ENVIRONMENT
& HEALTH

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HPH1, Hyde Park Hayes: Environmental Ground Conditions Statement

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1. Introduction

Background

This letter presents the objectives, scope, findings, and conclusions of a summary environmental ground conditions statement undertaken for HPH1 ("Building 1"), Hyde Park Hayes, 9 Millington Road, Hayes, UB3 4AZ (the "site").

This report was prepared by Ramboll UK Limited ("Ramboll") on behalf of Sackville Property Hayes (Jersey GP) Limited as general partner of Threadneedle UK PEC6 Hayes Jersey LP (the "Client"). The report was reviewed by Steve Reed of Jorvik Environmental Consulting Limited, who has worked with the Client for >20 years, and was retained as a sub-consultant by Ramboll.

This informative note review of the contaminative status of the site has been undertaken to support an application for Prior Approval (under Class MA of the Town and Country Planning (General Permitted Development etc.) (England) (Amendment) Order 2021, submitted prior to the intended change of use from existing Class E (office) floorspace to Class C3 (residential) use at first to third storey level at the Site. Ramboll understands that the ground floor of the building is leased for commercial (office) use, and this will be retained as part of the proposed repurposing i.e. only floors 1 – 3 (above ground) inclusive will be repurposed to residential use, with the ground floor retained in commercial use (albeit residential lobby access at ground floor level - to the floors above - will be provided, no residential occupancy of the ground floor is proposed).

Objectives

The main objective of the review was to assess the potential for soil or groundwater contamination and related environmental risks, both at and in the vicinity of the site, in the context of the proposed repurposing of the HPH1 building to a residential use.

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Scope of Works

The scope of the environmental ground condition statement has included a review of information collected as part of assessments of the wider HPH site, which were commissioned by the Client, abstracting information relevant to HPH1. The previous body of work is considered to be suitably up-to-date to provide a robust assessment of current conditions on-site. As such no additional on-site surveys are considered necessary to support the current application for partial change of use.

Scope of Works Notable Exceptions and Restrictions

This assessment has been undertaken with the assumption that the site will be repurposed from its current commercial use to combined commercial / residential use (floors 1-3 above ground only, with lobby access at ground level), broadly maintaining the existing building configuration. The current application does not seek to alter the footprint nor scale of the existing building.

No sampling or analysis of soils, waters or other materials has been carried out as part of this Environmental Statement. This is considered to be a robust and proportionate approach, given the nature of the proposals.

The assessment did not include an audit of operational environmental compliance issues. The assessment specifically excluded a detailed assessment as to the presence and condition of asbestos or asbestiform containing materials at the site.

The assessment did not include an assessment of geotechnical conditions at the site. Such assessments are not required given the nature of the proposals.

General Limitations and Reliance

This report has been prepared by Ramboll exclusively for the intended use by the Client in accordance with the agreement between Ramboll and the Client defining, among others, the purpose, the scope and the terms and conditions for the services. No other warranty, expressed or implied, is made as to the professional advice included in this report or in respect of any matters outside the agreed scope of the services or the purpose for which the report and the associated agreed scope were intended or any other services provided by Ramboll.

In preparation of the report and performance of any other services, Ramboll has relied upon publicly available information, information provided by the Client and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to Ramboll was accurate, complete and available to Ramboll within the reporting schedule.

Ramboll's services are not intended as legal advice, nor an exhaustive review of site conditions and/or compliance. This report and accompanying documents are initial and intended solely for the use and benefit of the Client for this purpose only and may not be used by or disclosed to, in whole or in part, any other person without the express written consent of Ramboll. Ramboll neither owes nor accepts any duty to any third party, unless formally agreed by Ramboll through that party entering into, at Ramboll's sole discretion, a written reliance agreement.

Unless otherwise stated in this report, the scope of services, assessment and conclusions made assume that the site will continue to be used for its current purpose and end-use without significant changes either on-site or off-site.

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Ramboll's scope of services for this assignment did not include collecting samples of any environmental media. Ramboll cannot rule out the existence of conditions, including, but not limited to, contamination not identified and defined by the data and information available to and/or obtained by Ramboll. Specifically, this assessment must not be considered as an asbestos survey (whether in built structures, waste, soils, etc.), even though the subject of asbestos-containing materials may have been discussed in the report. Given the nature of the proposals (which comprise internal works and change of use only), the nature and type of these surveys is considered to be appropriate, sufficient, and robust to support the current application.

2. Site Description

Figures showing the location of the site, site boundary, and key features on site are presented in Appendix 1.

Site Setting

The site currently comprises an overall four (4) storey office building, with all floors above ground (i.e. no basement level present). The building dates from the early 1990s and is understood to have been extensively refurbished after a 2018 Planning Permission for alterations to the building (London Borough of Hillingdon Planning Ref: 67351/APP/2018/610). It is located within part of the wider Hyde Park Hayes Business Park, at National Grid Reference 509250, 179210 (see Appendix 1).

Adjacent and surrounding land uses are summarised in Table 1 below.

Table 1: Adjacent and Surrounding Land Uses

Direction	Occupant	Activities	Distance
North	Millington Road External car parks North Hyde Road Residential properties	N/A Car park N/A Residential	Adjacent 30m 90m 100m
South	Multi-storey car park Millington Road Attewell	Brand merchandising N/A Aerospace	Adjacent 90m 110m
East	Millington Road City Circle UK Ltd Premier Inn Selco	N/A Coach and minibus hire Hotel Builders warehouse	Adjacent 20m 40m 30m
West	HPH Buildings	Various residential / commercial	Adjacent

Site Layout and Activities

The site (also known as "HPH1" / "Building 1") is located in the central-eastern portion in relation to the wider HPH Office Park. The building forms an area of approximately 0.28 hectares. The site and surrounding area are typically flat, with the surrounds including external car parking, a multi-storey parking lot, access roads and soft landscaping. The external areas typically comprise asphalt-surfaced

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access roads and surface car parking areas, paved footways, paved external amenity areas, and grassed 'lawn' areas with some small trees and shrubs.

The site building comprises a rectangular four-storey concrete frame construction with composite cladding and glass facades, surrounded by a slatted frame to provide sun-shading to the glass facades. The roof is a flat asphalt covered roof with plant equipment for the building.

It is understood that the ground floor office space is being leased at the time of writing this report.

3. Historical & Regulatory Information

Based on the review of historical mapping, aerial imagery (where available) and environmental database records undertaken during the 2023 Phase I assessment, the wider HPH Office Park (including the site) has had a longstanding commercial and industrial land use ranging back to the 1920s.

Anecdotal information indicates it has been occupied by various land uses including an aircraft production facilities (Fairey Aviation and Westland Helicopters), car sales and likely small scale car maintenance (Mercedes), and Argyll Foods (which began the alteration of the warehousing on-site to offices with other office based tenants).

The key activities with historical potential for ground contamination at the site and surrounding areas are outlined below.

Historical Potential for Ground Contamination

The Site

The following potentially contaminative activities have been identified as having taken place on site:-

- Fairey Aviation (Aeronautical Engineers) was present on the HPH1 site (and wider off-site area), and were operational by the c.1930s (including WWII), by which time the on-site building had expanded significantly to extend off-site to the south. Smaller buildings and structures were present to the north of the main building, on the current HPH1 car park area, including a rectangular Water Tank. A group of small structures or buildings, including some Tanks, were present on the site of the current roadway adjacent to the east of HPH1, potentially encroaching onto the eastern side of the HPH1 site. The Fairey Aviation site was taken over by Westland Helicopters in c.1960, and by the late 1970s, the building was in use as Warehouses, with the Water Tank removed and an Electrical Substation located in the north-west part of the plot (current car park area). Potential contaminants from these activities include metal dross and lubricants, acids, heavy metals, degreasing agents, hydrocarbon fuels and oils, solvents, asbestos and Polychlorinated Biphenyls (PCBs);
- The current building dates from the early 1990s, and is understood to have been extensively refurbished after a 2018 Planning Permission.

The Surrounding Area

The following potentially contaminative activities have been identified as having taken place in the surrounding area:-

- Maccess formerly occupied the footprint of Building 5 (20m to the south-west of the site) for the distribution of road vehicle spare parts and accessories. Ramboll understands from third party document review that some vehicle maintenance was undertaken here, including a recycling area

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adjacent to the north of Building 5. Mercedes also occupied a unit on-site, and although the specific location is unknown, it may coincide with the Maccess site use. The principal activity was car sales; however small scale car maintenance was likely also undertaken, which would include the generation and storage of waste oils. Potential contaminants could include hydrocarbons, metals, lubricants, and degreasers (e.g. solvents).

- Refuelling activities carried out by Safeway (and previously acquired companies: Argyll Foods, Allied Suppliers, and Cavenham Foods which all occupied wider Hyde Park Hayes site (including the site)), potentially from the 1970s until the mid-1990s. This included two (2) petrol USTs (located approximately 80-100m north-west of the HPH1 site), which are understood to have been decommissioned by foam filling in 1996. Potential contaminants from these activities include hydrocarbon fuels and oils.
- The large Aeronautical Engineering Works (present on-site) extended off-site to the north-west, south, and east. Ramboll understands that this may have included testing of aircraft on unsurfaced ground to the west of the current office park. Potential contaminants from these activities include metal dross and lubricants, acids, heavy metals, degreasing agents, hydrocarbon fuels and oils, solvents, and Polychlorinated Biphenyls (PCBs).
- Railway Line 150m north from at least the 1860s to present. Potential contaminants from these activities could include hydrocarbon fuels and oils, metals and timber treatments.
- Gramophone Factories (The Old Vinyl Factory) 240m north from at least the 1910s to the 1990s, including the manufacture of vinyl records and record players. The buildings that remain from historical uses have been redeveloped for mixed use including office space and residential apartments. Potential contaminants from historical activities could include solvents, hydrocarbons, and metals.
- Asda superstore including Petrol Filling Station 160m south-east of the site, from 2015 to the present day. Potential contaminants from these activities include hydrocarbon fuels and oils.
- Multiple Electricity Substations nearby to the site from c.1970s, the nearest located approximately 80m to the east. Potential contaminants include oils and polychlorinated biphenyls (PCBs).
- Further industrial and commercial land use in the area, including; Warehouse buildings from adjacent to the south, east and west (1970s to the 2010s); a large unidentified Factory 350m north-west (1960s to 1990s) and a Transport Depot 200m north-west (from 1960s) and Crown Oil Works 400m north (1930s to at least 1960s). Potential contaminants include various chemicals, metals, oils, and fuels.

The above activities represent potential off-site sources of contamination that (if present) could potentially migrate beneath the site.

The potential for off-site contamination (if present) to migrate beneath the site would be dependent on the underlying geological conditions, which are discussed in the following section.

4. Environmental Setting

Desk-based research of the local geology, hydrogeology and hydrology was carried out in order to establish the potential for migration of contamination onto or away from the site, and to assess the sensitivity and vulnerability of the site's setting with respect to surface water, groundwater, and ecological resources.

Information was obtained from a number of sources, including:-

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- examination of published geological maps produced by the British Geological Survey (BGS);
- review of publicly available BGS borehole logs for the site or near vicinity;
- a proprietary environmental database procured by Ramboll;
- previous intrusive site investigations and groundwater assessments; and
- Regulatory Authority websites including the Environment Agency (EA).

Geology and hydrogeology

According to the BGS website (accessed 16th August 2024) the BGS map of the area indicates that the site is directly on the superficial Langley Silt Formation (comprising silt or gravelly Clay). The western part of the wider HPH site is underlain by Lynch Hill Gravel (Sand and gravel, locally with lenses of silt, clay, or peat). The superficial deposits across the site are underlain by bedrock geology of the London Clay Formation comprising clay, silt and sand comprising a coal seam and siltstone.

Based on information gathered in previous investigations, the site has been confirmed to be underlain by the Langley Silt Formation, likely underlain by further superficial deposits of the Lynch Hill Gravels.

Two (2) boreholes drilled as part of previous ground investigations (by Jacobs in March 2014, reported August 2015, ref: KU032300) within 20m to the west of the site encountered Made Ground to a depth of 1.0m below ground level (bgl), underlain by a thin layer of orange brown sandy clay (0.5m - 1.1m thick), underlain by orange brown sandy gravel (3.1m - 3.6m in thickness) over grey sandy clay (to the base of the boreholes at 6.0m below ground level).

Groundwater was encountered at a depth of approximately 4.0m bgl, within the sandy gravel deposits.

The nearest available-to-view deep borehole logs are located approximately 290m north of the site (BGS borehole 574189 / TQ07NE361) and show drift (superficial) deposits (no description) to 5.8m bgl, overlying London Clay to 46.8m bgl. This is further underlain by Pebble Beds (comprising blue and mottled Clay) to 71.9m bgl which overly the Upper Chalk to a depth of 152m bgl (the ultimate depth of the Chalk is not proven in these logs).

An indicative summary of the geological and hydrogeological setting of the site and surrounding areas is provided in Table 2 below.

Table 2: Summary of Geology and Hydrogeology

Formation	Description	Thickness	EA Aquifer Designation	Hydrogeological Significance
Worked /Made Ground (Undivided)	Granite, flint, brick and concrete gravel over dark brown sandy gravelly clay with flint, brick and limestone.	1.0m adjacent to west of site	N/A	N/A
Langley Silt Formation	Silt or gravelly Clay	0.5-1.1 adjacent to west of site	Unproductive Strata	Low permeability formations with negligible significance for water supply.

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Formation	Description	Thickness	EA Aquifer Designation	Hydrogeological Significance
Lynch Hill Gravel Member	Sand and Gravel	3.1-3.6m adjacent to west of site	Principal	Highly permeable, with significant water storage. Able to support large abstractions.
London Clay Formation	Clay, Silt and Sand	Up to 45m thick	Unproductive Strata	Low permeability formations with negligible significance for water supply.
Lambeth Group	Clay, mottled in part with beds of sand	Up to 30m	Secondary A	Permeable formations with potential to support localised abstractions.
Thanet Sand	Fine-grained sand	Up to 18m	Secondary A	Permeable formations with potential to support localised abstractions.
White Chalk Sub-Group	White nodular chalk with flints	Up to 200m	Principal	Highly permeable, with significant water storage. Able to support large abstractions.

According to the EA, the geological units on-site make up part of the Lower Thames Gravels Water Body. In 2019, the EA classified the groundwater within this water body as being of 'Good' chemical quality and of 'Poor' quantitative status under the Water Framework Directive (WFD) classification scheme.

According to EA information provided by a commercial environmental regulatory database provider, there are twelve (12) licensed groundwater abstractions within a 2km radius of the site. Two (2) of these are within 1km, as summarised in Table 3 below.

Table 3: Licensed Groundwater Abstractions within 1km of the Site

Licence Holder	Distance from Wider HPH Site	Abstraction source	Purpose of Abstraction
Thorn EMI Electronics Ltd	230m N	Chalk (Undifferentiated)	Additional Purposes – Process, Cooling, and Manufacture.
Nestle UK Limited	960m E	Not specified	Other Industrial/ Commercial / Public Service: Evaporative Cooling, Boiler Feed

Environmental Sensitivity and Vulnerability

The site is considered to be situated in an area of ***moderate to high*** sensitivity with respect to groundwater resources due to the underlying Principal Aquifer (in relation to the Lynch Hill Gravel Member). However, Unproductive Strata in relation to the London Clay Formation is present underneath to protect the deeper Chalk Aquifers. There are no sensitive groundwater abstractions within 2km of the site. The site is not situated within an EA groundwater Source Protection Zone and the EA classified the groundwater chemical quality as 'Good' under the WFD but the quantitative status was 'Poor'.

The vulnerability of the groundwater receptor in the vicinity of the site is considered to be ***low to moderate***; the site is covered by building / hardstanding, with relatively small areas immediately surrounding the site comprising soft landscaping.

The sensitivity of the hydrological receptor can be considered as ***low to moderate*** as the Grand Union Canal (the nearest surface watercourse), is man-made and has been classified as having a 'Moderate' ecological potential and 'Fail' for chemical status by the EA under the WFD. There are no sensitive licensed surface water abstractions within 2km of the site.

The site is considered to be in an area of ***low*** vulnerability with respect to surface water resources as the nearest surface water course is 510m distant.

There are no statutory designated ecologically sensitive areas within 2km.

In summary the site's environmental setting indicates no issues of concern in relation to future residential uses being introduced within the Site.

5. Previous Environmental Assessments

Ramboll (formerly "ENVIRON", now part of Ramboll since December 2014) previously conducted several phases of environmental assessment of the wider HPH Office Park (including the subject site) since the Client's acquisition of it in 2014. This included Phase I Environmental Assessments, ground investigations, and several rounds of groundwater monitoring (the most recent conducted in early 2023). The previous assessments assumed a commercial end-use and therefore risk screening elements of these assessments are not relevant to the proposed repurposing, as these considered only commercial uses of the site.

Historically, environmental assessments of the wider HPH Office Park were undertaken, including for the construction of HPH5 from 20m south-west of the subject site). The information in those earlier reports is no longer considered to be representative of nearby plot conditions, and is therefore not repeated here.

Groundwater Monitoring of the wider HPH Office Park

Following acquisition of the wider Hyde Park Hayes Office Park by Columbia Threadneedle in 2015, Ramboll ENVIRON UK Ltd (now Ramboll) was commissioned in 2016 to conduct a groundwater monitoring and sampling survey programme over a 12-month period commencing March 2016 with a view to discharging Planning Condition 14 of Application 45753/APP/2013/1980 (Condition 14 was subsequently discharged on 28th November 2017 under Planning Application 45753/APP/2015/3676).

The principal objective of the monitoring programme was to provide evidence that concentrations of target contaminants in groundwater are exhibiting a downward trend over time in order to satisfy the EA (as statutory consultee under the planning regime) that no ongoing risk to groundwater resources was presented by the wider HPH area. The survey programme involved the regular monitoring of groundwater elevations, field measurement of groundwater physio-chemical parameters and collection of groundwater samples for laboratory analysis for target contaminants and other compounds indicative of the activity of natural attenuation.

The Groundwater Assessment programme conducted by Ramboll comprised:-

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- Eight (8) groundwater monitoring and sampling surveys (over the period March 2016 to March 2017), reported and submitted to the Local Planning Authority.
- Excavation of three (3) new boreholes and installation of monitoring wells part-way through the monitoring programme: two (2) in the south-east of the Office Park (approximately 50m and 100m south of the HPH1 site) to delineate impacts previously identified in this area, and one (1) off-site to the west (within the HPH4 approximately 100m west of the HPH1 site) to delineate potential impacts to the west of HPH5.

The findings of the Groundwater Assessment can be summarised as follows:-

- Overall, groundwater flow direction is consistently towards the east / north-east across the wider HPH area, which is broadly consistent with the findings of Jacobs' previous assessments;
- The groundwater system within the Lynch Hill Gravels aquifer was demonstrated by 12 months of field monitoring surveys to be moderately dynamic, with seasonal fluctuations in groundwater levels and physio-chemical parameters observed; and
- Hydrocarbons and chlorinated hydrocarbons were detected in multiple monitoring wells across the Hyde Park Hayes area in all of the eight (8) sampling surveys conducted to March 2017.
- Lines of evidence for the active presence of natural attenuation processes including:-
  - Complete reductive dechlorination to ethene / ethane.
  - Groundwater parameters indicative of the electrochemical evolution of groundwater on-site confirm the presence of reducing processes within areas of the site where the highest concentrations of target contaminants have been observed (i.e. the south-eastern corner of the wider HPH site (BH09, REH02, REH03) and HPH4 (REH01)).

<u>HPH5 Planning Condition Discharge</u>

Discharge of the outstanding Planning Condition 14 (2) by the Local Planning Authority (LPA), following advice from the EA, was achieved on 28th November 2017.

"*We have recently revised our risk bars to focus our efforts on those development sites with the greatest environmental sensitivity. As such we are unable to provide specific comments on the discharge of this condition. We recommend that you seek the views of your Environmental Health / Environmental Protection Department for further advice.*

The developer should continue to address any further risks to controlled waters from contamination at the site following the requirements of the National Planning Policy Framework (NPPF) and our Guiding Principles for Land Contamination (GPLC). Our previous correspondence provides site-specific advice regarding land contamination issues in this location. We have no further comments to make with regard to land contamination issues for this site."

<u>Recent Ramboll Groundwater Assessments</u>

As part of Columbia Threadneedle's ownership of the wider HPH site Ramboll has continued to undertake periodic groundwater monitoring and sampling surveys:-

- Three (3) rounds of groundwater monitoring and sampling surveys over 2018 (April, September, and December);
- April 2021; and
- March 2023.

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Recent groundwater assessments have broadly confirmed the conditions identified in prior assessments by Ramboll (ENVIRON).

As part of this review, the results of the most recent monitoring round have been compared against current generic assessment criteria (GAC) for both commercial and residential end-uses. GAC are utilised as a conservative initial screening aid when assessing the laboratory results; they are not intended to confirm the presence of an actual contamination linkage, and sometimes further quantitative risk assessment might be required.

From the March 2023 monitoring round, three (3) locations have been identified as being located in the vicinity of the HPH1 site, which show potentially relevant groundwater information for the HPH1 building. These locations and their approximate distance from the HPH1 building footprint are as follows:-

- BH06 (~12m south-east);
- BH26 (~15m west); and
- BH28 (~18m north-west).

The locations are shown on Figure 2 in Appendix 1, and the summary chemical data is in Appendix 2.

The following observations are made by Ramboll in relation to the analytical results for selected locations in the vicinity of site:-

- Chromium species were detected at concentrations of up to three (3) orders of magnitude above GAC in BH06 to the south-east of the HPH1 site (outside the subject site boundary). Chromium may be present in groundwater as a result of metal treatment activities undertaken during historical uses (e.g. aerospace engineering) of the site and the wider off-site area. No detailed information relating to specific historical on-site and off-site activities is available. However, total dissolved chromium was not detected at greater than the method reporting limit (MRL) in either of the other locations, and therefore BH06 is considered to be an isolated instance / outlier.
- The volatile organic compound (VOC), trichloroethene (TCE), was detected at concentrations greater than the residential GAC for human health in BH26 and BH28 (approximately 15-18m outside of the site boundary) . This GAC has been derived by Ramboll to be protective of human health via volatilisation pathways in a "typical" residential scenario (without HVAC systems) where the ground-floor is in residential use and subject to accumulation of vapours from intrusions from below the slab (sub-surface). No exceedances of GAC for commercial use were noted. Based on this and the proposed repurposing of floors 1-4 only of the on-site building / layout, it is considered unlikely that there is a potential source-pathway-receptor linkage for future site users. Further exceedances of groundwater or drinking water standard GACs were detected for two (2) other VOCs; 1,1-diochloroethene (1,1-DCE) in BH26 and BH28, and 1,1,1-trichloroethane (1,1,1-TCA) in BH26; such exceedances are not considered relevant to the proposed repurposing of the on-site building.
- For the remaining chemical suite analysed in March 2023, concentrations were below their respective GACs and were typically <MRL or minor detections.

Overall, given the low sensitivity of the site in relation to Regulator interest, and the proposed usage in its current configuration and building layout, none of the identified GAC exceedances are considered to be of significant concern in relation to the intended residential repurposing of the site.

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Ramboll Comments on Existing Assessments and HPH1

While the focus of recent environmental assessments and investigations has been on the surrounding area and wider HPH office park, Ramboll considers that the site has the benefit of a significant level of environmental investigation and assessment nearby which serves to reduce the uncertainty associated with the assessment of the contaminated status of the site resulting from historic industrial land uses.

Ground conditions encountered by intrusive investigations have broadly confirmed the published geological information:-

- a shallow depth of variable Made Ground was encountered in the areas surrounding the site.
- The top of the London Clay exhibits a variable undulating surface contour with a shallow depression centred on building HPH5 to the south-west of the site; and
- the thickness of the London Clay was not proven by any of the intrusive investigations undertaken on-site to date.

Remedial activities undertaken by Jacobs as part of the construction of HPH5; the location of HPH5 was considered by Jacobs to represent the primary source area for observed chlorinated solvent impacts to groundwater. Subsequently, long term monitoring and sampling of groundwater was undertaken by Ramboll from 2016 to the present; this has confirmed the presence of residual impacts to groundwater within the Lynch Hill Gravels from both hydrocarbons (fuel related compounds likely to be associated with historical activities, although no elevated concentrations were detected in the most recent (2023) monitoring in the monitoring wells closest to the HPH1 site) and chlorinated solvents (degreasing chemicals thought likely to be associated with the historical Aerospace Engineering site uses).

Ramboll's assessments have identified multiple lines of evidence supporting the activity of Natural Attenuation (NA) processes, including (but not limited to) complete reductive dechlorination to ethene / ethane, and electrochemical indicators in groundwater indicative of reductive processes, particularly associated with areas of impact from chlorinated hydrocarbons.

Based on the evidence available, there is not considered to be a continuing contamination source in the vicinity, and over time natural attenuation processes would likely further reduce the observed concentrations of chlorinated hydrocarbons.

Given the EA's comments in relation to the Lynch Hill Gravels aquifer, and the layout and usage context of the site, Ramboll considers that contamination risks associated with groundwater conditions at the site are ***low***.

The latest groundwater data (in the vicinity of the HPH1 site, but not within the subject site boundary/building footprint) indicate that although limited exceedances of the GAC for specific potential contaminants have been identified, concentrations of chlorinated hydrocarbons are ***not present at concentrations of concern for either the current commercial usage, or the proposed repurposing to residential usage***.

6. Qualitative Risk Assessment

Legislative Framework

The regime for contaminated land was set out in Part 2A (ss.78A-78YC) of the Environmental Protection Act 1990 (EPA), as inserted by S.57 of The Environment Act 1995 and came into effect in England on 1st April 2000 as The Contaminated Land (England) Regulations 2000 (SI 2000/227). These regulations

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were subsequently revoked with the provision of The Contaminated Land (England) Regulations 2006 (SI 2006/1380) (as amended), which came into force in August 2006, and consolidated the previous regulations and amendments. Revised statutory guidance ("the Guidance") for local authorities on how to implement the regime, including the decision-making process on whether land is contaminated land in the legal sense, has been published by Defra and entered into force in April 2012.

Under Part 2A of the EPA Section 78A(2), "contaminated land" is defined as "land which appears… to be in such a condition, by reason of substances in, on or under the land, that:

a) significant harm is being caused or there is a significant possibility of such harm being caused[1]; or

b) significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused".

The pollution of controlled waters is defined in Section 78A(9) of the Act as "the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter".

Risk Assessment Framework

"Significant harm" or "significant pollution of controlled waters" is defined in the Guidance on risk-based criteria and must be the result of one or more relevant 'contaminant linkages' relating to the land.

The presence of a contaminant linkage relies on the Source-Pathway-Receptor concept, where all three (3) factors must be present and potentially or actually linked for a potential risk to exist. For a risk of pollution or environmental harm to occur as a result of ground contamination, all of the following elements must be present:

- A ***source*** - a substance that is capable of causing pollution or harm;
- A ***receptor*** - something which could be adversely affected by the contaminant; and
- A ***pathway*** - a route by which the contaminant can reach the receptor.

If one of these elements is absent there can be no significant risk. If all are present then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

The potential severity of the risk and the probability of the risk occurring have been combined in accordance with the following matrix in order to give a level of risk for each potential hazard.

Table 4: Classification of Risk (after NHBC/EA 2008)

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	**Very high**	High	Moderate	Low
	Likely	High	Moderate	Moderate/Low	Low
	Low Likelihood	Moderate	Moderate/ Low	Low	Very low
	Unlikely	Moderate/ Low	Low	Very low	Very low

[1] Water Act 2003 (Commencement No. 11) Order 2012

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The assessment has considered the proposed repurposing of the site from commercial to residential.

Preliminary Risk Assessment

A preliminary conceptual site model has been developed and qualitative risk assessment undertaken to identify and assess the potential risks associated with environmental conditions at, and in the vicinity of, the site based on the available information; this is presented in Table 5.

Table 5: Conceptual Site Model

Source	Pathway	Receptor	Risk of Contaminant Linkage
Current use of the site as offices and nearby car parking.	Leaching to Groundwater & Groundwater Flow.	Groundwater in the Lynch Hill Gravel and the deeper Chalk (Principal Aquifers); Chalk protected by London Clay.	**Low**. No significant on-site potential contamination sources from current use.
	Surface water run-off.	Surface water as controlled water.	**Low**. No significant on-site potential contamination sources from current use. Nearest receptor is at distance.
	Dermal contact / ingestion.	Site buildings, current and future site users and neighbours.	**Low**. No significant on-site potential contamination sources from current use.
	Vapours.		**Low**. No significant on-site potential contamination sources from current use
Potential sources of contamination relating to historic site use include:- • Fairey Aviation (Aeronautical Engineers) from c.1930s to c.1960s; • Westland Helicopters present across the site from c.1960s; • Warehouses (used by food supplier companies) from c. 1970s to 1990s. • wells within 20m to the west of HPH1.	Leaching to Groundwater & Groundwater Flow.	Groundwater in the Lynch Hill Gravel and the deeper Chalk (Principal Aquifers); Chalk protected by London Clay. Lynch Hill Gravel is not abstracted for sensitive use. Site not situated in a groundwater Source Protection Zone.	**Low to Moderate**. Potential for residual historic contamination. No ground investigation information available for HPH1 footprint. Historical site uses have caused groundwater impacts; however risks associated with lateral and vertical contaminant migration with groundwater flow are considered to be low.
		Surface water as controlled water via connectivity with groundwater flow.	**Low**. Potential residual historic contamination present; however, nearest receptor is at distance.
	Dermal contact / ingestion.	Site buildings, current and future	**Low to Moderate.** Potential for residual historic contamination. However, site is hard covered.

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Source	Pathway	Receptor	Risk of Contaminant Linkage
	Vapours.	site users and neighbours.	**Low to Moderate**. Potential for vapours associated with historical use. However, the site is hard covered. Ground floor of site to remain in predominant commercial use (no residential occupation of ground floor).
Potential current and historical off-site contamination sources in the site vicinity include:- • Aeronautical Engineering Works (extending off-site in all directions (1930s to 1970s). • Three (3) current ASTs (to supply back-up generators) and an electricity substation within wider Office Park. All bunded and internal to buildings. • Maccess (distribution of road vehicle parts) 20m south-west (HPH5), 1980s to 1990s. • Railway 150m north (1800s to present); • Gramophone Factory 240m north (c.1910s to c.1990s); • Refuelling activities carried out by Safeway (and previously acquired companies) 80m north-west (c.1970s to mid-1990s); • Asda PFS adjacent to 160m east (2015 to present).	Leaching onto site in Groundwater & Groundwater Flow.	Groundwater in the Lynch Hill Gravel and the deeper Chalk (Principal Aquifers). Chalk protected by London Clay Formation. The Lynch Hill Gravel not abstracted for sensitive use, and site is not within a groundwater Source Protection Zone. Groundwater flow direction is unclear. Groundwater from off-site has the potential to migrate within the Lynch Hill Gravel.	**Moderate**. Potential for presence of contamination sources from off-site activities. Groundwater adjacent to the west appears to have been impacted by chlorinated solvents, assumed to originate from a historical source in the vicinity of HPH5 (from 20m south-west). Remediation was undertaken in the HPH5 area during construction of the current HPH5 building in 2014. Recent Ramboll groundwater monitoring indicates some slightly elevated chlorinated solvents concentrations in monitoring wells 15-20m west of HPH1. However there is good evidence of ongoing natural attenuation. Not considered to be of significant concern / nor restrictive to future residential usage on upper floors within the site.
	Vapours	Site buildings, current and future site users and neighbours.	**Low to Moderate**. Potential for vapours associated with detected concentrations of chlorinated solvents and breakdown products. However, the subject site is hard covered. Ground floor of site to remain in commercial use. Not considered to be of significant concern / nor restrictive to future residential usage on upper floors within the site.

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7. Conclusions

Findings

The Environmental Ground Condition Statement for the repurposing of the HPH1 site may be summarised as follows:-

The site was historically undeveloped (likely agricultural land) from at least 1864 until the 1930s, when the site was developed as part of an Aeronautical Engineering Works (which extended off-site in all directions). The site was redeveloped for commercial and office use in the 1980s / 1990s.

Previous investigations at the wider HPH office park indicated that a source of chlorinated solvents historically existed, centred on Building HPH5 (off-site 20m to the south-west of the site). Soil excavation and dewatering activities associated with the construction of Building 5 are understood to have removed a significant proportion of the contaminant mass from the dissolved phase in groundwater. Chlorinated solvents were also detected in other areas of the wider HPH office park, including the monitoring wells within 20m to the west of HPH1, however, these were typically at lower concentrations.

Recent groundwater monitoring data obtained by Ramboll concludes that there is good evidence that natural degradation / attenuation processes for chlorinated solvents is occurring.

The latest groundwater data (for the monitoring well locations in the vicinity of the HPH1 site) indicate that although limited exceedances of the GAC for specific potential contaminants have been identified, concentrations of chlorinated hydrocarbons are ***not present at concentrations of concern for either the current commercial usage, or the proposed repurposing to residential usage (floors 1-4 only, ground floor remaining in commercial use)***.

Conclusions

In the UK, a risk-based approach is used to assess the potential impact associated with ground contamination, as summarised in the CSM. The EA has confirmed (in 2017) that is has no further interest in groundwater at the wider HPH Office Park, in the context of the current development.

In relation to an assessment of contaminated land aspects, the site is considered to be suitable for the proposed repurposing to residential usage.

This assessment has been undertaken with the assumption that the site will be repurposed from its current commercial use to residential use (or combined commercial / residential use), broadly maintaining the existing building configuration.

If the site were to be demolished (partly or completely) and redeveloped, or the configuration significantly changed, further action (such as an intrusive investigation) may be required.

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Yours sincerely

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Encl.

Appendix 1: Figures
Appendix 2: Screening Table

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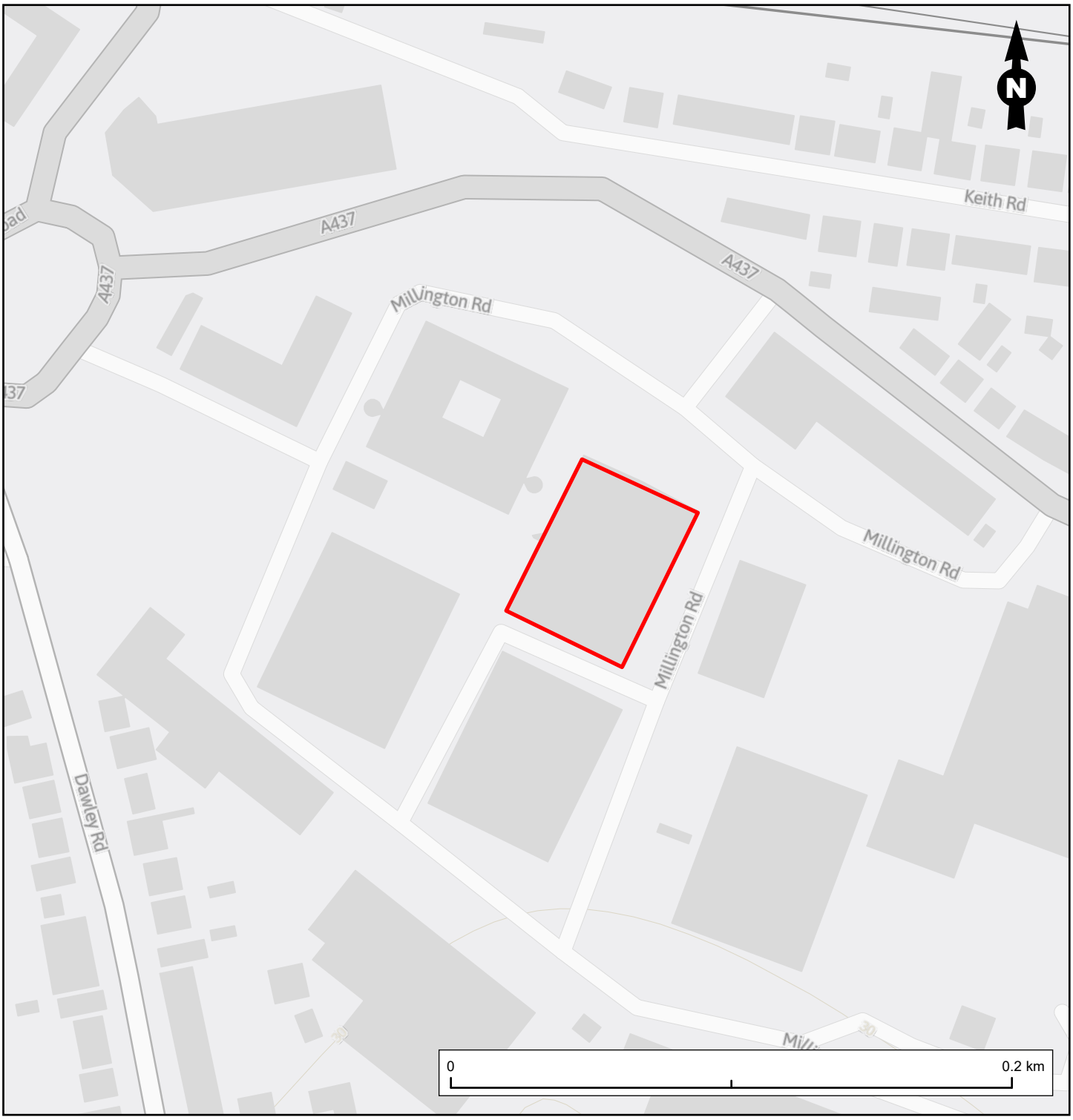
Appendix 1: Figures



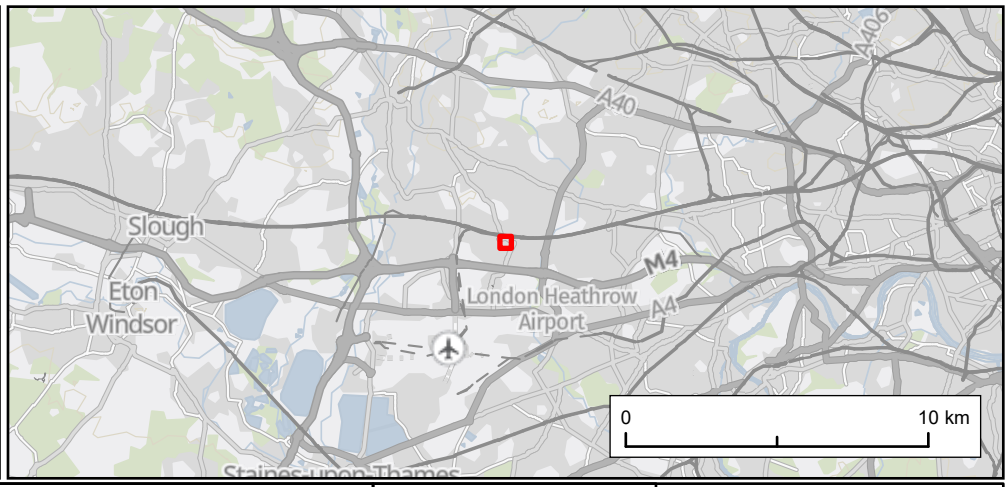


Figure Title: Figure 1: Site Location	Project Name: HPH1 Building,HYde Park Hayes, Middlesex, UB3 4AZ	Date: August 2024	
		Scale on Main Map: 1:2,000	
Project Number: 1700000706	Client: Threadneedle UK PEC6 Hayes Jersey LP	Issue: 1	Prepared By: MW

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BH08
BH30
BH29
BH02
BH11
BH27
BH28
BH16
BH17
BH26
BH18
REH01
HPH1
("Building 1")
BH06
BH23
REH03
REH02
BH09

N

0 75 Meters

Key

- REH Wells
- Existing Wells
- Approximate Site Boundary

Title	Monitoring Well Locations
Project No.	1700000706
Site	HPH1 Building, Hyde Park Hayes, Middlesex UB3 4AZ
Client	Threadneedle UK PEC6 Hayes Jersey LP
Date	August 2024
Scale	1:1,000 @ A3
Issue	A
Drawn by	JD/MW

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Path: P:\Contracts\C208xx\UK16-20878 Threadneedle Hayes\-004 HPH1 PDR Summary

Appendix 2: Screening Table

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Appendix 2 - Groundwater Screening Table
HPH1 ("Building 1"), Hyde Park Hayes
Millington Road, Hayes, UB3 4AZ

									Site	**HPH1**	**HPH1**	**HPH1**
									Sample Type	Groundwater	Groundwater	Groundwater
									EMT Job No:	23/4086	23/4086	23/4086
									Sampled Date	15/03/2023	15/03/2023	15/03/2023
			2023 Table Screening Values	**GW / DWS Screening Values**	**GAC for groundwater - to be protective of human health via volatilisation pathways**				**EMT Sample No**	81-90	31-40	21-30
CAS Number	**Test**	**Units**	**GAC/ RTC**	**GW/ DWS**	**Residential**	**Commercial / Industrial**	**MIN (HPH1)**	**MAX (HPH1)**	**LOD**	**BH06**	**BH26**	**BH28**
Heavy Metals												
7440-38-2	Dissolved Arsenic	ug/l	5	5	-	-	<	<	<2.5	<2.5	<2.5	<2.5
7440-41-7	Dissolved Beryllium	ug/l	-	4	-	-	<	<	<0.5	<0.5	<0.5	<0.5
7440-42-8	Dissolved Boron	ug/l	750	750	-	-	24	99	<12	24	99	88
7440-43-9	Dissolved Cadmium	ug/l	3.75	3.75	-	-	<	<	<0.5	<0.5	<0.5	<0.5
7440-47-3	Total Dissolved Chromium	ug/l	5	37.5	-	-	<	6070	<1.5	6070	<1.5	<1.5
7440-50-8	Dissolved Copper	ug/l	-	1500	-	-	<	<	<7	<7	<7	<7
7439-92-1	Dissolved Lead	ug/l	-	5	-	-	<	<	<5	<5	<5	<5
7439-96-5	Dissolved Manganese	ug/l	50	50	-	-	<	<	<2	<2	<2	<2
7439-97-6	Dissolved Mercury	ug/l	-	0.5	-	-	<	<	<1	<1	<1	<1
7440-02-0	Dissolved Nickel	ug/l	15	15	-	-	<	<	<2	<2	<2	<2
7782-49-2	Dissolved Selenium	ug/l	-	7.5	-	-	<	<	<3	<3	<3	<3
7440-62-2	Dissolved Vanadium	ug/l	-	-	-	-	<	<	<1.5	<1.5	<1.5	<1.5
7440-66-6	Dissolved Zinc	ug/l	10.9	5000	-	-	<	4	<3	<3	<3	4
HARD_TOT	Total Hardness Dissolved (as CaCO3)	mg/l	-	-	-	-	235	337	<1	235	337	258
Polycyclic Aromatic Hydrocarbons												
91-20-3	Naphthalene	ug/l	-	0.075	1400	190000	<	<	<0.1	<0.1	<0.1	<0.3
208-96-8	Acenaphthylene	ug/l	-	-	220000	20000000	<	<	<0.005	<0.005	<0.005	<0.015
83-32-9	Acenaphthene	ug/l	-	-	170000	15000000	<	<	<0.005	<0.005	<0.005	<0.015
86-73-7	Fluorene	ug/l	-	-	210000	18000000	<	<	<0.005	<0.005	<0.005	<0.015
85-01-8	Phenanthrene	ug/l	-	-	-	-	<	<	<0.005	<0.005	<0.005	<0.015
120-12-7	Anthracene	ug/l	0.05	0.05	-	-	<	<	<0.005	<0.005	<0.005	<0.015
206-44-0	Fluoranthene	ug/l	-	0.075	-	-	<	0.008	<0.005	<0.005	0.008	<0.015
129-00-0	Pyrene	ug/l	-	-	-	-	0.006	0.007	<0.005	0.006	0.007	<0.015
56-55-3	Benzo(a)anthracene	ug/l	-	-	-	-	<	0.006	<0.005	<0.005	0.006	<0.015
218-01-9	Chrysene	ug/l	-	-	-	-	<	0.005	<0.005	<0.005	0.005	<0.015
BEN-BK-FLUORAN	Benzo(bk)fluoranthene	ug/l	-	0.1	-	-	<	0.01	<0.008	<0.008	0.01	<0.024
50-32-8	Benzo(a)pyrene	ug/l	0.005	0.005	-	-	<	<	<0.005	<0.005	<0.005	<0.015
193-39-5	Indeno(123cd)pyrene	ug/l	0.05	0.05	-	-	<	<	<0.005	<0.005	<0.005	<0.015
53-70-3	Dibenzo(ah)anthracene	ug/l	-	-	-	-	<	<	<0.005	<0.005	<0.005	<0.015
191-24-2	Benzo(ghi)perylene	ug/l	0.05	0.05	-	-	<	<	<0.005	<0.005	<0.005	<0.015
TOT_EPA_16_PAH	PAH 16 Total	ug/l	-	-	-	-	<	<	<0.173	<0.173	<0.173	<0.519
205-99-2	Benzo(b)fluoranthene	ug/l	0.05	0.05	-	-	<	<	<0.008	<0.008	<0.008	<0.024
207-08-9	Benzo(k)fluoranthene	ug/l	-	0.05	-	-	<	<	<0.008	<0.008	<0.008	<0.024
PAH_SUR_REC	PAH Surrogate % Recovery	%	-	-	-	-	84	85	<0	85	85	84
Volatile Organic Compounds												
75-71-8	Dichlorodifluoromethane	ug/l	-	-	-	-	<	<	<2	<2	<2	<2
1634-04-4	Methyl Tertiary Butyl Ether	ug/l	-	15	83000	7800000	<	<	<0.1	<0.1	<0.1	<0.1
74-87-3	Chloromethane	ug/l	-	-	14	1400	<	<	<3	<3	<3	<3
75-01-4	Vinyl Chloride	ug/l	13.6	0.25	12	1200	<	<	<0.1	<0.1	<0.1	<0.1
74-83-9	Bromomethane	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
75-00-3	Chloroethane	ug/l	-	-	10000	1000000	<	<	<3	<3	<3	<3
75-69-4	Trichlorofluoromethane	ug/l	-	-	-	-	<	<	<3	<3	<3	<3
75-35-4	1,1-Dichloroethene (1,1 DCE)	ug/l	12.1	7	160	16000	18	78	<3	<3	78	18
75-09-2	Dichloromethane (DCM)	ug/l	-	5	3300	370000	<	<	<3	<3	<3	<3
156-60-5	trans-1-2-Dichloroethene	ug/l	201	50	160	16000	<	<	<3	<3	<3	<3
75-34-3	1,1-Dichloroethane	ug/l	917	-	2700	260000	6	26	<3	<3	26	6
156-59-2	cis-1-2-Dichloroethene	ug/l	201	50	370	36000	<	<	<3	<3	<3	<3
594-20-7	2,2-Dichloropropane	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
74-97-5	Bromochloromethane	ug/l	-	-	17	1600	<	<	<2	<2	<2	<2
67-66-3	Chloroform	ug/l	-	50	790	85000	<	<	<2	<2	<2	<2
71-55-6	1,1,1-Trichloroethane	ug/l	4100	200	3000	290000	96	430	<2	<2	430	96
563-58-6	1,1-Dichloropropene	ug/l	-	-	-	-	<	<	<3	<3	<3	<3
56-23-5	Carbon tetrachloride	ug/l	-	1.5	5.3	770	<	<	<2	<2	<2	<2
107-06-2	1,2-Dichloroethane	ug/l	-	3	160	15000	<	<	<2	<2	<2	<2
71-43-2	Benzene	ug/l	-	0.5	500	20000	<	<	<0.5	<0.5	<0.5	<0.5
79-01-6	Trichloroethene (TCE)	ug/l	86.1	5	3.2	310	14	68	<3	<3	68	14
78-87-5	1,2-Dichloropropane	ug/l	-	5	22	2600	<	<	<2	<2	<2	<2
74-95-3	Dibromomethane	ug/l	-	-	-	-	<	<	<3	<3	<3	<3
75-27-4	Bromodichloromethane	ug/l	-	60	17	1600	<	<	<2	<2	<2	<2
10061-01-5	cis-1-3-Dichloropropene	ug/l	-	-	-	-	<	<	<2	<2	<2	<2
108-88-3	Toluene	ug/l	-	350	230000	21000000	<	<	<5	<5	<5	<5
10061-02-6	trans-1-3-Dichloropropene	ug/l	-	-	-	-	<	<	<2	<2	<2	<2
79-00-5	1,1,2-Trichloroethane	ug/l	-	5	520	49000	<	<	<2	<2	<2	<2
127-18-4	Tetrachloroethene (PCE)	ug/l	-	7.5	61	6100	<	<	<3	<3	<3	<3
142-28-9	1,3-Dichloropropane	ug/l	-	-	-	-	<	<	<2	<2	<2	<2
124-48-1	Dibromochloromethane	ug/l	-	100	-	-	<	<	<2	<2	<2	<2
106-93-4	1,2-Dibromoethane	ug/l	-	0.05	-	-	<	<	<2	<2	<2	<2
108-90-7	Chlorobenzene	ug/l	-	100	98	15000	<	<	<2	<2	<2	<2
630-20-6	1,1,1,2-Tetrachloroethane	ug/l	-	-	240	22000	<	<	<2	<2	<2	<2
100-41-4	Ethylbenzene	ug/l	-	300	10000	960000	<	<	<1	<1	<1	<1
179601-23-1	m/p-Xylene	ug/l	-	500	9500	940000	<	<	<2	<2	<2	<2
95-47-6	o-Xylene	ug/l	-	500	12000	1100000	<	<	<1	<1	<1	<1
100-42-5	Styrene	ug/l	-	20	8800	810000	<	<	<2	<2	<2	<2
75-25-2	Bromoform	ug/l	-	100	3100	400000	<	<	<2	<2	<2	<2
98-82-8	Isopropylbenzene	ug/l	-	-	-	-	<	<	<3	<3	<3	<3
79-34-5	1,1,2,2-Tetrachloroethane	ug/l	-	-	1600	150000	<	<	<4	<4	<4	<4
108-86-1	Bromobenzene	ug/l	-	-	220	20000	<	<	<2	<2	<2	<2
96-18-4	1,2,3-Trichloropropane	ug/l	-	-	-	-	<	<	<3	<3	<3	<3
103-65-1	Propylbenzene	ug/l	-	-	2700	240000	<	<	<3	<3	<3	<3
95-49-8	2-Chlorotoluene	ug/l	-	-	7100	640000	<	<	<3	<3	<3	<3
108-67-8	1,3,5-Trimethylbenzene	ug/l	-	-	15	2200	<	<	<3	<3	<3	<3
106-43-4	4-Chlorotoluene	ug/l	-	-	-	-	<	<	<3	<3	<3	<3
98-06-6	tert-Butylbenzene	ug/l	-	-	-	-	<	<	<3	<3	<3	<3
95-63-6	1,2,4-Trimethylbenzene	ug/l	-	-	24	2200	<	<	<3	<3	<3	<3
135-98-8	sec-Butylbenzene	ug/l	-	-	-	-	<	<	<3	<3	<3	<3
99-87-6	4-Isopropyltoluene	ug/l	-	-	-	-	<	<	<3	<3	<3	<3
541-73-1	1,3-Dichlorobenzene	ug/l	-	-	31	2800	<	<	<3	<3	<3	<3
106-46-7	1,4-Dichlorobenzene	ug/l	-	80	5000	460000	<	<	<3	<3	<3	<3
104-51-8	n-Butylbenzene	ug/l	-	-	-	-	<	<	<3	<3	<3	<3
95-50-1	1,2-Dichlorobenzene	ug/l	-	600	2000	220000	<	<	<3	<3	<3	<3
96-12-8	1,2-Dibromo-3-chloropropane	ug/l	-	0.2	-	-	<	<	<2	<2	<2	<2
120-82-1	1,2,4-Trichlorobenzene	ug/l	-	35	68	7200	<	<	<3	<3	<3	<3
87-68-3	Hexachlorobutadiene	ug/l	-	0.05	1.7	230	<	<	<3	<3	<3	<3
91-20-3	Naphthalene	ug/l	-	0.075	220	23000	<	<	<2	<2	<2	<2
87-61-6	1,2,3-Trichlorobenzene	ug/l	-	-	35	3100	<	<	<3	<3	<3	<3
2037-26-5	Surrogate Recovery Toluene D8	%	-	-	-	-	81	99	<0	81	99	94
460-00-4	Surrogate Recovery 4-Bromofluorobenzene	%	-	-	-	-	80	101	<0	80	101	95

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Appendix 2 - Groundwater Screening Table
HPH1 ("Building 1"), Hyde Park Hayes
Millington Road, Hayes, UB3 4AZ

									Site	**HPH1**	**HPH1**	**HPH1**
									Sample Type	Groundwater	Groundwater	Groundwater
									EMT Job No:	23/4086	23/4086	23/4086
									Sampled Date	15/03/2023	15/03/2023	15/03/2023
			2023 Table Screening Values	**GW / DWS Screening Values**	**GAC for groundwater - to be protective of human health via volatilisation pathways**				**EMT Sample No**	81-90	31-40	21-30
CAS Number	**Test**	**Units**	**GAC/ RTC**	**GW/ DWS**	**Residential**	**Commercial / Industrial**	**MIN (HPH1)**	**MAX (HPH1)**	**LOD**	**BH06**	**BH26**	**BH28**
BTEX/ MTBE												
1634-04-4	Methyl Tertiary Butyl Ether	ug/l	-	15	83000	7800000	<	<	<0.1	<0.1	<0.1	<0.1
71-43-2	Benzene	ug/l	-	0.5	500	20000	<	<	<0.5	<0.5	<0.5	<0.5
108-88-3	Toluene	ug/l	-	350	230000	21000000	<	<	<5	<5	<5	<5
100-41-4	Ethylbenzene	ug/l	-	300	10000	960000	<	<	<1	<1	<1	<1
179601-23-1	m/p-Xylene	ug/l	-	500	9500	940000	<	<	<2	<2	<2	<2
95-47-6	o-Xylene	ug/l	-	500	12000	1100000	<	<	<1	<1	<1	<1
2037-26-5	Surrogate Recovery Toluene D8	%	-	-	-	-	81	99	<0	81	99	94
460-00-4	Surrogate Recovery 4-Bromofluorobenzene	%	-	-	-	-	80	101	<0	80	101	95
Semi-Volatile Organic Compounds (SVOCs) - Phenols												
95-57-8	2-Chlorophenol	ug/l	-	150	-	-	<	<	<1	<1	<1	<1
95-48-7	2-Methylphenol	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
88-75-5	2-Nitrophenol	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
120-83-2	2,4-Dichlorophenol	ug/l	-	100	-	-	<	<	<0.5	<0.5	<0.5	<0.5
105-67-9	2,4-Dimethylphenol	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
95-95-4	2,4,5-Trichlorophenol	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
88-06-2	2,4,6-Trichlorophenol	ug/l	-	200	-	-	<	<	<1	<1	<1	<1
59-50-7	4-Chloro-3-methylphenol	ug/l	-	350	-	-	<	<	<0.5	<0.5	<0.5	<0.5
106-44-5	4-Methylphenol	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
100-02-7	4-Nitrophenol	ug/l	-	-	-	-	<	<	<10	<10	<10	<10
87-86-5	Pentachlorophenol	ug/l	-	0.05	-	-	<	<	<1	<1	<1	<1
108-95-2	Phenol	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
PHENOLS_TOT	Total Phenols HPLC	mg/l	-	-	-	-	<	<	<0.15	<0.15	<0.15	<0.15
SVOCs - Polycyclic Aromatic Hydrocarbons												
91-58-7	2-Chloronaphthalene	ug/l	-	-	160	14000	<	<	<1	<1	<1	<1
91-57-6	2-Methylnaphthalene	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
SVOCs - Phthalates												
117-81-7	Bis(2-ethylhexyl) phthalate	ug/l	-	6	-	-	<	<	<5	<5	<5	<5
85-68-7	Butylbenzyl phthalate	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
84-74-2	Di-n-butyl phthalate	ug/l	-	-	-	-	<	<	<1.5	<1.5	<1.5	<1.5
117-84-0	Di-n-Octyl phthalate	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
84-66-2	Diethyl phthalate	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
131-11-3	Dimethyl phthalate	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
SVOCs - Other												
95-50-1	1,2-Dichlorobenzene	ug/l	-	600	2000	220000	<	<	<1	<1	<1	<1
120-82-1	1,2,4-Trichlorobenzene	ug/l	-	35	68	7200	<	<	<1	<1	<1	<1
541-73-1	1,3-Dichlorobenzene	ug/l	-	-	31	2800	<	<	<1	<1	<1	<1
106-46-7	1,4-Dichlorobenzene	ug/l	-	80	5000	460000	<	<	<1	<1	<1	<1
88-74-4	2-Nitroaniline	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
121-14-2	2,4-Dinitrotoluene	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
606-20-2	2,6-Dinitrotoluene	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
99-09-2	3-Nitroaniline	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
101-55-3	4-Bromophenylphenylether	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
106-47-8	4-Chloroaniline	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
7005-72-3	4-Chlorophenylphenylether	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
100-01-6	4-Nitroaniline	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
103-33-3	Azobenzene	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
111-91-1	Bis(2-chloroethoxy)methane	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
111-44-4	Bis(2-chloroethyl)ether	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
86-74-8	Carbazole	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
132-64-9	Dibenzofuran	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
118-74-1	Hexachlorobenzene	ug/l	-	0.05	-	-	<	<	<1	<1	<1	<1
87-68-3	Hexachlorobutadiene	ug/l	-	0.05	1.7	230	<	<	<1	<1	<1	<1
77-47-4	Hexachlorocyclopentadiene	ug/l	-	50	-	-	<	<	<1	<1	<1	<1
67-72-1	Hexachloroethane	ug/l	-	-	8.5	740	<	<	<1	<1	<1	<1
78-59-1	Isophorone	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
621-64-7	N-nitrosodi-n-propylamine	ug/l	-	-	-	-	<	<	<0.5	<0.5	<0.5	<0.5
98-95-3	Nitrobenzene	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
321-60-8	Surrogate Recovery 2-Fluorobiphenyl	%	-	-	-	-	90	126	<0	90	126	114
1718-51-0	Surrogate Recovery p-Terphenyl-d14	%	-	-	-	-	99	133	<0	99	133	124
Total Petroleum Hydrocarbons - Aliphatics												
>C05-C06_ALIPHA	TPH Aliphatic C5-6	ug/l	15000	-	1900	190000	<	29	<10	<10	29	<10
>C06-C08_ALIPHA	TPH Aliphatic C6-8	ug/l	15000	-	1500	150000	40	165	<10	<10	165	40
>C08-C10_ALIPHA	TPH Aliphatic C8-10	ug/l	-	-	57	5700	<	<	<10	<10	<10	<10
>C10-C12_ALIPHA	TPH Aliphatic C10-12	ug/l	-	-	37	3600	<	<	<5	<5	<5	<5
>C12-C16_ALIPHA	TPH Aliphatic C12-16	ug/l	-	-	-	-	<	<	<10	<10	<10	<10
>C16-C21_ALIPHA	TPH Aliphatic C16-21	ug/l	-	-	-	-	<	<	<10	<10	<10	<10
>C21-C35_ALIPHA	TPH Aliphatic C21-35	ug/l	-	-	-	-	<	<	<10	<10	<10	<10
>C05-C35_ALIPHA	Total aliphatics C5-35	ug/l	-	-	-	-	40	194	<10	<10	194	40
Total Petroleum Hydrocarbons - Aromatics												
>C05-C07_AROMA	TPH Aromatic C5-7	ug/l	-	-	-	-	<	<	<10	<10	<10	<10
>C07-C08_AROMA	TPH Aromatic C7-08	ug/l	-	-	-	-	<	<	<10	<10	<10	<10
>C08-C10_AROMA	TPH Aromatic C8-10	ug/l	-	-	1900	190000	<	<	<10	<10	<10	<10
>C10-C12_AROMA	TPH Aromatic C10-12	ug/l	-	90	6800	660000	<	<	<5	<5	<5	<5
>C12-C16_AROMA	TPH Aromatic C12-16	ug/l	-	90	39000	3700000	<	<	<10	<10	<10	<10
>C16-C21_AROMA	TPH Aromatic C16-21	ug/l	-	90	-	-	<	<	<10	<10	<10	<10
>C21-C35_AROMA	TPH Aromatic C21-35	ug/l	90	90	-	-	<	<	<10	<10	<10	<10
>C05-C35_AROMA	Total aromatics C5-35	ug/l	-	-	-	-	<	<	<10	<10	<10	<10
>C05-C35_ALAR	Total aliphatics and aromatics(C5-35)	ug/l	-	-	-	-	40	194	<10	<10	194	40
General Inorganics/ Other												
14808-79-8	Sulphate as SO4	mg/l	188	188	-	-	47.7	106.5	<0.5	47.7	106.5	101.9
16887-00-6	Chloride	mg/l	188	188	-	-	127.6	161.8	<0.3	161.8	142.4	127.6
NITRATE_AS_N	Nitrate as N	mg/l	37.5	10	-	-	2.95	8.17	<0.05	2.95	8.17	7.79
NITRITE_AS_N	Nitrite as N	mg/l	0.5	1	-	-	<	<	<0.006	<0.006	<0.006	<0.006
57-12-5	Total Cyanide	mg/l	-	0.05	-	-	<	<	<0.01	<0.01	<0.01	<0.01
AMM_NITROGEN_N	Ammoniacal Nitrogen as N	mg/l	0.29	0.29	-	-	<	0.05	<0.03	<0.03	0.05	<0.03
AMM_NITRO_NH4	Ammoniacal Nitrogen as NH4	mg/l	0.29	0.5	-	-	0.03	0.07	<0.03	<0.03	0.07	0.03
18540-29-9	Hexavalent Chromium	ug/l	3.4	5	-	-	<	5070	<6	5070	<6	<6
16065-83-1	Total Dissolved Chromium III	ug/l	4.7	37.5	-	-	<	1000	<6	1000	<6	<6
74-82-8	Dissolved Methane	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
74-85-1	Dissolved Ethene	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
74-84-0	Dissolved Ethane	ug/l	-	-	-	-	<	<	<1	<1	<1	<1
18496-25-8	Sulphide	mg/l	-	-	-	-	<	<	<0.01	<0.01	<0.01	<0.01
15438-31-0	Dissolved Iron II	mg/l	0.2	-	-	-	<	<	<0.02	<0.02	<0.02	<0.02
20074-52-6	Dissolved Iron III	mg/l	-	-	-	-	<	<	<0.02	<0.02	<0.02	<0.02
PH	pH	pH units	-	6.5-9.5	-	-	7.41	7.71	<0.01	7.48	7.41	7.71