



Contaminated Land Inspection Report

The Willows Nature Reserve,
Downham Market, King's Lynn

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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 Part 2A inspection strategy identified The Willows Nature reserve (the site) as being of High priority due to the presence of a former Brickworks and potentially sensitive receptors in the residential development of the surrounding area.

Given the former site use, an assessment of the site has been undertaken to assess the potential for harm to human health, property, ground/surface water and designated environmental receptors under Part 2A EPA 1990.

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 during the desk study of the site history and a site walkover, the following can be stated: The site was historically a brickworks. The site's present use is predominantly as a nature reserve with residential dwellings on the north and west of the site.

The site has not been subject to any previous investigations by the borough council. There have been contaminated land reports produced for the site as part of proposed and completed residential developments.

From the contaminated land risk assessment plausible source pathway receptor linkages were identified. A MODERATE/LOW risk was assessed from contamination to human health, VERY LOW risk to property, LOW risk to surface waters.

After the discovery of fly tipped material on the northeast of site, clean-up of the area has been undertaken to help reduce the risk to site users. 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.

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 moderate, the site would be classified as Category 3 as set out in the Statutory Guidance. The land does not meet the definition of contaminated land under Part 2A and is not considered contaminated land. No further assessment of the site is considered necessary under Part 2A.

1 Introduction

This report details a review of information and risk summary about land at the Former brickworks at Willows Nature Reserve and provides a conclusion on the risk to human health, property, groundwater and the wider environment.

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 report forms that written statement.

2 Desk Study Information

Location

The site's location (Figure 1) is shown in Appendix B. The grid reference for the centre of the site is 560370, 302986. The Address for the willows nature reserve which makes up most of the site is Brickfields Ln, Downham Market PE38 9EL

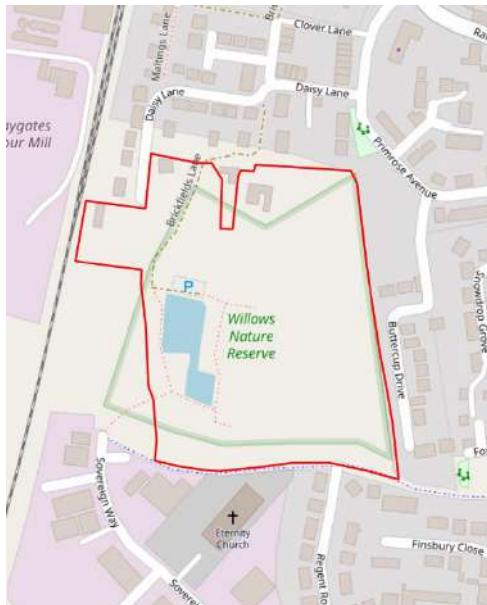


Figure 1 - Site plan

Previous investigation

Parts of the site have been subject to previous investigation related to planning or development. Table 1 below lists details of the reports used in compiling this written statement.

Table 1 Documents used in this report			
Planning Reference	Date	Author	Title
09/00194/RMM	March 2007	JPNGroup	Geoenvironmental Investigation report –
09/00194/RMM	December 2004	MLM Environmental	Phase 2 GeoEnvironmental Assessment report

14/01652/OM	November 2014	RSK	Phase 1 Geoenvironmental Site Assessment
14/01652/OM	December 2016	RSK	-Geoenvironmental and Geotechnical Site Assessment
14/01652/OM		Will Rudd	Remediation Strategy statement.
14/00918/F	10 th November 2014	AGB Environmental	Phase 1 Contaminated Land Desk Study.
14/00918/F	11 th June 2015	AGB Environmental	Phase 1 Contaminated Land Desk Study.

Previous Site Usage

The site was historically a brickworks with evidence of pits and kilns on site. Land to the north of the site has been redeveloped for housing.

Present Site Usage

The majority of the site's present use is as a nature reserve. There are also residential and commercial properties along the north and west of site. The site plan below (figure 1) shows the site edged in red. Photographs of the site are in appendix A.

Ownership

The majority of site known as Willows Nature Reserve is owned by The Borough Council of Kings Lynn & West Norfolk and is managed by the Property Services department. The remainder of site to the north and west are private residences. Landowners have been informed on the investigation of the site, and have been consulted on the report.

Environmental Setting

The Solid and Drift Geology Sheet 160, 1:50,000, 1999 and Regional Hydrological Characteristics Sheet 1 1:125 000 shows the site surface to be between approximately 3-8 meters above ordnance datum (m AOD).

Geology

No superficial geology is recorded at the site. The bedrock, classified as Kimmeridge Clay Formation – Mudstone (BGS website).

Hydrogeology

The site is on land classified as 'Unproductive Strata' with and is not within a Source Protection Zone for drinking water.

Hydrology

The nearest major water features are the pond on site, a drain to the immediate west of the site running parallel to the train tracks. The relief channel for the River Great Ouse is situated approximately 200m to the west of site.

Local Authority Pollution Prevention and Control Regulations (LAPPC)

No LAPPC processes exist on site or within 500 m.

MAGIC website records

DEFRA's MAGIC website records the following

- The site is part of an area covered by a Phosphate Issues Priority (Medium Priority).
- The site is part of an area listed in the Priority Habitat Inventory under Lowland Fens
- The site is part of an area designated as being a Nitrate Vulnerable Zone 2021-2024 (Surface Water).
- The site is part of an area designated as being covered by a Higher Level Stewardship Theme.
- The site is part of an area designated as being Priority Species for CS Targeting - Lapwing

Historic Maps

E-map Explorer

Enclosure Map 1800 – 1850 – Not available

Tithe map circa 1840 – The site is shown as fields, numbered 328, 329 and 330. A small structure is seen in the northwest corner of area 329 nearby where the property previously on the north of site named 'The Willows' has previously been.

Ordnance Survey 1st Ed. 1879 – 1886 – The site is shown with the Brickworks present and 2 kilns. There are several structures assumed to be associated with the brickworks on the northern half of the site. A timber yard is situated to the north. The railway line is seen to the west.

Norfolk County Council aerial photography 1988 – The property known as 'The Willows' is seen present and the structures to the south west with vehicles on site. the property known as 'Bricklands' is also present but the bungalow seen to the west of this property has been demolished. There is a single structure to the north of the pond.

Historic Maps on file at the Borough Council of King's Lynn and West Norfolk

Historic maps are presented in Appendix B and summarised below.

1843 – 1893: The site is as depicted on the 1st OS map. The site is labelled as a brickworks with kilns on the north of site and a saw pit to the west related to the timberworks immediately north of site. The south of site is largely

undeveloped with a number of ponds. There is a railway line to the west with a Gas works seen the other side of this railway. A pit is seen on the west of site.

1891 – 1912: The site is depicted as shown above with the exception that the timber yard has been replaced by a malthouse. Brick kilns and gas works have new structures added and have expanded southwards slightly, towards the centre of site. new ponds are seen on the south west and centre of site. The ponds on the far south of site are no longer present. The plot to the west is shown as a separate outlined plot

1904 – 1939: The site and surrounding area is as described above, but is not indicated as being a Brickworks. The malthouse remains, as does the ponds to the southwest of site, the ponds in the centre of the site are no longer present. One single kiln remains on the north east of site. The 2 kilns to the west are no longer depicted. A new structure is depicted on the north of the site.

1919 – 1943: No data

1945 – 1970: The properties known as 'the Willows', 'The Bungalow', 'Bricklands' and an additional unlabelled building to the east of Bricklands are depicted. 'The Bungalow' is the new structure seen in 1904 – 1939 maps. The willows site has had structures present since the beginning of our records but only labelled in this map edition. 'Bricklands' is a new structure to this map. Many smaller structures have been removed. The buildings associated with saw pit are still present but are unlabelled. A new building is noted near the centre of the site north of the ponds. This is unnamed but has a glasshouse associated with it. The malthouse is labelled, and an additional structure is shown on the west of site to the south of the malthouse. The southern portion of the site is labelled as a Marsh, reeds or saltings.

1970 – 1996: The site is as described above, with the exception that the Malthouse is no longer labelled. The properties known as 'The Willows' has been extended and there is one fewer structure to the north of the pond.

1996+: Trafalgar industrial estate is labelled to south. The gas works is now one large distribution station. A single structure remains to the north of the pond. The previous marsh is now illustrated as bracken, heath or rough grassland

Aerial Photographs

Aerial photographs are presented in Appendix B and summarised below.

1945 – 1946 MOD Aerial Photograph – The site is generally as depicted schematically in the 1904 -1939 map.

1999 Aerial Photograph – The site is generally as depicted schematically in the 1996 map however the property labelled 'the bungalow' has now been replaced with a structure to the north of that site which looks to now be associated with the property known as 'The Bricklands' The Bricklands has been extended also. the ponds are joined to form more of a larger pond with

an island. The structure north of the pond is no longer seen. the industrial estate is seen south. There seems to be numerous items on the ground around the property named 'The Willows' and the properties to the west.

2006-2009 Aerial Photograph - The site appears generally at it did in the 1999 aerial photograph. The area in the eastern section of the site looks the same, but as the photograph is more detailed there is a colour change that could be due to a change in vegetation. A pool has been installed within the curtilage of The Bricklands. 2 vehicles are seen outside 'The Willows' property, one on the vegetated area, and a pile of unidentifiable items is seen, however a smaller area than that in 1999 aerial photography. The malthouse looks to be under demolition.

2021 Aerial Photograph – The property known as The Willows has been demolished, as have 2 of the 3 structures south of the property on the west of site. A new building is seen west of 'The Bricklands' named willow view lodge, replacing a smaller structure noted on previous aerial photographs.

Planning History

Multiple planning applications exist on the site focussed on the properties on the north and west. A selection has been presented below in table 2:

2/93/0587/CU (Renewed under 2/96/0770/CU)	Construction of roundabout and access road at Railway Road site for residential development including change of use of former maltings	Permitted
2/94/1872/F	Retention and continued use of arcon building as private workshop	Permitted
2/95/0053/F	Retention of arcon building for car repairs	Permitted
2/96/0758/F	Construction of bungalow (amended design)	Permitted
2/97/0090/F	Continued use of arcon building as private workshop	Permitted
2/97/0395/F	Construction of 2 dwellings (amended design)	Permitted
2/97/0428/F	Retention of building for car repairs	Permitted
2/99/0279/F (Renewed 2/02/0588/F, 05/02018/F)	Retention and continued use of arcon building as private workshop	Permitted
2/03/0765/F	Double garage and extension to annexe	Permitted
2/03/2414/OM	Site for residential development comprising some 103 units of which 30 will be set aside for Affordable Housing and to include access and demolition of existing buildings	Permitted
2/03/2422/F	Construction of detached garage with storage/hobby room over	Permitted
04/01750/F	Two storey extension to dwelling	Permitted
04/02445/O	Outline Application: Mixed Use Development comprising 134 residential units (to include 40 affordable housing units and 5 no. live/work units), Use Class A1/B1 units (to max. of 278 sq.m), Use Class D1 unit (to a max. of	Permitted

	278sq.m.), and the demolition of existing buildings.	
06/02632/OM	Outline Application: residential development	Permitted
07/00996/O	Outline Application: residential development	Permitted
09/00194/RMM (for 04/02445/O)	Reserved Matters Application; 195 residential units, including 3 retail units, creche, open space, associated landscaping and car parking	Permitted
10/00969/FM	Site for residential development comprising some 103 units of which 30 will be set aside for Affordable Housing and to include access and demolition of existing buildings, without complying with condition 11 of planning permission 2/03/2414/OM	Permitted
10/00971/FM	Outline Application: Mixed Use Development comprising 134 residential units (to include 40 affordable housing units and 5 no. live/work units), Use Class A1/B1 units (to max. of 278 sq.m), Use Class D1 unit (to a max. of 278sq.m.), and the demolition of existing buildings, without complying with condition 12 of planning permission 04/02445/O	Permitted
11/01609/FM	Re-Design of extant permission and construction of 117 residential dwellings including 20 percent affordable homes, associated open space and landscaping	Permitted
12/01042/F	Alteration of an existing porch and the change of use of an annexe to a new dwelling.	Permitted
14/00918/F	Conversion of double garage with an extension to form a new residential dwelling	Permitted
14/00976/O	Outline application for one pair of semi-detached houses	Permitted
14/01652/OM	Outline application for up to 32 dwellings, all matters reserved apart from access	Permitted
15/01333/F	Erection of a pair of semi-detached houses	Permitted
19/02196/F	Erection of a pair of semi-detached houses	Permitted

As part of the planning process, some planning applications have been required to undertake investigations for land contamination to ensure that the sites will be suitable for the permitted use.

Planning applications in bold in Table 2 have included contaminated land reports and these are discussed further below.

09/00194/RMM

JPNGroup – Geo-environmental Investigation report – March 2007
Phase 2 Geo-Environmental Assessment report - MLM Environmental – December 2004.

The application covers the northwest of site on an area that is previously seen as part of a malthouse shown in historical maps 1891-1912. A saw pit is also seen on site in historic maps dated 1843-1893. The site has been subject to

an intrusive investigation as part of a larger development to the north. The 2007 investigation by JPNGroup installed a borehole on the site. Made ground was found to 0.9m depth and Clay beyond this to 3.0m when the borehole was stopped.

An earlier report by MLM Environmental from 2004 included testing a soil sample for metals, PAH, asbestos and TPH. No exceedances of assessment criteria were reported for residential use including home grown produce.

As the site has been developed and assessed as suitable for residential use under the planning system, this portion of the site has been removed from the site boundary. (Orange crosshatched area – Figure 2)

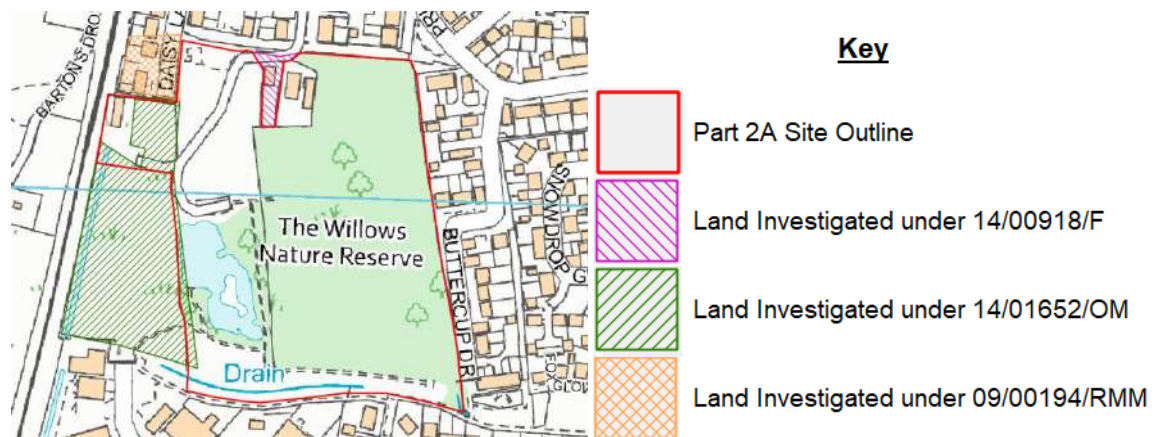


Figure 2 - Outline of the Willows site pre-removal (Red) of land investigated under application 14/00918/F (Pink). Land considered in 14/01652/OM is outlined in blue.

14/01652/OM

This section is directly west of site with a section close to the garage included in the site outline (Green Hatched Fill - figure 2). The area is to the west of the original brick kilns. The site is shown with what looks to be an excavation on site in historical maps dated 1843-1893. The RSK Phase 1 Geo-environmental Site Assessment dated November 2014 identifies that there has been fly-tipping on site of rubble and gas canisters and potentially asbestos containing materials. This report is followed by RSK Geo-environmental and Geotechnical Site Assessment dated December 2016 which includes some intrusive investigation. 3 separate areas of fly-tipped material are identified. Intrusive testing is reported in the pit area. Made ground in this area is reported to have been sampled and the results of laboratory analysis reports exceedances of metals and several PAHs in selected samples. The presence of fragments of cement bound asbestos is reported. A remediation scheme has been approved for the site that addresses the contamination found but has not yet been implemented at the time of writing.

14/00918/F

This site is currently occupied by a residential property (Purple hashed fill – Figure 2). Due to its proximity to the brick kilns investigation of the site was recommended though conditions.

Phase 1 Contaminated Land Desk Study by AGB Environmental dated 10th November 2014 which recommended further investigation looking at ground gasses and other contaminants.

This report is followed by Additional Investigation Report by AGB Environmental dated 11th June 2015. Testing found 2 exceedances for lead on site based on residential with homegrown produce. One of the samples was a minor exceedance for Lead at 207mg/kg slightly above the 200mg/kg GAC. Remediation of the area around this value considered unnecessary. The highest value found was 632mg/kg. The contamination was considered to be localised due to the lower values found around this instance. To address the high lead value a 15cm thick 4x4m concrete slab was laid to break the pathway. Ground gas was investigated in the additional investigation and deemed very low risk. Due to the measures implemented the site is considered remediated and removed from the site boundary (pink outline - Figure 2).

Environment Agency Records

The Environment Agency records indicated that they have no additional information relating to the site.

Norfolk County Council Records

Norfolk County Council was contacted regarding records they may hold for the site and potential landfilling activity. There appears to be no record of a site outline of a landfill with Norfolk County Council (or predecessor) involvement at this location.

3 Site Walkover

A site walkover was first carried out on the 20th December 2022. Photographs are presented in Appendix A.

The site is accessed via Brickfields lane which enters on the north west of site and runs into the nature reserve to a parking area just north of the pond. To the west, when first entering there is a clearing where the property named The Willows had been previously located. The site has grass cover and brambles encircling it, but a path can be seen through to the housing estate adjacent (Photograph 1, Appendix A).

The west of site is largely seen covered in bramble and saplings which makes it difficult to observe and access was not possible. There has been recent clearing works done leading to the garage, drain covers and other portions of the site (Photograph 6&7). The former garage is seen with new fencing outlining the plot. To the east of this, multiple piles are seen with various items dumped on site including car bumpers, tree branches and rubble (photograph 3). The path leading to the former garage has been cleared, with soil and a mix of ceramics and rubble being used to make the track (Photograph 2). The garage looks to have been disused and heavily graffitied on a visit in December 2022 (Photograph 4(a)).

A drain is present to the far west of site, south of the garage. This is seen with water present and green with algae (Photograph 8). The other clearing on the

track is to an area of hardstanding and a pile of mixed materials (Photograph 5). Plastic rubble and a circuit board is visible on the pile.

The track continues to a shingle parking area. There is a grassed area to the north and south surrounding the pond (Photograph 9 & 12). A path runs along the east of the pond which meets a path along the south of site and connecting it to the industrial estate (Photograph 11 & 13).

There is a footpath along the south of the site crossing a sluice gate. The path which has views across the reedbed and has an entrance from regent road on the southeast of site (Photographs 14,15 &16).

The site is bisected by a treeline which separates the western half of the reserve with the pond and grass cover, from the eastern portion with a large reed bed and grass cover (Photograph 22-25). The reedbed covers a most of the south of the site narrowing as it moves to the north where it changes to woodland and bramble (Photograph 21). The reedbed occupies the lowest lying portions of the site.

There is an unmaintained path on the north of the site to the south of the existing properties which can be followed to the northeast corner of the reserve (Photograph 17). The ground level raises, and a fragment of corrugated cement was noted through the soil as the path passed the properties on site (Photograph 18). On this raised portion at the end of the path is a clearing with numerous items dumped, and evidence of items being burned. A small structure with cement sheeting was noted, partially demolished with fragments nearby (Photograph 19(a)).

To the south of this clearing, there is a lowered area that has a few items scattered across it. The rest of the site is difficult to access due to dense bramble and reed cover (Photograph 20).

A further site visit was carried out on the 11th of April 2023 with borough council Property Services to help identify and look to address the area of fly-tipped material highlighted on the site visit. No changes or additional material was noted on site from the last visit.

A final site visit was undertaken on the 20th July 2023 to validate the works undertaken to remove fly tipped material from the site. The items on site identified in December 2022 had been removed (Photograph 19(b)). The garage on the northwest of site is now seen with gravel covering the ground and the structure has been renovated (Photograph 4(b)).

Location of Receptors

Humans

A housing estate borders the site on the north, with 2 residential properties currently remaining on the north of the site. A railway line bounds the site to the west, beyond which are two rivers and fields. Another structure is present on the west of site, previously used as a repair garage.

Property

Properties in the form of buildings as set out in Table 2 of the statutory guidance exist on the site. The properties that exist on the site have been established for an extended period. Two residential properties are present on the north of site and a property that has previously been used as a garage that located on the west of the revised site. These properties remain within the outline of the site due to lack of characterisation at present. A railway line runs north south, immediately adjacent to the west of the site. There are a number of houses within 250 m of the site as well as an industrial estate to the south, a flour mill 22m to the north-west and a gas distribution station 38m to the west.

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 of The Willows nature reserve does meet the definition of a nature reserve under section 21 of the National Parks and Access to the Countryside Act 1949. As such this receptor will be considered further in this report.

Controlled water - Groundwater

As the site is underlain by 'unproductive strata' this exposure pathway is not considered to be viable. As such this receptor will not be considered further in this report.

Controlled water - Surface water

A ditch marks the western boundary of the site. It is assumed this ditch flows beneath the adjacent railway line and discharges to the relief channel, located 60 m west of the site. The location of this assumed discharge is unknown. A pond is also present on the centre of the site within the nature reserve.

4 Contaminated Land Risk Assessment

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.

Assessment of probability of a contamination event

From the information gathered it is considered that there is the potential for sources of contamination to be present on the former brickworks. The potential source is from potential backfilling of excavations and contaminants associated with the brickworks as well as historic fly tipping on parts of the site.

Human health

The site is open and unfenced with a public footpath running through the middle of the site. Residential properties are located on the north of the site. More residential properties are located to the north and west. An industrial estate

south. The site, roadway and adjacent land is used regularly by dog walkers. Evidence of use is also indicated by the presence of litter. Given the location of the site to residential properties it is considered likely that the children living on the adjacent housing estate would utilise the site as a play area. Therefore the probability of a contamination event affecting human receptors is considered to be LIKELY.

Property

The properties that exist on the site have been established for an extended period. Two residential properties and one that has previously been used as a garage are located on the revised site due to lack of characterisation. The other properties previously on the brickworks have been investigated and can be remediated through planning system if the use is to change or if they have not been remediated already. At this time no contaminated land that is thought to be a risk to buildings has been found. Therefore, the probability of a contamination event affecting property receptors is considered to be UNLIKELY.

Environment

The Willows Nature Reserve covers the majority of the site and was established after use as a brickworks ended. There is the potential for contamination to be present on the site of the brickworks but this would have been the case from the parks formation, no significant additional contamination is known to have been introduced to the reserve. There is no evidence of contamination effecting wildlife or vegetation noted on the site visit. Therefore, the probability of a contamination event affecting Environment receptors is considered to be UNLIKELY.

Controlled water - Surface water

The site is bounded on the west by a ditch, the pond is on the centre of the site and a reedbed is to the east. The ditch appears to be slow moving, isolated and has significant algae present on the site visit. However there is a slight potential for runoff or leachate to percolate from the refuse pit identified on the west of site under 14/01652/OM, into the ditch and then into the adjacent rivers west of site. There is also a pond present on the site that supports a range of wildlife. Earlier site investigations indicate that the shallow soils are alkaline and not favourable to leaching and the underlying geology is shown to be cohesive and of low permeability. The probability of a contamination event to surface water is therefore assessed as being LOW.

Assessment of Hazard

The hazard posed by the site has been based on the material observed during the site walkover, the evidence presented in reports on areas of the site and evidence from site investigations undertaken on other adjacent sites.

Human Health

The information available indicates that the waste disposed on the west of site is from fly tipping and from historical backfilling. There is a second sheltered area on the northeast of site that is only accessible through a narrow track amongst the trees and is not considered part of the nature reserve section of

the site. This area was confirmed to be cleared of the previously discovered items on the 14th June 2023. There is no evidence of waste disposal elsewhere in the more accessible areas of the site. The western portion of site has been subject to an approved planning application and contamination present can be addressed through the planning system. This area is also largely inaccessible due to dense vegetation. Testing of metals and PAHs, in the reports outlined in section Planning History, found areas on site that may exceed the generic assessment criteria for Residential with homegrown produce. The site's current use is as a Public Park. The Screening values(C4SL) for this use has a much higher threshold due to the reduced likelihood of direct contact and ingestion. Every exceedance of the residential assessment criteria on the site falls below the public open space screening value. The exceedances were reported in areas outside the nature reserve.

Following the clean-up of waste present at the surface in some areas of the site has reduced the hazard which is now assessed as LOW.

Property

The site is a former brickworks with some isolated evidence of historical backfilling. As there is no capping on the site, any ground gas generated would be able to disperse into the atmosphere and not migrate laterally into the adjacent residential properties. The hazard is assessed as LOW

Controlled Water - Surface waters

The waste material has been present on site for significant period of time. During that time it can be assumed there will have been some degradation of contaminants and that any leachable contaminants could have migrated off-site. The drain which is nearby an area of known backfilling has been tested in the RSK Geo-environmental and Geotechnical Site Assessment dated December 2016. It was reported that the 2 samples from the drain on the west of site did not exceed the assessment criteria for freshwater. The hazard is assessed as LOW.

Consultations

The Environment Agency Groundwater & Contaminated Land team have reviewed the report and agree with the Council's assessment of the potential risks to controlled waters from the site and have no further site-specific comments.

Conceptual site model

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

Table 3: Preliminary conceptual site model

Source	Pathway	Receptor	Probability	Hazard	Risk
Metals and metalloids and PAHs within made ground on the west and north of site from former brickworks	Direct contact	Humans	Likely	Low	Moderate/Low
	Inhalation				
Metals and metalloids and PAHs within made ground on the west and north of site from former brickworks	Direct contact	Environment	Low	Low	Low
	Inhalation				
Metals and metalloids and PAHs within made ground on the west and north of site from former brickworks	Direct contact	Controlled water; Surface water.	Low	Low	Low
Asbestos fragments related to fly tipping and filled ground.	Direct Contact	Humans	Low	Low	Low Risk
	Inhalation				
Ground gasses from waste material	Direct contact	Humans	Low	Low	Low
Ground gasses from waste material	Direct contact	Property	Unlikely	Low	Very Low

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.

5 Outcome of Preliminary Risk Assessment

Conclusion

Plausible source pathway receptor linkages were identified. A MODERATE/LOW risk was identified from contamination to human health, VERY LOW risk to property and LOW risk was identified to surface water.

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 moderate, the site would be classified as Category 3 as set out in the Statutory Guidance (Appendix D 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.

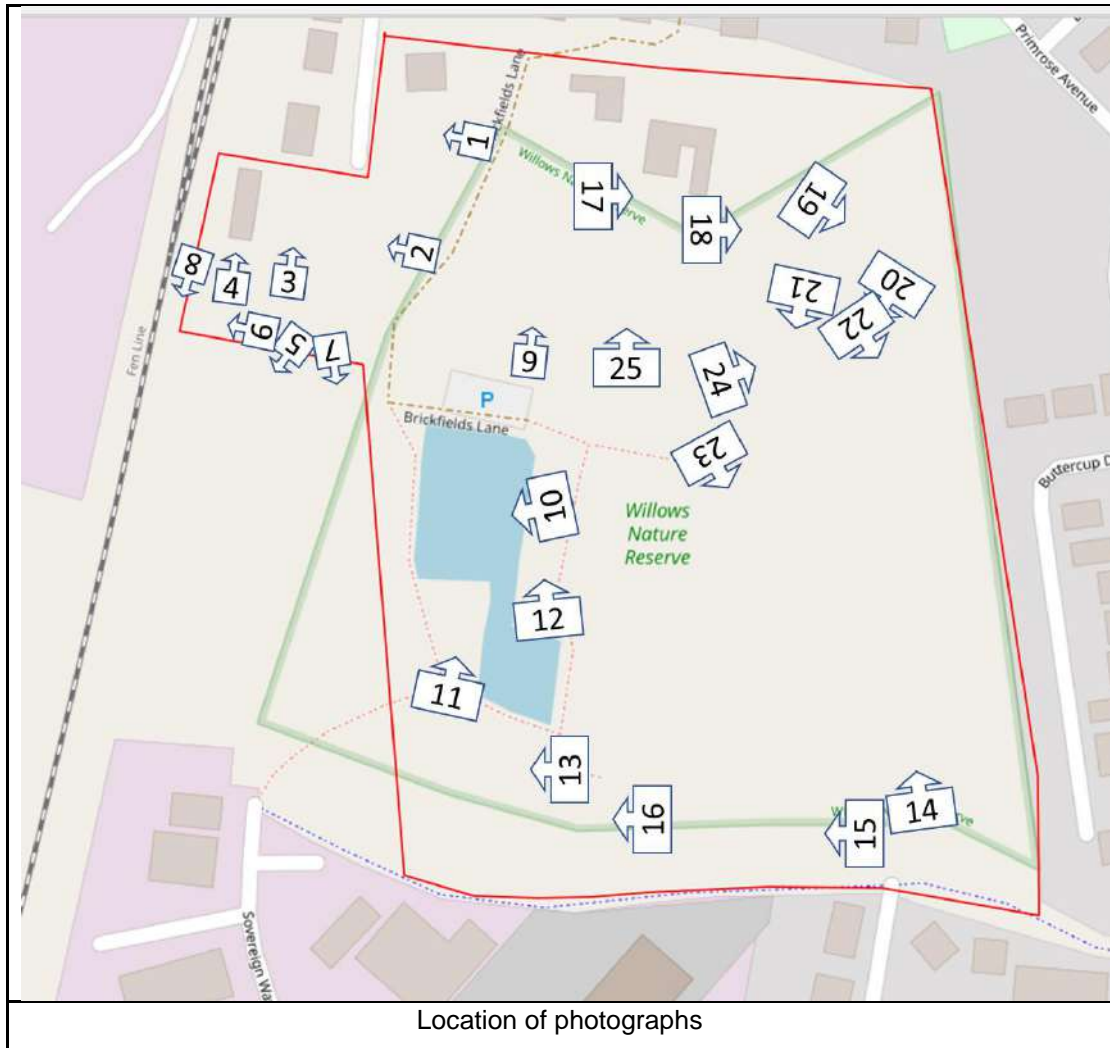
Further Action

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.

Appendices

Appendix A – Site Photos





Photograph 1: Overlooking a clearing formerly location of the property called the willows.



Photograph 2: Ceramic and brick in the made ground leading to the former garage



Photograph 3: Evidence of fly tipping? Car panel parts and various items on the west of site.



Photograph 4: (Above(a)) Former Garage, previously overgrown but looks recently cleared and fenced (December 2022)
(Below(b)) Renovation works undertaken to the structure (20/07/23)



Photograph 5: Stockpile and clearing with hardstanding/ waste items seen on site.



Photograph 6: Cleared area and access cover next to drain.



Photograph 7: drain cover and area cleared



Photograph 8: Drain sampled previous application on the west of site



Photograph 9: Field north of pond and carpark.



Photograph 10: Pond looking southwest. 20/07/23



Photograph 11: South of the pond facing north



Photograph 12: East of the pond facing north.



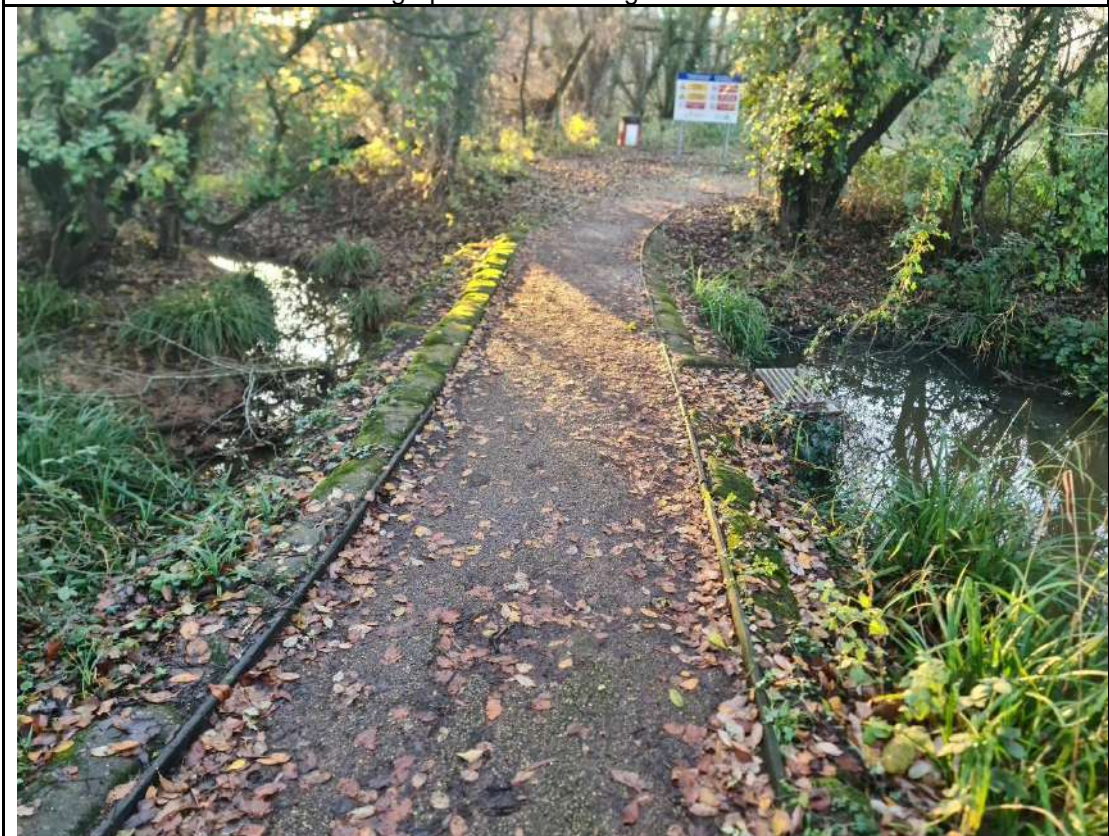
Photograph 13: South of pond facing west



Photograph 14: Reedbed covering a lot of the lower lying portion of the site.



Photograph 15: Path along south of site



Photograph 16: Sluice gate installed 2010 to manage reedbed.



Photograph 17: Path amongst trees on the north of site.



Photograph 18: Ground levels rising on the north east of site.



Photograph 19: Clearing on the northeast of site. (Above(a)) Dilapidated and partially demolished structure and various charred and dumped items
(Below(b)) Cleared site as of 20/07/23



Photograph 20: depression on the northeast of site.



Photograph 21: North of reed bed looking south, industrial building in background.



Photograph 22: Bramble looking south from the tree cover on the north of site.



Photograph 23: Reed bed looking southeast from the centre of site.





Photograph 24: Reed bed and tree cover looking north east from the centre of site.

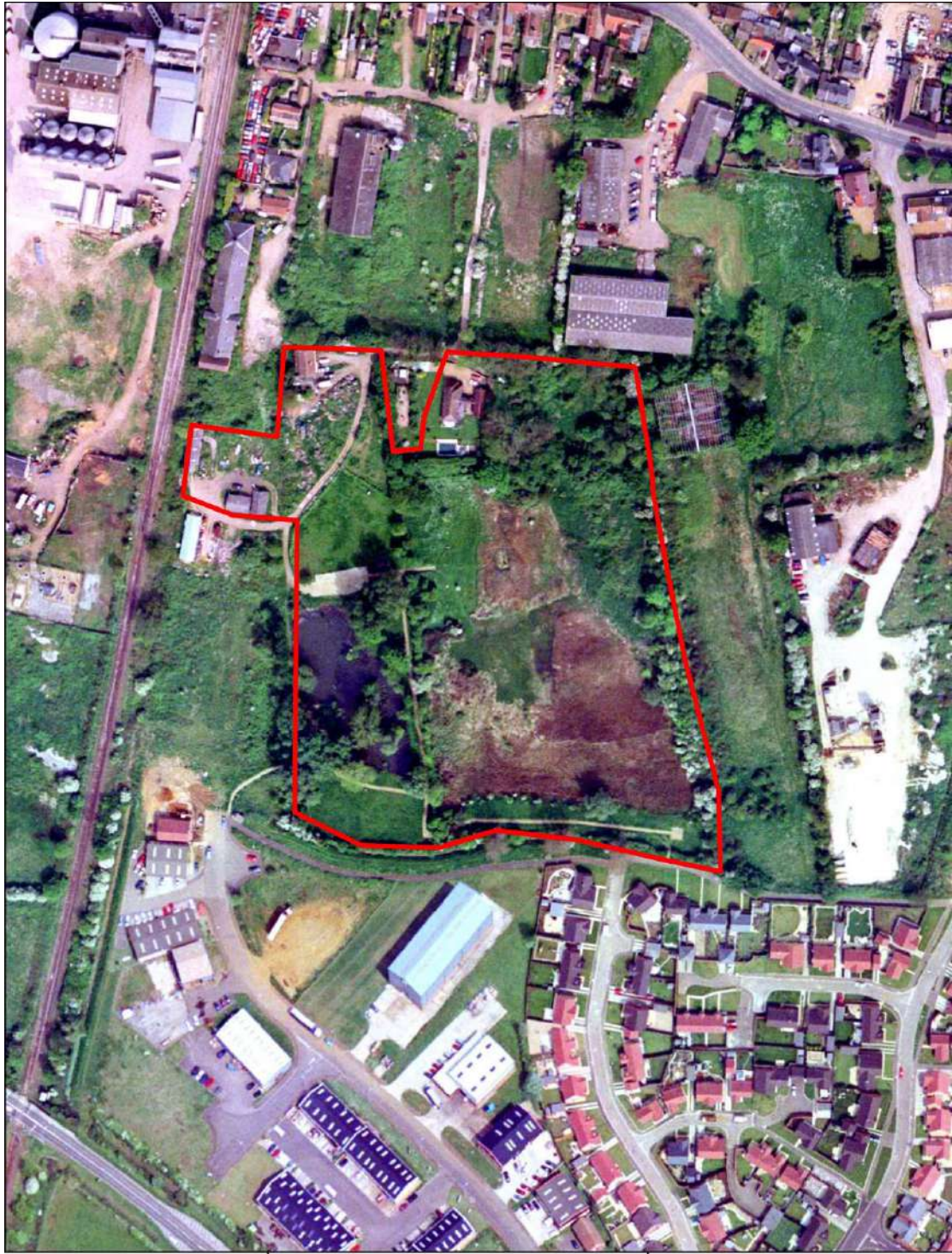


Photograph 25: Path to west half of site, to carpark and grassed area. Ahead, tree cover on the north of site.

Appendix B – Site Drawings



Borough Council of King's Lynn & West Norfolk 	Map Aerial Photography 1940s	Project / Details The Willows Nature Reserve	Drawn by AMW	Date January 2023	Scale 1:2,000
	<small>© Crown copyright and database rights 2016 Ordnance Survey 100024314</small>	Drawing / Reference Number 022388/13			



Borough Council of
**King's Lynn &
 West Norfolk**



Map
**Aerial Photography
 1999**

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Project / Details

**The Willows
 Nature Reserve**

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Date

January 2023

Scale

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022388/12





Borough Council of
**King's Lynn &
 West Norfolk**



Map
**Aerial Photography
 2006-2009**

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Project / Details

**The Willows
 Nature Reserve**

Drawn by

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Date

January 2023

Scale

1:2,000

Drawing / Reference Number

022388/11





Borough Council of
King's Lynn &
West Norfolk



Map
Aerial Photography
Recent

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Project / Details

The Willows
Nature Reserve

Drawn by

AMW

Date

January 2023

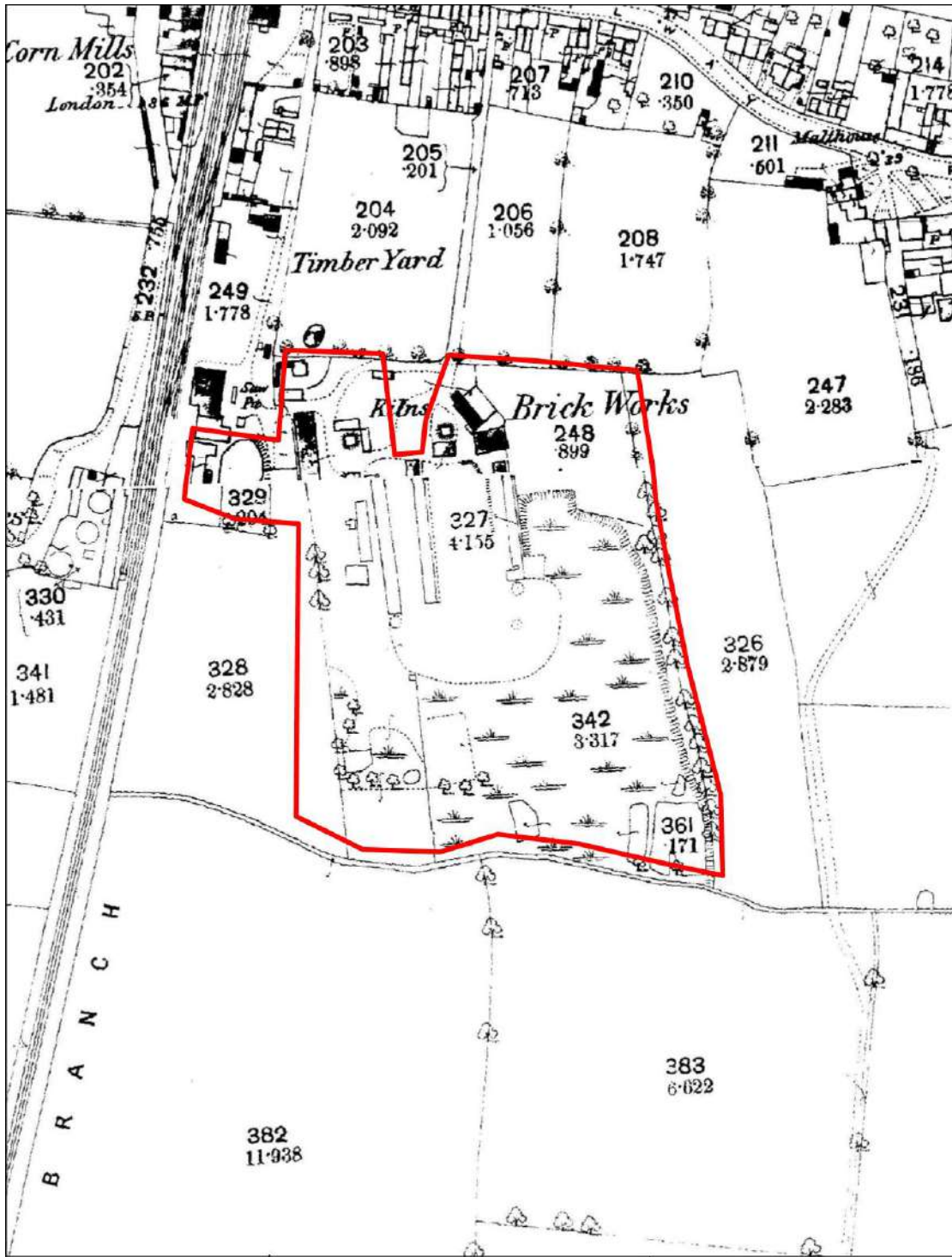
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West Norfolk



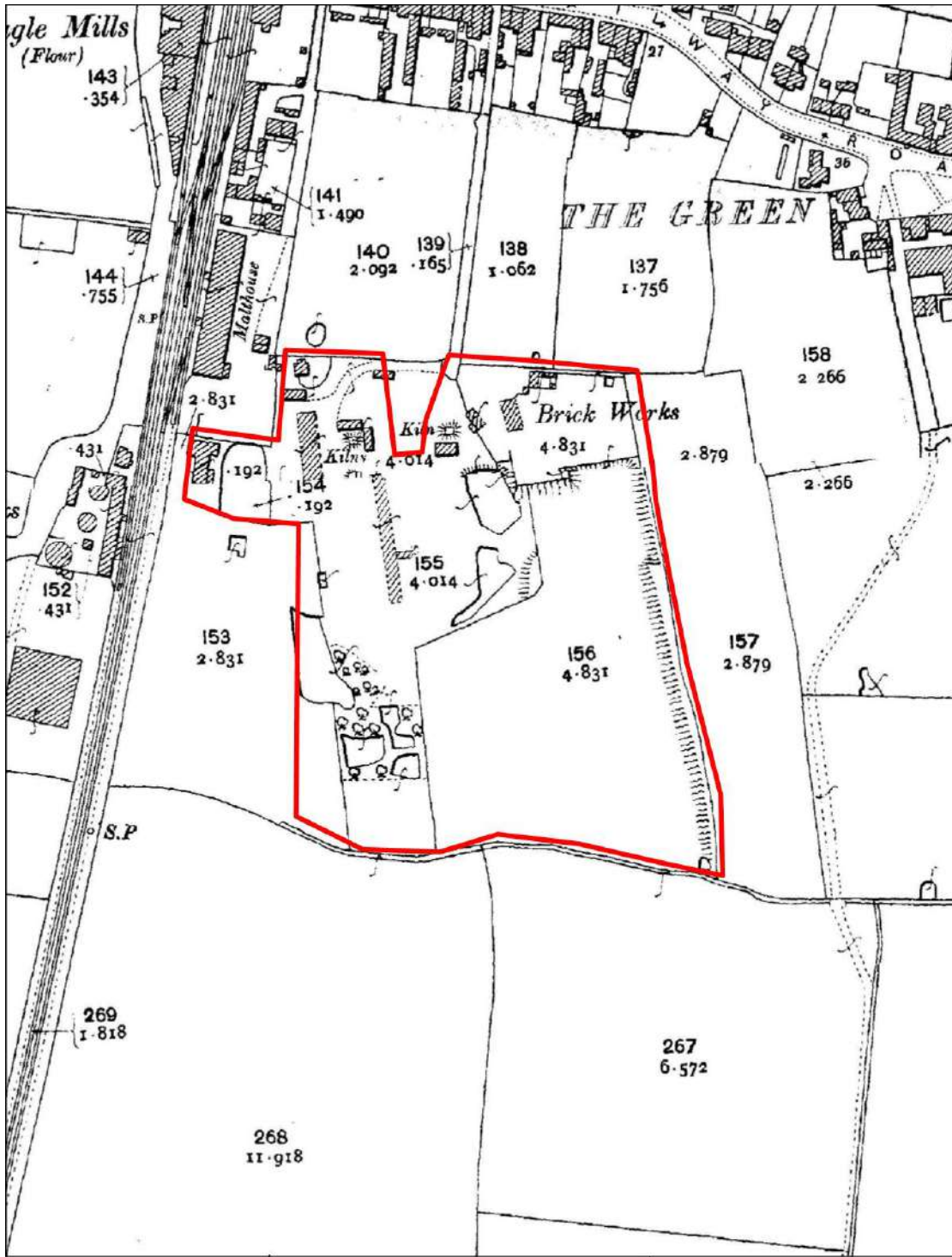
Map
Historical Maps
Epoch 1 1843-1893

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Project / Details
The Willows
Nature Reserve

Drawn by	Date	Scale
AMW	January 2023	1:2,000
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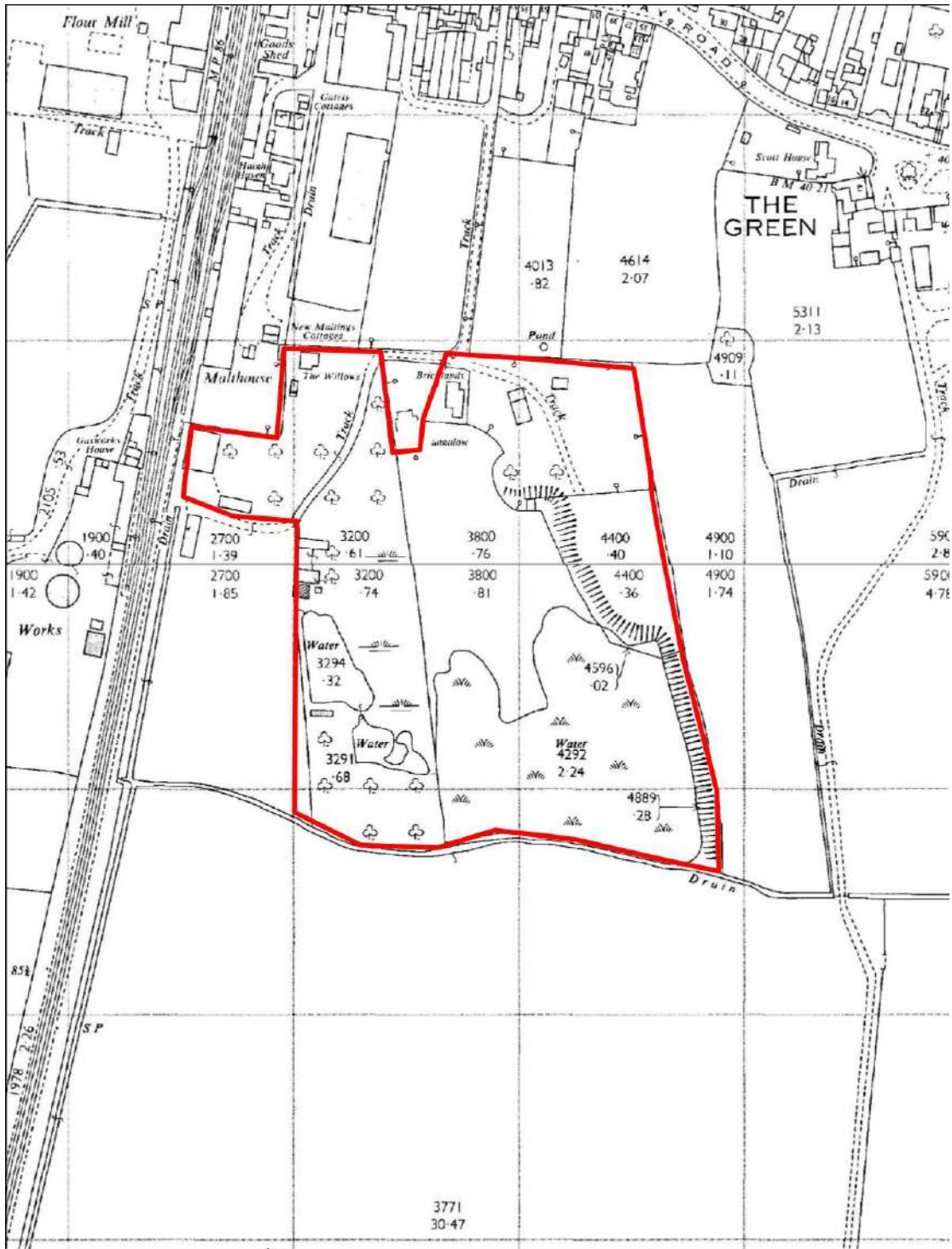
Map
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Epoch 2 1891-1912

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The Willows
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022388/02		





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West Norfolk



Map
Historical Maps
Epoch 5 1945-1970

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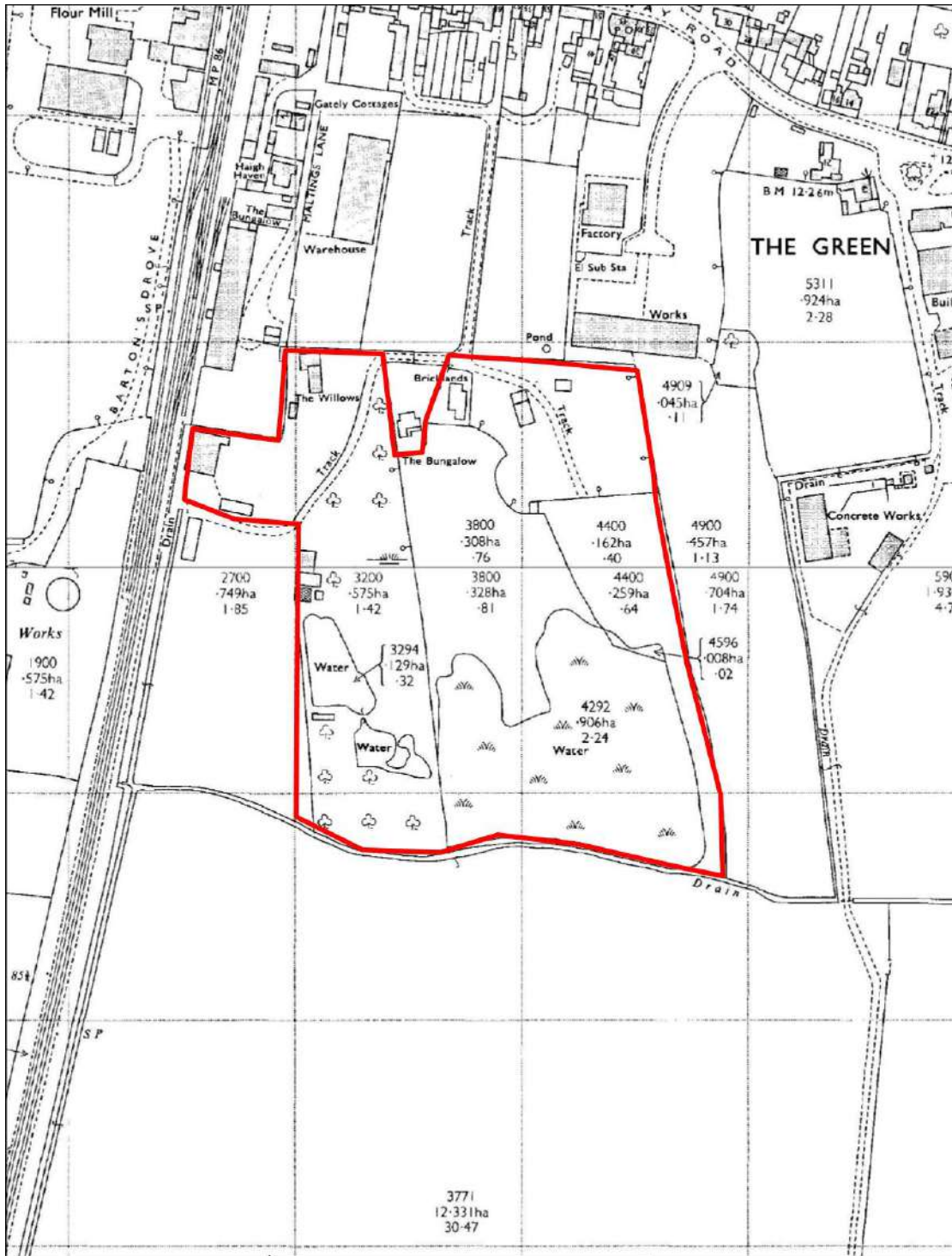
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The Willows
Nature Reserve

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Drawing / Reference Number
022388/05





Borough Council of
King's Lynn &
West Norfolk



Map
Historical Maps
Epoch 6 1970-1996

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The Willows
Nature Reserve

Drawn by

AMW

Date

January 2023

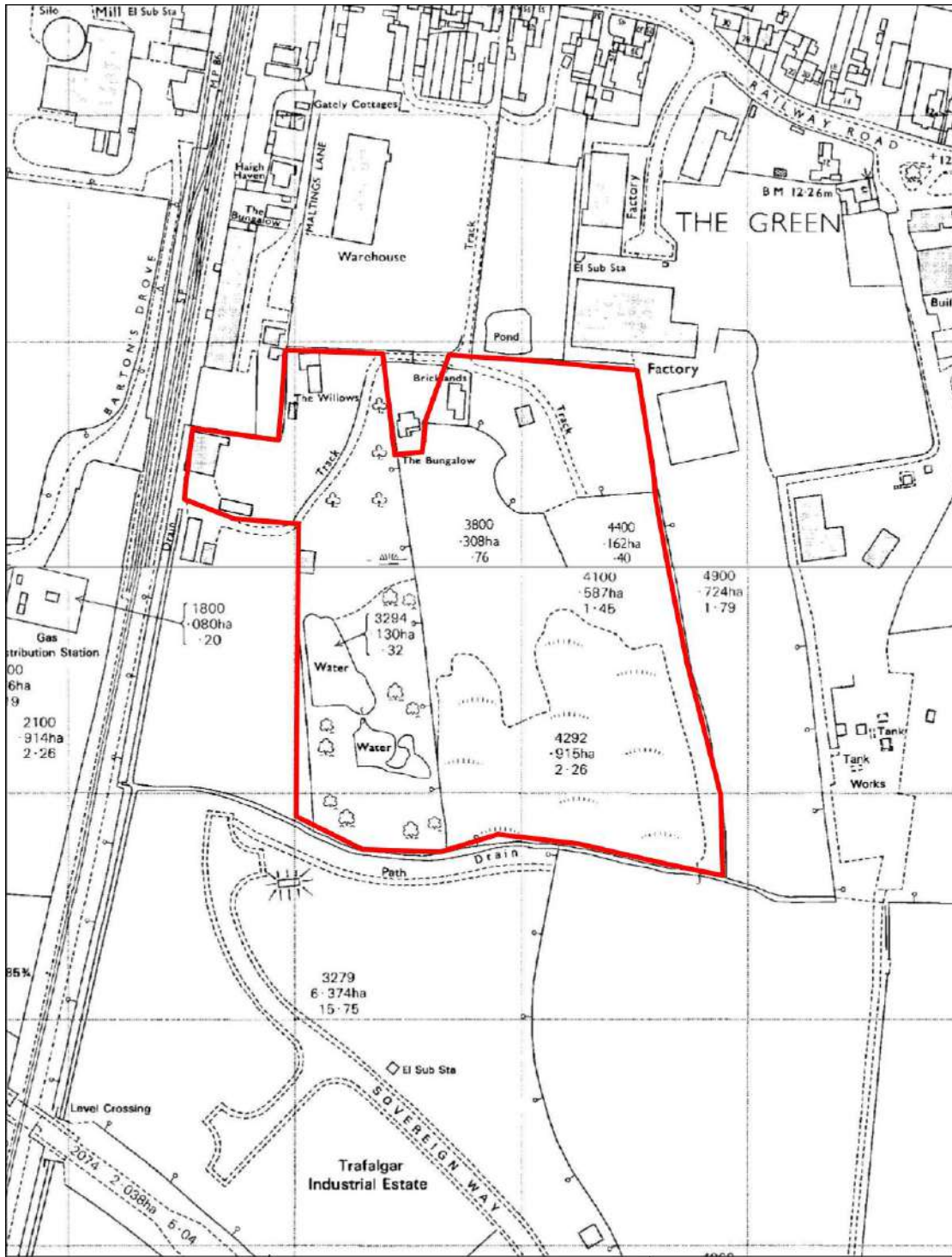
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Borough Council of
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West Norfolk



Map
Historical Maps
Epoch 7 1996+

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The Willows
Nature Reserve

Drawn by Date Scale
AMW January 2023 1:2,000

Drawing / Reference Number
022388/07



Appendix C. Risk Assessment Methodology

The Environment Agency's Land Contamination Risk Management (LCRM) 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 practice¹ 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');
- Low: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in

¹ <https://www.brebookshop.com/samples/142102.pdf>

'Contaminated Land Statutory Guidance, April 2012'). Damage to sensitive buildings, structures or the environment.

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
Probability	High Probability	Very High Risk	High Risk	Moderate Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk
	Low Probability	Moderate risk	Moderate/Low Risk	Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk
Very High Risk	<p>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</p> <p>This risk, if realised, is likely to result in a substantial liability.</p> <p>Urgent investigation (if not undertaken already) and remediation are likely to be required.</p>			
High Risk	<p>Harm is likely to arise to a designated receptor from an identified hazard.</p> <p>Realisation of the risk is likely to present a substantial liability.</p> <p>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.</p>			
Moderate risk	<p>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.</p>			
Moderate/Low risk	<p>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.</p>			
Low Risk	<p>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.</p>			
Very Low Risk	<p>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.</p>			

Appendix D. Determination of contaminated land – Contaminated Land Statutory Guidance, April 2012

Human Health

Category	
1	<p>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:</p> <ul style="list-style-type: none">(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	<p>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.</p>
3	<p>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.</p>

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).

Ecological system effects

Relevant types of receptor	Significant harm	Significant possibility of significant harm
<p>Any ecological system, or living organism forming part of such a system, within a location which is:</p> <ul style="list-style-type: none"> • A site of special scientific interest (under section 28 of the Wildlife and Countryside Act 1981) • A national nature reserve (under s.35 of the 1981 Act) • A marine nature reserve (under s.36 of the 1981 Act) • An area of special protection for birds (under s.3 of the 1981 Act) • A “European site” within the meaning of regulation 8 of the Conservation of Habitats and Species Regulations 2010 • Any habitat or site afforded policy protection under paragraph 6 of Planning Policy Statement (PPS 9) on nature conservation (i.e. candidate Special Areas of Conservation, potential Special Protection Areas and listed Ramsar sites); or • Any nature reserve established under section 21 of the National Parks and Access to the Countryside Act 1949. 	<p>The following types of harm should be considered to be significant harm:</p> <ul style="list-style-type: none"> • Harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or • Harm which significantly affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location. <p>In the case of European sites, harm should also be considered to be significant harm if it endangers the favourable conservation status of natural habitats at such locations or species typically found there. In deciding what constitutes such harm, the local authority should have regard to the advice of Natural England and to the requirements of the Conservation of Habitats and Species Regulations 2010.</p>	<p>Conditions would exist for considering that a significant possibility of significant harm exists to a relevant ecological receptor where the local authority considers that:</p> <ul style="list-style-type: none"> • Significant harm of that description is more likely than not to result from the contaminant linkage in question; or • There is a reasonable possibility of significant harm of that description being caused, and if that harm were to occur, it would result in such a degree of damage to features of special interest at the location in question that they would be beyond any practicable possibility of restoration. <p>Any assessment made for these purposes should take into account relevant information for that type of contaminant linkage, particularly in relation to the ecotoxicological effects of the contaminant.</p>

Property effects

Relevant types of receptor	Significant harm	Significant possibility of significant harm
<p>Property in the form of:</p> <ul style="list-style-type: none"> • Crops, including timber; • Produce grown domestically, or on allotments, for consumption; • Livestock; • Other owned or domesticated animals; • Wild animals which are the subject of shooting or fishing rights. 	<p>For crops, a substantial diminution in yield or other substantial loss in their value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.</p> <p>The local authority should regard a substantial loss in value as occurring only when a substantial proportion of the animals or crops are dead or otherwise no longer fit for their intended purpose. Food should be regarded as being no longer fit for purpose when it fails to comply with the provisions of the Food Safety Act 1990. Where a diminution in yield or loss in value is caused by a contaminant linkage, a 20% diminution or loss should be regarded as a benchmark for what constitutes a substantial diminution or loss.</p> <p>In this section, this description of significant harm is referred to as an “animal or crop effect”.</p>	<p>Conditions would exist for considering that a significant possibility of significant harm exists to the relevant types of receptor where the local authority considers that 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.</p>
<p>Property in the form of buildings. For this purpose, “building” means any structure or erection, and any part of a building including any part below ground level, but does not include plant or machinery comprised in a building, or buried services such as sewers, water pipes or electricity cables.</p>	<p>Structural failure, substantial damage or substantial interference with any right of occupation. The local authority should regard substantial damage or substantial interference as occurring when any part of the building ceases to be capable of being used for the purpose for which it is or was intended.</p> <p>In the case of a scheduled Ancient Monument, substantial damage should also be regarded as occurring when the damage significantly impairs the historic, architectural, traditional, artistic or archaeological interest by reason of which the monument was scheduled.</p> <p>In this Section, this description of significant harm is referred to as a “building effect”.</p>	<p>Conditions would exist for considering that a significant possibility of significant harm exists to the relevant types of receptor where the local authority considers that significant harm is more likely than not to result from the contaminant linkage in question during the expected economic life of the building (or in the case of a scheduled Ancient Monument the foreseeable future), taking into account relevant information for that type of contaminant linkage.</p>

Controlled waters

Significant pollution of controlled waters

The following types of pollution should be considered to constitute significant pollution of controlled waters:

- (a) Pollution equivalent to “environmental damage” to surface water or groundwater as defined by The Environmental Damage (Prevention and Remediation) Regulations 2009, but which cannot be dealt with under those Regulations.
- (b) Inputs resulting in deterioration of the quality of water abstracted, or intended to be used in the future, for human consumption such that additional treatment would be required to enable that use.
- (c) A breach of a statutory surface water Environment Quality Standard, either directly or via a groundwater pathway.
- (d) Input of a substance into groundwater resulting in a significant and sustained upward trend in concentration of contaminants (as defined in Article 2(3) of the Groundwater Daughter Directive (2006/118/EC)5).

Significant possibility of significant pollution of controlled waters

Category

1	This covers land where the authority considers that there is a strong and compelling case for considering that a significant possibility of significant pollution of controlled waters exists. In particular this would include cases where there is robust science-based evidence for considering that it is likely that high impact pollution (such as the pollution described in paragraph 4.38) would occur if nothing were done to stop it.
2	This covers land where: (i) the authority considers that the strength of evidence to put the land into Category 1 does not exist; but (ii) nonetheless, on the basis of the available scientific evidence and expert opinion, the authority considers that the risks posed by the land are of sufficient concern that the land should be considered to pose a significant possibility of significant pollution of controlled waters on a precautionary basis, with all that this might involve (e.g. likely remediation requirements, and the benefits, costs and other impacts of regulatory intervention). Among other things, this category might include land where there is a relatively low likelihood that the most serious types of significant pollution might occur
3	This covers land where the authority concludes that the risks are such that (whilst the authority and others might prefer they did not exist) the tests set out in Categories 1 and 2 above are not met, and therefore regulatory intervention under Part 2A is not warranted. This category should include land where the authority considers that it is very unlikely that serious pollution would occur; or where there is a low likelihood that less serious types of significant pollution might occur.
4	This covers land where the authority concludes that there is no risk, or that the level of risk posed is low. In particular, the authority should consider that this is the case where: <ul style="list-style-type: none"> (a) No contaminant linkage has been established in which controlled waters are the receptor in the linkage; or (b) The possibility only relates to types of pollution described in paragraph 4.40 above (i.e. types of pollution that should not be considered to be significant pollution); or (c) The possibility of water pollution similar to that which might be caused by “background” contamination as explained in Section 3.