

# Former Holloway Prison

Contamination - Preliminary  
Environmental Risk  
Assessment







# **Preliminary Environmental Risk Assessment**

Former Holloway Prison, London

October 2021

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### Quality Assurance – Approval Status

This document has been prepared and checked in accordance with  
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

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Issue	Date	Prepared by	Checked by	Approved by
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### Comments

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- 1.2.1 Updated with design freeze information.
- 1.3.1 Updated with comments from Avison Young



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## Executive Summary

### Objectives

Preliminary Environmental Risk Assessment (PERA) for ground contamination to support a planning application for the proposed residential-led redevelopment of the Former Holloway Prison, London (hereafter termed “the Site”).

### Site Setting

<b>Current Use</b>	Former Holloway Prison; a complex of low-rise buildings of two to five storeys in height, with areas of hard-standing alongside landscaped green spaces.
<b>History</b>	Prison from 1852 with ancillary buildings including an infirmary, workshop, artesian well, pump, brick kiln, chapel, drying green and prison ward. Hospital blocks and an electricity sub-station were constructed in the 1940s/1950s. The prison was entirely redeveloped between 1971 and 1985, closed in 2016 and has remained vacant since.
<b>Geology</b>	Made Ground (likely less than 3m) over London Clay Formation (about 40m thick). The Lambeth Group has been proven beneath the London Clay Formation (21m thick). The Thanet Sand Formation (about 4m thick) and Chalk Formation (in excess of 50m thickness) is recorded beneath.
<b>Controlled Waters</b>	London Clay Formation (Unproductive Strata), Lambeth Group and Thanet Sand Formation (both Secondary A Aquifer), Chalk Formation (Principal Aquifer). The Site is not located in a groundwater Source Protection Zone. There are no surface water features recorded within a 500m radius.
<b>Consultation</b>	A Groundsure dataset was obtained for the Site. Information was requested from the Environmental Health and Building Control departments of the London Borough of Islington (LBI). The LBI online planning register was accessed for pertinent information.

### Preliminary Conceptual Model

Potential contaminant linkages at the Site are identified, including:

- Construction workers may come into direct contact with ground contamination during redevelopment works;
- Future Site users may contact ground contamination at the completed development in areas of proposed soft landscaping;
- Vegetation in areas of proposed soft landscaping may come into direct contact with contaminants in the Made Ground;
- A significant vapour regime is potentially present locally on-Site, subject to assessment as part of a ground investigation. Future Site users, construction workers, and on-Site structures may be at risk;
- Buried foundations and services contacting contaminated ground with risks of chemical attack;
- Groundwater within the Secondary A and Principal Aquifers beneath the Site may be exposed to contamination via the historical abstraction well providing a preferential migration pathway.

### Conclusions

Given the proposed end use the overall risk rating for the Site is assessed as **medium**. However, upon implementation of the recommendations below, the residual risk is considered to be **low**. Therefore, the NPPF requirement that on completion the Site can no longer be captured under the Part IIA regime is expected to be met. An intrusive investigation is required to confirm the ground conditions on-Site.

### Recommendations

#### *Pre-construction*

- An intrusive geo-environmental ground investigation (GI) should be undertaken. This should include:
  - Characterisation of the contamination status and thickness of Made Ground and natural soils underlying the Site;
  - Groundwater monitoring and sampling, if relevant;

- 
- Preliminary Waste Classification Assessment of the likely waste soil arisings; and
  - PID headspace monitoring and analysis of soils and perched groundwater for VOCs/SVOCs, to confirm the vapour risk. If significant contamination is identified, vapour monitoring may be required. This should be confirmed as part of the ground investigation.
- The abstraction well on-Site should be located and decommissioned in line with EA guidance.
  - Concrete in construction and any new water supply pipes should be appropriately designed to be protected against contamination in Made Ground and soils.
  - A Construction Environmental Management Plan should be prepared to address possible issues during redevelopment such as dust and waste generation and potential for pollution from storage of harmful substances/fuels.
  - The GI results should be assessed within a Generic Quantitative Risk Assessment (GQRA) report which includes an updated conceptual model.
  - Production of a Remediation Strategy, detailing the remedial measures required to break the pollutant linkages as assessed in the GQRA.
  - The reuse of Site-won soils on-Site or another site can be facilitated by the use of the CL:AIRE DoWCoP subject to risk assessment and being chemically and geotechnically suitable for their intended location. The potential reuse of Site-won soils should be explored at an early stage to comply with the DoWCoP and considered when designing Site levels and calculating materials balances.

#### *During construction*

- Construction workers should wear the appropriate Personal Protective Equipment (PPE), Respiratory Protective Equipment (RPE), adhere to good practice hygiene and safety measures, the Confined Space Regulations 1997 and the Control of Asbestos Regulations 2012.
- During construction, potentially contaminative substances should be stored and handled in accordance with the COSHH Regulations 2002 to prevent fugitive emissions migrating to the Made Ground and underlying groundwater.
- During construction, dust suppression techniques should be implemented to minimise the dispersion of contaminants within dust.
- Soils being removed from the Site should be characterised in line with the Environment Agency's (EA) technical guidance to determine the most appropriate method of disposal.
- The re-use of inert demolition waste, such as bricks and concrete, on-Site can be facilitated by the use of the WRAP: *Quality Protocol – End of waste criteria for the production of aggregates from inert waste. 2013*; and
- Imported and re-used topsoil should be chemically tested to ensure it is suitable for use. Soft landscaping should be supported by a suitable growth medium that complies with 'BS3882:2015 – Specification for topsoil', 'BS8601:2013 – Specification for subsoil and requirements for use' and assessment criteria suitable for the proposed end use.

#### *Post completion*

- Post completion of the development a Verification Report should be prepared detailing the remedial measures undertaken during the development and confirming all pollutant linkages have been broken.
-

## 1. Introduction

### 1.1 Objectives

Waterman Infrastructure & Environment Limited (“Waterman”) was instructed by Avison Young on behalf of Peabody Construction Limited to undertake a Preliminary Environmental Risk Assessment (PERA) for ground contamination for the proposed redevelopment of the Former Holloway Prison, London (hereafter termed “the Site”).

### 1.2 Proposed Development

The Site is currently disused and comprises the Former Holloway Prison; a complex of low-rise buildings of two to five storeys in height, with areas of hardstanding alongside landscaped green spaces.

Existing ground level is variable across the Site, generally lower in the north and east trending higher to the south and west.

#### 1.2.1 Development Description

The description of the development as set out in the approved planning permission is as follows:

*‘Phased comprehensive redevelopment including demolition of existing structures; site preparation and enabling works; and the construction of 985 residential homes including 60 extra care homes (Use Class C3), a Women’s Building (Use Class F.2) and flexible commercial floorspace (Use Class E) in buildings of up to 14 storeys in height; highways/access works; landscaping; pedestrian and cycle connections; publicly accessible park; car (blue badge) and cycle parking; and other associated works.’*

#### 1.2.2 Detailed Development Proposals

It is proposed to demolish all buildings on-Site, along with re-levelling works to form new development platforms. Following levelling, the Site will be redeveloped to include

- 985 residential units (Use Class C3). This includes 60 extra care homes (Use Class C3).
- 1,489 sqm (GIA) Women’s Building (Use Class F.2)
- 1,822 sqm (GIA) Commercial Floorspace (Use Class E),

New hardstanding footpaths and roads, and managed soft landscaping will be installed surrounding all buildings.

Shared soft landscaped areas will be included in the development, however these will be centrally managed as part of landscaping maintenance. The development will include private hard landscaped terraces, but will not include private soft landscaped gardens. Plant uptake and direct contact with soil in a private setting is considered not relevant as a potential contaminant linkage at the completed development.

Breakdown for the development is as follows:

#### Plot A

- 235 residential units. The tenures in this Plot are social rent, London Shared Ownership and market. With communal outdoor space for residents.

#### Plot B

- 321 residential units. The tenures in this Plot are social rent, London Shared Ownership and market. With communal outdoor space for residents.
- Commercial floorspace.

#### Plot C

- 155 residential units. The tenure in this Plot is social rent only. With communal outdoor space for residents.
- Women's Building.
- Commercial floorspace.

#### Plot D

- 183 residential units. The tenures in this Plot are London Shared Ownership and market. With communal outdoor space for residents.
- Residents' facilities including concierge (1334 sqm).

#### Plot E

- 91 residential units, including 60 extra care units. The tenures in this Plot are social rent and market.

Proposed development plans are included in Appendix A.

### 1.3 Regulatory Context

The National Planning Policy Framework (NPPF) July 2021 sets out Government planning policy for England and how this is expected to be applied to development. Paragraph 118 of Section 11 – Making effective use of land and paragraphs 170, 178, 179 and 183 of Section 15 – Conserving and enhancing the natural environment of the NPPF relate to contaminated land matters and state the following:

*118. Planning policies and decisions should:*

*c) give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land;*

*170. Planning policies and decisions should contribute to and enhance the natural and local environment by:*

*e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*

*f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.*

*178. Planning policies and decisions should ensure that:*

*a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);*

*b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and*

*c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.*

*179. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.*

*183. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.*

In order to assess the contamination status of the Site, with respect to the proposed end use, it is necessary to assess whether the Site could potentially be classified as “Contaminated Land”, as defined in Part IIA of the Environmental Protection Act 1990 and Contaminated Land Statutory Guidance 2012. This is assessed by the identification and assessment of potential pollutant linkages. The linkage between the potential sources and potential receptors identified needs to be established and evaluated.

To fall within this definition, it is necessary that, as a result of the condition of the land, substances may be present in, on or under the land such that:

- a) significant harm is being caused or there is a significant possibility of such harm being caused; or
- b) significant pollution of controlled waters is being caused, or there is significant possibility of such pollution being caused.

It should be noted that DEFRA has advised (Ref. Section 4, DEFRA Contaminated Land Statutory Guidance 2012) Local Authorities that land should not be designated as “Contaminated Land” where:

- a) the relevant substance(s) are already present in controlled waters;
- b) entry into controlled waters of the substance(s) from land has ceased; and
- c) it is not likely that that further entry will take place.

These exclusions do not necessarily preclude regulatory action under the Environmental Permitting (England and Wales) Regulations 2016, which make it a criminal offence to cause or knowingly permit a water discharge of any poisonous, noxious or polluting matter to controlled waters. In England and Wales, under The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009, a works notice may be served by the regulator requiring appropriate investigation and clean-up.

## **1.4 Constraints**

The assessment was undertaken in accordance with the scope agreed between Waterman and Avison Young, as documented in Waterman’s fee letter (WIE16172-100-20190619-Fee, dated 19 June 2019), and with Waterman’s standard Terms of Appointment.

The benefit of this report is made to Peabody Construction Limited.

The information contained in this report is based on a review of available historical, geological and hydrogeological sources, a review of a previous environmental assessment by Amec Foster Wheeler Environment & Infrastructure UK Limited, consultation with the regulatory authorities and observations made on-Site on 05 September 2019.



Waterman has endeavoured to assess all information provided to them during this investigation but makes no guarantees or warranties as to the accuracy or completeness of this information.

The scope of this assessment does not include an assessment for the presence of asbestos containing materials within or below buildings or in the ground at the Site.

The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the Site.

During the Site walkover access to the interior of buildings was not available.

## 2. Methodology

This Preliminary Risk Assessment has been undertaken in general accordance with Land Contamination: Risk Management Guidance (LCRM: Environment Agency, April 2021).

The report includes the following:

- Review previous environmental assessments pertinent to the Site;
- Definition of overall Site objectives;
- Collation of available current and historical information about the Site and the potential contaminants expected to be present;
- A Site walkover;
- Formulation of a preliminary Conceptual Site Model;
- Qualitative risk assessment; and
- Record of findings and recommendations for further action.

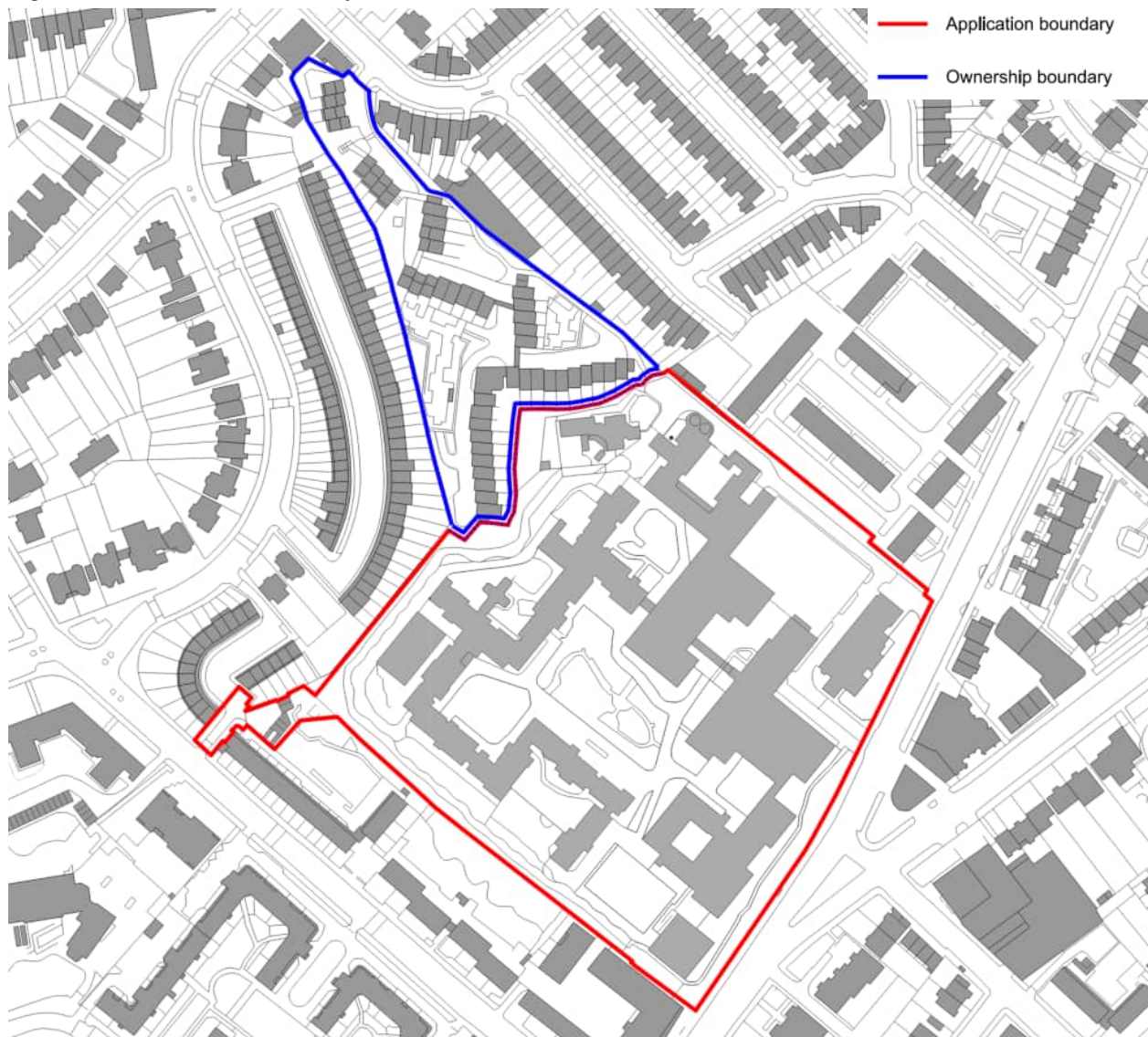
### 3. Hazard Identification

#### 3.1 Site Description and Reconnaissance

The Site is a 4.16 hectare area of land located at National Grid Reference 530098,185591 on Parkhurst Road in the London Borough of Islington (LBI).

A Site location plan and Site layout plan are presented as Appendix A. Photographs taken during the Site walkover are presented as Appendix B.

Figure 1: Current Site Layout



Source: Project Holloway Location Plan 171050-(00)\_001A.

The Site is currently vacant and comprises the Former Holloway Prison; a complex of low-rise buildings of two to five storeys in height which were used to house female prisoners and assorted administration. Buildings cover about 40% of the Site with hardstanding and landscaped green spaces covering about 35% and 25% respectively.



In addition to residential and office buildings, other buildings included a chapel, swimming pool, education centre, visitors centre, day care centre, healthcare unit, day nursery, boiler house and a works and maintenance unit.

Evidence of hazardous substance storage was observed in the north of the Site, external to the boiler house and day nursery, including two 151,370L steel diesel tanks, a single tank of unknown capacity, an IBC with unknown contents, numerous 25L containers of water treatment chemicals, herbicides and hydrochloric acid. A bunded acid bath and sacks of salts were also present. A chimney stack is connected to the boiler house via aboveground pipework. Aboveground gas pipes were present in a locked shed, adjacent to and leading into the boiler house.

A garden machinery workshop is in Block A; a sign on the door indicated petroleum storage inside. In the southeast of the Site, signage to the door of a plant room indicated the storage of hazardous substances inside. Neither room could be accessed during the walkover due to health and safety constraints.

An electricity substation is located in the works and maintenance building in the north of the Site, although access was not possible during the walkover. Signage to the door indicates the equipment is filled with sulphur hexafluoride (SF6) gas.

Waste storage areas were not evident during the walkover, apart from six metal electrical waste coffins that were situated on paving along the Site's northern boundary.

Pathways, roadways and yards across the Site are surfaced with a combination of asphalt, concrete slab, and block paving. An car park is present in the northeast of the Site. Concrete plinths were identified in the centre area of the Site where tanks may have been previously situated.

Surface water drainage observed across the Site, assumed to discharge to public sewer, although this was not confirmed during the walkover. A number of unknown manholes were also present across the Site.

The remainder of the Site comprises landscaped gardens with mature trees, shrubs, grassed areas and flower beds.

Ground level varies significantly across the Site, generally rising up to an area of higher ground in the south-west of the Site and a level difference of about 7m.

The prison is bounded by an 8m high wall on its north-western and southwestern boundary, with palisade fencing on its northern boundary and wooden hoarding along its southwestern frontage with the A503 Camden Road. The Site extends beyond the 8m high wall to include a path and soft landscaping which stretches approximately 5m beyond the wall.

Current potentially contaminative Site uses identified during the walkover are summarised in Table 1.

**Table 1: Summary of Potentially Contaminative Activities On-Site**

Potential Issue	Description	Condition
Aboveground Storage Tanks (and fuel lines)	Two 151,370L steel diesel tanks, stored in a brick bund. The presence of underground pipework could not be verified during the walkover.	No evidence of staining around the fill point or outside of the brick bund. Steel tanks showed evidence of rust.
	One metal skinned tank of unknown capacity and construction. Fuel hose hung externally on tank side, not provided with secondary containment. No evidence of underground pipework.	Tank appeared to be in good condition. No evidence of staining around the fill point or outside of the brick bund.
Drainage	Separate surface and foul water drainage systems are assumed.	The maintenance and integrity of drainage systems is not known.

Hazardous Materials	One IBC of unknown contents, labelling indicted hydrochloric acid to be contained within. Numerous 25L containers of water treatment chemicals, hydrochloric acid and herbicide. Some were provided with bunding, some were stored over hardstanding.	Some bottles open. Given the poor storage conditions the potential for leakage cannot be discounted.
Solid and Liquid Waste Storage	Six metal coffins on hardstanding on the north-eastern boundary. Labelling of the coffins indicated electrical waste to be stored within.	Evidence of rust to all coffins, the potential for leakage cannot be discounted.

### 3.1.1 Licences and Consents

According to the Groundsure report, presented in Appendix C, there are no licences or consents registered to the property.

### 3.1.2 Site Surroundings

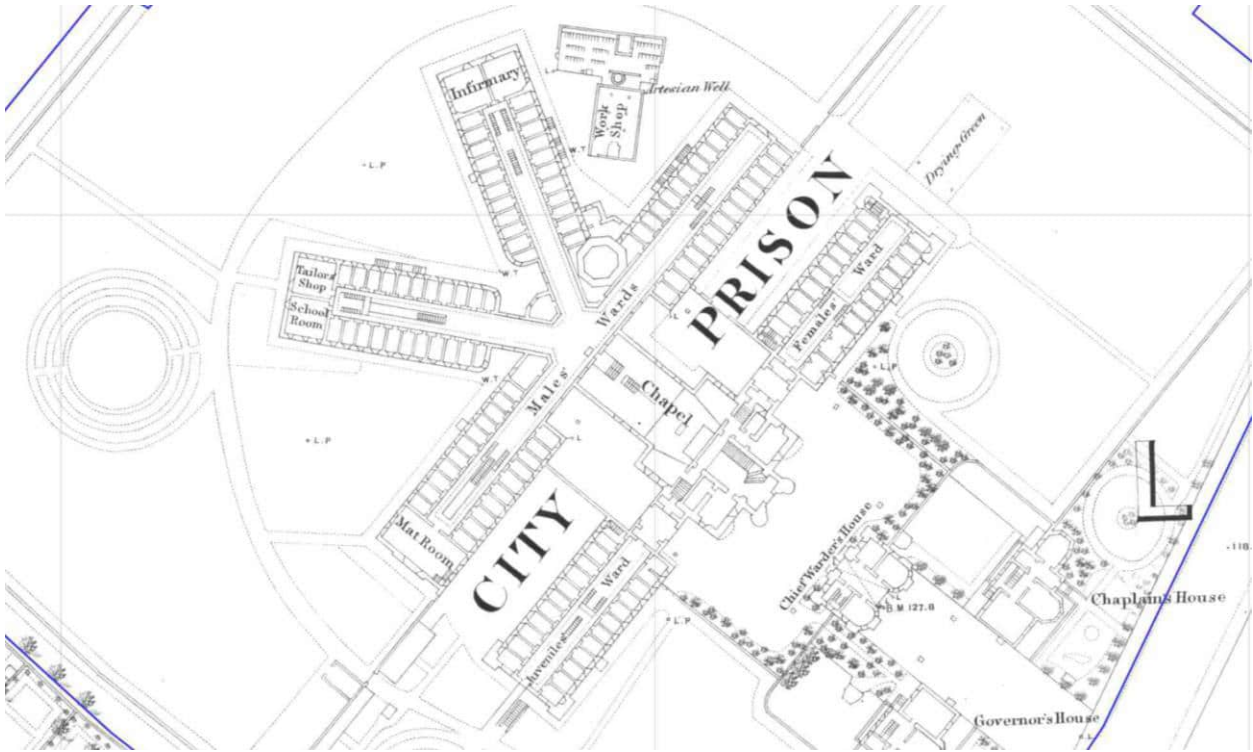
A summary of the current surrounding land uses, including relevant licences and consents, is shown in Table 2.

Table 2: Summary of Surrounding Land Uses

Location	Description
North-east	Four to ten storey residential buildings (with some private gardens) including the Bakersfield Estate adjacent to the northwest. Electricity sub-station adjacent to the north-eastern Site boundary.
North-west	Residential buildings with communal soft landscaping.
South-east	The A503 Camden Road is adjacent to the east. New Church Tower and Spire and a car sales showroom are 20m east of the Site. Residential properties are present from 30m southeast of the Site. The Castle Public House and Exan Coachworks (with historical Part B Environmental Permit for vehicle spraying) are 50m and 60m east respectively.
South-west	A public library and residential properties with communal soft landscaping. Electricity sub-stations 13m and 47m southwest.

## 3.2 History

Figure 2: Historical Site Use



Source: Groundsure MapInsight, 1872, 1056 Town Scale Plan, 1: 1,056.

A review of historical maps obtained from Groundsure has been undertaken. Table 3 summarises the relevant information.

Table 3: Site History

Source	Site <sup>a</sup>	Surroundings <sup>a</sup>
London Borough of Islington SPD, 2018	Holloway Prison was opened in 1852 as a mixed gender facility.	Not known.
1872, 1056 Town Scale Plan, 1: 1,056; 1873, County Series, 1: 10,560	Landscaped grounds with 'City Prison' in the centre of the Site, including an infirmary, <b>workshop</b> , artesian well, <b>brick kiln</b> , chapel, drying green and prison wards. A pump is shown close to the north-eastern Site boundary.	Open ground to the north and west. Residential properties to the south and east.
1894, County Series, 1: 10,560; 1896, 1056 Town Scale Plan, 1: 1,056; 1896, County Series, 1: 2,500	The Site is labelled as His (then Her) Majesty's Prison although the Site layout is not shown, apart from three buildings in the southeast.	Residential properties to the north and west. <b>A tramway</b> is shown adjacent to the south-eastern boundary.

Source	Site <sup>a</sup>	Surroundings <sup>a</sup>
1916, County Series, 1: 2,500; 1920, County Series, 1: 10,560; 1936, County Series, 1: 2,500; 1938, County Series, 1: 10,560	Additional residential buildings constructed adjacent to the south-eastern boundary.	Tramway no longer shown.
1948-1952, Provisional, 1: 10,560; 1952, National Grid, 1: 1,250	Additional buildings shown including two hospital blocks in the south and north of the Site and an <b>electricity sub-station</b> in the north-east of the Site.	<b>Workshops</b> are 10m southwest. A <b>garage</b> is 50m east of the Site.
1953-54, National Grid, 1: 1,250; 1955, National Grid, 1: 1,250; 1956, National Grid, 1: 1,250	Site layout not shown.	No significant changes.
1957-1962, Provisional, 1: 10,560; 1965-1968, Provisional, 1: 10,560; 1967, National Grid, 1: 1,250	No significant changes.	<b>Workshops</b> 10m southwest no longer shown. A <b>depot</b> is shown 90m east.
1970, National Grid, 1: 1,250; 1970-73, National Grid, 1: 1,250; 1973-75, National Grid, 1: 1,250; 1975, National Grid, 1: 10,000; 1976, National Grid, 1: 10,000; London Borough of Islington SPD, 2018	Site layout not shown. The London Borough of Islington 2018 SPD indicates the prison was rebuilt between 1971 and 1985.	<b>Garages</b> are shown 20m east and 90m northwest.
1978-1979, National Grid, 1: 1,250; 1982, National Grid, 1: 10,000	Site is cleared and two of the current buildings are shown along the northern Site boundary.	<b>Electricity sub-station</b> adjacent to the northern boundary.
1986-1991, National Grid, 1: 1,250; 1991-1992, National Grid, 1: 1,250; 1991-1992, National Grid, 1: 1,250; 1992-1994, National Grid, 1: 1,250; 1989-1994, National Grid, 1: 10,000	Site layout appears to reflect current layout although some of the internal layout is not shown. A <b>chimney</b> is shown in the north of the Site.	No significant changes.
2001, National Grid, 1: 10,000; 2003, Landline, 1: 1,250; 2019, National Grid, 1: 10,000	All buildings shown as per their current layout. <b>Tanks</b> are shown adjacent to the northern Site boundary.	No significant changes.

<sup>a</sup> potentially contaminative uses are shown in bold italics.

### 3.3 Geology

The geology beneath the Site has been established from the British Geological Survey (BGS) 1:50,000 scale Geological Map, Sheet 256 (North London), a BGS borehole record on Site (97m deep, ref. TQ38NW5).

A summary of the anticipated geology is provided in Table 4.

Table 4: Site Geology

Stratum	Area Covered	Estimated Thickness (m)	Typical Description
London Clay Formation	Entire Site	41	Clay, silt and sand
Lambeth Group		21	Green or yellow sand and clay.
Thanet Sand Formation		3.9	Greenish grey fine to medium sand.
Seaford Chalk and Newhaven Chalk Formations		31.1 (thickness not proven)	Pale grey to white calcareous limestone.

Given the current and previous development on-Site it is expected a layer of Made Ground will be present. The Made Ground is likely to comprise brick, and concrete fragments in a cohesive matrix. Made Ground is anticipated to be directly underlain by London Clay Formation; superficial deposits are not recorded on-Site or in the immediate surrounding area.

Historical mapping from 1872 indicates an artesian well in the central to north of the Site. The BGS log dated pre-1889 indicates that in June 1946 the Prison Commission confirmed the well was disused and that the well was located in a building which had been demolished. No information on installation details or decommissioning was provided in the log.

The Groundsure dataset indicates a 66kV underground electricity transmission cable is located beneath the Site, the cable is recorded as 'DC Decommissioned Cable Section 07'.

### 3.3.1 Ground Stability

Ground stability risks identified in the Groundsure report are included in Table 5.

Table 5 Ground Stability Risk Classification

Ground Stability Risk	Risk Classification
Collapsible Ground	Very Low
Compressible Ground	Negligible
Ground Dissolution	Negligible
Landslide	Very Low
Running Sand	Very Low
Shrinking or Swelling Clay	Moderate

The BGS map does not reveal any structural, geomorphological or geochemical features on or near to the Site.

The Site is not in an area that could be affected by coal mining or metalliferous mining activity.

### 3.3.2 Ground Gas and Vapours

#### Radon

The Groundsure report identifies the Site is not in an area of high radon levels. Correspondingly, no protective measures will be required in the proposed development.

In 2009 the Health Protection Agency ((HPA), now Public Health England) recommended that radon protection measures be built into all new occupied buildings in the UK, whether or not they were situated in radon sensitive area as identified by British Geological Survey (BGS) maps. The Building Regulations Advisory Committee supported the HPA's proposal. However, the then Government rejected this recommendation and the current Building Regulations (2013) do not include it. This approach should be confirmed with the Building Control Officer.

#### Ground Gas

There are no registered landfills within 500m of the Site, which may be a source of both off-site contamination and ground gas. The Groundsure report indicates potentially infilled ground 78m and 92m northwest and 240m northeast. However, based on historical mapping no significant infilling is identified. Given the scale and distance of the features identified in the Groundsure report, the potential ground gas risk is low and the sources have not been considered further in the Site's conceptual model.

The potential for ground gas has been further assessed using the Waterman Ground Gas Assessment Tool, with results reproduced in Appendix C. Following assessment, the Site is considered to represent a very low risk from ground gas issues.

#### Vapours

The Groundsure report does not record any pollution incidents relating to oils or fuels within 500m of the Site.

Land uses with the potential to result in ground contamination that could result in vapour risks to the Site have been identified, including the on-Site storage of fuel and hazardous substances. Given the low permeability of the underlying bedrock any contamination is likely to be localised.

Further characterisation of the contamination status of the underlying soils as part of a Ground Investigation (GI) will establish the vapour generation potential of any volatile contamination present (i.e. degree of degradation and volatility of contamination).

### 3.4 Controlled Waters

#### 3.4.1 Surface Waters

There are no surface water features in a 500m radius of the Site.

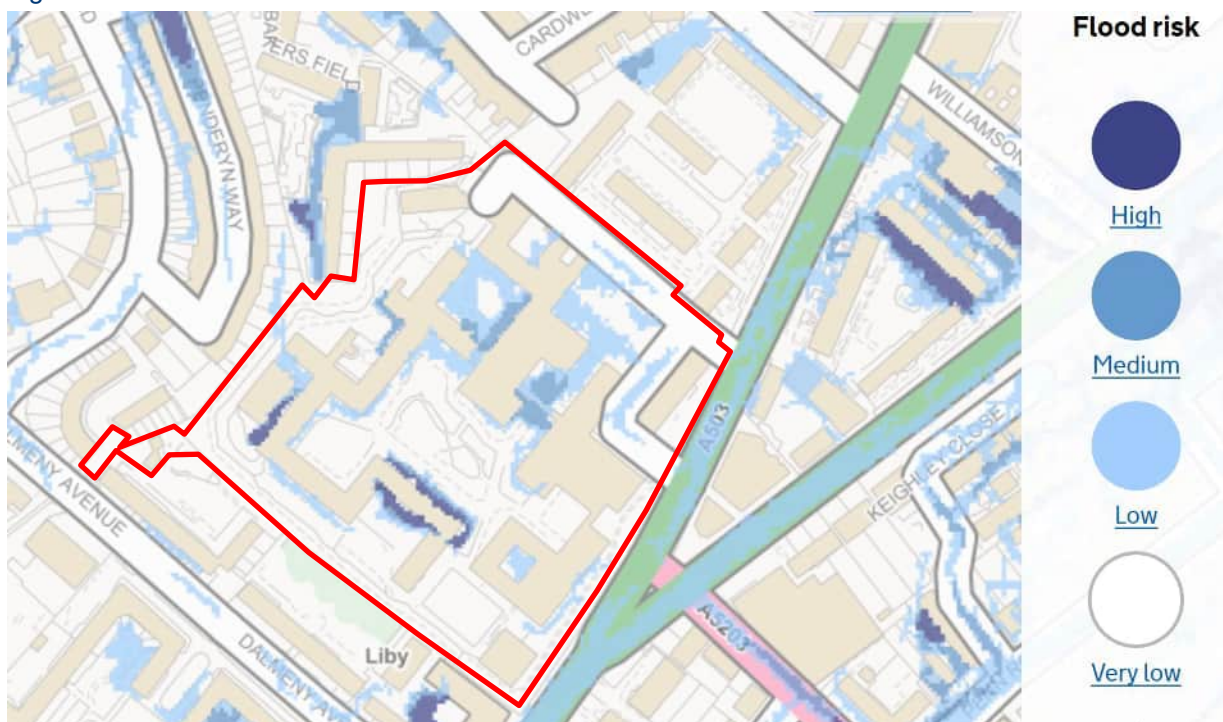
Furthermore, there are no recorded surface water abstractions within a 1km radius of the Site, or Environmental Permits for discharges to surface water in a 500m radius of the Site.

#### 3.4.2 Flood Risk

According to the EA's indicative flooding data, the Site is not located in an area of fluvial or tidal flooding.

The EA's indicative flooding data indicates the Site is located in an area at risk of surface water flooding. Areas with a low and medium risk of flooding are located in the north-eastern half, areas of low, medium and high risk flooding are located in the south-western half.

Figure 3: Flood Risk from Surface Water



Source: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>, accessed 09/09/19

The EA's indicative flooding data also indicates the Site is not located in an area at risk of groundwater flooding.

#### 3.4.3 Groundwater

According to the EA, the geological deposits underlying the Site are classified as per Table 6.

Table 6: Summary of Hydrogeological Properties of the Main Geological Strata

Stratum	EA Classification	Hydrogeological Significance
Made Ground	N/A	May contain perched water.
London Clay Formation	Unproductive Strata	Contains insignificant quantities of vertically or laterally extensive groundwater
Lambeth Group	Secondary A Aquifer	May be important in supporting local abstractions or in providing baseflow to rivers and streams
Thanet Sand Formation	Secondary A Aquifer	Regionally important aquifer, likely to be used to support potable abstractions. Likely to be afforded protection against the vertical downwards migration of contaminants by the low permeability London Clay Formation.
Seaford Chalk and Newhaven Chalk Formations	Principal Aquifer	Regionally important aquifer, likely to be used to support potable abstractions

The Site is not located within a groundwater Source Protection Zone.

Limited shallow groundwater is anticipated beneath the Site owing to the low permeability of the bedrock which directly underlies the Site. A small volume of perched water may be present in the Made Ground.

There are no recorded groundwater abstractions within a 1km radius of the Site.

Furthermore, there are no recorded Environmental Permits for discharges to groundwater in a 1km radius of the Site.

### 3.5 Ecological Systems

The Groundsure report has not identified any sensitive ecological systems to be within a 1km radius of the Site.

### 3.6 Consultations

The agencies and individuals which have been contacted and/or their records reviewed during the course of this study are listed in Table 7.

Table 7: List of parties consulted during this study

Organisation	Consultee	Response
<b>London Borough of Islington</b>		
Environmental Health	Daniel O'Sullivan	Received 11/09/19
Planning	Online	Accessed 09/09/19
Building Control	Jonathan White	Received 09/09/19

#### 3.6.1 Environmental Health

The Environmental Health Officer reported the following pertinent information:

- The Site has not been identified as contaminated land.
- The site has not currently been identified as being in need of further investigation as part of the Council's inspection regime.
- The car sales garage 90m northwest was remediated and redeveloped into residential circa



2015, under planning consent ref P111630 for 'demolition of existing garage workshop building and erection of a terrace of six, two storey houses (comprising 2 x 3 bedroom houses and 4 x 2 bedroom houses) together with erection of associated refuse / recycling and cycle stores and hard and soft landscaping' dated 24 January 2013. The contaminated land condition was discharged in 2014.

- There are no records of landfill or Made Ground at or near the Site.
- There are no records of Part B processes on the Site or adjacent to it.

### 3.6.2 Planning Department

A review of the LBI's online planning portal identified the following pertinent information which relates to the Site:

*Q2019/2051/DRP, registered on 04/07/19 for: Demolition of existing buildings and comprehensive redevelopment of the site to provide a residential-led scheme, including the provision of a women's centre. 1st Review.*

No further information was available.

### 3.6.3 Building Control Department

The Building Control Department confirmed they were unable to provide any information with respect to the Site.

## 4. Previous Environmental Assessments

The following environmental report relating to the Site has been reviewed as part of this study:

Table 8: List of Previous Environmental Reports Reviewed

Author	Title	Date and Reference
Amec Foster Wheeler Environment & Infrastructure UK Limited (Amec Foster Wheeler)	Phase 1 Geo-Environmental Desk Study, HMP Holloway Disposal	October 2016. Ref. 38741R003i2

The report was prepared by Amec Foster Wheeler for Bilfinger GVA on behalf of the Ministry of Justice (MoJ) prior to the intended disposal of the Site by the MoJ and its proposed redevelopment for mixed uses.

The assessment included a Site walkover, review of historical records, geological setting, hydrogeology and hydrology of the Site and its surrounds, development of a conceptual model and identification of assessment of potential development abnormalities.

Amec Foster Wheeler's walkover identified Site features similar to those recorded by Waterman during the 2019 walkover, but reported the Site was bound by a brick wall on three sides as opposed to two sides (northwest and southwest) during the 2019 walkover.

A Pre-Desk Study Unexploded Ordnance (UXO) Assessment by Zetica undertaken as part of the assessment indicated during WWII HE bombs fell on the site, which has a high recorded bombing density.

Seven potentially significant contamination linkages have been identified in relation to current and historical land uses and potential Made Ground. Identified receptors include future site users, and properties (building, buried services and water pipes). Identified pathways include inhalation, ingestion and dermal contact for human health receptors. Where required, it is anticipated that these pathways may be negated through the installation of a suitable capping layer (dermal contact/ingestion) or adequate gas/vapour protection measures (inhalation) in buildings in affected areas of the site.

A ground investigation including confirmation of the Site's geology, groundwater regime and ground gas regime was recommended.

It was also recommended for topsoil to be tested to ascertain its suitability for re-use, and for the soils likely waste characterisation to be assessed. An attempt to locate the on-Site well was also recommended.

## 5. Hazard Assessment and Preliminary Conceptual Model

The Preliminary Conceptual Model for the Site is presented in Table 10 and graphically in Figure A4 (Appendix A). The risk rating included in Table 10 has been assessed qualitatively using the criteria given in Appendix E and the potential receptors identified using the criteria given in Appendix F.

### 5.1 Contaminants of Concern

Contaminants of concern identified at the Site are summarised in Table 9.

Table 9: Contaminants of Concern

Source	Associated Contaminants
<b>On-Site (current)</b>	
Made Ground	Potentially contains asbestos, metal/metalloids, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbon (TPH) and volatile/semi-volatile organic compound (VOC/SVOC) contamination.
ASTs	PAHs, TPH and VOCs/SVOCs.
Hazardous substance storage (Water treatment chemicals, acids, herbicides)	Herbicides, VOCs, SVOCs, sulphate, chloride, metal/metalloids.
Chimney	Asbestos, metal/metalloids, PAHs, VOCs, SVOCs
<b>On-Site (historic)</b>	
Workshop, brick kiln	Asbestos, metal/metalloids, PAHs, TPH and VOCs/SVOCs.
Electricity sub-station	PBCs, TPH.
<b>Off-site (current)</b>	
None identified	
<b>Off-site (historic)</b>	
Electricity sub-station	PCBs, TPH.
Tramway	
Garages, depot, workshop	Asbestos, metal/metalloids, PAHs, TPH and VOCs/SVOCs.

Table 10: Preliminary Conceptual Model for the Site

Receptor	Potential Sources	Pathways	Risk	Justification / Mitigation	Residual Risk
<b>Human Health</b>					
	Contaminants within Made Ground and perched groundwater	Dermal contact, ingestion, and inhalation	Medium	<p>Potential for elevated contaminants in the Made Ground, with risks to construction workers during the redevelopment and to future Site users via soft landscaping at the completed development.</p> <p>As part of a ground investigation the ground conditions and contamination status of the soils and perched groundwater, if present, should be established. Where elevated contaminants are present remedial measures will be required to break the contaminant linkage. Site-won or imported topsoil should be chemically and geotechnically tested to ensure it is suitable for use. The reuse of Site-won Made Ground can be facilitated by the use of the CL:AIRE Definition of Waste Code of Practice (DoWCoP).</p>	Low
Future Site Users	Ground gas	Accumulation in internal and confined spaces with potential risk of explosion, inhalation and asphyxiation.	Low	A limited thickness of Made Ground is anticipated on-Site. Given the age of its placement, likely composition and thickness it is considered not likely to be capable of generating significant concentrations of ground gas that could impact the proposed development. Should significant deposits of Made Ground that are potentially capable of generating significant concentrations be encountered during the GI, further ground gas assessment will be carried out.	Low
	Vapour		Medium	Potential vapour sources on-Site include volatile contamination in soils and perched groundwater. The requirement for vapour monitoring/protection measures should be confirmed as part of a ground investigation. This could include PID headspace monitoring and analysis of soils and perched groundwater for VOCs/SVOCs, to confirm the vapour risk.	Low
Construction Workers	Contaminants within the Made Ground and perched groundwater	Dermal contact, ingestion and inhalation	Medium	<p>Potential for contaminants in the Made Ground. During construction, ground workers will come into direct contact with contaminants, exposing them to an unacceptable risk without mitigation measures being taken.</p> <p>Construction workers should wear the appropriate Personal Protection Equipment (PPE), Respiratory Protective Equipment (RPE), adhere to good hygiene and safe working practices, the Confined Space Regulations 1997, and the Control of Asbestos Regulations 2012.</p>	Low

Receptor	Potential Sources	Pathways	Risk	Justification / Mitigation	Residual Risk
Off-site residents/users	Contaminants within the Made Ground	Dispersion off-site through wind entrainment leading to direct contact and inhalation.	Medium	<p>Potential for contaminants in the Made Ground which could disperse off-site during construction works notably earthworks.</p> <p>During construction good working practices for dust suppression should be employed to limit dust creation and migration as far as is practically possible. Where elevated contaminants are present this will limit lateral migration of contaminants off-site.</p>	Low
<b>Property</b>					
On-Site structures	Potentially hazardous ground conditions	Chemical attack on buried services and foundations	Medium	<p>Buried foundations and services in contact with potentially contaminated soils and groundwater may be exposed to chemical attack.</p> <p>The results of intrusive investigation should be used to determine the design specification of buried foundations and services.</p>	Low
<b>Ecological Systems</b>					
Soft landscaping	Potential contamination in Made Ground and shallow soils	Plant uptake in Made Ground and shallow soils	Medium	<p>The proposed development includes new areas of soft landscaping.</p> <p>Future ground investigation will assess for phytotoxic contaminants in soils.</p> <p>Topsoil used for soft landscaping will be confirmed as suitable for use.</p>	Low
<b>Controlled Waters</b>					
Deep groundwater (Secondary A and Principal Aquifer)	Potential contamination in perched groundwater	Migration of contaminants through pathway created by historical abstraction well, to deeper aquifers.	Medium	<p>The historical abstraction well on-Site should be located and decommissioned to prevent the historical well from acting as a potential pathway to the Secondary A Aquifer (Thanet Sand Formation and Lambeth Group) and the Principal Aquifer (Chalk) at depth.</p>	Low

## 6. Conclusions

Based on the Site's historical, current, and proposed future end uses, in absence of mitigation the following potential pollutant linkages are identified.

- Construction workers may come into direct contact with ground contamination during redevelopment works;
- Future Site users may contact ground contamination at the completed development in areas of proposed soft landscaping;
- Vegetation in areas of proposed soft landscaping may come into direct contact with contaminants in the Made Ground;
- A significant vapour regime is potentially present locally on-Site, subject to assessment as part of a ground investigation. Future Site users, construction workers, and on-Site structures may be at risk;
- Buried foundations and services contacting contaminated ground with risks of chemical attack;
- Groundwater within the Secondary A and Principal Aquifers beneath the Site may be exposed to contamination via the historical abstraction well providing a preferential migration pathway.

The recommendations of this report outline preliminary remedial and mitigation measures that require confirmation through additional works. However, once successfully implemented the risks are anticipated to be low. Therefore the NPPF requirement that on completion the Site can no longer be captured under the Part IIA regime is expected to be met.

## 7. Recommendations

The following actions are recommended to address the potentially unacceptable risks identified:

### Prior to -Construction

- An intrusive geo-environmental ground investigation (GI) should be undertaken. This should include:
  - Characterisation of the contamination status and thickness of Made Ground and natural soils underlying the Site;
  - Groundwater monitoring and sampling, if relevant;
  - Preliminary Waste Classification Assessment of the likely waste soil arisings; and
  - PID headspace monitoring and analysis of soils and perched groundwater for VOCs/SVOCs, to confirm the vapour risk. If significant contamination is identified, vapour monitoring may be required. This should be confirmed as part of the ground investigation.
- The abstraction well on-Site should be located and decommissioned in line with EA guidance;
- Concrete in construction and any new water supply pipes should be appropriately designed to protected against contamination in Made Ground and soils
- A Construction Environmental Management Plan should be prepared to address possible issues during redevelopment such as dust and waste generation and potential for pollution from storage of harmful substances/fuels.
- The investigation results should be assessed within a Generic Quantitative Risk Assessment (GQRA) report which includes an updated conceptual model;
- Production of a Remediation Strategy, detailing the remedial measures required to break the pollutant linkages as assessed in the GQRA;
- The reuse of Site-won soils on-Site or another site can be facilitated by the use of the CL:AIRE DoWCoP subject to risk assessment and being chemically and geotechnically suitable for their intended location. The potential reuse of Site-won soils should be explored at an early stage to comply with the DoWCoP and considered when designing Site levels and calculating materials balances.

### During Construction

- Construction workers should wear the appropriate Personal Protective Equipment (PPE), Respiratory Protective Equipment (RPE), adhere to good practice hygiene and safety measures, the Confined Space Regulations 1997 and the Control of Asbestos Regulations 2012.
- During construction, potentially contaminative substances should be stored and handled in accordance with the COSHH Regulations 2002 to prevent fugitive emissions migrating to the Made Ground and underlying groundwater;
- During construction, dust suppression techniques should be implemented to minimise the dispersion of contaminants within dust;
- Soils being removed from the Site should be characterised in line with the Environment Agency's (EA) technical guidance to determine the most appropriate method of disposal;
- The re-use of inert demolition waste, such as bricks and concrete, on-Site can be facilitated by the use of the *WRAP: Quality Protocol – End of waste criteria for the production of aggregates from inert*

*waste. 2013; and*

- Imported topsoil should be chemically tested to ensure it is suitable for use. Soft landscaping should be supported by a suitable growth medium that complies with 'BS3882:2015 – Specification for topsoil', 'BS8601:2013 – Specification for subsoil and requirements for use' and assessment criteria suitable for the proposed end use.

#### Post Completion

- Post completion of the development a Verification Report should be prepared detailing the remedial measures undertaken during the Development and confirming all pollutant linkages have been broken.



## GLOSSARY

For the purpose of this report, the following terms and definitions apply (see BS 10175:2001).

Accuracy	Level of agreement between true value and observed value.
Conceptual Exposure model	<p>Textual and or schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process.</p> <p><b>Note 1:</b> The conceptual exposure model is initially derived from the information obtained by the preliminary investigation. This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of the field investigation can provide additional data that can be used to further refine the conceptual model.</p>
Contamination	<p>Presence of a substance which is in, on or under land, and which has <u>the potential</u> to cause significant harm or to cause significant pollution of controlled water.</p> <p><b>Note 1:</b> There is no assumption in this definition that harm results from the presence of the contamination.</p> <p><b>Note 2:</b> Naturally enhanced concentrations of harmful substances can fall within this definition of contamination.</p> <p><b>Note 3:</b> Contamination may relate to soils, groundwater or ground gas.</p>
Controlled water	<p>Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three mile limit of territorial waters.</p> <p><b>Note 1:</b> See Section 104 of The Water Resources Act 1991.</p>
Harm	Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case humans, including property.
Hazard	Inherently dangerous quality of a substance, procedure or event.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
Precision	Level of agreement within a series of measurements of a parameter.
Receptor	Persons, living organisms, ecological systems, controlled water, atmosphere, structures and utilities that could be adversely affected by the contaminant(s).
Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
Soil	<p>Upper layer of the earth's crust composed of mineral parts, organic substance, water, air and living matter.</p> <p><b>Note 1:</b> In accordance with BS 10175:2001 the term soil has the meaning ascribed to it through general use in civil engineering and includes topsoil and subsoil; deposits such as clays, silt, sand, gravel, cobbles, boulders and organic deposits such as peat; and material of natural or human origin (e.g. fills and deposited wastes). The term embraces all components of soil, including mineral matter, organic matter, soil gas and moisture, and living organisms.</p>
Source	<p>Location from which contamination is, or was, derived.</p> <p><b>Note 1:</b> This could be the location of the highest soil or groundwater concentration of the contaminant(s).</p>
Uncertainty	Parameter, associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement.



## **APPENDICES**

### **A. Site Plans**

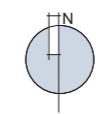
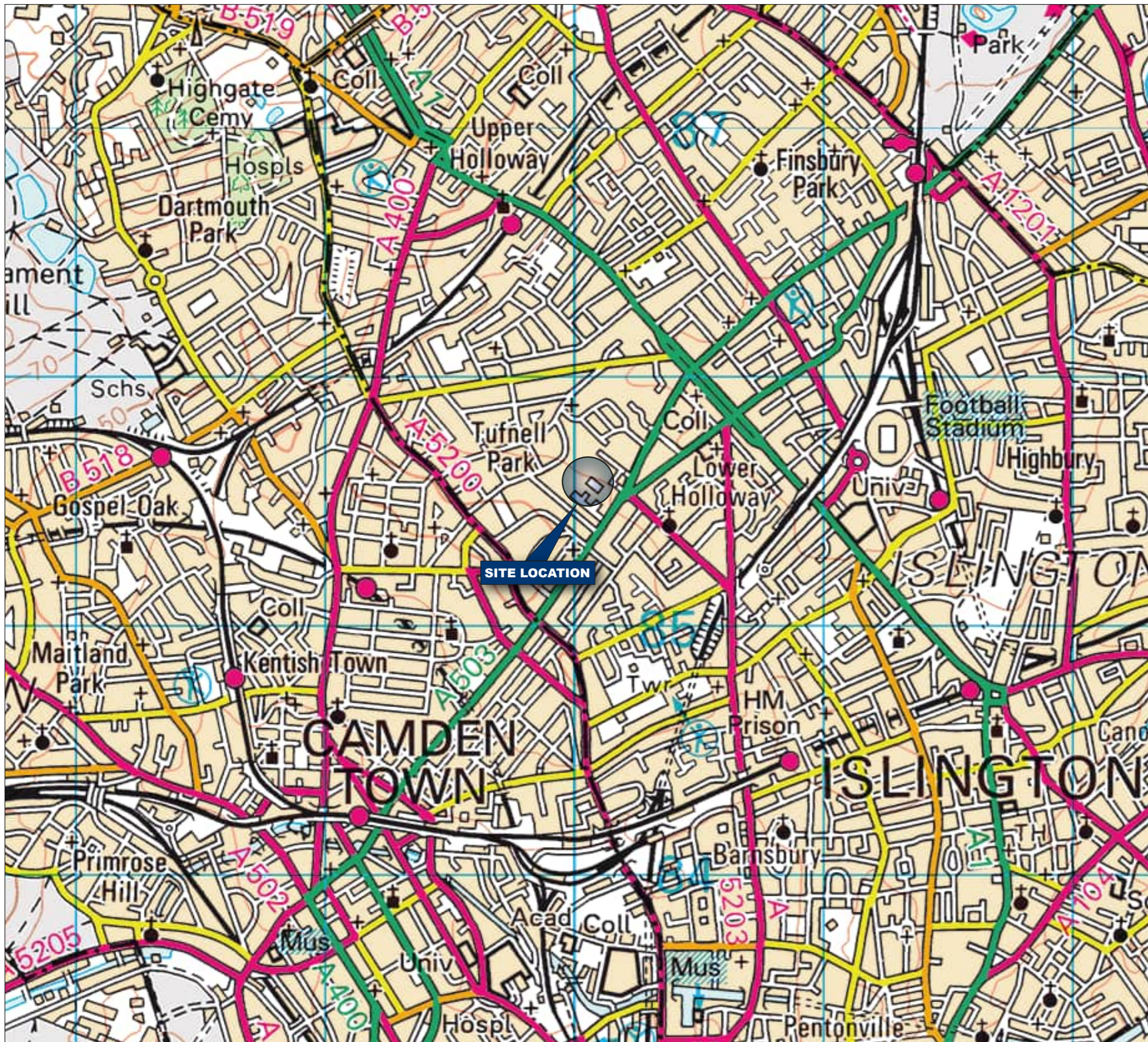
- **A1: Site Location Plan**
- **A2: Site Plan**
- **A3: Site Features Plan**
- **A4: Conceptual Site Model**
- **A5: Proposed Development Plans, Plots A-E**

#### **Appendices**

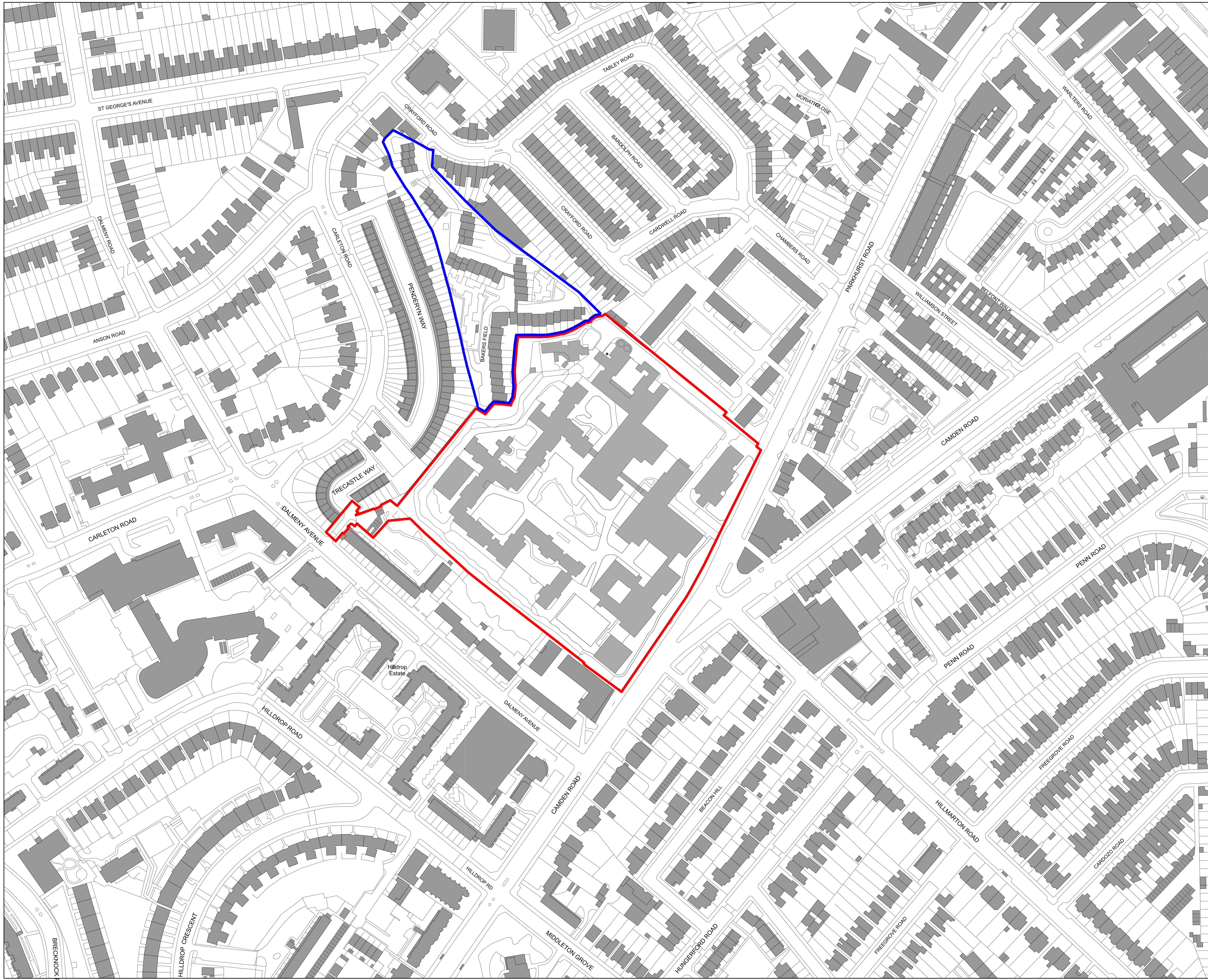
Preliminary Environmental Risk Assessment

Document Reference: WIE16172-100

WIE16172-100-R-1.3.1-PERA



Project Details	WIE16172-100: Holloway Prison, Parkhurst Road, London N7 0NU
Figure Title	Figure A1: Site Location Plan
Figure Ref	WIE16172-100_GR_PERA_A1A
Date	September 2019
File Location	\\s-Incs\wie\projects\wie16172\100\graphics\pera\issued figures



**KEY**

- Application boundary
- Land in the ownership of the applicant which is outside the application site  
Peabody Freehold Title (NGL805622)

Application boundary area: 4.16 Hectares

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REV	DATE
D	15/10/2021 DRAFT PLANNING
C	08/10/2021 INFORMATION
B	01/10/2021 INFORMATION
A	27/08/2021 DESIGN FREEZE 1
-	26/08/2021 DRAFT FOR INFORMATION

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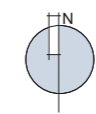
**LOCATION**

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job title  
**PROJECT HOLLOWAY**

drawing title / location  
**LOCATION PLAN**

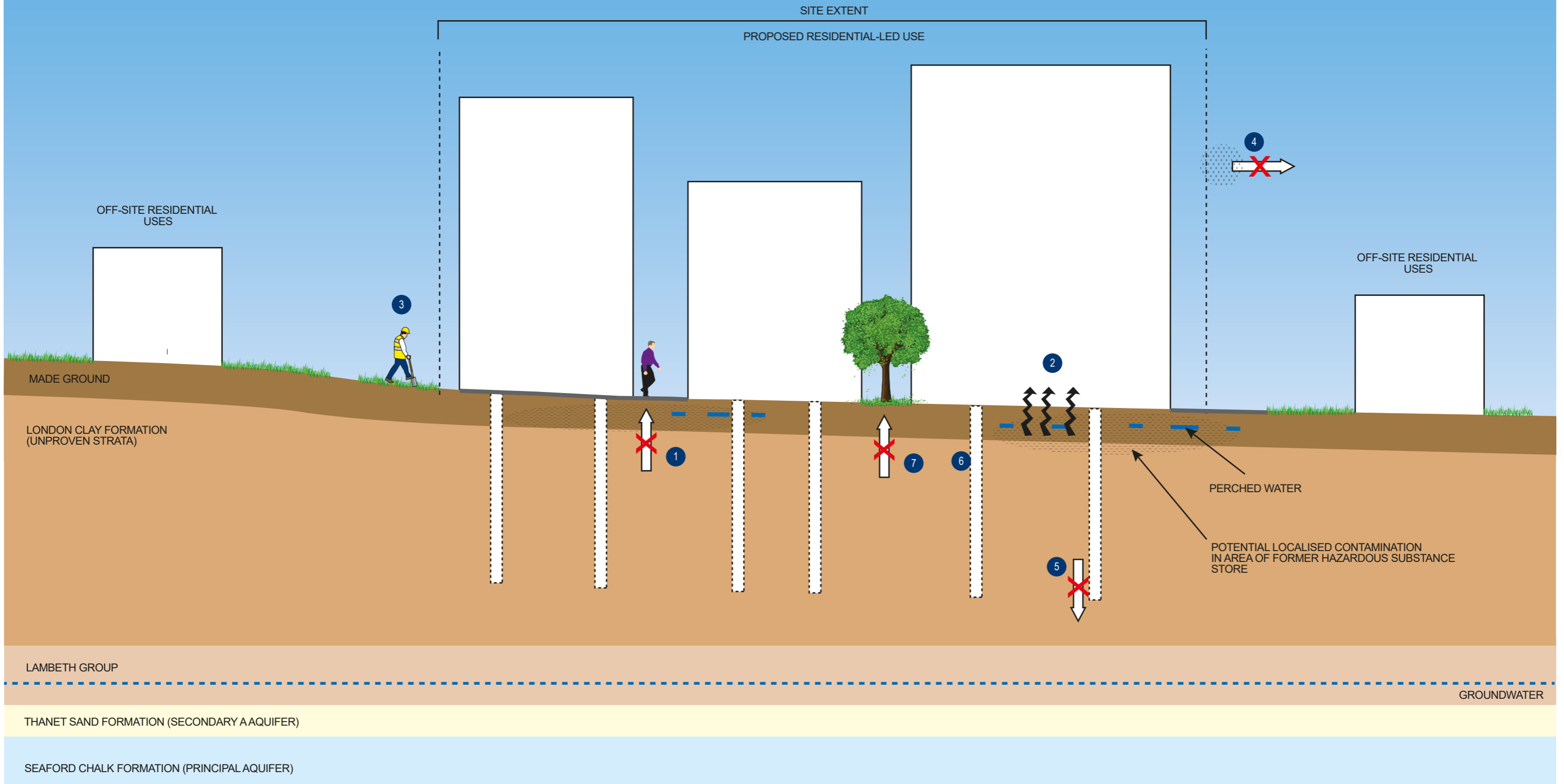
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Project Details	WIE16172-100: Holloway Prison, Parkhurst Road, London N7 0NU
Figure Title	Figure A3: Site Features Plan
Figure Ref	WIE16172-100_GR_PERA_A3A
Date	September 2019
File Location	\\s-inc\wiel\projects\wie16172\100\graphics\pera\issued figures

SW

NE



- 1 Potential for localised contamination in Made Ground, shallow natural soils and groundwater. Contamination pathway to future Site users will be blocked by hardstanding, building cover and managed soft landscaping.
- 2 Potential ground gas and vapour risk from localised soil and groundwater contamination, if present. Ground investigation to confirm the requirement for ground gas/vapour monitoring and protection measures. Ground investigation to include environmental sampling and analysis, PID headspace monitoring and exploratory observations.
- 3 Construction workers will need to be provided with appropriate Personal and Respiratory Protective Equipment (PPE/RPE), adopt good hygiene Standards and undertake works in line with relevant legislation.

- 4 Contamination dust pathway blocked by Construction Environmental Management Plan (CEMP) implementation.
- 5 Potential deep groundwater contamination pathway blocked by London Clay Formation. Foundations are likely to terminate in the London Clay Formation.
- 6 The results of ground investigation should be used to determine the design specification of buried foundations and services..
- 7 topsoil used for communal soft landscaping will be confirmed as suitable for use.

Project Details	WIE16172-100: Holloway Prison, Parkhurst Road, London N7 0NU
Figure Title	Figure A4: Conceptual Site Model
Figure Ref	WIE16172-100_GR_PERA_A4A
Date	September 2019
File Location	\\s-inc\wiel\projects\wie16172\100\graphics\pera\issued figures



**KEY**

1 BED	CYCLE STORE
2 BED	EXTRA-CARE
3 BED	AFFORDABLE TENURE
4 BED	MARKET TENURE
WOMENS CENTER	ROOF PRIVATE TERRACE
REFUSE STORE	SITE BOUNDARY
COMMERCIAL	
MEP	
HEAT PUMPS	

0 1m 2m 5m 10m

LANDSCAPE AND PUBLIC REALM INDICATIVE. REFER TO LANDSCAPE ARCHITECT INFORMATION.

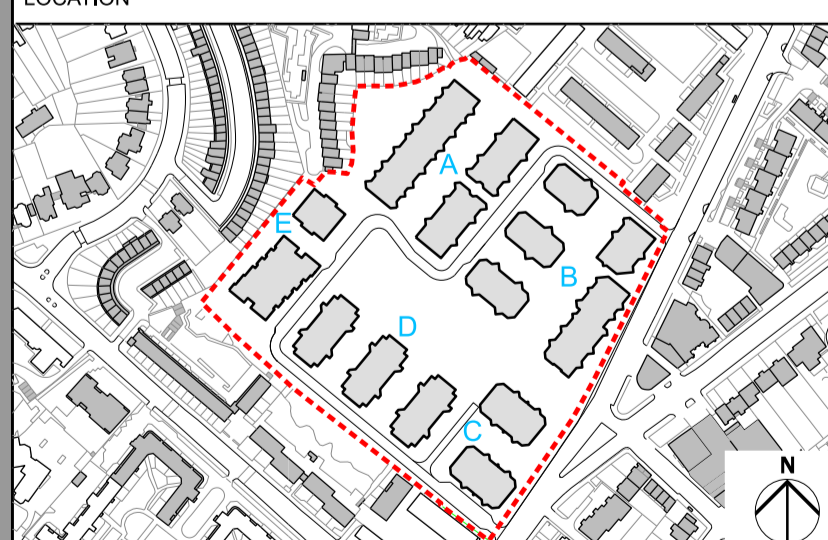
ROAD LAYOUT IS INDICATIVE AND TO BE CO-ORDINATED

REV	DATE
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F	24/08/21 INFORMATION
E	13/08/21 INFORMATION
D	02/08/21 INFORMATION
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drawing title / location  
**MASTERPLAN  
UPPER GROUND FLOOR**

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AC	LL	1:500@A1; 1:1000@A3	INFORMATION

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