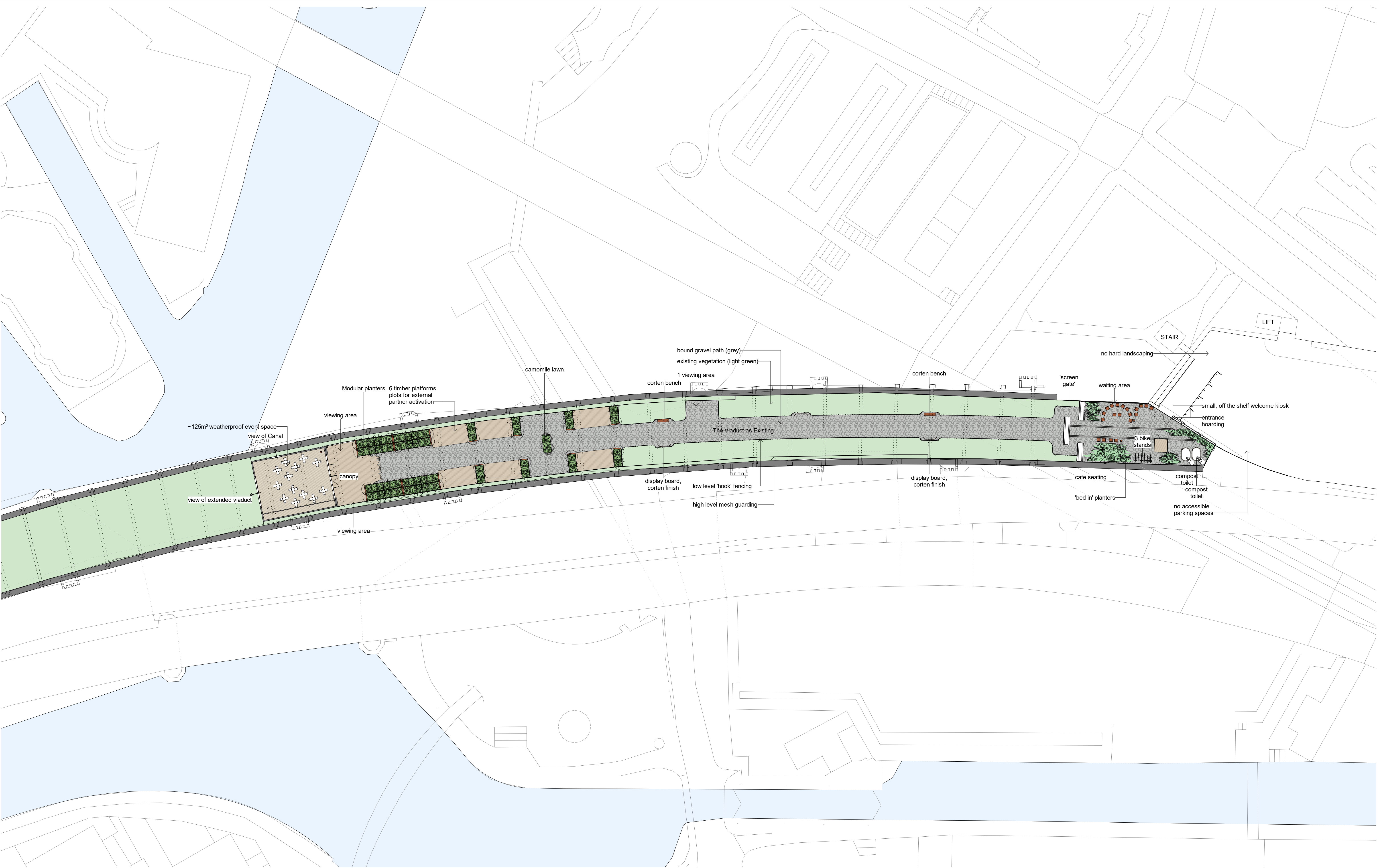




Appendix

Appendix A - Twelve Architects Masterplan



CDM Issues - Significant/Residual Hazards:

All designers involved in this drawing are to ensure that all foreseeable Significant Hazards relating to this drawing are indicated below.

Significant Hazards are not necessarily those that result in the greatest risks, but those that are:

- Unlikely to be obvious to a competent contractor or other designers;
- Unusual;
- Likely to be difficult to manage effectively.

As a design and building project, the Main Contractor is deemed to be a designer under the CDM Regulations as well as the Client, Architect, Engineer or subcontractors. This risk schedule is not a design risk assessment of a full and complete risk schedule and should not be deemed as such. Copies of the designers' risk assessment along with risk schedules are to be available from the Main Contractor's site office upon request.

Hazard	Description	Measure/Location/Reference
Fall from height	☐	
Falling objects	☐	
Hazardous materials	☐	
Uncontrolled substances	☐	
Site transport/pant	☐	
Crushing/entrapment	☐	
Hazardous operations	☐	
Confined spaces	☐	
Noise	☐	
Dust	☐	
Vibration (HAV)	☐	
Manual handling	☐	
Asbestos	☐	
Others	☐	

Notes:

1. Do not scale from this drawing.

2. Dimensions are in millimetres (mm) unless otherwise stated.

3. This drawing is to be read in conjunction with all relevant Architectural, Civil, Structural and Senior Engineer's drawings, schedules and specifications.

Key:

Rev.	Date	Description	Dm.	Chkd.	Appd.

Issue Status:

STAGE 4

Project Title:

The National Trust
Castlefield Viaduct

Drawing Title:

Stage 4 Masterplan

Scale @ A1:

1:300

Date:

22/09/21

Drawn:

IA

Checked:

MC

Approved:

MC

Job No.:

122019

Drawing No.:

(GA)001

Revision:

-

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Appendix

Appendix B - Quantitative Risk Assessment Methodology

Qualitative Methodology

The risk assessment considers the sources and potential receptors identified, together with linking pathways. These linkages are summarised in the Preliminary Conceptual Site Model and Qualitative Risk Assessment within the report, where the associated environmental risk is assessed for a given source and the end-use of the site. This assessment also takes account of specific chemicals of concern or groups of similar chemicals of concern. The column designated as 'Potential Consequence of Source- Pathway – Receptor-Linkage' in the Preliminary Conceptual Site Model and Qualitative Risk Assessment gives an indication of the sensitivity of a given receptor to a particular source/chemical of concern being considered. It is a worst case classification and is based on full exposure via the particular linkage being examined. The derivation of the classes used to rank this particular aspect is as follows based on CIRIA 552 'Contaminated Land Risk Assessment, A Guide to Good Practice' 2001:

Classification	Human Health	Controlled Water	Ecological	Built Environment	Amenity
Severe	Acute risk to human health likely to result in 'significant harm' as defined by the Environmental Protection Act 1990, Part 2A	Substantial pollution of sensitive water resources	Significant change to the number of one or more species or ecosystems	Catastrophic damage to buildings, structures or the environment	Irreversible damage to human health
Moderate	Chronic damage to human health ('significant harm').	Pollution of sensitive water resources	Change to population densities of non-sensitive species	Damage to sensitive buildings, structures or the environment	Non-permanent health effects to humans
Mild	Harm but not necessarily significant harm to humans	Pollution to non-sensitive water resources	Some change to population densities but with no negative effects on the function of the ecosystem	Easily repairable effects of damage to buildings or structures	Slight short term health effects to humans
Minor	Harm but not necessarily significant harm to humans which can easily be prevented with the use of PPE.	Slight pollution to non-sensitive water resources	No significant changes to population densities in the environment or in any ecosystem	Very slight non-structural damage or cosmetic harm to buildings or structures	No measurable effects on humans

Subsequently, in the column designated 'Likelihood of PCL, an assessment is made of the probability of the selected source and receptor being linked by the identified pathway. This assessment is ranked based on-site specific conditions as follows:

Classification of probability	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term
Low likelihood	There is a pollution linkage and circumstances are possible under which an even could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term
Unlikely	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur in the very long term

The 'Risk Classification' column is an overall assessment of the actual risk, which considers the likely consequence of a given risk being realised and the likelihood of that risk being realised. The risk classifications are assigned using the following consequence/likelihood matrix:

Matrix				
Severe	Moderate to low	Moderate	High	Very High
Medium	Low	Moderate to Low	Moderate	High
Mild	Very Low	Low	Moderate to Low	Moderate
Minor	Very Low	Very Low	Low	Moderate to Low
Likelihood	Unlikely	Low likelihood	Likely	High likelihood

Overall risks are described as follows:

Very Low	The presence of the identified source does not give rise to the potential to cause unacceptable harm.
Low	It is possible that harm could arise to a designated receptor from an identified source, however, this is unlikely to be unacceptable.
Moderate	It is possible that harm could arise to a designated receptor from an identified source, but it is likely that such harm would be relatively localised or non-permanent - remedial action may be necessary.
High	A designated receptor is likely to experience unacceptable harm from an identified source without remedial action.
Very High	There is a high probability that severe unacceptable harm could arise to a designated receptor from an identified source without appropriate remedial action.

In cases of physical features, such as foundations and underground services, harm is defined as impact which would result in non-serviceability of the identified receptor or extra over build costs associated with redevelopment.

Appendix

Appendix C - Photographic Plates of Downspout



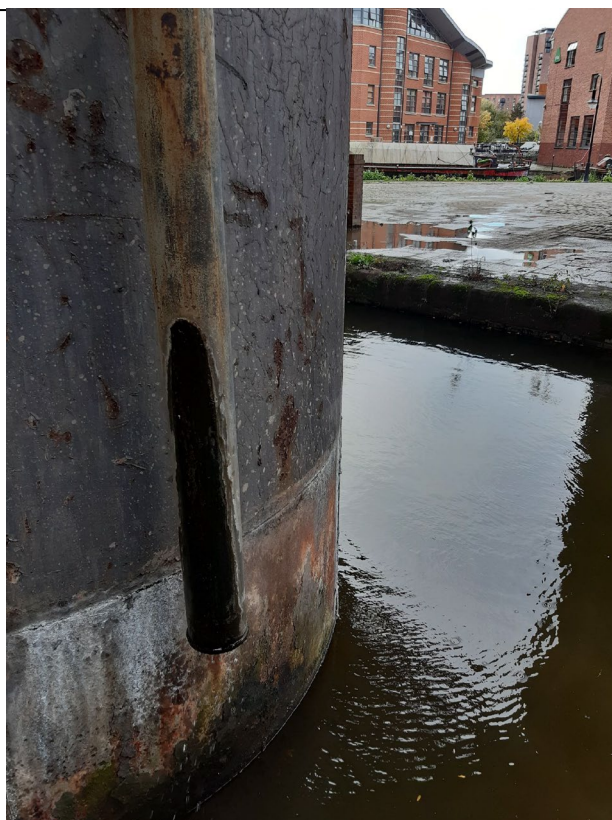
Photographic Plate No. 01: Bridgewater Canal Basin looking west toward the downspout on the columnar strut



Photographic Plate No. 02: Downspout with water flowing



Photographic Plate No. 03: Downspout sampled on right and downspout from tramline on left of photograph



Photographic Plate No. 04: Downspout with water flowing looking north



Photographic Plate No. 04: Post rainfall - noting water dropping from viaduct structure and at top of downspout



Photographic Plate No. 05: Stone quay within canal basin from downspout looking east

Appendix

Appendix D - Certificates of Chemical Analysis

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Analytical Report Number : 21-17722

Replaces Analytical Report Number: 21-17722, issue no. 1
Additional analysis undertaken.

Project / Site name:	Castlefield	Samples received on:	20/10/2021
Your job number:	PC2387	Samples instructed on/ Analysis started on:	20/10/2021
Your order number:	PC2387 107 100	Analysis completed by:	15/11/2021
Report Issue Number:	2	Report issued on:	15/11/2021
Samples Analysed:	3 water samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.



Analytical Report Number: 21-17722

Project / Site name: Castlefield

Your Order No: PC2387 107 100

Lab Sample Number				2054391	2054392	2054393
Sample Reference				DP1	DP2	TB
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				20/10/2021	20/10/2021	20/10/2021
Time Taken				1430	1430	1430
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status			

General Inorganics

pH	pH Units	N/A	ISO 17025	8.3	8.4	7.2
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16
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Heavy Metals / Metalloids

Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	1	NONE	2.0	1.5	< 1.0

Chromium (dissolved)	µg/l	0.2	ISO 17025	2.0	1.5	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	8.0	8.3	1.7
Lead (dissolved)	µg/l	0.2	ISO 17025	14	12	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	120	140	1.9



Analytical Report Number: 21-17722

Project / Site name: Castlefield

Your Order No: PC2387 107 100

Lab Sample Number				2054391	2054392	2054393
Sample Reference				DP1	DP2	TB
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				20/10/2021	20/10/2021	20/10/2021
Time Taken				1430	1430	1430
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status			

Environmental Forensics

Fluoranthene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Benzo(b)fluoranthene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Benzo(k)fluoranthene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Benzo(a)pyrene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Indeno(1,2,3-cd)pyrene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Benzo(ghi)perylene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Naphthalene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Acenaphthylene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Acenaphthene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Fluorene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Phenanthrene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Anthracene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Pyrene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Benzo(a)anthracene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Chrysene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Di-benzo(a,h)anthracene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020

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



Analytical Report Number : 21-17722

Project / Site name: Castlefield

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Cr (III) in water	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
low level PAHs in water	Determination of low level PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method	L102B-PL	W	NONE

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

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

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

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-18096

Replaces Analytical Report Number: 21-18096, issue no. 1
Client sampling date amended.

Project / Site name:	Castlefield	Samples received on:	22/10/2021
Your job number:	PC2387	Samples instructed on/ Analysis started on:	22/10/2021
Your order number:	PC2357 107 100	Analysis completed by:	28/10/2021
Report Issue Number:	2	Report issued on:	10/11/2021
Samples Analysed:	3 water samples		

Signed: *Karolina Marek*

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.



Analytical Report Number: 21-18096

Project / Site name: Castlefield

Your Order No: PC2357 107 100

Lab Sample Number				2056855	2056856	2056857
Sample Reference				DP1	DP2	TB
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				21/10/2021	21/10/2021	21/10/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status			

General Inorganics

pH	pH Units	N/A	ISO 17025	8.3	8.3	7.4
----	----------	-----	-----------	-----	-----	-----

Heavy Metals / Metalloids

Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	1	NONE	1.7	1.6	< 1.0

Chromium (dissolved)	µg/l	0.2	ISO 17025	1.7	1.6	0.3
Copper (dissolved)	µg/l	0.5	ISO 17025	7.4	7.1	0.8
Lead (dissolved)	µg/l	0.2	ISO 17025	9.7	8.5	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	590	410	4.9

Environmental Forensics

Fluoranthene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Benzo(b)fluoranthene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Benzo(k)fluoranthene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Benzo(a)pyrene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Indeno(1,2,3-cd)pyrene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Benzo(ghi)perylene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002
Naphthalene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Acenaphthylene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Acenaphthene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Fluorene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Phenanthrene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Antracene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Pyrene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Benzo(a)anthracene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Chrysene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020
Di-bezno(a,h)anthracene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020

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



Analytical Report Number : 21-18096

Project / Site name: Castlefield

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Cr (III) in water	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
low level PAHs in water	Determination of low level PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method	L102B-PL	W	NONE

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

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

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

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

**Punit Patel**

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Analytical Report Number : 21-20290

Project / Site name:	Castlefield	Samples received on:	02/11/2021
Your job number:	PC2387	Samples instructed on/ Analysis started on:	02/11/2021
Your order number:	PC2387-107-100	Analysis completed by:	09/11/2021
Report Issue Number:	1	Report issued on:	09/11/2021
Samples Analysed:	4 water samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.



Analytical Report Number: 21-20290

Project / Site name: Castlefield

Your Order No: PC2387-107-100

Lab Sample Number				2069285	2069286	2069287	2069288
Sample Reference				DP1	DP2	FB	TB
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				01/11/2021	01/11/2021	01/11/2021	01/11/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status	

General Inorganics

pH	pH Units	N/A	ISO 17025	8.3	8.3	7.0	6.8
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Heavy Metals / Metalloids

Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	1	NONE	1.1	1.7	< 1.0	< 1.0

Chromium (dissolved)	µg/l	0.2	ISO 17025	1.1	1.7	0.2	0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	6.8	7.2	2.1	1.4
Lead (dissolved)	µg/l	0.2	ISO 17025	9.2	9.5	< 0.2	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	140	100	3.6	2.9

Environmental Forensics

Fluoranthene (low level)	µg/l	0.002	NONE	0.080	< 0.002	< 0.002	0.020
Benzo(b)fluoranthene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002	< 0.002
Benzo(k)fluoranthene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002	< 0.002
Benzo(a)pyrene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002	< 0.002
Indeno(1,2,3-cd)pyrene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002	< 0.002
Benzo(ghi)perylene (low level)	µg/l	0.002	NONE	< 0.002	< 0.002	< 0.002	< 0.002
Naphthalene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Acenaphthylene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Acenaphthene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Fluorene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Phenanthrene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Antracene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Pyrene (low level)	µg/l	0.002	NONE	0.080	< 0.0020	< 0.0020	0.010
Benzo(a)anthracene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Chrysene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Di-bezno(a,h)anthracene (low level)	µg/l	0.002	NONE	< 0.0020	< 0.0020	< 0.0020	< 0.0020

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



Analytical Report Number : 21-20290

Project / Site name: Castlefield

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Cr (III) in water	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
low level PAHs in water	Determination of low level PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method	L102B-PL	W	NONE

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

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

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

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Appendix

Appendix E - Screened Water Chemical Data

Data Summary Statistics

Site:	Castlefield Viaduct	Project No:	PC2387
Data Description:	Downspout Water		
Land Use:	Future Public Open Space	Completed By:	KD
Receptor:	Controlled Waters - EQS	Checked By:	EH

Assessment Criteria Key

- a) WFD EQS inland surface waters 2015
b) M-BAT Tool
c)

Contaminant	Units	Method Detection Limit	Assess-ment Criteria (AC)	Source (see key)	Summary Statistics							Sample Identifiers and Analytical Data									
					Total Number of Samples	Results Above Detection Limit	Minimum	Maximum	Arithmetic Mean	Standard Deviation	Number of results >AC	DP1	DP1	DP1	DP2	DP2	DP2	TB	TB	TB	FB
												20/10/2021	21/10/2021	01/11/2021	20/10/2021	21/10/2021	01/11/2021	20/10/2021	21/10/2021	01/11/2021	01/11/2021
												Round 1 Sample	Round 2 Sample	Round 3 Sample	Round 1 Sample	Round 2 Sample	Round 3 Sample	Round 1 Trip Blank	Round 2 Trip Blank	Round 3 Trip Blank	Round 3 Field Blank
pH	pH Units	N/A	6 to 9	a	10	10	6.8	8.4	7.83	0.64644326	0	8.3	8.3	8.3	8.4	8.3	8.3	7.2	7.4	6.8	7
			-																		
Naphthalene	µg/l	0.01	2	a	10	0	0.002	0.002	-	-	0	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Acenaphthylene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Acenaphthene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Fluorene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Phenanthrene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Anthracene	µg/l	0.01	0.1	a	10	0	0.002	0.002	-	-	0	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Fluoranthene	µg/l	0.01	0.0063	a	10	2	0.002	0.08	0.0116	0.02469008	2	< 0.002	< 0.002	0.08	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.02	< 0.002
Pyrene	µg/l	0.01	-		10	2	0.002	0.08	0.0106	0.02451394	-	< 0.0020	< 0.0020	0.08	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	0.01	< 0.0020
Benzo(a)anthracene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Chrysene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Benzo(b)fluoranthene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Benzo(k)fluoranthene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Benzo(a)pyrene	µg/l	0.01	0.00017	a	10	0	0.002	0.002	-	-	10	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Indeno(1,2,3-cd)pyrene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Dibenz(a,h)anthracene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Benzo(ghi)perylene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
			-																		
Total EPA-16 PAHs	µg/l	0.16	-		3	0	0.16	0.16	-	-	-	< 0.16			< 0.16			< 0.16			
			-																		
Chromium (hexavalent)	µg/l	5	3.4	a	10	0	5	5	-	-	10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	1	4.7	a	10	6	1	2	1.36	0.38064273	0	2	1.7	1.1	1.5	1.6	1.7	< 1.0	< 1.0	< 1.0	< 1.0
			-																		
Chromium (dissolved)	µg/l	0.2	-		10	9	0.2	2	1.05	0.74423712	-	2	1.7	1.1	1.5	1.6	1.7	< 0.2	0.3	0.2	0.2
Copper (dissolved)	µg/l	0.5	17.1	b	10	10	0.8	8.3	5.08	3.12651741	0	8	7.4	6.8	8.3	7.1	7.2	1.7	0.8	1.4	2.1
Lead (dissolved)	µg/l	0.2	4.99	b	10	6	0.2	14	6.37	5.53394575	6	14	9.7	9.2	12	8.5	9.5	< 0.2	< 0.2	< 0.2	< 0.2
Zinc (dissolved)	µg/l	0.5	24.66	b	10	10	1.9	590	151.33	197.439527	6	120	590	140	140	410	100	1.9	4.9	2.9	3.6

Appendix

Appendix F - Existing Drainage Layout Drawing

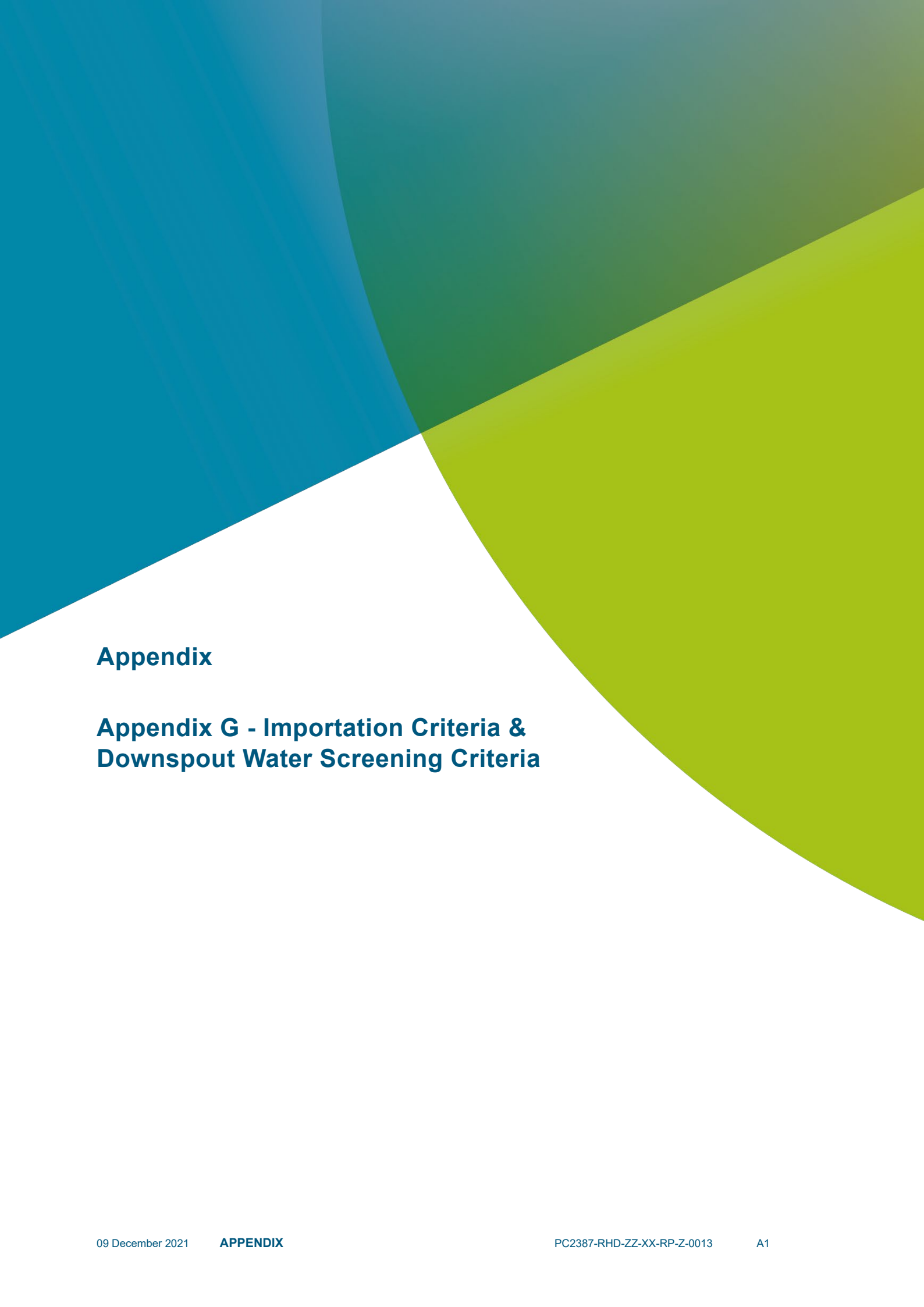
Data Summary Statistics

Site:	Castlefield Viaduct	Project No:	PC2387
Data Description:	Downspout Water		
Land Use:	Future Public Open Space	Completed By:	KD
Receptor:	Controlled Waters - EQS	Checked By:	EH

Assessment Criteria Key

- a) WFD EQS inland surface waters 2015
b) M-BAT Tool
c)

Contaminant	Units	Method Detection Limit	Assess-ment Criteria (AC)	Source (see key)	Summary Statistics							Sample Identifiers and Analytical Data									
					Total Number of Samples	Results Above Detection Limit	Minimum	Maximum	Arithmetic Mean	Standard Deviation	Number of results >AC	DP1	DP1	DP1	DP2	DP2	DP2	TB	TB	TB	FB
												20/10/2021	21/10/2021	01/11/2021	20/10/2021	21/10/2021	01/11/2021	20/10/2021	21/10/2021	01/11/2021	01/11/2021
												Round 1 Sample	Round 2 Sample	Round 3 Sample	Round 1 Sample	Round 2 Sample	Round 3 Sample	Round 1 Trip Blank	Round 2 Trip Blank	Round 3 Trip Blank	Round 3 Field Blank
pH	pH Units	N/A	6 to 9	a	10	10	6.8	8.4	7.83	0.64644326	0	8.3	8.3	8.3	8.4	8.3	8.3	7.2	7.4	6.8	7
			-																		
Naphthalene	µg/l	0.01	2	a	10	0	0.002	0.002	-	-	0	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Acenaphthylene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Acenaphthene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Fluorene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Phenanthrene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Anthracene	µg/l	0.01	0.1	a	10	0	0.002	0.002	-	-	0	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Fluoranthene	µg/l	0.01	0.0063	a	10	2	0.002	0.08	0.0116	0.02469008	2	< 0.002	< 0.002	0.08	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.02	< 0.002
Pyrene	µg/l	0.01	-		10	2	0.002	0.08	0.0106	0.02451394	-	< 0.0020	< 0.0020	0.08	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	0.01	< 0.0020
Benzo(a)anthracene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Chrysene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Benzo(b)fluoranthene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Benzo(k)fluoranthene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Benzo(a)pyrene	µg/l	0.01	0.00017	a	10	0	0.002	0.002	-	-	10	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Indeno(1,2,3-cd)pyrene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Dibenz(a,h)anthracene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Benzo(ghi)perylene	µg/l	0.01	-		10	0	0.002	0.002	-	-	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
			-																		
Total EPA-16 PAHs	µg/l	0.16	-		3	0	0.16	0.16	-	-	-	< 0.16			< 0.16			< 0.16			
			-																		
Chromium (hexavalent)	µg/l	5	3.4	a	10	0	5	5	-	-	10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	1	4.7	a	10	6	1	2	1.36	0.38064273	0	2	1.7	1.1	1.5	1.6	1.7	< 1.0	< 1.0	< 1.0	< 1.0
			-																		
Chromium (dissolved)	µg/l	0.2	-		10	9	0.2	2	1.05	0.74423712	-	2	1.7	1.1	1.5	1.6	1.7	< 0.2	0.3	0.2	0.2
Copper (dissolved)	µg/l	0.5	17.1	b	10	10	0.8	8.3	5.08	3.12651741	0	8	7.4	6.8	8.3	7.1	7.2	1.7	0.8	1.4	2.1
Lead (dissolved)	µg/l	0.2	4.99	b	10	6	0.2	14	6.37	5.53394575	6	14	9.7	9.2	12	8.5	9.5	< 0.2	< 0.2	< 0.2	< 0.2
Zinc (dissolved)	µg/l	0.5	24.66	b	10	10	1.9	590	151.33	197.439527	6	120	590	140	140	410	100	1.9	4.9	2.9	3.6



Appendix

Appendix G - Importation Criteria & Downspout Water Screening Criteria

Appendix G

Soils to be imported for use as a plant growing medium shall be chemically verified prior to placement ensure they meet the generic assessment criteria set out in the table below. This is to ensure the soils do not present a risk to future users of the site. These are based upon generic screening criteria suitable for allotment use in the scenario of gardeners tending to the plant beds. Any soils which do not meet the criteria will not be used in the site.

Table G-1 Imported Material Criteria – Soils

Determinand	Screening Value – Allotments (mg/kg)	Origin of Generic Assessment Criteria	Limits of detection required (mg/kg) unless stated otherwise
Fraction of organic carbon (FoC)			<0.001%
General Inorganics			
Asbestos	No visible ACM <0.001%		<0.001%
Metals			
Arsenic	43	C4SL (allotment)	3.0
Cadmium	3.9	C4SL (allotment)	0.3
Chromium (III)	18000	LQM/CIEH S4UL (allotment)	3.0
Chromium (VI)	170	C4SL (allotment)	3.0
Copper	520	LQM/CIEH S4UL (allotment)	6.0
Lead	80	C4SL (allotment)	2.0
Nickel	53	LQM/CIEH S4UL (allotment)	2.0
Selenium	88	LQM/CIEH S4UL (allotment)	1.0
Zinc	620	LQM/CIEH S4UL (allotment)	2.5
Inorganic Mercury	19	LQM/CIEH S4UL (allotment)	0.6
Organic Compounds			
BTEX	SOM 1%		
Benzene***	0.017	LQM/CIEH S4UL (allotment)	0.1
Toluene	22	LQM/CIEH S4UL (allotment)	0.1
Ethylbenzene	16	LQM/CIEH S4UL (allotment)	0.1
m-xylene	31	LQM/CIEH S4UL (allotment)	0.1
o-xylene	28	LQM/CIEH S4UL (allotment)	0.1

Determinand	Screening Value – Allotments (mg/kg)	Origin of Generic Assessment Criteria	Limits of detection required (mg/kg) unless stated otherwise
p-xylene	29	LQM/CIEH S4UL (allotment)	0.1
PAH	SOM 1%		
Benzo[a]pyrene	5.7	C4SL (allotment)	0.015
Naphthalene	4.1	LQM/CIEH S4UL (allotment)	0.01
TPH	SOM 1%		
Aliphatic TPH > C5 to C6	730	LQM/CIEH S4UL (allotment)	0.1
Aliphatic TPH > C6 to C8	2300	LQM/CIEH S4UL (allotment)	0.1
Aliphatic TPH > C8-10	320	LQM/CIEH S4UL (allotment)	0.1
Aliphatic TPH > C10-12	2200	LQM/CIEH S4UL (allotment)	0.1
Aliphatic TPH > C12-16	11000	LQM/CIEH S4UL (allotment)	0.1
Aliphatic TPH > C16-35	260000	LQM/CIEH S4UL (allotment)	0.1
Aliphatic TPH > C35-44	260000	LQM/CIEH S4UL (allotment)	0.1
Aromatic TPH > C5-7	13	LQM/CIEH S4UL (allotment)	0.1
Aromatic TPH > C7-8	22	LQM/CIEH S4UL (allotment)	0.1
Aromatic TPH > C8-10	8.6	LQM/CIEH S4UL (allotment)	0.1
Aromatic TPH > C10-12	13	LQM/CIEH S4UL (allotment)	0.1
Aromatic TPH > C12-16	23	LQM/CIEH S4UL (allotment)	0.1
Aromatic TPH > C16-21	46	LQM/CIEH S4UL (allotment)	0.1
Aromatic TPH > C21-35	370	LQM/CIEH S4UL (allotment)	0.1
Aromatic TPH > C35-44	370	LQM/CIEH S4UL (allotment)	0.1
Aliphatic and Aromatic TPH > C44-70	1200	LQM/CIEH S4UL (allotment)	0.1
Other determinands may be required specific to the origin of the soils, for example:			
VOCs			0.001

Determinand	Screening Value – Allotments (mg/kg)	Origin of Generic Assessment Criteria	Limits of detection required (mg/kg) unless stated otherwise
SVOCs			0.1
Free cyanide			1.0

Downspout Water Screening Criteria

Table G-2 Downspout Water Quality Screening Criteria

Determinand	Average concentration recorded in October and November 2021	Maximum concentration recorded in October and November 2021	Laboratory limit of detection (µg/l)
pH	8.3	8.4	0.1 pH units
Lead (dissolved)	10.5	14.0	0.2
Zinc (dissolved)	250	590	0.5



Royal HaskoningDHV is an independent, international engineering and project management consultancy with over 138 years of experience. Our professionals deliver services in the fields of aviation, buildings, energy, industry, infrastructure, maritime, mining, transport, urban and rural development and water.

Backed by expertise and experience of 6,000 colleagues across the world, we work for public and private clients in over 140 countries. We understand the local context and deliver appropriate local solutions.

We focus on delivering added value for our clients while at the same time addressing the challenges that societies are facing. These include the growing world population and the consequences for towns and cities; the demand for clean drinking water, water security and water safety; pressures on traffic and transport; resource availability and demand for energy and waste issues facing industry.

We aim to minimise our impact on the environment by leading by example in our projects, our own business operations and by the role we see in “giving back” to society. By showing leadership in sustainable development and innovation, together with our clients, we are working to become part of the solution to a more sustainable society now and into the future.

Our head office is in the Netherlands, other principal offices are in the United Kingdom, South Africa and Indonesia. We also have established offices in Thailand, India and the Americas; and we have a long standing presence in Africa and the Middle East.



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