



ENVIRONMENTAL PROTECTION ACT 1990, SECTION 78B

RECORD OF DETERMINATION THAT LAND IS CONTAMINATED **LAND**

In accordance with Part 2A of the Environmental Protection Act 1990 Gloucester City Council has determined that the land at:

18 WESTEND PARADE, ALNEY ISLAND, GLOUCESTER, GL1 2RY
(Identified on the attached plan as land within the blue boundary)

National grid reference 382361, 219184

is **CONTAMINATED LAND**, as defined by section 78A(2) of the Environmental Protection Act 1990, because:

Gloucester City Council has identified the presence of a contamination source, a pathway, and a receptor with respect to the current use of the land. The Council is satisfied that as a result of this pollution linkage a significant possibility of significant harm exists, with no suitable and sufficient risk management arrangements in place to prevent such harm.

A summary of the basis on which this determination has been made is set out in the Schedule to this record.

Dated 2nd October 2009

Gill Ragon
Head of Environmental Health
Gloucester City Council

Environmental Health
Gloucester City Council
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18 WESTEND PARADE, ALNEY ISLAND, GLOUCESTER, GL1 2RY

(Identified on the plan below as land within the blue boundary)



SCHEDULE

1 - DESCRIPTION OF THE SIGNIFICANT POLLUTION LINKAGE

Pollutants: Benzo(a)Pyrene in surface soils

Pathways: Direct soil/dust ingestion
Consumption of homegrown produce and soil
Consumption of soil attached to homegrown produce
Indoor dermal uptake from dust
Outdoor dermal uptake from soil contact
Indoor dust inhalation
Outdoor dust inhalation

Receptor: Young child (age 1-6 years) potentially resident at the determined property

In combination these source-pathway-receptor linkages are considered to represent a Significant Pollution Linkage, indicative of a significant possibility of significant harm to human health.

2 - SUMMARY OF THE EVIDENCE UPON WHICH THE DETERMINATION IS BASED

SHALLOW SOIL RESULTS FROM THE PROPERTY No.18 (mg/kg)

Benzo(a)Pyrene: **2.5 8.2 13.0 15.0**

SHALLOW SOIL RESULTS FROM ADJACENT PROPERTY No.20 (mg/kg)

Benzo(a)Pyrene: **8.9 5.2 23.0 4.9**

These combined results from the two properties have been statistically considered as a single dataset.

Sample Mean: 10.1mg/kg

US95%: 14.6mg/kg

Assuming Normal Distribution

36% confidence that population mean exceeds 11mg/kg

67% confidence that population mean exceeds 9mg/kg

94% confidence that population mean exceeds 6mg/kg

Assuming Non-normal Distribution (using Chebychev)

0% - 36% confidence that population mean exceeds 11mg/kg

17% - 67% confidence that population mean exceeds 9mg/kg

75% - 94% confidence that population mean exceeds 6mg/kg

Alney Island Flood Defence – Site Investigation Interpretative Report [DRAFT]
 - by Fugro Engineering Services Ltd, for the Environment Agency (*Sep 2005*)

Phase 1 Assessment of the Alney Island Site – Phase 1 Assessment
 - by Land Quality Management, for Gloucester City Council, (*Apr 2007*)

Phase 2 Assessment of the Alney Island Site – Factual Report
 - by Land Quality Management, for Gloucester City Council, (*Apr 2008*)

Phase 2 Assessment of the Alney Island Site – Interpretative Report
 - by Land Quality Management, for Gloucester City Council, (*Apr 2008*)

Appendix 3 of Alney Island Ground Investigation – Exploratory Hole Logs
 - by Geotechnical Engineering Ltd, for Land Quality Management, (*Dec 2007*)

Appendix 4 of Alney Island Ground Investigation – Soil & Leachate Analysis
 - by Land Quality Management, for Gloucester City Council, (*Apr 2008*)

Appendix 5 of Alney Island Ground Investigation – Groundwater Analysis
 - by Land Quality Management, for Gloucester City Council, (*Apr 2008*)

Consultation response letter concerning assessment of risk at Alney Island
 - by the Health Protection Agency, (*Jul 2008*)

Soil sample analyses results
 - by Chemtest, for Vertase Ltd, for Gloucester City Council, (*Jul 2009*)

Email correspondence with Michael Hughes of the Environment Agency, concerning justification of determination of 18 and 20 Westend Parade
 - by the Environment Agency, (*30th Jul 2009*)

3 - DESCRIPTION OF POTENTIALLY CONTAMINATIVE ACTIVITY AT ALNEY ISLAND

The site being determined: **18 WESTEND PARADE** is located within an area of Gloucester known as Alney Island, at grid reference: **382361, 219184**.

The areas of Alney Island investigated for possible contamination, contained a number of former potentially contaminative land uses, including; boat building/maintenance, saw mills/timber yards, brickworks, lime kilns, lorry parks and an area used for power station ash storage/disposal. Various other potentially contaminative activities existed in close proximity including; a coal-fired power station and an iron works. There are also significant anecdotal accounts of localised waste disposal, infilling and earthworks across the Alney Island site. It is possible that wastes from former gasworks sites may also have been deposited at the site.

4 - SUMMARY OF THE RELEVANT ASSESSMENT OF THE EVIDENCE

In October 2007 the consultants Land Quality Management undertook a comprehensive investigation of Alney Island on behalf of Gloucester City Council, to characterise how much contamination was present and advise whether any areas should be determined to be 'contaminated land'.

The investigations considered all available information at the time, and resulted in a total of 6no. residential houses, and the majority of the Showmens' sites, being determined to be Contaminated Land under Part 2A of the Environmental Protection Act 1990.

Numbers 18 and 20 Westend Parade were not investigated at this time, for various reasons, including access issues shortly after the flooding of July 2007. The City Council was asked by the occupiers of these properties to consider whether further investigation should be undertaken, at the same time as the remedial work on the other determined properties, and the Council agreed to carry out this testing in July 2009.

The sampling strategy was designed to simply evaluate risks to human health arising from shallow soils in the gardens of these properties.

The assessment of sample data followed a tiered approach, with data first being compared with relevant generic assessment criteria. A residential with plant uptake land use scenario was applied.

Comparison with generic screening values (DEFRA/EA SGVs or CIEH/LQM GACs) indicated exceedance for both arsenic and PAH/BaP.

Gloucester City Council recognises that exceedance of an SGV/GAC does not equate to an unacceptable level of risk, as defined by Part 2A.

Both of these potential contaminants of concern were subject to a statistical review, in accordance with that proposed in the CL:AIRE Guidance on Comparing Soil Contamination Data with a Critical Concentration. From inspection of the soil material, the common history of the properties concerned, and assessment of the analysis results, the data obtained from both properties have been considered together as a single data-set.

Following further consideration of the arsenic it was possible to establish this contaminant were unlikely to represent a significant possibility of significant harm, and was excluded as a possible basis for determination as contaminated land.

The investigations concluded that the polycyclic aromatic hydrocarbon benzo(a)pyrene was the principle risk driver for the two properties.

Benzo(a)Pyrene

At **18 Westend Parade** a total of 4 soil samples were analysed for Benzo(a)Pyrene. The analysis of these samples recorded a maximum concentration of **15mg/kg**, a sample mean of **9.7mg/kg**.

At **20 Westend Parade** a total of 4 soil samples were analysed for Benzo(a)Pyrene. The analysis of these samples recorded a maximum concentration of **23mg/kg**, a sample mean of **10.5mg/kg**.

The data from these two adjacent properties have been considered together statistically, for the purpose of considering risk, and in combination a total of 8 soil samples were analysed for Benzo(a)Pyrene. The analysis of these samples recorded a maximum concentration of **23mg/kg**, a sample mean of **10.1mg/kg**.

The minimal risk Generic Assessment Criteria (GAC) for Benzo(a)Pyrene is 0.83mg/kg, for residential properties with gardens.

Assuming a normal distribution for the data there is a 67% confidence level that the population mean exceeds 9mg/kg, and 94% confidence level that the population mean exceeds 6mg/kg.

Assuming a non-normal distribution for the data (using Chebychev Theorem) the relevant confidence level ranges are 17% to 67% (for 9mg/kg), and 75% to 94% (for 6mg/kg).

Establishing an assessment criteria for benzo(a)pyrene representative of a significant possibility of significant harm for human health (SPOSH) is not at the present time straightforward. No clear authoritative guidance is available regarding a possible significant possibility of significant harm level for BaP. A new LQM/CIEH generic assessment criteria (GAC) was published in 2009, giving a 'minimal risk' figure of 0.8mg/kg.

Guidance is continually emerging on the subject from several sources, most recently from DEFRA at the conclusion of the Way Forward process in 2008. This clearly states that DEFRA does not at this stage intend to publish guideline values indicative of SPOSH, and thereby leaving this decision to be made locally by individual local authorities.

Part 2A clearly makes Local Authorities responsible for deciding whether or not land is contaminated land, and allows them to exercise their judgement, so long as decisions are based on sound science and reasonable consideration of the site and local circumstances.

Gloucester City Council has therefore followed DEFRA's guidance on this matter, and taken it's own view on what level of BaP might comprise a significant possibility of significant harm in this instance.

In deciding upon a suitable Benzo(a)Pyrene concentration indicative of a significant possibility of significant harm, Gloucester City Council has adopted a 'lines of evidence' approach, considering the full range of published guidance, without placing total reliance on any one source. The 'lines of evidence' considered include:

- DEFRA - CLAN 6/06 Way Forward discussion document,
- Environment Agency - Draft proposals for revisions in the technical methodology of the CLEA model
- Health Protection Agency – Alney Island consultation response letter
- Health Protection Agency – Contaminated Land Clarification Note: Benzo(a)Pyrene, Use of excess lifetime cancer risk estimates
- Health Protection Agency – Margins of exposure approach discussion document, and an Introduction to Land Contamination for Public Health Professionals (section 5.2.1)
- Land Quality Management – Alney Island phase 2 interpretative report
- DEFRA – Guidance on the Legal Definition of Contaminated Land
- Email from Michael Hughes at the Environment Agency – dated 30th July 2009

Gloucester City Council is aware of the draft, or non-status of several of the above documents, at the time of writing, but considers that they nevertheless provide approaches, useful for consideration as 'lines of evidence'.

Considering these 'lines of evidence', the additional requirement to keep the intake of non-threshold substances such as benzo(a)pyrene as low as reasonably practicable and local conditions and factors, Gloucester City Council considers the quantity of benzo(a)pyrene identified at 18 Westend Parade to represent a significant possibility of significant harm, and thus has determined the property to be Contaminated Land.

5 - REFERENCES

Site Specific Information, Reports and Documents

Fugro Engineering Services Ltd

Alney Island Flood Defence: Site Investigation Interpretative report [DRAFT] (*September 2005*)

Land Quality Management

Alney Island Investigations: Phase 1 Assessment (*April 2007*)

Land Quality Management

Alney Island Investigations: Phase 2 Assessment Factual Report (*April 2008*)

Land Quality Management

Alney Island Investigations: Phase 2 Assessment Interpretative Report (*April 2008*)

Geotechnical Engineering Ltd

Alney Island Investigations: Appendix 3 Exploratory Hole Logs (*December 2007*)

Land Quality Management

Alney Island Investigations: Appendix 4 Soil and Leachate Analysis (*April 2008*)

Land Quality Management

Alney Island Investigations: Appendix 5 Groundwater Analysis (*April 2008*)

Health Protection Agency

Consultation response letter concerning assessment of risk at Alney Island (*July 2008*)

Environment Agency

Emailed correspondence concerning justification for determination (*July 2009*)

Statutory Guidance

DEFRA

Circular 01/2006 Environmental Protection Act 1990: Part 2A, Contaminated Land (*September 2006*)

Procedural Guidance

Chartered Institute of Environmental Health

Professional Practice Note: The determination of contaminated land; deciding what is an ‘unacceptable intake’ (*May 2006*)

Chartered Institute of Environmental Health

Local Authority Guide to the Application of Part 2A of the Environmental Protection Act 1990 (*July 2001*)

DEFRA

Applying the Definition of contaminated land under Part 2A of the EPA 1990 (*July 2008*)

DEFRA

Improvements to Contaminated Land Guidance: Outcomes of the ‘Way Forward’ Exercise on Soil Guideline Values (*22nd July 2008*)

DEFRA

Guidance on the Legal Definition of Contaminated Land (*July 2008*)

Gloucester City Council

Contaminated Land: An Inspection Strategy for Gloucester [CL-01] (*March 2006*)

General Technical Guidance

CL:AIRE

Guidance on Comparing Soil Contamination Data with a Critical Concentration (*May 2008*)

DEFRA/Environment Agency

TOX 2 Benzo(a)Pyrene: Collation of Toxicological Data and Intake Values for Humans (*April 2002*)

Environment Agency

CLEA Model Publications (*Various*)

Health Protection Agency

HPA –CLCN-1: Contaminated Land Clarification Note, Benzo(a)Pyrene (*2008*)

Health Protection Agency

An Introduction to Land Contamination for Public Health Professionals (*June 2008*)

Drafts, Consultations, Emerging, Forthcoming and Abandoned Guidance [with no official status]

DEFRA

Published Discussion Paper - CLAN 6/06: Assessing Risks from Land Contamination – a Proportionate Approach. Soil Guideline Values: the Way Forward (*November 2006*)

Health Protection Agency

Published Discussion Paper – Margins of Exposure approach (*2008*)