

# Contamination Assessment Report

Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

On behalf of Foreman Homes Limited

| Report Reference: GWPR6068/CAR/October 2024 |                                           |                                                                               | Status: Final                                               |
|---------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------|
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| EXECUTIVE SUMMARY        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PROPOSED DEVELOPMENT     | At the time of reporting, October 2024, the proposed development was understood to comprise the re-development of the Former Dairy Crest site and adjacent Southern Co-Op owned land to the south. The development will comprise 74no. apartments spread across the northern and western parts of the site with car parking occupying much of the remainder. A communal amenity space is proposed in the south, while covered bicycle storage located in the centre. Ground floor flats will have private gardens.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| GEOLOGY AND HYDROGEOLOGY | <p>The British Geological Survey (BGS) maps and DEFRA online maps for the area suggest that the site was located on superficial Head Deposits within the western half, classified as a Secondary (Undifferentiated) Aquifer, no superficial deposits were recorded within the eastern half of the site. This was underlain by the Bognor Sand Member, classified as a Secondary (A) Aquifer, within the eastern half of the site and the London Clay Formation, classified as Unproductive Strata, within the western half of the site. The superficial and bedrock aquifers are considered to be in hydraulic continuity.</p> <p>Examination of the Environment Agency records showed that the site did fall within a Zone 11 – Subsurface Activity Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.</p> <p>From analysis of hydrogeological and topographical maps the groundwater table was anticipated to be encountered at shallow to moderate depth within the Head Deposits and Bognor Sand Member capping the impermeable London Clay Formation. Perched water</p> |

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | <p>was also likely to be found within the Made Ground, especially after periods of intense or prolonged rainfall. It was considered that the groundwater was flowing southwards, towards the Riders stream located on the southern boundary of the site in alignment with local topography.</p> <p>Riders Stream (main river status) was noted adjacent to the southern boundary of the site, ultimately discharging into an ecological asset named Langstone Harbour. No other surface water features were noted within a 250m radius of the site.</p> <p>Examination of the Environment Agency records showed that the vast majority of the site was noted to be classified as Flood Zone 1. A small portion of the site, directly adjacent to the Riders Stream, was noted to be classified as Flood Zone 3. The site was not protected by flood defences or benefiting from flood storage.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| CONTAMINATION | Full details can be found within Section 5 of this report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| REMEDIATION   | <p>Full details can be found within Section 6.</p> <p><b>Soils</b></p> <p>The soil remediation has been split into private garden areas and communal soft landscaped areas.</p> <p><u>Private Garden Areas</u></p> <p>Based on the available information within this report it was proposed that the following remedial methodology should be undertaken within all private garden areas:</p> <ul style="list-style-type: none"> <li>Reduce dig of 600mm;</li> <li>Placement of 150mm anti-dig layer, overlaid by a geotextile marker membrane;</li> <li>Placement of 450mm clean capping of soil;</li> <li>Validation of the clean capping system by a suitably trained Ground and Water Limited engineer.</li> </ul> <p>Full liaison must be made with the statutory authority, prior to the implementation of this remediation strategy and/or removal of soils from the site. All works must be undertaken to meet their approval.</p> <p><u>Communal Soft Landscaped Areas</u></p> <p>Based on the available information within this report it was proposed that the following remedial methodology should be undertaken within all communal soft landscaped areas:</p> <ul style="list-style-type: none"> <li>Reduce dig of 450mm;</li> <li>Placement of 150mm anti-dig layer, overlaid by a geotextile marker membrane;</li> <li>Placement of 300mm clean capping of soil;</li> <li>Validation of the clean capping system by a suitably trained Ground and Water Limited engineer.</li> </ul> <p>Full liaison must be made with the statutory authority, prior to the implementation of this remediation strategy and/or removal of soils from the site. All works must be undertaken to meet their approval.</p> <p><b>Water Supply Pipes</b></p> <p>The Water Supply pipe risk assessment indicated that the use of PE pipes is appropriate at the site and no further measures are required.</p> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Groundwater</b></p> <p>The level 2 (groundwater) risk assessment has been undertaken and found a number of marginally elevated metals and inorganics within the groundwater on-site. A review of the soils assessment did not identify elevated cyanide within the Made Ground soils on-site. Similarly, other than lead, no metals were noted to be elevated within the Made Ground on-site. The groundwater results do not indicate that lead is elevated within the groundwater. Three other SVOCs were noted to be above the laboratory limit of detection. Research to find a GAC value did not identify a published threshold value within groundwater and therefore they are not considered to pose a vapour risk to the end users.</p> <p>Given the above the Made Ground soils on-site are not considered to be the source of the elevated determinands found within the groundwater. The understanding of the hydrogeological model indicates that the elevated determinands are likely caused by off-site sources within the nearby site environs, such as the bus depot, works, factory or garage noted within a 100m radius. Therefore, no further action is required. The findings of this risk assessment should be agreed with the Environment Agency.</p> <p><b>Ground Gas</b></p> <p>Based on risk assessment undertaken, the site warrants classification as Characteristic Situation CS2, where precautions to prevent the ingress of ground-gas are necessary. Type B buildings on CS2 classified sites require 3.5 points worth of protection, in accordance with BS8485:2015+A1:2019. Points must be made up through a structural barrier, ventilation, and/or membrane, where at least two methods are incorporated.</p> <p><b>Vapours</b></p> <p>No vapour protection measures are required on-site.</p> |
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## 1. INTRODUCTION

### 1.1. General

Ground and Water Limited were instructed by Foreman Homes Limited on the 12<sup>th</sup> June 2024 to conduct a Contamination Assessment Report on the site at Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ. The scope of the investigation was detailed within the fee proposal QU-0264Rev3, dated the 20<sup>th</sup> May 2024.

### 1.2. Aims of the Investigation

The aim of this report was to supply the client and their designers with information regarding the ground conditions underlying the site to assist them in preparing an appropriate scheme for development.

A geotechnical ground investigation report was issued in September 2024 and contains all of the geotechnical conclusions for the site. Report Ref. GWPR6068/GIR/September 2024 V1.01.

A contamination assessment was to be undertaken following chemical laboratory testing on soil samples recovered from the site to enable recommendations for the safe redevelopment of the site and the protection of site workers, end-users and the public from any potential contamination identified. The assessment comprises a Tier 2 Generic Quantitative Risk Assessment, under Land Contamination Risk Management (LCRM).

This Site Investigation Report must be read in conjunction with the following reports;

Desk Study Report produced by Ridge and Partners LLP issued in October 2018 referenced 5003415-RDG-XX-ST-DOC-C-0002.

Site Investigation Report produced by Ridge and Partners LLP issued in April 2020 referenced 5012199-RDG-XX-ST-DOC-C-00SIR01.

Site Investigation Report produced by Ridge and Partners LLP issued in July 2021 referenced 5012199-RDG-XX-ST-DOC-C-00SIR02.

The techniques adopted for the investigation were chosen considering the requirements of the client, anticipated ground conditions, and bearing in mind the nature of the site, limitations to site access and other logistical limitations.

### 1.3. Conditions and Limitations

This report has been prepared based on the terms, conditions and limitations outlined within Appendix A.

Reference has been made to a historical site investigation by another company. Ground and Water Limited cannot be held liable for any shortcomings.

### 1.4. Technical Glossary

Generic technical terms and their description can be viewed within the glossary provided within Appendix B.

## 2. SITE SETTING

### 2.1. Site Location

The site comprised a ~4,500m<sup>2</sup> roughly rectangular shaped plot of land, situated on the south-eastern corner of the junction of Dunsbury Way to the west and Fulflood Road to the north. The site was located in the northern portion of Havant, a mainly residential town within south-east Hampshire.

The national grid reference for the centre of the site was approximately SU 71324 08235. A site location plan is given within Figure 1. A view of the site development area can be found within Figure 2, with an aerial view of the site visible within Figure 3.

### 2.2. Site Description

The northern part of the site comprises a single storey masonry former milk packaging and distribution depot building along the north-west boundary with covered bays and a yard in the north-east and east, a toilet block in the north-east corner and parking bays in the west of the site. The building contains predominantly office accommodation at the western end with warehouse, storage, refrigeration and loading areas in the centre and west. The covered bays in the north-east and east of the site, where milk distribution vehicles are believed to have been parked, were noted to be of steel frame construction with brick rear walls and suspected asbestos cement sheeting forming the roofs. The yard was predominantly covered by asphalt surfacing with a concrete slab along the western edge of the yard. No evidence of fuel or chemical storage was observed during the walkover survey and it is understood from planning records that repair, servicing or refuelling of vehicles was not permitted on site under the planning permission for the development of the depot.

The southern part of the site comprises a single storey brick funeral care facility with soft landscaping and parking fronting Dunsbury Way to the west of the building with a yard and garage to the rear (east) of the building. Adjacent to the south of the funeral care building is a residential bungalow, understood to have originally been constructed as the dwelling for the manager of the funeral care facility, with soft landscaping fronting Dunsbury Way and a rear garden to the east. No evidence of fuel or chemical storage was noted in relation to the funeral care facility or the bungalow. The southern boundary of the site is formed by a steep embankment down to the adjacent Riders Stream, approximately 2-3m below the general site level.

At the time of site works in July and August 2024 the site was in the process of being demolished. This was noted to be finished by September 2024.

### 2.3. Proposed Development

At the time of reporting, October 2024, the proposed development was understood to comprise the re-development of the Former Dairy Crest site and adjacent Southern Co-Op owned land to the south. The development will comprise 74no. apartments spread across the northern and western parts of the site with car parking occupying much of the remainder. A communal amenity space is proposed in the south, while covered bicycle storage located in the centre. Ground floor flats will have private gardens.

The proposed development fell within Geotechnical Design Category 2 in accordance with Eurocode 7. A proposed development plan is displayed within Figure 4.

## 2.4. Geology

The British Geological Survey (BGS) maps and DEFRA online maps for the area suggest that the site was located on superficial Head Deposits within the western half, classified as a Secondary (Undifferentiated) Aquifer, no superficial deposits were recorded within the eastern half of the site. This was underlain by the Bognor Sand Member, classified as a Secondary (A) Aquifer, within the eastern half of the site and the London Clay Formation, classified as Unproductive Strata, within the western half of the site. The superficial and bedrock aquifers are considered to be in hydraulic continuity.

A BGS borehole record in similar geology ~1km north of the site (ref.: SU70NW320) noted Topsoil to 0.30m bgl, followed by a silty fine sand with bands of very sandy clay to a depth of 5.60m bgl. This was followed by a very silty grey CLAY to the base of the borehole at a depth of 34.40m bgl. Numerous water levels recorded throughout the drilling, shallowest level recorded at 4.39m bgl.

## 2.5. Hydrogeology and Hydrology

Examination of the Environment Agency records showed that the site did fall within a Zone 1I – Subsurface Activity Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

From analysis of hydrogeological and topographical maps the groundwater table was anticipated to be encountered at shallow to moderate depth within the Head Deposits and Bognor Sand Member capping the impermeable London Clay Formation. Perched water was also likely to be found within the Made Ground, especially after periods of intense or prolonged rainfall. It was considered that the groundwater was flowing southwards, towards the Riders stream located on the southern boundary of the site in alignment with local topography.

Riders Stream (main river status) was noted adjacent to the southern boundary of the site, ultimately discharging into an ecological asset named Langstone Harbour. No other surface water features were noted within a 250m radius of the site.

Examination of the Environment Agency records showed that the vast majority of the site was noted to be classified as Flood Zone 1. A small portion of the site, directly adjacent to the Riders Stream, was noted to be classified as Flood Zone 3. The site was not protected by flood defences or benefiting from flood storage.

## 2.6. Radon

A review of the freely available UK Health Security Agency radon database, UK Radon, indicated that the site was located within a 1km grid square, where the maximum radon potential of <1% was recorded. The neighbouring 1km grid square was noted to have a maximum radon potential of 5 – 10%. Basic radon protection measures are required in areas where more than 3% of houses are at or above the Action Level.

The site was in an area where a risk assessment was not required.

## 2.7. Internet Search (Site Setting)

### 2.7.1. Available Unexploded Ordnance (UXO) Map Review

A review of the data available on [www.zeticauxo.com/](http://www.zeticauxo.com/) revealed the site was located within a low-risk area associated with unexploded ordnance (UXO), as indicated by having <15 bombs dropped per 1000 acres. No Strategic Targets or Other Points of Note were recorded within a 1km radius of the site.

### 2.7.2. Historical Landfill Tool Review

A review of the data available on [www.groundsure.io/](http://www.groundsure.io/) revealed no areas of Historical or Authorised Landfills within a 250m radius of the site.

## 2.8. Preliminary Risk Assessment

The tabulated Conceptual Site Model developed as part of the Ridge and Partners LLP Desk Study (5003415-RDG-XX-ST-DOC-C-0002) is outlined overleaf. For ease of reference and understanding, the risks have been classified within this risk assessment against four possible levels / categories, summarised in the table below. Any risk deemed to be negligible within the Preliminary Risk Assessment have been excluded from this report.

| Risk Categories used in the Tabulated CSM |                                                                                                                                                                                                                                                                 |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Low Risk                                  | Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors. However, it is considered that further investigation to confirm this is recommended.        |
| Moderate Risk                             | Regarding this potential SPR linkage, the site may not be suitable for the proposed end-use in its current condition and there may be an unacceptable risk to receptors. Further investigation is required to confirm this.                                     |
| High Risk                                 | Regarding this potential SPR linkage, the site is probably or certainly not suitable for proposed end-use and there is likely to be an unacceptable risk to receptors. Contaminants probably or certainly present and urgent action required in the short term. |

| Tabulated Conceptual Site Model – Pollutant Linkage Summary                                                                                 |                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                      | (On-Site Sources)   |
|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Potential Sources                                                                                                                           | Potential Absorption Pathways                                                                                                                                                                                                                                                                                                                                        | Potential Receptors                                                                                                                                                                                                                                  | Risk Classification |
| <p>Made Ground from construction/ demolition activities:</p> <p>Asbestos, PAHs, TPHs, VOCs, Sulphates, and Metals.</p>                      | <p>Direct ingestion of soil and soil derived dust</p> <p>Dermal contact of soil and soil derived dust</p> <p>Inhalation of dust (indoors and outdoors) with elevated concentration of determinands</p> <p>Ingestion of home-grown produce, and soils attached</p> <p>Direct ingestion of groundwater</p> <p>Inhalation of volatile vapour (indoors and outdoors)</p> | <p>Human Health</p> <p>End Users (Residents/Future site visitors)</p> <p>Construction workers during development</p> <p>Site operatives during maintenance works</p> <p>Neighbours and public</p>                                                    | Moderate            |
|                                                                                                                                             | <p>Direct uptake of groundwater</p> <p>Direct uptake of determinands in the soil</p>                                                                                                                                                                                                                                                                                 | <p>Flora and Fauna</p> <p>Vegetation within soft landscaped areas</p>                                                                                                                                                                                | Moderate            |
|                                                                                                                                             | <p>Anthropogenic (man-made) pathways</p> <p>Vertical and lateral migration in permeable strata</p> <p>Surface water runoff</p>                                                                                                                                                                                                                                       | <p>Controlled Waters</p> <p>Secondary (Undifferentiated) Aquifer &amp; Secondary A Aquifer</p> <p>Riders Stream</p>                                                                                                                                  | Moderate            |
| <p>Aggressive ground conditions with Made Ground and natural ground, including groundwater:</p> <p>Sulphates, PAH/TPH.</p>                  | <p>Direct contact with aggressive ground conditions</p>                                                                                                                                                                                                                                                                                                              | <p>Building Materials and Services</p> <p>Buried Concrete</p> <p>Underground services (water pipes)</p>                                                                                                                                              | Moderate            |
| <p>Ground gases generated by Made Ground and organic materials:</p> <p>Methane, Carbon Dioxide, Hydrogen Sulphide, and Carbon Monoxide.</p> | <p>Migration through anthropogenic &amp; natural pathways</p> <p>Inhalation of Asphyxiating gases</p> <p>Explosion (methane only)</p>                                                                                                                                                                                                                                | <p>Human Health</p> <p>End Users (Residents/Future site visitors)</p> <p>Construction workers during development (especially in confined spaces)</p> <p>Site operatives during maintenance works in confined spaces</p> <p>Neighbours and public</p> | Moderate            |
|                                                                                                                                             | <p>Migration through anthropogenic &amp; natural pathways</p> <p>Explosion (methane only)</p>                                                                                                                                                                                                                                                                        | <p>Building Materials and Services</p> <p>Buildings</p> <p>Confined spaces</p> <p>Underground services</p>                                                                                                                                           | Moderate            |

| Tabulated Conceptual Site Model – Pollutant Linkage Summary                                                                                              |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                         | (Off-Site Sources)  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Potential Sources                                                                                                                                        | Potential Absorption Pathways                                                                                                                                                                                                                                                                             | Potential Receptors                                                                                                                                                                                                     | Risk Classification |
| <p>Made Ground from nearby construction and demolition works:</p> <p>Asbestos, PAHs, TPHs, VOCs, Sulphates, and Metals.</p>                              | <p>Direct ingestion of soil and soil derived dust</p> <p>Dermal contact of soil and soil derived dust</p> <p>Inhalation of dust (indoors and outdoors) with elevated concentration of determinands</p> <p>Direct ingestion of groundwater</p> <p>Inhalation of volatile vapour (indoors and outdoors)</p> | <p>Human Health</p> <p>End Users (Residents/Future site visitors)</p> <p>Construction workers during development</p> <p>Site operatives during maintenance works</p>                                                    | Moderate            |
|                                                                                                                                                          | <p>Direct uptake of groundwater</p>                                                                                                                                                                                                                                                                       | <p>Flora and Fauna</p> <p>Vegetation within soft landscaped areas</p>                                                                                                                                                   | Moderate            |
| <p>Aggressive ground conditions associated with impacted groundwater;</p> <p>Sulphates, PAH/TPH.</p>                                                     | <p>Direct contact with aggressive ground conditions</p>                                                                                                                                                                                                                                                   | <p>Building Materials and Services</p> <p>Buried Concrete</p> <p>Underground services (water pipes)</p>                                                                                                                 | Moderate            |
| <p>Ground gases generated by Made Ground:</p> <p>Methane, Carbon Dioxide, Hydrogen Sulphide, and Carbon Monoxide.</p>                                    | <p>Migration through anthropogenic &amp; natural pathways</p> <p>Inhalation of Asphyxiating gases</p> <p>Explosion (methane only)</p>                                                                                                                                                                     | <p>Human Health</p> <p>End Users (Residents/Future site visitors)</p> <p>Construction workers during development (especially in confined spaces)</p> <p>Site operatives during maintenance works in confined spaces</p> | Moderate            |
|                                                                                                                                                          | <p>Migration through anthropogenic &amp; natural pathways</p> <p>Explosion (methane only)</p>                                                                                                                                                                                                             | <p>Building Materials and Services</p> <p>Buildings</p> <p>Confined spaces</p> <p>Underground services</p>                                                                                                              | Moderate            |
| <p>Contaminants associated with off site depots, vehicle repair, service centre factory and works:</p> <p>Asbestos, PAHs, TPHs, VOCs, Sulphates, and</p> | <p>Direct ingestion of soil and soil derived dust</p> <p>Dermal contact of soil and soil derived dust</p> <p>Inhalation of dust (indoors and outdoors) with elevated concentration of determinands</p> <p>Direct ingestion of groundwater</p> <p>Inhalation of volatile vapour (indoors and outdoors)</p> | <p>Human Health</p> <p>End Users (Residents/Future site visitors)</p> <p>Construction workers during development</p> <p>Site operatives during maintenance works</p>                                                    | Moderate            |
|                                                                                                                                                          | <p>Direct uptake of groundwater</p>                                                                                                                                                                                                                                                                       | <p>Flora and Fauna</p> <p>Vegetation within soft landscaped areas</p>                                                                                                                                                   | Moderate            |

| Tabulated Conceptual Site Model – Pollutant Linkage Summary |                               |                     | (Off-Site Sources)  |
|-------------------------------------------------------------|-------------------------------|---------------------|---------------------|
| Potential Sources                                           | Potential Absorption Pathways | Potential Receptors | Risk Classification |
| Metals.                                                     |                               |                     |                     |

### 3. SITE WORKS

#### 3.1. Scope of Works

Site works were undertaken between 16<sup>th</sup> – 18<sup>th</sup> July 2024 and comprised the drilling of the 2no. cable percussive boreholes (BH01 & BH02) to 20.00m with standard penetration tests at 1.00m intervals to a depth of 3.00m bgl, with SPTs and U100's alternating at 1.50m intervals thereafter to the base of the borehole. The installations of 2No. combined ground water and ground gas monitoring wells were installed within BH01 and BH02, the details of which can be found in the following table.

| Combined Ground-gas and Groundwater Monitoring Well Construction |                               |                                                         |                                                   |                       |                               |
|------------------------------------------------------------------|-------------------------------|---------------------------------------------------------|---------------------------------------------------|-----------------------|-------------------------------|
| Trial Hole                                                       | Depth of Installation (m bgl) | Thickness of slotted piping with gravel filter pack (m) | Depth of plain piping with bentonite seal (m bgl) | Response Zone (m bgl) | Piping internal diameter (mm) |
| BH01                                                             | 5.00                          | 3.00                                                    | 2.00                                              | 2.00 – 5.00           | 50                            |
| BH02                                                             | 8.00                          | 3.00                                                    | 5.00                                              | 5.00 – 8.00           | 50                            |
| WS105                                                            | 4.50                          | 3.40                                                    | 1.10                                              | 1.10 – 4.50           | 50                            |

A second phase of site works was undertaken on 7<sup>th</sup> August and comprised the drilling of 5No. Windowless Sampler Boreholes (WS101 – WS105) to depths between 4.60 – 5.45m bgl. SPTs were undertaken at 1.00m intervals to the base of the trial holes. A combined groundwater and ground gas monitoring well was installed to a depth of 4.50m bgl with a response zone noted between 1.10 – 4.50m bgl. Details have been provided in the following table.

The location of the trial hole locations can be seen within Figure 5.

Prior to commencing the ground investigation, a walkover survey was carried out to identify the presence of underground services and drainage. Where underground services/drainage were suspected and/or positively identified, the exploratory position was relocated away from these areas.

As a further precautionary measure, the borehole was hand excavated to 1.20m below the local ground level (bgl) and scanned with a Cable Avoidance Tool (CAT scanner) to minimise the risk to services.

Upon completion of the drilling works, the trial holes were backfilled and made good, in relation to the surrounding area.

#### 3.2. Sampling Procedures

Small disturbed samples and environmental samples were recovered from the trial holes at the depths shown on the trial hole records. Soil samples were generally retrieved from each change of strata and/or at specific areas of concern. Samples were also taken at approximately 0.5m intervals during broad homogenous soil horizons.

A selection of samples were despatched to a laboratory for chemical testing purposes.

## 4. ENCOUNTERED GROUND CONDITIONS

### 4.1. Soil Conditions

The trial holes were logged by a Ground and Water Limited representative, generally in accordance with BS EN 14688 'Geotechnical Investigation and Testing – Identification and Classification of Soil'.

The ground conditions encountered within the trial holes constructed on the site did generally conform to that anticipated from examination of the geology map. A capping of Made Ground was noted to overlie the superficial Head Deposits and Bognor Sand Member deposits, underlain by the bedrock London Clay Formation.

The succession of conditions and description of soils encountered in the trial holes in descending order is tabulated below.

| Summary of Strata Encountered (BH01 - BH02 & WS101 – WS105)                                                                                                                                              |                      |                       |                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|------------------|
| Strata                                                                                                                                                                                                   | Top Depth<br>(m bgl) | Base Depth<br>(m bgl) | Thickness<br>(m) |
| MADE GROUND (BH1-BH02 & WS101 – WS105): Brown silty sandy gravelly CLAY. Sand is fine to medium. Gravel is angular to subrounded fine to coarse flint, brick, chalk, carbonaceous material and concrete. | GL – 0.90            | 1.10 – 3.00           | 1.10 – 2.10      |
| MADE GROUND (BH02): Reddish brown gravelly fine to coarse SAND. Gravel is angular to sub-rounded fine to coarse brick.                                                                                   | GL                   | 0.90                  | 0.90             |
| MADE GROUND (WS103): Brown silty slightly gravelly fine to coarse SAND. Gravel is fine to coarse subangular to rounded flint. Fragments of red brick.                                                    | 0.80                 | 2.60                  | 1.80             |
| HEAD DEPOSITS (BH02): Greyish brown silty sandy angular to sub-rounded fine to coarse GRAVEL comprised of flint. Sand is fine to coarse.                                                                 | 3.00                 | 4.20                  | 1.20             |
| HEAD DEPOSITS (WS103): Grey and brown clayey fine to medium SAND.                                                                                                                                        | 2.60                 | >5.45                 | >2.85            |
| HEAD DEPOSITS (WS105): Dark grey slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine sub-rounded flint.                                                                        | 1.10                 | 2.80                  | 1.70             |
| BOGNOR SAND MEMBER (WS102 & WS105): Orangish brown slightly sandy (slightly gravelly) CLAY. Sand is fine to coarse. Gravel is fine to medium angular flint.                                              | 1.20 – 2.80          | 3.10 – 3.90           | 1.10 - 1.90      |
| BOGNOR SAND MEMBER (BH01 & WS101 – WS102 & WS104): Orangish brown silty (slightly gravelly) fine to medium SAND. (Gravel is fine to coarse angular flint.)                                               | 1.10 – 3.10          | 3.70 - 4.30           | 0.80 – 2.60      |
| LONDON CLAY FORMATION (BH01 - BH02 & WS101 – WS102 & WS104 – WS105): Dark grey brown to Blueish grey silty slightly sandy CLAY. Sand is fine.                                                            | 3.55 - 4.30          | >4.60 – >20.00        | >1.05 - >15.80   |

For details of the composition of the soils encountered at particular points, reference must be made to the individual trial hole logs within Appendix C of this report. A trial hole location plan can also be viewed within Figure 5.

### 4.2. Roots Encountered

Fresh roots were proven to depths between 1.10 – 1.50m bgl across the site. The depths of root penetration can be seen tabulated below.

| Summary of Root Penetration |                          |
|-----------------------------|--------------------------|
| Trial Hole                  | Fresh Root Depth (m bgl) |
| BH01                        | None noted.              |
| BH02                        | None noted.              |
| WS101                       | 1.10                     |
| WS102                       | 1.50                     |
| WS103                       | 1.10                     |
| WS104                       | 1.10                     |
| WS105                       | None noted.              |

It should be noted that the accuracy of determining the depth of root penetration within narrow diameter boreholes is considered low. The site and its immediate environs were noted to contain a number of existing trees and vegetation. Therefore, it should be noted that roots may be found to greater depths at other locations on the site, particularly close to trees and/or trees that have been removed both within the site and its close environs.

#### 4.3. Groundwater Conditions

Groundwater was encountered at shallow to intermediate depth within all of the boreholes undertaken on-site. A summary can be seen in the following table.

| Summary of Groundwater Strikes |                         |                                |
|--------------------------------|-------------------------|--------------------------------|
| Trial Hole                     | Depth of Strike (m bgl) | Depth after 20 minutes (m bgl) |
| BH01                           | 2.60                    | 2.40                           |
| BH02                           | 3.30                    | 2.90                           |
| WS101                          | 2.00                    | -                              |
| WS102                          | 2.35                    | -                              |
| WS103                          | 2.30                    | -                              |
| WS104                          | 2.10                    | -                              |
| WS105                          | 3.50                    | -                              |

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was undertaken in July – August 2024 when groundwater levels are likely to be approaching their annual minimum (lowest elevation). Exact groundwater levels may only be determined through long term measurements from monitoring wells installed on-site.

Groundwater monitoring was undertaken on six occasions. A summary can be seen in the following table.

| Summary of Groundwater Observations |            |             |                  |
|-------------------------------------|------------|-------------|------------------|
| Date                                | Trial Hole | Water Level | Final Well Depth |
| 08/08/2024                          | BH01       | 2.10        | 5.20             |
|                                     | BH02       | 2.43        | 3.14             |
|                                     | WS105      | 2.20        | 4.33             |
| 20/09/2024                          | BH01       | DRY         | 4.52             |
|                                     | BH02       | 3.30        | 8.00             |
|                                     | WS105      | 4.23        | 4.44             |
| 27/09/2024                          | BH01       | 1.35        | 5.52             |
|                                     | BH02       | 2.42        | 10.30            |
|                                     | WS105      | -           | -                |

| Summary of Groundwater Observations |            |             |                  |
|-------------------------------------|------------|-------------|------------------|
| Date                                | Trial Hole | Water Level | Final Well Depth |
| 02/10/2024                          | BH01       | 1.24        | 5.52             |
|                                     | BH02       | 2.39        | 10.30            |
|                                     | WS105      | -           | -                |
| 04/01/2024                          | BH01       | 1.80        | 5.00             |
|                                     | BH02       | 2.90        | 10.30            |
|                                     | WS105      | -           | -                |
| 07/10/2024                          | BH01       | 2.10        | 5.30             |
|                                     | BH02       | 2.60        | 10.56            |
|                                     | WS105      | -           | -                |

#### 4.4. Obstructions

No artificial or natural sub-surface obstructions were noted during construction of the trial holes.

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## 5. CONTAMINATION RISK ASSESSMENT

### 5.1. Results of the Preliminary Risk Assessment

The tabulated Conceptual Site Model developed as part of the Ridge and Partners LLP Desk Study (5003415-RDG-XX-ST-DOC-C-0002) is reproduced in section 2.8. For the complete information please see the Desk Study report.

No additional source of contamination, pathway or receptor was identified between the desk study and the ground investigation and as such, it was not necessary to modify the CSM.

In the UK, the assessment of risk from contamination follows the source-pathway-receptor (SPR) approach. For a risk to be present there must be a source of contamination, a receptor or receptors, and a pathway for contaminants to migrate or be absorbed. If there is a linkage between any given source and receptor, then a quantitative risk assessment is used to assess the significance or impact of the pollutant linkage.

### 5.2. Sampling Locations

The synopsis for the trial hole locations and their final depth can be seen tabulated below. A trial hole location plan is provided within Figure 5. The table also indicates whether any locations targeted a source of contamination as well as the proposed end-use. The proposed development can be seen in Figure 4.

| Trial Hole Location Synopsis |                   |                                |
|------------------------------|-------------------|--------------------------------|
| Trial Hole/Final Depth       | Sampling Strategy | Proposed End-Use               |
| BH101/20.00m                 | Random            | Footprint of Proposed Building |
| BH102/20.00m                 | Random            | Footprint of Proposed Building |
| WS101/5.45m                  | Random            | Footprint of Proposed Building |
| WS102/5.45m                  | Random            | Hardstanding                   |
| WS103/5.45m                  | Random            | Hardstanding                   |
| WS104/5.45m                  | Random            | Footprint of Proposed Building |
| WS105/4.60m                  | Random            | Hardstanding                   |

The investigation area totals approximately 4,500m<sup>2</sup> and with seven sampling locations, given an unknown hotspot shape, the sampling density means that a hotspot with an area of approximately 965m<sup>2</sup> and a radius of approximately 17.50m would be encountered (CLR 4).

### 5.3. Soil Risk Assessment

Sampling depths were chosen to reflect the receptor of concern (e.g. human health, controlled waters and vegetation). The remaining samples were scheduled under a random strategy. The receptors relevant to the sampling depths are tabulated below.

| Summary of Receptors per Sample Depth |                                                                                                                                                                                                                                                                                |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Depth                                 | Receptors                                                                                                                                                                                                                                                                      |
| Shallow Samples (< 0.75m bgl)         | End Users (Residents/Future site visitors)<br>Construction workers during development<br>Site operatives during maintenance works<br>Neighbours and public<br>Vegetation within soft landscaped areas (shallow rooted)<br>Secondary (Undifferentiated) Aquifer – Head Deposits |

|                                     |                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | Secondary A Aquifer – Bognor Sand Member<br>Buried Concrete<br>Receiving landfill                                                                                                                                                                                                                                               |
| Moderate Samples (0.75 – 1.50m bgl) | Construction workers during development<br>Site operatives during maintenance works<br>Vegetation within soft landscaped areas (deep rooted)<br>Secondary (Undifferentiated) Aquifer – Head Deposits<br>Secondary A Aquifer – Bognor Sand Member<br>Buried Concrete<br>Receiving landfill<br>Underground services (water pipes) |

Chemical laboratory testing, scheduled by Ground and Water Limited, and carried out by ALS Laboratories UK Limited, was undertaken on four samples of Made Ground. The samples were subjected to a combination of analysis that comprised:

Asbestos screen;  
 Semi-metals and heavy metals incl. Arsenic, Cadmium, Chromium (incl. Hexavalent Chromium), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc;  
 Polycyclic Aromatic Hydrocarbons (PAH's) incl. Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, Benzo(ghi)perylene;  
 Speciated TPH including full aliphatic/aromatic split;  
 BTEX compounds (Benzene, Toluene, Ethylbenzene, Xylene) and MTBE – used as marker compounds for Volatile Organic Compounds (VOCs);

A breakdown of the number of tests undertaken for each determinand is discussed in further sections. The chemical laboratory results are presented in Appendix D.

### 5.3.1. Soil Assessment Criteria and Results

At the time of reporting, August 2024, the proposed development was understood to comprise the re-development of the Former Dairy Crest site and adjacent Southern Co-Op owned land to the south. The development will comprise 74no. apartments spread across the northern and western parts of the site with car parking occupying much of the remainder. A communal amenity space is proposed in the south, while covered bicycle storage located in the centre. Ground floor flats will have private gardens.

Based on the proposed development, the results of the chemical laboratory testing were compared to the Generic Assessment Criteria (GAC) for a 'Residential with homegrown produce' land-use scenario, as this was considered the most appropriate land-use scenario.

Where a contaminant of concern's GAC varies according to the Soil's Organic Matter (SOM), the SOM recorded for each uncontaminated soil type was used to derive the appropriate GAC for each soil type. A SOM value of 1%, the most conservative value, was utilised.

A summary of the analytical results and the comparison to the determinands adopted screening value are presented in the table below and overleaf.

| Soil Contamination Test Results and Screening Values |                   |                               |                               |                                 |                                                                          |
|------------------------------------------------------|-------------------|-------------------------------|-------------------------------|---------------------------------|--------------------------------------------------------------------------|
| Determinand                                          | Number of Samples | Minimum Concentration (mg/kg) | Maximum Concentration (mg/kg) | Adopted Screening Value (mg/kg) | Was the adopted screening value exceeded for relevant land-use scenario? |
| INORGANICS                                           |                   |                               |                               |                                 |                                                                          |
| Asbestos                                             | 4                 | ND                            | Detected                      | ND                              | Yes – WS101/1.00m                                                        |
| Cyanide (total)                                      | 4                 | < 1                           | < 1                           | 24                              | No                                                                       |
| Phenols                                              | 4                 | < 1                           | < 1                           | 280                             | No                                                                       |
| METALS                                               |                   |                               |                               |                                 |                                                                          |
| Arsenic                                              | 4                 | 8.5                           | 11                            | 37                              | No                                                                       |
| Boron                                                | 4                 | 0.5                           | 1.5                           | 290                             | No                                                                       |
| Cadmium                                              | 4                 | < 0.2                         | < 0.2                         | 11                              | No                                                                       |
| Chromium (III)                                       | 4                 | 17                            | 23                            | 910                             | No                                                                       |
| Chromium (Hexavalent)                                | 4                 | < 1.8                         | < 1.8                         | 6                               | No                                                                       |
| Copper                                               | 4                 | 14                            | 21                            | 2,400                           | No                                                                       |
| Lead                                                 | 4                 | 61                            | 280                           | 200                             | Yes – BH1/0.80m                                                          |
| Mercury                                              | 4                 | < 0.3                         | < 0.3                         | 1.2                             | No                                                                       |
| Nickel                                               | 4                 | 9.1                           | 12                            | 130                             | No                                                                       |
| Selenium                                             | 4                 | < 1                           | < 1                           | 250                             | No                                                                       |
| Vanadium                                             | 4                 | 29                            | 39                            | 410                             | No                                                                       |
| Zinc                                                 | 4                 | 54                            | 150                           | 3,700                           | No                                                                       |
| TOTAL PETROLEUM HYDROCARBONS (TPHs)                  |                   |                               |                               |                                 |                                                                          |
| Aliphatic >C5 - C6                                   | 1                 | < 0.020                       | < 0.020                       | 42                              | No                                                                       |
| Aliphatic >C6 - C8                                   | 1                 | < 0.020                       | < 0.020                       | 100                             | No                                                                       |
| Aliphatic >C8 - C10                                  | 1                 | < 0.050                       | < 0.050                       | 27                              | No                                                                       |
| Aliphatic >C10 - C12                                 | 1                 | < 1                           | < 1                           | 130                             | No                                                                       |
| Aliphatic >C12 - C16                                 | 1                 | < 2                           | < 2                           | 1,100                           | No                                                                       |
| Aliphatic >C16 - C21                                 | 1                 | < 8                           | < 8                           | 65,000                          | No                                                                       |
| Aliphatic >C21 - C35                                 | 1                 | < 8                           | < 8                           |                                 |                                                                          |
| Aliphatic >C35 – C40                                 | 1                 | < 10                          | < 10                          | 65,000                          | No                                                                       |
| Aromatic >C5 - C7                                    | 1                 | < 0.010                       | < 0.010                       | 70                              | No                                                                       |
| Aromatic >C7 - C8                                    | 1                 | < 0.010                       | < 0.010                       | 130                             | No                                                                       |
| Aromatic >C8 - C10                                   | 1                 | < 0.050                       | < 0.050                       | 34                              | No                                                                       |
| Aromatic >C10 - C12                                  | 1                 | < 1                           | < 1                           | 74                              | No                                                                       |
| Aromatic >C12 - C16                                  | 1                 | < 2                           | < 2                           | 140                             | No                                                                       |
| Aromatic >C16 - C21                                  | 1                 | < 10                          | < 10                          | 260                             | No                                                                       |
| Aromatic >C21 - C35                                  | 1                 | < 10                          | < 10                          | 1,100                           | No                                                                       |
| Aromatic >C35 – C40                                  | 1                 | < 10                          | < 10                          | 1100                            | No                                                                       |
| Benzene                                              | 1                 | < 5                           | < 5                           | 0.087                           | No                                                                       |
| Toluene                                              | 1                 | < 5                           | < 5                           | 130                             | No                                                                       |
| Ethylbenzene                                         | 1                 | < 5                           | < 5                           | 47                              | No                                                                       |
| m,p-Xylene                                           | 1                 | < 5                           | < 5                           | 56                              | No                                                                       |
| o-Xylene                                             | 1                 | < 5                           | < 5                           | 60                              | No                                                                       |
| POLYCYCLIC-AROMATIC HYDROCARBONS                     |                   |                               |                               |                                 |                                                                          |

|                        |   |        |        |       |    |
|------------------------|---|--------|--------|-------|----|
| Acenaphthene           | 4 | < 0.05 | 0.15   | 210   | No |
| Acenaphthylene         | 4 | < 0.05 | < 0.05 | 170   | No |
| Anthracene             | 4 | < 0.05 | 0.49   | 2,400 | No |
| Benzo(a)anthracene     | 4 | < 0.05 | 1.4    | 7.2   | No |
| Benzo(a)pyrene         | 4 | 0.19   | 1.3    | 2.2   | No |
| Benzo(b)fluoranthene   | 4 | 0.17   | 1.50   | 2.6   | No |
| Benzo(ghi)perylene     | 4 | < 0.05 | 0.56   | 320   | No |
| Benzo(k)fluoranthene   | 4 | 0.13   | 0.76   | 77    | No |
| Chrysene               | 4 | 0.17   | 1.40   | 15    | No |
| Dibenzo(a,h)anthracene | 4 | < 0.05 | 0.14   | 0.24  | No |
| Fluoranthene           | 4 | 0.33   | 2.9    | 280   | No |
| Fluorene               | 4 | < 0.05 | 0.13   | 170   | No |
| Indeno(1,2,3-cd)pyrene | 4 | < 0.05 | 0.51   | 27    | No |
| Naphthalene            | 4 | < 0.05 | 0.08   | 2.3   | No |
| Phenanthrene           | 4 | 0.13   | 1.6    | 95    | No |
| Pyrene                 | 4 | 0.3    | 2.6    | 620   | No |

MARKER FOR VOLATILE ORGANIC COMPOUND

|                                |   |     |     |    |    |
|--------------------------------|---|-----|-----|----|----|
| Methyl tert-butyl ether (MTBE) | 1 | < 5 | < 5 | 49 | No |
|--------------------------------|---|-----|-----|----|----|

The derivation of the Soil Assessment Criteria used within this report can be seen within Appendix E. The soil concentrations were typically compared to the LQM/CIEH Suitable for Use Levels (S4UL) (2014), based upon the assumption of 1% soil organic matter. A screening value for Lead is based on the Category 4 Screening Levels (C4SLs). Where no S4UL or C4SL is available for Cyanide, a SoBRA acute GAC is assigned. Where no S4UL or C4SL is available for MTBE, a CL:AIRE 2010 GAC is assigned. Where exceedances are noted, the trial hole and depth of sample is recorded.

The proposed development includes areas of soft-landscaping, where shallow rooted vegetation may be exposed to aggressive ground conditions. The previous table compares the results of the laboratory analysis to GAC that is protective of Human Health and therefore different GAC is required for vegetation.

| Soil Contamination Test Results and Screening Value |                   |                               |                               |                                 |                                                                          |
|-----------------------------------------------------|-------------------|-------------------------------|-------------------------------|---------------------------------|--------------------------------------------------------------------------|
| Determinand                                         | Number of Samples | Minimum Concentration (mg/kg) | Maximum Concentration (mg/kg) | Adopted Screening Value (mg/kg) | Was the adopted screening value exceeded for relevant land-use scenario? |
| Copper                                              | 4                 | 14                            | 21                            | 100                             | No                                                                       |
| Nickel                                              | 4                 | 9.1                           | 12                            | 60                              | No                                                                       |
| Zinc                                                | 4                 | 54                            | 150                           | 200                             | No                                                                       |

The derivation of the Soil Assessment Criteria used within this report can be seen within Appendix E. The soil concentrations were compared to BS3882:2015 Specification for Topsoil and based on differing pH. For the purpose of conservatism, the pH of the soils have been assumed to be below 6 within this table. Where exceedances are noted, the trial hole and depth of sample is recorded.

### 5.3.2. Soil Assessment

The comparison between the laboratory analysis and the assessment criteria indicates that there is an unacceptable risk to future receptors caused by exceedances of the following determinands: Lead; Asbestos. The remaining determinands were identified at below the adopted screening value and are

not considered to represent an unacceptable risk to future receptors. Where an unacceptable risk to future receptors remains, mitigation is required.

Lead was noted to be elevated within one sample (BH1/0.80m bgl) at 280mg/kg above the S4UL threshold of 200mg/kg for a 'Residential with Homegrown Produce' land-use scenario.

Due to the nature of the contamination encountered at the site, it is considered that there is an unacceptable risk to future receptors. Remediation, as outlined later within this report is required as part of any site development.

#### Asbestos

Asbestos was identified within one sample (WS101/1.00m) as amosite loose fibres. Quantification was ongoing at the time of reporting. Given the depth that the sample was recorded at and the location, beneath the building footprint there is only considered to be a short-term risk to development/construction workers and more specifically groundworkers from asbestos.

An Asbestos Management Strategy should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination.

#### Ridge and Partners Data – Soil Testing

Testing was undertaken on 9No. samples from across the site area. It should be noted that these were undertaken in areas of external hardstanding or soft landscaping and not within the footprint of the historical buildings on-site. The ground and water data is targeted to the footprint of the former buildings post demolition in order to improve site coverage in these areas.

Asbestos was detected in two of the nine samples tested. WS1-0.30m identified small bundles of chrysotile at <0.001% of the total sample volume. WS2-0.50m identified chrysotile and crocidolite present in microscopic loose fibrous debris <0.003% of the total sample by volume. Asbestos was identified in samples obtained from Made Ground soils only, asbestos was not detected in natural soils.

There were exceedances of the GAC for lead. Samples obtained from WS1-0.30m, WS3-0.70m and WS2-0.50m returned concentrations for lead of 384, 362 and 400mg/kg respectively, which exceeded the GAC of 200mg/kg. All samples exceeding the lead GAC were removed from Made Ground soils, there were no exceedances of natural soils. Following statistical analysis, those samples exceeding the lead GAC can be classified as significant outliers ( $P < 0.05$ ) when compared to the remainder of the Made Ground dataset. Therefore, lead results at WS1-0.30m, WS3-0.70m and WS2-0.50m are considered to represent isolated lead contamination 'hotspots'.

There were five exceedances of the PAH GAC, all returned from one sample WS1-0.30m. The sample was obtained from Made Ground comprising brick. There were no exceedances of natural soils. Following statistical analysis, all determinands exceeding PAH GAC in the sample obtained from WS1 at 0.30m can be classified as significant outliers ( $P < 0.05$ ) when compared to the remainder of the Made Ground dataset. Therefore, PAH results at WS1-0.30m are considered to represent an isolated PAH contamination 'hotspot'.

### 5.3.3. Water Supply Pipe Risk Assessment

As part of the proposed development it is expected that new water supply pipes will be installed at the site. Water supply pipes have the potential to be exposed to contaminants in the ground that can lead to unacceptable concentrations within the drinking water. If a risk is identified, specialist pipes that are protective of the drinking water are required.

A pipe selection risk assessment should be submitted to the water supply company as part of the development based on the supplier's assessment criteria. An indication of whether there is likely to be a risk can be seen tabulated below, where the PE pipe thresholds are based on UKWIR Contaminated Land Assessment Guidance, 2014.

| Pipe Selection Risk Assessment             |                           |                                   |                             |
|--------------------------------------------|---------------------------|-----------------------------------|-----------------------------|
| Determinand                                | PE Pipe Threshold (mg/kg) | Laboratory Analysis Range (mg/kg) | Was the Threshold Exceeded? |
| Total BTEX and MTBE                        | 0.1                       | < 5                               | No                          |
| Total VOCs                                 | 0.5                       | Marker compounds at lab LOD       | No                          |
| Total SVOCs                                | 2                         | Marker compounds at lab LOD       | No                          |
| Phenols                                    | 2                         | < 1                               | No                          |
| TPH EC5 – EC10 (aliphatics and aromatics)  | 2                         | < 0.05                            | No                          |
| TPH EC10 – EC16 (aliphatics and aromatics) | 10                        | < 4                               | No                          |
| TPH EC16 – EC40 (aliphatics and aromatics) | 500                       | < 20                              | No                          |
| Naphthalene                                | 5                         | < 0.05 – 0.08                     | No                          |

The results indicate that no determinands were above the threshold for the use of a PE pipe at the site.

### 5.4. Groundwater Risk Assessment

In the UK, the water environment is protected under a number of regulatory regimes, mainly governed by the Environment Agency. The Environment Agency is consulted when there may be a risk to Controlled Waters, or where a pollution incident has occurred historically. The Water Framework Directive is implemented in various guises covering groundwater, surface water and drinking water supply. In addition to the water environment receptors, contaminated groundwater has the potential to cause unacceptable risk to human health through vapours.

#### 5.4.1. Background Information

The British Geological Survey (BGS) maps and DEFRA online maps for the area suggest that the site was located on superficial Head Deposits within the western half, classified as a Secondary (Undifferentiated) Aquifer, no superficial deposits were recorded within the eastern half of the site. This was underlain by the Bognor Sand Member, classified as a Secondary (A) Aquifer, within the eastern half of the site and the London Clay Formation, classified as Unproductive Strata, within the western half of the site. The superficial and bedrock aquifers are considered to be in hydraulic continuity.

Examination of the Environment Agency records showed that the site did fall within a Zone 1I – Subsurface Activity Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater.

From analysis of hydrogeological and topographical maps the groundwater table was anticipated to be encountered at shallow to moderate depth within the Head Deposits and Bognor Sand Member capping the impermeable London Clay Formation. Perched water was also likely to be found within the Made Ground, especially after periods of intense or prolonged rainfall. It was considered that the groundwater was flowing southwards, towards the Riders stream located on the southern boundary of the site in alignment with local topography.

Riders Stream (main river status) was noted adjacent to the southern boundary of the site, ultimately discharging into an ecological asset named Langstone Harbour. No other surface water features were noted within a 250m radius of the site.

Examination of the Environment Agency records showed that the vast majority of the site was noted to be classified as Flood Zone 1. A small portion of the site, directly adjacent to the Riders Stream, was noted to be classified as Flood Zone 3. The site was not protected by flood defences or benefiting from flood storage.

During the site investigation, Made Ground was encountered to a maximum depth of 2.60m bgl, overlying granular and cohesive deposits of the superficial Head Deposits to depths between 2.80 - >5.45m bgl. This was underlain by cohesive and granular deposits of the Bognor Sand Member to depths between 3.10 – 4.30m bgl. This was underlain by cohesive deposits of the London Clay Formation to the base of the boreholes at depths between >4.60 - >20.00m bgl. Groundwater strikes were recorded between 2.60 – 3.30m bgl within BH101 & BH102 during site works.

Following the site investigation, 6No. return groundwater monitoring visits were undertaken. The groundwater levels can be seen below.

| Summary of Groundwater Observations |            |             |                  |
|-------------------------------------|------------|-------------|------------------|
| Date                                | Trial Hole | Water Level | Final Well Depth |
| 08/08/2024                          | BH01       | 2.10        | 5.20             |
|                                     | BH02       | 2.43        | 3.14             |
|                                     | WS105      | 2.20        | 4.33             |
| 20/09/2024                          | BH01       | DRY         | 4.52             |
|                                     | BH02       | 3.30        | 8.00             |
|                                     | WS105      | 4.23        | 4.44             |
| 27/09/2024                          | BH01       | 1.35        | 5.52             |
|                                     | BH02       | 2.42        | 10.30            |
|                                     | WS105      | -           | -                |
| 02/10/2024                          | BH01       | 1.24        | 5.52             |
|                                     | BH02       | 2.39        | 10.30            |
|                                     | WS105      | -           | -                |
| 04/01/2024                          | BH01       | 1.80        | 5.00             |
|                                     | BH02       | 2.90        | 10.30            |
|                                     | WS105      | -           | -                |
| 07/10/2024                          | BH01       | 2.10        | 5.30             |
|                                     | BH02       | 2.60        | 10.56            |
|                                     | WS105      | -           | -                |

During the monitoring round on the 16<sup>th</sup> August and 27<sup>th</sup> September 2024, samples were recovered from boreholes WS105 and BH101 respectively, following the removal of three times the borehole

volume. Samples were collected within a series of plastic and glass bottles, glass vials and bottles with preservatives to meet the requirements of BS5667 and as requested by the laboratory.

#### Ridge and Partners Data – Water Testing

Testing of the groundwater was undertaken on 3No. samples recovered during a round of monitoring.

There were no exceedances of the GAC, and the majority of results were below LOD.

Analytical results mirror observations made in the field, in that there was no visual/ olfactory evidence of contamination noted during groundwater sampling.

Groundwater was shown to rest at an average of 1.70mbgl. Soil exceedances were identified in soils at 0.30-0.70mbgl and therefore it is unlikely soil contamination has migrated to groundwater.

#### 5.4.2. Level 2 (groundwater) Risk Assessment

As the site is located on a Secondary (Undifferentiated) Aquifer comprising the superficial Head Deposits and a Secondary A Aquifer comprising the bedrock Bognor Sand Member. It is considered that the aquifer may support base flow to rivers and surface water at a local level. It is therefore concluded that the most applicable screening values to be used is the Environmental Quality Standards (EQS), which are protective of ecology within the water. Where no EQS is available, other water quality standards have been noted within the table. A level 2 (groundwater) risk assessment compares the recorded concentration of a determinand to a pre-defined GAC (EQS, USEPA and UK drinking water standard).

The chemical laboratory results are presented in Appendix D and have been summarised within the table below and overleaf. Only determinands that have an appropriate screening value have been included within the table.

| Groundwater Contamination Test Results and Screening Values |                              |                              |                                |                                           |
|-------------------------------------------------------------|------------------------------|------------------------------|--------------------------------|-------------------------------------------|
| Determinand                                                 | Minimum Concentration (µg/l) | Maximum Concentration (µg/l) | Adopted Screening Value (µg/l) | Was the adopted screening value exceeded? |
| INORGANICS                                                  |                              |                              |                                |                                           |
| pH                                                          | 7                            | 10                           | 6.5 – 9.5 <sup>5</sup>         | Yes – BH101                               |
| Cyanide                                                     | < 1                          | 2.7                          | 1 <sup>1</sup>                 | Yes – BH101                               |
| Phenols                                                     | < 1                          | < 1                          | 7.7 <sup>1</sup>               | No                                        |
| METALS                                                      |                              |                              |                                |                                           |
| Arsenic                                                     | 1.09                         | 3.26                         | 50 <sup>1</sup>                | No                                        |
| Boron                                                       | 44                           | 260                          | 750 <sup>1</sup>               | No                                        |
| Cadmium                                                     | < 0.02                       | 0.05                         | 0.08 – 0.25 <sup>1,2</sup>     | No                                        |
| Chromium (III)                                              | < 0.2                        | 17                           | 4.7 <sup>1</sup>               | No                                        |
| Chromium (Hexavalent)                                       | < 5                          | 15                           | 3.4 <sup>1</sup>               | Yes – BH101                               |
| Copper                                                      | 13                           | 14                           | 1 <sup>1,4</sup>               | Yes – BH101                               |
| Lead                                                        | < 0.2                        | 0.2                          | 1.2 <sup>1</sup>               | No                                        |
| Mercury                                                     | < 0.05                       | < 0.05                       | 0.07 <sup>1</sup>              | No                                        |
| Nickel                                                      | 3.3                          | 9.2                          | 4 <sup>1</sup>                 | Yes – BH101                               |
| Selenium                                                    | 1.3                          | 12                           | 7.5 <sup>1</sup>               | Yes – BH101                               |
| Vanadium                                                    | 0.5                          | 18                           | 86 <sup>6</sup>                | No                                        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |        |                            |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|----------------------------|----|
| Zinc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.9    | 5.7    | 10.9 <sup>1,4</sup>        | No |
| PETROLEUM HYDROCARBONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |        |                            |    |
| Aliphatic >C5 – C6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <1     | <1     | 15,000 <sup>3</sup>        | No |
| Aliphatic >C6 – C8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <1     | <1     |                            | No |
| Aliphatic >C8 – C10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <1     | <1     | 300 <sup>3</sup>           | No |
| Aliphatic >C10 – C12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <10    | <10    |                            | No |
| Aliphatic >C12 – C16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <10    | <10    |                            | No |
| Aliphatic >C16 – C21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <10    | <10    | Not derived                | No |
| Aliphatic >C21 – C35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <10    | <10    | Not derived                | No |
| Aromatic >EC5 – EC7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <1     | <1     | 10 <sup>3</sup>            | No |
| Aromatic >EC7 – EC8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <1     | <1     | 700 <sup>3</sup>           | No |
| Aromatic >EC8 – EC10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <1     | <1     | 300 <sup>3</sup>           | No |
| Aromatic >EC10 – EC12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <10    | <10    | 90 <sup>3</sup>            | No |
| Aromatic >EC12 – EC16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <10    | <10    |                            | No |
| Aromatic >EC16 – EC21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <10    | <10    | 90 <sup>3</sup>            | No |
| Aromatic >EC21 – EC35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <10    | <10    |                            | No |
| Total TPH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <10    | <10    | 10 <sup>51</sup>           | No |
| Benzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | < 3    | < 3    | 10 <sup>1</sup>            | No |
| Toluene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | < 3    | < 3    | 74 <sup>1</sup>            | No |
| Ethylbenzene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | < 3    | < 3    | 300 <sup>3</sup>           | No |
| Xylene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | < 3    | < 3    | 15.5-63.6 <sup>1</sup>     | No |
| POLYCYCLIC-AROMATIC HYDROCARBONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |                            |    |
| Anthracene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | < 0.01 | < 0.01 | 0.1 <sup>1</sup>           | No |
| Benzo(a)pyrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | < 0.01 | < 0.01 | 0.00017 <sup>1</sup>       | No |
| Benzo(b)fluoranthene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | < 0.01 | < 0.01 | 7                          | No |
| Benzo(k)fluoranthene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | < 0.01 | < 0.01 |                            | No |
| Benzo(ghi)perylene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | < 0.01 | < 0.01 | 7                          | No |
| Dibenzo(a,h)anthracene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | < 0.01 | < 0.01 | 0.0025 <sup>6</sup>        | No |
| Fluoranthene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | < 0.01 | < 0.01 | 0.0063 <sup>1</sup>        | No |
| Fluorene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | < 0.01 | < 0.01 | 290 <sup>6</sup>           | No |
| Indeno(1,2,3-cd)pyrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | < 0.01 | < 0.01 | 7                          | No |
| Naphthalene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | < 0.01 | < 0.01 | 2 <sup>1</sup>             | No |
| Total EPA-16 PAHs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <0.16  | <0.16  | 0.1 <sup>5</sup>           | No |
| VOLATILE ORGANIC COMPOUNDS (VOCs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |        |                            |    |
| ALL BELOW LABORATORY LIMIT OF DETECTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <3     | <3     | -                          | No |
| SEMI-VOLATILE ORGANIC COMPOUND (SVOCs) (WHERE ABOVE LOD)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |        |                            |    |
| Dimethylphthalate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.39   | 39     | -                          | No |
| Diethyl phthalate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <0.05  | 0.45   | Classed as inert by USEPA. | No |
| Dibutyl phthalate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <0.05  | 0.15   | -                          |    |
| <sup>1</sup> Environmental Quality Standards (EQS)<br><sup>2</sup> Screening value changes as a result of calcium carbonate concentration of aquifer<br><sup>3</sup> WHO Guidelines for drinking water quality, 2022<br><sup>4</sup> Site specific threshold calculated based on the bio-availability per sample<br><sup>5</sup> UK Drinking Water Standards<br><sup>6</sup> United States Environmental Protection Agency<br><sup>7</sup> For the group of priority substances for PAH, the AA EQS in water refer to the concentration of Benzo(a)pyrene on the toxicity of which they are based. Benzo(a)pyrene can be considered as a marker for other PAH's, hence only Benzo(a)pyrene must be monitored for comparison with the AA EQS. |        |        |                            |    |

The level 2 (groundwater) risk assessment has been undertaken and found a number of marginally elevated metals and inorganics within the groundwater on-site. A review of the soils assessment did not identify elevated cyanide within the Made Ground soils on-site. Similarly, other than lead, no metals were noted to be elevated within the Made Ground on-site. The groundwater results do not indicate that lead is elevated within the groundwater. Three other SVOCs were noted to be above the laboratory limit of detection. Research to find a GAC value did not identify a published threshold value within groundwater and therefore they are not considered to pose a vapour risk to the end users.

Given the above the Made Ground soils on-site are not considered to be the source of the elevated determinands found within the groundwater. The understanding of the hydrogeological model indicates that the elevated determinands are likely caused by off-site sources within the nearby site environs, such as the bus depot, works, factory or garage noted within a 100m radius. Therefore, no further action is required. The findings of this risk assessment should be agreed with the Environment Agency.

## 5.5. Ground Gas Risk Assessment

A review of the Phase I desk study, has identified a source of ground gas on-site or within influencing distance of the site that warrants investigation through ground gas monitoring.

The investigation undertaken to date have identified the main sources of ground gases to be associated with the degradation of putrescible material within Made Ground both on-site and off-site, where the off-site sources include the presence of a nearby garages, depots and works. Ground gases have the potential to migrate vertically through preferential pathways and build up within the proposed development, especially enclosed spaces on the ground floor. Based on the preceding information, ground gas monitoring was undertaken at the site.

### 5.5.1. Available Data

#### Soils

An alternative approach to ground gas risk assessment is presented within the CL:AIRE research bulletin RB17 and included within Annex D of BS8485:2015+A1:2019. The method considers the gas generation potential of the soils from data that is not subject to external influences, for example atmospheric pressure can change the recorded flow and concentrations of ground gas during spot monitoring, or a rising groundwater level can displace ground gases in pore spaces. Determination of the characteristic situation is based on the total organic carbon (TOC) of the soils, coupled with any organic-rich material identified within the borehole logs, such as wood gravels. TOC is easily analysed by the laboratory and can also be calculated by the equation outlined below.

$$\text{Total Organic Carbon (TOC)} = 0.58 \times \text{Soil Organic Matter (SOM)} = 1.33 \times \text{Degradable Organic Carbon (DOC)}$$

As part of the ground investigation works, four samples were submitted to the laboratory for analysis, which identified TOC to vary between 0.5 and 0.9% in the Made Ground. The trial hole logs identified the gravels within the Made Ground to comprise; flint, brick, chalk, carbonaceous material and concrete. Made Ground was identified to a maximum depth between 1.10m and 2.60m bgl.

#### Gas Monitoring

In order to assess the ground-gas risk, three combined ground-gas/groundwater monitoring standpipes were installed to a maximum depth of 8.00m bgl. The construction of the wells has been tabulated below.

| Monitoring Well Construction |                               |                               |                       |                                            |
|------------------------------|-------------------------------|-------------------------------|-----------------------|--------------------------------------------|
| Trial Hole                   | Piping internal diameter (mm) | Depth of Installation (m bgl) | Response Zone (m bgl) | Response Zone Strata                       |
| BH101                        | 50                            | 5.00                          | 2.00 – 5.00           | Bognor Sand Member & London Clay Formation |
| BH102                        | 50                            | 8.00                          | 5.00 – 8.00           | London Clay Formation                      |
| WS105                        | 50                            | 4.50                          | 1.10 – 4.50           | Head Deposits & Bognor Sand Member         |

Ground-gas monitoring has been undertaken on six occasions by a representative of Ground and Water Limited using a GasData GFM436 landfill gas analyser, where monitoring was undertaken during a combination of atmospheric pressures and pressure trends. During monitoring the borehole flow, as well as concentrations of methane, carbon dioxide, carbon monoxide and hydrogen sulphide were recorded. In addition to the borehole readings, a reading was taken from the ambient air of the site to ensure that the gas analyser was functioning correctly.

The results of the ground-gas monitoring have been tabulated below and the full Ground and Water Limited monitoring results are provided within Appendix F. Where the reliability of the monitoring results will require consideration in line with CIRIA C665 and BS8485:2015+A1:2019, the table has been highlighted orange.

| Ground-Gas Monitoring Results |                                 |                                 |                               |                                |                  |                          |                                |
|-------------------------------|---------------------------------|---------------------------------|-------------------------------|--------------------------------|------------------|--------------------------|--------------------------------|
| Trial Hole                    | Highest CH <sub>4</sub> (% v/v) | Highest CO <sub>2</sub> (% v/v) | Lowest O <sub>2</sub> (% v/v) | Highest H <sub>2</sub> S (ppm) | Highest CO (ppm) | Highest Flow Rate (l/hr) | Shallowest Groundwater (m BGL) |
| Ambient Air                   | 0.00                            | 0.00                            | 19.50 <sup>6</sup>            | 0                              | 0                | n/a                      | n/a                            |
| BH101                         | 0.00                            | 2.90 <sup>2</sup>               | 14.20 <sup>1</sup>            | 0                              | 0                | 0.00                     | 1.24 <sup>4</sup>              |
| BH102                         | 0.00                            | 4.60 <sup>5</sup>               | 14.80 <sup>1,5</sup>          | 0                              | 0                | 0.00                     | 2.39 <sup>4</sup>              |
| WS105                         | 0.00                            | 12.00 <sup>1</sup>              | 2.30 <sup>1</sup>             | 0                              | 0                | 0.00                     | 2.20 <sup>1</sup>              |

Notes: Number <sup>1,2 etc.</sup> indicates monitoring round when recorded.

It should be noted that a number of the wells were recorded as flooded, and therefore the data within the table above has been highlighted orange when the readings occurred in flooded wells. No methane was encountered during the monitoring rounds. Carbon dioxide was encountered in all boreholes at a maximum concentration of 12.00%v/v, and was elevated during all the monitoring visits undertaken. No positive flow was encountered.

### 5.5.2. Data Quality

A review was made of the quality of the available data for the site, which can be viewed in the table below. CIRIA Report C665 (2007), BS 8485:2015+A1:2019 and BS 8576:2013 stress the need for risk assessments to be based on good quality data and give guidance as to best practice in this respect.

| Review of Data Quality |                       |             |                |
|------------------------|-----------------------|-------------|----------------|
| Data Type              | Current Understanding | UK Practice | Recommendation |

| Review of Data Quality                     |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                            |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Geological and hydro-geological conditions | The CSM identified the site to be located on Made Ground to a depth of 2.60m bgl, overlying both permeable and impermeable strata of the Head Deposits and Bognor Sand Member. Groundwater has been encountered at shallow depth during drilling and monitoring. | CIRIA C665 & C659, Wilson and Card (1999) and BS 8485 recommend that geology and hydrogeology be fully understood.                                                                                                                                                                                             | The geological and hydrogeological model is understood to a standard that will not compromise the findings of the risk assessment.<br><br>No further action required.                                                                      |
| Soil Laboratory Analysis                   | A dataset of soil analysis from 4No. samples have identified a range of TOC concentrations between 0.5% and 0.9%.                                                                                                                                                | CL:AIRE RB17 outlines an approach to ground gas risk assessment away from the influences that directly affect ground gas monitoring. It should typically be used on sites with limited sources identified in the CSM and Made Ground with average thickness <3m and maximum thickness <5m. TOC should be < 4%. | The TOC concentrations are below the limit of 4% in order to use the soil derived approach for the risk assessment.<br><br>No further action required.                                                                                     |
| Monitoring period                          | The monitoring has been undertaken on a total of six occasions to date.<br><br>Monitoring has been undertaken during a variety of atmospheric conditions including periods of falling, steady and rising pressure.                                               | CIRIA C665 and BS 8576 recommends monitoring over a range of weather conditions. Concentrations of ground gas are likely to be highest during falling pressures, with sharp falls providing the worst-case results. In line with CIRIA C665 / BS8576 a minimum of 6No. monitoring visits are required.         | Monitoring should be undertaken over a 2 month period with between weekly and fortnightly readings.<br><br>Monitoring has been undertaken during atmospheric pressures of between 986.3 and 1016.5 mbar<br><br>No further action required. |
| Gas data sets                              | Carbon dioxide concentrations were recorded up to 12.00%. No methane, hydrogen sulphide or carbon monoxide has been detected during monitoring. No positive flow rates were recorded.                                                                            | Borehole flow velocity and borehole gas volume (methane and carbon dioxide) are required for ground gas flux categorisation. Modified Wilson and Card classification, CIRIA C665 (2007), BS8485:2015+A1:2019.                                                                                                  | 6No. suitable gas datasets are available for the risk assessment.<br><br>No further action required.                                                                                                                                       |

### 5.5.3. Risk Assessment

#### Soil Derived Method

The intrusive investigation has revealed a maximum thickness of Made Ground of 2.60m overlying both granular and cohesive Head Deposits and Bognor Sand Member. These deposits were underlain by cohesive deposits of the London Clay Formation. Site has undergone a previous phase of construction and limited degradable material has been identified. The introduction of oxygen to the Made Ground through redevelopment may lead to an initial increase of ground gas generation as degradable material within the soils present on-site may act as source of ground gas. The soils at the site are considered to be of variable permeability (low to high) in nature and pathways for ground gas migration will be present.

An alternative approach for ground gas risk assessment (CL:AIRE RB17) can be considered utilising measured concentrations from soil parameters that are independent of influencing factors such as atmospheric pressure and groundwater level. Total Organic Carbon (TOC) was tested on 4No. samples with the analytical results ranging between 0.5 and 0.9%. Furthermore, it is considered that a thickness of 1.10 - 2.60m would not generate sufficient ground gas to pose an unacceptable risk.

Using the soil derived method, it is considered that a TOC value of <1% within soil is unlikely to pose an unacceptable risk from ground gases and the site can be characterised as Characteristic Situation CS1. Any value between 3 and 6% warrants classification as a Characteristic Situation CS3. Any value over 6% requires investigation through ground gas monitoring. Any site with Made Ground <1.00m bgl will have a limited gas generation potential from the organic carbon present and consideration should be given to this thickness within the risk assessment.

Based on the soil derived method outlined and the maximum TOC concentration encountered, the soils from site would warrant classification as Characteristic Situation CS1. It should be noted that this only represents the assessment from an on-site source.

#### Gas Monitoring Data

The ground gas monitoring undertaken to date has been reviewed and following any omissions caused by contradiction of the UK guidance (e.g. flooded wells), is deemed suitable for use in the risk assessment. The monitoring undertaken recorded carbon dioxide concentrations of up to 12.00%v/v and no positive flow was recorded.

Based on the documentation presented in BS 8485:2015+A1:2019 “Code of practice for the characterisation and remediation from ground gas in affected developments”, the hazardous gas flow rate ( $Q_{hg}$ ) should be calculated for each borehole using the equation below.

$$Q_{hg} = (C_{hg}/100) * q$$

Where:  $Q_{hg}$  is the measured hazardous gas concentration (in percentage volume-by-volume);  
 $q$  is the flow rate (in litres per hour) of combined gases found by direct measurement.

The hazardous gas flow rate has been calculated for each borehole, referred to as the Gas Screening Value (GSV) using the worst-case steady-state concentration and flow, from all monitoring to date. The results are presented within the table below. Following the generation of the GSV, a ground gas characteristic situation can be assigned to the borehole. This has also been included within the table below.

| Hazardous Gas Flow Rate Assessment |                           |                           |                     |                               |                             |                               |                             |
|------------------------------------|---------------------------|---------------------------|---------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------------|
| Trial Hole                         | CH <sub>4</sub><br>(%v/v) | CO <sub>2</sub><br>(%v/v) | Flow Rate<br>(l/hr) | CH <sub>4</sub> GSV<br>(l/hr) | Characteristic<br>Situation | CO <sub>2</sub> GSV<br>(l/hr) | Characteristic<br>Situation |
| BH101                              | 0.0                       | 2.90                      | 0.0                 | 0.0000                        | CS1                         | 0.0029                        | CS1                         |
| BH102                              | 0.0                       | 4.60                      | 0.0                 | 0.0000                        | CS1                         | 0.0046                        | CS1                         |
| WS105                              | 0.0                       | 12.00                     | 0.0                 | 0.0000                        | CS1                         | 0.0120                        | CS1                         |

<sup>1</sup>Where a value of 0.0 %v/v is detected the detection error is to be used of 0.2%v/v for methane.

<sup>2</sup>Where a value of 0.0 %v/v is detected the detection error is to be used of 0.1%v/v for carbon dioxide.

<sup>3</sup>Where a value of 0.0 l/hr is detected the detection error is to be used of 0.1 l/hr for flow.

<sup>4</sup>CS1 typically when <1% methane and <5% carbon dioxide otherwise consider an increase to CS2.

Based upon the available ground gas monitoring to date, the risk from ground gas is considered to be very low (CS1), in accordance with BS8485:2015+A1:2019. Carbon monoxide and hydrogen sulphide was not detected at a concentration to warrant further assessment.

Consideration is required to any GSV that falls into the CS1 category, however the methane concentration is greater than 1% and/or the carbon dioxide concentration is greater than 5%. These locations are typical of sites where the hazardous gas concentration is significant, however marginal flow has been recorded during monitoring. It should be noted that consideration does not indicate that an increase is required. The monitoring results indicate due to the elevated Carbon Dioxide results, consideration for an increase is required.

Assessing the sufficiency of the data is a requirement of BS 8576:2013, to determine whether further monitoring is required and the impact that this may have on the risk assessment. The current worst-case scenario is within WS105, which has identified a carbon dioxide GSV of 0.0120 l/hr. A GSV of 0.07 l/hr or above would result in an increase to Characteristic Situation CS2. Should the flow rate remain (0.1l/hr), a carbon dioxide concentration of 70% would be required to increase the classification to CS2. The understanding of the CSM indicates that this is unlikely to occur, however a slight increase may be plausible. Should the concentration of carbon dioxide remain constant (12.00%), a borehole flow rate of 0.583l/hr would be required to increase the classification to CS2. This increase in flow is possible within the understanding of the CSM. A worst-case falling pressure has been noted during monitoring.

#### Ridge and Partners Data – Gas Monitoring

Gas Monitoring was undertaken on 5No. rounds by Ridge and Partners on 3No. wells installed across the site area. A snippet of the Monitoring Results summary has been included below.

Results from the monitoring programme are summarised in the table below. Atmospheric pressure was noted to be decreasing during monitoring rounds 2 and 5. Monitoring sheets can be viewed in Appendix 3.

|                             | WS1  | WS7   | WS8  | Worst Case |
|-----------------------------|------|-------|------|------------|
| Max. Flow Rate (L/hr)       | 0    | 0.30  | 0.10 | 0.30       |
| Peak CH <sub>4</sub> (%)    | 0.20 | 59.70 | 0.20 | 59.70      |
| Peak CO <sub>2</sub> (%)    | 9.60 | 1.10  | 6.80 | 9.60       |
| Min. O <sub>2</sub> (%)     | 0.90 | 0.60  | 7    | 0.60       |
| Max. H <sub>2</sub> S (ppm) | 0    | 0     | 0    | 0          |
| Max. CO (ppm)               | 84   | 0     | 2    | 84         |
| VOCs (ppm)                  | 0.40 | 0.26  | 0.39 | 0.40       |

Flow was recorded at a maximum of 0.30L/hr. Methane was consistently high in WS7, with a maximum of 59.70% recorded, although it is likely equilibrium levels are closer to 10.70% which was recorded during the last monitoring round. Methane was less than 1% across the remainder of the monitoring wells. Carbon dioxide was recorded above 5% within two of the three monitoring wells with a maximum of 9.60% recorded at WS1 during monitoring round 4. Carbon monoxide was generally

below 10ppm, other than that recorded at WS1 during monitoring round 3, where 84ppm was recorded. This reduced to 6ppm after 30 seconds, and to <1ppm thereafter. PID results were all below 1ppm across the monitoring programme. The results find a classification of the site as CS2.

#### 5.5.4. Ground Gas Risk Assessment Summary

Two methods of ground gas risk assessment have been applied to the site following site investigation, comprising a review of organic content of soils and ground gas monitoring.

A soil derived approach identified soils of the Made Ground was not considered to pose an unacceptable ground gas risk at the site and warrant classification of Characteristic Situation CS1.

The ground gas monitoring and the derived GSVs have indicated that there is a very low risk from ground gases, equating to Characteristic Situation CS1 across the site, however a small increase in borehole flow rate during the final monitoring rounds may result in a Characteristic Situation CS2 classification, as a result of the high CO<sub>2</sub> concentration.

Therefore, based on the evidence available to date, the risk assessment for the site indicates that the site should be classified as Characteristic Situation CS2. All plots on-site require gas protection measures.

Boreholes can act as preferential pathways for ground gas and therefore prior to construction, all boreholes should be suitably decommissioned in line with Environment Agency guidance. This usually comprises pumping liquid grout down a tremie pipe to the base of the borehole, raising as the borehole fills.

The gas protection methods are outlined in BS8485:2015+A1:2019 and should be installed in line with CIRIA C735. The protection measures required are summarised within Section 5.8.

#### 5.6. Vapour Risk Assessment

The CSM identified a source of contamination that may pose an unacceptable risk to receptors through vapours. Best practice is to assess a multiple lines of evidence to identify any vapours that may be present.

##### 5.6.1. Soil Assessment

In order to assess the potential for a vapour risk at the site, soil samples were sent to the laboratory for analysis (Appendix D). The testing suites included contaminants that may be present in the vapour phase (Mercury, Napthalene, TPHs and volatile Organic Compounds (VOCs)) taken within Made Ground samples.

All samples scheduled (4No.) identified VOCs at concentrations lower than the laboratory limit of detection. Two samples of naphthalene were noted to be marginally elevated above the laboratory limit of detection but well below the relevant GAC.

##### 5.6.2. Human Health Risk Assessment from Dissolved Contaminants

In order to assess potential risk to site users, dissolved concentrations of potential contaminants have been compared to generic assessment criteria (GAC<sub>gwvap</sub>) for assessing vapour risk to human health for volatile contaminants in groundwater for a residential end-use, published by the Society for

Brownfield Risk Assessment (SoBRA). The table below and overleaf summarises the results of the laboratory analysis. Potential contaminants have been split into the groups presented in the SoBRA Report. Only determinands of concern that were detected in at least one sample over the monitoring period above the LOD where a SoBRA GAC<sub>gwvap</sub> is published have been included. The results are included as Appendix D.

| Groundwater Contamination Test Results                   |                                      |                                     |                       |
|----------------------------------------------------------|--------------------------------------|-------------------------------------|-----------------------|
| Determinand                                              | SoBRA GAC <sub>gwvap</sub><br>(µg/l) | Laboratory Analysis Range<br>(µg/l) | Was the GAC Exceeded? |
| ORGANIC AND INORGANIC                                    |                                      |                                     |                       |
| Mercury                                                  | 1.1/95                               | <0.05                               | No                    |
| Methyl tert-butyl ether (MTBE)                           | 83,000/7,800,000                     | < 3                                 | No                    |
| PETROLEUM HYDROCARBONS                                   |                                      |                                     |                       |
| ALL BELOW LABORATORY LIMIT OF DETECTION                  | 1,900/190,000                        | <10                                 | No                    |
| POLYCYCLIC-AROMATIC HYDROCARBONS                         |                                      |                                     |                       |
| ALL BELOW LABORATORY LIMIT OF DETECTION                  | 170,000/15,000,000                   | <0.01                               | No                    |
| VOLATILE ORGANIC COMPOUNDS (VOCs)                        |                                      |                                     |                       |
| ALL BELOW LABORATORY LIMIT OF DETECTION                  | 240/22,000                           | <3                                  | No                    |
| SEMI-VOLATILE ORGANIC COMPOUNDS (VOCs) (WHERE ABOVE LOD) |                                      |                                     |                       |
| Dimethylphthalate                                        | -                                    | 0.39 – 39                           | No                    |
| Diethyl phthalate                                        | -                                    | <0.05 – 0.45                        | No                    |
| Dibutyl phthalate                                        | -                                    | <0.05 – 0.15                        | No                    |

The assessment of risk to human health from vapours associated with dissolved contaminants in groundwater summarised in the table above indicates that the majority of the determinands are significantly below the GAC<sub>gwvap</sub> adopted.

The assessment of risk to human health from dissolved contamination in groundwater indicates that the concentrations measured do not represent an unacceptable risk to human health from vapour generation. Therefore no vapour protection measures are required on-site. Similarly, no remediation to the groundwater is considered necessary on-site.

### 5.6.3. Borehole Monitoring

During the monitoring of the boreholes installed, an oil-water interface probe and Photoionization Detector (PID) was utilised. The interface probe did not identify any dense or light non-aqueous phase liquids (DNAPL / LNAPL) during any of the monitoring visits. PID monitoring was undertaken on 6 rounds, on the first monitoring round peak PID readings were noted between 19.1 – 78.2ppm before dropping off after ~30 seconds. On the remaining monitoring rounds peak PID readings were recorded between 0.0 – 6.7ppm. Given the dataset the average peak PID reading fell well below the 10ppm threshold for further works. The conceptual site model indicates that sources of vapours are from off-site and would therefore have to be dissolved within the groundwater on-site as the Made Ground identified was primarily cohesive to a depth of 1.10m bgl. Direct testing for VOCs and SVOCs within the groundwater identified all determinands other than 3No. to be below the laboratory limit of detection. Therefore no unacceptable risk is considered to be present and no vapour protection measures are required on-site.

## 5.7. Updated Conceptual Site Model

Following completion of the Phase 2 Site Investigation, the CSM, inclusive of associated risk, within Section 2.8 of this report was re-evaluated.

For ease of reference and understanding, the risks have been re-assigned within this risk assessment against three possible levels / categories, summarised in the table below.

| Risk Categories used in the Tabulated CSM |                                                                                                                                                                               |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Low Risk                                  | Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors.           |
| Moderate Risk                             | Regarding this potential SPR linkage, the site is suitable for the proposed end-use however remediation and/or further investigation is required.                             |
| High Risk                                 | Regarding this potential SPR linkage, the site is not suitable for proposed end-use and there is an unacceptable risk to receptors. Urgent action required in the short term. |

| Tabulated Conceptual Site Model – Pollutant Linkage Summary                                                                                 |                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                      | (On-Site Sources)                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Potential Sources                                                                                                                           | Potential Absorption Pathways                                                                                                                                                                                                                                                                                                                                        | Potential Receptors                                                                                                                                                                                                                                  | Risk Classification                                                                                         |
| <p>Made Ground from construction/ demolition activities:</p> <p>Asbestos, PAHs, TPHs, VOCs, - Low risk Sulphates, and Metals.</p>           | <p>Direct ingestion of soil and soil derived dust</p> <p>Dermal contact of soil and soil derived dust</p> <p>Inhalation of dust (indoors and outdoors) with elevated concentration of determinands</p> <p>Ingestion of home-grown produce, and soils attached</p> <p>Direct ingestion of groundwater</p> <p>Inhalation of volatile vapour (indoors and outdoors)</p> | <p>Human Health</p> <p>End Users (Residents/Future site visitors)</p> <p>Construction workers during development</p> <p>Site operatives during maintenance works</p> <p>Neighbours and public</p>                                                    | <p><b>Moderate – Engineered Capping System within Private Gardens and Soft Landscaped Areas On-site</b></p> |
|                                                                                                                                             | <p>Direct uptake of groundwater</p> <p>Direct uptake of determinands in the soil</p>                                                                                                                                                                                                                                                                                 | <p>Flora and Fauna</p> <p>Vegetation within soft landscaped areas</p>                                                                                                                                                                                | <p><b>Moderate – Suitable growing medium required.</b></p>                                                  |
|                                                                                                                                             | <p>Anthropogenic (man-made) pathways</p> <p>Vertical and lateral migration in permeable strata</p> <p>Surface water runoff</p>                                                                                                                                                                                                                                       | <p>Controlled Waters</p> <p>Secondary (Undifferentiated) Aquifer &amp; Secondary A Aquifer</p> <p>Riders Stream</p>                                                                                                                                  | <p><b>Low</b></p>                                                                                           |
| <p>Aggressive ground conditions with Made Ground and natural ground, including groundwater:</p> <p>Sulphates, PAH/TPH.</p>                  | <p>Direct contact with aggressive ground conditions</p>                                                                                                                                                                                                                                                                                                              | <p>Building Materials and Services</p> <p>Buried Concrete</p> <p>Underground services (water pipes)</p>                                                                                                                                              | <p><b>Low</b></p>                                                                                           |
| <p>Ground gases generated by Made Ground and organic materials:</p> <p>Methane, Carbon Dioxide, Hydrogen Sulphide, and Carbon Monoxide.</p> | <p>Migration through anthropogenic &amp; natural pathways</p> <p>Inhalation of Asphyxiating gases</p> <p>Explosion (methane only)</p>                                                                                                                                                                                                                                | <p>Human Health</p> <p>End Users (Residents/Future site visitors)</p> <p>Construction workers during development (especially in confined spaces)</p> <p>Site operatives during maintenance works in confined spaces</p> <p>Neighbours and public</p> | <p><b>Moderate – Site Classified as CS2</b></p>                                                             |
|                                                                                                                                             | <p>Migration through anthropogenic &amp; natural pathways</p> <p>Explosion (methane only)</p>                                                                                                                                                                                                                                                                        | <p>Building Materials and Services</p> <p>Buildings</p> <p>Confined spaces</p> <p>Underground services</p>                                                                                                                                           | <p><b>Moderate – Site Classified as CS2</b></p>                                                             |

| Tabulated Conceptual Site Model – Pollutant Linkage Summary                                                                                                      |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                         | (Off-Site Sources)                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Potential Sources                                                                                                                                                | Potential Absorption Pathways                                                                                                                                                                                                                                                                             | Potential Receptors                                                                                                                                                                                                     | Risk Classification               |
| <p>Made Ground from nearby construction and demolition works:</p> <p>Asbestos, PAHs, TPHs, VOCs, Sulphates, and Metals.</p>                                      | <p>Direct ingestion of soil and soil derived dust</p> <p>Dermal contact of soil and soil derived dust</p> <p>Inhalation of dust (indoors and outdoors) with elevated concentration of determinands</p> <p>Direct ingestion of groundwater</p> <p>Inhalation of volatile vapour (indoors and outdoors)</p> | <p>Human Health</p> <p>End Users (Residents/Future site visitors)</p> <p>Construction workers during development</p> <p>Site operatives during maintenance works</p>                                                    | Low                               |
|                                                                                                                                                                  | <p>Direct uptake of groundwater</p>                                                                                                                                                                                                                                                                       | <p>Flora and Fauna</p> <p>Vegetation within soft landscaped areas</p>                                                                                                                                                   | Low                               |
| <p>Aggressive ground conditions associated with impacted groundwater;</p> <p>Sulphates, PAH/TPH.</p>                                                             | <p>Direct contact with aggressive ground conditions</p>                                                                                                                                                                                                                                                   | <p>Building Materials and Services</p> <p>Buried Concrete</p> <p>Underground services (water pipes)</p>                                                                                                                 | Low                               |
| <p>Ground gases generated by Made Ground:</p> <p>Methane, Carbon Dioxide, Hydrogen Sulphide, and Carbon Monoxide.</p>                                            | <p>Migration through anthropogenic &amp; natural pathways</p> <p>Inhalation of Asphyxiating gases</p> <p>Explosion (methane only)</p>                                                                                                                                                                     | <p>Human Health</p> <p>End Users (Residents/Future site visitors)</p> <p>Construction workers during development (especially in confined spaces)</p> <p>Site operatives during maintenance works in confined spaces</p> | Moderate – Site Classified as CS2 |
|                                                                                                                                                                  | <p>Migration through anthropogenic &amp; natural pathways</p> <p>Explosion (methane only)</p>                                                                                                                                                                                                             | <p>Building Materials and Services</p> <p>Buildings</p> <p>Confined spaces</p> <p>Underground services</p>                                                                                                              | Moderate – Site Classified as CS2 |
| <p>Contaminants associated with off site depots, vehicle repair, service centre factory and works:</p> <p>Asbestos, PAHs, TPHs, VOCs, Sulphates, and Metals.</p> | <p>Direct ingestion of soil and soil derived dust</p> <p>Dermal contact of soil and soil derived dust</p> <p>Inhalation of dust (indoors and outdoors) with elevated concentration of determinands</p> <p>Direct ingestion of groundwater</p> <p>Inhalation of volatile vapour (indoors and outdoors)</p> | <p>Human Health</p> <p>End Users (Residents/Future site visitors)</p> <p>Construction workers during development</p> <p>Site operatives during maintenance works</p>                                                    | Low                               |
|                                                                                                                                                                  | <p>Direct uptake of groundwater</p>                                                                                                                                                                                                                                                                       | <p>Flora and Fauna</p> <p>Vegetation within soft landscaped areas</p>                                                                                                                                                   | Low                               |

## 6. CONTAMINATION RECOMMENDATIONS AND REMEDIATION STRATEGY

Based on the results of the intrusive works, chemical analyses and risk assessments undertaken, the following has been identified that requires further action:

Three contaminants (lead, PAHs & asbestos) have been found at an unacceptable concentrations within the soils across the site.

Gas protection measures are required in line with the requirements of Characteristic Situation CS2.

An Asbestos Management Strategy should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination.

### 6.1. Soils

The soil remediation has been split into private garden areas and communal soft landscaped areas.

#### Private Garden Areas

The highest exceedance of contaminants has been identified as PAHs at ~7 times the assessment criteria. Since the exceedances is considered to be significant (more than 5-6 times the assessment criteria), the BRE "Cover Systems for Land Generation" is not appropriate. An engineered capping system should be considered applicable within all soft landscaped areas.

Based on the available information within this report it was proposed that the following remedial methodology should be undertaken within all private garden areas:

- Reduce dig of 600mm;
- Placement of 150mm anti-dig layer, overlaid by a geotextile marker membrane;
- Placement of 450mm clean capping of soil;
- Validation of the clean capping system by a suitably trained Ground and Water Limited engineer.

Full liaison must be made with the statutory authority, prior to the implementation of this remediation strategy and/or removal of soils from the site. All works must be undertaken to meet their approval.

#### 6.1.1. 600mm Reduce Dig

Made Ground should be removed from the locations to a minimum depth of 0.60m bgl to allow for the placement of the engineered capping system. On sites where levels are raised, the imported materials should be clean and validated, and can therefore enable a reduction in the reduce level dig. Should site levels be lowered, or natural soils encountered, samples of the natural soils should be sent to the laboratory for testing. If the soils are deemed suitable for use, the risk assessment should be revisited and a new remediation strategy agreed with the regulators.

Materials should be removed and stockpiled on an impermeable liner with raised edges and covered at all times. This contamination stockpile destined for removal from site should be stored away from imported soils to avoid cross-contamination. Materials to be removed off-site must be classified by carrying out Waste Acceptance Produce (WAP) testing. A registered contractor must undertake the

removal of waste. Consignment notes for the removal of waste must be obtained and kept for inclusion within the final validation Report.

#### 6.1.2. 150mm Anti-dig layer and Marker Membrane

Following the excavation of the 600mm reduce dig, the void should be infilled with 150mm thick anti-dig layer comprising gap graded certified clean material (e.g. recycled crushed concrete), free from rebar and debris.

Following placement of the anti-dig layer a geotextile marker membrane should be placed to act as a barrier between the clean soils above and the anti-dig layer and contaminated soils below.

#### 6.1.3. 450mm Clean Capping of Soil

The capping system should be at least 450mm in thickness within all garden areas and soft landscaping. It is recommended that at least the top 150mm of the clean capping should comprise suitable topsoil for use as a growing medium. It is a requirement that this should be no less than 100mm thick.

All subsoil and topsoil must be fit for purpose to ensure that the receptors cannot come into contact with determinands that could be detrimental to their health, see 'Imported Material' Section 4.8.

#### Communal Soft Landscaped Areas

The highest exceedance of contaminants has been identified as PAHs at ~7 times the assessment criteria. Since the exceedances is considered to be significant (more than 5-6 times the assessment criteria), the BRE "Cover Systems for Land Generation" is not appropriate. An engineered capping system should be considered applicable within all soft landscaped areas.

Based on the available information within this report it was proposed that the following remedial methodology should be undertaken within all communal soft landscaped areas:

- Reduce dig of 450mm;
- Placement of 150mm anti-dig layer, overlaid by a geotextile marker membrane;
- Placement of 300mm clean capping of soil;
- Validation of the clean capping system by a suitably trained Ground and Water Limited engineer.

Full liaison must be made with the statutory authority, prior to the implementation of this remediation strategy and/or removal of soils from the site. All works must be undertaken to meet their approval.

#### 6.1.4. 450mm Reduce Dig

Made Ground should be removed from the locations to a minimum depth of 0.45m bgl to allow for the placement of the engineered capping system. On sites where levels are raised, the imported materials should be clean and validated, and can therefore enable a reduction in the reduce level dig. Should site levels be lowered, or natural soils encountered, samples of the natural soils should be sent to the laboratory for testing. If the soils are deemed suitable for use, the risk assessment should be revisited and a new remediation strategy agreed with the regulators.

Materials should be removed and stockpiled on an impermeable liner with raised edges and covered at all times. This contamination stockpile destined for removal from site should be stored away from imported soils to avoid cross-contamination. Materials to be removed off-site must be classified by carrying out Waste Acceptance Produce (WAP) testing. A registered contractor must undertake the removal of waste. Consignment notes for the removal of waste must be obtained and kept for inclusion within the final validation Report.

#### 6.1.5. 150mm Anti-dig layer and Marker Membrane

Following the excavation of the 450mm reduce dig, the void should be infilled with 150mm thick anti-dig layer comprising gap graded certified clean material (e.g. recycled crushed concrete), free from rebar and debris.

Following placement of the anti-dig layer a geotextile marker membrane should be placed to act as a barrier between the clean soils above and the anti-dig layer and contaminated soils below.

#### 6.1.6. 300mm Clean Capping of Soil

The capping system should be at least 300mm in thickness within all garden areas and soft landscaping. It is recommended that at least the top 150mm of the clean capping should comprise suitable topsoil for use as a growing medium. It is a requirement that this should be no less than 100mm thick.

All subsoil and topsoil must be fit for purpose to ensure that the receptors cannot come into contact with determinands that could be detrimental to their health, see 'Imported Material' Section 4.8.

#### 6.1.7. Validation

The remediation works outlined above will need to be inspected and independently validated by a Ground and Water Limited Engineer. All excavations will need to be inspected, documented and photographed.

The remediation works should be validated through a site visit and photographed by a suitably trained Ground and Water Limited Engineer following the 750mm reduce dig, placement of the no dig layer (prior to placement of the geotextile membrane) and after placement of the clean soils.

Validation holes should prove the depth of the clean cover to the marker membrane to ensure that it is present and enable the sampling of soils. Due to the design of the proposed development, validation should be undertaken at a rate of 1 validation trial hole per area of soft-landscaping and a sample taken equating to 1 sample per 50m<sup>3</sup> imported.

#### 6.1.8. Water Supply Pipes

The Water Supply pipe risk assessment indicated that the use of PE pipes is appropriate at the site and no further measures are required.

### 6.2. Groundwater

The level 2 (groundwater) risk assessment has been undertaken and found a number of marginally elevated metals and inorganics within the groundwater on-site. A review of the soils assessment did not identify elevated cyanide within the Made Ground soils on-site. Similarly, other than lead, no metals were noted to be elevated within the Made Ground on-site. The groundwater results do not

indicate that lead is elevated within the groundwater. Three other SVOCs were noted to be above the laboratory limit of detection. Research to find a GAC value did not identify a published threshold value within groundwater and therefore they are not considered to pose a vapour risk to the end users.

Given the above the Made Ground soils on-site are not considered to be the source of the elevated determinands found within the groundwater. The understanding of the hydrogeological model indicates that the elevated determinands are likely caused by off-site sources within the nearby site environs, such as the bus depot, works, factory or garage noted within a 100m radius. Therefore, no further action is required. The findings of this risk assessment should be agreed with the Environment Agency.

### 6.3. Ground Gas and Vapours

Based on risk assessment undertaken, the site warrants classification as Characteristic Situation CS2, where precautions to prevent the ingress of ground-gas are necessary. Type B buildings on CS2 classified sites require 3.5 points worth of protection, in accordance with BS8485:2015+A1:2019. Points must be made up through a structural barrier, ventilation, and/or membrane, where at least two methods are incorporated.

An example of the gas protection measures that could be adopted are:

Passive sub-floor dispersal layer, typically no fine gravel or polystyrene (1.5 points):

In accordance with BS8485: The volume flow-through rate is governed by the size and number of side vents; for small to medium width buildings (up to 15 m wide – considered to be present onsite), the minimum area of side ventilation should be 1500mm<sup>2</sup>/m run of wall on at least two opposite sides. Where there are multiple internal obstructions to air flow (caused by beams), there should be four or five times the area of the side vents provided in the internal obstructions.

Gas Resistant Membrane (Visqueen gas barrier or similar) meeting the criteria below (2 points):

- Sufficiently impervious to the gases (methane and carbon dioxide);
- Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;
- Sufficiently strong to withstand in-service stresses (e.g. settlement if placed below a floor slab);
- Sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc);
- Capable, after installation, of providing a complete barrier to the entry of the relevant gas;
- Verified by a suitably trained Ground and Water Limited Engineer in accordance with CIRIA C735.

Please note any deviation from the above should meet the points criteria, as outlined within BS8485:2015+A1:2019. Gas protection measures should be suitably designed by a qualified professional following confirmation of the construction design.

#### 6.3.1. Prior to Construction

Prior to construction of the buildings, the following should be undertaken:

The decommissioning of all boreholes beneath the footprint of the building, in line with the EA guidance.

Suitable design of ground gas protection measures.

#### 6.3.2. During Construction

During construction of the structure, the following should be undertaken within each plot:

Following the excavation and construction of foundations, a passive subfloor dispersal layer should be installed, complete with ventilation bricks.

The subfloor dispersal layer should be verified by an appropriately trained Ground and Water Limited Engineer, and photographs obtained.

Following installation of ventilation system, a gas resistant membrane (Visqueen Gas barrier or similar) should be installed by a suitably qualified groundworker prior to pouring of the floor slab.

The gas resistant membrane must be visually verified in accordance with CIRIA C735, by an appropriately trained Ground and Water Limited Engineer, and photographs obtained of all components (overlaps, service entries, corners, repairs). This is required prior to pouring of the floor slab.

The floor slab should be poured to prevent any damage or loss of integrity to the installed ground gas precautions.

#### 6.3.3. Verification

Following completion of all the verification works, outlined above, a report should be submitted to the local authority for approval. This should include as a minimum, verification photographs of the visual checks.

#### Vapours

No vapour protection measures are required on-site.

#### 6.4. Discovery Strategy

There may be areas of contamination that have not been identified during the course of the intrusive investigation (e.g. underground storage tanks). Such occurrences may be discovered during the construction phases for the redevelopment of the site.

Groundworkers should be instructed to report to the Site Manager any evidence for such contamination; this may comprise visual indicators, such as fibrous materials within the soil, discolouration, or odours and emission. Upon discovery advice must be taken from a suitably qualified person and then the Local Authority will need to be informed.

#### 6.5. Imported Material

Any soil which is to be imported onto the site must undergo chemical analysis to prove that it is suitable for the purpose for which it is intended.

The soil must be fit for purpose and must either be supplied with traceable chemical laboratory test certificates or be tested, prior to placing (ideally) and after placing, to ensure that the future receptors (human health and vegetation) cannot come into contact with compounds that could be detrimental

to their health. The compounds that are to be tested for are those given in the Generic Assessment Criteria, which can be viewed in Appendix E of this report.

#### 6.6. Waste Disposal

The excavation of foundations and other soils is likely to produce waste which will require classification and then recycling or removal from site.

Under the Landfill (England and Wales) Regulations 2002 (as amended), prior to disposal, all waste must be classified as either: Inert; Non-hazardous; or Hazardous.

The Environment Agency's Hazardous Waste Technical Guidance (WM3) document outlines the methodology for classifying wastes. Once classified the waste can be removed to the appropriately licensed facilities, with some waste requiring pre-treatments prior to disposal.

Following the investigation, 4No. samples were submitted to the analytical laboratory to undergo a suite of testing for contamination testing, as discussed in the previous sections. Sampling depths were chosen to reflect the receptor of concern, human health, and typically comprised a surface or near surface sample and periodically to 1.00m bgl. Any horizon where olfactory or visual evidence of contamination was present was also sampled.

Based on a risk phase analysis of the chemical laboratory test results, in accordance with EC Hazardous Waste Directive and undertaken by Ground and Water Limited, three soil samples (WS102/0.80m bgl, BH101/0.80m bgl & BH102/0.40m bgl) of Made Ground encountered on-site were NON-HAZARDOUS. Sample WS101/1.00m bgl was found to be HAZARDOUS due to the pH and was flagged for being corrosive. The results of the assessment are given within Appendix G.

It is important to note that whilst we consider our in-house assessment tool to be an accurate interpretation of the requirements of WM3, therefore producing an initial classification in accordance with the guidance, this method classifies soils as either non-hazardous or hazardous and landfill operators have their own assessment tools and can often come to different conclusions. As a result, some landfill operators could refuse to take apparently suitable waste. It is recommended that the receiving landfill views the results of this assessment and the chemical laboratory results to determine their own classification.

In addition to the samples described above, 1No. sample was scheduled to undergo Waste Acceptance Criteria (WAC) testing with single batch leachate. The results indicate that 1No. samples conformed to the Inert Waste Classification.

Where contaminated soils are to be removed, they should be placed on an impermeable membrane (visqueen or similar) to ensure that no cross-contamination of soils occurs.

#### 6.7. Duty of Care

Groundworkers must maintain a good standard of personal hygiene including the wearing of overalls, boots, gloves and eye protectors and the use of dust masks during periods of dry weather.

To prevent exposure to airborne dust by both the general public and construction personnel the site should be kept damp during dry weather and at other times when dust would be generated as a result of construction activities.

The site should be securely fenced at all times to prevent unauthorised access. Washing facilities should be provided and eating restricted to mess huts.

---

# FIGURES



Site Location

NTS

Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

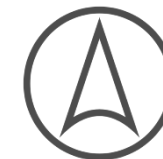
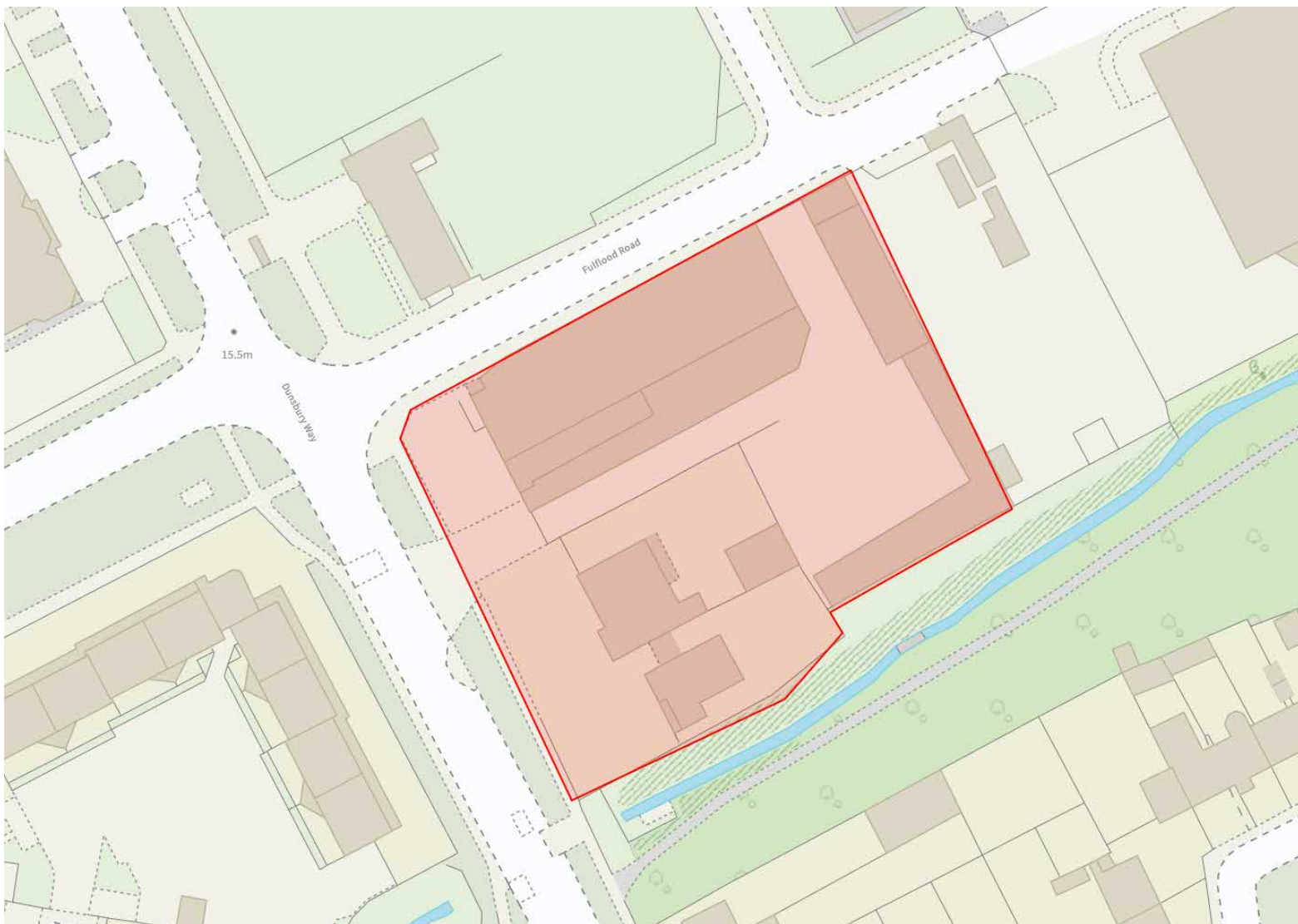
Foreman Homes Limited

October 2024

Figure 1 – Site Location Plan

GWPR6068





Site Boundary

NTS

Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Foreman Homes Limited

October 2024

Figure 2 – Site Development Area

GWPR6068





NTS

Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Foreman Homes Limited

October 2024

Figure 3 – Aerial Photograph

GWPR6068





NTS

Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

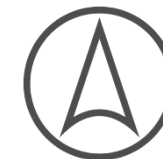
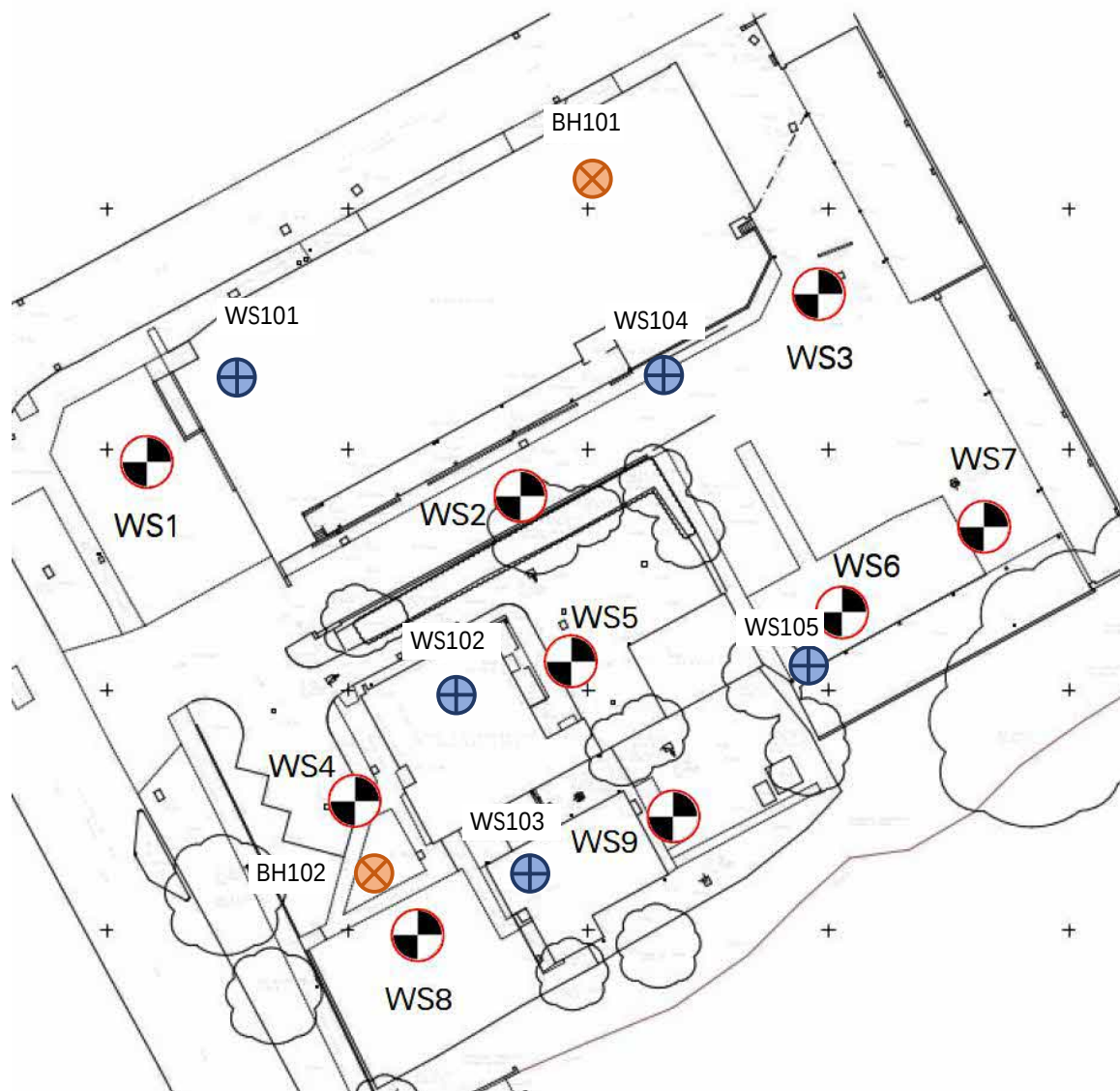
Foreman Homes Limited

October 2024

Figure 4 – Proposed development plan -Site plan

GWPR6068





-  Site boundary
-  Cable Percussion Borehole
-  Windowless Sampler Borehole
-  Ridge Boreholes

NOT TO SCALE

Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Foreman Homes Limited

October 2024

Figure 5 – Trial Hole Location Plan

GWPR6068



# APPENDIX A: Conditions and Limitations

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly, any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist.

The conclusions and recommendations relate to Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

# APPENDIX B:

## Technical Glossary

## TECHNICAL GLOSSARY

The list of possible definitions within the report may be seen below. Please note that some definitions may not be relevant to this report.

### HYDROGEOLOGY:

A Principal Aquifer is a layer of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary (A) Aquifers consist of deposits with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Minor Aquifers.

Secondary (B) Aquifers consist of deposits with predominantly lower permeability layers with may stoke and yield limited amounts of groundwater due to localised features such as fissures, think permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary Aquifers (Undifferentiated) are assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both a minor aquifer and non-aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers.

### FLOOD ZONES:

Environment Agency Flood Zone 2, defined as; land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

Environment Agency Flood Zone 3 shows the extent of a river flood with a 1 in 100 (1%0 or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

Environment Agency Flood Zone 3 area that benefits from flood defences, defined as; land and property in this flood zone would have a high probability of flooding without the local flood defences. These protect the area against a river flood with a 1% chance of happening each year, or a flood from the sea with a 0.5% chance of happening each year.

### GROUNDWATER SOURCE PROTECTION ZONES (SPZS):

Inner Zone (SPZ1): This zone is 50 day travel time of pollutant to source with a 50 metres default minimum radius.

Outer Zone (SPZ2): This zone is 400 day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken.

Total Catchment (SPZ3): This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.

Zone of Special Interest (SPZ4): This zone is where local conditions require additional protection.

#### IN-SITU STRENGTH GEOTECHNICAL TESTING:

Windowless Sample and/or Cable Percussion and/or Rotary Boreholes provide samples of the ground for assessment but they do not give any engineering data. The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide information on the geotechnical engineering properties of soil. The test uses a thick-walled sample tube, with an outside diameter of 50mm and an inside diameter of 35mm, and a length of around 650mm. This is driven into the ground at the bottom of a borehole by blows from a slide hammer with a weight of 63.5kg falling through a distance of 760mm. The sample tube is driven 150mm into the ground and then the number of blows needed for the tube to penetrate each 75mm up to a depth of 450mm is recorded. The sum of the number of blows is termed the "standard penetration resistance" or the "N-value".

Dynamic Probing involves the driving of a metal cone into the ground via a series of steel rods. These rods are driven from the surface by a hammer system that lifts and drops a 63.5kg (SHDP) hammer onto the top of the rods through a set height, thus ensuring a consistent energy input. The number of hammer blows that are required to drive the cone down by each 100mm increment are recorded. These blow counts then provide a comparative assessment from which correlations have been published, based on dynamic energy, which permits engineering parameters to be generated. (The Dynamic Probe 'Super Heavy' (SHDP) Tests were conducted in accordance with BS 1377; 1990; Part 9, Clause 3.2).

# APPENDIX C: Trial Hole Logs

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| Well |
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|      |

# APPENDIX D: Chemical Laboratory Testing

Ground and Water Ltd  
2 The Long Barn  
Norton Farm  
Selbourne Road  
Alton  
Hampshire  
GU34 3NB

i2 Analytical Ltd.  
7 Woodshots Meadow,  
Croxley Green  
Business Park,  
Watford,  
Herts,  
WD18 8YS

e: robert.terrell@groundandwater.co.uk  
myles.finnerty@groundandwater.co.uk

t: 01923 225404  
f: 01923 237404  
e: reception@i2analytical.com

## **Analytical Report Number : 24-032141**

Replaces Analytical Report Number: 24-032141, issue no. 1  
Client references/information amended.  
Site name amended at clients request

|                             |                                                        |                                                        |            |
|-----------------------------|--------------------------------------------------------|--------------------------------------------------------|------------|
| <b>Project / Site name:</b> | Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ | <b>Samples received on:</b>                            | 23/07/2024 |
| <b>Your job number:</b>     | GWPR6068                                               | <b>Samples instructed on/<br/>Analysis started on:</b> | 23/07/2024 |
| <b>Your order number:</b>   | GWPR6068                                               | <b>Analysis completed by:</b>                          | 29/07/2024 |
| <b>Report Issue Number:</b> | 2                                                      | <b>Report issued on:</b>                               | 30/07/2024 |
| <b>Samples Analysed:</b>    | 2 soil samples - 1 leachate sample                     |                                                        |            |

**Signed:**

Adam Fenwick  
Key Account Executive  
**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: 24-032141

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

|                                         |               |                              |
|-----------------------------------------|---------------|------------------------------|
| Lab Sample Number                       | 265002        | 265003                       |
| Sample Reference                        | BH1           | BH2                          |
| Sample Number                           | None Supplied | None Supplied                |
| Depth (m)                               | 0.80-0.80     | 0.40-0.40                    |
| Date Sampled                            | 16/07/2024    | 18/07/2024                   |
| Time Taken                              | None Supplied | None Supplied                |
| Analytical Parameter<br>(Soil Analysis) | Units         | Test Limit of<br>detection   |
|                                         |               | Test Accreditation<br>Status |

|                               |    |      |      |       |       |
|-------------------------------|----|------|------|-------|-------|
| Stone Content                 | %  | 0.1  | NONE | < 0.1 | < 0.1 |
| Moisture Content              | %  | 0.01 | NONE | 14    | 16    |
| Total mass of sample received | kg | 0.1  | NONE | 1.1   | 1.1   |

#### Asbestos

|                                        |      |     |           |              |              |
|----------------------------------------|------|-----|-----------|--------------|--------------|
| Asbestos in Soil Detected/Not Detected | Type | N/A | ISO 17025 | Not-detected | Not-detected |
| Asbestos Analyst ID                    | N/A  | N/A | N/A       | MWI          | MWI          |

#### General Inorganics

|                                                                 |          |              |        |       |       |
|-----------------------------------------------------------------|----------|--------------|--------|-------|-------|
| pH (L005B)                                                      | pH Units | N/A          | MCERTS | -     | 7.5   |
| pH (L099)                                                       | pH Units | N/A          | MCERTS | 10.5  | 8.5   |
| Total Cyanide                                                   | mg/kg    | 1            | MCERTS | < 1.0 | < 1.0 |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1) | mg/kg    | 2.5          | MCERTS | 1900  | 250   |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1)             | mg/l     | 1.25         | MCERTS | 973   | 125   |
| Organic Matter (automated)                                      | %        | 0.1          | MCERTS | 1.1   | 1.5   |
| Total Organic Carbon (TOC) - Automated                          | %        | 0.1          | MCERTS | 0.7   | 0.9   |
| Loss on Ignition @ 450°C                                        | %        | 0.2          | MCERTS | -     | 2.8   |
| Acid Neutralisation Capacity                                    | mmol/kg  | +/-<br>-9999 | NONE   | -     | 4.6   |

#### Total Phenols

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

#### Speciated PAHs

|                        |       |      |           |        |        |
|------------------------|-------|------|-----------|--------|--------|
| Naphthalene            | mg/kg | 0.05 | MCERTS    | 0.06   | < 0.05 |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS    | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS    | 0.1    | < 0.05 |
| Fluorene               | mg/kg | 0.05 | MCERTS    | 0.08   | < 0.05 |
| Phenanthrene           | mg/kg | 0.05 | MCERTS    | 1.6    | 0.13   |
| Anthracene             | mg/kg | 0.05 | MCERTS    | 0.32   | < 0.05 |
| Fluoranthene           | mg/kg | 0.05 | MCERTS    | 2.4    | 0.33   |
| Pyrene                 | mg/kg | 0.05 | MCERTS    | 1.9    | 0.3    |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS    | 1      | 0.16   |
| Chrysene               | mg/kg | 0.05 | MCERTS    | 1.1    | 0.17   |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | ISO 17025 | 1.3    | 0.17   |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | ISO 17025 | 0.48   | 0.13   |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS    | 0.98   | 0.19   |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS    | 0.51   | 0.12   |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS    | 0.14   | < 0.05 |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS    | 0.56   | < 0.05 |
| Coronene               | mg/kg | 0.05 | NONE      | -      | 0.08   |

#### Total PAH

|                             |       |      |           |      |      |
|-----------------------------|-------|------|-----------|------|------|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8  | ISO 17025 | 12.5 | 1.7  |
| Total WAC-17 PAHs           | mg/kg | 0.85 | NONE      | -    | 1.77 |

#### Heavy Metals / Metalloids

|                                  |       |     |        |       |       |
|----------------------------------|-------|-----|--------|-------|-------|
| Arsenic (aqua regia extractable) | mg/kg | 1   | MCERTS | 11    | 8.8   |
| Boron (water soluble)            | mg/kg | 0.2 | MCERTS | 0.6   | 0.5   |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 |
| Chromium (hexavalent)            | mg/kg | 1.8 | MCERTS | < 1.8 | < 1.8 |

Analytical Report Number: 24-032141

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

|                                         |               |                            |                              |               |       |
|-----------------------------------------|---------------|----------------------------|------------------------------|---------------|-------|
| Lab Sample Number                       | 265002        |                            |                              | 265003        |       |
| Sample Reference                        | BH1           |                            |                              | BH2           |       |
| Sample Number                           | None Supplied |                            |                              | None Supplied |       |
| Depth (m)                               | 0.80-0.80     |                            |                              | 0.40-0.40     |       |
| Date Sampled                            | 16/07/2024    |                            |                              | 18/07/2024    |       |
| Time Taken                              | None Supplied |                            |                              | None Supplied |       |
| Analytical Parameter<br>(Soil Analysis) | Units         | Test Limit of<br>detection | Test Accreditation<br>Status |               |       |
| Chromium (aqua regia extractable)       | mg/kg         | 1                          | MCERTS                       | 17            | 23    |
| Copper (aqua regia extractable)         | mg/kg         | 1                          | MCERTS                       | 21            | 14    |
| Lead (aqua regia extractable)           | mg/kg         | 1                          | MCERTS                       | 280           | 66    |
| Mercury (aqua regia extractable)        | mg/kg         | 0.3                        | MCERTS                       | < 0.3         | < 0.3 |
| Nickel (aqua regia extractable)         | mg/kg         | 1                          | MCERTS                       | 9.9           | 12    |
| Selenium (aqua regia extractable)       | mg/kg         | 1                          | MCERTS                       | < 1.0         | < 1.0 |
| Vanadium (aqua regia extractable)       | mg/kg         | 1                          | MCERTS                       | 30            | 38    |
| Zinc (aqua regia extractable)           | mg/kg         | 1                          | MCERTS                       | 150           | 54    |

#### Petroleum Hydrocarbons

|                                                          |       |      |        |   |         |
|----------------------------------------------------------|-------|------|--------|---|---------|
| TPHCWG - Aliphatic >EC5 - EC6 <sub>HS_1D_AL</sub>        | mg/kg | 0.01 | MCERTS | - | < 0.020 |
| TPHCWG - Aliphatic >EC6 - EC8 <sub>HS_1D_AL</sub>        | mg/kg | 0.01 | MCERTS | - | < 0.020 |
| TPHCWG - Aliphatic >EC8 - EC10 <sub>HS_1D_AL</sub>       | mg/kg | 0.01 | MCERTS | - | < 0.050 |
| TPHCWG - Aliphatic >EC10 - EC12 <sub>EH_CU_1D_AL</sub>   | mg/kg | 1    | MCERTS | - | < 1.0   |
| TPHCWG - Aliphatic >EC12 - EC16 <sub>EH_CU_1D_AL</sub>   | mg/kg | 2    | MCERTS | - | < 2.0   |
| TPHCWG - Aliphatic >EC16 - EC21 <sub>EH_CU_1D_AL</sub>   | mg/kg | 8    | MCERTS | - | < 8.0   |
| TPHCWG - Aliphatic >EC21 - EC35 <sub>EH_CU_1D_AL</sub>   | mg/kg | 8    | MCERTS | - | < 8.0   |
| TPHCWG - Aliphatic >EC35 - EC40 <sub>EH_CU_1D_AL</sub>   | mg/kg | 10   | NONE   | - | < 10    |
| TPHCWG - Aliphatic >EC5 - EC35 <sub>EH_CU+HS_1D_AL</sub> | mg/kg | 10   | NONE   | - | < 10    |
| TPHCWG - Aliphatic >EC5 - EC40 <sub>EH_CU+HS_1D_AL</sub> | mg/kg | 10   | NONE   | - | < 10    |

|                                                         |       |      |        |   |         |
|---------------------------------------------------------|-------|------|--------|---|---------|
| TPHCWG - Aromatic >EC5 - EC7 <sub>HS_1D_AR</sub>        | mg/kg | 0.01 | MCERTS | - | < 0.010 |
| TPHCWG - Aromatic >EC7 - EC8 <sub>HS_1D_AR</sub>        | mg/kg | 0.01 | MCERTS | - | < 0.010 |
| TPHCWG - Aromatic >EC8 - EC10 <sub>HS_1D_AR</sub>       | mg/kg | 0.02 | MCERTS | - | < 0.050 |
| TPHCWG - Aromatic >EC10 - EC12 <sub>EH_CU_1D_AR</sub>   | mg/kg | 1    | MCERTS | - | < 1.0   |
| TPHCWG - Aromatic >EC12 - EC16 <sub>EH_CU_1D_AR</sub>   | mg/kg | 2    | MCERTS | - | < 2.0   |
| TPHCWG - Aromatic >EC16 - EC21 <sub>EH_CU_1D_AR</sub>   | mg/kg | 10   | MCERTS | - | < 10    |
| TPHCWG - Aromatic >EC21 - EC35 <sub>EH_CU_1D_AR</sub>   | mg/kg | 10   | MCERTS | - | < 10    |
| TPHCWG - Aromatic >EC35 - EC40 <sub>EH_CU_1D_AR</sub>   | mg/kg | 10   | NONE   | - | < 10    |
| TPHCWG - Aromatic >EC5 - EC35 <sub>EH_CU+HS_1D_AR</sub> | mg/kg | 10   | NONE   | - | < 10    |
| TPHCWG - Aromatic >EC5 - EC40 <sub>EH_CU+HS_1D_AR</sub> | mg/kg | 10   | NONE   | - | < 10    |

|                                                    |       |    |      |   |      |
|----------------------------------------------------|-------|----|------|---|------|
| TPH Total >EC5 - EC40 <sub>EH_CU+HS_1D_TOTAL</sub> | mg/kg | 10 | NONE | - | < 10 |
|----------------------------------------------------|-------|----|------|---|------|

|                                                  |       |    |      |   |      |
|--------------------------------------------------|-------|----|------|---|------|
| Mineral Oil (EC10 - EC40) <sub>EH_CU_1D_AL</sub> | mg/kg | 10 | NONE | - | < 10 |
|--------------------------------------------------|-------|----|------|---|------|

#### VOCS

|                                    |       |   |        |   |       |
|------------------------------------|-------|---|--------|---|-------|
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 5 | NONE   | - | < 5.0 |
| Benzene                            | µg/kg | 5 | MCERTS | - | < 5.0 |
| Toluene                            | µg/kg | 5 | MCERTS | - | < 5.0 |
| Ethylbenzene                       | µg/kg | 5 | MCERTS | - | < 5.0 |
| p & m-Xylene                       | µg/kg | 5 | MCERTS | - | < 5.0 |
| o-Xylene                           | µg/kg | 5 | MCERTS | - | < 5.0 |

|            |       |   |        |   |       |
|------------|-------|---|--------|---|-------|
| Total BTEX | µg/kg | 5 | MCERTS | - | < 5.0 |
|------------|-------|---|--------|---|-------|

#### PCBs by GC-MS

|                  |       |       |        |   |         |
|------------------|-------|-------|--------|---|---------|
| PCB Congener 28  | mg/kg | 0.001 | MCERTS | - | < 0.001 |
| PCB Congener 52  | mg/kg | 0.001 | MCERTS | - | < 0.001 |
| PCB Congener 101 | mg/kg | 0.001 | MCERTS | - | < 0.001 |
| PCB Congener 118 | mg/kg | 0.001 | MCERTS | - | < 0.001 |
| PCB Congener 138 | mg/kg | 0.001 | MCERTS | - | < 0.001 |

Analytical Report Number: 24-032141

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

|                                         |       |                            |                              |               |               |
|-----------------------------------------|-------|----------------------------|------------------------------|---------------|---------------|
| Lab Sample Number                       |       |                            |                              | 265002        | 265003        |
| Sample Reference                        |       |                            |                              | BH1           | BH2           |
| Sample Number                           |       |                            |                              | None Supplied | None Supplied |
| Depth (m)                               |       |                            |                              | 0.80-0.80     | 0.40-0.40     |
| Date Sampled                            |       |                            |                              | 16/07/2024    | 18/07/2024    |
| Time Taken                              |       |                            |                              | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Test Limit of<br>detection | Test Accreditation<br>Status |               |               |
| PCB Congener 153                        | mg/kg | 0.001                      | MCERTS                       | -             | < 0.001       |
| PCB Congener 180                        | mg/kg | 0.001                      | MCERTS                       | -             | < 0.001       |
| Total PCBs                              | mg/kg | 0.007                      | MCERTS                       | -             | < 0.007       |

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



4041



Environmental Science

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## Waste Acceptance Criteria Analytical Results

|                                                                                                                      |                                                        |  |           |                                                   |                                                                                |                             |
|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--|-----------|---------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------|
| Report No:                                                                                                           | 24-032141                                              |  |           |                                                   |                                                                                |                             |
|                                                                                                                      |                                                        |  |           |                                                   |                                                                                |                             |
|                                                                                                                      |                                                        |  |           | Client: GANDW                                     |                                                                                |                             |
|                                                                                                                      |                                                        |  |           |                                                   |                                                                                |                             |
| Location                                                                                                             | Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ |  |           |                                                   |                                                                                |                             |
| Lab Reference (Sample Number)                                                                                        | 265003                                                 |  |           | Landfill Waste Acceptance Criteria                |                                                                                |                             |
|                                                                                                                      |                                                        |  |           | Limits                                            |                                                                                |                             |
| Sampling Date                                                                                                        | 18/07/2024                                             |  |           | Inert Waste<br>Landfill                           | Stable Non-<br>reactive<br>HAZARDOUS<br>waste in non-<br>hazardous<br>Landfill | Hazardous<br>Waste Landfill |
| Sample ID                                                                                                            | BH2                                                    |  |           |                                                   |                                                                                |                             |
| Depth (m)                                                                                                            | 0.40-0.40                                              |  |           |                                                   |                                                                                |                             |
| Solid Waste Analysis                                                                                                 |                                                        |  |           |                                                   |                                                                                |                             |
| TOC (%)**                                                                                                            | 0.9                                                    |  |           | 3%                                                | 5%                                                                             | 6%                          |
| Loss on Ignition (%) **                                                                                              | 2.8                                                    |  |           | --                                                | --                                                                             | 10%                         |
| BTEX (µg/kg) **                                                                                                      | < 5.0                                                  |  |           | 6000                                              | --                                                                             | --                          |
| Sum of PCBs (mg/kg) **                                                                                               | < 0.007                                                |  |           | 1                                                 | --                                                                             | --                          |
| Mineral Oil (mg/kg) <small>EH 1D CU AL</small>                                                                       | < 10                                                   |  |           | 500                                               | --                                                                             | --                          |
| Total PAH (WAC-17) (mg/kg)                                                                                           | 1.77                                                   |  |           | 100                                               | --                                                                             | --                          |
| pH (units)**                                                                                                         | 7.5                                                    |  |           | --                                                | >6                                                                             | --                          |
| Acid Neutralisation Capacity (mmol / kg)                                                                             | 4.6                                                    |  |           | --                                                | To be evaluated                                                                | To be evaluated             |
| Eluate Analysis                                                                                                      | 10:1                                                   |  | 10:1      | Limit values for compliance leaching test         |                                                                                |                             |
| (BS EN 12457 - 2 preparation utilising end over end leaching procedure)                                              | mg/l                                                   |  | mg/kg     | using BS EN 12457-2 at L/S 10 l/kg (mg/kg)        |                                                                                |                             |
| Arsenic *                                                                                                            | < 0.00100                                              |  | < 0.0100  | 0.5                                               | 2                                                                              | 25                          |
| Barium *                                                                                                             | 0.0234                                                 |  | 0.234     | 20                                                | 100                                                                            | 300                         |
| Cadmium *                                                                                                            | < 0.000100                                             |  | < 0.00100 | 0.04                                              | 1                                                                              | 5                           |
| Chromium *                                                                                                           | 0.0030                                                 |  | 0.030     | 0.5                                               | 10                                                                             | 70                          |
| Copper *                                                                                                             | 0.017                                                  |  | 0.17      | 2                                                 | 50                                                                             | 100                         |
| Mercury *                                                                                                            | < 0.000500                                             |  | < 0.00500 | 0.01                                              | 0.2                                                                            | 2                           |
| Molybdenum *                                                                                                         | 0.00213                                                |  | 0.0213    | 0.5                                               | 10                                                                             | 30                          |
| Nickel *                                                                                                             | 0.0021                                                 |  | 0.021     | 0.4                                               | 10                                                                             | 40                          |
| Lead *                                                                                                               | 0.0041                                                 |  | 0.041     | 0.5                                               | 10                                                                             | 50                          |
| Antimony *                                                                                                           | < 0.0017                                               |  | < 0.017   | 0.06                                              | 0.7                                                                            | 5                           |
| Selenium *                                                                                                           | < 0.0040                                               |  | < 0.040   | 0.1                                               | 0.5                                                                            | 7                           |
| Zinc *                                                                                                               | 0.016                                                  |  | 0.16      | 4                                                 | 50                                                                             | 200                         |
| Chloride *                                                                                                           | 0.75                                                   |  | 7.5       | 800                                               | 15000                                                                          | 25000                       |
| Fluoride*                                                                                                            | 0.33                                                   |  | 3.3       | 10                                                | 150                                                                            | 500                         |
| Sulphate *                                                                                                           | 16                                                     |  | 160       | 1000                                              | 20000                                                                          | 50000                       |
| TDS*                                                                                                                 | 66                                                     |  | 660       | 4000                                              | 60000                                                                          | 100000                      |
| Phenol Index (Monohydric Phenols) *                                                                                  | < 0.010                                                |  | < 0.10    | 1                                                 | -                                                                              | -                           |
| DOC                                                                                                                  | 7.51                                                   |  | 75.1      | 500                                               | 800                                                                            | 1000                        |
|                                                                                                                      |                                                        |  |           |                                                   |                                                                                |                             |
| Leach Test Information                                                                                               |                                                        |  |           |                                                   |                                                                                |                             |
|                                                                                                                      |                                                        |  |           |                                                   |                                                                                |                             |
| Stone Content (%)                                                                                                    | < 0.1                                                  |  |           |                                                   |                                                                                |                             |
| Sample Mass (kg)                                                                                                     | 1.1                                                    |  |           |                                                   |                                                                                |                             |
| Dry Matter (%)                                                                                                       | 84                                                     |  |           |                                                   |                                                                                |                             |
| Moisture (%)                                                                                                         | 16                                                     |  |           |                                                   |                                                                                |                             |
|                                                                                                                      |                                                        |  |           |                                                   |                                                                                |                             |
|                                                                                                                      |                                                        |  |           |                                                   |                                                                                |                             |
|                                                                                                                      |                                                        |  |           |                                                   |                                                                                |                             |
| Results are expressed on a dry weight basis, after correction for moisture content where applicable.                 |                                                        |  |           | * = UKAS accredited (liquid eluate analysis only) |                                                                                |                             |
| Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation |                                                        |  |           | ** = MCERTS accredited                            |                                                                                |                             |

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.  
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 24-032141

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

\* 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 *   |
|-------------------|------------------|---------------|-----------|------------------------|
| 265002            | BH1              | None Supplied | 0.80-0.80 | Brown clay with gravel |
| 265003            | BH2              | None Supplied | 0.40-0.40 | Brown clay with gravel |

Analytical Report Number : 24-032141

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

| 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 dispersion staining techniques                               | In-house method based on HSG 248, 2021                                                                 | A001B         | D                  | ISO 17025            |
| pH at 20°C in soil                                 | Determination of pH in soil by addition of water followed by electrometric measurement                                                              | In-house method                                                                                        | L005B         | W                  | MCERTS               |
| Organic matter (Automated) in soil                 | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method) | In-house method                                                                                        | L009B         | D                  | MCERTS               |
| Total organic carbon (Automated) in soil           | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method) | In-house method                                                                                        | L009B         | D                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically (up to 30°C)                                                                                           | In-house method                                                                                        | L019B         | W                  | NONE                 |
| 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.                             | L019B         | D                  | NONE                 |
| PCB's By GC-MS in soil                             | Determination of PCB by extraction with hexane followed by GC-MS                                                                                    | In-house method based on USEPA 8082                                                                    | L027B         | D                  | MCERTS               |
| Total dissolved solids 10:1 WAC                    | Determination of total dissolved solids in water by electrometric measurement                                                                       | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton | L031B         | W                  | ISO 17025            |
| Fluoride 10:1 WAC                                  | Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode                                        | In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination     | L033B         | W                  | ISO 17025            |
| Dissolved organic carbon 10:1 WAC                  | Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser                                                                      | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton | L037B         | W                  | NONE                 |
| 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                    | L038B         | D                  | MCERTS               |
| Boron, water soluble, in soil                      | Determination of water soluble boron in soil by hot water extract followed by ICP-OES                                                               | In-house method based on Second Site Properties version 3                                              | L038B         | D                  | MCERTS               |
| Sulphate, water soluble, in soil (16hr extraction) | Sulphate, water soluble, in soil (16hr extraction)                                                                                                  | In-house method                                                                                        | L038B         | D                  | MCERTS               |
| Metals in leachate by ICP-OES                      | Determination of metals in leachate by acidification followed by ICP-OES                                                                            | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil                    | L039B         | W                  | ISO 17025            |
| Sample Preparation                                 |                                                                                                                                                     | In-house method                                                                                        | L043B         | W                  | NONE                 |
| Acid neutralisation capacity of soil               | Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe                                            | In-house method based on Guidance on Sampling and Testing of Wastes to Meet Landfill Waste Acceptance  | L046B         | W                  | NONE                 |

Analytical Report Number : 24-032141

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

| Analytical Test Name                                                        | Analytical Method Description                                                                                                          | Analytical Method Reference                                                                            | Method number | Wet / Dry Analysis | Accreditation Status |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Loss on ignition of soil @ 450°C                                            | Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace                         | In-house method                                                                                        | L047          | D                  | MCERTS               |
| Speciated PAHs and/or Semi-volatile organic compounds in soil               | Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS | In-house method based on USEPA 8270                                                                    | L064B         | D                  | MCERTS               |
| BTEX and/or Volatile organic compounds in soil                              | Determination of volatile organic compounds in soil by headspace GC-MS                                                                 | In-house method based on USEPA 8260                                                                    | L073B         | W                  | MCERTS               |
| Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil | Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic                    | In-house method                                                                                        | L076B/L088    | D/W                | MCERTS               |
| Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil                     | Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS                                                               | In-house method                                                                                        | L076B/L088    | D/W                | NONE                 |
| Hexavalent chromium in soil                                                 | Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry       | In-house method                                                                                        | L080          | W                  | MCERTS               |
| Monohydric phenols 10:1 WAC                                                 | Determination of phenols in leachate by distillation followed by colorimetry                                                           | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton | L080          | W                  | ISO 17025            |
| 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 | L080          | W                  | 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 | L080          | W                  | MCERTS               |
| Chloride 10:1 WAC                                                           | Determination of Chloride colorimetrically by discrete analyser                                                                        | In-house based on MEWAM Method ISBN 0117516260                                                         | L082B         | W                  | ISO 17025            |
| pH in soil (automated)                                                      | Determination of pH in soil by addition of water followed by automated electrometric measurement                                       | In-house method                                                                                        | L099          | D                  | MCERTS               |

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' 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 30°C.

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.

## Information in Support of Analytical Results

### List of HWOL Acronyms and Operators

| Acronym | Descriptions                                                           |
|---------|------------------------------------------------------------------------|
| HS      | Headspace Analysis                                                     |
| MS      | Mass spectrometry                                                      |
| FID     | Flame Ionisation Detector                                              |
| GC      | Gas Chromatography                                                     |
| EH      | Extractable Hydrocarbons (i.e. everything extracted by the solvent(s)) |

Analytical Report Number : 24-032141

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

| Analytical Test Name | Analytical Method Description                                      | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------|--------------------------------------------------------------------|-----------------------------|---------------|--------------------|----------------------|
| CU                   | Clean-up - e.g. by Florisil®, silica gel                           |                             |               |                    |                      |
| 1D                   | GC - Single coil/column gas chromatography                         |                             |               |                    |                      |
| 2D                   | GC-GC - Double coil/column gas chromatography                      |                             |               |                    |                      |
| Total                | Aliphatics & Aromatics                                             |                             |               |                    |                      |
| AL                   | Aliphatics                                                         |                             |               |                    |                      |
| AR                   | Aromatics                                                          |                             |               |                    |                      |
| #1                   | EH_2D_Total but with humics mathematically subtracted              |                             |               |                    |                      |
| #2                   | EH_2D_Total but with fatty acids mathematically subtracted         |                             |               |                    |                      |
| -                    | Operator - underscore to separate acronyms (exception for +)       |                             |               |                    |                      |
| +                    | Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total |                             |               |                    |                      |

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution



## Sample Deviation Report



Analytical Report Number : 24-032141

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

| Sample ID | Other ID | Sample Type | Lab Sample Number | Sample Deviation | Test Name             | Test Ref | Test Deviation |
|-----------|----------|-------------|-------------------|------------------|-----------------------|----------|----------------|
| BH1       | N/A      | S           | 265002            | c                | Total cyanide in soil | L080     | c              |



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## **Analytical Report Number : 24-037309**

|                             |                                        |                                                        |            |
|-----------------------------|----------------------------------------|--------------------------------------------------------|------------|
| <b>Project / Site name:</b> | Former Dairy Crest Depot, Dunsbury Way | <b>Samples received on:</b>                            | 13/08/2024 |
| <b>Your job number:</b>     | GWPR6068                               | <b>Samples instructed on/<br/>Analysis started on:</b> | 20/08/2024 |
| <b>Your order number:</b>   | GWPR6068                               | <b>Analysis completed by:</b>                          | 23/08/2024 |
| <b>Report Issue Number:</b> | 1                                      | <b>Report issued on:</b>                               | 23/08/2024 |
| <b>Samples Analysed:</b>    | 2 soil samples                         |                                                        |            |

**Signed:**



Joanna Wawrzeczko  
Senior Reporting Specialist  
**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: 24-037309  
Project / Site name: Former Dairy Crest Depot, Dunsbury Way  
Your Order No: GWPR6068

|                                         |       |                            |                              |               |               |
|-----------------------------------------|-------|----------------------------|------------------------------|---------------|---------------|
| Lab Sample Number                       |       |                            |                              | 291569        | 291570        |
| Sample Reference                        |       |                            |                              | WS101         | WS102         |
| Sample Number                           |       |                            |                              | None Supplied | None Supplied |
| Depth (m)                               |       |                            |                              | 1.00          | 0.80          |
| Date Sampled                            |       |                            |                              | 07/08/2024    | 07/08/2024    |
| Time Taken                              |       |                            |                              | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Test Limit of<br>detection | Test Accreditation<br>Status |               |               |
|                                         |       |                            |                              |               |               |
|                                         |       |                            |                              |               |               |
|                                         |       |                            |                              |               |               |
|                                         |       |                            |                              |               |               |

|                               |    |      |      |      |       |
|-------------------------------|----|------|------|------|-------|
| Stone Content                 | %  | 0.1  | NONE | 65.4 | < 0.1 |
| Moisture Content              | %  | 0.01 | NONE | 4.9  | 11    |
| Total mass of sample received | kg | 0.1  | NONE | 0.8  | 0.8   |

Asbestos

|                                        |      |     |           |              |              |
|----------------------------------------|------|-----|-----------|--------------|--------------|
| Asbestos in Soil Detected/Not Detected | Type | N/A | ISO 17025 | Detected     | Not-detected |
| Asbestos Analyst ID                    | N/A  | N/A | N/A       | PKU          | PKU          |
| Actinolite detected                    | Type | N/A | ISO 17025 | Not-detected | -            |
| Amosite detected                       | Type | N/A | ISO 17025 | Detected     | -            |
| Anthophyllite detected                 | Type | N/A | ISO 17025 | Not-detected | -            |
| Chrysotile detected                    | Type | N/A | ISO 17025 | Not-detected | -            |
| Crocidolite detected                   | Type | N/A | ISO 17025 | Not-detected | -            |
| Tremolite detected                     | Type | N/A | ISO 17025 | Not-detected | -            |

|                                                   |      |     |           |              |   |
|---------------------------------------------------|------|-----|-----------|--------------|---|
| Asbestos Containing Material Types Detected (ACM) | Type | N/A | ISO 17025 | Loose Fibres | - |
|---------------------------------------------------|------|-----|-----------|--------------|---|

General Inorganics

|                                                                 |          |      |        |       |       |
|-----------------------------------------------------------------|----------|------|--------|-------|-------|
| pH (L099)                                                       | pH Units | N/A  | MCERTS | 11.5  | 8     |
| Total Cyanide                                                   | mg/kg    | 1    | MCERTS | < 1.0 | < 1.0 |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1) | mg/kg    | 2.5  | MCERTS | 310   | 450   |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1)             | mg/l     | 1.25 | MCERTS | 156   | 224   |
| Organic Matter (automated)                                      | %        | 0.1  | MCERTS | 0.9   | 1.6   |
| Total Organic Carbon (TOC) - Automated                          | %        | 0.1  | MCERTS | 0.5   | 0.9   |

Total Phenols

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

Speciated PAHs

|                        |       |      |           |        |        |
|------------------------|-------|------|-----------|--------|--------|
| Naphthalene            | mg/kg | 0.05 | MCERTS    | < 0.05 | 0.08   |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS    | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS    | < 0.05 | 0.15   |
| Fluorene               | mg/kg | 0.05 | MCERTS    | < 0.05 | 0.13   |
| Phenanthrene           | mg/kg | 0.05 | MCERTS    | 0.23   | 1.6    |
| Anthracene             | mg/kg | 0.05 | MCERTS    | < 0.05 | 0.49   |
| Fluoranthene           | mg/kg | 0.05 | MCERTS    | 0.46   | 2.9    |
| Pyrene                 | mg/kg | 0.05 | MCERTS    | 0.41   | 2.6    |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS    | < 0.05 | 1.4    |
| Chrysene               | mg/kg | 0.05 | MCERTS    | 0.25   | 1.4    |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | ISO 17025 | 0.27   | 1.5    |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | ISO 17025 | 0.15   | 0.76   |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS    | 0.25   | 1.3    |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS    | < 0.05 | 0.49   |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS    | < 0.05 | < 0.05 |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS    | 0.14   | 0.53   |

Total PAH

|                             |       |     |           |      |      |
|-----------------------------|-------|-----|-----------|------|------|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | ISO 17025 | 2.15 | 15.4 |
|-----------------------------|-------|-----|-----------|------|------|



Analytical Report Number: 24-037309  
Project / Site name: Former Dairy Crest Depot, Dunsbury Way  
Your Order No: GWPR6068

|                                         |       |                            |                              |               |               |
|-----------------------------------------|-------|----------------------------|------------------------------|---------------|---------------|
| Lab Sample Number                       |       |                            |                              | 291569        | 291570        |
| Sample Reference                        |       |                            |                              | WS101         | WS102         |
| Sample Number                           |       |                            |                              | None Supplied | None Supplied |
| Depth (m)                               |       |                            |                              | 1.00          | 0.80          |
| Date Sampled                            |       |                            |                              | 07/08/2024    | 07/08/2024    |
| Time Taken                              |       |                            |                              | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Test Limit of<br>detection | Test Accreditation<br>Status |               |               |

Heavy Metals / Metalloids

|                                   |       |     |        |       |       |
|-----------------------------------|-------|-----|--------|-------|-------|
| Arsenic (aqua regia extractable)  | mg/kg | 1   | MCERTS | 8.5   | 9.6   |
| Boron (water soluble)             | mg/kg | 0.2 | MCERTS | 1.5   | 1.2   |
| Cadmium (aqua regia extractable)  | mg/kg | 0.2 | MCERTS | < 0.2 | < 0.2 |
| Chromium (hexavalent)             | mg/kg | 1.8 | MCERTS | < 1.8 | < 1.8 |
| Chromium (aqua regia extractable) | mg/kg | 1   | MCERTS | 17    | 22    |
| Copper (aqua regia extractable)   | mg/kg | 1   | MCERTS | 20    | 14    |
| Lead (aqua regia extractable)     | mg/kg | 1   | MCERTS | 91    | 61    |
| Mercury (aqua regia extractable)  | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable)   | mg/kg | 1   | MCERTS | 9.1   | 11    |
| Selenium (aqua regia extractable) | mg/kg | 1   | MCERTS | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable) | mg/kg | 1   | MCERTS | 29    | 39    |
| Zinc (aqua regia extractable)     | mg/kg | 1   | MCERTS | 84    | 79    |

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



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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 *                           |
|-------------------|------------------|---------------|-----------|------------------------------------------------|
| 291569            | WS101            | None Supplied | 1         | Brown sand with gravel and stones              |
| 291570            | WS102            | None Supplied | 0.8       | Brown clay and sand with gravel and vegetation |

Analytical Report Number : 24-037309  
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Water matrix abbreviations:  
 Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

| 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 dispersion staining techniques                               | In-house method based on HSG 248, 2021                                                                 | A001B         | D                  | ISO 17025            |
| Organic matter (Automated) in soil                            | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method) | In-house method                                                                                        | L009B         | D                  | MCERTS               |
| Total organic carbon (Automated) in soil                      | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method) | In-house method                                                                                        | L009B         | D                  | MCERTS               |
| Moisture Content                                              | Moisture content, determined gravimetrically (up to 30°C)                                                                                           | In-house method                                                                                        | L019B         | W                  | NONE                 |
| 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.                             | L019B         | D                  | NONE                 |
| 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                    | L038B         | D                  | MCERTS               |
| Boron, water soluble, in soil                                 | Determination of water soluble boron in soil by hot water extract followed by ICP-OES                                                               | In-house method based on Second Site Properties version 3                                              | L038B         | D                  | MCERTS               |
| Sulphate, water soluble, in soil (16hr extraction)            | Sulphate, water soluble, in soil (16hr extraction)                                                                                                  | In-house method                                                                                        | L038B         | D                  | MCERTS               |
| Speciated PAHs and/or Semi-volatile organic compounds in soil | Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS              | In-house method based on USEPA 8270                                                                    | L064B         | D                  | MCERTS               |
| Hexavalent chromium in soil                                   | Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazine followed by colorimetry                    | In-house method                                                                                        | L080          | W                  | MCERTS               |
| 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 | L080          | W                  | 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 | L080          | W                  | MCERTS               |



Analytical Report Number : 24-037309  
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Water matrix abbreviations:  
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

| Analytical Test Name   | Analytical Method Description                                                                    | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|------------------------|--------------------------------------------------------------------------------------------------|-----------------------------|---------------|--------------------|----------------------|
| pH in soil (automated) | Determination of pH in soil by addition of water followed by automated electrometric measurement | In-house method             | L099          | D                  | MCERTS               |

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).  
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).  
For method numbers ending in 'PL' or 'B' 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.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.  
The result for sum should be interpreted with caution



Sample Deviation Report



Analytical Report Number : 24-037309  
Project / Site name: Former Dairy Crest Depot, Dunsbury Way

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

| Sample ID | Other ID | Sample Type | Lab Sample Number | Sample Deviation | Test Name             | Test Ref | Test Deviation |
|-----------|----------|-------------|-------------------|------------------|-----------------------|----------|----------------|
| WS101     | N/A      | S           | 291569            | c                | Total cyanide in soil | L080     | c              |
| WS102     | N/A      | S           | 291570            | c                | Total cyanide in soil | L080     | c              |



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## **Analytical Report Number : 24-035877**

|                             |                                                        |                                                        |            |
|-----------------------------|--------------------------------------------------------|--------------------------------------------------------|------------|
| <b>Project / Site name:</b> | Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ | <b>Samples received on:</b>                            | 09/08/2024 |
| <b>Your job number:</b>     | GWPR6068                                               | <b>Samples instructed on/<br/>Analysis started on:</b> | 13/08/2024 |
| <b>Your order number:</b>   | GWPR6068                                               | <b>Analysis completed by:</b>                          | 16/08/2024 |
| <b>Report Issue Number:</b> | 1                                                      | <b>Report issued on:</b>                               | 16/08/2024 |
| <b>Samples Analysed:</b>    | 1 water sample                                         |                                                        |            |

**Signed:**

Rafał Szczepańczyk  
Technical Reviewer  
**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: 24-035877

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

|                                          |               |                            |                              |  |
|------------------------------------------|---------------|----------------------------|------------------------------|--|
| Lab Sample Number                        | 284243        |                            |                              |  |
| Sample Reference                         | WS105         |                            |                              |  |
| Sample Number                            | None Supplied |                            |                              |  |
| Depth (m)                                | 3.00          |                            |                              |  |
| Date Sampled                             | 16/08/2024    |                            |                              |  |
| Time Taken                               | None Supplied |                            |                              |  |
| Analytical Parameter<br>(Water Analysis) | Units         | Test Limit of<br>detection | Test Accreditation<br>Status |  |

#### General Inorganics

|                                  |          |       |           |       |
|----------------------------------|----------|-------|-----------|-------|
| pH (L099)                        | pH Units | N/A   | ISO 17025 | 7     |
| Total Cyanide (Low Level 1 µg/l) | µg/l     | 1     | NONE      | < 1.0 |
| Sulphate as SO <sub>4</sub>      | mg/l     | 0.045 | ISO 17025 | 9.33  |

#### Total Phenols

|                                      |      |   |      |       |
|--------------------------------------|------|---|------|-------|
| Total Phenols (Monohydric) Low Level | µg/l | 1 | NONE | < 1.0 |
|--------------------------------------|------|---|------|-------|

#### Speciated PAHs

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

#### Total PAH

|                   |      |      |           |        |
|-------------------|------|------|-----------|--------|
| Total EPA-16 PAHs | µg/l | 0.16 | ISO 17025 | < 0.16 |
|-------------------|------|------|-----------|--------|

#### Heavy Metals / Metalloids

|                      |      |      |           |        |
|----------------------|------|------|-----------|--------|
| Arsenic (dissolved)  | µg/l | 0.15 | ISO 17025 | 1.09   |
| Cadmium (dissolved)  | µg/l | 0.02 | ISO 17025 | 0.05   |
| Chromium (dissolved) | µg/l | 0.2  | ISO 17025 | < 0.2  |
| Copper (dissolved)   | µg/l | 0.5  | ISO 17025 | 14     |
| Lead (dissolved)     | µg/l | 0.2  | ISO 17025 | 0.2    |
| Mercury (dissolved)  | µg/l | 0.05 | ISO 17025 | < 0.05 |
| Nickel (dissolved)   | µg/l | 0.5  | ISO 17025 | 9.2    |
| Selenium (dissolved) | µg/l | 0.6  | ISO 17025 | 1.3    |
| Vanadium (dissolved) | µg/l | 0.2  | ISO 17025 | 0.5    |
| Zinc (dissolved)     | µg/l | 0.5  | ISO 17025 | 5.7    |

|                       |      |    |           |       |
|-----------------------|------|----|-----------|-------|
| Boron (dissolved)     | µg/l | 10 | ISO 17025 | 44    |
| Chromium (hexavalent) | µg/l | 5  | ISO 17025 | < 5.0 |

Analytical Report Number: 24-035877

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

|                                          |       |                            |                              |               |
|------------------------------------------|-------|----------------------------|------------------------------|---------------|
| Lab Sample Number                        |       |                            |                              | 284243        |
| Sample Reference                         |       |                            |                              | WS105         |
| Sample Number                            |       |                            |                              | None Supplied |
| Depth (m)                                |       |                            |                              | 3.00          |
| Date Sampled                             |       |                            |                              | 16/08/2024    |
| Time Taken                               |       |                            |                              | None Supplied |
| Analytical Parameter<br>(Water Analysis) | Units | Test Limit of<br>detection | Test Accreditation<br>Status |               |

#### Petroleum Hydrocarbons

|                                                       |      |    |           |       |
|-------------------------------------------------------|------|----|-----------|-------|
| TPH - Aliphatic >EC5 - EC6 <sub>HS 1D AL</sub>        | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aliphatic >EC6 - EC8 <sub>HS 1D AL</sub>        | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aliphatic >EC8 - EC10 <sub>HS 1D AL</sub>       | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aliphatic >EC10 - EC12 <sub>EH 1D AL MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC12 - EC16 <sub>EH 1D AL MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC16 - EC21 <sub>EH 1D AL MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC21 - EC35 <sub>EH 1D AL MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC5 - EC35 <sub>HS+EH 1D AL MS</sub> | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC35 - EC40 <sub>EH 1D AL MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC5 - EC40 <sub>HS+EH 1D AL MS</sub> | µg/l | 10 | NONE      | < 10  |

|                                                      |      |    |           |       |
|------------------------------------------------------|------|----|-----------|-------|
| TPH - Aromatic >EC5 - EC7 <sub>HS 1D AR</sub>        | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aromatic >EC7 - EC8 <sub>HS 1D AR</sub>        | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aromatic >EC8 - EC10 <sub>HS 1D AR</sub>       | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aromatic >EC10 - EC12 <sub>EH 1D AR MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC12 - EC16 <sub>EH 1D AR MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC16 - EC21 <sub>EH 1D AR MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC21 - EC35 <sub>EH 1D AR MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC5 - EC35 <sub>HS+EH 1D AR MS</sub> | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC35 - EC40 <sub>EH 1D AR MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC5 - EC40 <sub>HS+EH 1D AR MS</sub> | µg/l | 10 | NONE      | < 10  |

|                                                      |      |    |      |      |
|------------------------------------------------------|------|----|------|------|
| TPH Total (>EC5 - EC40) <sub>HS+EH 1D TOTAL MS</sub> | µg/l | 10 | NONE | < 10 |
|------------------------------------------------------|------|----|------|------|

#### VOCS

|                                       |      |   |           |       |
|---------------------------------------|------|---|-----------|-------|
| Chloromethane                         | µg/l | 3 | ISO 17025 | < 3.0 |
| Chloroethane                          | µg/l | 3 | ISO 17025 | < 3.0 |
| Bromomethane                          | µg/l | 3 | ISO 17025 | < 3.0 |
| Vinyl Chloride                        | µg/l | 3 | NONE      | < 3.0 |
| Trichlorofluoromethane                | µg/l | 3 | NONE      | < 3.0 |
| 1,1-Dichloroethene                    | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | µg/l | 3 | ISO 17025 | < 3.0 |
| Trans 1,2-dichloroethylene            | µg/l | 3 | ISO 17025 | < 3.0 |
| MTBE (Methyl Tertiary Butyl Ether)    | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,1-Dichloroethane                    | µg/l | 3 | ISO 17025 | < 3.0 |
| 2,2-Dichloropropane                   | µg/l | 3 | NONE      | < 3.0 |
| Chloroform                            | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,1,1-Trichloroethane                 | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,2-Dichloroethane                    | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,1-Dichloropropene                   | µg/l | 3 | ISO 17025 | < 3.0 |
| Cis-1,2-dichloroethene                | µg/l | 3 | ISO 17025 | < 3.0 |
| Benzene                               | µg/l | 3 | ISO 17025 | < 3.0 |
| Carbon tetrachloride                  | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,2-Dichloropropane                   | µg/l | 3 | ISO 17025 | < 3.0 |
| Trichloroethene                       | µg/l | 3 | ISO 17025 | < 3.0 |
| Dibromomethane                        | µg/l | 3 | ISO 17025 | < 3.0 |
| Bromodichloromethane                  | µg/l | 3 | ISO 17025 | < 3.0 |
| Cis-1,3-dichloropropene               | µg/l | 3 | ISO 17025 | < 3.0 |
| Trans-1,3-dichloropropene             | µg/l | 3 | ISO 17025 | < 3.0 |
| Toluene                               | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,1,2-Trichloroethane                 | µg/l | 3 | ISO 17025 | < 3.0 |

Analytical Report Number: 24-035877

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

| Lab Sample Number                        |       |                            |                              | 284243        |
|------------------------------------------|-------|----------------------------|------------------------------|---------------|
| Sample Reference                         |       |                            |                              | WS105         |
| Sample Number                            |       |                            |                              | None Supplied |
| Depth (m)                                |       |                            |                              | 3.00          |
| Date Sampled                             |       |                            |                              | 16/08/2024    |
| Time Taken                               |       |                            |                              | None Supplied |
| Analytical Parameter<br>(Water Analysis) | Units | Test Limit of<br>detection | Test Accreditation<br>Status |               |
| 1,3-Dichloropropane                      | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Dibromochloromethane                     | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Tetrachloroethene                        | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2-Dibromoethane                        | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Chlorobenzene                            | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,1,1,2-Tetrachloroethane                | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Ethylbenzene                             | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| p & m-xylene                             | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Styrene                                  | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Bromoform                                | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| o-xylene                                 | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Isopropylbenzene                         | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,1,2,2-Tetrachloroethane                | µg/l  | 3                          | NONE                         | < 3.0         |
| Bromobenzene                             | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| n-Propylbenzene                          | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 2-Chlorotoluene                          | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 4-Chlorotoluene                          | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,3,5-Trimethylbenzene                   | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| tert-Butylbenzene                        | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2,4-Trimethylbenzene                   | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| sec-Butylbenzene                         | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,3-Dichlorobenzene                      | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| p-Isopropyltoluene                       | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,4-Dichlorobenzene                      | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2-Dichlorobenzene                      | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Butylbenzene                             | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2-Dibromo-3-chloropropane              | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2,4-Trichlorobenzene                   | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Hexachlorobutadiene                      | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2,3-Trichlorobenzene                   | µg/l  | 3                          | ISO 17025                    | < 3.0         |

#### SVOCs

|                             |      |      |      |        |
|-----------------------------|------|------|------|--------|
| Aniline                     | µg/l | 0.05 | NONE | < 0.05 |
| Phenol                      | µg/l | 0.05 | NONE | < 0.05 |
| 2-Chlorophenol              | µg/l | 0.05 | NONE | < 0.05 |
| Bis(2-chloroethyl)ether     | µg/l | 0.05 | NONE | < 0.05 |
| 1,3-Dichlorobenzene         | µg/l | 0.05 | NONE | < 0.05 |
| 1,2-Dichlorobenzene         | µg/l | 0.05 | NONE | < 0.05 |
| 1,4-Dichlorobenzene         | µg/l | 0.05 | NONE | < 0.05 |
| Bis(2-chloroisopropyl)ether | µg/l | 0.05 | NONE | < 0.05 |
| 2-Methylphenol              | µg/l | 0.05 | NONE | < 0.05 |
| Hexachloroethane            | µg/l | 0.05 | NONE | < 0.05 |
| Nitrobenzene                | µg/l | 0.05 | NONE | < 0.05 |
| 4-Methylphenol              | µg/l | 0.05 | NONE | < 0.05 |
| Isophorone                  | µg/l | 0.05 | NONE | < 0.05 |
| 2-Nitrophenol               | µg/l | 0.05 | NONE | < 0.05 |
| 2,4-Dimethylphenol          | µg/l | 0.05 | NONE | < 0.05 |
| Bis(2-chloroethoxy)methane  | µg/l | 0.05 | NONE | < 0.05 |
| 1,2,4-Trichlorobenzene      | µg/l | 0.05 | NONE | < 0.05 |
| 2,4-Dichlorophenol          | µg/l | 0.05 | NONE | < 0.05 |
| 4-Chloroaniline             | µg/l | 0.05 | NONE | < 0.05 |
| Hexachlorobutadiene         | µg/l | 0.05 | NONE | < 0.05 |

Analytical Report Number: 24-035877

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

| Lab Sample Number                        |       |                            |                              | 284243        |
|------------------------------------------|-------|----------------------------|------------------------------|---------------|
| Sample Reference                         |       |                            |                              | WS105         |
| Sample Number                            |       |                            |                              | None Supplied |
| Depth (m)                                |       |                            |                              | 3.00          |
| Date Sampled                             |       |                            |                              | 16/08/2024    |
| Time Taken                               |       |                            |                              | None Supplied |
| Analytical Parameter<br>(Water Analysis) | Units | Test Limit of<br>detection | Test Accreditation<br>Status |               |
| 4-Chloro-3-methylphenol                  | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 2,4,6-Trichlorophenol                    | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 2,4,5-Trichlorophenol                    | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 2-Methylnaphthalene                      | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 2-Chloronaphthalene                      | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Dimethylphthalate                        | µg/l  | 0.05                       | NONE                         | 39            |
| 2,6-Dinitrotoluene                       | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 2,4-Dinitrotoluene                       | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Dibenzofuran                             | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 4-Chlorophenyl phenyl ether              | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Diethyl phthalate                        | µg/l  | 0.05                       | NONE                         | 0.45          |
| 4-Nitroaniline                           | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Azobenzene                               | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Bromophenyl phenyl ether                 | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Hexachlorobenzene                        | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Carbazole                                | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Dibutyl phthalate                        | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Anthraquinone                            | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Butyl benzyl phthalate                   | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 3+4-Methylphenol                         | µg/l  | 0.1                        | NONE                         | < 0.10        |

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 24-035877

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

| 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 | L012B         | W                  | ISO 17025            |
| Metals in water by ICP-OES (dissolved)                             | Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices: SW, GW, PW, PrW (Al, Cu, Fe,Zn)              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil                           | L039B         | W                  | ISO 17025            |
| Total petroleum hydrocarbons with carbon banding by GC-MS in water | Determination of total petroleum hydrocarbons in water by GC-MS/GC-MS HS with carbon banding aliphatic and aromatic                      | In-house method                                                                                               | L070B         | W                  | NONE                 |
| BTEX and/or Volatile organic compounds in water                    | Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW                                   | In-house method based on USEPA 8260                                                                           | L073B         | 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          | W                  | ISO 17025            |
| Monohydric phenols (low level) in water                            | Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW                                             | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton        | L080          | W                  | NONE                 |
| Total cyanide (low level) in water                                 | Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW                                    | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton        | L080          | W                  | NONE                 |
| Total petroleum hydrocarbons by GC-MS HS in water                  | Determination of total petroleum hydrocarbons in water by GC-MS HS                                                                       | In-house method                                                                                               | L088B         | W                  | ISO 17025            |
| pH at 20°C in water (automated)                                    | Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW                                                 | In-house method                                                                                               | L099          | W                  | ISO 17025            |
| Speciated PAHs and/or Semi-volatile organic compounds in water     | Determination of semi-volatile organic compounds (including PAH) in leachate by extraction in dichloromethane followed by GC-MS          | In-house method based on USEPA 8270                                                                           | L102B         | W                  | ISO 17025            |
| Phenols in water by GC-MS                                          | Determination of phenols in water by GC-MS                                                                                               | In-house method                                                                                               | L102B         | W                  | NONE                 |

Analytical Report Number : 24-035877

Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

| Analytical Test Name | Analytical Method Description                                                                                                     | Analytical Method Reference                                                         | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Sulphate in water    | Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW, LL | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil | L039B         | W                  | ISO 17025            |

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' 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 30°C.

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.

## Information in Support of Analytical Results

### List of HWOL Acronyms and Operators

| Acronym | Descriptions                                                           |
|---------|------------------------------------------------------------------------|
| HS      | Headspace Analysis                                                     |
| MS      | Mass spectrometry                                                      |
| FID     | Flame Ionisation Detector                                              |
| GC      | Gas Chromatography                                                     |
| EH      | Extractable Hydrocarbons (i.e. everything extracted by the solvent(s)) |
| CU      | Clean-up - e.g. by Florisil®, silica gel                               |
| 1D      | GC - Single coil/column gas chromatography                             |
| 2D      | GC-GC - Double coil/column gas chromatography                          |
| Total   | Aliphatics & Aromatics                                                 |
| AL      | Aliphatics                                                             |
| AR      | Aromatics                                                              |
| #1      | EH_2D_Total but with humics mathematically subtracted                  |
| #2      | EH_2D_Total but with fatty acids mathematically subtracted             |
| -       | Operator - underscore to separate acronyms (exception for +)           |
| +       | Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total     |

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution



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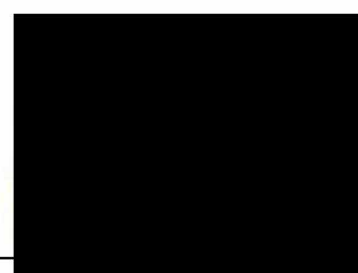
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## **Analytical Report Number : 24-044930**

|                             |                                                        |                                                        |            |
|-----------------------------|--------------------------------------------------------|--------------------------------------------------------|------------|
| <b>Project / Site name:</b> | Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ | <b>Samples received on:</b>                            | 27/09/2024 |
| <b>Your job number:</b>     | GWPR6068                                               | <b>Samples instructed on/<br/>Analysis started on:</b> | 27/09/2024 |
| <b>Your order number:</b>   | GWPR6068                                               | <b>Analysis completed by:</b>                          | 07/10/2024 |
| <b>Report Issue Number:</b> | 1                                                      | <b>Report issued on:</b>                               | 07/10/2024 |
| <b>Samples Analysed:</b>    | 1 water sample                                         |                                                        |            |

**Signed:**



Dominika Liana  
Junior Reporting Specialist  
**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: 24-044930  
Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

|                                          |       |                            |                              |               |
|------------------------------------------|-------|----------------------------|------------------------------|---------------|
| Lab Sample Number                        |       |                            |                              | 332821        |
| Sample Reference                         |       |                            |                              | BH101         |
| Sample Number                            |       |                            |                              | None Supplied |
| Depth (m)                                |       |                            |                              | 2.00          |
| Date Sampled                             |       |                            |                              | 27/09/2024    |
| Time Taken                               |       |                            |                              | None Supplied |
| Analytical Parameter<br>(Water Analysis) | Units | Test Limit of<br>detection | Test Accreditation<br>Status |               |

General Inorganics

|                                  |          |       |           |      |
|----------------------------------|----------|-------|-----------|------|
| pH (L099)                        | pH Units | N/A   | ISO 17025 | 10   |
| Total Cyanide (Low Level 1 µg/l) | µg/l     | 1     | NONE      | 2.7  |
| Sulphate as SO <sub>4</sub>      | mg/l     | 0.045 | ISO 17025 | 1580 |

Total Phenols

|                                      |      |   |      |       |
|--------------------------------------|------|---|------|-------|
| Total Phenols (Monohydric) Low Level | µg/l | 1 | NONE | < 1.0 |
|--------------------------------------|------|---|------|-------|

Speciated PAHs

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

Total PAH

|                   |      |      |           |        |
|-------------------|------|------|-----------|--------|
| Total EPA-16 PAHs | µg/l | 0.16 | ISO 17025 | < 0.16 |
|-------------------|------|------|-----------|--------|

Heavy Metals / Metalloids

|                      |      |      |           |        |
|----------------------|------|------|-----------|--------|
| Arsenic (dissolved)  | µg/l | 0.15 | ISO 17025 | 3.26   |
| Cadmium (dissolved)  | µg/l | 0.02 | ISO 17025 | < 0.02 |
| Chromium (dissolved) | µg/l | 0.2  | ISO 17025 | 17     |
| Copper (dissolved)   | µg/l | 0.5  | ISO 17025 | 13     |
| Lead (dissolved)     | µg/l | 0.2  | ISO 17025 | < 0.2  |
| Mercury (dissolved)  | µg/l | 0.05 | ISO 17025 | < 0.05 |
| Nickel (dissolved)   | µg/l | 0.5  | ISO 17025 | 3.3    |
| Selenium (dissolved) | µg/l | 0.6  | ISO 17025 | 12     |
| Vanadium (dissolved) | µg/l | 0.2  | ISO 17025 | 18     |
| Zinc (dissolved)     | µg/l | 0.5  | ISO 17025 | 0.9    |

|                       |      |    |           |     |
|-----------------------|------|----|-----------|-----|
| Boron (dissolved)     | µg/l | 10 | ISO 17025 | 260 |
| Chromium (hexavalent) | µg/l | 5  | ISO 17025 | 15  |



Analytical Report Number: 24-044930  
Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

|                                          |               |                            |                              |  |
|------------------------------------------|---------------|----------------------------|------------------------------|--|
| Lab Sample Number                        | 332821        |                            |                              |  |
| Sample Reference                         | BH101         |                            |                              |  |
| Sample Number                            | None Supplied |                            |                              |  |
| Depth (m)                                | 2.00          |                            |                              |  |
| Date Sampled                             | 27/09/2024    |                            |                              |  |
| Time Taken                               | None Supplied |                            |                              |  |
| Analytical Parameter<br>(Water Analysis) | Units         | Test Limit of<br>detection | Test Accreditation<br>Status |  |

Petroleum Hydrocarbons

|                                                       |      |    |           |       |
|-------------------------------------------------------|------|----|-----------|-------|
| TPH - Aliphatic >EC5 - EC6 <sub>HS_1D_AL</sub>        | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aliphatic >EC6 - EC8 <sub>HS_1D_AL</sub>        | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aliphatic >EC8 - EC10 <sub>HS_1D_AL</sub>       | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aliphatic >EC10 - EC12 <sub>EH_1D_AL_MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC12 - EC16 <sub>EH_1D_AL_MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC16 - EC21 <sub>EH_1D_AL_MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC21 - EC35 <sub>EH_1D_AL_MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC5 - EC35 <sub>HS+EH_1D_AL_MS</sub> | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC35 - EC40 <sub>EH_1D_AL_MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aliphatic >EC5 - EC40 <sub>HS+EH_1D_AL_MS</sub> | µg/l | 10 | NONE      | < 10  |

|                                                      |      |    |           |       |
|------------------------------------------------------|------|----|-----------|-------|
| TPH - Aromatic >EC5 - EC7 <sub>HS_1D_AR</sub>        | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aromatic >EC7 - EC8 <sub>HS_1D_AR</sub>        | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aromatic >EC8 - EC10 <sub>HS_1D_AR</sub>       | µg/l | 1  | ISO 17025 | < 1.0 |
| TPH - Aromatic >EC10 - EC12 <sub>EH_1D_AR_MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC12 - EC16 <sub>EH_1D_AR_MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC16 - EC21 <sub>EH_1D_AR_MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC21 - EC35 <sub>EH_1D_AR_MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC5 - EC35 <sub>HS+EH_1D_AR_MS</sub> | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC35 - EC40 <sub>EH_1D_AR_MS</sub>   | µg/l | 10 | NONE      | < 10  |
| TPH - Aromatic >EC5 - EC40 <sub>HS+EH_1D_AR_MS</sub> | µg/l | 10 | NONE      | < 10  |

|                                                      |      |    |      |      |
|------------------------------------------------------|------|----|------|------|
| TPH Total (>EC5 - EC40) <sub>HS+EH_1D_TOTAL_MS</sub> | µg/l | 10 | NONE | < 10 |
|------------------------------------------------------|------|----|------|------|

VOCs

|                                       |      |   |           |       |
|---------------------------------------|------|---|-----------|-------|
| Chloromethane                         | µg/l | 3 | ISO 17025 | < 3.0 |
| Chloroethane                          | µg/l | 3 | ISO 17025 | < 3.0 |
| Bromomethane                          | µg/l | 3 | ISO 17025 | < 3.0 |
| Vinyl Chloride                        | µg/l | 3 | NONE      | < 3.0 |
| Trichlorofluoromethane                | µg/l | 3 | NONE      | < 3.0 |
| 1,1-Dichloroethene                    | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | µg/l | 3 | ISO 17025 | < 3.0 |
| Trans 1,2-dichloroethylene            | µg/l | 3 | ISO 17025 | < 3.0 |
| MTBE (Methyl Tertiary Butyl Ether)    | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,1-Dichloroethane                    | µg/l | 3 | ISO 17025 | < 3.0 |
| 2,2-Dichloropropane                   | µg/l | 3 | NONE      | < 3.0 |
| Chloroform                            | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,1,1-Trichloroethane                 | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,2-Dichloroethane                    | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,1-Dichloropropene                   | µg/l | 3 | ISO 17025 | < 3.0 |
| Cis-1,2-dichloroethene                | µg/l | 3 | ISO 17025 | < 3.0 |
| Benzene                               | µg/l | 3 | ISO 17025 | < 3.0 |
| Carbontetrachloride                   | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,2-Dichloropropane                   | µg/l | 3 | ISO 17025 | < 3.0 |
| Trichloroethene                       | µg/l | 3 | ISO 17025 | < 3.0 |
| Dibromomethane                        | µg/l | 3 | ISO 17025 | < 3.0 |
| Bromodichloromethane                  | µg/l | 3 | ISO 17025 | < 3.0 |
| Cis-1,3-dichloropropene               | µg/l | 3 | ISO 17025 | < 3.0 |
| Trans-1,3-dichloropropene             | µg/l | 3 | ISO 17025 | < 3.0 |
| Toluene                               | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,1,2-Trichloroethane                 | µg/l | 3 | ISO 17025 | < 3.0 |
| 1,3-Dichloropropane                   | µg/l | 3 | ISO 17025 | < 3.0 |



Analytical Report Number: 24-044930  
Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

|                                          |       |                            |                              |               |
|------------------------------------------|-------|----------------------------|------------------------------|---------------|
| Lab Sample Number                        |       |                            |                              | 332821        |
| Sample Reference                         |       |                            |                              | BH101         |
| Sample Number                            |       |                            |                              | None Supplied |
| Depth (m)                                |       |                            |                              | 2.00          |
| Date Sampled                             |       |                            |                              | 27/09/2024    |
| Time Taken                               |       |                            |                              | None Supplied |
| Analytical Parameter<br>(Water Analysis) | Units | Test Limit of<br>detection | Test Accreditation<br>Status |               |
| Dibromochloromethane                     | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Tetrachloroethene                        | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2-Dibromoethane                        | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Chlorobenzene                            | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,1,1,2-Tetrachloroethane                | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Ethylbenzene                             | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| p & m-xylene                             | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Styrene                                  | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Bromoform                                | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| o-xylene                                 | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Isopropylbenzene                         | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,1,2,2-Tetrachloroethane                | µg/l  | 3                          | NONE                         | < 3.0         |
| Bromobenzene                             | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| n-Propylbenzene                          | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 2-Chlorotoluene                          | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 4-Chlorotoluene                          | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,3,5-Trimethylbenzene                   | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| tert-Butylbenzene                        | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2,4-Trimethylbenzene                   | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| sec-Butylbenzene                         | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,3-Dichlorobenzene                      | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| p-Isopropyltoluene                       | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,4-Dichlorobenzene                      | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2-Dichlorobenzene                      | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Butylbenzene                             | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2-Dibromo-3-chloropropane              | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2,4-Trichlorobenzene                   | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| Hexachlorobutadiene                      | µg/l  | 3                          | ISO 17025                    | < 3.0         |
| 1,2,3-Trichlorobenzene                   | µg/l  | 3                          | ISO 17025                    | < 3.0         |

SVOCs

|                             |      |      |      |        |
|-----------------------------|------|------|------|--------|
| Aniline                     | µg/l | 0.05 | NONE | < 0.05 |
| Phenol                      | µg/l | 0.05 | NONE | < 0.05 |
| 2-Chlorophenol              | µg/l | 0.05 | NONE | < 0.05 |
| Bis(2-chloroethyl)ether     | µg/l | 0.05 | NONE | < 0.05 |
| 1,3-Dichlorobenzene         | µg/l | 0.05 | NONE | < 0.05 |
| 1,2-Dichlorobenzene         | µg/l | 0.05 | NONE | < 0.05 |
| 1,4-Dichlorobenzene         | µg/l | 0.05 | NONE | < 0.05 |
| Bis(2-chloroisopropyl)ether | µg/l | 0.05 | NONE | < 0.05 |
| 2-Methylphenol              | µg/l | 0.05 | NONE | < 0.05 |
| Hexachloroethane            | µg/l | 0.05 | NONE | < 0.05 |
| Nitrobenzene                | µg/l | 0.05 | NONE | < 0.05 |
| 4-Methylphenol              | µg/l | 0.05 | NONE | < 0.05 |
| Isophorone                  | µg/l | 0.05 | NONE | < 0.05 |
| 2-Nitrophenol               | µg/l | 0.05 | NONE | < 0.05 |
| 2,4-Dimethylphenol          | µg/l | 0.05 | NONE | < 0.05 |
| Bis(2-chloroethoxy)methane  | µg/l | 0.05 | NONE | < 0.05 |
| 1,2,4-Trichlorobenzene      | µg/l | 0.05 | NONE | < 0.05 |
| 2,4-Dichlorophenol          | µg/l | 0.05 | NONE | < 0.05 |
| 4-Chloroaniline             | µg/l | 0.05 | NONE | < 0.05 |
| Hexachlorobutadiene         | µg/l | 0.05 | NONE | < 0.05 |
| 4-Chloro-3-methylphenol     | µg/l | 0.05 | NONE | < 0.05 |
| 2,4,6-Trichlorophenol       | µg/l | 0.05 | NONE | < 0.05 |



Analytical Report Number: 24-044930  
Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Your Order No: GWPR6068

|                                          |       |                            |                              |               |
|------------------------------------------|-------|----------------------------|------------------------------|---------------|
| Lab Sample Number                        |       |                            |                              | 332821        |
| Sample Reference                         |       |                            |                              | BH101         |
| Sample Number                            |       |                            |                              | None Supplied |
| Depth (m)                                |       |                            |                              | 2.00          |
| Date Sampled                             |       |                            |                              | 27/09/2024    |
| Time Taken                               |       |                            |                              | None Supplied |
| Analytical Parameter<br>(Water Analysis) | Units | Test Limit of<br>detection | Test Accreditation<br>Status |               |
| 2,4,5-Trichlorophenol                    | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 2-Methylnaphthalene                      | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 2-Chloronaphthalene                      | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Dimethylphthalate                        | µg/l  | 0.05                       | NONE                         | 0.39          |
| 2,6-Dinitrotoluene                       | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 2,4-Dinitrotoluene                       | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Dibenzofuran                             | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 4-Chlorophenyl phenyl ether              | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Diethyl phthalate                        | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 4-Nitroaniline                           | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Azobenzene                               | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Bromophenyl phenyl ether                 | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Hexachlorobenzene                        | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Carbazole                                | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Dibutyl phthalate                        | µg/l  | 0.05                       | NONE                         | 0.15          |
| Anthraquinone                            | µg/l  | 0.05                       | NONE                         | < 0.05        |
| Butyl benzyl phthalate                   | µg/l  | 0.05                       | NONE                         | < 0.05        |
| 3+4-Methylphenol                         | µg/l  | 0.1                        | NONE                         | < 0.10        |

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number : 24-044930  
Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Water matrix abbreviations:  
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

| 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 | L012B         | W                  | ISO 17025            |
| Metals in water by ICP-OES (dissolved)                             | Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices: SW, GW, PW, PrW (Al, Cu, Fe,Zn)              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil                           | L039B         | W                  | ISO 17025            |
| Total petroleum hydrocarbons with carbon banding by GC-MS in water | Determination of total petroleum hydrocarbons in water by GC-MS/GC-MS HS with carbon banding aliphatic and aromatic                      | In-house method                                                                                               | L070B         | W                  | NONE                 |
| BTEX and/or Volatile organic compounds in water                    | Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW                                   | In-house method based on USEPA 8260                                                                           | L073B         | 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            |
| Monohydric phenols (low level) in water                            | Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW                                             | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton        | L080-PL       | W                  | NONE                 |
| Total cyanide (low level) in water                                 | Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW                                    | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton        | L080-PL       | W                  | NONE                 |
| Total petroleum hydrocarbons by GC-MS HS in water                  | Determination of total petroleum hydrocarbons in water by GC-MS HS                                                                       | In-house method                                                                                               | L088-PL       | W                  | ISO 17025            |
| pH at 20°C in water (automated)                                    | Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW                                                 | In-house method                                                                                               | L099-PL       | W                  | ISO 17025            |
| Speciated PAHs and/or Semi-volatile organic compounds in water     | Determination of semi-volatile organic compounds (including PAH) in leachate by extraction in dichloromethane followed by GC-MS          | In-house method based on USEPA 8270                                                                           | L102B         | W                  | ISO 17025            |
| Phenols in water by GC-MS                                          | Determination of phenols in water by GC-MS                                                                                               | In-house method                                                                                               | L102B         | W                  | NONE                 |



Analytical Report Number : 24-044930  
Project / Site name: Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

Water matrix abbreviations:  
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

| Analytical Test Name | Analytical Method Description                                                                                                     | Analytical Method Reference                                                         | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Sulphate in water    | Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW, LL | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil | L039B         | W                  | ISO 17025            |

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).  
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).  
For method numbers ending in 'PL' or 'B' 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.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

| Acronym | Descriptions                                                           |
|---------|------------------------------------------------------------------------|
| HS      | Headspace Analysis                                                     |
| MS      | Mass spectrometry                                                      |
| FID     | Flame Ionisation Detector                                              |
| GC      | Gas Chromatography                                                     |
| EH      | Extractable Hydrocarbons (i.e. everything extracted by the solvent(s)) |
| CU      | Clean-up - e.g. by Florisil®, silica gel                               |
| 1D      | GC - Single coil/column gas chromatography                             |
| 2D      | GC-GC - Double coil/column gas chromatography                          |
| Total   | Aliphatics & Aromatics                                                 |
| AL      | Aliphatics                                                             |
| AR      | Aromatics                                                              |
| #1      | EH_2D_Total but with humics mathematically subtracted                  |
| #2      | EH_2D_Total but with fatty acids mathematically subtracted             |
| _       | Operator - underscore to separate acronyms (exception for +)           |
| +       | Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total     |

Quality control parameter failure associated with individual result applies to calculated sum of individuals.  
The result for sum should be interpreted with caution

# APPENDIX E: Soil Assessment Criteria

## Ground and Water Limited

### Soil Guideline Values and Generic Assessment Criteria

The Contaminated Land Regime reflects the UK Government's stated objectives of achieving sustainable development through the 'suitable for use approach'. At preliminary risk assessment stage, risks are evaluated qualitatively. As the site investigation progresses to a generic or detailed quantitative risk assessment, data is collected and assessment criteria are utilised to evaluate whether the contaminants represent an unacceptable risk to the identified receptors.

#### 1. Contaminated Land Exposure Assessment Model (CLEA)

Current United Kingdom risk assessment practice is based on the Contaminated Land Exposure Assessment Model (CLEA).

The CLEA Guidance comprises the following documents:

- 1) EA Science Report SC050021/SR2: Human health toxicological assessment of contaminants in soil.
- 2) EA Science Report SC050021/SR3: Updated technical background to the CLEA model.
- 3) EA CLEA Bulletin (2009).
- 4) CLEA software version 1.07 (2015)
- 5) Toxicological reports and SGV technical notes.

The CLEA guidance and tools:

Do not cover other types of risk to humans, such as fire, suffocation or explosion, or short-term and acute exposures;  
Do not cover risks to the environment, such as groundwater, ecosystems or buildings;  
Do not provide a definitive test for telling when human health risks are significant; and  
Are not a legal requirement in assessing land contamination risks. They are not part of the legal regime for Part 2A of the Environmental Protection Act 1990.

The CLEA guidance derives soil concentrations of contaminants above which (in the opinion of the EA) there may be a concern that warrants further investigation. It does not provide a definitive test for establishing that the risk is significant.

##### 1.1. Land-use Scenarios

The CLEA model uses a range of standard land-use scenarios to develop conceptual exposure models outlined in the following sections.

##### 1.1.1. Residential (with home grown produce) (RwHP)

Generic scenario assumes a typical two-storey house built on a ground bearing slab with a private garden having a lawn, flowerbeds and a small fruit and vegetable patch.

Critical receptor is a young female child (zero to six years old)  
 Exposure duration is six years.  
 Exposure pathways include direct soil and indoor dust ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours.  
 Building type is a two-storey small-terraced house.

A sub-set of this land-use is residential apartments with communal landscaped gardens where the consumption of home grown vegetables will not occur. (Residential without homegrown produce (RwoHP)).

#### 1.1.2. Allotments

Provision of open space (about 250sq.m) commonly made available to tenants by the local authority to grow fruit and vegetable for their own consumption. Typically, there are a number of plots to a site which may have a total area of up to 1 hectare. The tenants are assumed to be adults and that young children make occasional accompanied visits.

Although some allotment holders may choose to keep animals including rabbits, hens, and ducks, potential exposure to contaminated meat and eggs is not considered.

Critical receptor is a young female child (zero to six years old)  
 Exposure duration is six years.  
 Exposure pathways include direct soil ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and inhalation of outdoor dust and vapours.  
 There is no building.

#### 1.1.3. Commercial/Industrial

The generic scenario assumes a typical commercial or light industrial property comprising a three-storey building at which employees spend most time indoors and are involved in office-based or relatively light physical work.

Critical receptor is a working female adult (aged 16 to 65 years old).  
 Exposure duration is a working lifetime of 49 years.  
 Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts and inhalation of dust and vapours.  
 Building type is a three-storey office (pre 1970).

## 2. LQM/CIEH Suitable 4 Use Levels (S4UL)

For derivation of these S4UL reference must be made to:

Nathanial, P., McCaffrey, C., Gillet, A., Ogden, R., Nathanial, J., The LQM/CIEH S4UL's for Human Health Risk Assessment. Land Quality Press. 2015

### 2.1. S4UL Background

The Land Quality Management/Chartered Institute of Environmental Health (LQM/CIEH) S4UL for a given land use is the concentration of the contaminant in soil at which the predicted daily exposure,

as calculated by the CLEA software, equals the Health Criteria Value. The S4ULs have been derived for substances based on various generic land use and soil organic matter contents.

The final output for each contaminant represents a synthesis of new toxicological (and fate and transport) reviews published since the preparation of the 2<sup>nd</sup> edition LQM/CIEH GAC's (Nathanial et al., 2009).

In the derivation of LQM/CIEH S4UL's the principles of 'minimal' or 'tolerable' risk enshrined in SR2, which has not been withdrawn, has been maintained.

## 2.2. S4UL Land-use

S4UL's have been derived for the basic CLEA land-uses, as described in section 1.2, and for two new land uses:

Public Open Spaces near Residential Housing (POSresi).  
Public Park (POSpark).

### 2.2.1. Public Open Spaces near Residential Housing (POSresi)

Includes the predominantly grassed areas adjacent to high density housing, the central green area on many 1930's – 1970's housing estates, and smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soils with planting. It is assumed that the close proximity to the place of residence will allow tracking back of soil to occur.

### 2.2.2. Public Park (POSpark)

An area of open space, usually owned and maintained by the local authority, provided for recreational uses including family visits and picnics, children's play area, informal sporting activities (not a dedicated sports pitch), and dog walking. It is assumed that tracking back of soils into places of residence will be negligible.

The following LQM/CIEH S4ULs (Copyright Land Quality Management Limited) have been reproduced with permission, to the publication number S4UL3072.

## 3. Category 4 Screening Levels (C4SLs)

In the case of Lead, no SGV or GAC has been published to date. This is likely to be due to the toxicity review that is currently being undertaken by the Environment Agency. In the absence of updated toxicity information the SGV derived using CLEA 1.07 methodology and related toxicity will be used.

The overall objective of the C4SLs research project was to assist the provision of technical guidance in support of Defra's revised Statutory Guidance (SG) for Part 2A of the Environmental Protection Act 1990 (Part 2A) (Defra, 2012a). Specifically, the project aimed to deliver:

A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and  
A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

To help achieve a more targeted approach to identifying and managing contaminated land in relation to the risk (or possibility) of harm to human health, the revised SG presented a new four category

system for considering land under Part 2A, ranging from Category 4, where there is no risk that land poses a significant possibility of significant harm (SPOSH), or the level of risk is low, to Category 1, where the risk that land poses a significant possibility of significant harm (SPOSH) is unacceptably high. More specific guidance on what type of land should be considered as Category 4 (Human Health) is provided in Paragraphs 4.21 and 4.22 of the revised SG, as follows:

“4.21 The local authority should consider that the following types of land should be placed into Category 4: Human Health:

- (a) Land where no relevant contaminant linkage has been established.
- (b) Land where there are only normal levels of contaminants in soil, as explained in Section 3 of this Guidance.
- (c) Land that has been excluded from the need for further inspection and assessment because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of this Guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of this Guidance.
- (d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed in the normal course of their lives).

4.22 The local authority may consider that land other than the types described in paragraph 4.21 should be placed into Category 4: Human Health if following a detailed quantitative risk assessment it is satisfied that the level of risk posed is sufficiently low.”

The C4SLs are intended as “relevant technical tools” (in relation to Paragraph 4.21(c)) to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

“The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land.”

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

“SGVs are guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to human health.”

The implication of Paragraph 47(h) of the IA is that minimal risk is well within Category 4 and that the C4SLs should describe a higher level of risk which, whilst not minimal, can still be considered low enough to allow a judgement to be made that land containing substances at, or below, the C4SLs would typically fall within Category 4. This reflects Paragraph 4.20 of the revised SG, which states:

“4.20 The local authority should not assume that land poses a significant possibility of significant harm if it considers that there is no risk or that the level of risk posed is low. For the purposes of this Guidance, such land is referred to as a “Category 4: Human Health” case. The authority may decide that the land is a Category 4: Human Health case as soon as it considers it has evidence to this effect, and this may happen at any stage during risk assessment including the early stages.”

C4SLs, therefore, should not be viewed as “SPOSH levels” and they should not be used as a legal trigger for the determination of land under Part 2A.

The generic screening values referred to before usually take the form of risk-based Soil Guideline Values (SGVs) or other Generic Assessment Criteria (GACs) that are most typically derived using the Environment Agency's Contaminated Land Exposure Assessment (CLEA) model, as described in the Environment Agency's SR2, SR3 and SR7 reports (EA, 2009b & c; EA, 2008). It is anticipated that C4SLs will be used in a similar manner; as generic screening criteria that can be used within a GQRA, albeit describing a higher level of risk than the SGVs.

The suggested approach to the development of C4SLs consists of the retention and use of the CLEA framework, modified according to considerations of the underlying science within the context of Defra's policy objectives relating to the revised SG. Within this context, it is suggested that the development of C4SLs may be achieved in one of three ways, namely:

- By modifying the toxicological parameters used within CLEA (while maintaining current exposure parameters);
- By modifying the exposure parameters embedded within CLEA (while maintaining current toxicological “minimal risk” interpretations); and
- By modifying both toxicological and exposure parameters.

There is also a suggested check on “other considerations” (e.g., background levels, epidemiological data, sources of uncertainty) within the approach, applicable to all three options.

It is suggested that a new term is defined for the toxicological guidance values associated with the derivation of C4SLs – a Low Level of Toxicological Concern (LLTC). A LLTC should represent an intake of low concern that remains suitably protective of health, and definitely does not approach an intake level that could be defined as SPOSH.

#### 4. CL:AIRE Generic Assessment Criteria (GAC)

For derivation of the CL:AIRE Generic Assessment Criteria (GAC) reference should be made to the following report:

CL:AIRE, The Soil Generic Assessment Criteria for Human Health Risk Assessment. Contaminated Land: Applications in the Real Environment. 2009.

Within this report, Contaminated Land: Applications in Real Environments (CL:AIRE) provided Generic Assessment Criteria (GAC) in accordance with the CLEA software and the principles outlined previously for a further 35 contaminants sometimes encountered on land affected by contamination.

## 5. SoBRA Acute GAC

The Society of Brownfield Risk Assessment (SoBRA) identified that most human health risk assessments focus on the chronic risks arising from long-term exposure to specific substances. As chronic risks often occur at lower doses than acute risks, they are often the key drivers, however, in some instances the acute dose may also be an important consideration within risk assessments.

The methodology for deriving the acute GAC were related to two distinct receptor groups:

Members of the public, where the 'critical' receptor for this group will typically be a female child, which is consistent with CLEA residential and Public Open Space/allotments land-uses; Workers involved with excavations. The critical receptor for this group is assumed to be a female working adult, without the use of PPE.

The acute GACs relate to short term exposure of high concentrations of a substance that lead to acute effects. They are not considered to be average exposures across a specific / defined area. As a result, the GACs should be normally be compared with the maximum likely concentration that the individual may be exposed to, and not the average concentration within a specific area.

The SoBRA acute GAC will primarily be used for contaminants that do not currently have any GAC, most notably Cyanide.

## 6. Detailed Quantitative Risk Assessments (DQRA)

Where the adoption of a GAC is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses, then a DQRA may be undertaken to develop site specific values for relevant soil contaminants.

|                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Establishing the plausibility that generic exposure pathways exist in practice by measurement and observation.<br>Developing more accurate parameters using site data. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 7. Phytotoxicity

CLEA guidance only addresses human health toxicity; assessment of plant toxicity (phytotoxicity) is based on threshold trigger values obtained from the following source:

BS3882:2015 – Specification for Topsoil

The trigger values are relevant only to those contaminants, where present in excess, have the potential to inhibit plant growth, or kill plants (Cu, Ni and Zn). The criteria have been based on a wide range of planting that are common within a multi-purpose topsoil.

## 8. Statistical Tests

DEFRA R&D Publication CLR 7 (DOE 1994) addressed the statistical treatment of test results and their comparison to Soil Guideline Values.

Consideration must be given to the appropriate area of land to be considered termed the critical averaging area.

For a communal open space or commercial land-use, the critical averaging area will depend on the proposed layout. For a residential use with private gardens the averaging area is the individual plot.

It may be appropriate to compare the upper 95<sup>th</sup> percentile concentration with the Soil Guideline Value, subject to applying a statistical test to establish that the range of concentrations are reasonably consistent and belonging to the same underlying distribution of data.

CL:AIRE published guidance in 2020, Guidance in comparing soil contamination data with a critical concentration, superseding the CL:AIRE/CIEH 2008 report of the same name. The guidance provides ways to assist land contamination stakeholders to apply statistical methods to their data to enable decisions under the legislative framework; either planning system or Part 2A of the Environmental Protection Act 1990.

The use of the statistical tests should only be applied if the following statements are valid for the datasets:

Averaging areas, as well as the smallest area of concern have been identified on the basis of the CSM, including the desk study and/or the site walkover;  
The sample locations were chosen using a simple random, stratified random or stratified systematic (square, herringbone or triangular grid) sampling pattern, rather than being targeted to locations suspected of being contaminated;  
The sample locations are relatively evenly spread across the area and are not clustered, to avoid giving undue weight to some parts of the site over others in the calculated statistics;  
The analyses do not suggest a hotspot or outlier of contamination that should be treated as a separate zone. This has been established by a histogram and/or a names statistical test;  
The sample locations are all taken from one population (i.e. the same material);  
Where an averaging zone encompasses several averaging areas, analyses do not show a spatial trend or other spatial pattern across that zone; and  
The number of samples has been shown to be sufficient for a statistical analysis.

Any included statistical spreadsheet is based on an in-house method of statistical analysis, in line with those outlined within the CL:AIRE guidance (2020).

#### Treatment of Hot-Spots

A statistical test is applied to establish whether the data is a part of a single set, or whether data outliers are present.

Provided that the data is based on random sampling and no distinct contamination source was present at the sampling location, the hot-spot(s) may be excluded and the mean of the remaining data assessed.

## 9. Ground and Water Limited Soil Assessment Criteria

The Soil Assessment Criteria used in the preparation of the Generic Quantitative Risk Assessment are tabulated in the following pages, where the source of each has been outlined in the previous sections.

## 9.1. Inorganics

| SoBRA – Acute Generic Assessment Criteria |              |               |                   |                    |                 |                 |
|-------------------------------------------|--------------|---------------|-------------------|--------------------|-----------------|-----------------|
| Determinand                               | RwHP (mg/kg) | RwoHP (mg/kg) | Allotment (mg/kg) | Commercial (mg/kg) | POSresi (mg/kg) | POSpark (mg/kg) |
| Cyanide                                   | 24           | 24            | 24                | 1400               | 24              | 24              |

## 9.2. Metals

| C4SL Low Level of Toxicological Concern |              |               |                   |                    |                 |                 |
|-----------------------------------------|--------------|---------------|-------------------|--------------------|-----------------|-----------------|
| Determinand                             | RwHP (mg/kg) | RwoHP (mg/kg) | Allotment (mg/kg) | Commercial (mg/kg) | POSresi (mg/kg) | POSpark (mg/kg) |
| Lead                                    | < 200        | < 310         | < 80              | < 2300             | < 630           | < 1300          |

| LQM/CIEH Suitable 4 Use Levels – Metals and Semi-metals |              |               |                   |                    |                 |                 |
|---------------------------------------------------------|--------------|---------------|-------------------|--------------------|-----------------|-----------------|
| Determinand                                             | RwHP (mg/kg) | RwoHP (mg/kg) | Allotment (mg/kg) | Commercial (mg/kg) | POSresi (mg/kg) | POSpark (mg/kg) |
| Arsenic                                                 | 37           | 40            | 43                | 640                | 79              | 170             |
| Beryllium                                               | 1.7          | 1.7           | 35                | 12                 | 2.2             | 63              |
| Boron                                                   | 290          | 11000         | 45                | 240000             | 21000           | 46000           |
| Cadmium                                                 | 11           | 85            | 1.9               | 190                | 120             | 532             |
| Chromium (III)                                          | 910          | 910           | 18000             | 8600               | 1500            | 33000           |
| Chromium (VI)                                           | 6            | 6             | 1.8               | 33                 | 7.7             | 220             |
| Copper                                                  | 2400         | 7100          | 520               | 68000              | 12000           | 44000           |
| Elemental Mercury                                       | 1.2          | 1.2           | 21                | 58                 | 16              | 30              |
| Inorganic Mercury                                       | 40           | 56            | 19                | 1100               | 120             | 240             |
| Methylmercury                                           | 11           | 15            | 6                 | 320                | 40              | 68              |
| Nickel                                                  | 130          | 180           | 53                | 980                | 230             | 800             |
| Selenium                                                | 250          | 430           | 88                | 12000              | 1100            | 1800            |
| Vanadium                                                | 410          | 1200          | 91                | 9000               | 2000            | 5000            |
| Zinc                                                    | 3700         | 40000         | 620               | 730000             | 81000           | 170000          |

| Phytotoxicity (Harmful to Plants) Threshold Trigger Values |                       |                           |                       |
|------------------------------------------------------------|-----------------------|---------------------------|-----------------------|
| Determinand                                                | Soil pH < 6.0 (mg/kg) | Soil pH 6.0 – 7.0 (mg/kg) | Soil pH > 7.0 (mg/kg) |
| Copper                                                     | 100                   | 135                       | 200                   |
| Nickel                                                     | 60                    | 75                        | 110                   |
| Zinc                                                       | 200                   | 200                       | 300                   |

Notes:  
BS3882:2015 – Specification for Topsoil. Based on a wide range of common plants that will be exposed to multi-purpose topsoil. Toxicity of contaminant may also be impacted by pH of soils.  
Site observation of plant vitality may give additional guidance.

| CL:AIRE Soil Generic Assessment Criteria |                     |                                          |                   |                    |
|------------------------------------------|---------------------|------------------------------------------|-------------------|--------------------|
| Determinand                              | Residential (mg/kg) | Residential without plant uptake (mg/kg) | Allotment (mg/kg) | Commercial (mg/kg) |
| Antimony                                 | ND                  | 550                                      | ND                | 7500               |
| Barium                                   | ND                  | 1300                                     | ND                | 22000              |
| Molybdenum                               | ND                  | 670                                      | ND                | 17000              |
| ND – Not derived                         |                     |                                          |                   |                    |

### 9.3. Total Petroleum Hydrocarbons (TPHs)

#### 9.3.1. BTEX Compounds

| LQM/CIEH Suitable 4 Use Levels – BTEX Compounds |                     |              |               |                   |                    |                 |                 |
|-------------------------------------------------|---------------------|--------------|---------------|-------------------|--------------------|-----------------|-----------------|
| Determinand                                     | Soil Organic Matter | RwHP (mg/kg) | RwoHP (mg/kg) | Allotment (mg/kg) | Commercial (mg/kg) | POSresi (mg/kg) | POSpark (mg/kg) |
| Benzene                                         | 1.0% SOM            | 0.087        | 0.38          | 0.017             | 27                 | 72              | 90              |
|                                                 | 2.5% SOM            | 0.170        | 0.70          | 0.034             | 47                 | 72              | 100             |
|                                                 | 6.0% SOM            | 0.370        | 1.40          | 0.075             | 90                 | 73              | 110             |
| Toluene                                         | 1.0% SOM            | 130          | 880           | 22                | 56000              | 56000           | 87000           |
|                                                 | 2.5% SOM            | 290          | 1900          | 51                | 110000             | 56000           | 95000           |
|                                                 | 6.0% SOM            | 660          | 3900          | 120               | 180000             | 56000           | 100000          |
| Ethylbenzene                                    | 1.0% SOM            | 47           | 83            | 16                | 5700               | 24000           | 17000           |
|                                                 | 2.5% SOM            | 110          | 190           | 39                | 13000              | 24000           | 22000           |
|                                                 | 6.0% SOM            | 260          | 440           | 91                | 27000              | 25000           | 27000           |
| o-Xylene                                        | 1.0% SOM            | 60           | 88            | 28                | 6600               | 41000           | 17000           |
|                                                 | 2.5% SOM            | 140          | 210           | 67                | 15000              | 42000           | 24000           |
|                                                 | 6.0% SOM            | 330          | 480           | 160               | 33000              | 43000           | 33000           |
| m-Xylene                                        | 1.0% SOM            | 59           | 82            | 31                | 6200               | 41000           | 17000           |
|                                                 | 2.5% SOM            | 140          | 190           | 74                | 14000              | 42000           | 24000           |
|                                                 | 6.0% SOM            | 320          | 450           | 170               | 31000              | 43000           | 33000           |
| p-Xylene                                        | 1.0% SOM            | 56           | 79            | 29                | 5900               | 41000           | 17000           |
|                                                 | 2.5% SOM            | 130          | 180           | 69                | 14000              | 42000           | 23000           |
|                                                 | 6.0% SOM            | 310          | 430           | 160               | 30000              | 43000           | 31000           |
| SOM = Soil Organic Matter Content (%)           |                     |              |               |                   |                    |                 |                 |

#### 9.3.2. Total Petroleum Hydrocarbons – Aliphatic

| LQM/CIEH Suitable 4 Use Levels For TPH                                                   |          |                   |                   |                   |                    |                    |                    |
|------------------------------------------------------------------------------------------|----------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|
| Aliphatic                                                                                |          | RwHP (mg/kg)      | RwoHP (mg/kg)     | Allotment (mg/kg) | Commercial (mg/kg) | POSresi (mg/kg)    | POSpark (mg/kg)    |
| EC 5-6                                                                                   | 1.0% SOM | 42                | 42                | 730               | 3,200 (304) sol    | 570,000 (304) sol  | 95,000 (304) sol   |
|                                                                                          | 2.5% SOM | 78                | 78                | 1,700             | 5,900 (558) sol    | 590,000            | 130,000 (558) sol  |
|                                                                                          | 6.0% SOM | 160               | 160               | 3,900             | 12,000 (1150) sol  | 600,000 (1150) sol | 180,000 (1150) sol |
| EC >6-8                                                                                  | 1.0% SOM | 100               | 100               | 2,300             | 7,800 (144) sol    | 600,000            | 150,000 (144) sol  |
|                                                                                          | 2.5% SOM | 230               | 230               | 5,600             | 17,000 (322) sol   | 610,000            | 220,000 (322) sol  |
|                                                                                          | 6.0% SOM | 530               | 530               | 13,000            | 40,000 (736) sol   | 620,000            | 320,000 (736) sol  |
| EC >8-10                                                                                 | 1.0% SOM | 27                | 27                | 320               | 2,000 (78) sol     | 13,000             | 14,000 (78) sol    |
|                                                                                          | 2.5% SOM | 65                | 65                | 770               | 4,800 (118) vap    | 13,000             | 18,000 (118) vap   |
|                                                                                          | 6.0% SOM | 150               | 150               | 1,700             | 11,000 (451) vap   | 13,000             | 21,000 (451) vap   |
| EC >10-12                                                                                | 1.0% SOM | 130 (48) vap      | 130 (48) vap      | 2,200             | 9,700 (48) sol     | 13,000             | 21,000 (48) sol    |
|                                                                                          | 2.5% SOM | 330 (118) vap     | 330 (118) vap     | 4,400             | 23,000 (118) vap   | 13,000             | 23,000 (118) vap   |
|                                                                                          | 6.0% SOM | 760 (283) vap     | 760 (283) vap     | 7,300             | 47,000 (283) vap   | 13,000             | 24,000 (283) vap   |
| EC >12-16                                                                                | 1.0% SOM | 1,100 (24) sol    | 1,100 (24) sol    | 11,000            | 59,000 (24) sol    | 13,000             | 25,000 (24) sol    |
|                                                                                          | 2.5% SOM | 2,400 (59) sol    | 2,400 (59) sol    | 13,000            | 82,000 (59) sol    | 13,000             | 25,000 (59) sol    |
|                                                                                          | 6.0% SOM | 4,300 (142) sol   | 4,400 (142) sol   | 13,000            | 90,000 (142) sol   | 13,000             | 26,000 (142) sol   |
| EC >16-35                                                                                | 1.0% SOM | 65,000 (8.48) sol | 65,000 (8.48) sol | 260,000           | 1,600,000          | 250,000            | 450,000            |
|                                                                                          | 2.5% SOM | 92,000 (21) sol   | 92,000 (21) sol   | 270,000           | 1,700,000          | 250,000            | 480,000            |
|                                                                                          | 6.0% SOM | 110,000           | 110,000           | 270,000           | 1,800,000          | 250,000            | 490,000            |
| EC >35-44                                                                                | 1.0% SOM | 65,000 (8.48) sol | 65,000 (8.48) sol | 260,000           | 1,600,000          | 250,000            | 450,000            |
|                                                                                          | 2.5% SOM | 92,000 (21) sol   | 92,000 (21) sol   | 270,000           | 1,700,000          | 250,000            | 480,000            |
|                                                                                          | 6.0% SOM | 110,000           | 110,000           | 270,000           | 1,800,000          | 250,000            | 490,000            |
| SOM = Soil Organic Matter Content (%)                                                    |          |                   |                   |                   |                    |                    |                    |
| vap – GAC presented exceeds the vapour saturation limit, which is presented in brackets. |          |                   |                   |                   |                    |                    |                    |
| sol – GAC presented exceeds the soil saturation limit, which is presented in brackets.   |          |                   |                   |                   |                    |                    |                    |

## 9.3.3. Total Petroleum Hydrocarbons – Aromatic

| LQM/CIEH Suitable 4 Use Levels For TPH                                                              |          |                 |                            |                      |                               |                    |                               |
|-----------------------------------------------------------------------------------------------------|----------|-----------------|----------------------------|----------------------|-------------------------------|--------------------|-------------------------------|
| Aromatic                                                                                            |          | RwHP<br>(mg/kg) | RwoHP<br>(mg/kg)           | Allotment<br>(mg/kg) | Commercial<br>(mg/kg)         | POSresi<br>(mg/kg) | POSpark<br>(mg/kg)            |
| EC 5-7<br>(Benzene)                                                                                 | 1.0% SOM | 70              | 370                        | 13                   | 26,000 (1220) <sup>sol</sup>  | 56,000             | 76,000 (1220) <sup>sol</sup>  |
|                                                                                                     | 2.5% SOM | 140             | 690                        | 27                   | 46,000 (2260) <sup>sol</sup>  | 56,000             | 84,000 (2260) <sup>sol</sup>  |
|                                                                                                     | 6.0% SOM | 300             | 1,400                      | 57                   | 86,000 (4710) <sup>sol</sup>  | 56,000             | 92,000 (4710) <sup>sol</sup>  |
| EC >7-8<br>(Toluene)                                                                                | 1.0% SOM | 130             | 860                        | 22                   | 56,000 (869) <sup>vap</sup>   | 56,000             | 87,000 (869) <sup>sol</sup>   |
|                                                                                                     | 2.5% SOM | 290             | 1,800                      | 51                   | 110,000 (1920) <sup>sol</sup> | 56,000             | 95,000 (1920) <sup>sol</sup>  |
|                                                                                                     | 6.0% SOM | 660             | 3,900                      | 120                  | 180,000 (4360) <sup>vap</sup> | 56,000             | 100,000 (4360) <sup>vap</sup> |
| EC >8-10                                                                                            | 1.0% SOM | 34              | 47                         | 8.6                  | 3,500 (613) <sup>vap</sup>    | 5,000              | 7,200 (613) <sup>vap</sup>    |
|                                                                                                     | 2.5% SOM | 83              | 110                        | 21                   | 8,100 (1500) <sup>vap</sup>   | 5,000              | 8,500 (1500) <sup>vap</sup>   |
|                                                                                                     | 6.0% SOM | 190             | 270                        | 51                   | 17,000 (3850) <sup>vap</sup>  | 5,000              | 9,300 (3580) <sup>vap</sup>   |
| EC >10-12                                                                                           | 1.0% SOM | 74              | 250                        | 13                   | 16,000 (364) <sup>sol</sup>   | 5,000              | 9,200 (364) <sup>sol</sup>    |
|                                                                                                     | 2.5% SOM | 180             | 590                        | 31                   | 28,000 (899) <sup>sol</sup>   | 5,000              | 9,700 (889) <sup>sol</sup>    |
|                                                                                                     | 6.0% SOM | 380             | 1,200                      | 74                   | 34,000 (2150) <sup>sol</sup>  | 5,000              | 10,000                        |
| EC >12-16                                                                                           | 1.0% SOM | 140             | 1,800                      | 23                   | 36,000 (169) <sup>sol</sup>   | 5,100              | 10,000                        |
|                                                                                                     | 2.5% SOM | 330             | 2,300 (419) <sup>sol</sup> | 57                   | 37,000                        | 5,100              | 10,000                        |
|                                                                                                     | 6.0% SOM | 660             | 2,500                      | 130                  | 38,000                        | 5,000              | 10,000                        |
| EC >16-21                                                                                           | 1.0% SOM | 260             | 1,900                      | 46                   | 28,000                        | 3,800              | 7,600                         |
|                                                                                                     | 2.5% SOM | 540             | 1,900                      | 110                  | 28,000                        | 3,800              | 7,700                         |
|                                                                                                     | 6.0% SOM | 930             | 1,900                      | 260                  | 28,000                        | 3,800              | 7,800                         |
| EC >21-35                                                                                           | 1.0% SOM | 1,100           | 1,900                      | 370                  | 28,000                        | 3,800              | 7,800                         |
|                                                                                                     | 2.5% SOM | 1,500           | 1,900                      | 820                  | 28,000                        | 3,800              | 7,800                         |
|                                                                                                     | 6.0% SOM | 1,700           | 1,900                      | 1,600                | 28,000                        | 3,800              | 7,900                         |
| EC >35-44                                                                                           | 1.0% SOM | 1,100           | 1,900                      | 370                  | 28,000                        | 3,800              | 7,800                         |
|                                                                                                     | 2.5% SOM | 1,500           | 1,900                      | 820                  | 28,000                        | 3,800              | 7,800                         |
|                                                                                                     | 6.0% SOM | 1,700           | 1,900                      | 1,600                | 28,000                        | 3,800              | 7,900                         |
| EC >44-70                                                                                           | 1.0% SOM | 1,600           | 1,900                      | 1,200                | 28,000                        | 3,800              | 7,800                         |
|                                                                                                     | 2.5% SOM | 1,800           | 1,900                      | 2,100                | 28,000                        | 3,800              | 7,800                         |
|                                                                                                     | 6.0% SOM | 1,900           | 1,900                      | 3,000                | 28,000                        | 3,800              | 7,900                         |
| SOM = Soil Organic Matter Content (%)                                                               |          |                 |                            |                      |                               |                    |                               |
| <sup>vap</sup> – GAC presented exceeds the vapour saturation limit, which is presented in brackets. |          |                 |                            |                      |                               |                    |                               |
| <sup>sol</sup> – GAC presented exceeds the soil saturation limit, which is presented in brackets.   |          |                 |                            |                      |                               |                    |                               |

## 9.4. Polycyclic Aromatic Hydrocarbons (PAHs)

| LQM/CIEH Suitable 4 Use Levels For Polycyclic Aromatic Hydrocarbons (PAHs)                          |          |                 |                             |                      |                             |                    |                    |
|-----------------------------------------------------------------------------------------------------|----------|-----------------|-----------------------------|----------------------|-----------------------------|--------------------|--------------------|
| Determinands                                                                                        |          | RwHP<br>(mg/kg) | RwoHP<br>(mg/kg)            | Allotment<br>(mg/kg) | Commercial<br>(mg/kg)       | POSresi<br>(mg/kg) | POSpark<br>(mg/kg) |
| Acenaphthene                                                                                        | 1.0% SOM | 210             | 3,000 (57.0) <sup>sol</sup> | 34                   | 84,000(57.0) <sup>sol</sup> | 15,000             | 29,000             |
|                                                                                                     | 2.5% SOM | 510             | 4,700(141) <sup>sol</sup>   | 85                   | 97,000(141) <sup>sol</sup>  | 15,000             | 30,000             |
|                                                                                                     | 6.0% SOM | 1100            | 6,000(336) <sup>sol</sup>   | 200                  | 100,000                     | 15,000             | 30,000             |
| Acenaphthylene                                                                                      | 1.0% SOM | 170             | 2,900(86.1) <sup>sol</sup>  | 28                   | 83,000(86.1) <sup>sol</sup> | 15,000             | 29,000             |
|                                                                                                     | 2.5% SOM | 420             | 4,600(212) <sup>sol</sup>   | 69                   | 97,000(212) <sup>sol</sup>  | 15,000             | 30,000             |
|                                                                                                     | 6.0% SOM | 920             | 6,000(506) <sup>sol</sup>   | 160                  | 100,000                     | 15,000             | 30,000             |
| Anthracene                                                                                          | 1.0% SOM | 2,400           | 31,000(1.17) <sup>vap</sup> | 380                  | 520,000                     | 74,000             | 150,000            |
|                                                                                                     | 2.5% SOM | 5,400           | 35,000                      | 950                  | 540,000                     | 74,000             | 150,000            |
|                                                                                                     | 6.0% SOM | 11,000          | 37,000                      | 2,200                | 540,000                     | 74,000             | 150,000            |
| Benzo(a)anthracene                                                                                  | 1.0% SOM | 7.20            | 11                          | 2.90                 | 170                         | 29                 | 49                 |
|                                                                                                     | 2.5% SOM | 11              | 14                          | 6.50                 | 170                         | 29                 | 56                 |
|                                                                                                     | 6.0% SOM | 13              | 15                          | 13                   | 180                         | 29                 | 62                 |
| Benzo(a)pyrene                                                                                      | 1.0% SOM | 2.20            | 3.20                        | 0.97                 | 35                          | 5.70               | 11                 |
|                                                                                                     | 2.5% SOM | 2.70            | 3.20                        | 2.00                 | 35                          | 5.70               | 12                 |
|                                                                                                     | 6.0% SOM | 3.00            | 3.20                        | 3.50                 | 36                          | 5.70               | 13                 |
| Benzo(b)fluoranthene                                                                                | 1.0% SOM | 2.60            | 3.90                        | 0.99                 | 44                          | 7.10               | 13                 |
|                                                                                                     | 2.5% SOM | 3.30            | 4.00                        | 2.10                 | 44                          | 7.20               | 15                 |
|                                                                                                     | 6.0% SOM | 3.70            | 4.00                        | 3.90                 | 45                          | 7.20               | 16                 |
| Benzo(ghi)perylene                                                                                  | 1.0% SOM | 320             | 360                         | 290                  | 3,900                       | 640                | 1,400              |
|                                                                                                     | 2.5% SOM | 340             | 360                         | 470                  | 4,000                       | 640                | 1,500              |
|                                                                                                     | 6.0% SOM | 350             | 360                         | 640                  | 4,000                       | 640                | 1,600              |
| Benzo(k)fluoranthene                                                                                | 1.0% SOM | 77              | 110                         | 37                   | 1,200                       | 190                | 370                |
|                                                                                                     | 2.5% SOM | 93              | 110                         | 75                   | 1,200                       | 190                | 410                |
|                                                                                                     | 6.0% SOM | 100             | 110                         | 130                  | 1,200                       | 190                | 440                |
| Chrysene                                                                                            | 1.0% SOM | 15              | 30                          | 4.10                 | 350                         | 57                 | 93                 |
|                                                                                                     | 2.5% SOM | 22              | 31                          | 9.40                 | 350                         | 57                 | 110                |
|                                                                                                     | 6.0% SOM | 27              | 32                          | 19                   | 350                         | 57                 | 120                |
| Dibenzo(ah)anthracene                                                                               | 1.0% SOM | 0.24            | 0.31                        | 0.14                 | 3.50                        | 0.57               | 1.10               |
|                                                                                                     | 2.5% SOM | 0.28            | 0.32                        | 0.27                 | 3.50                        | 0.57               | 1.30               |
|                                                                                                     | 6.0% SOM | 0.30            | 0.32                        | 0.43                 | 3.60                        | 0.58               | 1.40               |
| Fluoranthene                                                                                        | 1.0% SOM | 280             | 1,500                       | 52                   | 23,000                      | 3,100              | 6,300              |
|                                                                                                     | 2.5% SOM | 560             | 1,600                       | 130                  | 23,000                      | 3,100              | 6,300              |
|                                                                                                     | 6.0% SOM | 890             | 1,600                       | 290                  | 23,000                      | 3,100              | 6,300              |
| Flourene                                                                                            | 1.0% SOM | 170             | 2,800 (30.9) <sup>sol</sup> | 27                   | 63,000(30.9) <sup>sol</sup> | 9,900              | 20,000             |
|                                                                                                     | 2.5% SOM | 400             | 3,800(76.5) <sup>sol</sup>  | 67                   | 68,000                      | 9,900              | 20,000             |
|                                                                                                     | 6.0% SOM | 860             | 4,500(183) <sup>sol</sup>   | 160                  | 71,000                      | 9,900              | 20,000             |
| Indeno(123-cd)pyrene                                                                                | 1.0% SOM | 27              | 45                          | 9.50                 | 500                         | 82                 | 150                |
|                                                                                                     | 2.5% SOM | 36              | 46                          | 21                   | 510                         | 82                 | 170                |
|                                                                                                     | 6.0% SOM | 41              | 46                          | 39                   | 510                         | 82                 | 180                |
| Napthalene                                                                                          | 1.0% SOM | 15              | 36                          | 65                   | 1,600                       | 11,000             | 800                |
|                                                                                                     | 2.5% SOM | 36              | 36                          | 130                  | 3,700                       | 15,000             | 1,200              |
|                                                                                                     | 6.0% SOM | 85              | 85                          | 200                  | 8,400                       | 17,000             | 1,900              |
| Phenanthrene                                                                                        | 1.0% SOM | 95              | 1,300(183) <sup>sol</sup>   | 15                   | 22,000                      | 3,100              | 6,200              |
|                                                                                                     | 2.5% SOM | 220             | 1,500                       | 38                   | 22,000                      | 3,100              | 6,200              |
|                                                                                                     | 6.0% SOM | 440             | 1,500                       | 90                   | 23,000                      | 3,100              | 6,300              |
| Pyrene                                                                                              | 1.0% SOM | 620             | 3,700                       | 110                  | 54,000                      | 7,400              | 15,000             |
|                                                                                                     | 2.5% SOM | 1200            | 3,800                       | 270                  | 54,000                      | 7,400              | 15,000             |
|                                                                                                     | 6.0% SOM | 2000            | 3,800                       | 620                  | 54,000                      | 7,400              | 15,000             |
| Coal Tar (Benzo(a)pyrene<br>used as marker<br>compound)                                             | 1.0% SOM | 0.79            | 1.2                         | 0.32                 | 15                          | 2.20               | 4.40               |
|                                                                                                     | 2.5% SOM | 0.98            | 1.2                         | 0.67                 | 15                          | 2.20               | 4.70               |
|                                                                                                     | 6.0% SOM | 1.10            | 1.2                         | 1.20                 | 15                          | 2.20               | 4.80               |
| SOM = Soil Organic Matter Content (%)                                                               |          |                 |                             |                      |                             |                    |                    |
| <sup>vap</sup> – GAC presented exceeds the vapour saturation limit, which is presented in brackets. |          |                 |                             |                      |                             |                    |                    |
| <sup>sol</sup> – GAC presented exceeds the soil saturation limit, which is presented in brackets.   |          |                 |                             |                      |                             |                    |                    |

## 9.5. Volatile and Semi-volatile Organic Compounds

| LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds |          |                 |                  |                      |                       |                    |                               |
|------------------------------------------------------------------------------------|----------|-----------------|------------------|----------------------|-----------------------|--------------------|-------------------------------|
| Determinands                                                                       |          | RwHP<br>(mg/kg) | RwoHP<br>(mg/kg) | Allotment<br>(mg/kg) | Commercial<br>(mg/kg) | POSresi<br>(mg/kg) | POSpark<br>(mg/kg)            |
| Chloroalkanes & alkenes                                                            |          |                 |                  |                      |                       |                    |                               |
| 1,2 Dichloroethane                                                                 | 1.0% SOM | 0.0071          | 0.0092           | 0.0046               | 0.67                  | 29                 | 21                            |
|                                                                                    | 2.5% SOM | 0.011           | 0.013            | 0.0083               | 0.97                  | 29                 | 24                            |
|                                                                                    | 6.0% SOM | 0.019           | 0.023            | 0.016                | 1.70                  | 29                 | 28                            |
| 1,1,2,2 Tetrachloroethane                                                          | 1.0% SOM | 1.60            | 3.90             | 0.41                 | 270                   | 1,400              | 1,800                         |
|                                                                                    | 2.5% SOM | 3.40            | 8.00             | 0.89                 | 550                   | 1,400              | 2,100                         |
|                                                                                    | 6.0% SOM | 7.50            | 17               | 2.00                 | 1,100                 | 1,400              | 2,300                         |
| 1,1,1,2 Tetrachloroethane                                                          | 1.0% SOM | 1.20            | 1.50             | 0.79                 | 110                   | 1,400              | 1,500                         |
|                                                                                    | 2.5% SOM | 2.80            | 3.50             | 1.90                 | 250                   | 1,400              | 1,800                         |
|                                                                                    | 6.0% SOM | 6.40            | 8.20             | 4.40                 | 560                   | 1,400              | 2,100                         |
| Tetrachloroethene                                                                  | 1.0% SOM | 0.18            | 0.18             | 0.65                 | 19                    | 1,400              | 810 <sup>sol</sup> (424)      |
|                                                                                    | 2.5% SOM | 0.39            | 0.40             | 1.50                 | 42                    | 1,400              | 1,100 <sup>sol</sup> (951)    |
|                                                                                    | 6.0% SOM | 0.90            | 0.92             | 3.60                 | 95                    | 1,400              | 1,500                         |
| 1,1,1 Trichloroethane                                                              | 1.0% SOM | 8.80            | 9.00             | 48                   | 660                   | 140,000            | 57,000 <sup>vap</sup> (1425)  |
|                                                                                    | 2.5% SOM | 18              | 18               | 110                  | 1,300                 | 140,000            | 76,000 <sup>vap</sup> (2915)  |
|                                                                                    | 6.0% SOM | 39              | 40               | 240                  | 3,000                 | 140,000            | 100,000 <sup>vap</sup> (6392) |
| Tetrachloromethene                                                                 | 1.0% SOM | 0.026           | 0.026            | 0.45                 | 2.90                  | 890                | 190                           |
|                                                                                    | 2.5% SOM | 0.056           | 0.056            | 1.00                 | 6.30                  | 920                | 270                           |
|                                                                                    | 6.0% SOM | 0.130           | 0.130            | 2.40                 | 14                    | 950                | 400                           |
| Trichloroethene                                                                    | 1.0% SOM | 0.016           | 0.017            | 0.041                | 1.20                  | 120                | 70                            |
|                                                                                    | 2.5% SOM | 0.034           | 0.036            | 0.091                | 2.60                  | 120                | 91                            |
|                                                                                    | 6.0% SOM | 0.075           | 0.080            | 0.210                | 5.70                  | 120                | 120                           |
| Trichloromethane                                                                   | 1.0% SOM | 0.91            | 1.20             | 0.42                 | 99                    | 2,500              | 2,600                         |
|                                                                                    | 2.5% SOM | 1.70            | 2.10             | 0.83                 | 170                   | 2,500              | 2,800                         |
|                                                                                    | 6.0% SOM | 3.40            | 4.20             | 1.70                 | 350                   | 2,500              | 3,100                         |
| Vinyl Chloride                                                                     | 1.0% SOM | 0.00064         | 0.00077          | 0.00055              | 0.059                 | 3.50               | 4.80                          |
|                                                                                    | 2.5% SOM | 0.00087         | 0.00100          | 0.00100              | 0.077                 | 3.50               | 5.00                          |
|                                                                                    | 6.0% SOM | 0.00014         | 0.00150          | 0.00180              | 0.120                 | 3.50               | 5.40                          |
| Explosives                                                                         |          |                 |                  |                      |                       |                    |                               |
| 2,4,6 Trinitrotoluene                                                              | 1.0% SOM | 1.60            | 65               | 0.24                 | 1,000                 | 130                | 260                           |
|                                                                                    | 2.5% SOM | 3.70            | 66               | 0.58                 | 1,000                 | 130                | 270                           |
|                                                                                    | 6.0% SOM | 8.10            | 66               | 1.40                 | 1,000                 | 130                | 270                           |
| RDX<br>(Hexogen/Cyclonite/1,3,5-trinitro-1,3,5-triazacyclohexane)                  | 1.0% SOM | 120             | 13,000           | 17                   | 210,000               | 26,000             | 49,000(18.7) <sup>sol</sup>   |
|                                                                                    | 2.5% SOM | 250             | 13,000           | 38                   | 210,000               | 26,000             | 51,000                        |
|                                                                                    | 6.0% SOM | 540             | 13,000           | 85                   | 210,000               | 27,000             | 53,000                        |
| HMX (Octogen/1,3,5,7-tetrenitro-1,3,5,7-tetrazacyclo-octane)                       | 1.0% SOM | 5.70            | 67,00            | 0.86                 | 110,000               | 13,000             | 23,000(0.35) <sup>vap</sup>   |
|                                                                                    | 2.5% SOM | 13              | 67,00            | 1.90                 | 110,000               | 13,000             | 23,000(0.39) <sup>vap</sup>   |
|                                                                                    | 6.0% SOM | 26              | 67,00            | 3.90                 | 110,000               | 13,000             | 24,000(0.48) <sup>vap</sup>   |
| Atrazine                                                                           | 1.0% SOM | 3.30            | 610              | 0.50                 | 9,300                 | 1,200              | 2,300                         |
|                                                                                    | 2.5% SOM | 7.60            | 620              | 1.20                 | 9,400                 | 1,200              | 2,400                         |
|                                                                                    | 6.0% SOM | 17.40           | 620              | 2.70                 | 9,400                 | 1,200              | 2,400                         |

<sup>vap</sup> – GAC presented exceeds the vapour saturation limit, which is presented in brackets.  
<sup>sol</sup> – GAC presented exceeds the soil saturation limit, which is presented in brackets.

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

| LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds                  |          |                 |                             |                      |                               |                     |                              |
|-----------------------------------------------------------------------------------------------------|----------|-----------------|-----------------------------|----------------------|-------------------------------|---------------------|------------------------------|
| Determinands                                                                                        |          | RwHP<br>(mg/kg) | RwoHP<br>(mg/kg)            | Allotment<br>(mg/kg) | Commercial<br>(mg/kg)         | POSresi<br>(mg/kg)  | POSpark<br>(mg/kg)           |
| Pesticides                                                                                          |          |                 |                             |                      |                               |                     |                              |
| Aldrin                                                                                              | 1.0% SOM | 5.70            | 7.30                        | 3.20                 | 170                           | 18                  | 30                           |
|                                                                                                     | 2.5% SOM | 6.60            | 7.40                        | 6.10                 | 170                           | 18                  | 31                           |
|                                                                                                     | 6.0% SOM | 7.10            | 7.50                        | 9.60                 | 170                           | 18                  | 31                           |
| Dieldrin                                                                                            | 1.0% SOM | 0.97            | 7.00                        | 0.17                 | 170                           | 18                  | 30                           |
|                                                                                                     | 2.5% SOM | 2.00            | 7.30                        | 0.41                 | 170                           | 18                  | 30                           |
|                                                                                                     | 6.0% SOM | 3.50            | 7.40                        | 0.96                 | 170                           | 18                  | 31                           |
| Dichlorvos                                                                                          | 1.0% SOM | 0.032           | 6.40                        | 0.0049               | 140                           | 16                  | 26                           |
|                                                                                                     | 2.5% SOM | 0.066           | 6.50                        | 0.0100               | 140                           | 16                  | 26                           |
|                                                                                                     | 6.0% SOM | 0.140           | 6.60                        | 0.0220               | 140                           | 16                  | 27                           |
| Alpha - Endosulfan                                                                                  | 1.0% SOM | 7.40            | 160(0.003) <sup>vap</sup>   | 1.20                 | 5,600(0.003) <sup>vap</sup>   | 1,200               | 2,400                        |
|                                                                                                     | 2.5% SOM | 18              | 280(0.007) <sup>vap</sup>   | 2.90                 | 7,400(0.007) <sup>vap</sup>   | 1,200               | 2,400                        |
|                                                                                                     | 6.0% SOM | 41              | 410(0.016) <sup>vap</sup>   | 6.80                 | 8,400(0.016) <sup>vap</sup>   | 1,200               | 2,400                        |
| Beta - Endosulfan                                                                                   | 1.0% SOM | 7.00            | 190(0.00007) <sup>vap</sup> | 1.10                 | 6,300(0.00007) <sup>vap</sup> | 1,200               | 2,400                        |
|                                                                                                     | 2.5% SOM | 17              | 320(0.0002) <sup>vap</sup>  | 2.70                 | 7,800(0.0002) <sup>vap</sup>  | 1,200               | 2,400                        |
|                                                                                                     | 6.0% SOM | 39              | 440(0.0004) <sup>vap</sup>  | 6.40                 | 8700                          | 1,200               | 2,500                        |
| Alpha - Hexachlorocyclohexanes                                                                      | 1.0% SOM | 0.23            | 6.90                        | 0.035                | 170                           | 24                  | 47                           |
|                                                                                                     | 2.5% SOM | 0.55            | 9.20                        | 0.087                | 180                           | 24                  | 48                           |
|                                                                                                     | 6.0% SOM | 1.20            | 11                          | 0.210                | 180                           | 24                  | 48                           |
| Beta - Hexachlorocyclohexanes                                                                       | 1.0% SOM | 0.085           | 3.70                        | 0.013                | 65                            | 8.10                | 15                           |
|                                                                                                     | 2.5% SOM | 0.200           | 3.80                        | 0.032                | 65                            | 8.10                | 15                           |
|                                                                                                     | 6.0% SOM | 0.460           | 3.80                        | 0.077                | 65                            | 8.10                | 16                           |
| Gamma - Hexachlorocyclohexanes                                                                      | 1.0% SOM | 0.06            | 2.90                        | 0.0092               | 67                            | 8.2                 | 14                           |
|                                                                                                     | 2.5% SOM | 0.14            | 3.30                        | 0.0230               | 69                            | 8.2                 | 15                           |
|                                                                                                     | 6.0% SOM | 0.33            | 3.50                        | 0.0540               | 70                            | 8.2                 | 15                           |
| Chlorobenzenes                                                                                      |          |                 |                             |                      |                               |                     |                              |
| Chlorobenzene                                                                                       | 1.0% SOM | 0.46            | 0.46                        | 5.90                 | 56                            | 11,000              | 1,300(675) <sup>sol</sup>    |
|                                                                                                     | 2.5% SOM | 1.00            | 1.00                        | 14                   | 130                           | 13,000              | 2,000(1520) <sup>sol</sup>   |
|                                                                                                     | 6.0% SOM | 2.40            | 2.40                        | 32                   | 290                           | 14,000              | 2,900                        |
| 1,2-Dichlorobenzene                                                                                 | 1.0% SOM | 23              | 24                          | 94                   | 2,000 (571) <sup>sol</sup>    | 90,000              | 24,000(571) <sup>sol</sup>   |
|                                                                                                     | 2.5% SOM | 55              | 57                          | 230                  | 4,800 (1370) <sup>sol</sup>   | 95,000              | 36,000(1370) <sup>sol</sup>  |
|                                                                                                     | 6.0% SOM | 130             | 130                         | 540                  | 11,000 (3240) <sup>sol</sup>  | 98,000              | 51,000(3240) <sup>sol</sup>  |
| 1,3-Dichlorobenzene                                                                                 | 1.0% SOM | 0.40            | 0.44                        | 0.25                 | 30                            | 300                 | 390                          |
|                                                                                                     | 2.5% SOM | 1.00            | 1.10                        | 0.60                 | 73                            | 300                 | 440                          |
|                                                                                                     | 6.0% SOM | 2.30            | 2.50                        | 1.50                 | 170                           | 300                 | 470                          |
| 1,4-Dichlorobenzene                                                                                 | 1.0% SOM | 61              | 61                          | 15                   | 4,400 (224) <sup>vap</sup>    | 17,000 <sup>g</sup> | 36,000 (224) <sup>vap</sup>  |
|                                                                                                     | 2.5% SOM | 150             | 150                         | 37                   | 10,000 (540) <sup>vap</sup>   | 17,000 <sup>g</sup> | 36,000 (540) <sup>vap</sup>  |
|                                                                                                     | 6.0% SOM | 350             | 350                         | 88 <sup>g</sup>      | 25,000 (1280) <sup>vap</sup>  | 17,000 <sup>g</sup> | 36,000 (1280) <sup>vap</sup> |
| 1,2,3,-Trichlorobenzene                                                                             | 1.0% SOM | 1.50            | 1.50                        | 4.70                 | 102                           | 1,800               | 770(134) <sup>vap</sup>      |
|                                                                                                     | 2.5% SOM | 3.60            | 3.70                        | 12                   | 250                           | 1,800               | 1,100(330) <sup>vap</sup>    |
|                                                                                                     | 6.0% SOM | 8.60            | 8.80                        | 28                   | 590                           | 1,800               | 1,600(789) <sup>vap</sup>    |
| 1,2,4,-Trichlorobenzene                                                                             | 1.0% SOM | 2.60            | 2.60                        | 55                   | 220                           | 15,000              | 1,700(318) <sup>vap</sup>    |
|                                                                                                     | 2.5% SOM | 6.40            | 6.40                        | 140                  | 530                           | 17,000              | 2,600(786) <sup>vap</sup>    |
|                                                                                                     | 6.0% SOM | 15              | 15                          | 320                  | 1,300                         | 19,000              | 4,000(1880) <sup>vap</sup>   |
| 1,3,5,-Trichlorobenzene                                                                             | 1.0% SOM | 0.33            | 0.33                        | 4.70                 | 23                            | 1,700               | 380(36.7) <sup>vap</sup>     |
|                                                                                                     | 2.5% SOM | 0.81            | 0.81                        | 12                   | 55                            | 1,700               | 590(90.8) <sup>vap</sup>     |
|                                                                                                     | 6.0% SOM | 1.90            | 1.90                        | 140                  | 130                           | 1,800               | 860(217) <sup>vap</sup>      |
| <sup>vap</sup> – GAC presented exceeds the vapour saturation limit, which is presented in brackets. |          |                 |                             |                      |                               |                     |                              |
| <sup>sol</sup> – GAC presented exceeds the soil saturation limit, which is presented in brackets.   |          |                 |                             |                      |                               |                     |                              |

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

| LQM CIEH General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds                  |          |                           |                            |                      |                               |                               |                               |
|-----------------------------------------------------------------------------------------------------|----------|---------------------------|----------------------------|----------------------|-------------------------------|-------------------------------|-------------------------------|
| Determinands                                                                                        |          | RwHP<br>(mg/kg)           | RwoHP<br>(mg/kg)           | Allotment<br>(mg/kg) | Commercial<br>(mg/kg)         | POSresi<br>(mg/kg)            | POSpark<br>(mg/kg)            |
| Chlorobenzenes (cont.)                                                                              |          |                           |                            |                      |                               |                               |                               |
| 1,2,3,4,-<br>Tetrachlorobenzene                                                                     | 1.0% SOM | 15                        | 24                         | 4.40                 | 1,700(122) <sup>vap</sup>     | 830                           | 1,500(122) <sup>vap</sup>     |
|                                                                                                     | 2.5% SOM | 36                        | 56                         | 11                   | 3,080(304) <sup>vap</sup>     | 830                           | 1,600                         |
|                                                                                                     | 6.0% SOM | 78                        | 120                        | 26                   | 4,400(728) <sup>vap</sup>     | 830                           | 1,600                         |
| 1,2,3,5,-<br>Tetrachlorobenzene                                                                     | 1.0% SOM | 0.66                      | 0.75                       | 0.38                 | 49(39.4) <sup>vap</sup>       | 78                            | 110(39) <sup>vap</sup>        |
|                                                                                                     | 2.5% SOM | 1.60                      | 1.90                       | 0.90                 | 120(98.1) <sup>vap</sup>      | 79                            | 120                           |
|                                                                                                     | 6.0% SOM | 3.70                      | 4.30                       | 2.20                 | 240(235) <sup>vap</sup>       | 79                            | 130                           |
| 1,2,4, 5,-<br>Tetrachlorobenzene                                                                    | 1.0% SOM | 0.33                      | 0.73                       | 0.06                 | 42(19.7) <sup>sol</sup>       | 13                            | 25                            |
|                                                                                                     | 2.5% SOM | 0.77                      | 1.70                       | 0.16                 | 72(49.1) <sup>sol</sup>       | 13                            | 26                            |
|                                                                                                     | 6.0% SOM | 1.60                      | 3.50                       | 0.37                 | 96                            | 13                            | 26                            |
| Pentachlorobenzene                                                                                  | 1.0% SOM | 5.80                      | 19                         | 1.20                 | 640(43.0) <sup>sol</sup>      | 100                           | 190                           |
|                                                                                                     | 2.5% SOM | 12                        | 30                         | 3.10                 | 770(107) <sup>sol</sup>       | 100                           | 190                           |
|                                                                                                     | 6.0% SOM | 22                        | 38                         | 7.00                 | 830                           | 100                           | 190                           |
| Hexachlorobenzene                                                                                   | 1.0% SOM | 1.80(0.20) <sup>vap</sup> | 4.10 (0.20) <sup>vap</sup> | 0.47                 | 110(0.20) <sup>vap</sup>      | 16                            | 30                            |
|                                                                                                     | 2.5% SOM | 3.30(0.50) <sup>vap</sup> | 5.70 (0.50) <sup>vap</sup> | 1.10                 | 120                           | 16                            | 30                            |
|                                                                                                     | 6.0% SOM | 4.90                      | 6.70 (1.2) <sup>vap</sup>  | 2.50                 | 120                           | 16                            | 30                            |
| Phenols & Chlorophenols                                                                             |          |                           |                            |                      |                               |                               |                               |
| BTEX                                                                                                |          |                           |                            |                      | 760 <sup>dir</sup> (31,000)   | 760 <sup>dir</sup> (11,000)   | 760 <sup>dir</sup> (8,600)    |
|                                                                                                     | 1.0% SOM | 280                       | 750                        | 66                   | 1,500 <sup>dir</sup> (35,000) | 1,500 <sup>dir</sup> (11,000) | 1,500 <sup>dir</sup> (9,700)  |
|                                                                                                     | 2.5% SOM | 550                       | 1,300                      | 140                  | 3,200 <sup>dir</sup> (37,000) | 3,200 <sup>dir</sup> (11,000) | 3,200 <sup>dir</sup> (11,000) |
|                                                                                                     | 6.0% SOM | 1100                      | 2,300                      | 280                  |                               |                               |                               |
| Chlorophenols (4<br>Congeners)                                                                      | 1.0% SOM | 0.87                      | 94                         | 0.13                 | 3,500                         | 620                           | 1,100                         |
|                                                                                                     | 2.5% SOM | 2.00                      | 150                        | 0.30                 | 4,000                         | 620                           | 1,100                         |
|                                                                                                     | 6.0% SOM | 4.50                      | 210                        | 0.70                 | 4,300                         | 620                           | 1,100                         |
| Pentachlorophenols                                                                                  | 1.0% SOM | 0.22                      | 27(16.4) <sup>vap</sup>    | 0.03                 | 400                           | 60                            | 110                           |
|                                                                                                     | 2.5% SOM | 0.52                      | 29                         | 0.08                 | 400                           | 60                            | 120                           |
|                                                                                                     | 6.0% SOM | 1.20                      | 31                         | 0.19                 | 400                           | 60                            | 120                           |
| Others                                                                                              |          |                           |                            |                      |                               |                               |                               |
| Carbon Disulphide                                                                                   | 1.0% SOM | 0.14                      | 0.14                       | 4.80                 | 11                            | 11,000                        | 1,300                         |
|                                                                                                     | 2.5% SOM | 0.29                      | 0.29                       | 10                   | 22                            | 11,000                        | 1,900                         |
|                                                                                                     | 6.0% SOM | 0.62                      | 0.62                       | 23                   | 47                            | 12,000                        | 2,700                         |
| Hexachloro-1,3-<br>Butadiene                                                                        | 1.0% SOM | 0.29                      | 0.32                       | 0.25                 | 31                            | 25                            | 48                            |
|                                                                                                     | 2.5% SOM | 0.70                      | 0.78                       | 0.61                 | 68                            | 25                            | 50                            |
|                                                                                                     | 6.0% SOM | 1.60                      | 1.80                       | 1.40                 | 120                           | 25                            | 51                            |
| <sup>vap</sup> – GAC presented exceeds the vapour saturation limit, which is presented in brackets. |          |                           |                            |                      |                               |                               |                               |
| <sup>sol</sup> – GAC presented exceeds the soil saturation limit, which is presented in brackets.   |          |                           |                            |                      |                               |                               |                               |

VOC and SVOC table continued overleaf

VOC and SVOC table continued from previous page

| CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds |          |                 |                  |                      |                       |
|-----------------------------------------------------------------------------------|----------|-----------------|------------------|----------------------|-----------------------|
| Determinands                                                                      |          | RwHP<br>(mg/kg) | RwoHP<br>(mg/kg) | Allotment<br>(mg/kg) | Commercial<br>(mg/kg) |
| 1,1,2 Trichloroethane                                                             | 1.0% SOM | 0.60            | 0.88             | 0.28                 | 94                    |
|                                                                                   | 2.5% SOM | 1.20            | 1.8              | 0.61                 | 190                   |
|                                                                                   | 6.0% SOM | 2.70            | 3.9              | 1.40                 | 400                   |
| 1,1-Dichloroethane                                                                | 1.0% SOM | 2.40            | 2.50             | 9.20                 | 280                   |
|                                                                                   | 2.5% SOM | 3.90            | 4.10             | 17                   | 450                   |
|                                                                                   | 6.0% SOM | 7.40            | 7.70             | 35                   | 850                   |
| 1,1-Dichloroethene                                                                | 1.0% SOM | 0.23            | 0.23             | 2.80                 | 26                    |
|                                                                                   | 2.5% SOM | 0.40            | 0.41             | 5.60                 | 46                    |
|                                                                                   | 6.0% SOM | 0.82            | 0.82             | 12                   | 92                    |
| 1,2,4-Trimethylbenzene                                                            | 1.0% SOM | 0.35            | 0.41             | 0.38                 | 42                    |
|                                                                                   | 2.5% SOM | 0.85            | 0.99             | 0.93                 | 99                    |
|                                                                                   | 6.0% SOM | 2.00            | 2.30             | 2.20                 | 220                   |
| 1,2-Dichloropropane                                                               | 1.0% SOM | 0.024           | 0.024            | 0.62                 | 3.3                   |
|                                                                                   | 2.5% SOM | 0.042           | 0.042            | 1.20                 | 5.9                   |
|                                                                                   | 6.0% SOM | 0.084           | 0.085            | 2.60                 | 12                    |
| 2,4-Dimethylphenol                                                                | 1.0% SOM | 19              | 210              | 3.10                 | 16000*                |
|                                                                                   | 2.5% SOM | 43              | 410              | 7.20                 | 24000*                |
|                                                                                   | 6.0% SOM | 97              | 730              | 17                   | 30000*                |
| 2,4-Dinitrotoluene                                                                | 1.0% SOM | 1.50            | 170*             | 0.22                 | 3700*                 |
|                                                                                   | 2.5% SOM | 3.20            | 170              | 0.49                 | 3700*                 |
|                                                                                   | 6.0% SOM | 7.20            | 170              | 1.10                 | 3800*                 |
| 2,6-Dinitrotoluene                                                                | 1.0% SOM | 0.78            | 78               | 0.12                 | 1900*                 |
|                                                                                   | 2.5% SOM | 1.70            | 84               | 0.27                 | 1900*                 |
|                                                                                   | 6.0% SOM | 3.90            | 87               | 0.61                 | 1900*                 |
| 2-Chloronaphthalene                                                               | 1.0% SOM | 3.70            | 3.80             | 40                   | 390*                  |
|                                                                                   | 2.5% SOM | 9.20            | 9.30             | 98                   | 960*                  |
|                                                                                   | 6.0% SOM | 22              | 22               | 230                  | 2200*                 |
| Biphenyl                                                                          | 1.0% SOM | 66*             | 220*             | 14                   | 18000*                |
|                                                                                   | 2.5% SOM | 160             | 500*             | 35                   | 33000*                |
|                                                                                   | 6.0% SOM | 360             | 980*             | 83                   | 48000*                |
| Bis (2-ethylhexyl) phthalate                                                      | 1.0% SOM | 280*            | 2700*            | 47*                  | 85000*                |
|                                                                                   | 2.5% SOM | 610*            | 2800*            | 120*                 | 86000*                |
|                                                                                   | 6.0% SOM | 1100*           | 2800*            | 280*                 | 86000*                |
| Bromobenzene                                                                      | 1.0% SOM | 0.87            | 0.91             | 3.2                  | 97                    |
|                                                                                   | 2.5% SOM | 2.0             | 2.1              | 7.6                  | 220                   |
|                                                                                   | 6.0% SOM | 4.7             | 4.9              | 18                   | 520                   |
| Bromodichloromethane                                                              | 1.0% SOM | 0.016           | 0.019            | 0.016                | 2.1                   |
|                                                                                   | 2.5% SOM | 0.030           | 0.034            | 0.032                | 3.7                   |
|                                                                                   | 6.0% SOM | 0.061           | 0.070            | 0.068                | 7.6                   |
| Bromoform                                                                         | 1.0% SOM | 2.8             | 5.2              | 0.95                 | 760                   |
|                                                                                   | 2.5% SOM | 5.9             | 11               | 2.1                  | 1500                  |
|                                                                                   | 6.0% SOM | 13              | 23               | 4.6                  | 3100                  |
| Butyl benzyl phthalate                                                            | 1.0% SOM | 1400*           | 42000*           | 220*                 | 940000*               |
|                                                                                   | 2.5% SOM | 3300*           | 44000*           | 550*                 | 940000*               |
|                                                                                   | 6.0% SOM | 7200*           | 44000*           | 1300*                | 950000*               |

\*soil concentration above saturation limit

VOC and SVOC table continued from previous page

| CL:AIRE General Assessment Criteria: Volatile and Semi-Volatile Organic Compounds |          |                 |                  |                      |                       |
|-----------------------------------------------------------------------------------|----------|-----------------|------------------|----------------------|-----------------------|
| Determinands                                                                      |          | RwHP<br>(mg/kg) | RwoHP<br>(mg/kg) | Allotment<br>(mg/kg) | Commercial<br>(mg/kg) |
| Chloroethane                                                                      | 1.0% SOM | 8.3             | 8.4              | 110                  | 960                   |
|                                                                                   | 2.5% SOM | 11              | 11               | 200                  | 1300                  |
|                                                                                   | 6.0% SOM | 18              | 18               | 380                  | 2100                  |
| Chloromethane                                                                     | 1.0% SOM | 0.0083          | 0.0085           | 0.066                | 1.0                   |
|                                                                                   | 2.5% SOM | 0.0098          | 0.0099           | 0.13                 | 1.2                   |
|                                                                                   | 6.0% SOM | 0.013           | 0.013            | 0.23                 | 1.6                   |
| Cis 1,2 Dichloroethene                                                            | 1.0% SOM | 0.11            | 0.12             | 0.26                 | 14                    |
|                                                                                   | 2.5% SOM | 0.19            | 0.20             | 0.50                 | 24                    |
|                                                                                   | 6.0% SOM | 0.37            | 0.39             | 1.0                  | 47                    |
| Dichloromethane                                                                   | 1.0% SOM | 0.58            | 2.10             | 0.10                 | 270                   |
|                                                                                   | 2.5% SOM | 0.98            | 2.80             | 0.19                 | 360                   |
|                                                                                   | 6.0% SOM | 1.70            | 4.50             | 0.34                 | 560                   |
| Diethyl Phthalate                                                                 | 1.0% SOM | 120*            | 1800*            | 19*                  | 150000*               |
|                                                                                   | 2.5% SOM | 260*            | 3500*            | 41*                  | 220000*               |
|                                                                                   | 6.0% SOM | 570*            | 6300*            | 94*                  | 290000*               |
| Di-n-butyl phthalate                                                              | 1.0% SOM | 13*             | 450*             | 2.00                 | 15000*                |
|                                                                                   | 2.5% SOM | 31*             | 450*             | 5.00                 | 15000*                |
|                                                                                   | 6.0% SOM | 67*             | 450*             | 12                   | 15000*                |
| Di-n-octyl phthalate                                                              | 1.0% SOM | 2300*           | 3400*            | 940*                 | 89000*                |
|                                                                                   | 2.5% SOM | 2800*           | 3400*            | 2100*                | 89000*                |
|                                                                                   | 6.0% SOM | 3100*           | 3400*            | 3900*                | 89000*                |
| Hexachloroethane                                                                  | 1.0% SOM | 0.20            | 0.22             | 0.27                 | 22*                   |
|                                                                                   | 2.5% SOM | 0.48            | 0.54             | 0.67                 | 53*                   |
|                                                                                   | 6.0% SOM | 1.10            | 1.30             | 1.60                 | 120*                  |
| Isopropylbenzene                                                                  | 1.0% SOM | 11              | 12               | 32                   | 1400*                 |
|                                                                                   | 2.5% SOM | 27              | 28               | 79                   | 3300*                 |
|                                                                                   | 6.0% SOM | 64              | 67               | 190                  | 7700*                 |
| Methyl tert-butyl ether<br>(MTBE)                                                 | 1.0% SOM | 49              | 73               | 23                   | 7900                  |
|                                                                                   | 2.5% SOM | 84              | 120              | 44                   | 13000                 |
|                                                                                   | 6.0% SOM | 160             | 220              | 90                   | 24000                 |
| Propylbenzene                                                                     | 1.0% SOM | 34              | 40               | 34                   | 4100*                 |
|                                                                                   | 2.5% SOM | 82              | 97               | 83                   | 9700*                 |
|                                                                                   | 6.0% SOM | 190             | 230              | 200                  | 21000*                |
| Styrene                                                                           | 1.0% SOM | 8.10            | 35               | 1.60                 | 3300*                 |
|                                                                                   | 2.5% SOM | 19              | 78               | 3.70                 | 6500*                 |
|                                                                                   | 6.0% SOM | 43              | 170              | 8.70                 | 11000*                |
| Total Cresols (2-, 3-, and 4-methylphenol)                                        | 1.0% SOM | 80              | 3700             | 12                   | 160000                |
|                                                                                   | 2.5% SOM | 180             | 5400             | 27                   | 180000*               |
|                                                                                   | 6.0% SOM | 400             | 6900             | 63                   | 180000*               |
| Trans 1,2 Dichloroethene                                                          | 1.0% SOM | 0.19            | 0.19             | 0.93                 | 22                    |
|                                                                                   | 2.5% SOM | 0.34            | 0.35             | 1.90                 | 40                    |
|                                                                                   | 6.0% SOM | 0.70            | 0.71             | 0.24                 | 81                    |
| Tributyl tin oxide                                                                | 1.0% SOM | 0.25            | 1.40             | 0.042                | 130*                  |
|                                                                                   | 2.5% SOM | 0.59            | 3.10             | 0.100                | 180*                  |
|                                                                                   | 6.0% SOM | 1.30            | 5.70             | 0.240                | 200*                  |

\*soil concentration above saturation limit

| C4SL Low Level of Toxicological Concern     |          |                 |                  |                      |                       |                    |                    |
|---------------------------------------------|----------|-----------------|------------------|----------------------|-----------------------|--------------------|--------------------|
| Determinands                                |          | RwHP<br>(mg/kg) | RwoHP<br>(mg/kg) | Allotment<br>(mg/kg) | Commercial<br>(mg/kg) | POSresi<br>(mg/kg) | POSpark<br>(mg/kg) |
| 1,2-Dichloroethane<br>(Ethylene Dichloride) | 1.0% SOM | 0.11            | 0.16             | 0.054                | 12                    | 300                | 300                |
|                                             | 2.5% SOM | 0.18            | 0.24             | 0.10                 | 17                    | 310                | 330                |
|                                             | 6.0% SOM | 0.31            | 0.41             | 0.19                 | 29                    | 310                | 380                |
| Cis-1,2-Dichloroethene                      | 1.0% SOM | 0.46            | 0.50             | 0.89                 | 38                    | 3,800              | 2,000              |
|                                             | 2.5% SOM | 0.78            | 0.84             | 1.7                  | 64                    | 3,800              | 2,400              |
|                                             | 6.0% SOM | 1.5             | 1.6              | 3.6                  | 120                   | 3,900              | 3,100              |
| Tetrachloroethene<br>(PCE)                  | 1.0% SOM | 0.31            | 0.32             | 2                    | 24                    | 3,200              | 1,400              |
|                                             | 2.5% SOM | 0.70            | 0.71             | 4.8                  | 55                    | 3,300              | 1,900              |
|                                             | 6.0% SOM | 1.60            | 1.60             | 11                   | 130                   | 3,400              | 2,500              |
| Trans-1,2-Dichloroethene                    | 1.0% SOM | 0.90            | 0.93             | 3.70                 | 69                    | 13,000             | 5,600              |
|                                             | 2.5% SOM | 1.60            | 1.70             | 7.50                 | 120                   | 13,000             | 7,000              |
|                                             | 6.0% SOM | 3.30            | 3.40             | 16                   | 260                   | 13,000             | 9,100              |
| Trichloroethene<br>(TCE)                    | 1.0% SOM | 0.0093          | 0.0097           | 0.032                | 0.73                  | 76                 | 41                 |
|                                             | 2.5% SOM | 0.020           | 0.020            | 0.072                | 1.5                   | 78                 | 54                 |
|                                             | 6.0% SOM | 0.043           | 0.045            | 0.16                 | 3.4                   | 79                 | 69                 |
| Vinyl Chloride<br>(Chloroethene)            | 1.0% SOM | 0.0064          | 0.015            | 0.0017               | 1.1                   | 7.8                | 18                 |
|                                             | 2.5% SOM | 0.010           | 0.019            | 0.0031               | 1.4                   | 7.8                | 19                 |
|                                             | 6.0% SOM | 0.017           | 0.029            | 0.0058               | 2.2                   | 7.8                | 19                 |

#### 9.6. Asbestos

No asbestos or asbestos containing materials (ACM's) are considered acceptable on-site from a human health perspective. Therefore the GAC for asbestos & ACM's within any imported material should be none detected (ND).

## Ground and Water Limited

### Waters Guideline Values and Generic Assessment Criteria

Land contamination can harm a number of receptors, most notably: human health; drinking water; groundwater; surface water; soils; ecosystems; and buildings/structures. The UK Government's stated objectives of LCRM are to enhance the health and wellbeing of all, whilst adding the economic, ecological and amenity value of the area through dealing with land contamination.

The risk assessment is an iterative process. At preliminary risk assessment stage, risks are evaluated qualitatively. As the site investigation progresses to a generic or detailed quantitative risk assessment, data is collected and assessment criteria are utilised to evaluate whether the contaminants represent an unacceptable risk to the identified receptors.

Based on the identified receptor, there are numerous assessment criteria that can be used, which have been outlined in the subsequent sections.

#### 1. Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015

##### 1.1. Background

Within England and Wales, an appropriate agency must classify the ecological and chemical status of a body of surface water. The agency must also classify the chemical and quantitative status of a body of groundwater. The appropriate agency must review and update the classifications at least every 6 years as and when new data is collected through monitoring programmes. In addition to the classification and as part of the WFD, pollution of surface waters must be controlled by limiting the discharge of priority substances and other substances into surface water.

##### 1.2. Surface Water

In order to aid with the classification, a series of environmental quality standards (EQS) for specific pollutants have been generated. The EQS refer to the dissolved fraction of metals within a water sample, therefore the sample collected must pass through a 0.45µm filter at the time of sampling. A number of metals have a bioavailable threshold and therefore a site specific meta bioavailability assessment should be undertaken.

Where the calculated mean value of a measurement is less than the limit of quantification and the limit of quantification is above the EQS, the result must not be used for determining a failed classification.

For the majority of substances, two values will be included for review; AA and MAC. The Annual Average (AA) is the arithmetic mean of the concentrations measured at different times during the year for each representative point within the water body. When using the Max Allowable Concentration (MAC) values, a statistical analysis may be undertaken to ensure an acceptable level of confidence for determining compliance with the MAC.

##### 1.3. Groundwater

The appropriate agency must apply the threshold values for groundwater (in Table 1, Schedule 5) and, if any value is exceeded, undertake an appropriate investigation to determine whether or not the

applicable conditions for good groundwater chemical status are met. The criteria outlined are designed to be averaged across an aquifer rather than a site specific investigations.

## 2. The Water Supply (Water Quality) Regulations 2016

The water supply regulations apply in relation to the supply of water to premises for domestic purposes (including for cooking, drinking, food preparation and washing) or for food production purposes, both of which include the intended use for human consumption.

The point of compliance for the water supply is principally the consumers' taps, however, where stated the compliance point is the reservoir or treatment works.

## 3. World Health Organisation, Petroleum Products in Drinking Water, 2008

The World Health Organisation produced a background document for the development of WHO Guidelines for Drinking-water Quality, specifically relating to petroleum products (WHO/SDE/WSH/05.08/123). Petroleum products are used widely in a range of industrial applications, with the largest quantities used for gasoline, diesel and heating oil.

The difference in chemical and physical properties of each hydrocarbon means that they will behave differently within the environment, where their persistence is dictated by their volatilisation, biodegradation and dissolution within water. As a result of these, the heavier hydrocarbons typically have more persistence. Exposure to human health from petroleum hydrocarbons within drinking water can occur from a short to long-term, however the incident that leads to high concentrations within the drinking water will typically occur in the short term.

Petroleum products are a complicated mix of hundreds of compounds and therefore assessment can be difficult. The TPH-CWG method, developed in the USA, groups the TPH into a series of fractions based on the number of carbon atoms, coupled with the overall structure of the compound. This process enables the TPHs to be split into two distinct groups, aliphatics and aromatics.

## 4. SoBRA GAC<sub>gwvap</sub>

Prior to the development of the SoBRA GAC<sub>gwvap</sub>, there were no formally published UK GAC for the assessment of vapour risk arising from volatile contaminants in groundwater in the UK. The SoBRA groundwater vapour GAC (GAC<sub>gwvap</sub>) is intended as a conservative screening tool that assessors may choose to use to help assess the long-term (chronic) risks to human health from inhalation of vapours arising from groundwater. They are intended for comparison with measured groundwater concentrations and represent the estimated concentration in groundwater below which the long-term risks to human health from vapour migration and inhalation can be considered low/tolerable, i.e. unlikely to be of concern (for the land use scenarios considered). When used as part of a Generic Quantitative Risk Assessment (GQRA) (which includes consideration of uncertainties) comparison of the GAC<sub>gwvap</sub> with measured concentrations in groundwater can be used to screen out contaminants as being unlikely to represent an unacceptable risk to humans living or working above the groundwater plume.

The GAC have been derived for two land use scenarios for which the vapour intrusion pathway is likely to require assessment: residential and commercial. Generic assumptions have been made for each land use. These include assumptions about the depth to groundwater, soil type in the unsaturated zone, building dimension and foundation type, and receptor behaviour. The parameter values have been chosen to ensure that the GAC are precautionary for the vast majority of commercial and

residential properties in the UK. However, there may be particular situations where the GAC are not protective, for example where non aqueous phase liquid (NAPL) is present or preferential pathways exist.

## 5. Detailed Quantitative Risk Assessments (DQRA)

Where the adoption of a GAC is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses, then a DQRA may be undertaken to develop site specific values for relevant groundwater contaminants. As part of the EA Remedial Targets Methodology (RTM), a level 3 risk assessment will consider the effect of attenuation between the site and a downgradient receptor or compliance point. For a level 4 risk assessment the appropriateness of assessing dilution in a receiving watercourse or a pumping abstraction borehole will need to be considered.

The RTM also recommends that sensitivity/uncertainty analysis is incorporated into each stage of the assessment.

## 6. Ground and Water Limited Waters Assessment Criteria

The Waters Assessment Criteria used in the preparation of the Generic Quantitative Risk Assessment are tabulated in the following pages, where the source of each has been outlined in the previous sections.

### 6.1. Inorganics

| Specific Pollutants |                                    |                                     |                                   |                                    |
|---------------------|------------------------------------|-------------------------------------|-----------------------------------|------------------------------------|
| Determinand         | Long Term<br>Fresh water<br>(µg/l) | Short Term<br>Fresh water<br>(µg/l) | Long Term<br>Salt water<br>(µg/l) | Short Term<br>Salt water<br>(µg/l) |
| Cyanide             | 1                                  | 5                                   | 1                                 | 5                                  |
| Phenol              | 7.7                                | 46                                  | 7.7                               | 46                                 |

| Drinking Water Standards |                                                               |
|--------------------------|---------------------------------------------------------------|
| Determinand              | Maximum allowable Concentration at compliance point<br>(µg/l) |
| Cyanide                  | 50                                                            |
| pH                       | 6.5 – 9.5                                                     |

### 6.2. Metals

| Specific Pollutants |                                    |                                     |                                   |                                    |
|---------------------|------------------------------------|-------------------------------------|-----------------------------------|------------------------------------|
| Determinand         | Long Term<br>Fresh water<br>(µg/l) | Short Term<br>Fresh water<br>(µg/l) | Long Term<br>Salt water<br>(µg/l) | Short Term<br>Salt water<br>(µg/l) |
| Arsenic             | 50                                 | -                                   | 25                                | -                                  |
| Chromium (III)      | 4.7                                | 32                                  | -                                 | -                                  |
| Chromium (VI)       | 3.4                                | -                                   | 0.6                               | 32                                 |
| Copper              | 1*                                 | -                                   | 3.76                              | 34                                 |
| Iron                | 1000                               | -                                   | 1000                              | -                                  |
| Manganese           | 123*                               | -                                   | -                                 | -                                  |
| Zinc                | 10.9*                              | -                                   | 6.8                               | -                                  |

\*Site specific bioavailability calculation should be undertaken.

EQS for Priority Substances and other substances

| Determinand |                           | AA-EQS<br>Inland surface<br>water<br>(µg/l) | MAC-EQS<br>Inland surface<br>water<br>(µg/l) | AA-EQS<br>Other<br>Surface<br>waters<br>(µg/l) | MAC-EQS<br>Other<br>Surface<br>waters<br>(µg/l) |
|-------------|---------------------------|---------------------------------------------|----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| Cadmium     | <40mg/l CaCO <sub>3</sub> | <0.08                                       | <0.45                                        | 0.2                                            | -                                               |
|             | 40 – <50mg/l              | 0.08                                        | 0.45                                         |                                                |                                                 |
|             | 50 – <100mg/l             | 0.09                                        | 0.6                                          |                                                |                                                 |
|             | 100 – <200mg/l            | 0.15                                        | 0.9                                          |                                                |                                                 |
|             | >200mg/l                  | 0.25                                        | 1.5                                          |                                                |                                                 |
| Lead        |                           | 1.2                                         | 14                                           | 1.3                                            | 14                                              |
| Mercury     |                           | -                                           | 0.07                                         | -                                              | 0.07                                            |
| Nickel      |                           | 4                                           | 34                                           | 8.6                                            | 34                                              |

| Threshold Values for Groundwater |                                                  |                                            |                                                  |
|----------------------------------|--------------------------------------------------|--------------------------------------------|--------------------------------------------------|
| Determinand                      | Groundwater Impact<br>on Surface Water<br>(µg/l) | Drinking water<br>Protected Area<br>(µg/l) | General Quality of<br>Groundwater Body<br>(µg/l) |
| Aluminum                         | -                                                | 150                                        | 150                                              |
| Arsenic                          | 25.8 – 106                                       | 7.5                                        | 7.5                                              |
| Boron                            | -                                                | 750                                        | -                                                |
| Cadmium                          | 0.054 – 0.53                                     | 3.75                                       | -                                                |
| Copper                           | 0.516 – 2.12                                     | 1500                                       | 1500                                             |
| Lead                             | 0.619 – 2.54                                     | 7.5                                        | 7.5                                              |
| Mercury                          | 0.026 – 0.106                                    | 0.75                                       | -                                                |
| Nickel                           | 2.06 – 8.48                                      | 15                                         | 15                                               |
| Selenium                         | -                                                | 7.5                                        | -                                                |
| Zinc                             | 5.62 – 23.1                                      | -                                          | -                                                |

| Drinking Water Standards |                                                               |
|--------------------------|---------------------------------------------------------------|
| Determinand              | Maximum allowable Concentration at compliance point<br>(µg/l) |
| Arsenic                  | 10                                                            |
| Cadmium                  | 5                                                             |
| Chromium                 | 50                                                            |
| Copper                   | 2                                                             |
| Lead                     | 10                                                            |
| Mercury                  | 1                                                             |
| Nickel                   | 20                                                            |

### 6.3. Total Petroleum Hydrocarbons (TPHs)

#### 6.3.1. BTEX Compounds

| Specific Pollutants |                                    |                                     |                                   |                                    |
|---------------------|------------------------------------|-------------------------------------|-----------------------------------|------------------------------------|
| Determinand         | Long Term<br>Fresh water<br>(µg/l) | Short Term<br>Fresh water<br>(µg/l) | Long Term<br>Salt water<br>(µg/l) | Short Term<br>Salt water<br>(µg/l) |
| Toluene             | 74                                 | 380                                 | 74                                | 370                                |

| EQS for Priority Substances and other substances |                                             |                                              |                                                |                                                 |
|--------------------------------------------------|---------------------------------------------|----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| Determinand                                      | AA-EQS<br>Inland surface<br>water<br>(µg/l) | MAC-EQS<br>Inland surface<br>water<br>(µg/l) | AA-EQS<br>Other<br>Surface<br>waters<br>(µg/l) | MAC-EQS<br>Other<br>Surface<br>waters<br>(µg/l) |
| Benzene                                          | 10                                          | 50                                           | 8                                              | 50                                              |

| Threshold Values for Groundwater |                                            |                                      |                                            |
|----------------------------------|--------------------------------------------|--------------------------------------|--------------------------------------------|
| Determinand                      | Groundwater Impact on Surface Water (µg/l) | Drinking water Protected Area (µg/l) | General Quality of Groundwater Body (µg/l) |
| Benzene                          | 5.16 – 21.2                                | 0.75                                 | 0.75                                       |
| Toluene                          | 38.2 – 157                                 | -                                    | -                                          |
| Xylene (o+p+m)                   | 15.5 – 63.6                                | -                                    | -                                          |

### 6.3.2. Total Petroleum Hydrocarbons – Aliphatic

| World Health Organisation |                                |
|---------------------------|--------------------------------|
| Determinand               | Drinking Water Standard (µg/l) |
| >C5 – C6                  | 15,000                         |
| >C6 – C8                  |                                |
| >C8 – C10                 |                                |
| >C10 – C12                | 300                            |
| >C12 – C16                |                                |
| >C16 – C21                |                                |
| >C21 – C35                | Not Derived                    |

### 6.3.3. Total Petroleum Hydrocarbons – Aromatic

| World Health Organisation |                                |
|---------------------------|--------------------------------|
| Determinand               | Drinking Water Standard (µg/l) |
| >EC5 – EC7                | 10                             |
| >EC7 – EC8                | 700                            |
| >EC8 – EC10               | 300                            |
| >EC10 – EC12              | 90                             |
| >EC12 – EC16              |                                |
| >EC16 – EC21              |                                |
| >EC21 – EC35              | 90                             |

### 6.4. Polycyclic Aromatic Hydrocarbons (PAHs)

| EQS for Priority Substances and other substances |                                             |                                              |                                                |                                                 |
|--------------------------------------------------|---------------------------------------------|----------------------------------------------|------------------------------------------------|-------------------------------------------------|
| Determinand                                      | AA-EQS<br>Inland surface<br>water<br>(µg/l) | MAC-EQS<br>Inland surface<br>water<br>(µg/l) | AA-EQS<br>Other<br>Surface<br>waters<br>(µg/l) | MAC-EQS<br>Other<br>Surface<br>waters<br>(µg/l) |
| Anthracene                                       | 0.1                                         | 0.1                                          | 0.1                                            | 0.1                                             |
| Fluoranthene                                     | 0.0063                                      | 0.12                                         | 0.0063                                         | 0.12                                            |
| Naphthalene                                      | 2                                           | 130                                          | 2                                              | 130                                             |
| Benzo(a)pyrene                                   | 0.00017                                     | 0.27                                         | 0.00017                                        | 0.027                                           |
| Benzo(b)fluoranthene                             | *                                           | 0.017                                        | *                                              | 0.017                                           |
| Benzo(k)fluoranthene                             | *                                           | 0.017                                        | *                                              | 0.017                                           |
| Benzo(ghi)perylene                               | *                                           | 0.0082                                       | *                                              | 0.00082                                         |
| Indeno(123-cd)pyrene                             | *                                           | -                                            | *                                              | -                                               |

\*For the group of priority substances of polyaromatic hydrocarbons, the AA-EQS in water refer to the concentration of benzo(a)pyrene. Benzo(a)pyrene can be considered as a marker for the other PAHs, hence only benzo(a)pyrene must be monitored for comparison with the corresponding AA-EQS.

| Threshold Values for Groundwater |                                            |                                      |                                            |
|----------------------------------|--------------------------------------------|--------------------------------------|--------------------------------------------|
| Determinand                      | Groundwater Impact on Surface Water (µg/l) | Drinking water Protected Area (µg/l) | General Quality of Groundwater Body (µg/l) |
| Anthracene                       | 0.052 – 0.193                              | -                                    | -                                          |
| Benzo(a)pyrene                   | 0.000089 – 0.000328                        | 0.0075                               | -                                          |
| Benzo(b)fluoranthene             | 0.016 – 0.058                              | 0.075                                | -                                          |
| Fluoranthene                     | 0.0033 – 0.0122                            | -                                    | 0.075                                      |
| Naphthalene                      | 1.03 – 4.24                                | -                                    | 0.075                                      |

| Drinking Water Standards |                                                            |
|--------------------------|------------------------------------------------------------|
| Determinand              | Maximum allowable Concentration at compliance point (µg/l) |
| Benzo(a)pyrene           | 0.010                                                      |
| Benzo(b) fluoranthene    | 0.10                                                       |
| Benzo(k)fluoranthene     |                                                            |
| Benzo(ghi)perylene       |                                                            |
| Indeno(1,2,3-cd)pyrene   |                                                            |

## 6.5. Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

| EQS for Priority Substances and other substances |                                          |                                           |                                          |                                           |
|--------------------------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|-------------------------------------------|
| Determinand                                      | AA-EQS<br>Inland surface water<br>(µg/l) | MAC-EQS<br>Inland surface water<br>(µg/l) | AA-EQS<br>Other Surface waters<br>(µg/l) | MAC-EQS<br>Other Surface waters<br>(µg/l) |
| Perfluorooctane sulfonic acid (PFOS)             | 0.00065                                  | 36                                        | 0.00013                                  | 7.2                                       |

## 6.6. Volatile and Semi-volatile Organic Compounds

| SoBRA GAC <sub>gwvap</sub> for Petroleum Hydrocarbons |                                            |                  |                           |
|-------------------------------------------------------|--------------------------------------------|------------------|---------------------------|
| Determinand                                           | GAC <sub>gwvap</sub> (µg/l) <sup>1,2</sup> |                  | Aqueous Solubility (µg/l) |
|                                                       | Residential                                | Commercial       |                           |
| 1,2,4-Trimethylbenzene                                | 24                                         | 2,200            | 559,000                   |
| Benzene <sup>3</sup>                                  | 210                                        | 20,000           | 1,780,000                 |
| Ethylbenzene <sup>3</sup>                             | 10,000                                     | 960,000 (sol)    | 180,000                   |
| Isopropylbenzene                                      | 850                                        | 86,000 (sol)     | 56,000                    |
| Propylbenzene                                         | 2,700                                      | 240,000 (sol)    | 54,100                    |
| Styrene                                               | 8,800                                      | 810,000 (sol)    | 290,000                   |
| Toluene <sup>3</sup>                                  | 230,000                                    | 21,000,000 (sol) | 590,000                   |
| TPH Aliphatic EC5-EC6 <sup>3</sup>                    | 1,900                                      | 190,000 (sol)    | 35,900                    |
| TPH Aliphatic >EC6-EC8 <sup>3</sup>                   | 1,500                                      | 150,000 (sol)    | 5,370                     |
| TPH Aliphatic >EC8-EC10 <sup>3</sup>                  | 57                                         | 5,700 (sol)      | 427                       |
| TPH Aliphatic >EC10-EC12 <sup>3</sup>                 | 37                                         | 3,600 (sol)      | 34                        |
| TPH Aromatic >EC5-EC7 <sup>3</sup>                    | 210,000                                    | 20,000,000 (sol) | 1,780,000                 |
| TPH Aromatic >EC7-EC8 <sup>3</sup>                    | 220,000                                    | 21,000,000 (sol) | 590,000                   |
| TPH Aromatic >EC8-EC10 <sup>3</sup>                   | 1,900                                      | 190,000 (sol)    | 64,600                    |
| TPH Aromatic >EC10-EC12 <sup>3</sup>                  | 6,800                                      | 660,000 (sol)    | 24,500                    |
| TPH Aromatic >EC12-EC16 <sup>3</sup>                  | 39,000                                     | 3,700,000 (sol)  | 5,750                     |
| m-Xylene <sup>3,5</sup>                               | 9,500                                      | 940,000 (sol)    | 200,000                   |
| o-Xylene <sup>3,5</sup>                               | 12,000                                     | 1,100,000 (sol)  | 173,000                   |
| p-Xylene <sup>2,1</sup>                               | 9,900                                      | 980,000 (sol)    | 200,000                   |
| Notes                                                 |                                            |                  |                           |

1. GAC in italics with (sol) exceed aqueous solubility.
2. GAC rounded to two significant figures.
3. The GAC for these petroleum hydrocarbon contaminants have been calculated using a sub-surface soil to indoor air correction factor of 10 in line with the physical-chemical data sources.
4. The GAC for TPH fractions do not account for genotoxic mutagenic effects. Concentrations of TPH Aromatic >EC5-EC7 should therefore also be compared with the GAC for benzene to ensure that such effects are also assessed.
5. The Health Criteria Value used for each xylene isomer was for total xylene. If site specific additivity assessments are not completed, as a conservative measure the sum of isomer concentrations should be compared to the lowest xylene GAC (as is the case for soil GAC).

| SoBRA GAC <sub>gwwap</sub> for Polycyclic Aromatic Hydrocarbons |                                            |                  |                           |
|-----------------------------------------------------------------|--------------------------------------------|------------------|---------------------------|
| Determinand                                                     | GAC <sub>gwwap</sub> (µg/l) <sup>1,2</sup> |                  | Aqueous Solubility (µg/l) |
|                                                                 | Residential                                | Commercial       |                           |
| Acenaphthene                                                    | 170,000 (sol)                              | 15,000,000 (sol) | 4,110                     |
| Acenaphthylene                                                  | 220,000 (sol)                              | 20,000,000 (sol) | 7,950                     |
| Fluorene                                                        | 210,000 (sol)                              | 18,000,000 (sol) | 1,860                     |
| Naphthalene                                                     | 220                                        | 23,000 (sol)     | 19,000                    |
| Notes                                                           |                                            |                  |                           |
| 1. GAC in italics with (sol) exceed aqueous solubility.         |                                            |                  |                           |
| 2. GAC rounded to two significant figures.                      |                                            |                  |                           |

| SoBRA GAC <sub>gwwap</sub> for Pesticides               |                                            |               |                           |
|---------------------------------------------------------|--------------------------------------------|---------------|---------------------------|
| Determinand                                             | GAC <sub>gwwap</sub> (µg/l) <sup>1,2</sup> |               | Aqueous Solubility (µg/l) |
|                                                         | Residential                                | Commercial    |                           |
| Aldrin                                                  | 47 (sol)                                   | 3,700 (sol)   | 20                        |
| alpha-Endosulfan                                        | 7,400 (sol)                                | 590,000 (sol) | 530                       |
| beta-Endosulfan                                         | 7,500 (sol)                                | 600,000 (sol) | 280                       |
| Notes                                                   |                                            |               |                           |
| 1. GAC in italics with (sol) exceed aqueous solubility. |                                            |               |                           |
| 2. GAC rounded to two significant figures.              |                                            |               |                           |

| SoBRA GAC <sub>gwwap</sub> for Halogenated Organics |                                            |               |                           |
|-----------------------------------------------------|--------------------------------------------|---------------|---------------------------|
| Determinand                                         | GAC <sub>gwwap</sub> (µg/l) <sup>1,2</sup> |               | Aqueous Solubility (µg/l) |
|                                                     | Residential                                | Commercial    |                           |
| 1,1,1,2-Tetrachloroethane                           | 240                                        | 22,000        | 1,110,000                 |
| 1,1,1-Trichloroethane                               | 3,000                                      | 290,000       | 1,300,000                 |
| 1,1,2,2-Tetrachloroethane                           | 1,600                                      | 150,000       | 2,930,000                 |
| 1,1,2-Trichloroethane                               | 520                                        | 49,000        | 4,491,000                 |
| 1,1-Dichloroethane                                  | 2,700                                      | 260,000       | 3,666,000                 |
| 1,1-Dichloroethene                                  | 160                                        | 16,000        | 3,100,000                 |
| 1,2,3,4-Tetrachlorobenzene                          | 240                                        | 31,000 (sol)  | 7,800                     |
| 1,2,3,5-Tetrachlorobenzene                          | 7.0                                        | 600           | 3,500                     |
| 1,2,3-Trichlorobenzene                              | 35                                         | 3,100         | 21,000                    |
| 1,2,4,5-Tetrachlorobenzene                          | 8.1                                        | 700 (sol)     | 600                       |
| 1,2,4-Trichlorobenzene                              | 68                                         | 7,200         | 41,400                    |
| 1,2-Dichlorobenzene                                 | 2,000                                      | 220,000 (sol) | 133,000                   |
| 1,2-Dichloroethane                                  | 8.9                                        | 850           | 8,680,000                 |
| 1,2-Dichloropropane                                 | 22                                         | 2,600         | 2,050,000                 |

|                                                                                                                       |          |               |            |
|-----------------------------------------------------------------------------------------------------------------------|----------|---------------|------------|
| 1,3,5-Trichlorobenzene                                                                                                | 7.4      | 660           | 6,000      |
| 1,3-Dichlorobenzene                                                                                                   | 31       | 2,800         | 103,000    |
| 1,4-Dichlorobenzene                                                                                                   | 5,000    | 460,000 (sol) | 51,200     |
| Bromobenzene                                                                                                          | 220      | 20,000        | 388,040    |
| Bromodichloromethane                                                                                                  | 17       | 1,600         | 3,000,000  |
| Bromoform (Tribromomethane)                                                                                           | 3,100    | 400,000       | 3,000,000  |
| Chlorobenzene                                                                                                         | 98       | 15,000        | 387,000    |
| Chloroethane                                                                                                          | 10,000   | 1,000,000     | 5,742,000  |
| Chloroethene (Vinyl Chloride)                                                                                         | 0.62     | 63            | 2,760,000  |
| Chloromethane                                                                                                         | 14       | 1,400         | 5,350,000  |
| cis-1,2-Dichloroethene                                                                                                | 130      | 13,000        | 7,550,000  |
| Dichloromethane                                                                                                       | 3,300    | 370,000       | 20,080,000 |
| Hexachlorobenzene                                                                                                     | 16 (sol) | 1,400 (sol)   | 10         |
| Hexachlorobutadiene                                                                                                   | 1.7      | 230           | 4,800      |
| Hexachloroethane                                                                                                      | 8.5      | 740           | 49,900     |
| Pentachlorobenzene                                                                                                    | 140      | 12,000 (sol)  | 500        |
| Tetrachloroethene                                                                                                     | 34       | 4,600         | 225,000    |
| Tetrachloromethane (Carbon Tetrachloride)                                                                             | 5.3      | 770           | 846,000    |
| trans-1,2-Dichloroethene                                                                                              | 160      | 16,000        | 5,250,000  |
| Trichloroethene                                                                                                       | 5.7      | 530           | 1,370,000  |
| Trichloromethane (Chloroform)                                                                                         | 790      | 85,000        | 8,950,000  |
| Notes<br>1. GAC in <i>italics</i> with (sol) exceed aqueous solubility.<br>2. GAC rounded to two significant figures. |          |               |            |

| SoBRA GAC <sub>gwvap</sub> for Others (organic and inorganic)                                                         |                                            |                 |                           |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------|---------------------------|
| Determinand                                                                                                           | GAC <sub>gwvap</sub> (µg/l) <sup>1,2</sup> |                 | Aqueous Solubility (µg/l) |
|                                                                                                                       | Residential                                | Commercial      |                           |
| 2-Chloronaphthalene                                                                                                   | 160                                        | 14,000 (sol)    | 11,700                    |
| Biphenyl (Limonene)                                                                                                   | 15,000 (sol)                               | 1,300,000 (sol) | 4,060                     |
| Carbon disulphide                                                                                                     | 56                                         | 5,600           | 2,100,000                 |
| Mercury, elemental                                                                                                    | 1.1                                        | 95 (sol)        | 56                        |
| Methyl tertiary butyl ether (MTBE)                                                                                    | 83,000                                     | 7,800,000       | 48,000,000                |
| Notes<br>1. GAC in <i>italics</i> with (sol) exceed aqueous solubility.<br>2. GAC rounded to two significant figures. |                                            |                 |                           |

## 7. Climate Change

Review of the publication by SoBRA referenced: Guidance on Assessing Risk to Controlled Waters from UK Land Contamination Under Conditions of Future Climate Change, August 2022, addresses the consideration of climate change as part of groundwater risk assessments. Following the development of a preliminary Conceptual Site Model (CSM), climate change should be included by re-evaluating the potential Source-Pathway-Receptor (SPR) linkage assessment to account for the potential effects of climate change based on projections for the region of the site. It is recommended where practicable to use at least two contrasting future climate change scenarios, incorporating information for the periods of 2020s, 2050s and 2080s dependent on the relevant timeframe to the specific assessment. A qualitative assessment of the impact of climate change on the SPRs and resultant impacts on the contaminants linkages within the CSM. Quantitative data can be used to re-address the generic quantitative risk assessment for medium to long term climate change effects. For short-term extreme weather events the of “what if” scenarios should be considered. Consideration also needs to be given to the shortcomings of available simulation models in the UK where they are not equipped to model

temporal changes to parameter values and where mitigation measures may be appropriate to address this.

# APPENDIX F: Ground Gas Monitoring Results

|            |              |
|------------|--------------|
| Job No:    | GWPR6068     |
| Site name: | Former Dairy |
| Operator:  | MF           |

|           |            |    |       |
|-----------|------------|----|-------|
| Date:     | 08/08/2024 |    |       |
| Time:     | 11:30      | to | 12:40 |
| Visit No: | 1          | of | 6     |

|                      |         |
|----------------------|---------|
| Ground Gas Analyser: | GFM-436 |
| Last Calibration:    | Mar-24  |



|                  | GAS CONCENTRATIONS |        |                       |        |                       |                         |               |        | VOLATILES      |                        | FLOW DATA        |        |                                     | WELL AND WATER DATA |                       | Additional Remarks   |
|------------------|--------------------|--------|-----------------------|--------|-----------------------|-------------------------|---------------|--------|----------------|------------------------|------------------|--------|-------------------------------------|---------------------|-----------------------|----------------------|
| Monitoring Point | Methane (%v/v)     |        | Carbon dioxide (%v/v) |        | Carbon monoxide (ppm) | Hydrogen sulphide (ppm) | Oxygen (%v/v) |        | PID Peak (ppm) | Product thickness (mm) | Flow rate (l/hr) |        | Differential borehole Pressure (Pa) | Water level (m bgl) | Depth of well (m bgl) |                      |
|                  | Peak               | Steady | Peak                  | Steady | Peak                  | Peak                    | Min           | Steady |                |                        | Peak             | Steady |                                     |                     |                       |                      |
| Ambient air      | 0.00               | 0.00   | 0.20                  | 0.00   | 0                     | 0                       | 20.30         | 20.30  | /              | /                      | n/a              | n/a    | n/a                                 | n/a                 | n/a                   |                      |
| Bh101            | 0.00               | 0.00   | 0.10                  | 0.10   | 0                     | 0                       | 14.20         | 14.20  | 19.1           | /                      | 0.0              | 0.0    | 0.00                                | 2.10                | 5.20                  | No product. Flooded. |
| Bh102            | 0.00               | 0.00   | 2.80                  | 2.80   | 0                     | 0                       | 14.80         | 14.80  | 78.2           | /                      | 0.0              | 0.0    | 0.00                                | 2.43                | 3.14                  | No product. Flooded. |
| WS105            | 0.00               | 0.00   | 12.00                 | 12.00  | 0                     | 0                       | 2.30          | 2.30   | 41.0           | /                      | 0.0              | 0.0    | 0.00                                | 2.20                | 4.33                  | No product.          |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
| Max              | 0.00               | 0.00   | 12.00                 | 12.00  | 0                     | 0                       | 20.30         | 20.30  | 78.2           | 0                      | 0.00             | 0.00   | 0.00                                | 2.43                |                       |                      |
| Min              | 0.00               | 0.00   | 0.10                  | 0.00   | 0                     | 0                       | 2.30          | 2.30   | 19.1           | 0                      | 0.00             | 0.00   | 0.00                                | 2.1                 |                       |                      |

#### SITE INFORMATION:

|                  |                                          |                                              |                                   |                                 |                                       |
|------------------|------------------------------------------|----------------------------------------------|-----------------------------------|---------------------------------|---------------------------------------|
| State of ground: | <input checked="" type="checkbox"/> Dry  | <input type="checkbox"/> Wet                 | <input type="checkbox"/> Snow     | <input type="checkbox"/> Frozen | <input type="checkbox"/> Hardstanding |
| Wind:            | <input checked="" type="checkbox"/> Calm | <input type="checkbox"/> Moderate            | <input type="checkbox"/> Strong   |                                 |                                       |
| Cloud cover:     | <input type="checkbox"/> None            | <input checked="" type="checkbox"/> Cloudy   | <input type="checkbox"/> Overcast |                                 |                                       |
| Precipitation:   | <input type="checkbox"/> None            | <input checked="" type="checkbox"/> Moderate | <input type="checkbox"/> Heavy    |                                 |                                       |

#### METEOROLOGICAL INFORMATION:

Official Barometric Pressure (mbar):  3hr Before  End of Monitoring (taken from [www.metoffice.gov.uk](http://www.metoffice.gov.uk) station Draig)

Official Pressure Tendency:

(Change in atmospheric pressure for the preceding 3 hours of monitoring)

|                                     |                                       |
|-------------------------------------|---------------------------------------|
| <input type="checkbox"/>            | Falling (decreasing change >1.6 mbar) |
| <input checked="" type="checkbox"/> | Steady (change of 0.1 - 1.5 mbar)     |
| <input type="checkbox"/>            | Rising (increasing change >1.6 mbar)  |

|            |              |
|------------|--------------|
| Job No:    | GWPR6068     |
| Site name: | Former Dairy |
| Operator:  | AA           |

|           |            |    |       |
|-----------|------------|----|-------|
| Date:     | 20/09/2024 |    |       |
| Time:     | 12:30      | to | 13:00 |
| Visit No: | 2          | of | 6     |

|                      |         |
|----------------------|---------|
| Ground Gas Analyser: | GFM-436 |
| Last Calibration:    | Mar-24  |



|                  | GAS CONCENTRATIONS |        |                       |        |                       |                         |               |        | VOLATILES      |                        | FLOW DATA        |        |                                     | WELL AND WATER DATA |                       | Additional Remarks   |
|------------------|--------------------|--------|-----------------------|--------|-----------------------|-------------------------|---------------|--------|----------------|------------------------|------------------|--------|-------------------------------------|---------------------|-----------------------|----------------------|
| Monitoring Point | Methane (%v/v)     |        | Carbon dioxide (%v/v) |        | Carbon monoxide (ppm) | Hydrogen sulphide (ppm) | Oxygen (%v/v) |        | PID Peak (ppm) | Product thickness (mm) | Flow rate (l/hr) |        | Differential borehole Pressure (Pa) | Water level (m bgl) | Depth of well (m bgl) |                      |
|                  | Peak               | Steady | Peak                  | Steady | Peak                  | Peak                    | Min           | Steady |                |                        | Peak             | Steady |                                     |                     |                       |                      |
| Ambient air      | 0.00               | 0.00   | 0.00                  | 0.00   | 0                     | 0                       | 20.30         | 20.30  | /              | /                      | n/a              | n/a    | n/a                                 | n/a                 | n/a                   |                      |
| BH101            | 0.00               | 0.00   | 2.90                  | 2.90   | 0                     | 0                       | 15.00         | 15.10  | 6.7            | /                      | 0.0              | 0.0    | 0.00                                | Dry                 | 4.52                  | No product.          |
| BH102            | 0.00               | 0.00   | 1.10                  | 1.10   | 0                     | 0                       | 18.50         | 18.60  | 1.2            | /                      | 0.0              | 0.0    | 0.00                                | 3.30                | 8.00                  | No product. Flooded. |
| WS105            | 0.00               | 0.00   | 0.40                  | 0.40   | 0                     | 0                       | 18.00         | 18.00  | 0.9            | /                      | 0.0              | 0.0    | 0.00                                | 4.23                | 4.44                  | No product.          |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                      |
| Max              | 0.00               | 0.00   | 2.90                  | 2.90   | 0                     | 0                       | 20.30         | 20.30  | 6.7            | 0                      | 0.00             | 0.00   | 0.00                                | 4.23                |                       |                      |
| Min              | 0.00               | 0.00   | 0.00                  | 0.00   | 0                     | 0                       | 15.00         | 15.10  | 0.9            | 0                      | 0.00             | 0.00   | 0.00                                | 3.3                 |                       |                      |

#### SITE INFORMATION:

|                  |                                          |                                              |                                   |                                 |                                       |
|------------------|------------------------------------------|----------------------------------------------|-----------------------------------|---------------------------------|---------------------------------------|
| State of ground: | <input checked="" type="checkbox"/> Dry  | <input type="checkbox"/> Wet                 | <input type="checkbox"/> Snow     | <input type="checkbox"/> Frozen | <input type="checkbox"/> Hardstanding |
| Wind:            | <input checked="" type="checkbox"/> Calm | <input type="checkbox"/> Moderate            | <input type="checkbox"/> Strong   |                                 |                                       |
| Cloud cover:     | <input type="checkbox"/> None            | <input checked="" type="checkbox"/> Cloudy   | <input type="checkbox"/> Overcast |                                 |                                       |
| Precipitation:   | <input type="checkbox"/> None            | <input checked="" type="checkbox"/> Moderate | <input type="checkbox"/> Heavy    |                                 |                                       |

#### METEOROLOGICAL INFORMATION:

Official Barometric Pressure (mbar):  3hr Before  End of Monitoring (taken from [www.metoffice.gov.uk](http://www.metoffice.gov.uk) station Draig)

#### Official Pressure Tendency:

|                                                                          |                                                                       |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------|
| (Change in atmospheric pressure for the preceding 3 hours of monitoring) | <input type="checkbox"/> Falling (decreasing change >1.6 mbar)        |
|                                                                          | <input checked="" type="checkbox"/> Steady (change of 0.1 - 1.5 mbar) |
|                                                                          | <input type="checkbox"/> Rising (increasing change >1.6 mbar)         |

|            |              |
|------------|--------------|
| Job No:    | GWPR6068     |
| Site name: | Former Dairy |
| Operator:  | AA           |

|           |            |    |       |
|-----------|------------|----|-------|
| Date:     | 27/09/2024 |    |       |
| Time:     | 07:20      | to | 09:00 |
| Visit No: | 3          | of | 6     |

|                      |         |
|----------------------|---------|
| Ground Gas Analyser: | GFM-436 |
| Last Calibration:    | Mar-24  |



|                  | GAS CONCENTRATIONS |        |                       |        |                       |                         |               |        | VOLATILES      |                        | FLOW DATA        |        |                                     | WELL AND WATER DATA |                       | Additional Remarks    |
|------------------|--------------------|--------|-----------------------|--------|-----------------------|-------------------------|---------------|--------|----------------|------------------------|------------------|--------|-------------------------------------|---------------------|-----------------------|-----------------------|
| Monitoring Point | Methane (%v/v)     |        | Carbon dioxide (%v/v) |        | Carbon monoxide (ppm) | Hydrogen sulphide (ppm) | Oxygen (%v/v) |        | PID Peak (ppm) | Product thickness (mm) | Flow rate (l/hr) |        | Differential borehole Pressure (Pa) | Water level (m bgl) | Depth of well (m bgl) |                       |
|                  | Peak               | Steady | Peak                  | Steady | Peak                  | Peak                    | Min           | Steady |                |                        | Peak             | Steady |                                     |                     |                       |                       |
| Ambient air      | 0.00               | 0.00   | 0.00                  | 0.00   | 0                     | 0                       | 20.40         | 20.40  | /              | /                      | n/a              | n/a    | n/a                                 | n/a                 | n/a                   |                       |
| BH101            | 0.00               | 0.00   | 0.40                  | 0.40   | 0                     | 0                       | 18.70         | 18.70  | 0.6            | /                      | 0.0              | 0.0    | 0.00                                | 1.35                | 5.52                  | No product. Flooded.  |
| BH102            | 0.00               | 0.00   | 2.40                  | 2.40   | 0                     | 0                       | 16.20         | 16.40  | 5.2            | /                      | 0.0              | 0.0    | 0.00                                | 2.42                | 10.30                 | No product. Flooded.  |
| WS105            | -                  | -      | -                     | -      | -                     | -                       | -             | -      | -              | -                      | -                | -      | -                                   | -                   | -                     | COULD NOT LOCATE WELL |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
| Max              | 0.00               | 0.00   | 2.40                  | 2.40   | 0                     | 0                       | 20.40         | 20.40  | 5.2            | 0                      | 0.00             | 0.00   | 0.00                                | 2.42                |                       |                       |
| Min              | 0.00               | 0.00   | 0.00                  | 0.00   | 0                     | 0                       | 16.20         | 16.40  | 0.6            | 0                      | 0.00             | 0.00   | 0.00                                | 1.35                |                       |                       |

#### SITE INFORMATION:

|                  |                               |                                              |                                   |                                 |                                       |
|------------------|-------------------------------|----------------------------------------------|-----------------------------------|---------------------------------|---------------------------------------|
| State of ground: | <input type="checkbox"/> Dry  | <input checked="" type="checkbox"/> Wet      | <input type="checkbox"/> Snow     | <input type="checkbox"/> Frozen | <input type="checkbox"/> Hardstanding |
| Wind:            | <input type="checkbox"/> Calm | <input checked="" type="checkbox"/> Moderate | <input type="checkbox"/> Strong   |                                 |                                       |
| Cloud cover:     | <input type="checkbox"/> None | <input checked="" type="checkbox"/> Cloudy   | <input type="checkbox"/> Overcast |                                 |                                       |
| Precipitation:   | <input type="checkbox"/> None | <input checked="" type="checkbox"/> Moderate | <input type="checkbox"/> Heavy    |                                 |                                       |

#### METEOROLOGICAL INFORMATION:

Official Barometric Pressure (mbar):  3hr Before  End of Monitoring (taken from [www.metoffice.gov.uk](http://www.metoffice.gov.uk) station Draig)

#### Official Pressure Tendency:

(Change in atmospheric pressure for the preceding 3 hours of monitoring)

|                                     |                                       |
|-------------------------------------|---------------------------------------|
| <input type="checkbox"/>            | Falling (decreasing change >1.6 mbar) |
| <input type="checkbox"/>            | Steady (change of 0.1 - 1.5 mbar)     |
| <input checked="" type="checkbox"/> | Rising (increasing change >1.6 mbar)  |

|            |              |
|------------|--------------|
| Job No:    | GWPR6068     |
| Site name: | Former Dairy |
| Operator:  | AA           |

|           |            |    |       |
|-----------|------------|----|-------|
| Date:     | 02/10/2024 |    |       |
| Time:     | 07:40      | to | 08:10 |
| Visit No: | 4          | of | 6     |

|                      |         |
|----------------------|---------|
| Ground Gas Analyser: | GFM-436 |
| Last Calibration:    | Mar-24  |



|                  | GAS CONCENTRATIONS |        |                       |        |                       |                         |               |        | VOLATILES      |                        | FLOW DATA        |        |                                     | WELL AND WATER DATA |                       | Additional Remarks    |
|------------------|--------------------|--------|-----------------------|--------|-----------------------|-------------------------|---------------|--------|----------------|------------------------|------------------|--------|-------------------------------------|---------------------|-----------------------|-----------------------|
| Monitoring Point | Methane (%v/v)     |        | Carbon dioxide (%v/v) |        | Carbon monoxide (ppm) | Hydrogen sulphide (ppm) | Oxygen (%v/v) |        | PID Peak (ppm) | Product thickness (mm) | Flow rate (l/hr) |        | Differential borehole Pressure (Pa) | Water level (m bgl) | Depth of well (m bgl) |                       |
|                  | Peak               | Steady | Peak                  | Steady | Peak                  | Peak                    | Min           | Steady |                |                        | Peak             | Steady |                                     |                     |                       |                       |
| Ambient air      | -                  | -      | -                     | -      | -                     | -                       | -             | -      | /              | /                      | n/a              | n/a    | n/a                                 | n/a                 | n/a                   |                       |
| BH101            | -                  | -      | -                     | -      | -                     | -                       | -             | -      | 0.8            | /                      | -                | -      | -                                   | 1.24                | 5.52                  | No product. Flooded.  |
| BH102            | -                  | -      | -                     | -      | -                     | -                       | -             | -      | 5.9            | /                      | -                | -      | -                                   | 2.39                | 10.30                 | No product. Flooded.  |
| WS105            | -                  | -      | -                     | -      | -                     | -                       | -             | -      | -              | -                      | -                | -      | -                                   | -                   | -                     | COULD NOT LOCATE WELL |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
| Max              | 0.00               | 0.00   | 0.00                  | 0.00   | 0                     | 0                       | 0.00          | 0.00   | 5.9            | 0                      | 0.00             | 0.00   | 0.00                                | 2.39                |                       |                       |
| Min              | 0.00               | 0.00   | 0.00                  | 0.00   | 0                     | 0                       | 0.00          | 0.00   | 0.8            | 0                      | 0.00             | 0.00   | 0.00                                | 1.24                |                       |                       |

#### SITE INFORMATION:

State of ground: ☒ Dry ☐ Wet ☐ Snow ☐ Frozen ☐ Hardstanding  
 Wind: ☒ Calm ☐ Moderate ☐ Strong  
 Cloud cover: ☒ None ☐ Cloudy ☐ Overcast  
 Precipitation: ☒ None ☐ Moderate ☐ Heavy

#### METEOROLOGICAL INFORMATION:

Official Barometric Pressure (mbar):  3hr Before  End of Monitoring (taken from [www.metoffice.gov.uk](http://www.metoffice.gov.uk) station Draig)

#### Official Pressure Tendency:

(Change in atmospheric pressure for the preceding 3 hours of monitoring)
 ☐ Falling (decreasing change >1.6 mbar)  
☐ Steady (change of 0.1 - 1.5 mbar)  
☒ Rising (increasing change >1.6 mbar)

|            |              |
|------------|--------------|
| Job No:    | GWPR6068     |
| Site name: | Former Dairy |
| Operator:  | AA           |

|           |            |    |       |
|-----------|------------|----|-------|
| Date:     | 04/10/2024 |    |       |
| Time:     | 13:45      | to | 14:20 |
| Visit No: | 5          | of | 6     |

|                      |         |
|----------------------|---------|
| Ground Gas Analyser: | GFM-436 |
| Last Calibration:    | Mar-24  |



|                  | GAS CONCENTRATIONS |        |                       |        |                       |                         |               |        | VOLATILES      |                        | FLOW DATA        |        |                                     | WELL AND WATER DATA |                       | Additional Remarks    |
|------------------|--------------------|--------|-----------------------|--------|-----------------------|-------------------------|---------------|--------|----------------|------------------------|------------------|--------|-------------------------------------|---------------------|-----------------------|-----------------------|
| Monitoring Point | Methane (%v/v)     |        | Carbon dioxide (%v/v) |        | Carbon monoxide (ppm) | Hydrogen sulphide (ppm) | Oxygen (%v/v) |        | PID Peak (ppm) | Product thickness (mm) | Flow rate (l/hr) |        | Differential borehole Pressure (Pa) | Water level (m bgl) | Depth of well (m bgl) |                       |
|                  | Peak               | Steady | Peak                  | Steady | Peak                  | Peak                    | Min           | Steady |                |                        | Peak             | Steady |                                     |                     |                       |                       |
| Ambient air      | 0.00               | 0.00   | 0.00                  | 0.00   | 0                     | 0                       | 20.40         | 20.40  | /              | /                      | n/a              | n/a    | n/a                                 | n/a                 | n/a                   |                       |
| BH101            | 0.00               | 0.00   | 0.10                  | 0.10   | 0                     | 0                       | 18.30         | 18.30  | 0.2            | /                      | 0.0              | 0.0    | 0.00                                | 1.80                | 5.00                  | No product. Flooded.  |
| BH102            | 0.00               | 0.00   | 4.60                  | 4.60   | 0                     | 0                       | 14.80         | 14.80  | 0.2            | /                      | 0.0              | 0.0    | 0.00                                | 2.90                | 10.30                 | No product. Flooded.  |
| WS105            | -                  | -      | -                     | -      | -                     | -                       | -             | -      | -              | -                      | -                | -      | -                                   | -                   | -                     | COULD NOT LOCATE WELL |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
| Max              | 0.00               | 0.00   | 4.60                  | 4.60   | 0                     | 0                       | 20.40         | 20.40  | 0.2            | 0                      | 0.00             | 0.00   | 0.00                                | 2.9                 |                       |                       |
| Min              | 0.00               | 0.00   | 0.00                  | 0.00   | 0                     | 0                       | 14.80         | 14.80  | 0.2            | 0                      | 0.00             | 0.00   | 0.00                                | 1.8                 |                       |                       |

#### SITE INFORMATION:

|                  |                                          |                                            |                                   |                                 |                                       |
|------------------|------------------------------------------|--------------------------------------------|-----------------------------------|---------------------------------|---------------------------------------|
| State of ground: | <input checked="" type="checkbox"/> Dry  | <input type="checkbox"/> Wet               | <input type="checkbox"/> Snow     | <input type="checkbox"/> Frozen | <input type="checkbox"/> Hardstanding |
| Wind:            | <input checked="" type="checkbox"/> Calm | <input type="checkbox"/> Moderate          | <input type="checkbox"/> Strong   |                                 |                                       |
| Cloud cover:     | <input type="checkbox"/> None            | <input checked="" type="checkbox"/> Cloudy | <input type="checkbox"/> Overcast |                                 |                                       |
| Precipitation:   | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Moderate          | <input type="checkbox"/> Heavy    |                                 |                                       |

#### METEOROLOGICAL INFORMATION:

Official Barometric Pressure (mbar):  3hr Before  End of Monitoring (taken from [www.metoffice.gov.uk](http://www.metoffice.gov.uk) station Draig)

Official Pressure Tendency:

(Change in atmospheric pressure for the preceding 3 hours of monitoring)

|                                     |                                       |
|-------------------------------------|---------------------------------------|
| <input type="checkbox"/>            | Falling (decreasing change >1.6 mbar) |
| <input checked="" type="checkbox"/> | Steady (change of 0.1 - 1.5 mbar)     |
| <input type="checkbox"/>            | Rising (increasing change >1.6 mbar)  |

|            |              |
|------------|--------------|
| Job No:    | GWPR6068     |
| Site name: | Former Dairy |
| Operator:  | OD           |

|           |            |    |       |
|-----------|------------|----|-------|
| Date:     | 07/10/2024 |    |       |
| Time:     | 14:45      | to | 15:30 |
| Visit No: | 6          | of | 6     |

|                      |         |
|----------------------|---------|
| Ground Gas Analyser: | GFM-436 |
| Last Calibration:    | Mar-24  |



|                  | GAS CONCENTRATIONS |        |                       |        |                       |                         |               |        | VOLATILES      |                        | FLOW DATA        |        |                                     | WELL AND WATER DATA |                       | Additional Remarks    |
|------------------|--------------------|--------|-----------------------|--------|-----------------------|-------------------------|---------------|--------|----------------|------------------------|------------------|--------|-------------------------------------|---------------------|-----------------------|-----------------------|
| Monitoring Point | Methane (%v/v)     |        | Carbon dioxide (%v/v) |        | Carbon monoxide (ppm) | Hydrogen sulphide (ppm) | Oxygen (%v/v) |        | PID Peak (ppm) | Product thickness (mm) | Flow rate (l/hr) |        | Differential borehole Pressure (Pa) | Water level (m bgl) | Depth of well (m bgl) |                       |
|                  | Peak               | Steady | Peak                  | Steady | Peak                  | Peak                    | Min           | Steady |                |                        | Peak             | Steady |                                     |                     |                       |                       |
| Ambient air      | 0.00               | 0.00   | 0.00                  | 0.00   | 0                     | 0                       | 19.50         | 19.50  | /              | /                      | n/a              | n/a    | n/a                                 | n/a                 | n/a                   |                       |
| BH101            | -0.10              | -0.10  | 0.20                  | 0.20   | 0                     | 0                       | 20.30         | 20.30  | 0.0            | /                      | 0.0              | 0.0    | 0.00                                | 2.10                | 5.30                  | No product. Flooded.  |
| BH102            | 0.00               | 0.00   | 0.20                  | 0.20   | 0                     | 0                       | 20.10         | 20.10  | 0.0            | /                      | 0.0              | 0.0    | 0.00                                | 2.60                | 10.56                 | No product. Flooded.  |
| WS105            | -                  | -      | -                     | -      | -                     | -                       | -             | -      | -              | -                      | -                | -      | -                                   | -                   | -                     | COULD NOT LOCATE WELL |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
|                  |                    |        |                       |        |                       |                         |               |        |                |                        |                  |        |                                     |                     |                       |                       |
| Max              | 0.00               | 0.00   | 0.20                  | 0.20   | 0                     | 0                       | 20.30         | 20.30  | 0.0            | 0                      | 0.00             | 0.00   | 0.00                                | 2.6                 |                       |                       |
| Min              | -0.10              | -0.10  | 0.00                  | 0.00   | 0                     | 0                       | 19.50         | 19.50  | 0.0            | 0                      | 0.00             | 0.00   | 0.00                                | 2.1                 |                       |                       |

#### SITE INFORMATION:

|                  |                                          |                                   |                                   |                                 |                                       |
|------------------|------------------------------------------|-----------------------------------|-----------------------------------|---------------------------------|---------------------------------------|
| State of ground: | <input checked="" type="checkbox"/> Dry  | <input type="checkbox"/> Wet      | <input type="checkbox"/> Snow     | <input type="checkbox"/> Frozen | <input type="checkbox"/> Hardstanding |
| Wind:            | <input checked="" type="checkbox"/> Calm | <input type="checkbox"/> Moderate | <input type="checkbox"/> Strong   |                                 |                                       |
| Cloud cover:     | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Cloudy   | <input type="checkbox"/> Overcast |                                 |                                       |
| Precipitation:   | <input checked="" type="checkbox"/> None | <input type="checkbox"/> Moderate | <input type="checkbox"/> Heavy    |                                 |                                       |

#### METEOROLOGICAL INFORMATION:

Official Barometric Pressure (mbar):  3hr Before  End of Monitoring (taken from [www.metoffice.gov.uk](http://www.metoffice.gov.uk) station Draig)

Official Pressure Tendency:

(Change in atmospheric pressure for the preceding 3 hours of monitoring)

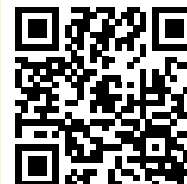
|                                     |                                       |
|-------------------------------------|---------------------------------------|
| <input checked="" type="checkbox"/> | Falling (decreasing change >1.6 mbar) |
| <input type="checkbox"/>            | Steady (change of 0.1 - 1.5 mbar)     |
| <input type="checkbox"/>            | Rising (increasing change >1.6 mbar)  |

# APPENDIX G: Waste Hazard Assessment

## Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



23SML-JCE01-3VIYG

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

### Job name

24-032141-2\_HWOL

### Description/Comments

### Project

GWPR6068

### Site

Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

### Classified by

Name: **Myles Finnerty**  
 Date: **11 Oct 2024 10:02 GMT**  
 Telephone:  
 Company: **Ground and Water**  
**2 The Long Barn, Norton Farm, Selborne**  
**Road**  
**Alton**  
**CU34 3NB**

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

### HazWasteOnline™ Certification:

#### Course

Hazardous Waste Classification

#### Date

### Purpose of classification

2 - Material Characterisation

### Address of the waste

Former Dairy Crest Depot, Dunsbury Way, Havant

Post Code **PO9 5BQ**

### SIC for the process giving rise to the waste

### Description of industry/producer giving rise to the waste

Redevelopment of site

### Description of the specific process, sub-process and/or activity that created the waste

Foundation preparation

### Description of the waste

Made Ground

## Job summary

| # | Sample name        | Depth [m] | Classification Result | Hazard properties | Page |
|---|--------------------|-----------|-----------------------|-------------------|------|
| 1 | BH1--16072024-0.80 |           | Non Hazardous         |                   | 3    |
| 2 | BH2--18072024-0.40 |           | Non Hazardous         |                   | 5    |

## Related documents

| # | Name                  | Description                                       |
|---|-----------------------|---------------------------------------------------|
| 1 | 24-032141-2_HWOL.hwol | i2 Analytical .hwol file used to populate the Job |

## Report

Created by: Myles Finnerty

Created date: 11 Oct 2024 10:02 GMT

| Appendices                                                                 | Page |
|----------------------------------------------------------------------------|------|
| <a href="#">Appendix A: Classifier defined and non GB MCL determinands</a> | 8    |
| <a href="#">Appendix B: Rationale for selection of metal species</a>       | 9    |
| <a href="#">Appendix C: Version</a>                                        | 10   |

Classification of sample: BH1--16072024-0.80

 **Non Hazardous Waste**  
Classified as **17 05 04**  
in the List of Waste

### Sample details

|                           |                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------|
| Sample name:              | LoW Code:                                                                                 |
| <b>BH1--16072024-0.80</b> | Chapter:                                                                                  |
| Moisture content:         | 17: Construction and Demolition Wastes (including excavated soil from contaminated sites) |
| <b>14%</b>                | 17 05 04 (Soil and stones other than those mentioned in 17 05 03)                         |
| (wet weight correction)   |                                                                                           |

### Hazard properties

None identified

### Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

| #  | Determinand                                                                                                                                                                            |                                |                                  | CLP Note | User entered data |       | Conv. Factor | Compound conc. |       | Classification value | MC Applied | Conc. Not Used |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------|----------|-------------------|-------|--------------|----------------|-------|----------------------|------------|----------------|
|    | EU CLP index number                                                                                                                                                                    | EC Number                      | CAS Number                       |          |                   |       |              |                |       |                      |            |                |
| 1  | chromium in chromium(VI) compounds { chromium(VI) oxide }                                                                                                                              |                                |                                  |          | <1.8              | mg/kg | 1.923        | <3.462         | mg/kg | <0.000346 %          |            | <LOD           |
|    | 024-001-00-0                                                                                                                                                                           | 215-607-8                      | 1333-82-0                        |          |                   |       |              |                |       |                      |            |                |
| 2  | monohydric phenols                                                                                                                                                                     |                                |                                  |          | <1                | mg/kg |              | <1             | mg/kg | <0.0001 %            |            | <LOD           |
|    |                                                                                                                                                                                        |                                | P1186                            |          |                   |       |              |                |       |                      |            |                |
| 3  | cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } |                                |                                  |          | <1                | mg/kg | 1.884        | <1.884         | mg/kg | <0.000188 %          |            | <LOD           |
|    | 006-007-00-5                                                                                                                                                                           |                                |                                  |          |                   |       |              |                |       |                      |            |                |
| 4  | pH                                                                                                                                                                                     |                                |                                  |          | 10.5              | pH    |              | 10.5           | pH    | 10.5 pH              |            |                |
|    |                                                                                                                                                                                        |                                | PH                               |          |                   |       |              |                |       |                      |            |                |
| 5  | boron { boron tribromide }                                                                                                                                                             |                                |                                  |          | 0.6               | mg/kg | 23.173       | 11.957         | mg/kg | 0.0012 %             | ✓          |                |
|    | 005-003-00-0                                                                                                                                                                           | 233-657-9                      | 10294-33-4                       |          |                   |       |              |                |       |                      |            |                |
| 6  | arsenic { arsenic }                                                                                                                                                                    |                                |                                  |          | 11                | mg/kg |              | 9.46           | mg/kg | 0.000946 %           | ✓          |                |
|    | 033-001-00-X                                                                                                                                                                           | 231-148-6                      | 7440-38-2                        |          |                   |       |              |                |       |                      |            |                |
| 7  | cadmium { cadmium sulfide }                                                                                                                                                            |                                |                                  | 1        | <0.2              | mg/kg | 1.285        | <0.257         | mg/kg | <0.00002 %           |            | <LOD           |
|    | 048-010-00-4                                                                                                                                                                           | 215-147-8                      | 1306-23-6                        |          |                   |       |              |                |       |                      |            |                |
| 8  | copper { dicopper oxide; copper (I) oxide }                                                                                                                                            |                                |                                  |          | 21                | mg/kg | 1.126        | 20.334         | mg/kg | 0.00203 %            | ✓          |                |
|    | 029-002-00-X                                                                                                                                                                           | 215-270-7                      | 1317-39-1                        |          |                   |       |              |                |       |                      |            |                |
| 9  | mercury { mercury }                                                                                                                                                                    |                                |                                  |          | <0.3              | mg/kg |              | <0.3           | mg/kg | <0.00003 %           |            | <LOD           |
|    | 080-001-00-0                                                                                                                                                                           | 231-106-7                      | 7439-97-6                        |          |                   |       |              |                |       |                      |            |                |
| 10 | nickel { nickel dihydroxide }                                                                                                                                                          |                                |                                  |          | 9.9               | mg/kg | 1.579        | 13.448         | mg/kg | 0.00134 %            | ✓          |                |
|    | 028-008-00-X                                                                                                                                                                           | 235-008-5 [1]<br>234-348-1 [2] | 12054-48-7 [1]<br>11113-74-9 [2] |          |                   |       |              |                |       |                      |            |                |
| 11 | lead { lead chromate }                                                                                                                                                                 |                                |                                  | 1        | 280               | mg/kg | 1.56         | 375.603        | mg/kg | 0.0241 %             | ✓          |                |
|    | 082-004-00-2                                                                                                                                                                           | 231-846-0                      | 7758-97-6                        |          |                   |       |              |                |       |                      |            |                |
| 12 | selenium { selenium }                                                                                                                                                                  |                                |                                  |          | <1                | mg/kg |              | <1             | mg/kg | <0.0001 %            |            | <LOD           |
|    | 034-001-00-2                                                                                                                                                                           | 231-957-4                      | 7782-49-2                        |          |                   |       |              |                |       |                      |            |                |
| 13 | vanadium { divanadium pentaoxide; vanadium pentoxide }                                                                                                                                 |                                |                                  |          | 30                | mg/kg | 1.785        | 46.058         | mg/kg | 0.00461 %            | ✓          |                |
|    | 023-001-00-8                                                                                                                                                                           | 215-239-8                      | 1314-62-1                        |          |                   |       |              |                |       |                      |            |                |
| 14 | zinc { zinc sulphate }                                                                                                                                                                 |                                |                                  |          | 150               | mg/kg | 2.469        | 318.539        | mg/kg | 0.0319 %             | ✓          |                |
|    | 030-006-00-9                                                                                                                                                                           | 231-793-3 [1]<br>231-793-3 [2] | 7446-19-7 [1]<br>7733-02-0 [2]   |          |                   |       |              |                |       |                      |            |                |

| #      | Determinand                                                 |              |            | CLP Note | User entered data | Conv. Factor | Compound conc. |              | Classification value | MC Applied | Conc. Not Used |
|--------|-------------------------------------------------------------|--------------|------------|----------|-------------------|--------------|----------------|--------------|----------------------|------------|----------------|
|        | EU CLP index number                                         | EC Number    | CAS Number |          |                   |              |                |              |                      |            |                |
| 15     | • acenaphthylene                                            | 205-917-1    | 208-96-8   |          | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 %  |                      |            | <LOD           |
| 16     | • acenaphthene                                              | 201-469-6    | 83-32-9    |          | 0.1 mg/kg         |              | 0.086 mg/kg    | 0.0000086 %  | ✓                    |            |                |
| 17     | • anthracene                                                | 204-371-1    | 120-12-7   |          | 0.32 mg/kg        |              | 0.275 mg/kg    | 0.0000275 %  | ✓                    |            |                |
| 18     | benzo[a]anthracene                                          | 601-033-00-9 | 200-280-6  | 56-55-3  | 1 mg/kg           |              | 0.86 mg/kg     | 0.000086 %   | ✓                    |            |                |
| 19     | benzo[a]pyrene; benzo[def]chrysene                          | 601-032-00-3 | 200-028-5  | 50-32-8  | 0.98 mg/kg        |              | 0.843 mg/kg    | 0.0000843 %  | ✓                    |            |                |
| 20     | benzo[b]fluoranthene                                        | 601-034-00-4 | 205-911-9  | 205-99-2 | 1.3 mg/kg         |              | 1.118 mg/kg    | 0.000112 %   | ✓                    |            |                |
| 21     | benzo[k]fluoranthene                                        | 601-036-00-5 | 205-916-6  | 207-08-9 | 0.48 mg/kg        |              | 0.413 mg/kg    | 0.0000413 %  | ✓                    |            |                |
| 22     | • benzo[ghi]perylene                                        | 205-883-8    | 191-24-2   |          | 0.56 mg/kg        |              | 0.482 mg/kg    | 0.0000482 %  | ✓                    |            |                |
| 23     | chrysene                                                    | 601-048-00-0 | 205-923-4  | 218-01-9 | 1.1 mg/kg         |              | 0.946 mg/kg    | 0.0000946 %  | ✓                    |            |                |
| 24     | dibenz[a,h]anthracene                                       | 601-041-00-2 | 200-181-8  | 53-70-3  | 0.14 mg/kg        |              | 0.12 mg/kg     | 0.000012 %   | ✓                    |            |                |
| 25     | • fluoranthene                                              | 205-912-4    | 206-44-0   |          | 2.4 mg/kg         |              | 2.064 mg/kg    | 0.000206 %   | ✓                    |            |                |
| 26     | • fluorene                                                  | 201-695-5    | 86-73-7    |          | 0.08 mg/kg        |              | 0.0688 mg/kg   | 0.00000688 % | ✓                    |            |                |
| 27     | • indeno[123-cd]pyrene                                      | 205-893-2    | 193-39-5   |          | 0.51 mg/kg        |              | 0.439 mg/kg    | 0.0000439 %  | ✓                    |            |                |
| 28     | naphthalene                                                 | 601-052-00-2 | 202-049-5  | 91-20-3  | 0.06 mg/kg        |              | 0.0516 mg/kg   | 0.00000516 % | ✓                    |            |                |
| 29     | • phenanthrene                                              | 201-581-5    | 85-01-8    |          | 1.6 mg/kg         |              | 1.376 mg/kg    | 0.000138 %   | ✓                    |            |                |
| 30     | • pyrene                                                    | 204-927-3    | 129-00-0   |          | 1.9 mg/kg         |              | 1.634 mg/kg    | 0.000163 %   | ✓                    |            |                |
| 31     | chromium in chromium(III) compounds { chromium(III) oxide } | 215-160-9    | 1308-38-9  |          | 17 mg/kg          | 1.462        | 24.846 mg/kg   | 0.00248 %    |                      |            |                |
| Total: |                                                             |              |            |          |                   |              |                |              | 0.0704 %             |            |                |

#### Key

|             |                                                                                                                                 |
|-------------|---------------------------------------------------------------------------------------------------------------------------------|
|             | User supplied data                                                                                                              |
|             | Determinand values ignored for classification, see column 'Conc. Not Used' for reason                                           |
| •           | Determinand defined or amended by HazWasteOnline (see Appendix A)                                                               |
| •           | Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| <LOD        | Below limit of detection                                                                                                        |
| CLP: Note 1 | Only the metal concentration has been used for classification                                                                   |

Classification of sample: BH2--18072024-0.40

 **Non Hazardous Waste**  
Classified as **17 05 04**  
in the List of Waste

### Sample details

|                           |                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------|
| Sample name:              | LoW Code:                                                                                 |
| <b>BH2--18072024-0.40</b> | Chapter:                                                                                  |
| Moisture content:         | 17: Construction and Demolition Wastes (including excavated soil from contaminated sites) |
| <b>16%</b>                | 17 05 04 (Soil and stones other than those mentioned in 17 05 03)                         |
| (wet weight correction)   |                                                                                           |

### Hazard properties

None identified

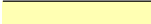
### Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

| #  | Determinand                                                                                                                                                                            |                                |                                  | CLP Note | User entered data |       | Conv. Factor | Compound conc. |       | Classification value | MC Applied | Conc. Not Used |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------|----------|-------------------|-------|--------------|----------------|-------|----------------------|------------|----------------|
|    | EU CLP index number                                                                                                                                                                    | EC Number                      | CAS Number                       |          |                   |       |              |                |       |                      |            |                |
| 1  | chromium in chromium(VI) compounds { chromium(VI) oxide }                                                                                                                              |                                |                                  |          | <1.8              | mg/kg | 1.923        | <3.462         | mg/kg | <0.000346 %          |            | <LOD           |
|    | 024-001-00-0                                                                                                                                                                           | 215-607-8                      | 1333-82-0                        |          |                   |       |              |                |       |                      |            |                |
| 2  | monohydric phenols                                                                                                                                                                     |                                |                                  |          | <1                | mg/kg |              | <1             | mg/kg | <0.0001 %            |            | <LOD           |
|    |                                                                                                                                                                                        |                                | P1186                            |          |                   |       |              |                |       |                      |            |                |
| 3  | cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } |                                |                                  |          | <1                | mg/kg | 1.884        | <1.884         | mg/kg | <0.000188 %          |            | <LOD           |
|    | 006-007-00-5                                                                                                                                                                           |                                |                                  |          |                   |       |              |                |       |                      |            |                |
| 4  | pH                                                                                                                                                                                     |                                |                                  |          | 8.5               | pH    |              | 8.5            | pH    | 8.5 pH               |            |                |
|    |                                                                                                                                                                                        |                                | PH                               |          |                   |       |              |                |       |                      |            |                |
| 5  | boron { boron tribromide }                                                                                                                                                             |                                |                                  |          | 0.5               | mg/kg | 23.173       | 9.733          | mg/kg | 0.000973 %           | ✓          |                |
|    | 005-003-00-0                                                                                                                                                                           | 233-657-9                      | 10294-33-4                       |          |                   |       |              |                |       |                      |            |                |
| 6  | arsenic { arsenic }                                                                                                                                                                    |                                |                                  |          | 8.8               | mg/kg |              | 7.392          | mg/kg | 0.000739 %           | ✓          |                |
|    | 033-001-00-X                                                                                                                                                                           | 231-148-6                      | 7440-38-2                        |          |                   |       |              |                |       |                      |            |                |
| 7  | cadmium { cadmium sulfide }                                                                                                                                                            |                                |                                  | 1        | <0.2              | mg/kg | 1.285        | <0.257         | mg/kg | <0.00002 %           |            | <LOD           |
|    | 048-010-00-4                                                                                                                                                                           | 215-147-8                      | 1306-23-6                        |          |                   |       |              |                |       |                      |            |                |
| 8  | copper { dicopper oxide; copper (I) oxide }                                                                                                                                            |                                |                                  |          | 14                | mg/kg | 1.126        | 13.24          | mg/kg | 0.00132 %            | ✓          |                |
|    | 029-002-00-X                                                                                                                                                                           | 215-270-7                      | 1317-39-1                        |          |                   |       |              |                |       |                      |            |                |
| 9  | mercury { mercury }                                                                                                                                                                    |                                |                                  |          | <0.3              | mg/kg |              | <0.3           | mg/kg | <0.00003 %           |            | <LOD           |
|    | 080-001-00-0                                                                                                                                                                           | 231-106-7                      | 7439-97-6                        |          |                   |       |              |                |       |                      |            |                |
| 10 | nickel { nickel dihydroxide }                                                                                                                                                          |                                |                                  |          | 12                | mg/kg | 1.579        | 15.921         | mg/kg | 0.00159 %            | ✓          |                |
|    | 028-008-00-X                                                                                                                                                                           | 235-008-5 [1]<br>234-348-1 [2] | 12054-48-7 [1]<br>11113-74-9 [2] |          |                   |       |              |                |       |                      |            |                |
| 11 | lead { lead chromate }                                                                                                                                                                 |                                |                                  | 1        | 66                | mg/kg | 1.56         | 86.476         | mg/kg | 0.00554 %            | ✓          |                |
|    | 082-004-00-2                                                                                                                                                                           | 231-846-0                      | 7758-97-6                        |          |                   |       |              |                |       |                      |            |                |
| 12 | selenium { selenium }                                                                                                                                                                  |                                |                                  |          | <1                | mg/kg |              | <1             | mg/kg | <0.0001 %            |            | <LOD           |
|    | 034-001-00-2                                                                                                                                                                           | 231-957-4                      | 7782-49-2                        |          |                   |       |              |                |       |                      |            |                |
| 13 | vanadium { divanadium pentaoxide; vanadium pentoxide }                                                                                                                                 |                                |                                  |          | 38                | mg/kg | 1.785        | 56.983         | mg/kg | 0.0057 %             | ✓          |                |
|    | 023-001-00-8                                                                                                                                                                           | 215-239-8                      | 1314-62-1                        |          |                   |       |              |                |       |                      |            |                |
| 14 | zinc { zinc sulphate }                                                                                                                                                                 |                                |                                  |          | 54                | mg/kg | 2.469        | 112.007        | mg/kg | 0.0112 %             | ✓          |                |
|    | 030-006-00-9                                                                                                                                                                           | 231-793-3 [1]<br>231-793-3 [2] | 7446-19-7 [1]<br>7733-02-0 [2]   |          |                   |       |              |                |       |                      |            |                |

| #      | Determinand                                                 |              |                                                                  | CLP Note                                                     | User entered data | Conv. Factor | Compound conc. |              | Classification value | MC Applied | Conc. Not Used |
|--------|-------------------------------------------------------------|--------------|------------------------------------------------------------------|--------------------------------------------------------------|-------------------|--------------|----------------|--------------|----------------------|------------|----------------|
|        | EU CLP index number                                         | EC Number    | CAS Number                                                       |                                                              |                   |              |                |              |                      |            |                |
| 15     | acenaphthylene                                              | 205-917-1    | 208-96-8                                                         |                                                              | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 %  |                      |            | <LOD           |
| 16     | acenaphthene                                                | 201-469-6    | 83-32-9                                                          |                                                              | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 %  |                      |            | <LOD           |
| 17     | anthracene                                                  | 204-371-1    | 120-12-7                                                         |                                                              | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 %  |                      |            | <LOD           |
| 18     | benzo[a]anthracene                                          | 601-033-00-9 | 200-280-6                                                        | 56-55-3                                                      | 0.16 mg/kg        |              | 0.134 mg/kg    | 0.0000134 %  | ✓                    |            |                |
| 19     | benzo[a]pyrene; benzo[def]chrysene                          | 601-032-00-3 | 200-028-5                                                        | 50-32-8                                                      | 0.19 mg/kg        |              | 0.16 mg/kg     | 0.000016 %   | ✓                    |            |                |
| 20     | benzo[b]fluoranthene                                        | 601-034-00-4 | 205-911-9                                                        | 205-99-2                                                     | 0.17 mg/kg        |              | 0.143 mg/kg    | 0.0000143 %  | ✓                    |            |                |
| 21     | benzo[k]fluoranthene                                        | 601-036-00-5 | 205-916-6                                                        | 207-08-9                                                     | 0.13 mg/kg        |              | 0.109 mg/kg    | 0.0000109 %  | ✓                    |            |                |
| 22     | benzo[ghi]perylene                                          | 205-883-8    | 191-24-2                                                         |                                                              | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 %  |                      |            | <LOD           |
| 23     | chrysene                                                    | 601-048-00-0 | 205-923-4                                                        | 218-01-9                                                     | 0.17 mg/kg        |              | 0.143 mg/kg    | 0.0000143 %  | ✓                    |            |                |
| 24     | dibenz[a,h]anthracene                                       | 601-041-00-2 | 200-181-8                                                        | 53-70-3                                                      | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 %  |                      |            | <LOD           |
| 25     | fluoranthene                                                | 205-912-4    | 206-44-0                                                         |                                                              | 0.33 mg/kg        |              | 0.277 mg/kg    | 0.0000277 %  | ✓                    |            |                |
| 26     | fluorene                                                    | 201-695-5    | 86-73-7                                                          |                                                              | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 %  |                      |            | <LOD           |
| 27     | indeno[123-cd]pyrene                                        | 205-893-2    | 193-39-5                                                         |                                                              | 0.12 mg/kg        |              | 0.101 mg/kg    | 0.0000101 %  | ✓                    |            |                |
| 28     | naphthalene                                                 | 601-052-00-2 | 202-049-5                                                        | 91-20-3                                                      | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 %  |                      |            | <LOD           |
| 29     | phenanthrene                                                | 201-581-5    | 85-01-8                                                          |                                                              | 0.13 mg/kg        |              | 0.109 mg/kg    | 0.0000109 %  | ✓                    |            |                |
| 30     | pyrene                                                      | 204-927-3    | 129-00-0                                                         |                                                              | 0.3 mg/kg         |              | 0.252 mg/kg    | 0.0000252 %  | ✓                    |            |                |
| 31     | benzene                                                     | 601-020-00-8 | 200-753-7                                                        | 71-43-2                                                      | <5 µg/kg          |              | <0.005 mg/kg   | <0.0000005 % |                      |            | <LOD           |
| 32     | ethylbenzene                                                | 601-023-00-4 | 202-849-4                                                        | 100-41-4                                                     | <5 µg/kg          |              | <0.005 mg/kg   | <0.0000005 % |                      |            | <LOD           |
| 33     | tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane    | 603-181-00-X | 216-653-1                                                        | 1634-04-4                                                    | <5 µg/kg          |              | <0.005 mg/kg   | <0.0000005 % |                      |            | <LOD           |
| 34     | o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]        | 601-022-00-9 | 202-422-2 [1]<br>203-396-5 [2]<br>203-576-3 [3]<br>215-535-7 [4] | 95-47-6 [1]<br>106-42-3 [2]<br>108-38-3 [3]<br>1330-20-7 [4] | <5 µg/kg          |              | <0.005 mg/kg   | <0.0000005 % |                      |            | <LOD           |
| 35     | toluene                                                     | 601-021-00-3 | 203-625-9                                                        | 108-88-3                                                     | <5 µg/kg          |              | <0.005 mg/kg   | <0.0000005 % |                      |            | <LOD           |
| 36     | polychlorobiphenyls; PCB                                    | 602-039-00-4 | 215-648-1                                                        | 1336-36-3                                                    | <0.007 mg/kg      |              | <0.007 mg/kg   | <0.0000007 % |                      |            | <LOD           |
| 37     | coronene                                                    | 205-881-7    | 191-07-1                                                         |                                                              | 0.08 mg/kg        |              | 0.0672 mg/kg   | 0.00000672 % | ✓                    |            |                |
| 38     | TPH (C6 to C40) petroleum group                             |              | TPH                                                              |                                                              | <10 mg/kg         |              | <10 mg/kg      | <0.001 %     |                      |            | <LOD           |
| 39     | chromium in chromium(III) compounds { chromium(III) oxide } | 215-160-9    | 1308-38-9                                                        |                                                              | 23 mg/kg          | 1.462        | 33.616 mg/kg   | 0.00336 %    |                      |            |                |
| Total: |                                                             |              |                                                                  |                                                              |                   |              |                |              | 0.0324 %             |            |                |

Key

|                                                                                   |                                                                                                                                 |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|  | User supplied data                                                                                                              |
|  | Determinand values ignored for classification, see column 'Conc. Not Used' for reason                                           |
|  | Determinand defined or amended by HazWasteOnline (see Appendix A)                                                               |
|  | Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| <b>&lt;LOD</b>                                                                    | Below limit of detection                                                                                                        |
| CLP: Note 1                                                                       | Only the metal concentration has been used for classification                                                                   |

## Appendix A: Classifier defined and non GB MCL determinands

### • **monohydric phenols** (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)

Data source: CLP combined data

Data source date: 26 Mar 2019

Hazard Statements: Muta. 2; H341, Acute Tox. 3; H331, Acute Tox. 3; H311, Acute Tox. 3; H301, STOT RE 2; H373, Skin Corr. 1B; H314, Skin Corr. 1B; H314 >= 3 %, Skin Irrit. 2; H315 1 <= conc. < 3 %, Eye Irrit. 2; H319 1 <= conc. < 3 %, Aquatic Chronic 2; H411

### • **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

### • **pH** (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

### • **arsenic** (EC Number: 231-148-6, CAS Number: 7440-38-2)

GB MCL index number: 033-001-00-X

Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans

Additional Hazard Statement(s): Carc. 1A; H350

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

### • **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302, Acute Tox. 1; H330, Acute Tox. 1; H310, Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315

### • **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Aquatic Chronic 2; H411

### • **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

### • **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410

### • **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

### • **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410

♦ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database  
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>  
Data source date: 06 Aug 2015  
Hazard Statements: Carc. 2; H351

♦ **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database  
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>  
Data source date: 06 Aug 2015  
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

♦ **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014  
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>  
Data source date: 21 Aug 2015  
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

♦ **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from ECHA's C&L inventory database  
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>  
Data source date: 30 Apr 2020  
Hazard Statements: Acute Tox. 4; H302 , Skin Sens. 1; H317 , Eye Irrit. 2; H319

♦ **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4  
Description/Comments:  
Additional Hazard Statement(s): Carc. 2; H351  
Reason for additional Hazards Statement(s):  
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

♦ **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

GB MCL index number: 602-039-00-4  
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;  
  
POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.  
Additional Hazard Statement(s): Carc. 1A; H350  
Reason for additional Hazards Statement(s):  
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

♦ **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.  
Data source: <http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en>  
Data source date: 16 Jun 2014  
Hazard Statements: STOT SE 2; H371

♦ **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013  
Data source: WM3 1st Edition 2015  
Data source date: 25 May 2015  
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

## Appendix B: Rationale for selection of metal species

### chromium in chromium(VI) compounds {chromium(VI) oxide}

Most likely worst case.

**cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}**

Most likely worst case.

### boron {boron tribromide}

Most likely worst case.

---

**arsenic {arsenic}**

Most likely worst case.

**cadmium {cadmium sulfide}**

Most likely worst case.

**copper {dicopper oxide; copper (I) oxide}**

Most likely worst case.

**mercury {mercury}**

Most likely worst case.

**nickel {nickel dihydroxide}**

Most likely worst case.

**lead {lead chromate}**

Most likely worst case.

**selenium {selenium}**

Most likely worst case.

**vanadium {divanadium pentaoxide; vanadium pentoxide}**

Most likely worst case.

**zinc {zinc sulphate}**

Most likely worst case.

**chromium in chromium(III) compounds {chromium(III) oxide}**

Most likely worst case.

---

**Appendix C: Version**

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**  
 HazWasteOnline Classification Engine Version: 2024.281.6280.11501 (07 Oct 2024)  
 HazWasteOnline Database: 2024.281.6280.11501 (07 Oct 2024)

This classification utilises the following guidance and legislation:

**WM3 v1.2.GB - Waste Classification** - 1stEditionv1.2.GB-Oct2021

**CLP Regulation** - Regulation1272/2008/ECof16December2008

**1st ATP** - Regulation790/2009/ECof10August2009

**2nd ATP** - Regulation286/2011/ECof10March2011

**3rd ATP** - Regulation618/2012/EUof10July2012

**4th ATP** - Regulation487/2013/EUof8May2013

**Correction to 1st ATP** - Regulation758/2013/EUof7August2013

**5th ATP** - Regulation944/2013/EUof2October2013

**6th ATP** - Regulation605/2014/EUof5June2014

**WFD Annex III replacement** - Regulation1357/2014/EUof18December2014

**Revised List of Waste 2014** - Decision2014/955/EUof18December2014

**7th ATP** - Regulation2015/1221/EUof24July2015

**8th ATP** - Regulation(EU)2016/918of19May2016

**9th ATP** - Regulation(EU)2016/1179of19July2016

**10th ATP** - Regulation(EU)2017/776of4May2017

**HP14 amendment** - Regulation(EU)2017/997of8June2017

**13th ATP** - Regulation(EU)2018/1480of4October2018

**14th ATP** - Regulation(EU)2020/217of4October2019

**15th ATP** - Regulation(EU)2020/1182of19May2020

**The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)**

**Regulations 2020** - UK:2020No.1567of16thDecember2020

**The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020** - UK: 2020 No. 1540 of 16th December 2020

**GB MCL List** - version1.1of09June2021

**GB MCL List v2.0** - version2.0of20thOctober2023

**GB MCL List v3.0** - version3.0of11thJanuary2024

**GB MCL List v4.0** - version4.0of2ndMarch2024

**GB MCL List v5.0** - version5.0of26thJune2024

## Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



BNNLD-EFJZ6-IOTV0

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

### Job name

24-037309\_HWOL

### Description/Comments

### Project

GWPR6068

### Site

Former Dairy Crest Depot, Dunsbury Way, Havant PO9 5BQ

### Classified by

Name: **Myles Finnerty**  
 Date: **11 Oct 2024 10:03 GMT**  
 Telephone:  
 Company: **Ground and Water**  
**2 The Long Barn, Norton Farm, Selborne**  
**Road**  
**Alton**  
**CU34 3NB**

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

### HazWasteOnline™ Certification:

#### Course

Hazardous Waste Classification

#### Date

### Purpose of classification

2 - Material Characterisation

### Address of the waste

Former Dairy Crest Depot, Dunsbury Way, Havant

Post Code PO9 5BQ

### SIC for the process giving rise to the waste

### Description of industry/producer giving rise to the waste

Redevelopment of the site

### Description of the specific process, sub-process and/or activity that created the waste

Foundation preparation

### Description of the waste

Made Ground

## Job summary

| # | Sample name          | Depth [m] | Classification Result | Hazard properties | Page |
|---|----------------------|-----------|-----------------------|-------------------|------|
| 1 | WS101--07082024-1.00 |           | Hazardous             | HP 8              | 3    |
| 2 | WS102--07082024-0.80 |           | Non Hazardous         |                   | 5    |

## Related documents

| # | Name                | Description                                       |
|---|---------------------|---------------------------------------------------|
| 1 | 24-037309_HWOL.hwol | i2 Analytical .hwol file used to populate the Job |

## Report

Created by: Myles Finnerty

Created date: 11 Oct 2024 10:03 GMT

| Appendices                                                                 | Page |
|----------------------------------------------------------------------------|------|
| <a href="#">Appendix A: Classifier defined and non GB MCL determinands</a> | 7    |
| <a href="#">Appendix B: Rationale for selection of metal species</a>       | 8    |
| <a href="#">Appendix C: Version</a>                                        | 9    |

Classification of sample: WS101--07082024-1.00

 **Hazardous Waste**  
Classified as **17 05 03 \***  
in the List of Waste

### Sample details

|                                        |                                                                                                    |
|----------------------------------------|----------------------------------------------------------------------------------------------------|
| Sample name:                           | LoW Code:                                                                                          |
| <b>WS101--07082024-1.00</b>            | Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites) |
| Moisture content:                      | Entry: 17 05 03 * (Soil and stones containing hazardous substances)                                |
| <b>4.9%</b><br>(wet weight correction) |                                                                                                    |

### Hazard properties

**HP 8: Corrosive** "waste which on application can cause skin corrosion"

**pH; pH** "Assumed to be irritant/corrosive because of pH value"

Because of determinand:

pH: (conc.: 11.5 pH)

### Determinands

Moisture content: 4.9% Wet Weight Moisture Correction applied (MC)

| #  |                                                                                     | Determinand                                                                                                                                                                                                                                                                |                                |                                  | CLP Note | User entered data |       | Conv. Factor | Compound conc. |       | Classification value | MC Applied | Conc. Not Used |
|----|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------|----------|-------------------|-------|--------------|----------------|-------|----------------------|------------|----------------|
|    |                                                                                     | EU CLP index number                                                                                                                                                                                                                                                        | EC Number                      | CAS Number                       |          |                   |       |              |                |       |                      |            |                |
| 1  |  | chromium in chromium(VI) compounds { chromium(VI) oxide }                                                                                                                                                                                                                  |                                |                                  |          | <1.8              | mg/kg | 1.923        | <3.462         | mg/kg | <0.000346 %          |            | <LOD           |
|    |                                                                                     | 024-001-00-0                                                                                                                                                                                                                                                               | 215-607-8                      | 1333-82-0                        |          |                   |       |              |                |       |                      |            |                |
| 2  |  | monohydric phenols                                                                                                                                                                                                                                                         |                                |                                  |          | <1                | mg/kg |              | <1             | mg/kg | <0.0001 %            |            | <LOD           |
|    |                                                                                     |                                                                                                                                                                                                                                                                            |                                | P1186                            |          |                   |       |              |                |       |                      |            |                |
| 3  |  | cyanides {  salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } |                                |                                  |          | <1                | mg/kg | 1.884        | <1.884         | mg/kg | <0.000188 %          |            | <LOD           |
|    |                                                                                     | 006-007-00-5                                                                                                                                                                                                                                                               |                                |                                  |          |                   |       |              |                |       |                      |            |                |
| 4  |  | pH                                                                                                                                                                                                                                                                         |                                |                                  |          | 11.5              | pH    |              | 11.5           | pH    | 11.5 pH              |            |                |
|    |                                                                                     |                                                                                                                                                                                                                                                                            |                                | PH                               |          |                   |       |              |                |       |                      |            |                |
| 5  |  | boron { boron tribromide }                                                                                                                                                                                                                                                 |                                |                                  |          | 1.5               | mg/kg | 23.173       | 33.056         | mg/kg | 0.00331 %            | ✓          |                |
|    |                                                                                     | 005-003-00-0                                                                                                                                                                                                                                                               | 233-657-9                      | 10294-33-4                       |          |                   |       |              |                |       |                      |            |                |
| 6  |  | arsenic {  arsenic }                                                                                                                                                                    |                                |                                  |          | 8.5               | mg/kg |              | 8.083          | mg/kg | 0.000808 %           | ✓          |                |
|    |                                                                                     | 033-001-00-X                                                                                                                                                                                                                                                               | 231-148-6                      | 7440-38-2                        |          |                   |       |              |                |       |                      |            |                |
| 7  |  | cadmium { cadmium sulfide }                                                                                                                                                                                                                                                |                                |                                  | 1        | <0.2              | mg/kg | 1.285        | <0.257         | mg/kg | <0.00002 %           |            | <LOD           |
|    |                                                                                     | 048-010-00-4                                                                                                                                                                                                                                                               | 215-147-8                      | 1306-23-6                        |          |                   |       |              |                |       |                      |            |                |
| 8  |  | copper { dicopper oxide; copper (I) oxide }                                                                                                                                                                                                                                |                                |                                  |          | 20                | mg/kg | 1.126        | 21.414         | mg/kg | 0.00214 %            | ✓          |                |
|    |                                                                                     | 029-002-00-X                                                                                                                                                                                                                                                               | 215-270-7                      | 1317-39-1                        |          |                   |       |              |                |       |                      |            |                |
| 9  |  | mercury { mercury }                                                                                                                                                                                                                                                        |                                |                                  |          | <0.3              | mg/kg |              | <0.3           | mg/kg | <0.00003 %           |            | <LOD           |
|    |                                                                                     | 080-001-00-0                                                                                                                                                                                                                                                               | 231-106-7                      | 7439-97-6                        |          |                   |       |              |                |       |                      |            |                |
| 10 |  | nickel { nickel dihydroxide }                                                                                                                                                                                                                                              |                                |                                  |          | 9.1               | mg/kg | 1.579        | 13.669         | mg/kg | 0.00137 %            | ✓          |                |
|    |                                                                                     | 028-008-00-X                                                                                                                                                                                                                                                               | 235-008-5 [1]<br>234-348-1 [2] | 12054-48-7 [1]<br>11113-74-9 [2] |          |                   |       |              |                |       |                      |            |                |
| 11 |  | lead { lead chromate }                                                                                                                                                                                                                                                     |                                |                                  | 1        | 91                | mg/kg | 1.56         | 134.988        | mg/kg | 0.00865 %            | ✓          |                |
|    |                                                                                     | 082-004-00-2                                                                                                                                                                                                                                                               | 231-846-0                      | 7758-97-6                        |          |                   |       |              |                |       |                      |            |                |
| 12 |  | selenium { selenium }                                                                                                                                                                                                                                                      |                                |                                  |          | <1                | mg/kg |              | <1             | mg/kg | <0.0001 %            |            | <LOD           |
|    |                                                                                     | 034-001-00-2                                                                                                                                                                                                                                                               | 231-957-4                      | 7782-49-2                        |          |                   |       |              |                |       |                      |            |                |

| #      | Determinand                                                 |                                |                                | CLP Note | User entered data | Conv. Factor | Compound conc. |             | Classification value | MC Applied | Conc. Not Used |
|--------|-------------------------------------------------------------|--------------------------------|--------------------------------|----------|-------------------|--------------|----------------|-------------|----------------------|------------|----------------|
|        | EU CLP index number                                         | EC Number                      | CAS Number                     |          |                   |              |                |             |                      |            |                |
| 13     | vanadium { divanadium pentaoxide; vanadium pentoxide }      |                                |                                |          | 29 mg/kg          | 1.785        | 49.234 mg/kg   | 0.00492 %   | ✓                    |            |                |
|        | 023-001-00-8                                                | 215-239-8                      | 1314-62-1                      |          |                   |              |                |             |                      |            |                |
| 14     | zinc { zinc sulphate }                                      |                                |                                |          | 84 mg/kg          | 2.469        | 197.257 mg/kg  | 0.0197 %    | ✓                    |            |                |
|        | 030-006-00-9                                                | 231-793-3 [1]<br>231-793-3 [2] | 7446-19-7 [1]<br>7733-02-0 [2] |          |                   |              |                |             |                      |            |                |
| 15     | acenaphthylene                                              |                                |                                |          | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 % |                      | <LOD       |                |
|        |                                                             | 205-917-1                      | 208-96-8                       |          |                   |              |                |             |                      |            |                |
| 16     | acenaphthene                                                |                                |                                |          | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 % |                      | <LOD       |                |
|        |                                                             | 201-469-6                      | 83-32-9                        |          |                   |              |                |             |                      |            |                |
| 17     | anthracene                                                  |                                |                                |          | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 % |                      | <LOD       |                |
|        |                                                             | 204-371-1                      | 120-12-7                       |          |                   |              |                |             |                      |            |                |
| 18     | benzo[a]anthracene                                          |                                |                                |          | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 % |                      | <LOD       |                |
|        | 601-033-00-9                                                | 200-280-6                      | 56-55-3                        |          |                   |              |                |             |                      |            |                |
| 19     | benzo[a]pyrene; benzo[def]chrysene                          |                                |                                |          | 0.25 mg/kg        |              | 0.238 mg/kg    | 0.0000238 % | ✓                    |            |                |
|        | 601-032-00-3                                                | 200-028-5                      | 50-32-8                        |          |                   |              |                |             |                      |            |                |
| 20     | benzo[b]fluoranthene                                        |                                |                                |          | 0.27 mg/kg        |              | 0.257 mg/kg    | 0.0000257 % | ✓                    |            |                |
|        | 601-034-00-4                                                | 205-911-9                      | 205-99-2                       |          |                   |              |                |             |                      |            |                |
| 21     | benzo[k]fluoranthene                                        |                                |                                |          | 0.15 mg/kg        |              | 0.143 mg/kg    | 0.0000143 % | ✓                    |            |                |
|        | 601-036-00-5                                                | 205-916-6                      | 207-08-9                       |          |                   |              |                |             |                      |            |                |
| 22     | benzo[ghi]perylene                                          |                                |                                |          | 0.14 mg/kg        |              | 0.133 mg/kg    | 0.0000133 % | ✓                    |            |                |
|        |                                                             | 205-883-8                      | 191-24-2                       |          |                   |              |                |             |                      |            |                |
| 23     | chrysene                                                    |                                |                                |          | 0.25 mg/kg        |              | 0.238 mg/kg    | 0.0000238 % | ✓                    |            |                |
|        | 601-048-00-0                                                | 205-923-4                      | 218-01-9                       |          |                   |              |                |             |                      |            |                |
| 24     | dibenz[a,h]anthracene                                       |                                |                                |          | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 % |                      | <LOD       |                |
|        | 601-041-00-2                                                | 200-181-8                      | 53-70-3                        |          |                   |              |                |             |                      |            |                |
| 25     | fluoranthene                                                |                                |                                |          | 0.46 mg/kg        |              | 0.437 mg/kg    | 0.0000437 % | ✓                    |            |                |
|        |                                                             | 205-912-4                      | 206-44-0                       |          |                   |              |                |             |                      |            |                |
| 26     | fluorene                                                    |                                |                                |          | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 % |                      | <LOD       |                |
|        |                                                             | 201-695-5                      | 86-73-7                        |          |                   |              |                |             |                      |            |                |
| 27     | indeno[123-cd]pyrene                                        |                                |                                |          | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 % |                      | <LOD       |                |
|        |                                                             | 205-893-2                      | 193-39-5                       |          |                   |              |                |             |                      |            |                |
| 28     | naphthalene                                                 |                                |                                |          | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 % |                      | <LOD       |                |
|        | 601-052-00-2                                                | 202-049-5                      | 91-20-3                        |          |                   |              |                |             |                      |            |                |
| 29     | phenanthrene                                                |                                |                                |          | 0.23 mg/kg        |              | 0.219 mg/kg    | 0.0000219 % | ✓                    |            |                |
|        |                                                             | 201-581-5                      | 85-01-8                        |          |                   |              |                |             |                      |            |                |
| 30     | pyrene                                                      |                                |                                |          | 0.41 mg/kg        |              | 0.39 mg/kg     | 0.000039 %  | ✓                    |            |                |
|        |                                                             | 204-927-3                      | 129-00-0                       |          |                   |              |                |             |                      |            |                |
| 31     | chromium in chromium(III) compounds { chromium(III) oxide } |                                |                                |          | 17 mg/kg          | 1.462        | 24.846 mg/kg   | 0.00248 %   |                      |            |                |
|        |                                                             | 215-160-9                      | 1308-38-9                      |          |                   |              |                |             |                      |            |                |
| Total: |                                                             |                                |                                |          |                   |              |                |             | 0.0444 %             |            |                |

#### Key

|             |                                                                                                                                 |
|-------------|---------------------------------------------------------------------------------------------------------------------------------|
|             | User supplied data                                                                                                              |
|             | Determinand values ignored for classification, see column 'Conc. Not Used' for reason                                           |
|             | Hazardous result                                                                                                                |
| •           | Determinand defined or amended by HazWasteOnline (see Appendix A)                                                               |
| •           | Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| <LOD        | Below limit of detection                                                                                                        |
| CLP: Note 1 | Only the metal concentration has been used for classification                                                                   |

Classification of sample: WS102--07082024-0.80

 **Non Hazardous Waste**  
Classified as **17 05 04**  
in the List of Waste

### Sample details

|                             |                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------|
| Sample name:                | LoW Code:                                                                                 |
| <b>WS102--07082024-0.80</b> | Chapter:                                                                                  |
| Moisture content:           | 17: Construction and Demolition Wastes (including excavated soil from contaminated sites) |
| <b>11%</b>                  | 17 05 04 (Soil and stones other than those mentioned in 17 05 03)                         |
| (wet weight correction)     |                                                                                           |

### Hazard properties

None identified

### Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

| #  | Determinand                                                                                                                                                                                                                                                                |                                |                                  | CLP Note | User entered data |       | Conv. Factor | Compound conc. |       | Classification value | MC Applied | Conc. Not Used |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------|----------|-------------------|-------|--------------|----------------|-------|----------------------|------------|----------------|
|    | EU CLP index number                                                                                                                                                                                                                                                        | EC Number                      | CAS Number                       |          |                   |       |              |                |       |                      |            |                |
| 1  |  chromium in chromium(VI) compounds { chromium(VI) oxide }                                                                                                                              |                                |                                  |          | <1.8              | mg/kg | 1.923        | <3.462         | mg/kg | <0.000346 %          |            | <LOD           |
|    | 024-001-00-0                                                                                                                                                                                                                                                               | 215-607-8                      | 1333-82-0                        |          |                   |       |              |                |       |                      |            |                |
| 2  |  monohydric phenols                                                                                                                                                                     |                                | P1186                            |          | <1                | mg/kg |              | <1             | mg/kg | <0.0001 %            |            | <LOD           |
| 3  |  cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } |                                |                                  |          | <1                | mg/kg | 1.884        | <1.884         | mg/kg | <0.000188 %          |            | <LOD           |
|    | 006-007-00-5                                                                                                                                                                                                                                                               |                                |                                  |          |                   |       |              |                |       |                      |            |                |
| 4  |  pH                                                                                                                                                                                     |                                | PH                               |          | 8                 | pH    |              | 8              | pH    | 8pH                  |            |                |
| 5  |  boron { boron tribromide }                                                                                                                                                             |                                |                                  |          | 1.2               | mg/kg | 23.173       | 24.749         | mg/kg | 0.00247 %            | ✓          |                |
|    | 005-003-00-0                                                                                                                                                                                                                                                               | 233-657-9                      | 10294-33-4                       |          |                   |       |              |                |       |                      |            |                |
| 6  |  arsenic { arsenic }                                                                                                                                                                    |                                |                                  |          | 9.6               | mg/kg |              | 8.544          | mg/kg | 0.000854 %           | ✓          |                |
|    | 033-001-00-X                                                                                                                                                                                                                                                               | 231-148-6                      | 7440-38-2                        |          |                   |       |              |                |       |                      |            |                |
| 7  |  cadmium { cadmium sulfide }                                                                                                                                                            |                                |                                  | 1        | <0.2              | mg/kg | 1.285        | <0.257         | mg/kg | <0.00002 %           |            | <LOD           |
|    | 048-010-00-4                                                                                                                                                                                                                                                               | 215-147-8                      | 1306-23-6                        |          |                   |       |              |                |       |                      |            |                |
| 8  |  copper { dicopper oxide; copper (I) oxide }                                                                                                                                            |                                |                                  |          | 14                | mg/kg | 1.126        | 14.029         | mg/kg | 0.0014 %             | ✓          |                |
|    | 029-002-00-X                                                                                                                                                                                                                                                               | 215-270-7                      | 1317-39-1                        |          |                   |       |              |                |       |                      |            |                |
| 9  |  mercury { mercury }                                                                                                                                                                    |                                |                                  |          | <0.3              | mg/kg |              | <0.3           | mg/kg | <0.00003 %           |            | <LOD           |
|    | 080-001-00-0                                                                                                                                                                                                                                                               | 231-106-7                      | 7439-97-6                        |          |                   |       |              |                |       |                      |            |                |
| 10 |  nickel { nickel dihydroxide }                                                                                                                                                          |                                |                                  |          | 11                | mg/kg | 1.579        | 15.463         | mg/kg | 0.00155 %            | ✓          |                |
|    | 028-008-00-X                                                                                                                                                                                                                                                               | 235-008-5 [1]<br>234-348-1 [2] | 12054-48-7 [1]<br>11113-74-9 [2] |          |                   |       |              |                |       |                      |            |                |
| 11 |  lead { lead chromate }                                                                                                                                                                 |                                |                                  | 1        | 61                | mg/kg | 1.56         | 84.682         | mg/kg | 0.00543 %            | ✓          |                |
|    | 082-004-00-2                                                                                                                                                                                                                                                               | 231-846-0                      | 7758-97-6                        |          |                   |       |              |                |       |                      |            |                |
| 12 |  selenium { selenium }                                                                                                                                                                  |                                |                                  |          | <1                | mg/kg |              | <1             | mg/kg | <0.0001 %            |            | <LOD           |
|    | 034-001-00-2                                                                                                                                                                                                                                                               | 231-957-4                      | 7782-49-2                        |          |                   |       |              |                |       |                      |            |                |
| 13 |  vanadium { divanadium pentaoxide; vanadium pentoxide }                                                                                                                                 |                                |                                  |          | 39                | mg/kg | 1.785        | 61.964         | mg/kg | 0.0062 %             | ✓          |                |
|    | 023-001-00-8                                                                                                                                                                                                                                                               | 215-239-8                      | 1314-62-1                        |          |                   |       |              |                |       |                      |            |                |
| 14 |  zinc { zinc sulphate }                                                                                                                                                                 |                                |                                  |          | 79                | mg/kg | 2.469        | 173.616        | mg/kg | 0.0174 %             | ✓          |                |
|    | 030-006-00-9                                                                                                                                                                                                                                                               | 231-793-3 [1]<br>231-793-3 [2] | 7446-19-7 [1]<br>7733-02-0 [2]   |          |                   |       |              |                |       |                      |            |                |

| #      | Determinand                                                 |              |            | CLP Note | User entered data | Conv. Factor | Compound conc. |              | Classification value | MC Applied | Conc. Not Used |
|--------|-------------------------------------------------------------|--------------|------------|----------|-------------------|--------------|----------------|--------------|----------------------|------------|----------------|
|        | EU CLP index number                                         | EC Number    | CAS Number |          |                   |              |                |              |                      |            |                |
| 15     | • acenaphthylene                                            | 205-917-1    | 208-96-8   |          | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 %  |                      |            | <LOD           |
| 16     | • acenaphthene                                              | 201-469-6    | 83-32-9    |          | 0.15 mg/kg        |              | 0.134 mg/kg    | 0.0000134 %  | ✓                    |            |                |
| 17     | • anthracene                                                | 204-371-1    | 120-12-7   |          | 0.49 mg/kg        |              | 0.436 mg/kg    | 0.0000436 %  | ✓                    |            |                |
| 18     | benzo[a]anthracene                                          | 601-033-00-9 | 200-280-6  | 56-55-3  | 1.4 mg/kg         |              | 1.246 mg/kg    | 0.000125 %   | ✓                    |            |                |
| 19     | benzo[a]pyrene; benzo[def]chrysene                          | 601-032-00-3 | 200-028-5  | 50-32-8  | 1.3 mg/kg         |              | 1.157 mg/kg    | 0.000116 %   | ✓                    |            |                |
| 20     | benzo[b]fluoranthene                                        | 601-034-00-4 | 205-911-9  | 205-99-2 | 1.5 mg/kg         |              | 1.335 mg/kg    | 0.000133 %   | ✓                    |            |                |
| 21     | benzo[k]fluoranthene                                        | 601-036-00-5 | 205-916-6  | 207-08-9 | 0.76 mg/kg        |              | 0.676 mg/kg    | 0.0000676 %  | ✓                    |            |                |
| 22     | • benzo[ghi]perylene                                        | 205-883-8    | 191-24-2   |          | 0.53 mg/kg        |              | 0.472 mg/kg    | 0.0000472 %  | ✓                    |            |                |
| 23     | chrysene                                                    | 601-048-00-0 | 205-923-4  | 218-01-9 | 1.4 mg/kg         |              | 1.246 mg/kg    | 0.000125 %   | ✓                    |            |                |
| 24     | dibenz[a,h]anthracene                                       | 601-041-00-2 | 200-181-8  | 53-70-3  | <0.05 mg/kg       |              | <0.05 mg/kg    | <0.000005 %  |                      |            | <LOD           |
| 25     | • fluoranthene                                              | 205-912-4    | 206-44-0   |          | 2.9 mg/kg         |              | 2.581 mg/kg    | 0.000258 %   | ✓                    |            |                |
| 26     | • fluorene                                                  | 201-695-5    | 86-73-7    |          | 0.13 mg/kg        |              | 0.116 mg/kg    | 0.0000116 %  | ✓                    |            |                |
| 27     | • indeno[123-cd]pyrene                                      | 205-893-2    | 193-39-5   |          | 0.49 mg/kg        |              | 0.436 mg/kg    | 0.0000436 %  | ✓                    |            |                |
| 28     | naphthalene                                                 | 601-052-00-2 | 202-049-5  | 91-20-3  | 0.08 mg/kg        |              | 0.0712 mg/kg   | 0.00000712 % | ✓                    |            |                |
| 29     | • phenanthrene                                              | 201-581-5    | 85-01-8    |          | 1.6 mg/kg         |              | 1.424 mg/kg    | 0.000142 %   | ✓                    |            |                |
| 30     | • pyrene                                                    | 204-927-3    | 129-00-0   |          | 2.6 mg/kg         |              | 2.314 mg/kg    | 0.000231 %   | ✓                    |            |                |
| 31     | chromium in chromium(III) compounds { chromium(III) oxide } | 215-160-9    | 1308-38-9  |          | 22 mg/kg          | 1.462        | 32.154 mg/kg   | 0.00322 %    |                      |            |                |
| Total: |                                                             |              |            |          |                   |              |                |              | 0.0406 %             |            |                |

#### Key

|             |                                                                                                                                 |
|-------------|---------------------------------------------------------------------------------------------------------------------------------|
|             | User supplied data                                                                                                              |
|             | Determinand values ignored for classification, see column 'Conc. Not Used' for reason                                           |
| •           | Determinand defined or amended by HazWasteOnline (see Appendix A)                                                               |
| •           | Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| <LOD        | Below limit of detection                                                                                                        |
| CLP: Note 1 | Only the metal concentration has been used for classification                                                                   |

## Appendix A: Classifier defined and non GB MCL determinands

### ♦ monohydric phenols (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)

Data source: CLP combined data

Data source date: 26 Mar 2019

Hazard Statements: Muta. 2; H341, Acute Tox. 3; H331, Acute Tox. 3; H311, Acute Tox. 3; H301, STOT RE 2; H373, Skin Corr. 1B; H314, Skin Corr. 1B; H314 >= 3 %, Skin Irrit. 2; H315 1 <= conc. < 3 %, Eye Irrit. 2; H319 1 <= conc. < 3 %, Aquatic Chronic 2; H411

### ♦ salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

### ♦ pH (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

### ♦ arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

GB MCL index number: 033-001-00-X

Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans

Additional Hazard Statement(s): Carc. 1A; H350

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

### ♦ acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302, Acute Tox. 1; H330, Acute Tox. 1; H310, Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315

### ♦ acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Aquatic Chronic 2; H411

### ♦ anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

### ♦ benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410

### ♦ fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

### ♦ fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410

• **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database  
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>  
Data source date: 06 Aug 2015  
Hazard Statements: Carc. 2; H351

• **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database  
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>  
Data source date: 06 Aug 2015  
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

• **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014  
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>  
Data source date: 21 Aug 2015  
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from ECHA's C&L inventory database  
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>  
Data source date: 30 Apr 2020  
Hazard Statements: Acute Tox. 4; H302 , Skin Sens. 1; H317 , Eye Irrit. 2; H319

## Appendix B: Rationale for selection of metal species

### chromium in chromium(VI) compounds {chromium(VI) oxide}

Most likely worst case.

**cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}**

Most likely worst case.

### boron {boron tribromide}

Most likely worst case.

### arsenic {arsenic}

Most likely worst case.

### cadmium {cadmium sulfide}

Most likely worst case.

### copper {dicopper oxide; copper (I) oxide}

Most likely worst case.

### mercury {mercury}

Most likely worst case.

### nickel {nickel dihydroxide}

Most likely worst case.

### lead {lead chromate}

Most likely worst case.

### selenium {selenium}

Most likely worst case.

### vanadium {divanadium pentaoxide; vanadium pentoxide}

Most likely worst case.

### zinc {zinc sulphate}

Most likely worst case.

### chromium in chromium(III) compounds {chromium(III) oxide}

Most likely worst case.

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## Appendix C: Version

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HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2024.281.6280.11501 (07 Oct 2024)

HazWasteOnline Database: 2024.281.6280.11501 (07 Oct 2024)

This classification utilises the following guidance and legislation:

**WM3 v1.2.GB - Waste Classification** - 1stEditionv1.2.GB-Oct2021

**CLP Regulation** - Regulation1272/2008/ECof16December2008

**1st ATP** - Regulation790/2009/ECof10August2009

**2nd ATP** - Regulation286/2011/ECof10March2011

**3rd ATP** - Regulation618/2012/EUof10July2012

**4th ATP** - Regulation487/2013/EUof8May2013

**Correction to 1st ATP** - Regulation758/2013/EUof7August2013

**5th ATP** - Regulation944/2013/EUof2October2013

**6th ATP** - Regulation605/2014/EUof5June2014

**WFD Annex III replacement** - Regulation1357/2014/EUof18December2014

**Revised List of Waste 2014** - Decision2014/955/EUof18December2014

**7th ATP** - Regulation2015/1221/EUof24July2015

**8th ATP** - Regulation(EU)2016/918of19May2016

**9th ATP** - Regulation(EU)2016/1179of19July2016

**10th ATP** - Regulation(EU)2017/776of4May2017

**HP14 amendment** - Regulation(EU)2017/997of8June2017

**13th ATP** - Regulation(EU)2018/1480of4October2018

**14th ATP** - Regulation(EU)2020/217of4October2019

**15th ATP** - Regulation(EU)2020/1182of19May2020

**The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)**

**Regulations 2020** - UK:2020No.1567of16thDecember2020

**The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020** - UK: 2020 No. 1540 of 16th December 2020

**GB MCL List** - version1.1of09June2021

**GB MCL List v2.0** - version2.0of20thOctober2023

**GB MCL List v3.0** - version3.0of11thJanuary2024

**GB MCL List v4.0** - version4.0of2ndMarch2024

**GB MCL List v5.0** - version5.0of26thJune2024