Borough Council of
King's Lynn &
West Norfolk

Contaminated Land Inspection Report

Chequers Close, Pott Row

March 2024

Reference no. CL/24/001

Written by

Fabia Pollard
Scientific Officer

Reviewed by

Ashley Wheeler
Senior Environmental Protection Officer

Tammy Rhodes
Technical Support Officer

Approved by

Dave Robson
Environmental Health Manager

Borough Council of King's Lynn and West Norfolk
King's Court
Chapel Street
King's Lynn
Norfolk
PE30 1EX
Tel: 01553 616200
Email: environmentalquality@west-norfolk.gov.uk

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Executive Summary

The Borough Council of King's Lynn and West Norfolk (BCKLWN) has a statutory duty to inspect its district for potentially contaminated land under Part 2A of the Environmental Protection Act 1990. The borough council's contaminated land strategy details how sites are prioritised and the arrangements for strategic inspection. From time to time we carry out inspections in response to complaints regarding land where we may need to find out more about the land.

A house in Pott Row has been identified for inspection in response to a report from a member of the public who had concerns about their pet's health because of potential soil contamination. Initial screening, by the resident, of metal concentrations in soil indicated suspected elevated levels of lead.

An assessment of the site has been undertaken to assess the potential for harm to human and animal health and screening of risks to the wider environment under Part 2A.

To gather information of the site's history a desk study and preliminary risk assessment were carried out by the Environmental Quality Team. From the evidence gathered, the following can be stated:

The site was historically agricultural land and is now a semi-detached bungalow with garden. The property is owned and managed by Freebridge Housing.

Initial screening of soils carried out by the resident indicated potentially elevated levels of metals in soil. Samples were subsequently collected by the borough council for laboratory analysis to check this assumption. From the contaminated land risk assessment plausible source pathway receptor linkages were identified.

Following laboratory analysis of samples and comparison to appropriate assessment criteria, a LOW risk from contamination to human health was identified, LOW risk to property (pets), VERY LOW risk to property (buildings), VERY LOW risk to the wider environment, and LOW risk was identified to surface water and groundwater.

There was no evidence of harm or of a significant possibility of significant harm to the receptors identified in the conceptual site model. As the risk posed is low or very low, the site would be classified as Category 4 as set out in the Statutory Guidance (Appendix C contains the categorisations from the Statutory Guidance). No evidence was noted of significant pollution of controlled waters or of the significant possibility of such pollution.

Therefore, the site is not considered to be contaminated land under Part 2A of the Environmental Protection Act 1990. No further assessment of the site is considered necessary under Part 2A unless additional information is discovered or if changes are made to the site.

1 Introduction

The Borough Council of King's Lynn and West Norfolk has published a contaminated land inspection strategy which sets out how it proposes to fulfil its legal responsibilities for inspection under the contaminated land regime. The legal definition of Contaminated Land in Part 2A of the Environmental Protection Act 1990 (Part 2A EPA 1990) relates to unacceptable risks to human health or the wider environment. The contaminated land strategy details how sites are prioritised and the arrangements for inspection. From time to time we carry out inspections in response to complaints regarding land where we may need to find out more about the land.

A house in Pott Row has been identified for inspection in response to a report from a member of the public who has concerns about their pet's health because of potential soil contamination. This is a report of the assessment of the site and the potential for harm to human and animal health and screening of risks to the wider environment under Part 2A EPA 1990.

The Contaminated Land Statutory Guidance (DEFRA, 2012) suggests that where the authority has ceased its inspection and assessment of land as there is little or no evidence to suggest that it is contaminated land the authority should issue a written statement to that effect. This inspection report forms that written statement.

The borough council follows the process set out in the Environment Agency's Land Contamination Risk Management (LCRM)[1] which sets out how to assess and manage the risks from land contamination.

2 Desk Study Information

Location

The site's location is Chequers Close, Pott Row PE32 1 . NGR 570 322 . The site is shown in Figure 1 below and in the appendices.

Previous Site Use

The site was historically agricultural land.

Present Site Use

The site's present use is a semi detached bungalow and garden. The site plan shows the property set within a residential area. Photographs of the site are in appendix A.

Ownership

The property is owned and managed by Freebridge Housing. This report will be made available to the site owners and to the tenants. Both Freebridge and the tenant have given permission for this report to be published.

[1] https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

Previous Investigation

We are not aware of any earlier formal investigation reports. The resident has reported flaking of old paint from the house which could potentially contain lead.

The resident has reported that the domestic pheasant was treated by the vet due to symptoms reported following foraging in the garden. The resident reported that they suggested lead poisoning as the pheasant did not respond to antibiotics and exhibited confusion and possible neurological symptoms. During the course of the current investigation, the resident's vet took a sample for analysis of the pheasant's blood lead. After a period of illness the pheasant subsequently died.

The resident carried out heavy metals screening on composite soil samples using SenSafe Soil Check Test strips[2]. It should be noted that the test measures up to 400ppm and will have interference from other heavy metals such as Zinc, Iron, Cadmium, Copper and Chromium. A summary of the tests has been supplied. The summary reports elevated levels of metals in soils, particularly soils close to the house.

No formal confirmation of lead poisoning has been received from the vet to date. Results of avian blood lead analysis reports a low level of lead in blood (Appendix B). No postmortem examination is reported to have been carried out.

Environmental Setting

Geology & Geochemistry

The OS Terrain 50 digital height dataset indicates that the site is at 14m above ordnance datum (maOD). Superficial geology is recorded as Head - Clay, silt, sand and gravel at the site. The bedrock is classified as Carstone - Sandstone. (BGS digital geology). Normal Background concentrations[3] (principal domain[4]) of Lead are expected to be 180 mg/kg in soil. Concentrations of benzo a pyrene are expected to be 0.5mg/kg

BGS records a borehole on Chequers Road, approximately 20m to the southwest of the site. The borehole log (Fig 2) shows topsoil (0.30m depth), sandy gravel, dark grey silt and light grey silt to 2.44m depth and a later excavation on the same log Sept 1970 records dark brown flinty sandy soil and subsoil (0.30m depth) and orange brown dirty flinty sandy head to 0.91m over dark to medium grey finely laminated silts with some chalk pebbles (Glacial lake deposits) to 2.13m and chalky till to 2.74m where the log ends.

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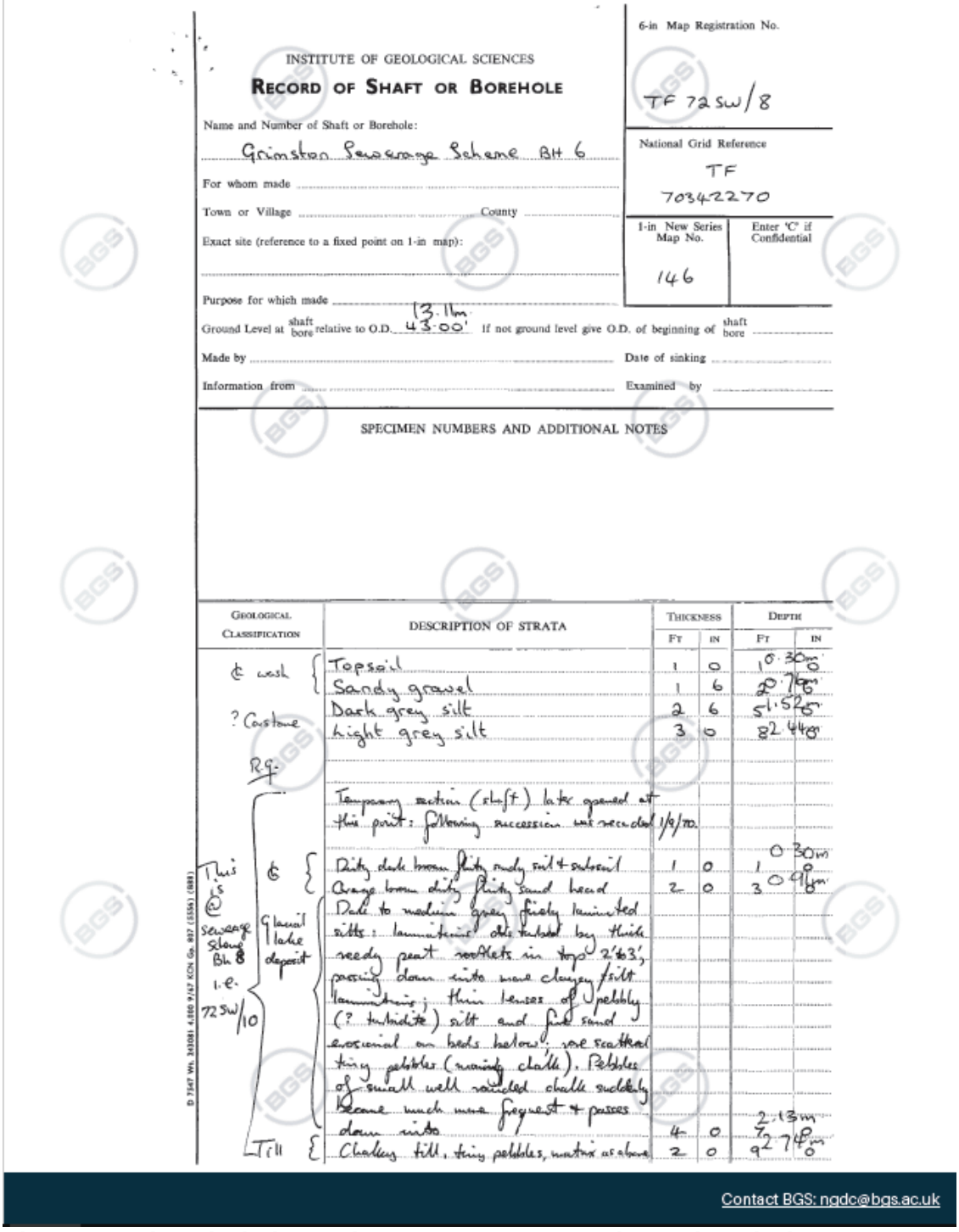
[2] https://www.itseurope.co.uk/products/sensafe%C2%AE-leadpaint-test-1

[3] https://www.bgs.ac.uk/geology-projects/applied-geochemistry/g-base-environmental-geochemistry/nbc-defra-project/

[4] Defra, 2012. Technical Guidance Sheet on normal levels of contaminants in English soils: Lead. Technical Guidance Sheet No. TGS02, July 2012. Department for Environment Food and Rural Affairs (Defra), Soils R&D Project SP1008

British Geological Survey

BGS ID: 510327 : BGS Reference: TF72SW8
British National Grid (27700) : 570340,322700



INSTITUTE OF GEOLOGICAL SCIENCES

RECORD OF SHAFT OR BOREHOLE

6-in Map Registration No. TF 72 SW/8

Name and Number of Shaft or Borehole: Grimston Sewerage Scheme BH 6

National Grid Reference: TF 70342270

For whom made

Town or Village ..... County .....

Exact site (reference to a fixed point on 1-in map):

1-in New Series Map No. 146

Enter 'C' if Confidential

Purpose for which made

Ground Level at shaft / bore relative to O.D. 43·00' (13.11m) If not ground level give O.D. of beginning of shaft / bore

Made by ..... Date of sinking .....

Information from ..... Examined by .....

SPECIMEN NUMBERS AND ADDITIONAL NOTES

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS FT	THICKNESS IN	DEPTH FT	DEPTH IN
& wash	Topsoil	1	0	1	0 (0.30m)
	Sandy gravel	1	6	2	6 (0.76m)
? Carstone	Dark grey silt	2	6	5	0 (1.52m)
	Light grey silt	3	0	8	0 (2.44m)
RG					
	Temporary section (shaft) later opened at this point: following succession not recorded 1/9/70.				
This & Sewerage Scheme Bh 8 i.e. 72SW/10 &	Dirty dark brown slightly sandy soil & subsoil	1	0	1	0 (0.30m)
	Orange brown dirty slightly sandy head	2	0	3	0 (0.91m)
Glacial lake deposit	Dark to medium grey finely laminated silts: laminations defined by thin reedy peat rootlets in top 2'6 3", passing down into more clayey silt laminations; thin lenses of pebbly (? turbidite) silt and fine sand occasional on beds below, rare scattered tiny pebbles (mainly chalk). Pebbles of small well rounded chalk suddenly became much more frequent & passes down into	4	0	7	0 (2.13m)
Till	Chalky till, tiny pebbles, matrix as above	2	0	9	0 (2.74m)

D 7367 Wt. 83081 4,000 9/67 KCN Gp. 897 (5554) (083)

Contact BGS: ngdc@bgs.ac.uk

Fig 2: BGS borehole log Grimston Sewerage Scheme borehole 6

Hydrogeology
The site is on land classified as a highly productive aquifer with significant intergranular flow (BGS Geo-index). It is within Zone 3 of a Source Protection Zone for drinking water. No private water supplies are recorded within 1km.

Hydrology
The nearest major water features are ponds and drains to the northeast, south east, and northwest, all over 0.5km from the site.

Historical Maps
The land appears to be a small field on early map editions.
1843 – 1893: The surrounding area is shown as a small settlement in the north of Pott Row. A smithy and Manor Farm are depicted to the east (180m) and south east (130m) respectively. The wider surroundings are agricultural to the south & east, and scrub land to the north & west.
1891 – 1912: The smithy is no longer shown. Land immediately to the west is labelled allotment gardens.
1945 – 1970: Houses in the southern part of Chequers Close are shown
1970 – 1996: The Chequers Close development and additional housing to the south is shown.

Aerial Photographs
1945 – 1946 MOD Aerial Photograph: The site appears to be a field
2006-2009 Aerial Photograph: The site is developed as shown on the later map editions.
2020 Aerial Photograph – More recent aerial photography below shows the addition of outbuildings or sheds in the rear garden.

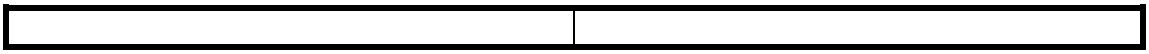


Fig 3: Aerial photograph and plan of the site

3 Site Walkover

A site walkover was carried out in February 2024. Photographs are presented in Appendix A. The property has recently had major roof repairs following an escape of water. The roof, soffits and facias are reported to have been replaced. An appropriate survey and action plan for asbestos materials during these works has been supplied by the landowner. The source of paint flakes in the garden is assumed to be from painted woodwork which has now been removed and replaced. Heating is reported to be electric, so no oil storage was noted.

The site walkover visit was made with the permission of the landlord and tenant, and a subsequent visit was agreed to collect soil samples. The borough council's scientific officer and senior environmental quality officer were met on site by the tenant who provided some further information on the use of the garden and the soil test strip survey they had carried out.

Despite nearby high groundwater levels, heavy rain and pluvial flooding locally in past month, garden soils appeared well drained, with no pooling of water. Soil samples were collected on a dry day, with some sunshine after light morning rain.

No pets are currently housed on site. A rescued pet duck lives indoors but would usually be allowed out to forage in the garden during the day.

A small area of bare soil was noted near the northwestern corner of the house where shrubs were recently removed by cutting back, to gain access for the recent roofing works. Root were noted remaining in the soil. This area at the northwestern corner was where the pheasant was reported to have dug and foraged most recently.

A small area of bare soil to the southwest of the house alongside the boundary fence had some new immature shrubs planted, adjacent to an area of soil cultivated for strawberries. The new shrubs were reported to be cuttings from the shrubs removed from the garden.

The resident has constructed raised beds for produce, with some added organic material and compost to raise levels and improve the growing medium. This is reported to be a mix of home-compost and purchased. The edging wood is reported to be untreated. Crops include kale, beans, salad crops and strawberries. At the rear of garden, on the western boundary, tyres have been used as planters for squash plants. Advice has been given regarding the potential hazard to food crops posed by breakdown of tyres into soil.

Some debris was noted in soils near to the house and also some further to the west near to the fence. This appeared to include paint flakes and insulation material.

At the time of the site visits, all vegetation appeared healthy and thriving.

Location of Receptors

Humans
The site is a residential property & garden. The house is occupied by two adults. The garden is cultivated for home grown produce in soil and raised beds.

Property
The site is surrounded by houses and gardens. The garden contains a pen and housing previously used to house a domesticated rescued pheasant, a domesticated rescued duck lives indoors but is allowed access to forage in the garden. In table 2 of the contaminated land statutory guidance[5], owned or domesticated animals are defined as a relevant receptor.

Environment
There are no relevant types of receptor as set out in Table 1 of the statutory guidance within 1km of the site.

Controlled Water - Groundwater & Surface water
The site is within a source protection zone 3 for drinking water. No surface water was noted on site or nearby.

Potential Hazard

No significant sources of contamination were noted from the desk study information or the site walkover. It was noted that houses on Chequers Close had chimneys, so there is a possibility that ash from open fires could have been spread in gardens in the past. Coal ash and other partially combusted material could be a source of heavy metals and poly aromatic hydrocarbons.

Fragments of paint were observed in garden soil. Due to the age of the properties this could have contained lead.

Screening on composite soil samples using SenSafe Soil Check Test strips, carried out by the resident, reported elevated levels of metals in soils, particularly soils close to the house.

Initial conceptual site model

The preliminary conceptual site model (Table 1) shows the sources, pathways and receptors identified and the subsequent risk classification.

The Council has used a process adapted from CIRIA C552 (Contaminated Land Risk Assessment, a guide to good practice) to produce the conceptual site model and estimate the risks to defined receptors. This involves the consideration of the probability, nature and extent of exposure and the severity and extent of the effects of the contamination hazard should exposure occur. Further explanation is provided in Appendix C.

[5] DEFRA, 2012, Contaminated Land Statutory Guidance

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Table 1: Initial conceptual site model

Source	Pathway	Receptor	Probability	Hazard	Risk
Heavy metals, polyaromatic hydrocarbons from coal and partially combusted material in ash Lead from flaking paint	Direct contact, dermal contact, ingestion, dust inhalation, plant uptake and consumption of garden produce	Humans (adults)	Likely	Minor/Low (assumed)	Moderate/ low risk
	Direct contact, ingestion	Property (domesticated birds)	Likely	Minor/Low (assumed)	Moderate/ low risk
	Direct contact	Property (buildings)	Low	Low	Low risk
	Direct contact	Environment*	Unlikely	Low	Very low risk
	Direct contact	Controlled water (surface and groundwater)	Low	Low	Low risk

Moderate/Low risk - It is possible that harm could arise to a designated receptor from an identified hazard. However, if any harm were to occur it is more likely that harm would be relatively mild.
Low risk - It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very low risk - There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is unlikely to be severe.

*Ecological systems as set out in Table 1 of the contaminated land statutory guidance

4 Contaminated Land Risk Assessment

Exploratory Investigation

An exploratory investigation was required to reduce uncertainty and update the conceptual site model. Analysis of selected soil samples allows comparison of the contaminants of concern to relevant generic assessment criteria.

Sampling strategy

The sampling strategy targeted locations where the domestic birds were reported to forage and also areas that were actively cultivated for produce. Samples represented surface soils (direct contact pathway) and root zone (plant uptake).

Sample descriptions

Samples were excavated by hand using a stainless steel spade and trowel, which were cleaned in between samples. Samples were collected in glass jars and plastic tubs as supplied by the laboratory. Samples were placed in a cool box and refrigerated overnight before transportation to the laboratory. Photographs of the sampling locations are in Appendix A.

Surface soils
S1: Topsoil 0-0.1m Dark brown sandy loam, twigs and flinty gravel (large twigs and stones removed from sample)
S2: Strawberry bed 0-0.1m Dark brown sandy loam, rootlets

Raised bed, soil surface 20cm above ground level
S3: Topsoil/compost, raised bed (kale) 0-0.1m dark brown sandy loam, some more organic matter than in S1 & S2
S3: Soil, 0.40-0.44m dark/grey brown sandy/silty loam

Surface soil
S4 Topsoil, 0-0.1m Dark brown sandy loam, twigs and flinty gravel (large twigs and stones removed from sample)

Laboratory analysis

Samples were analysed for a range of heavy metals and poly aromatic hydrocarbons as identified in the initial site conceptual model. Blood lead levels in the pet pheasant were reported by the resident's veterinary practice.

Laboratory analysis is in Appendix B. A summary of analysis is in table 2 below.

Table 2: Summary of laboratory analysis							
Location	Topsoil	Topsoil Fruit Bed	Comp/Soil Raised bed	Soil Raised bed	Topsoil	Screening level	
						Human	
sample	**S1**	**S2**	**S3**	**S3**	**S4**	C4SL*	NBC**
						mg/kg	mg/kg
Arsenic	12	8.6	10	9.0	16	37	32
Cadmium	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	22	1.0
Lead (soil)	53	40	53	35	63	200	180
Chromium VI	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	21	-
Benzo a pyrene	< 0.1	< 0.1	2.6	0.4	< 0.1	5	0.5
						Avian	
						Reported PbB	Acute AC
						µg/L	µg/L
Lead (blood)						4	600

*Category 4 Screening Levels (C4SL) are relevant technical tools as described in the statutory guidance to help local authorities when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health). The C4SLs are listed in Appendix B. Appendix C contains further explanation of the categories.

**Normal Background Concentrations (NBC) provide guidance on what 'normal' levels of contaminant concentrations are in soils in support of Part 2A Contaminated Land Statutory Guidance. The technical guidance sheet states that if the concentration is at or below the NBC for the specified domain then "the result should not be considered to cause the land to qualify as contaminated land, unless there is a particular reason to consider otherwise" The NBCs are listed in Appendix B.

Assessment criteria (AC) for lead in avians was provided by the clinical pathologist at the veterinary laboratory in the form of a toxic level of lead in blood. This was confirmed with Coastal Veterinary Practice to be for acute toxicity. A brief literature review was undertaken on the effects of lead in avians. It is reported that 'Blood lead (PbB) remains elevated for weeks or months after exposure.'[6]

[6] Effects of lead from ammunition on birds and other wildlife: A review and update - PMC (nih.gov) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6675766/

Assessment of probability of a contamination event

From the information gathered it is considered that there is the potential for a source of contamination to be present on the site. The potential source is ash and paint containing lead.

Human health, property

The site is residential with a garden. Occupants are two adults and a domesticated duck. The occupants also kept a domesticated pheasant, but the pheasant has died during the course of this investigation. The garden is used for home grown produce and to allow the bird to exercise and forage. The contaminated land statutory guidance defines owned or domesticated animals as a relevant property receptor. The guidance states that the local authority should consider whether 'significant harm is more likely than not to result from the contaminant linkage in question, taking into account relevant information for that type of contaminant linkage, particularly in relation to the ecotoxicological effects of the contaminant.'

The probability of a contamination event affecting human health, or property is LIKELY.

Environment

In considering environmental receptors, the statutory guidance states that the authority should only regard certain receptors (described in Table 1 of the Statutory Guidance) as being relevant for the purposes of Part 2A. Harm to an ecological system outside that description should not be considered to be significant harm. The site and surrounding area do / do not contain any of the receptors stipulated in Table 1 of the Statutory Guidance.

Controlled water - Groundwater

The site is on land classified as a highly productive aquifer with significant intergranular flow and is within Zone 3 of a Source Protection Zone for drinking water. During the site walkover and sample collection, soils were noted to be sandy and well drained and therefore could transmit mobile contaminants downwards to groundwater. The probability of a contamination event to surface water is assessed as LIKELY.

Controlled water - Surface water

No surface water was noted on site or nearby. No preferential pathways were noted for site drainage to surface water. The probability of a contamination event to surface water is therefore assessed as UNLIKELY.

Assessment of Hazard

Screening samples collected and tested by the resident using SenSafe Soil Check Test strips, reported elevated levels of metals in soils. The tests are used to detect lead in soil, however the tests' supplier notes that the results are subject to interference from other heavy metals such as Zinc, Iron, Cadmium, Copper and Chromium. In this case the screening samples have been assumed to be indicative only.

Laboratory analysis results from subsequent soil sampling were screened against available generic assessment criteria. In this case the DEFRA category 4 screening levels are considered to provide a suitably cautious estimate of contaminant concentrations in soil that are considered to present an acceptable level of risk, within the context of Part 2A[7]. C4SLs combine information on human health toxicology, exposure assessment and normal ambient levels of contaminants in the environment. These are shown in Table 3 in Appendix B.

Assessment criteria for lead in avians was provided by the clinical pathologist at the veterinary laboratory in the form of an acute toxicity level of lead in blood.

Human Health
The laboratory analysis of soil did not indicate hazardous levels of metals or PAHs in surface soils or the root zone of home grown produce. Health effects to human health can be easily prevented by means such as basic PPE such as gloves and normal washing of home grown produce. The hazard is assessed as MINOR.

Property
Harm, should it occur to home grown produce, domesticated animals and buildings is not expected to be significant as defined in the statutory guidance. The hazard is assessed as MINOR.

Controlled Water -Groundwater & Surface water
High concentrations of mobile contaminants were not detected in the selected samples. Therefore the hazard is assessed as MINOR.

[7] DEFRA/CL:AIRE https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=18341

Conceptual site model

The conceptual site model (Table 3) shows the sources, pathways and receptors identified and the subsequent risk classification.

Table 3: Conceptual site model

fpoll	Pathway	Receptor	Probability	Hazard	Risk
Heavy metals, polyaromatic hydrocarbons from coal and partially combusted material in ash Lead from flaking paint	Direct contact, dermal contact, ingestion, dust inhalation, plant uptake and consumption of garden produce	Humans (adults)	Likely	Minor	Low risk
	Direct contact, ingestion	Property (domesticated birds)	Likely	Minor	Low risk
	Direct contact	Property (buildings)	Low	Minor	Very Low risk
	Direct contact	Environment*	Unlikely	Minor	Very low risk
	Direct contact	Controlled water (surface and groundwater)	Low	Minor	Low risk

Low risk - It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.

Very low risk - There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is unlikely to be severe.

*Ecological systems as set out in Table 1 of the contaminated land statutory guidance

5 Outcome of Preliminary Risk Assessment

Conclusion

Plausible source pathway receptor linkages were identified and a LOW risk from contamination to human health, LOW risk to property (pets), VERY LOW risk to property (buildings), VERY LOW risk to the wider environment, and LOW risk was identified to surface water and groundwater.

There was no evidence of harm or of a significant possibility of significant harm to the receptors identified in the conceptual site model. As the risk posed is low or very low, the site would be classified as Category 4 as set out in the Statutory Guidance (Appendix C contains the categorisations from the Statutory Guidance).

No evidence was noted of significant pollution of controlled waters or of the significant possibility of such pollution.

Part 2A status

Statutory Guidance states that 'If the authority considers there is little reason to consider that the land might pose an unacceptable risk, inspection activities should stop at that point.' In such cases the authority should issue a written statement to that effect. This report forms that written statement.

On the basis of its assessment, the authority has concluded that the land does not meet the definition of contaminated land under Part 2A and is not considered contaminated land.

Further Action

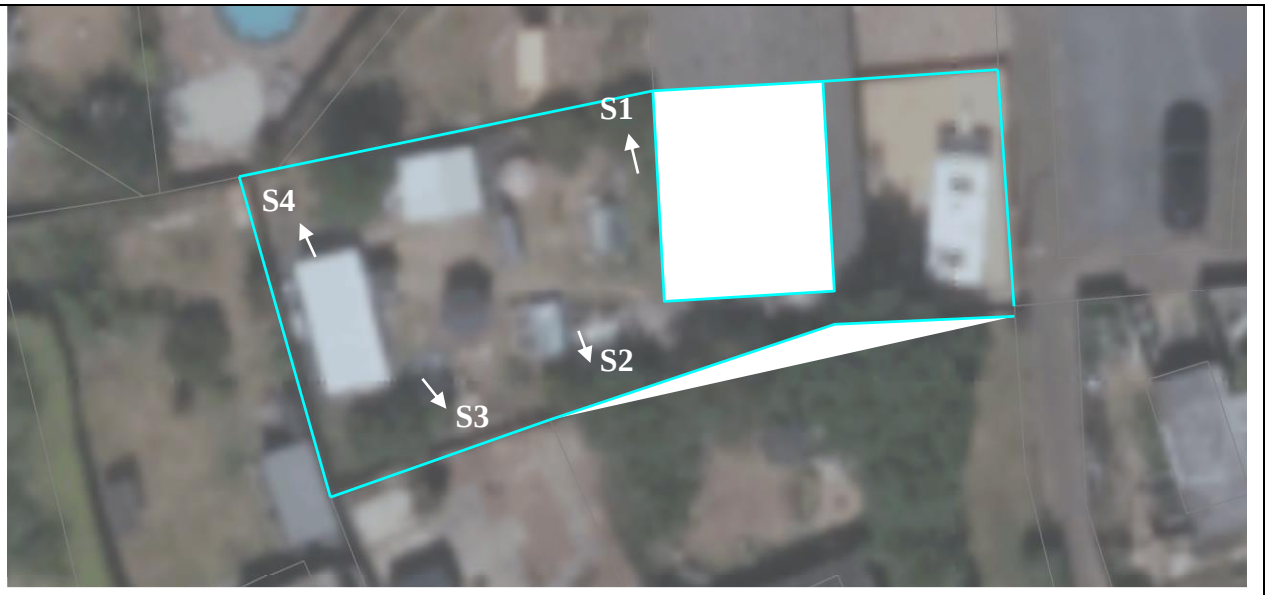
This assessment is based on the site's current use and is valid providing no changes are made to the soil or vegetation cover material, to surface water conditions or to the site's use.

No further assessment of the site is considered necessary under Part 2A unless additional information is discovered or if changes are made to the site.

Additional advice is provided in the Public Health factsheet: Use of Potentially Contaminated Residential Land, Gardens and Allotments.
https://assets.publishing.service.gov.uk/media/5c66b568e5274a72b55d58a3/factsheet_for_contaminated_land.pdf

Appendices

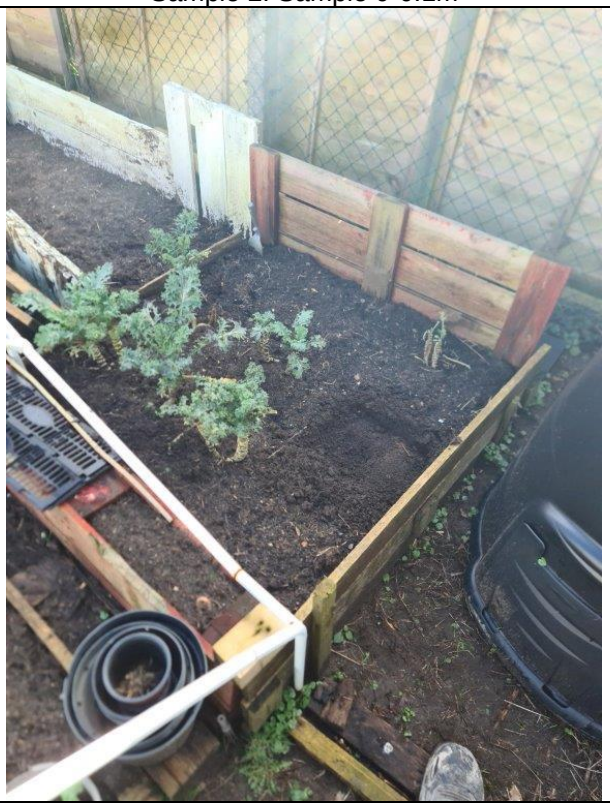
Appendix A: Site Photographs



Sampling locations and direction of photographs

Sample 1: Location

Sample 1: Sample 0-0.1m

	
Sample 2: Location	Sample 2: Sample 0-0.1m
	
Sample 3: Location	Sample 3: Sample 0-0.1m

	
Sample 3: Sample 0.43-0.44	Sample 4: Location/Sample 0-0.1

Appendix B: Assessment Criteria & Laboratory analysis

Category 4 Screening levels C4SLs

from DEFRA, 2014, SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination

Substance	Residential (with home-grown produce)	Residential (without home-grown produce)	Allotments	Commercial	Public Open Space 1	Public Open Space 2
Arsenic	37 mg/kg	40 mg/kg	49 mg/kg	640 mg/kg	79 mg/kg	170 mg/kg
Benzene	0.87 mg/kg	3.3 mg/kg	0.18 mg/kg	98 mg/kg	140 mg/kg	230 mg/kg
Benzo(a)pyrene	5.0 mg/kg	5.3 mg/kg	5.7 mg/kg	77 mg/kg	10 mg/kg	21 mg/kg
Cadmium	22 mg/kg	150 mg/kg	3.9 mg/kg	410 mg/kg	220 mg/kg	880 mg/kg
Chromium VI	21 mg/kg	21 mg/kg	170 mg/kg	49 mg/kg	21 mg/kg	250 mg/kg
Lead	200 mg/kg	310 mg/kg	80 mg/kg	2300 mg/kg	630 mg/kg	1300 mg/kg

This table should be read in conjunction with the Final C4SL R&D report.

Normal background concentrations of contaminants in England

from JOHNSON, CC, ANDER, EL, CAVE, MR and PALUMBO-ROE, B. 2012. Normal background concentrations (NBCs) of contaminants in English soils: Final project report. British Geological Survey Commissioned Report, CR/12/035

Substance	Principal domain	Urban domain	Mineralisation domain 1	Mineralisation domain 2	Ironstone	Chalk South
Arsenic	32 mg/kg		290 mg/kg		220 mg/kg	
Benzo-a-pyrene	0.5 mg/kg	3.6 mg/kg				
Cadmium	1.0 mg/kg	2.1 mg/kg	17 mg/kg	2.9 mg/kg		2.5 mg/kg
Lead	180 mg/kg	820 mg/kg	2400 mg/kg			

Laboratory Analysis Reports

Blood Lead analysis, pet pheasant

IDEXX +44 (0)20 3788 7508

PHEASANT

PET OWNER:		**COASTAL VETERINARY GROUP**		LAB ID:	1009371490
SPECIES:	Avian	16 ALMA ROAD		ORDER ID:	225260357
BREED:		KINGS LYNN, NORFOLK PE31 7NY		COLLECTION DATE:	**30/1/2024**
GENDER:	Unspecified	01485 544201		DATE OF RECEIPT:	**31/1/2024**
AGE:	44 Years	ACCOUNT #:	C528	DATE OF RESULT:	**14/2/2024**
PATIENT ID:	2000004173	ATTENDING VET:	Chris Tansley		

IDEXX Services: **Lead (Blood)**

Therapeutics / Toxicology

31/1/2024 (Order Received)
14/2/2024 2:46 pm (Last Updated)

TEST		RESULT	REFERENCE VALUE
Lead (Blood)	a	4	ug/L
Clinical Pathologist Report		Results approved by: Stephen Jordan BVM&S FRCPath MRCVS Head of Clinical Pathology UK	

a Toxic limit >600 ug/l

Laboratory Address:
Grange House
Sandbeck Way
Wetherby
WEST YORKSHIRE LS 22 7DN
Telephone 02037 887508

Please see IDEXX website (www.idexx.co.uk/ukas) for details of Test Methods.

Soil laboratory analysis report

Appendix C: Risk Assessment Methodology

Land contamination: risk management guidance from the Environment Agency[8] provides the technical framework for applying a risk management process when dealing with contaminated land.

The Borough Council's Contaminated Land Strategy has identified priority sites based on mapping and documentary information. The Contaminated Land Inspection Report collates all the existing information on the site and develops a conceptual site model to identify and assess potential pollutant linkages and to estimate risk.

The risk assessment process focuses on whether there is an unacceptable risk, which will depend on the circumstances of the site and the context of the decision. The Council has used a process adapted from CIRIA C552, Contaminated Land Risk Assessment, a guide to good practice[9] to produce the conceptual site model and estimate the risk of harm to defined receptors. This involves the consideration of the probability, nature and extent of exposure and the severity and extent of the effects of the contamination hazard should exposure occur.

The probability of an event can be classified as follows:

- Highly likely: The event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;
- Likely: It is probable that an event will occur, or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;
- Low likelihood: Circumstances are possible under which an event could occur, but it is not certain even in the long term that an event would occur and it is less likely in the short term;
- Unlikely: Circumstances are such that it is improbable the event would occur even in the long term.

The severity of the hazard can be classified as follows:

- High: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. Short term risk to an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Contaminated Land Statutory Guidance, April 2012');
- Medium: Chronic damage to human health ('significant harm' as defined in 'Contaminated Land Statutory Guidance, April 2012'), pollution of sensitive water resources, significant change in an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Contaminated Land Statutory Guidance, April 2012');

[8] www.gov.uk/guidance/land-contamination-how-to-manage-the-risks
[9] www.brebookshop.com/samples/142102.pdf

- Low: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Contaminated Land Statutory Guidance, April 2012'). Damage to sensitive buildings, structures or the environment.
- Minor: Harm, though not necessarily significant harm, which may result in financial loss, to expenditure to resolve. Non-permanent human health effects (easily prevented by use of PPE). Easily repairable effects of damage to buildings, structure and services.

Once the probability of an event occurring and hazard severity has been classified, a risk category can be assigned from the table below:

		Hazard			
		High	Medium	Low	Minor
Probability	High Probability	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Probability	Moderate risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) if required to clarify the risk and to determine the potential liability. Some remedial work may be required in the longer term.
Moderate risk	It's possible that harm could arise to a designated receptor from an identified hazard. However, it is relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that harm would be relatively mild.
Moderate/Low risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, if any harm were to occur it is more likely that harm would be relatively mild.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is unlikely to be severe.

Determination of contaminated land
Contaminated Land Statutory Guidance, April 2012

Human Health

Category	
1	The local authority should assume that a significant possibility of significant harm exists in any case where it considers 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. For the purposes of this Guidance, these are referred to as "Category 1: Human Health" cases. Land should be deemed to be a Category 1: Human Health case where: (a) The authority is aware that similar land or situations are known, or are strongly suspected on the basis of robust evidence, to have caused such harm before in the United Kingdom or elsewhere; or (b) The authority is aware that similar degrees of exposure (via any medium) to the contaminant(s) in question are known, or strongly suspected on the basis of robust evidence, to have caused such harm before in the United Kingdom or elsewhere; (c) The authority considers that significant harm may already have been caused by contaminants in, on or under the land, and that there is an unacceptable risk that it might continue or occur again if no action is taken. Among other things, the authority may decide to determine the land on these grounds if it considers that it is likely that significant harm is being caused, but it considers either: (i) that there is insufficient evidence to be sure of meeting the "balance of probability" test for demonstrating that significant harm is being caused; or (ii) that the time needed to demonstrate such a level of probability would cause unreasonable delay, cost, or disruption and stress to affected people particularly in cases involving residential properties.
2	Land should be placed into Category 2 if the authority concludes, on the basis that 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, with all that this might involve and having regard to Section 1. Category 2 may include land where there is little or no direct evidence that similar land, situations or levels of exposure have caused harm before, but nonetheless the authority considers on the basis of the available evidence, including expert opinion, that there is a strong case for taking action under Part 2A on a precautionary basis.
3	Land should be placed into Category 3 if the authority concludes that the strong case described in 4.25(a) does not exist, and therefore the legal test for significant possibility of significant harm is not met. Category 3 may include land where the risks are not low, but nonetheless the authority considers that regulatory intervention under Part 2A is not warranted. This recognises that placing land in Category 3 would not stop others, such as the owner or occupier of the land, from taking action to reduce risks outside of the Part 2A regime if they choose. The authority should consider making available the results of its inspection and risk assessment to the owners/occupiers of Category 3 land.

Human Health

Category	
4	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).