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Ref: 11-813-V9  
Date: 20<sup>th</sup> January 2021

**Steve Weir**  
**Rowlinson Construction**  
London House  
London Road South  
Poynton  
Stockport  
SK12 1YP

BY Email

**Dear Sir**

## **GARDEN VALIDATION – BOWES STREET**

An E3P engineer attended the above site to validate the thickness of the cover system that had been placed within the rear gardens of Plots 4&6 at Bowes street, Manchester.

In total 2No. hand excavated trial pits were advanced with the resulting strata detailed to the rear of this letter.

All trial pits were completed to highlight the required cover system of 600mm (600mm topsoil).

E3P can confirm that our independent validation demonstrates that all gardens have been installed with 300mm of certified topsoil in accordance with the NHBC requirements for a site of this nature.

### **TOPSOIL**

E3P attended site on 27<sup>th</sup> July 2020 to obtain three samples of the stockpiled topsoil deposits which were analysed in accordance with the E3P Remediation Strategy. Chemical analysis confirmed that these topsoil deposits were chemically suitable for use within the proposed garden and soft landscaping areas.

Chemical analysis results are included within lab report - 20-21973 (attached to this letter).

I trust this information is satisfactory to your requirements, and should I be able to be of any further assistance, please do not hesitate to contact me.

Yours sincerely,

**For and on behalf of E3P Ltd**





**Rob Horseman**  
Associate Director



## Site: Bowes Street

|                              |                         |
|------------------------------|-------------------------|
| Date: 19-01-2021             | Project Number: 11-813  |
| Project Manager: R. Horseman | E3P Engineer: T.Preston |
| Plot Numbers Validated: 4&6  |                         |

### Chemical Laboratory Analysis

Analysis for topsoil and subsoil undertaken by I2 Analytical Laboratory using UKAS accredited methods where applicable.

Chemical analysis suite comprises heavy metals, sulphates, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAHs), speciated and total Petroleum Hydrocarbons (TPH) and asbestos. Sampling frequency in accordance with the agreed Remediation Strategy. Laboratory analysis certificates attached to this validation certificate.

|                                                        | Topsoil | Subsoil |
|--------------------------------------------------------|---------|---------|
| <i>Chemical analysis confirmed materials suitable?</i> | Pass    | Pass    |
| <i>Further Comments</i>                                | N/A     | N/A     |



Plot No: 4

|                         |      |                   |
|-------------------------|------|-------------------|
| Depth of Strata (m bgl) | 0.60 | Validated TOPSOIL |
|-------------------------|------|-------------------|

Depth of Cover System Materials



Depth of Cover System Materials



Depth of Cover System at Ground Level



Depth of Cover System in Relation to Plot



Plot No: 6

|                         |      |                   |
|-------------------------|------|-------------------|
| Depth of Strata (m bgl) | 0.60 | Validated TOPSOIL |
|-------------------------|------|-------------------|

*Depth of Cover System Materials*



*Depth of Cover System Materials*



*Depth of Cover System at Ground Level*



*Depth of Cover System in Relation to Plot*



**Rob Horseman**

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## **Analytical Report Number : 20-19767**

|                             |                |                                                    |            |
|-----------------------------|----------------|----------------------------------------------------|------------|
| <b>Project / Site name:</b> | Bowes St.      | <b>Samples received on:</b>                        | 16/07/2020 |
| <b>Your job number:</b>     |                | <b>Sample instructed/<br/>Analysis started on:</b> | 16/07/2020 |
| <b>Your order number:</b>   |                | <b>Analysis completed by:</b>                      | 22/07/2020 |
| <b>Report Issue Number:</b> | 1              | <b>Report issued on:</b>                           | 22/07/2020 |
| <b>Samples Analysed:</b>    | 3 soil samples |                                                    |            |

**Signed:** Caroline Harel

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 |

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.

Iss No 20-19767-1 Bowes St..XLS

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report relate only to the sample(s) submitted for testing.

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Project / Site name: Bowes St.

| Lab Sample Number                       |       |                       |                         | 1564595       | 1564596       | 1564597       |  |  |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|---------------|--|--|
| Sample Reference                        |       |                       |                         | TS101         | TS102         | TS103         |  |  |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied | None Supplied |  |  |
| Depth (m)                               |       |                       |                         | None Supplied | None Supplied | None Supplied |  |  |
| Date Sampled                            |       |                       |                         | 15/07/2020    | 15/07/2020    | 15/07/2020    |  |  |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied | None Supplied |  |  |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |               |  |  |
| Stone Content                           | %     | 0.1                   | NONE                    | < 0.1         | < 0.1         | < 0.1         |  |  |
| Moisture Content                        | %     | N/A                   | NONE                    | 10            | 13            | 14            |  |  |
| Total mass of sample received           | kg    | 0.001                 | NONE                    | 0.50          | 0.50          | 0.50          |  |  |

|                  |      |     |           |              |              |              |  |  |
|------------------|------|-----|-----------|--------------|--------------|--------------|--|--|
| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected | Not-detected |  |  |
|------------------|------|-----|-----------|--------------|--------------|--------------|--|--|

#### General Inorganics

|                                                                  |          |         |        |      |      |      |  |  |
|------------------------------------------------------------------|----------|---------|--------|------|------|------|--|--|
| pH - Automated                                                   | pH Units | N/A     | MCERTS | 8.0  | 6.7  | 7.1  |  |  |
| Total Cyanide                                                    | mg/kg    | 1       | MCERTS | 3    | 1    | 2    |  |  |
| Total Sulphate as SO <sub>4</sub>                                | mg/kg    | 50      | MCERTS | 1900 | 1800 | 1900 |  |  |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | g/l      | 0.00125 | MCERTS | 0.20 | 0.19 | 0.22 |  |  |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | mg/kg    | 2.5     | MCERTS | 410  | 380  | 440  |  |  |
| Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction | mg/l     | 1.25    | MCERTS | 204  | 189  | 222  |  |  |
| Sulphide                                                         | mg/kg    | 1       | MCERTS | 1.1  | 7.3  | 2.9  |  |  |
| Total Sulphur                                                    | mg/kg    | 50      | MCERTS | 1100 | 1200 | 1200 |  |  |

#### Total Phenols

|                            |       |   |        |       |       |       |  |  |
|----------------------------|-------|---|--------|-------|-------|-------|--|--|
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 |  |  |
|----------------------------|-------|---|--------|-------|-------|-------|--|--|

#### Speciated PAHs

|                        |       |      |        |        |        |        |  |  |
|------------------------|-------|------|--------|--------|--------|--------|--|--|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |  |  |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 |  |  |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | 0.29   | 0.23   | 0.95   |  |  |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 0.65   |  |  |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 2.3    | 1.8    | 5.2    |  |  |
| Anthracene             | mg/kg | 0.05 | MCERTS | 0.39   | 0.47   | 1.1    |  |  |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 3.3    | 4.1    | 7.0    |  |  |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 3.2    | 3.8    | 6.4    |  |  |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 2.0    | 2.4    | 4.8    |  |  |
| Chrysene               | mg/kg | 0.05 | MCERTS | 1.4    | 2.0    | 2.8    |  |  |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 1.9    | 2.4    | 3.7    |  |  |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.94   | 0.95   | 1.5    |  |  |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 1.7    | 1.8    | 3.5    |  |  |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 0.71   | 0.85   | 1.4    |  |  |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 0.37   |  |  |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | 0.83   | 0.94   | 1.5    |  |  |

#### Total PAH

|                             |       |     |        |      |      |      |  |  |
|-----------------------------|-------|-----|--------|------|------|------|--|--|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 19.0 | 21.7 | 40.9 |  |  |
|-----------------------------|-------|-----|--------|------|------|------|--|--|

#### Heavy Metals / Metalloids

|                                   |       |     |        |       |       |       |  |  |
|-----------------------------------|-------|-----|--------|-------|-------|-------|--|--|
| Arsenic (aqua regia extractable)  | mg/kg | 1   | MCERTS | 28    | 29    | 39    |  |  |
| Cadmium (aqua regia extractable)  | mg/kg | 0.2 | MCERTS | 0.6   | 0.6   | 0.7   |  |  |
| Chromium (hexavalent)             | mg/kg | 4   | MCERTS | < 4.0 | < 4.0 | < 4.0 |  |  |
| Chromium (aqua regia extractable) | mg/kg | 1   | MCERTS | 31    | 27    | 29    |  |  |
| Copper (aqua regia extractable)   | mg/kg | 1   | MCERTS | 66    | 68    | 75    |  |  |
| Lead (aqua regia extractable)     | mg/kg | 1   | MCERTS | 470   | 260   | 350   |  |  |
| Mercury (aqua regia extractable)  | mg/kg | 0.3 | MCERTS | 0.7   | 0.7   | 0.8   |  |  |
| Nickel (aqua regia extractable)   | mg/kg | 1   | MCERTS | 24    | 22    | 22    |  |  |
| Selenium (aqua regia extractable) | mg/kg | 1   | MCERTS | 2.2   | 2.1   | 2.1   |  |  |
| Zinc (aqua regia extractable)     | mg/kg | 1   | MCERTS | 150   | 150   | 170   |  |  |



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Project / Site name: Bowes St.

|                                         |  |  |  |               |                       |                         |  |  |
|-----------------------------------------|--|--|--|---------------|-----------------------|-------------------------|--|--|
| Lab Sample Number                       |  |  |  | 1564595       | 1564596               | 1564597                 |  |  |
| Sample Reference                        |  |  |  | TS101         | TS102                 | TS103                   |  |  |
| Sample Number                           |  |  |  | None Supplied | None Supplied         | None Supplied           |  |  |
| Depth (m)                               |  |  |  | None Supplied | None Supplied         | None Supplied           |  |  |
| Date Sampled                            |  |  |  | 15/07/2020    | 15/07/2020            | 15/07/2020              |  |  |
| Time Taken                              |  |  |  | None Supplied | None Supplied         | None Supplied           |  |  |
| Analytical Parameter<br>(Soil Analysis) |  |  |  | Units         | Limit of<br>detection | Accreditation<br>Status |  |  |

**Petroleum Hydrocarbons**

|                           |       |     |        |       |       |       |  |  |
|---------------------------|-------|-----|--------|-------|-------|-------|--|--|
| TPH (C5 - C6)             | mg/kg | 1   | NONE   | < 1.0 | < 1.0 | < 1.0 |  |  |
| TPH (C6 - C8)             | mg/kg | 0.1 | MCERTS | < 0.1 | < 0.1 | < 0.1 |  |  |
| TPH (C8 - C10)            | mg/kg | 0.1 | MCERTS | < 0.1 | < 0.1 | < 0.1 |  |  |
| TPH (C10 - C12)           | mg/kg | 2   | MCERTS | < 2.0 | < 2.0 | < 2.0 |  |  |
| TPH (C12 - C16)           | mg/kg | 4   | MCERTS | < 4.0 | < 4.0 | < 4.0 |  |  |
| TPH (C16 - C21)           | mg/kg | 1   | MCERTS | 8.3   | 8.9   | 24    |  |  |
| TPH (C21 - C35)           | mg/kg | 1   | MCERTS | 25    | 42    | 74    |  |  |
| TPH (C35 - C40)           | mg/kg | 10  | MCERTS | < 10  | < 10  | < 10  |  |  |
| <b>TPH Total C5 - C40</b> | mg/kg | 10  | MCERTS | 36    | 53    | 99    |  |  |



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\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

| Lab Sample Number | Sample Reference | Sample Number | Depth (m)     | Sample Description *                            |
|-------------------|------------------|---------------|---------------|-------------------------------------------------|
| 1564595           | TS101            | None Supplied | None Supplied | Brown loam and sand with gravel and vegetation. |
| 1564596           | TS102            | None Supplied | None Supplied | Brown loam and sand with gravel and vegetation. |
| 1564597           | TS103            | None Supplied | None Supplied | Brown loam and sand with gravel and vegetation. |

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**Project / Site name: Bowes St.**

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

| Analytical Test Name                               | Analytical Method Description                                                                                                                                          | Analytical Method Reference                                                                                     | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Asbestos identification in soil                    | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.                                                  | In house method based on HSG 248                                                                                | A001-PL       | D                  | ISO 17025            |
| Hexavalent chromium in soil                        | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.                  | In-house method                                                                                                 | L080-PL       | W                  | MCERTS               |
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                                           | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                            | L038-PL       | D                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                                  | In house method.                                                                                                | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                                 | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL       | W                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                                      | In house method.                                                                                                | L099-PL       | D                  | MCERTS               |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.                 | In-house method based on USEPA 8270                                                                             | L064-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                                            | In-house method based on British Standard Methods and MCERTS requirements.                                      | L019-UK/PL    | D                  | NONE                 |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).              | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| Sulphate, water soluble, in soil (1hr extraction)  | Sulphate, water soluble, in soil (1hr extraction)                                                                                                                      | In-house method                                                                                                 | L038-PL       | D                  | MCERTS               |
| Sulphide in soil                                   | Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode. | In-house method                                                                                                 | L010-PL       | D                  | MCERTS               |
| Total cyanide in soil                              | Determination of total cyanide by distillation followed by colorimetry.                                                                                                | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar) | L080-PL       | W                  | MCERTS               |
| Total sulphate (as SO4 in soil)                    | Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.                                                                                | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| Total Sulphur in soil                              | Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.                                                   | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| TPH in (Soil)                                      | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                                                          | In-house method, TPH with carbon banding and silica gel split/cleanup.                                          | L076-PL       | D                  | MCERTS               |

**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.**