

Appendix F – UXO

STAGE 1 PRELIMINARY UXO RISK ASSESSMENT

REPORT REF: PRA-21-1510 | Revision: 1



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Client: Mace Group
Project: Broadwater Lake, Uxbridge
Date: 26/10/2022

INTRODUCTION

The Stage 1 Preliminary Risk Assessment is an initial screening assessment designed to highlight any sources of unexploded ordnance (UXO) with the potential to contaminate a given site.

The aim of the Stage 1 assessment is to identify or discount the need for further detailed research - a Stage 2 Detailed UXO Risk Assessment.

This desktop assessment has been researched and written by a dedicated Researcher / Risk Assessor and produced in accordance with the CIRIA C681 Guidelines: 'Unexploded Ordnance, a Guide for the Construction Industry' (published in 2009).

In preparation for this assessment, original wartime records, historic OS mapping and the *Brimstone UXO Sources Database* have been reviewed. The latter incorporates multiple datasets plotting the positions of a variety of domestic military sites and confirmed historic German bombing targets.

The Stage 1 Preliminary Risk Assessment considers the following:

1. The Proposed Works
2. Enemy Action during WWI and WWII
3. British / Allied Military Activity
4. Historic Site Occupancy
5. Risk Mitigating Factors

THE SITE

The Site (approximately centred on the National Grid Ref: TQ 04400 89621) is located in South Harefield, within the London Borough of Hillingdon, approximately 4.2km north of Uxbridge and 1m north-east of Denham railway station. It comprises three parcels of land, which will be referred to as Sites A, B and C for the purposes of this assessment.

Site A comprises a large area of land predominantly consisting of a body of water, forming part of Mid Colne Valley, a biological Site of Special Scientific Interest. Small islands are situated sporadically throughout the water. The northern extent of the Site encompasses a small structure and associated car parking, as well as footpaths and vegetation. The eastern extent encompasses further footpaths and vegetation. A large area of vegetation, as well as a cluster of structures, a smaller body of water and an accessway are present in the south / south-east. A hard surfaced roadway runs adjacent to the eastern border, connecting to Moorhall Road in the south. The River Colne is present to the immediate north and west and the Grand Union Canal is present to the immediate east, whilst Northmoor Hill Nature Reserve is situated approximately 630m east.

Site B, situated to the immediate east of Site A on the adjacent side of the Grand Union Canal, comprises an area of mature vegetation. It is bound to the east by residential properties on St Mary's Road and St Mary's Close and to the south by an industrial facility, Maying Transport.

Site C, situated approximately 135m west of the southern extent of Site A, comprises predominantly undeveloped land consisting of grass and vegetation. The western border partially encompasses a structure of an assumed industrial nature and associated hard surfaced ground. It is bound to the south by Moorhall Road.



THE PROPOSED WORKS

An SI is proposed, comprising boreholes drilled to a depth of 15m bgl, with further shallow excavations. Development works comprise an outdoor activity centre. The deepest excavations related to the development are expected to be to 2-3m bgl (to be confirmed) to facilitate a foul drainage pumping station. Foundation excavations associated with the new infrastructure should be to 1-2m bgl, subject to existing ground conditions.

ENEMY ACTION DURING WWI AND WWII

Potential Source of UXO	Significant?	Details	
WWI German Bombing	✗	No raids affected Uxbridge during WWI.	
WWII German Bombing	✓	British District Bombing Density Statistics	The Site is located in the border area of the WWII-era Municipal Borough of Uxbridge, which sustained 20.7 bombs / 1,000 acres, a low-to-moderate bombing density, and the Urban District of Eton, which sustained 4 bombs / 1,000 acres, a very low bombing density.
		Evidence of bomb strikes / damage	Bomb census mapping records 14 HE bomb strikes within an approximate 500m radius of the Site; note, available mapping did not cover the area to the west of the Site and as such, further unrecorded strikes may have occurred in the vicinity. One of the above-mentioned bomb strikes is recorded in the north of Site B. Strikes are recorded on the eastern and southern borders of Site A; the strikes to the south are part of a bomb-stick (individual aircraft bombload). The closest recorded strike to Site C is plotted approximately 140m west. No immediately obvious evidence of bomb damage occurring on Site or in the immediate surrounds within post-WWII OS mapping. Note, due to the Site's open composition during WWII, evidence of damage occurring may not be visible within consulted sources at a preliminary stage.
		Local Bombing Decoy Sites	None within a significant distance of the Site. The closest was located approximately 11km south of Site C.
		Local German Bombing Targets	No confirmed identified primary Luftwaffe targets in the wider study area. RAF Denham, approximately 330m west of Site A at its closest point, may have been identified as a target.
WWII German Cross Channel Artillery Shelling	✗	n/a	

BRITISH / ALLIED MILITARY ACTIVITY

Potential Source of UXO	Significant?	Details
WWII Home Guard (HG) activity	✗/✓	Soldiers of the 14 th Middlesex (Uxbridge) HG Battalion will have been active locally during WWII. The possibility that the land-based areas of the Site accessed by armed HG troops on patrol cannot be discounted at this stage.

Site requisitioned for wartime military use	x/✓	No such evidence found at this stage. The possibility that the Site areas were requisitioned for temporary wartime use cannot be ruled out entirely (e.g. tented military camp, LAA gun battery, searchlight battery, RAF barrage balloon site).
Existing or historic Army or RAF training area / weapons range	x	n/a
Existing or historic military bases and other installations	x/✓	RAF Denham, a WWI and WWII-era flying training school, was situated approximately 330m west of Site A. Anecdotal evidence refers to a weapons development unit being present at the airfield from late 1942 onwards, testing RP3 rockets for consistency and directional stability. ¹ 'Secret weapons' are also referenced as being brought to Denham during WWII. ² The close proximity of the airfield to the Site could feasibly have resulted in Allied UXO contamination on Site, such as training activities or improper disposal methods.
Existing or historic munitions or explosives factories	x	n/a
Existing or historic military storage depots	x	n/a
Existing or historic military defensive fortifications	x/✓	A pillbox is situated to the immediate east of Site A and approximately 350m south of Site B. The installation is said to be in the back garden of a residential property on the east bank of Grand Union Canal, which would place it on the opposite side of the canal to Site A. A further pillbox is also situated approximately 295m south-east of Site C.
WWII light and / or heavy anti-aircraft (LAA and HAA) fire	✓	12 permanent HAA batteries were active within range of the Site during WWII. LAA guns likely defended vulnerable points within the wider area too. Luftwaffe activity in the region was relatively frequent. It is possible that an unexploded AA shell struck the Site.
WWII pipe-mined locations and beach minefields	x	n/a
Explosive Ordnance Clearance (EOC) tasks	✓	A series of EOC tasks were potentially conducted in the north-western extent of the Site in 1998, according to a geo-data set held in-house. Available information states that during the initial recce of the Site, a locator search was deemed impracticable due to domestic contamination, and the attendance of an EOD banksman was recommended if further excavations in the area of concern were required. A banksman later attended but provided no clearance certificate. No live / expended items of UXO are recorded to have been found.

¹ <http://www.egld.com/1940.html>

² <http://www.egld.com/1944.html>

SITE HISTORY	
What was the Site occupancy historically, especially during WWI and WWII?	During WWII, the majority of all three Site areas were predominantly occupied by undeveloped land of an assumed agricultural nature. Site A may have also acted as a floodplain. Rows of vegetation intersect Site A throughout. A disused brickworks was present approximately 170m north-west of Site B. A cluster of structures were present to the immediate west of Site C, possibly partially encompassed by the western border.
RISK MITIGATING FACTORS	
Post-conflict ground works	<p>By 1972, a sand and gravel works had been developed in the southern extent of Site A; whilst still predominantly consisting of undeveloped ground, a number of structures labelled as hoppers and conveyors were situated sporadically throughout. An associated accessway had also been developed in this area.</p> <p>By 1999, the majority of Site A was occupied by a body of water. Although it should be noted that it is unknown if the formation of this occurred naturally or whether it was man made, evidence suggests that it may have formed within an abandoned gravel pit. Other lakes in the wider area are known to have formed from similar conditions.</p> <p>An area of vegetation in the south had been retained, although the aforementioned works was no longer present. A cluster of structures had been developed in the south / south-east, whilst the accessway remained in place. In the north, the structure and car park identified in recent aerial photography had been developed.</p> <p>Sites B and C have largely retained their WWII-era composition, aside from the structure partially encompassed by the western border of Site C.</p> <p>The excavations for foundations associated with post-WWII infrastructure within Sites A and C are likely to have been to shallow depths (1-2m bgl). Post-WWII agricultural work and the laying of hard surfaced ground is likely to have disturbed WWII-era soil to a very shallow depth (<1m bgl) within all three Site areas; note, no laying of hard surfaced ground appears to have occurred within Site B. No deep excavations (>2m bgl) of WWII-era soil are likely to have taken place in the post-WWII period within all three Site areas, although it should again be noted that it is not known whether Site A was subject to excavation works in association with the body of water.</p>
Likelihood of UXO remaining	<p>The risk associated with (any) very shallow buried UXO will have been partially mitigated within all three Site areas. The risk associated with shallow buried UXO will have been partially mitigated in areas subject to post-WWII excavation works for foundations i.e. the structures present in the north and south of Site A. The risk associated with (any) deep buried UXO almost certainly remains unmitigated within all three Site areas.</p> <p>If Site A was subject to post-WWII excavation works to form the body of water, it should be noted that the risk of encountering UXO within the area encompassed by the water is considered mitigated down to the specific depths of its post-WWII excavations.</p>
CONCLUSIONS	

German UXO:

- Although Uxbridge nor Eton were never the subject of a large-scale concentrated air raid, the surrounding area experienced numerous smaller scale attacks, largely due to its vulnerable position within 20km of central London, the Luftwaffe's aiming point for indiscriminate bombing. Consequently, the area experienced an elevated bombing density.
- The majority of bombing in the area can largely be attributed to 'tip and run' raids when bomber crews jettisoned any remaining bombs over targets of opportunity, such as RAF Denham to the west of Site A. Such incidents were commonplace throughout the region.
- No confirmed Luftwaffe targets were present in the immediate vicinity. However, 14 HE bomb strikes were recorded within an approximate 500m radius of the Site areas; one strike is recorded within the northern extent of Site B, whilst further strikes are recorded on the eastern and southern borders of Site A; the strikes in the south formed part of a bomb-stick. It should be noted that the consulted bomb census mapping did not cover the area to the west of Site A and as such, further unrecorded strikes may have occurred. Therefore, given this evidence, it is quite possible that wayward bombs (potential UXBs) were dropped in the immediate vicinity of the Site.
- As areas of undeveloped land of an agricultural nature, any UXB strike(s) occurring on Site could have gone unnoticed and the resulting entry hole could have been overlooked / obscured by vegetation. Furthermore, access levels are not anticipated to have been frequent or regular, although this will have depended on the landowner. This further impedes the likelihood of a UXB strike being noticed and reported at the time.
- As the majority of the ground encompassed by all three Site areas has only experienced minimal post-WWII intrusive works, it is entirely possible that a UXB may remain in-situ in previously undisturbed areas / depths beneath previous post-WWII intrusive works.

British / Allied UXO:

- No evidence of significant military activity occurring specifically on Site has been found. However, the presence of RAF Denham to the west of Site A and a number of pillboxes in the wider surrounds, including one immediately east of Site A, highlights a heightened military presence in the surrounds.
- Although no confirmed evidence of such an occurrence has been found at this stage, it is possible that the Site may have been temporarily requisitioned for military purposes, which may have resulted in military training using live munitions or improper disposal of ordnance.
- It is quite possible that an unexploded British AA shell struck the Site during WWII and penetrated to a shallow depth. Any such UXO incident could have been overlooked and remained in-situ as per the reasons above.

RECOMMENDATION(S)

SI Works	A Stage 2 Detailed Risk Assessment is recommended to further assess the risk to the proposed works.
Development Works	