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PHASE 1 GEO-ENVIRONMENTAL DESK STUDY REPORT



FOR

NEW TRACKWAYS AT DICK WHITTINGTON FARM PARK, BLAKEMORE PARK, LITTLE LONDON, LONGHOPE, GLOUCESTERSHIRE, GL17 0PH











Report No. 5257



		Report Production Record
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Site Name	New Trackways at Gloucestershire, Gl	Dick Whittington Farm Park, Blakemore Park, Little London, Longhope, L17 0PH
Client	Dick Whittington Pa	ark Limited
Report on	Phase 1 Geo-Envir	ronmental Desk Study
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PHASE 1 GEO-ENVIRONMENTAL DESK STUDY REPORT FOR NEW TRACKWAYS AT DICK WHITTINGTON FARM PARK, BLAKEMORE PARK, LITTLE LONDON, LONGHOPE, GLOUCESTERSHIRE, GL17 0PH PREPARED FOR DICK WHITTINGTON PARK LIMITED

1 INTRODUCTION

- 1.1 It is proposed to construct a series of trackways to service the proposed amenity space for the farm park at the above site. A Phase 1 geo-environmental desk study report has therefore been requested in support of a proposed planning application, to assess the contamination status of the site and to determine if any "source-pathway-receptor" pollutant linkages are present.
- **1.2** The Geo-environmental assessment has been carried out in accordance with BS10175:2011 "Code of Practice for the Investigation of Potentially Contaminated Sites" and Environment Agency (EA) document LCRM "Land Contamination Risk Management" (2020).
- 1.3 This report has been prepared in accordance with quotation reference Q23269, dated 2nd November 2023 with instruction received from Mr Chris Turney of Dick Whittington Park Limited dated 25th November 2023, to whom reliance on this report is presently restricted.

2 SITE LOCATION AND DESCRIPTION

- 2.1 Centred on National Grid Reference 369695, 218654 the irregularly-shaped c5ha site is located in a rural part of Gloucestershire, c1.1km east of Longhope as shown on drawing 5257/1.
- A walkover survey was undertaken by this Practice on 17th November 2023.
 Observations are recorded on drawing 5257/2 and a selection of representative photos



is presented in Appendix 1. This identified the site to predominantly comprise sloping arable/pasture land across the eastern two-thirds and a mixture of paddocks and overgrown grassland in the western third. A small area in the north-west corner of the site (photo P1) coincident with the access road underwent minor excavation to supply material for construction of a bund around the lake; the remnant ground disturbance is clearly the result of this previous excavation, rather than tipping of materials as had been mistakenly reported by others. The site is enclosed by a camp site to the north, agricultural fields to the east, the Dick Whittington Park facility to the south and Ley Brook with associated lakes to the west.

2.3 Topographic mapping data derived from Google Earth aerial mapping indicates a site elevation of 119-165m above Ordnance Datum (AOD) with a westerly fall.

3 DESK STUDY RESEARCHES

Recorded Geology

- **3.1** The geology of the site is shown on the British Geological Survey (BGS) 1:10,560 scale mapping sheet SO 61 NE and online, which indicates it to be underlain by bedrock variously of the Yartleton Formation (YT) which comprises sandstone with subsidiary limestone, Woolhope Limestone Formation (WoL) which comprises thinly bedded nodular limestones with siltstones and mudstones, and the Coalbrookdale Formation (CBRD), which typically comprises olive-grey to dark bluish-grey, well-bedded, silty mudstone. There is an inferred fault that downthrows to the west through the eastern third of the site between the WoL and YT. There are no areas of mapped made ground or superficial deposits shown either on or within potential influencing distance of the site.
- **3.2** Neither this Practice or the BGS have any previous borehole records either on or within useable distance of the site.

Hydrogeology

3.3 The MAGIC website confirms that the CBRD is a "Secondary B" aquifer, described as low permeability strata with a limited ability to store and yield groundwater by virtue of localised features such as fissures, thin permeable horizons and weathering. The



WoL and YT are classified as "Secondary A" aquifers, meaning that they comprise more-permeable strata capable of supporting water supplies at a local rather than strategic level, and in some cases form an important source of baseflow to rivers. There are no nearby EA authorised groundwater abstractors and the site does not lie within a groundwater Source Protection Zone (SPZ).

3.4 Based upon the above information the site is considered to lie within an area of low to moderate sensitivity in terms of groundwater resources.

Hydrology

- 3.5 The site itself contains no ponds or watercourses; the nearest significant surface water features appear to be Ley Brook and its associated man-made ponds 20m to the west. The EA does not consider the site to be at risk of flooding from either rivers or seas. The site surface entirely comprises topsoil so rainwater infiltration can be expected to be high, subject to natural permeability and the prevailing weather conditions.
- **3.6** Based upon the above information the site is considered to lie within an area of low to moderate sensitivity in terms of controlled surface waters.

Site History

3.7 The history of the site has been deduced by inspection of historical Ordnance Survey maps dating back to 1883 together with historical aerial imagery provided as part of the online Google Earth mapping service, and a selection of relevant extracts is presented as drawing 5257/3. Any on and/or off-site points of interest that may affect or be affected by the proposed development have been summarised within Table 1 below.



TABLE 1: SUMMARY OF SITE HISTORY

Date (Source Map Scale)	On-Site	Off-Site	Potential Contaminants that may affect Site	Likelihood of Site Impact
1883 - 1884 (1:10,560)	Part of large agricultural field with a small agricultural building in the centre	40m W – Stream 90m SW – Blakemore Farm 200m – Old lime kiln 150m SE – Spring 160m SE – Lonehead Farm	Toxic and phytotoxic metals Pesticides	Very low
1903 - 1922 (1:10,560)	No significant change	As above plus 200m NW – Durla Barn 200m SW – Spring	As Above	Very low
1954 - 1976 (1:10,000)	Agricultural building no longer recorded	No significant change	As Above	Very low
2000 (1:10:000 and Google Earth historical aerial imagery)	Agricultural enclosures delineated	Immediate S – Blakemore Farm expansion	As Above	Very low
2013 (Google Earth historical aerial imagery)	Material excavated in north-west corner	No significant change	As Above	Very low
2020 - 2023 (1:10,000 and Google earth Aerial photos)	No significant change	<20m W – four man-made lakes constructed along course of Lay brook	As Above	Very low

3.8 Ordnance Survey plans only represent periodic snapshots in time and do not provide a continuous record of previous site usage, there is therefore a risk that the site may contain buried remnant foundations of former buildings or waste products associated with unrecorded previous site usage, which may not be evident from the site walkover inspection and desk study researches.

Landfill Gas and Radon Gas

3.9 The EA landfill register records two historical landfills c200m west of the site. "Old Hill" landfill was in use from 1956 to 1976 and received industrial, commercial and household waste; "Land adjacent Colemans Wood/The old Limekilns" landfill received inert and commercial waste however the date of tipping is not known. No gas control measures are recorded for either landfill.



- **3.10** On the basis that no buildings are proposed within which any migrating gas could potentially accumulate, there is not considered to be a risk to future site users. It is therefore considered that the historic landfills are discounted as contamination risks to the site and no further assessment is deemed necessary.
- **3.11** Consultation of the UK Health Security Agency (HSA)/BGS "UK maps of radon" online resource indicates 10-30% of homes in this area to be above the actionable level. As above however, on the basis that no buildings are proposed within which radon gas could potentially accumulate it is considered that there is no risk to future site users.

Unexploded Ordnance Risk

3.12 An online review of regional unexploded bomb data on the Zetica website indicates that this area of Gloucestershire is considered to constitute a low risk (less than fifteen bombs per thousand acres), and for which a more detailed unexploded ordnance (UXO) assessment is considered unnecessary.

4 PROPOSED DEVELOPMENT

4.1 It is proposed to develop the site with a series of trackways to service the proposed amenity space associated with the farm park complex, the routes of which have been reproduced as drawing 5257/2. No permanent buildings with habitable space are proposed.

5 PRELIMINARY RISK ASSESSMENT AND CONCEPTUAL SITE MODEL

5.1 The site and its immediate surroundings have been assessed in terms of current and historical land use and the environmental, geological and hydrogeological setting; the methodology of which is described in Appendix 2. In view of the proposed trackways/amenity space development, for risk assessment purposes the critical receptors would be a female child (age class 1 – 6) and our assessment has been progressed on this basis.



- **5.2** Review of historical mapping suggests that the site has remained as predominantly undeveloped agricultural/pasture land since the earliest available mapping of 1883 until the present day. The walkover inspection revealed no evidence of obvious ground contamination.
- 5.3 In view of the foregoing the potential sources and the **principal contaminants of concern** are presented in Table 2 below.

	Potential Sources	Principal Contaminants of Concern
ON-SITE	Unrecorded made ground and topsoil	Toxic/phytotoxic metals Pesticides
OFF-SITE	None	None

TABLE 2: POTENTIAL SOURCES AND PRINCIPAL CONTAMINANTS OF CONCERN

5.4 The above information is converted into the preliminary Conceptual Site Model shown in Figure 1 below, and the **potential pollutant linkages** involving future site users, proposed services and local environmental receptors are discussed in Table 3, with appropriate risk levels.



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FIGURE 1: PRELIMINARY CONCEPTUAL SITE MODEL (NTS)

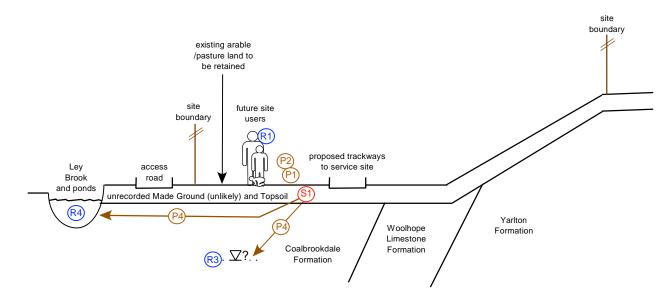


TABLE 3: SUMMARY OF PRELIMINARY POTENTIAL POLLUTANT LINKAGES

Potential		Receptors			;			
Sources	Pathways	R1	R2	R3	R4	R5	Comments	Preliminary Risk Assessment
ON-SITE								
	P1	x						
	P2	x						
S1	P3						Unrecorded made ground and topsoil potentially elevated in toxic/phytotoxic metals and pesticides	Very Low
	P4			x	x		Greatest risk within areas of retained/proposed soft landscaping	
	P5							
	P6							
OFF-SITE								
None								
SOURCES	S1	Unrecorde	ed made gro	ound and top	osoil potentia	ally elevated	in toxic/phytotoxic metals and pesticides	
	P1	Direct der	mal contact	or ingestion	1			
	P2	Inhalation	of dust and	l vapours				
PATHWAYS	P3	Permeatio	n into new	water supply	/ pipework			
TAIlwars	P4	Vertical lea	aching of le	achable con	itaminants ir	n unsaturate	d zone and lateral migration in saturated zone	
	P5	Landfill ga	s migration	through uns	saturated zo	ne and accu	mulation within confined spaces	
	P6	Radon gas	s migration	through uns	aturated zor	ne and accur	mulation within confined spaces	
	R1	Future site	e users (Cri	tical Recepto	or Female C	hild Age Cla	ss 1-6)	
	R2	Potable wa	ater supply					
RECEPTORS	R3	Groundwa	ter (CBRD	classified as	s "Secondary	/ B" aquifer,	WoL and YT classified as "Secondary A" aquifers)	
	R4	Surface w	aters (Ley E	Brook and m	an-made po	nds <20m V	V)	
	R5	Adjacent s	ite users					



5.5 The findings of the Phase 1 desk study suggest a very low risk that the site may contain contaminants at elevations sufficient to pose a significant risk to human health or environmental receptors, on which basis soil sampling, testing and quantitative risk assessment is deemed unnecessary.

6 CONCLUSIONS AND RECOMMENDATIONS

- 6.1 The foregoing discussions and recommendations are based upon the results of a Phase 1 geo-environmental desk study. As always however the ground profile can vary from that envisaged from the desk study research, thus a careful watch should be maintained during site clearance and/or development for any abnormalities that might require referral back to this Practice.
- 6.2 Based upon historic Ordnance Survey mapping the site has remained as predominantly undeveloped agricultural/pasture land since the earliest available mapping of 1883 until the present day. The walkover inspection revealed no evidence of obvious ground contamination.
- **6.3** The desk study and conceptual site model suggest a negligible/low likelihood that potential pollutant linkages will exist to receptors following development, thus from a planning perspective intrusive (Phase 2) ground investigation and sampling is considered unnecessary. As usual should unexpected/suspected ground contamination become evident during usage, this Practice should be informed such that appropriate assessment can be instigated.
- 6.4 The above recommendations must not be used in respect of any development differing in any way from the proposals described in this report, without reference back to this Practice or to another geo-environmental specialist. This report is subject to our standard terms and conditions.



7 <u>REFERENCES</u>

British Standards Institute, BS 10175: 'Code of Practice for the Investigation of Potentially Contaminated Sites' (2011)

Environment Agency LCRM: Land Contamination Risk Management (2020)

Environment Agency/National House Building Council (NHBC) R&D 66 'Guidance for the Safe Development of Housing on Land Affected by Contamination' (2000)

Chartered Institute of Environmental Health (CIEH/Land Quality Management Limited (LQM). CIEH/LQM. 'S4ULs fpr Human Health Risk Assessment' (2015); Land Quality Press

British Standards Institute, BS 8485: 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (2015)

Construction Industry Research & Information Association (CIRIA) 665: 'Assessing Risks Posed by Hazardous Ground Gases to Buildings' (2007)

Building Research Establishment (BRE 414): 'Protective Measures for Housing on Gas-Contaminated Land' (2001)

Building Research Establishment (BR211): Radon - 'Guidance on Protective Measures for New Buildings' (2015)

British Standards Institute, BS5930:2015 'Code of Practice for Ground Investigations'

British Geological Survey 1:10,560 scale mapping SO 61 NE and online

Landmark Historical Ordnance Survey mapping Ref: 285154090_1_1, dated 20th September 2021

UK Health Security Agency (ukradon.org/information/maps)

Zetica (www.zetica.com)

Environment Agency (www.environment.agency.gov.uk)

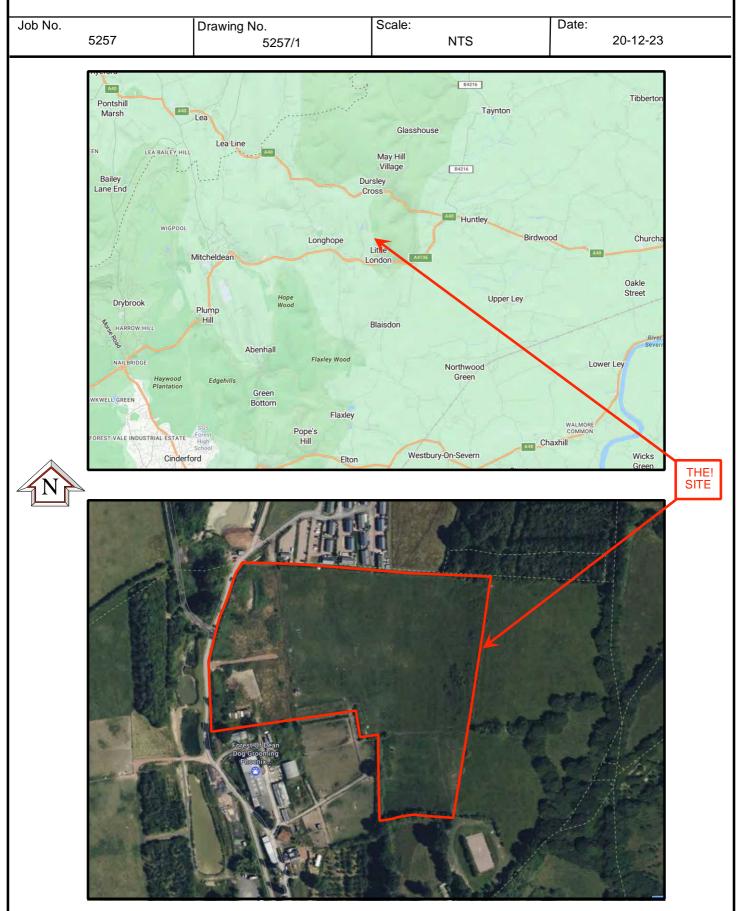
Department for Environment, Food and Rural Affairs "MAGIC" mapping (2019)

Google Earth Aerial Mapping

DICK WHITTINGTON FARM PARK, BLAKEMORE PARK, LITTLE LONDON,! LONGHOPE, GLOS GL17 0PH!



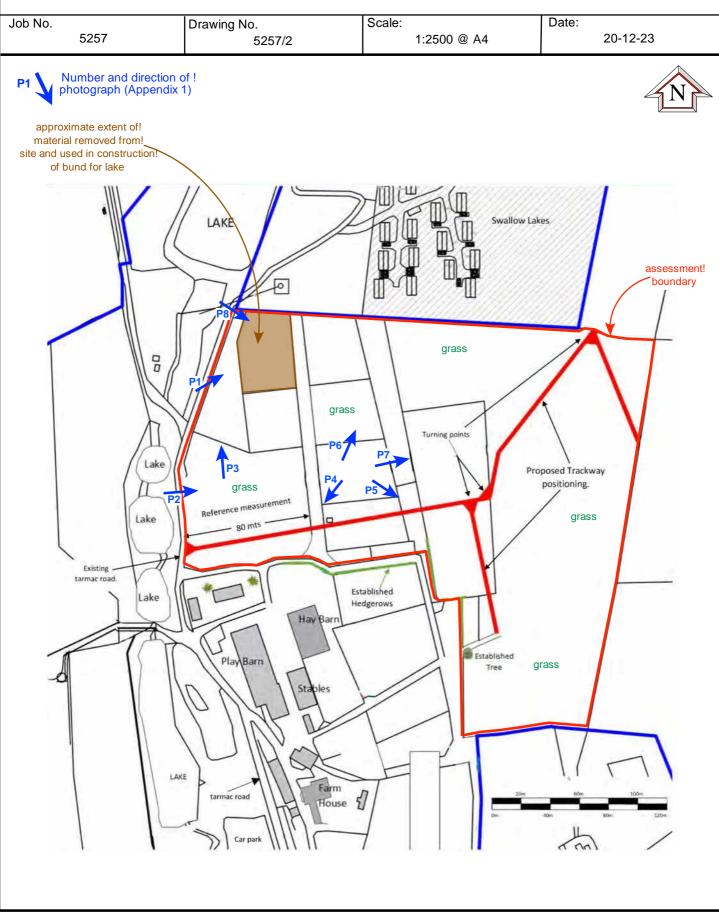
SITE LOCATION (based on Microsoft Bing Mapping)

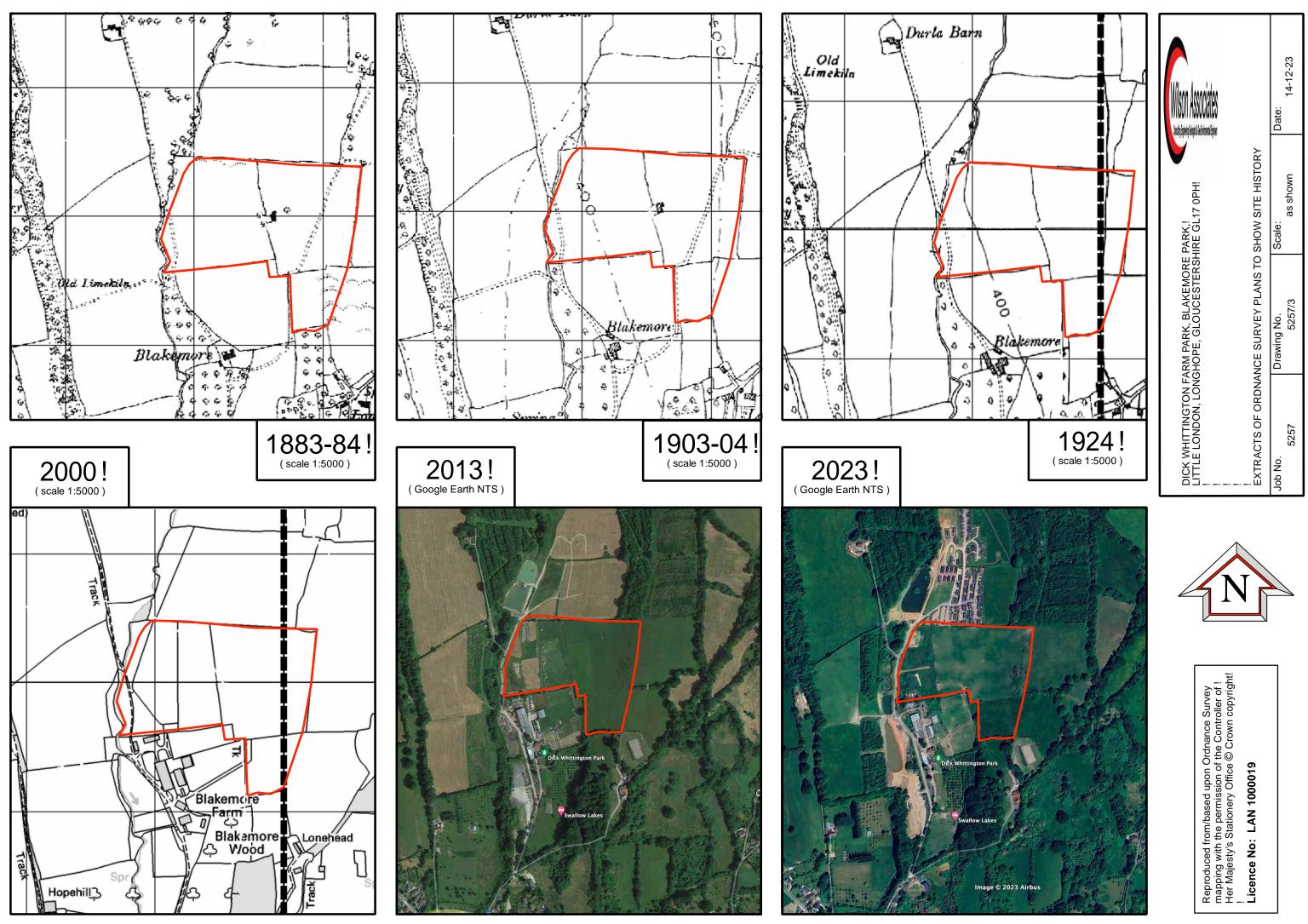


DICK WHITTINGTON FARM PARK, BLAKEMORE PARK, LITTLE LONDON,! LONGHOPE, GLOS GL17 0PH!



PROPOSED LAYOUT (based upon Datapic drg. 223/AJ/KL Datapic, dated February 2023) SHOWING ! PROPOSED TRACKWAYS, SITE WALKOVER NOTES AND PHOTOGRAPH POSITIONS





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APPENDIX 1

SITE PHOTOGRAPHS





Photograph P1



Photograph P2



Photograph P3



Photograph P4



Photograph P5



Photograph P6





Photograph P7



Photograph P8



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APPENDIX 2

CONTAMINATION STATUTORY FRAMEWORK / METHODOLOGY



A2 CONTAMINATION RISK ASSESSMENT

Statutory Framework

A2.1 Part 2A of the Environmental Protection Act 1990 (inserted by Section 57 of the Environment Act 1995) provides a regime for the control of specific threats to health or the environment from existing land contamination. In accordance with the Act and the statutory guidance document on the Contaminated Land (England) Regulations 2000, the definition of contaminated land is intended to embody the concept of risk assessment. Within the meaning of the Act, land is only 'contaminated land' where it appears to the regulatory authority to be in such a condition, by reason of substances within or under the land, that:

harm is being caused or has significant possibility of significant harm to be caused to human health, or

pollution is being caused or has significant possibility of significant pollution to be caused to controlled waters.

A2.2 In 2012 revised Statutory Guidance for Part 2A of the Environmental Protection Act (1990) came into force for England and Wales. This introduced a new four category approach for classifying land affected by contamination to assist decisions by regulators in cases of Significant Possibility of Significant Harm (SPOSH) to specified receptors, including humans, and significant pollution of controlled waters.

Category 1 describes land which is clearly problematic e.g. because similar sites are known to have caused a significant problem in the past. The legal definition is where "there is an unacceptably high probability, supported by robust science-based evidence, that significant harm would occur if no action is taken to stop it".

Categories 2 and 3 cover land where detailed consideration is needed before deciding whether it may be contaminated land. Category 2 is defined as land where "there is a strong case for considering that the risks from the land are of sufficient concern that the land poses a significant possibility of significant harm". Category 3 is defined as land where there is not the strong case described in the test for Category 2, and may include "land where the risks are not low, but nonetheless the authority considers that regulatory intervention under Part 2A is not warranted". The decision basis is initially related to human health risks, and if this is not conclusive due to uncertainty over risks, wider socio-economic factors (e.g. cost, local perception etc).



Category 4 describes land that is clearly not contaminated land, where there is no risk or the level or risk posed is low.

- A2.3 This same 4 category system has also been introduced to assist in identifying whether there is a significant possibility of significant pollution of controlled waters. Part 2A states that normal levels of contaminants in soil should not be considered to cause land to qualify as contaminated land, unless there is a particular reason to consider otherwise.
- A2.4 Once land has been determined as contaminated land, the enforcing authority must consider how it should be remediated and, where appropriate, it must issue a remediation notice to require such remediation. The enforcing authority for the purposes of remediation may be the local authority which determined the land, or the Environment Agency which takes on responsibility once land has been determined if the land is deemed to be a "special site". The rules on what land is to be regarded as special sites, and various rules on the issuing of remediation notices, are set out in the Contaminated Land (England) Regulations 2006.
- A2.5 The UK guidance on the assessment of land contamination has developed as a direct result of the introduction of the above two Acts. The current technical guidance supporting the legislation has been summarised in the document Land Contamination Risk Management (LCRM), originally published in October 2020 by the Environment Agency (EA).

Contamination Assessment Methodology

A2.6 LCRM guidance proposes a three-stage risk based assessment process for identifying if a hazard exists within a site.

Stage 1: Risk assessment Stage 2: Options appraisal Stage 3: Remediation and verification

A2.7 Stage 1 is to collect detailed information about the site, firstly to establish the likelihood of a hazard being present, and if a potential hazard is identified, to assess (through the source-pathway-receptor potential pollutant linkage concept) whether it has the



potential to pose an unacceptable risk. That unacceptable risk is subsequently estimated and /or evaluated.

- A2.8 Stage 1 can be achieved through a preliminary desk-based risk assessment and if considered appropriate, by progression to a generic or detailed quantitative risk assessment using appropriate intrusive investigation methods supported by UKAS accredited laboratory testing.
- A2.9 Quantitative assessment of human health risk posed by ground contamination is achieved by comparison of soil concentrations with Tier 1 Suitable for Use Levels (S4UL) as published by LQM/CIEH (2015) or (in the case of the toxic metal Lead only) with a Category Four Screening Level (C4SL) published by DEFRA (2014). The official Soil Guideline Values utilise a soil organic matter content of 6% which is considered to be higher than typical UK soils, however three sets of S4UL's have been developed for organic matter contents of 1%, 2.5% and 6%, thus the most appropriate set is selected based upon proven site conditions.
- A2.10 Contaminant concentrations below the threshold screening values are considered not to warrant further risk assessment. Concentrations of contaminants above these screening values require further consideration of potential pollutant linkages and may indicate potentially unacceptable risks to site users that warrants either further detailed quantitative risk assessment or progression to Stage 2. It should be noted that S4UL/C4SL's are not absolute thresholds and an exceedance does not necessarily indicate that a potential pollutant linkage is automatically established.
- A2.11 In order to assess any risk to controlled waters posed by contaminants within the underlying soils and groundwater, laboratory results are screened against Level 1 Environmental Quality Standard (EQS) values derived from the Water Framework Directive (Standards & Classification) Directions (England & Wales) 2015 and the current UK Drinking Water Supply (Water Quality) Regulations (DWS), dependent upon the most vulnerable receptor. The EQS is usually an upper concentration set for the receiving watercourse and not the discharge itself. The DWS is established for compliance at the point of use or abstraction and not the source area.
- A2.12 Stage 2 follows on from the risk assessment completed in Stage 1 by firstly identifying all feasible remediation options, then through consideration of additional factors including but not limited to; sustainability, limitations, timescales and budgets and regulatory controls, narrow the list of remediation options down to a favoured



remediation/mitigation approach. Note that this approach is not restrictive and may include the adoption of as many remediation options as necessary in order to achieve the remediation objective(s).

- A2.13 Stage 3 takes the chosen remediation/mitigation approach from Stage 2 and from which a remediation strategy 'that can be implemented in practice' is developed and agreed with the regulatory authority. Once agreed the approved remediation works can take place as per the strategy, whilst still being mindful of whether the chosen remedial strategy is working as anticipated and also for the presence of unexpected contamination. Subject to findings, the agreed remedial strategy may require adjustment in order to ensure that the remediation objectives(s) can be met.
- A2.14 Upon completion of the remedial works a verification plan is produced detailing the works undertaken and demonstrating that the risk has been reduced, that the remediation objective(s) and criteria have been met and that the site no longer presents a risk to human health and/or controlled waters, and therefore can be considered 'suitable for use'.

Waste Classification

A2.15 In terms of controlled off-site disposal to landfill of site arisings, if/where intended, waste classification is carried out in line with European Waste Catalogue (EWC) and Technical Guidance Waste Management 3 (TGWM3, EA Version 1.2, October 2021) using contamination test results obtained for that material. The assessment utilises the 'HazWasteOnline' software to establish a 'Hazardous' (170503*) / 'Non-hazardous' (170504) classification. Where required, the foregoing may be supplemented by Waste Acceptance Criteria (WAC) analysis, in order that the waste can further be designated as 'Hazardous' / 'Stable non-reactive' / 'Inert', for use by the receiving landfill operator. It should be noted that WAC is only required for disposal of wastes at certain classes of landfill; if arisings are not intended for removal to landfill, then WAC testing is not applicable.