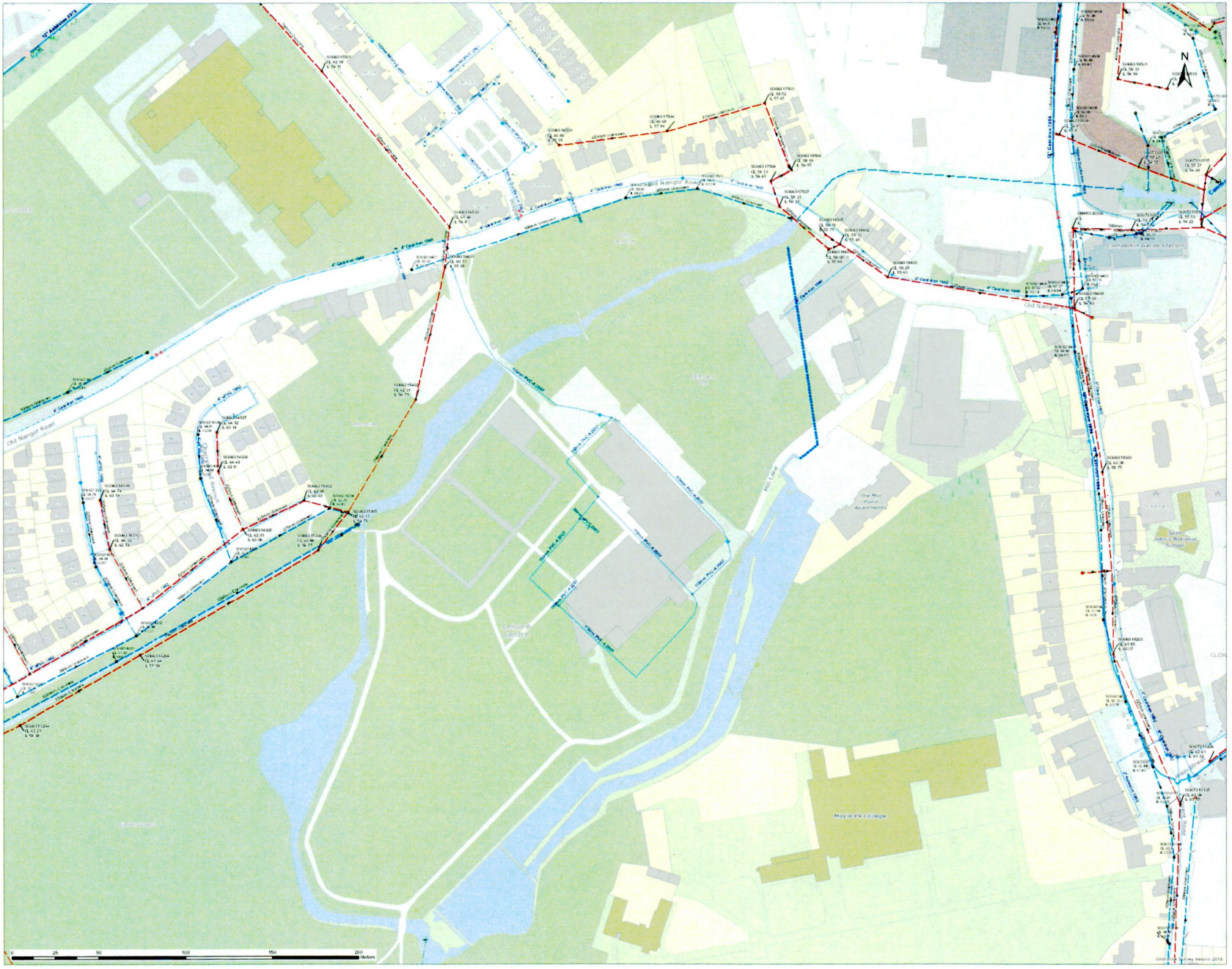
APPENDIX C

Drainage Records



UISCE ÉIREANN : IRISH WATER

Legend

- Pump Stations
- Irish Water
- Private
- Irish Water
- Non IW
- Gravity - Combined
- Gravity - Foul
- Gravity - Overflow
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Overflow
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Syphon - Overflow
- Overflow
- Gravity - Combined
- Gravity - Foul
- Gravity - Overflow
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Overflow
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Syphon - Overflow
- Overflow
- Surface Gravity Mains
- Surface Gravity Mains Private
- Surface Water Pressurised Mains
- Surface Water Pressurised Mains Private

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APPENDIX D

Micro Drainage Output

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S1.000	13.199	0.030	440.0	0.000	1.00	695.0	0.600	[]	-1	Pipe/Conduit
S1.001	54.036	0.122	442.9	0.198	3.00	0.0	0.600	[]	-1	Pipe/Conduit
S1.002	30.320	0.068	445.9	0.189	3.00	0.0	0.600	[]	-1	Pipe/Conduit
S1.003	27.047	0.063	429.3	0.000	0.00	0.0	0.600	[]	-1	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S1.000	56.699	0.000	695.0	2.31	7608.0
S1.001	56.669	0.198	695.0	2.30	7582.5
S1.002	56.547	0.387	695.0	2.29	7557.1
S1.003	56.479	0.387	695.0	2.34	7702.3

Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m^2)
-1	[]	2500	1500	90.0		1.839	3.295

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.198	0.198	0.198
1.002	-	-	100	0.189	0.189	0.189
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.387	0.387	0.387

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	20.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.400	Storm Duration (mins)	30
Ratio R	0.277		

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	20.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.277
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.400	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360
Return Period(s) (years)	5, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	100	+20%					57.128
S1.001	S2	15 Summer	100	+20%					57.090
S1.002	S3	15 Summer	100	+20%					56.976
S1.003	S4	15 Summer	100	+20%					56.888

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-1.071	0.000	0.31		834.9	OK	
S1.001	S2	-1.079	0.000	0.18		936.4	OK	
S1.002	S3	-1.071	0.000	0.23		1019.7	OK	
S1.003	S4	-1.091	0.000	0.24		1015.9	OK	