



Low Risk



Medium Risk

**Low and Medium Risk Areas:**

- Site Specific Unexploded Ordnance Awareness Briefings to all personnel conducting intrusive works

**Medium Risk Area:**

- Unexploded Ordnance (UXO) Specialist Presence on Site to support shallow intrusive works
- Intrusive Magnetometer Survey of all Borehole and pile locations down to a maximum bomb penetration depth

For indicative purposes – not to scale



**1ST LINE DEFENCE**

Unit 3, Maple Park  
Essex Road, Hoddesdon,  
Hertfordshire. EN11 0EX  
Email: [info@1stlinedefence.co.uk](mailto:info@1stlinedefence.co.uk)  
Tel: +44 (0)1992 245 020

Client: **Curtins**

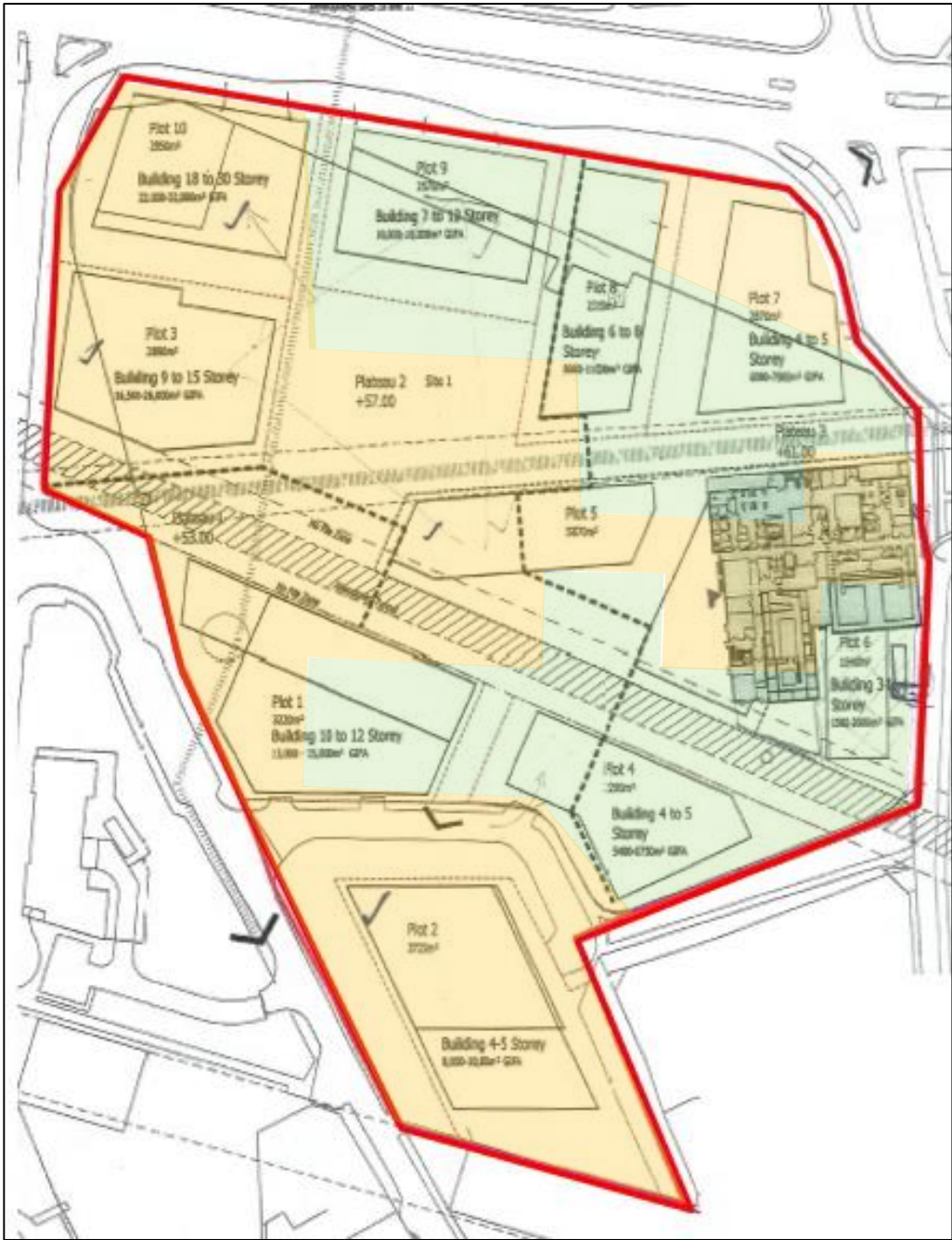
Project: **Kaplin, Smithdown Lane, Liverpool**

Ref: **DA4024-01**

Source: National Monuments Record Office (Historic England)

 **Approximate site boundary**





- Low Risk
- Medium Risk

**Low and Medium Risk Areas:**

- Site Specific Unexploded Ordnance Awareness Briefings to all personnel conducting intrusive works

**Medium Risk Area:**

- Unexploded Ordnance (UXO) Specialist Presence on Site to support shallow intrusive works
- Intrusive Magnetometer Survey of all Borehole and pile locations down to a maximum bomb penetration depth

For indicative purposes – not to scale



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Client: Curtins

Project: Kaplin, Smithdown Lane, Liverpool

Ref: DA4024-01

Source: 1st Line Defence

Approximate site boundary



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**1<sup>ST</sup> LINE DEFENCE**

## **APPENDIX 6**

### **Invasive Species Survey Report**



# Extended Phase 1 Habitat Survey

Mason Street, Liverpool

March 2017

## Draft Report

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**Report Prepared For:**

Fairhurst,  
Arngrove Court,  
Barrack Road,  
Newcastle upon Tyne,  
NE4 6DB

**Project Ref:** ECN16 186

**Prepared By:** Maria Thompson Grad CIEEM

**Reviewed By:** Catherine Charles MCIEEM

**Approved By:** Claire Snowball MCIEEM

**Date:** 6<sup>th</sup> March 2017

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# Document Control

Version	Date	Changes	Confidentiality	Prep	Rev	Auth
Draft V01	06/03/17	Draft to client	Not confidential	MT	CC	CS

## Field Investigations and Data

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by EcoNorth Ltd. for inaccuracies in the data supplied by any other party.

## Declaration of Compliance

"The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed within this document are our true and professional bona fide opinions."

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# 1. Summary

EcoNorth Ltd. was commissioned by Fairhurst to undertake an extended phase 1 survey of land at Mason Street in Liverpool, Merseyside. The survey was undertaken by Maria Thompson on 23<sup>rd</sup> February 2017. Habitat maps were produced in accordance with the methodology described in the Handbook for Phase 1 Habitat Survey (JNCC, 2010), with the survey 'extended' to determine the potential suitability of the site for protected species. It is proposed to redevelop the site; this report is designed to highlight key ecological constraints and assesses the potential impacts upon the ecological interests of the site, with a particular emphasis on the presence of non-native and invasive plant species listed on schedule 9 of the Wildlife and Countryside Act 1981 (as amended). **This is a draft report and is not currently suitable to support a planning application.**

The following table highlights the key ecological features/species identified on site and those which have the potential to be present, based on the information available to date. Requirements for further surveys are highlighted, while necessary mitigation measures are provided in Section 7.

Ecological Feature	Presence on Site	Ecological Value	Further Surveys Required Pre-Planning?	Key Mitigation
Habitats	Habitats on site are dominated by hard standing, with limited areas of scrub, tall ruderal, semi-improved grassland, scattered trees and dense scrub	Negligible - local	No	None
Invasive Plant Species	None identified during site visit	N/A	No	None
Bats	No potential roost sites present and habitats provide limited foraging opportunities for the local bat population.	Negligible-low	No	Consider native planting scheme around periphery of development to provide potential foraging opportunities
Birds	Some potential for a limited range of locally common species of breeding bird to utilise the site	Low	No	Breeding bird check required if vegetation removal undertaken during breeding bird season (March – August inclusive)

Reptiles, badgers, great crested newts, otter and water vole were also considered, but are excluded from the above as habitats were not considered to be suitable.



## 2. Introduction

### 2.1 Background

EcoNorth Ltd. was commissioned by Fairhurst to undertake an extended Phase 1 survey of land at Mason Street in Liverpool, Merseyside (central grid reference SJ 3634 9035). Fairhurst proposes to redevelop the site. The survey was designed to map the habitats and determine the potential suitability of the site for protected species, to highlight key ecological constraints with a particular emphasis on the presence of non-native and invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

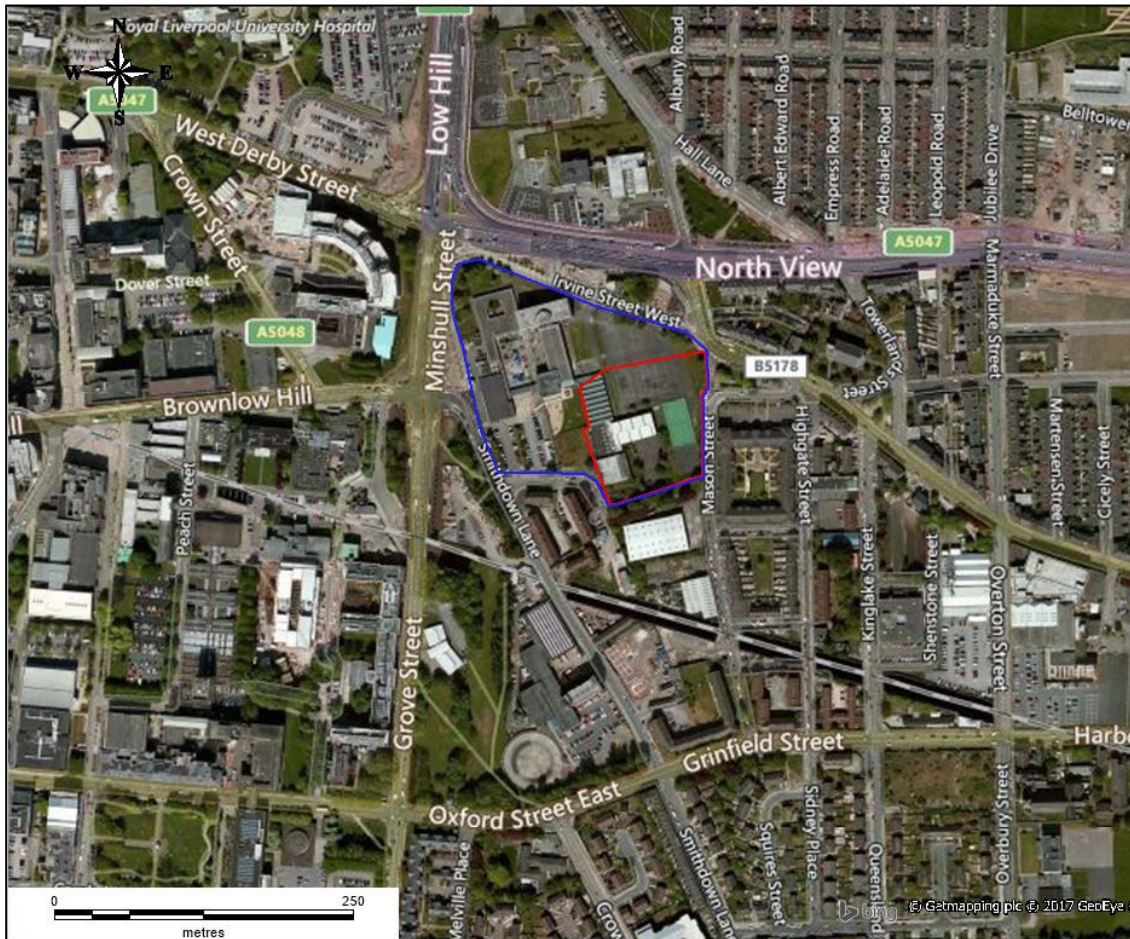
This report:

- Sets out the results of the survey
- Analyses the site's value for nature conservation
- Highlights the presence of any non-native or invasive species present on site
- Identifies additional survey requirements in order to fully determine the baseline ecological conditions on the site
- Identifies key avoidance, mitigation and/or compensation measures required to ensure the proposals do not have an adverse impact upon biodiversity

## 2.2 Site Context

Figure 1 identifies the location and extent of the development site.

**Figure 1: Indicative Site Boundary** (Boundary outlined in red, area surveyed in blue)



The site is located approximately 1km to the east of the City of Liverpool and 2.6km to the east of the River Mersey. The site lies in an area dominated by commercial development with interspersed residential development. The site previously housed a large school, which has recently been demolished.

## 2.3 Nature of the Proposals

It is proposed to redevelop the site following the demolition of a school. This report is designed highlight any ecological constraints associated with the proposals, particularly the presence of any non-native invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act.



### **3. Planning Policy and Legislation**

#### **3.1 Planning Policy and Guidance**

A series of national and local planning policies are in place which are designed to ensure that development works do not have an adverse impact upon biodiversity, at a site or wider level. Such policies ensure that both developers and public bodies must give due consideration to the potential effects of development works upon both ecological receptors (in line with existing wildlife legislation) and biodiversity.

##### **3.1.1 National Planning Policy Framework (NPPF) (2012)**

The NPPF outlines the Government's policies through the planning process, acting as guidance for local planning authorities and decision-makers. The document places a duty on local authorities to consider the principles included when assessing planning applications and preparing Local Plans and Regional Spatial Strategies. Chapter 11 relates to the conservation and enhancement of the natural environment, in line with existing wildlife legislation. Further details are provided on the gov.uk website (<https://www.gov.uk/government/publications/national-planning-policy-framework--2>)

##### **3.1.2 Biodiversity Action Plans (BAPs)**

The UK BAP was published in 1994 to guide national strategies for the conservation of biodiversity. BAPs were designed to ensure the conservation and re-establishment of natural habitats, and that measures were implemented to aid the conservation and enhancement of habitats and species of local importance, the latter through the development of Local BAPs. The UK BAP was succeeded by the 'UK Post-2010 Biodiversity Framework' in 2012 however, the lists of species and habitats of conservation importance are still considered to remain a valuable tool for identifying features of local and national conservation concern. As such, the potential presence of both Local and UK BAP habitats and species were considered throughout the surveys and assessment.

#### **3.2 Legislation**

A range of legislation is in place to ensure that habitats and species of conservation importance are protected from both direct and indirect harm. Key legislation includes:

- The Conservation of Habitats and Species Regulations 2010 (The Habitat Regulations)
- The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (The Bern Convention)
- The Wildlife and Countryside Act 1981 (as amended)



- The Natural Environment and Rural Communities (NERC) Act 2006
- The Countryside and Rights of Way (CROW) Act 2000
- The Wild Mammals (Protection) Act 1996
- The Protection of Badgers Act 1992
- The Hedgerow Regulations 1997

An overview of the above legislation is provided in Appendix A.

The potential presence, on or near the site, of species afforded protection under the above legislation was considered throughout the surveys and assessment. Species considered include:

- Bats
- Great crested newt
- Otter
- Water Vole
- Reptiles
- Badger
- Birds

An overview of the legislation and level of protection relating to such species is provided in Appendix A.

## 4. Methodology

### 4.1 Desk Study

Contextual information was gathered as part of a desk study undertaken prior to the start of field surveys. Such information can identify protected or notable species which may occur on the proposed development site or in the local area, as well as identifying statutory and non-statutory ecological sites which may have the potential to be affected by the proposals. The location of statutory and non-statutory nature conservation sites within 2km of the survey site were obtained from the Multi-Agency Geographic Information for the Countryside (MAGIC) website ([www.magic.gov.uk](http://www.magic.gov.uk)).

Additionally, 1:10,000 Ordnance Survey maps were consulted to help identify waterbodies or watercourses within 500m of the site. This search reflects the potential for great crested newts *Triturus cristatus* to utilise terrestrial habitat up to 500m from their breeding ponds





and also helps determine the potential for other riparian or semi-aquatic species which will move away from a watercourse to be present (e.g. otter *Lutra lutra*).

It should be noted that an absence of records is likely to reflect an absence of survey data and cannot be taken as confirmation that a particular species is not present in the site or surrounding area.

## **4.2 Field Survey**

### **4.2.1 Habitats**

Mapping of the habitats within the site followed the Phase 1 survey methodology outlined in the 2010 edition of the 'Handbook for Phase 1 habitat survey' by the Joint Nature Conservation Committee (JNCC). This follows a standardised system which can be easily interpreted, with habitats and boundary features correlating to one of around ninety set definitions. Target notes were used to record further information regarding features of interest, or specific habitats or features identified during the survey which do not closely match any of the Phase 1 criteria.

Plant species were identified in accordance with Rose (2006) and Stace (2010). A search was conducted for presence of Schedule 9 invasive non-native plant species such as Japanese knotweed *Fallopia japonica* and Himalayan balsam *Impatiens glandulifera*.

The results of the Phase 1 survey are shown in Appendix B, with target notes provided in Appendix C and site photographs in Appendix D.

### **4.2.2 Protected and Notable Species**

Throughout the field survey, searches were made for field signs indicating the presence of protected and notable species, including but not being limited to those species listed in Section 3.2. Any field signs recorded (including sightings of the animals themselves) were mapped; any such signs are illustrated in Appendix B and listed as target notes in Appendix C. An assessment was also made of the potential for the site and adjacent areas to support protected and notable species, to identify where the proposals may impact upon such species and identify any requirements for further (species-specific) surveys.

### **4.2.3 Survey Conditions and Personnel**

The extended phase 1 survey was completed on 22<sup>nd</sup> February 2017 by Maria Thompson. Details of qualifications and experience are available at [www.econorth.co.uk/team](http://www.econorth.co.uk/team)



Table 1 shows the conditions during the survey.

**Table 1: Survey Conditions**

Date	Precipitation	Temperature (°C)	Cloud Cover (Octas)	Wind (Beaufort Scale)
22/02/2017	Light intermittent rain throughout survey	10 °C	8/8	4

Any constraints or limitations to the survey are discussed in Section 6.1.

### 4.3 Assessment

The botanical value of the habitats on site and the value of the site for protected species, as determined through the extended phase 1 survey, were based on the criteria published by the Chartered the Institute of Ecology and Environmental Management (CIEEM) in 2016 (<http://www.cieem.net/ecia-guidelines-terrestrial->). Each feature was classified as being as one of the following levels of value:

- International
- National
- Regional/County
- City/District/Borough
- Local
- Low

Examples of different ecological features meeting each of these criteria are outlined in Appendix E.

## 5. Baseline Conditions

### 5.1 Desk Study

#### 5.1.1 Designated Sites

No statutory or non-statutory sites were identified within 2km of the development site.



## 5.2 Field Survey

### 5.2.1 Habitats

Habitats within the site were found to be dominated by hard standing, with semi-improved grassland, dense scrub, tall ruderal and scattered trees. One structure was present on site. Such habitats are described in the following sub-sections. The results of the Phase 1 survey are shown in Appendix B, with target notes provided in Appendix C and site photographs in Appendix D.

#### Habitat Name/Phase 1 Criteria

##### Hard Standing/Built Development

Hard standing dominates the site, owing to its previous use as a car park and school yard. Small areas of rubble are present along the periphery of the site where the previous school building has been demolished. A single structure is present within the development area, comprising a single brick tower which appears to be in a sound condition.

##### Semi-improved Grassland/Tall Ruderal

The site is bordered by a semi-improved grassland margin featuring perennial rye-grass *Lolium perenne*, cock's foot *Dactylis glomerata*, white clover *Trifolium repens*, dandelion *Taraxacum officinale* agg., creeping buttercup *Ranunculus repens*, broadleaved dock *Rumex obtusifolius*, ribwort plantain *Plantago lanceolata*, common sorrel *Rumex acetosa*, ragwort *Senecio jacobaea*, spear thistle *Cirsium vulgare*, creeping thistle *Cirsium arvense*, weld *Reseda luteola*, pineappleweed *Matricaria discoidea*, self-heal *Prunella vulgaris* and herb Robert *Geranium robertianum*, with instances of hogweed *Heracleum sphondylium*, common nettle *Urtica dioica*, common horsetail *Equisetum arvense* and cleavers *Galium aparine*. The semi-improved grassland margins are interspersed with tall ruderal vegetation including rosebay willowherb *Chamerion angustifolium* and buddleia *Buddleja davidii*.

##### Dense Scrub

Dense scrub is dominant in the south and west of the site, comprising bramble *Rubus fruticosus* agg. with instances of rosebay willowherb and buddleia.

##### Scattered Trees

Scattered trees are present along the periphery of the site. The trees range from immature saplings through to semi-mature in age. Species noted include silver birch *Betula pendula*, sycamore *Acer pseudoplatanus*, grey willow *Salix cinerea*, alder *Alnus glutinosa*, dogwood *Cornus sanguinea* and hazel *Corylus avellana*.

### 5.2.2 Schedule 9 Plant Species

No schedule 9 plant species were identified on or within close proximity to the site.





### **5.2.3 Protected and Notable Species**

#### **Bats**

Habitats on site are considered to be of varied quality for bats. The grassy margins with scattered trees are considered to provide some potential foraging habitat, with corridor features suitable for commuting. However, the majority of the site is hard standing and thus offers limited foraging and commuting opportunities owing to its open and exposed nature.

The trees on site are considered too immature and sound to support roosting bats. The single structure present on site - a brick tower - is well sealed with no potential access points. The mortar and bricks are all in a good condition with no signs of wear. As a result, the structure is not considered to have the potential to support roosting bats.

#### **Great Crested Newts**

Habitats on the site are considered to be unsuitable for such species due to the lack of potential breeding habitat (no ponds identified within 500m) and the dominance of hard standing, lacking potential foraging opportunities or shelter (from the weather or predators). As a result, great crested newt are not considered any further within this assessment.

#### **Otter**

No waterbodies or watercourses are present on or immediately adjacent to the site which could be used by otter, and the habitats within the survey area were considered to be unsuitable for the species, lacking either foraging opportunities or shelter. As such, otter are not considered further in this assessment.

#### **Water Vole**

The lack of aquatic habitat on or adjacent to the site, and the dominance of hard standing and built development within the proposed works area, are considered to preclude the use of the site by water vole. As such, the species is not considered further in this assessment.

#### **Reptiles**

Although the areas of hard standing within the site have the potential to be used by basking reptiles, the lack of cover or potential foraging opportunities for such species within the site, and the severance of the site from potentially suitable habitat in the wider area, makes it highly unlikely that such species would be present or affected by the proposals. As such, reptiles are not considered further in this assessment.



## Badger

The dominance of hard standing across the site is considered to provide unsuitable habitat for foraging badger or sett creation. Whilst areas of dense scrub may provide suitable badger habitat, the perimeter fence restricts access to the site for the species, with no mammal trails identified crossing this feature. As such, the species is not considered further in this assessment.

## Birds

The scattered trees and limited areas of scrub on site have the potential to support small numbers of locally common species of breeding bird during the nesting period, with a single robin and c.5 goldfinches observed within the southern area of the site during the survey.

## BAP and Other Species

The vegetated areas on site are considered suitable to support hedgehog, which may frequent the site from time to time.

# 6. Interpretation and Discussion

## 6.1 Survey Constraints and Further Survey Requirements

Due to the timing of the survey (winter) a full plant list could not be compiled. This limited the opportunity to find and identify species however, a good range of plants species were identifiable and given the nature and use of the site, it is considered that a robust assessment of the phase 1 habitat category and hence, conservation value of the site, could be made.

## 6.2 Assessment of Value

Based on the results of the desk study and field work completed to date, the ecological interests of the site are valued as shown in Table 2, below, using the criteria outlined in Section 4.3 and Appendix E.

**Table 2: Value of Ecological Features Recorded on Site**

Ecological Feature	Ecological Value	Justification
Hard standing and structure (botanical)	Negligible	No botanical value
Scrub, tall ruderal, semi-improved grassland,	Low to local	Small areas supporting semi-improved grassland, scrub, tall ruderal, dense scrub and scattered trees with a range of locally common species, which can be readily recreated



Ecological Feature	Ecological Value	Justification
scattered trees and dense scrub		over a short period of time.
Bats	Negligible – low	Sub-optimal habitat for foraging and commuting with the exception of the vegetated periphery. Negligible roosting potential across site.  Wider area is of negligible-low value to bats (built up infrastructure).
Birds	Low	Some potential for a limited range of locally common species of breeding birds to utilise the site

### 6.3 Input into the Design Process

Due to the nature of the habitats on site and the lack of suitable bat roosting habitat, no key ecological constraints to the proposals were identified which would require specific measures to be incorporated into the site design.

### 6.4 Impact Assessment

Based on the information available to date, the development will have the following impacts upon the ecological interests of the site:

- The loss of habitats of negligible to local value (largely the former), primarily comprising areas of hard standing
- The loss of a small area of habitat of low value to foraging and commuting bats
- The loss of a small area of habitat of low value to breeding birds
- The harm or disturbance of active nests, in the event that site clearance works are undertaken during the breeding season (March – August inclusive)

## 7. Mitigation and Compensation Strategy

The following measures will be implemented in order to minimise the ecological impacts of the proposals, including the risk of protected species being adversely affected:

- Works (vegetation clearance) will not commence during the bird breeding season (March to August inclusive) unless a checking survey by an appropriately qualified ecologist has shown active nests to be absent within the five days prior to the start of works
- Priority within the planting scheme should be given to native species, ideally of local provenance, or those of known value to wildlife, in order to help maximise the ecological value of the site



## 8. References

- Anon (2012). *National Planning Policy Framework*. Department for Communities and Local Government.
- England Field Unit – Nature Conservancy Council 1990 (2010). *Handbook for Phase 1 Habitat Survey – a technique for environmental audit*. Joint Nature Conservation Committee, Peterborough.
- Rose, F. (1989). *Colour Identification Guide to the Grasses, Sedges, Rushes and Ferns of the British Isles and north-western Europe*. Viking.
- Rose, F. (revised and updated by O'Reilly, C.) (2006). *The Wild Flower Key: How to identify wild flowers, trees and shrubs in Britain and Ireland*. Frederick Warne.
- Stace, C (2010). *New Flora of the British Isles, 3<sup>rd</sup> Edition*. Cambridge University Press.



## Appendix A – Key Legislation

**Table A1: Overview of Key Legislation**

Legislation	Key Features
The Conservation of Habitats and Species Regulations 2010 (The Habitats Regulations)	<p>The Habitat Regulations transpose <i>Council Directive 79/409/EEC on the Protection of Wild Birds</i> (the EC Birds Directive 1979) and <i>Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna</i> (the EC Habitats Directive 1992) into UK law. The Birds Directive was amended in 2009, becoming Directive 2009/147/EC.</p> <p>The Habitat Regulations make it an offence (with certain exceptions) to deliberately capture, disturb, kill or trade in those animal species listed in Schedule 2, or to pick, cut, uproot, collect, destroy or trade in those plant species listed in Schedule 4.</p> <p>The EC Birds Directive requires member states to establish and monitor Special Protection Areas (SPAs) for all rare or vulnerable species included in Annex I, as well as for all regularly occurring migratory species, with key focus on wetlands of international importance. Annex I and II of the Habitats Directive respectively list those habitats and species for which a similar network of sites – Special Areas of Conservation (SACs) – must be established and monitored. Collectively, SPAs and SACs form a network of pan-European protected areas which are referred to as 'Natura 2000' sites.</p>
The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (Bern Convention)	<p>The Bern Convention was adopted in 1979 and ratified by the UK Government in 1982. The principal aims of the Convention are to ensure the conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species).</p> <p>Members of the European Community meet their obligations via the Birds Directive and the Habitats Directive. These are transposed into UK law by the Wildlife and Countryside Act 1981 (as amended), Nature Conservation (Scotland) Act 2004 (as amended), Wildlife (Northern Ireland) Order 1985, and the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985.</p>
The Wildlife and Countryside Act	The Wildlife and Countryside Act consolidates and amends existing national legislation to implement the requirements of the Bern



Legislation	Key Features
1981 (as amended)	<p>Convention and the Birds Directive throughout Great Britain. The Act is the primary UK mechanism for the designation of statutory ecological sites - Sites of Special Scientific Interest (SSSIs) - and the protection of individual species listed under Schedules 1, 2, 5, 6 and 8 of the Act, each of which is subject to varying levels of protection.</p> <p><b>Schedule 9</b> of the Act also lists those plant species which it is an offence to plant or otherwise cause to grow in the wild, while Schedule 14 prevents the release into the wild or sale of certain plant and animal species which may cause ecological, environmental or socio-economic harm.</p>
Natural Environment and Rural Communities Act 2006	<p>The NERC Act places a duty on public bodies to consider and conserve biodiversity through the exercise of their functions and includes a range of measures to strengthen the protection of both habitats and wildlife. The Act makes provision in respect of biodiversity, pesticides harmful to wildlife, protection of birds and invasive non-native species.</p>
The Countryside and Rights of Way (CROW) Act 2000	<p>The CROW Act, which applies to England and Wales only, strengthens the provisions of the Wildlife and Countryside Act 1981 (as amended), both in respect of protected species and statutory ecological sites, the latter primarily relating to the management and protection of SSSIs. It also provides for better management of Areas of Outstanding Natural Beauty (AONBs).</p> <p>The Act places a statutory obligation on public bodies to further the conservation of biodiversity through the exercise of their functions, thereby providing a statutory basis to the Biodiversity Action Plan (BAP) process. Section 74 of the Act lists those habitats and species of principal importance in England.</p>
The Wild Mammals (Protection) Act 1996	<p>This Act provides protection for wild mammals from acts of cruelty. An offence is committed if any person mutilates, kicks, beats, nails, or otherwise impales, stabs, burns, stones, crushes, drowns, drags or asphyxiates any wild mammal with intent to inflict unnecessary suffering.</p>
The Protection of Badgers Act 1992	<p>This consolidates the existing legislation relating to the protection of badgers, and makes it an offence in England and Wales to wilfully kill, injure or take a badger (or attempt to do so) and affords protection to both the animals themselves and their setts.</p>
Hedgerow Regulations 1997	<p>The Hedgerow Regulations are intended to protect important countryside hedgerows from destruction or damage in England and</p>



Legislation	Key Features
	Wales.

**Table A2: Overview of Key Protected Species Legislation and Protection**

Species	Key Legislation and Protection
Bats	<p>All European bat species are protected in Britain under the Habitat Regulations 2010. All British bat species are included on Schedules 5 and 6 of the Wildlife and Countryside Act 1981 (as amended) and the whole of Section 9 applies to European bat species. The above collectively prohibits the following:</p> <ul style="list-style-type: none"> <li>• Deliberately or recklessly capturing, injuring, taking or killing of a bat</li> <li>• Deliberately or recklessly harassing a bat</li> <li>• Intentionally or recklessly disturbing of a bat in its place of rest (roost), or which is used for protection or rearing young</li> <li>• Deliberately or recklessly damaging, destroying or obstructing access to any resting place or breeding area used by bats</li> <li>• Deliberately or recklessly disturbing a bat in any way which is likely to significantly affect the local populations of the species, either through affecting their distribution or abundance, or affect any individuals' ability to survive, reproduce or rear young</li> <li>• Possession or advertisement/sale/exchange of a bat (dead or alive) or any part of a bat</li> </ul> <p>Bats are also protected by the Wild Mammals (Protection) Act 1996. Licenses are issued by Natural England for any works which may compromise the protection of European protected species, including bats. This license is required irrespective of whether the works require planning permission. Selected species are also listed in the UK BAP.</p>
Great Crested Newt	Great crested newts receive the same levels of protection under British and European law as is afforded to bats (see above). Great crested newts are included on the UK BAP.
Otter	Otter are protected under British and European law, receiving the same level of protection as bats (see above). Otter are also listed as a priority species in Appendix II of the Bern Convention. Otter are included on the UK BAP.
Reptiles	<p>Common reptiles (grass snake, adder, common lizard and slow-worm) receive partial protection under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to:</p> <ul style="list-style-type: none"> <li>• Intentionally or recklessly kill or injure these species</li> <li>• Sell, offer or advertise for sale, possess or transport for the</li> </ul>



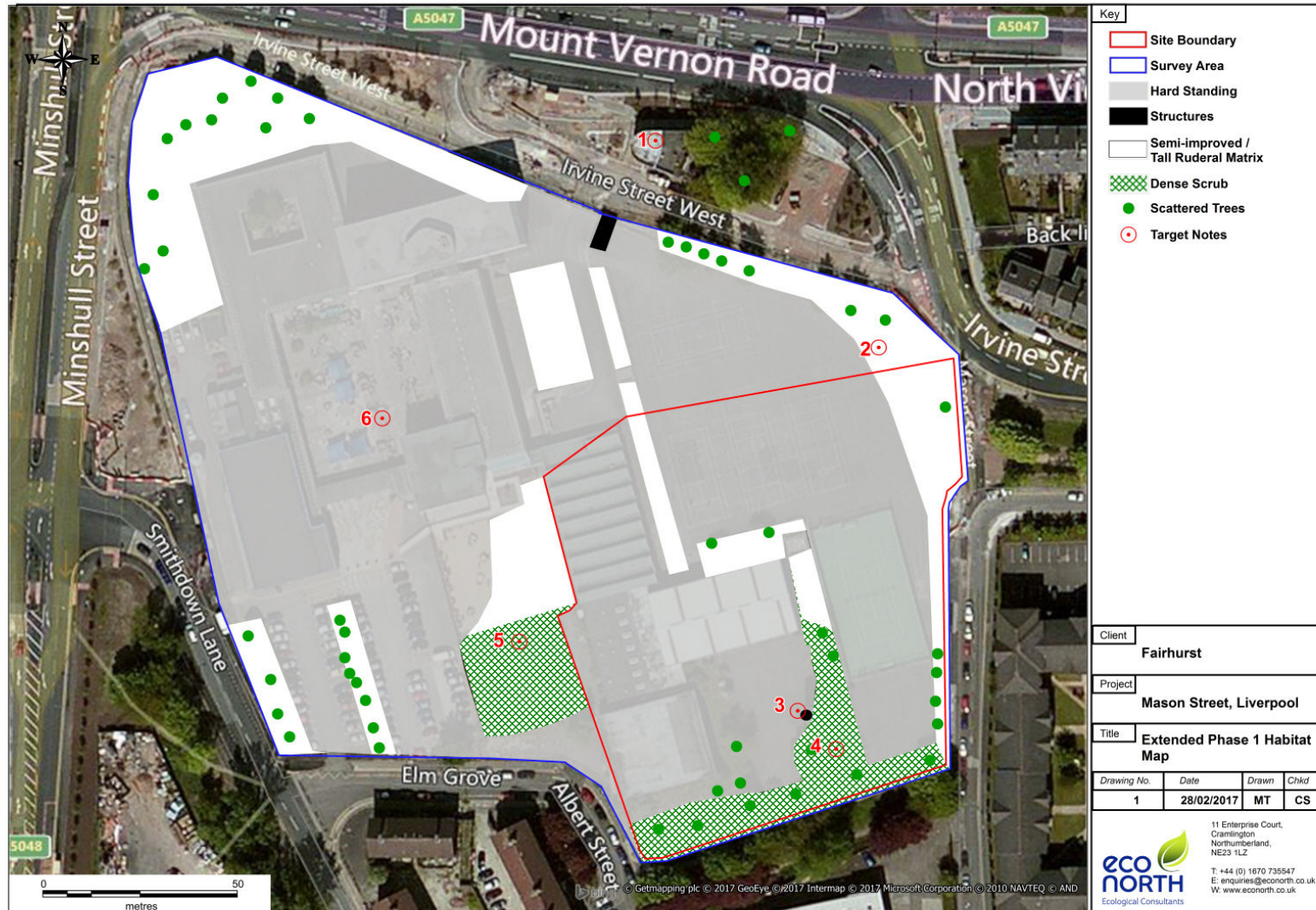
Species	Key Legislation and Protection
	<p>purposes of sale these animals, whether alive or dead, or any part thereof</p> <p>In addition, smooth snake and sand lizard are also protected under the Habitat Regulations 2010, which makes it an offence to:</p> <ul style="list-style-type: none"><li>• Intentionally or recklessly kill, injure, capture, disturb or handle these species;</li><li>• Intentionally or recklessly damage or destroy any place used by these species for shelter, protection, resting or breeding; and</li><li>• Intentionally or recklessly obstruct access to any place used for shelter, protection, resting or breeding by these species.</li></ul> <p>All 6 species of native reptile are listed on the UK BAP.</p>
Water Vole	<p>Water voles are protected under Schedules 5 and 6 of the WCA 1981 (as amended). This makes it an offence to:</p> <ul style="list-style-type: none"><li>• Intentionally kill, injure or take water voles</li><li>• Possess or control the species</li><li>• Damage or destroy any place used by water vole for shelter or protection</li><li>• Disturb water vole while they occupy such places of shelter</li><li>• Sell, possess or transport water vole for the purpose of sale</li><li>• Advertise the buying or selling of water vole</li></ul> <p>The species is also protected under the Wild Mammals (Protection) Act 1996 and is listed on the UK BAP.</p>
Badger	<p>Badger are protected under the Protection of Badgers Act 1992, which makes it an offence to:</p> <ul style="list-style-type: none"><li>• Knowingly kill, capture, injure or disturb any individual</li><li>• Intentionally damage or destroy a badger sett, or any part thereof</li><li>• Obstruct access to an area which is used for breeding, resting or shelter</li><li>• Disturb a badger while it is using any place used for breeding, resting or shelter</li></ul> <p>The species is also protected by the Wild Mammals (Protection) Act 1996 and receives partial protection through inclusion on Schedule 6 of the Wildlife and Countryside Act 1981 (as amended).</p>
Birds	<p>With the exception of some species listed on Schedule 2, the majority of bird species are protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to intentionally or recklessly:</p> <ul style="list-style-type: none"><li>• Kill, injure or take any wild bird</li><li>• Take, damage or destroy any nest which is in use or being built</li></ul>





Species	Key Legislation and Protection
	<ul style="list-style-type: none"><li>• Take, damage or destroy the eggs of any such bird</li></ul> <p>Additional protection against disturbance at the nest is also afforded to any bird species listed on Schedule 1 of the Act. Selected bird species are also listed on the UK BAP.</p>

## Appendix B – Phase 1 Habitat Map





## Appendix C – Target Notes

**Table C1: Target Notes Relating to Figure (see Appendix B)**

Number	Description
1	Large derelict pubic house to the north of the survey area (outside of the proposed development area)
2	Semi-improved grassland interspersed with tall ruderal such as rosebay willowherb and buddleia.
3	Tower structure located in the south of the site. Structure considered sound with no suitable roosting opportunities for bats present.
4	Area of dense scrub comprising bramble and rosebay willowherb. A single robin and c.5 goldfinches observed here during survey.
5	Area of dense scrub and young saplings.
6	Large area of hard standing with rubble where previous building has been demolished.



## Appendix D – Site Photographs

**Photo 1:** Hard standing, semi-improved grassland and rubble to the west of the site



**Photo 2:** Hardstanding; looking to the south of the site



**Photo 3:** Immature trees along periphery of site



**Photo 4:** Dense scrub, immature trees and tower structure in the south of the site







**Photo 5:** Hardstanding, dense scrub and scattered trees



**Photo 6:** Semi-improved grassland with tall ruderal





## Appendix E – Value of Ecological Receptors

**Table E1: Examples of Ecological Receptors of Differing Value**

Value	Examples
International	<ul style="list-style-type: none"><li>• An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, pSAC, Ramsar site) or an area which meets the designation criteria for such sites.</li><li>• Internationally significant and viable areas of a habitat type listed in Annexe 1 of the Habitats Directive, or smaller areas of such habitat, which are essential to maintain the viability of a larger whole.</li><li>• Any regularly occurring, globally threatened species.</li><li>• A regularly occurring population of an internationally important species, which is threatened or rare in the UK, of uncertain conservation status</li><li>• A regularly occurring, nationally significant population/number of any internationally important species.</li></ul>
National	<ul style="list-style-type: none"><li>• A nationally designated site (<u>e.g.</u> SSSI, NNR) or a discrete area which meets the published selection criteria for national designation (<u>e.g.</u> SSSI selection guidelines) irrespective of whether or not it has yet been notified.</li><li>• A viable area of a UK BAP priority habitat, or smaller areas of such habitat which are essential to maintain the viability of a larger whole.</li><li>• A regularly occurring significant number/population of a nationally important species <u>e.g.</u> listed on the Wildlife and Countryside Act 1981 (as amended).</li><li>• A regularly occurring population of a nationally important species that is threatened or rare in the county or region.</li><li>• A feature identified as being of critical importance in the UK BAP.</li></ul>
Regional/County	<ul style="list-style-type: none"><li>• Viable areas of key habitat identified in the Regional or County BAP or smaller areas of such a habitat, which are essential to maintain the viability of the larger whole.</li><li>• Regional/county significant and viable areas of key habitat identified as being of regional value in the appropriate English Nature (now Natural England) Natural Area.</li><li>• A regularly occurring significant population/number of any important species important at a regional/county level.</li><li>• Any regularly occurring, locally significant population of a species which is listed in a Regional/County Red Data Book or BAP on account of its regional rarity or localisation.</li><li>• Sites of conservation importance that exceed the district</li></ul>



Value	Examples
	selection criteria but that fall short of SSSI selection guidelines.
City/District/Borough	<ul style="list-style-type: none"><li>• Areas of habitat identified in a District/City/Borough BAP or in the relevant Natural Area profile.</li><li>• Sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on District/City/Borough ecological criteria.</li><li>• Sites/features that are scarce within the District/City/Borough or which appreciably enrich the District/City/Borough habitat resource.</li><li>• A diverse and/or ecologically valuable hedgerow network.</li><li>• A population of a species that is listed in a District/City/Borough BAP because of its rarity in the locality or in the relevant Natural Area profile because of its regional rarity or localisation.</li><li>• A regularly occurring, locally significant number of a District/City/Borough important species during key phases of its life cycle.</li></ul>
Local	<ul style="list-style-type: none"><li>• Areas identified in a Local BAP or the relevant natural area profile.</li><li>• Sites/features which are scarce in the locality or which are considered to appreciably enrich the habitat resource within the local context, e.g. species-rich hedgerows.</li><li>• Local Nature Reserves selected on Parish/Local ecological criteria.</li><li>• Significant numbers/population of a locally important species <u>e.g.</u> one which is listed on the Local BAP.</li><li>• Any species, populations or habitats of local importance.</li></ul>
Low	<ul style="list-style-type: none"><li>• Habitats of moderate to low diversity which support a range of locally and nationally common species, the loss of which can be easily mitigated.</li></ul>

## **APPENDIX 7**

### **Microgravity Survey Report**





**PHASE**  
SITE INVESTIGATIONS

**PPI Liverpool  
Paddington Place**

**Geophysical Survey**

**Project No. HAZ/2072/744**

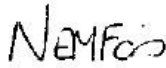
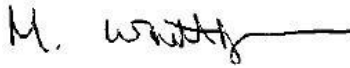
**March 2017**



# **PPI Liverpool Paddington Place**

## **Geophysical Survey**

**Project No. HAZ/2072/744**

Report prepared by		Report checked by	
Name	Nicola Fairs BSc MSc DIC CGeol FGS	Name	Mark Whittingham BSc MA MCIfA
Signature		Signature	
Date	29/03/17	Date	30/03/17

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**DIGITAL COPY OF REPORT CAN BE FOUND ON CD ATTACHED TO BACK COVER**

## 1. INTRODUCTION

### 1.1 Overview

Phase Site Investigations Ltd was commissioned by Fairhurst, to carry out a microgravity survey at the proposed site of PPI Liverpool, Paddington Place, Liverpool.

The site is adjacent to an area where the ‘Williamson Tunnels’ are present and it was suspected that some tunnels may be present under the site. The purpose of the survey was to confirm if tunnels or other voids were present under the proposed building footprint and if so to define their extents.

The location of the site is shown in drawing HAZ\_2072\_744\_01.

### 1.2 Background

Joseph Williamson was a Liverpool philanthropist who employed local men for a number of construction projects in the early to mid 1800s. These included a series of tunnels many miles long and at depths of 1 m to 15 m below ground level (referenced in Cuss and Styles, 1999). The tunnels were apparently constructed randomly with pits, wells and blind passages and over time information on the location and extent of many of the tunnels has been lost.

A geophysical survey utilising microgravity, was undertaken in 1994 (Cuss and Styles, 1999). Within the paper describing the survey they show two tunnels extending into the current site and describe these as, ‘*from previous surveys*’. The 1994 microgravity survey successfully identified a number of tunnels and also identified several possible tunnels, two of which were located within the current site. There appears however to be a discrepancy between the tunnels shown ‘*from previous surveys*’ and the location of possible tunnels identified by the previous microgravity survey.

It is also possible that no tunnels are present in the current site as the source and accuracy of the tunnels shown as ‘*from previous surveys*’ is not known and the interpretation of the possible tunnels from the previous microgravity survey appeared to be relatively tentative as this was based on only three or four profiles spaced at 12 m intervals with a reading taken every 3 m along each profile. It was recognised within Cuss and Styles (1999) that this survey strategy was not ideal but time constraints meant that they were unable to survey their entire site on a regular grid system.

It was not certain therefore if there may be multiple tunnels present, just two possible tunnels, or potentially no tunnels and so a new microgravity survey, using more up-to-date equipment and processing on a closely spaced regular grid, was required to confirm the presence / absence of tunnels or voids within the proposed building footprint.

A rapid inspection of historic mapping for the site (old-maps.co.uk, 2017) shows that prior to the most recent land-use the site contained several terraces of buildings and roads.

### 1.3 Scope of work and site description

The site is located to the west of Mason Street, Liverpool and was part of a larger ‘brownfield’ site. The survey was based around the proposed location of a building footprint, centred at NGR SE 331 719. The survey extended around most of the proposed building footprint by 2 m and in total 773 readings were recorded. Readings were taken at nominal 2 m intervals. In some instances the position of a reading was moved slightly to allow it to be taken over a more level or uniform surface. Several stations could not be recorded due to the presence of trees. The location of the proposed building footprint and each microgravity survey station are shown in drawing HAZ\_2072\_744\_01.

Part of the survey area (the south-western part) was within the footprint of a relatively recently demolished building, the northern part of the survey area was asphalt and was recently in use as a car park and the majority of the south-eastern part was an artificial rubber / resin surface surrounded by asphalt.

The south-western part of the survey area was at a significantly lower level than the rest of the survey area (approximately 3 m lower) and was bounded by relatively steep grassed slopes, parts of which were within the survey area. Within the rest of the survey area there was a gradual slope upwards to the east until the edge of the site where there was a small but relatively steep incline to the adjacent road.

The survey was carried out on consecutive days between 27 February 2017 and 14 March 2017. During this time the weather was generally fine but there were several days of strong wind.

## **2. SURVEY METHODOLOGY**

### **2.1 Microgravity survey**

The microgravity survey was carried out using a Scintrex CG5 microgravity meter. The CG-5 is an automated gravity meter with a resolution of 1 $\mu$ gal.

The gravity data was undertaken as a series of readings taken at nominal 2 m intervals.

The extent of the survey grid was established using an RTK VRS GNSS and intermediate survey station points were set-out using tape measures. The position and level of individual microgravity survey station points was recorded using a Topcon DS-103AC robotic total station. The geophysical survey was referenced to the existing topographic survey using the topographic survey stations MM1, MM2, RS04A and RS03 so that accurate positional and level values for each microgravity survey station could be obtained relative to Ordnance Survey National Grid (OSNG).

A base station was established at a relatively level point within the survey area. The base station was revisited at intervals not exceeding one and a half hours throughout the duration of the survey.

Measurements were taken for a period of 60 to 90 seconds at each station from which an average value was calculated by the instrument.

10% of the readings were repeated and over the majority of the site the maximum repeat error was generally between 1  $\mu$ Gal and 2  $\mu$ Gal, however, there were some readings on the grass slopes where the repeatability was 5  $\mu$ Gal, mainly due to soft ground and difficulty in levelling the instrument on the slopes. Repeat readings within 3  $\mu$ Gal to 5  $\mu$ Gal of the original value indicate high quality data so it can be seen that while the repeat values are higher on the slopes the data quality was still good and that for the majority of the site the data quality was very good.

The Earth tide corrections were calculated internally by the CG-5 instrument.

A more detailed technical summary on the theory and survey methodology of the microgravity technique can be found in Appendix 2.

### **2.4 Data processing and presentation**

The microgravity data was downloaded from the instrument using bespoke software specific to the CG-5. The raw data has been corrected and reduced to the Bouguer Anomaly using in-house software and gridded using the Kriging method in Surfer (Golden Software). A second order polynomial surface has been fitted to the data and subsequently removed to account for the dip of the local geology.

The variations in height across the survey area were significant enough that terrain corrections were required.

The terrain corrections were calculated using the microgravity module of Oasis Montaj v. 9.1.2 (Geosoft Software). A local terrain grid of the 3D points from the topographic survey of the site was merged with a regional terrain grid compiled from opensource Lidar data (Environment.data.gov.uk, 2017). This combined terrain grid was then used by the software to calculate corrections to each data point to compensate for the changes in topography across and adjacent to the site. The terrain corrections were applied based on a local correction distance of 50 m from the individual stations. The effects due to terrain features at distances greater than 50 m, while possibly large in magnitude, will influence each survey station value

by an equal amount and so the relative gravity effects from these features can be ignored (summarised from Sharma, 1997).

The microgravity data was analysed over a range of values and a plot of the residual Bouguer dataset was then exported from the gridding software in .png format. This was then imported into AutoCAD direct to OSNG and overlain onto the topographic survey. The data is presented in drawing HAZ\_2072\_744\_03 and an accompanying interpretation is shown in drawing HAZ\_2072\_744\_04.

***The geophysical interpretation drawing must be used in conjunction with the relevant results section and appendices of this report.***

### 3. RESULTS & DISCUSSION

A discussion of the magnitude of potential gravity anomalies is provided by Cuss and Styles (1999) for their wider site. They indicate that regional variations in low density rubble across their site could create anomaly variations of up to 40  $\mu\text{Gal}$ . In terms of the magnitude of responses related to tunnels they state that Williamsons Great Hall would create a gravity anomaly of 550  $\mu\text{Gal}$  while the anomaly from the 26 m deep and 18 m wide Lime Street rail tunnel would be twice that. But these are the largest tunnels within their survey area and they recognise that smaller tunnels would have smaller anomalies and that partially destroyed / infilled tunnels would have different density contrasts which would produce smaller and more difficult to categorise responses.

This microgravity survey has mapped density variations across the survey area.

The gravity values are relative to the base station which is fixed at a value of zero. The residual Bouguer Anomaly data, shown in drawing HAZ\_2072\_744\_03, shows negative values (blue) and positive values (red) relative to the base station and indicates areas of lower (negative) density and higher (positive) density respectively compared to the ground below the base station. Negative gravity anomalies indicate less dense ground, such as loose material or voids, but they can also reflect other sub-surface variations (natural or man-made). Interpreting the cause of a negative anomaly can be difficult as any given anomaly can have a large number of possible causes depending on the size, depth and type of feature that is producing a variation. Changes in the near surface geology (i.e. within the superficial deposits or made ground) over a large area can produce the same response as a large, deep void and likewise features of different sizes and depths but which have different densities can all produce the same type of response.

Generally speaking this data set has the expected variations for this type of brownfield site where there will be potentially varying amounts of made ground present and which had undergone a number of previous land-uses and phases of buildings. The 'background values' (white and paler red and blue) are thought to reflect local changes in sub-surface conditions related to this former land use and made ground.

There are only a relatively small amount of readings that stand out as relatively strong variations but none of these approach the size of the anomalies that would be expected from significant voids. These stronger responses have been shown on the interpretation (HAZ\_2072\_744\_04) as they may reflect slightly more significant sub-surface changes

The hatched red areas on the interpretation are **positive Bouguer anomalies** and are possibly caused by more 'solid' below ground material. These will not be related to tunnels.

The hatched blue areas on the interpretation are **negative Bouguer anomalies** and indicate areas of lower density ground. None of these negative Bouguer anomalies are on a similar alignment to the expected orientation of the possible tunnels. One of the negative Bouguer anomalies (**Anomaly A**) has an elongated shape and so potentially could be related to a feature such as a tunnel. It is worth noting that the data in the south-east is more uniform and has high density areas around it possibly relating to the remains of a former structure. Anomaly A is located adjacent to this area and may therefore be caused by the same sub-surface feature / variation.



## 4. CONCLUSIONS

The microgravity survey has identified density variations beneath the site but none of the observed variations have an alignment that corresponds with the expected orientations of potential tunnels. There is one broadly linear pattern of lower density responses (aligned approximately east to west) and the exact cause of this is not certain. It could potentially be related to a tunnel but it could be caused by some other type of sub-surface variation.

The lack of clearly defined responses related to tunnels does not definitely indicate that no such features are present as if a tunnel was infilled then its gravity response would be much weaker and it may not be possible to identify this amongst the variable background readings that are present.

There is no evidence in this survey data for the possible tunnels interpreted from the geophysical survey undertaken in the 1990s. The paper detailing this earlier survey does mention that coverage was limited in parts of their survey area and the current site falls within this limited coverage area. In terms of the previous geophysical survey it appears that the interpretation of tunnels within the current site was actually quite tentative and was based upon data in three or four profiles spaced 12 m apart (with readings collected on each profile at 3 m intervals). It is interesting to note that several of the points that may have provided the anomaly interpreted as a possible tunnel are located on or in close proximity to the steep slope within the site and it is possible that these may have caused erroneous data points in the previous survey. The data quality from the current survey is demonstrably high and it is considered that the data, both in terms of values and positional accuracy, is very reliable.

It should be noted that the features / variations that cause geophysical anomalies are often much smaller in area than the anomaly extents shown in the interpretation. If there is any intrusive work to investigate the anomalies then, where possible, it should be targeted towards the centre of an anomaly where the strongest values are present.

***It should be noted that a geophysical survey does not directly locate sub-surface features - it identifies variations or anomalies in the background response caused by features. The interpretation of geophysical anomalies is often subjective and it is rarely possible to identify the cause of all such anomalies. Not all features will produce a measurable anomaly and the effectiveness of a geophysical survey is also dependant on the site-specific conditions. The main factors that may limit whether a feature can be detected are the composition of a feature, its depth and size and the surrounding material. It is not possible to guarantee that a geophysical survey will identify all sub-surface features. Confirmation on the identification of anomalies and the presence or absence of sub-surface features can only be achieved by intrusive investigation.***