

Anchor Hanover

Remediation Strategy

**Land north of St Andrews Road
St Andrews Park
Uxbridge
UB10 0RX**

**Report No: 18.11.002a
April 2020**

DOCUMENT RECORD

Report Title Remediation Strategy

Project Title New Assisted Living Apartments Development

Project Address Land north of St Andrews Road, St Andrews Park, Uxbridge, UB10 0RX

Project Number 18.11.002a

Client Anchor Hanover

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For and on behalf of ListersGeo, trading name of Listers Geotechnical Consultants Ltd

Issue No	Date	Status
1	25 th March 2020	Draft
2	31 st March 2020	Final
3	9 th April 2020	Final with updated Proposed Site Layout Plan

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REMEDIAL STRATEGY

INTRODUCTION

This Remedial Strategy describes the remediation to be undertaken for a block of assisted living apartments on land to the north of St Andrews Road, St Andrews Park Uxbridge, UB10 0RX. The proposed site plan is provided at the end of this report.

Instructions to undertake this report was received from Perega acting on behalf of the client, Anchor Hanover, in their email dated 10th March.

A Ground Investigation was previously prepared by ListersGeo, report number 18.11.002, dated April 2019. This site has been subject to a number of other previous reports which were summarised within our report referenced 18.11.002.

It is proposed to redevelop the site to accommodate a part four-storey to part eight-storey assisted living apartments, to include a partial basement and with associated car parking and grassed soft landscaped areas. A proposed site layout plan is provided in Appended to this report.

This report has been prepared for the sole use of the client and their professional advisors. This report shall not be relied upon by third parties without the express written authority of ListersGeo. If an unauthorised third party comes into possession of this report, they must not rely on it and the authors owe them no duty of care and skill.

CONTAMINATION RISK ASSESSMENT

The site lies in an area currently being redeveloped with residential properties located to the east of Uxbridge town centre.

An investigation of the site history identified that the site once formed part of the former Ministry of Defence (MOD) RAF Uxbridge, which closed in 2010. The west of the site was developed between 1934 and 1960 with offices, a ground electrical servicing department and ground equipment servicing department for use by Military Transport. A tennis court was developed in the east of the site, around 1962, which itself replaced in the 1990's by a row of three garages. The garages and Military Transport buildings were demolished in 2014 as part of the wider St Andrews Park redevelopment.

During the previous investigations between 0.5m and 2.7m, but typically less than 1.0m, of Made Ground was encountered on the site. Made Ground generally comprised a sandy gravelly clay, silty clayey sandy gravel, and silty clayey gravelly sand with gravel of quartz, flint, brick, ash and fragments of clinker, concrete, metal, roadstone and occasional brick cobbles.

Following demolition of the former buildings, up to 2.0m of crushed arisings were recorded to have been used to infill voids left during demolition. Further earthworks raised site levels by up to a maximum of 0.91m above original ground levels.

Beneath the Made Ground locally Alluvium was encountered close to the centre of the southern site boundary in a thickness of 1.6m and comprised soft brown orange brown mottled silty clay, clayey sandy silt and sandy gravelly clay with gravel of flint and occasional organic traces.

Black Park Gravel, River Terrace Deposits, were recorded at two locations underlying the Made Ground at 1.30m and 2.0m below the original ground level with the base of the deposits not encountered. No information is provided on where these deposits were encountered within the historical reports but geological mapping suggests that they are most likely to be encountered towards the northwest of the site. However, Alluvium and River Terrace Deposits were not encountered during the site investigation undertaken by ListersGeo.

Beneath the Made ground and Superficial Deposits, the London Clay Formation was encountered from depths of between 0.6m and 2.30m and extended to beyond the base of the investigation at 25.45m bgl.

The London Clay Formation and is generally represented by a brown locally mottled grey clay locally silty, and locally with selenite crystals, mudstone and siltstone lithorelicts and shell debris. At the top of the formation the London Clay is generally soft or firm slightly sandy and slightly gravelly with gravel of flint.

Groundwater was encountered as seepages within the Made Ground at between 0.67m and 1.35m bgl during the previous investigations. Groundwater strikes were recorded within the London Clay at depths of between 1.70m and 3.50m. Previous reports record the strikes within the London Clay to be related to perched water associated with bands of claystone.

Longer term monitoring revealed standing water levels of between 0.43m and 1.65m within the Made Ground and at depths of 4.27m and 4.88m within the London Clay. During some monitoring visits boreholes were recorded to be dry down to 1.90m and 3.83m bgl. This is considered to reflect the perched nature of the groundwater within the Made Ground and London Clay Formation.

The site is understood to have previously undergone localised remediation following the removal of contaminated Made Ground and asbestos contamination. These remedial measures are understood to have generally related to the removal of contamination hotspots, removal from site, and infill with 'clean' Fill.

Whilst no significantly elevated concentrations of contaminants have been identified during the Investigation undertaken by ListersGeo, a Land Quality Statement (LQS) was previously undertaken by Atkins, report number 5105977-UXB-OUT-0979 dated July 2018. This LQS stated that 'The future site developer as part of their consideration needs to provide clean soil cover, 300mm, overlying a marker membrane in areas of soft landscaping'. This is considered to be precautionary, but given the site history and the localised nature of previously encountered contamination, it is considered a sensible approach for the site. These remedial measures are aimed to break the source-pathway-receptor linkage between the contaminated soils and the end users, which would also protect the surrounding residents. For the construction workers at the site, different measures will need to be taken.

PROPOSED REMEDIAL MEASURES

The Atkins LQS recommended that a 300mm thick clean soil cover system should be placed over marker membrane above the Made Ground. This cover system should include at least 150mm of Topsoil. The cover system may be created by either raising site levels or removing some of the soil to create the cover depth required. This applies to the soft landscaped areas at this site or any areas of gardens if present. A proposed development plan is Appended to this report.

Imported material should be certified 'clean' by an environmental engineer prior to placement.

IMPORTED TOPSOIL AND SUBSOIL SPECIFICATION

The source of any soils imported to the site must be specified and delivery notes connecting the soils from the supplier to the site must be provided.

Any Topsoil or Subsoil imported to the site requires testing for a range of contaminants to ensure that the soil is suitable for the particular development. The analysis should include a range of metals and non-metals, pH, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH) and asbestos.

Normally the supplier will have undertaken chemical testing on the soils prior to sale. The geoenvironmental engineer performing the remediation verification will need to review the chemical testing results to validate the imported soil, prior to the cover system being constructed.

Testing of the imported material would need to be provided at a rate of approximately one per 50m³ of both the Topsoil and Subsoil. If the above is not provided then independent chemical testing of the soils to be imported will also be required, to demonstrate that the imported soils are clean and suitable for use. With the soft landscaped areas at this development, testing will be undertaken at a rate of approximately one sample per 50m³, or a minimum number of three samples from the imported supply. This is in accordance with NHBC Technical Extra, Issue 08, November 2012.

The testing is recommended to be undertaken either on samples collected from a segregated stockpile at the supplier's depot, or on-site, but prior to placement in the designated areas, lest the soil be found to be unsuitable.

If the Imported Topsoil or Subsoil is found to be unsuitable for use and has already been placed, then it will be removed and replaced with a more suitable verified supply.

The Imported Topsoil or Subsoil should contain levels of contaminants at or below the current Category 4 Screening Levels (C4SLs) or Suitable for Use Levels (S4ULs) for residential end use without homegrown produce as an initial conservative assessment. Should exceedances be encountered then site specific assessment criteria for assisted living apartments, or a Care Home scenario, modelled using the CLEA software, may be required.

Following the Environment Agency regulatory position statement, *RPS 190 Use of manufactured topsoil*, up to 1,000 tonnes of manufactured Topsoil may be imported without an environmental permit.

The Imported Topsoil must comply with *BS 3882:2015 Specification for topsoil*. It is recommended that confirmation on the soil quality is sought from the landscape specialist for the project.

Delivery notes for the Imported Topsoil and Subsoil must be retained for inspection and copies forwarded to the geoenvironmental consultant for inclusion in the Post Remediation Verification Report.

SITE WON SUBSOIL

Based upon the human health risk assessment undertaken within our report reference 18.11.002, the natural soils on this site are considered to be suitable to be re-used on site for landscaping purposes and beneath areas of buildings and permanent hardstanding. This is dependent on the agreement of the Local Authority and on the basis that they do not appear to have been impacted by any contaminants, if encountered. However, given the fine-grained nature of the natural soils at the site, predominantly of the London Clay Formation, they may not be suitable for use as Subsoil from a drainage/engineering point of view. If the natural soils are to be reused, then approval will be necessary from the Local Authority and the soils must be clearly segregated from any Made Ground prior to re-use. Disturbed natural soils can be difficult to validate if they are mixed with other materials on site, such as fragments of building materials including brick or concrete.

Given the inherent variability of the Made Ground, and contamination hotspots historically encountered on site, it is considered that Made Ground should not be used as part of the cover system.

GROUND WORKERS

For the construction workers, remedial measures would not be in place when they undertake the site work and therefore different measures should be taken to reduce the risk of coming into contact with the soil and break the pollutant linkage with these receptors.

To reduce the risk to as low as reasonably practicable for the construction workers it is recommended that high standards of personal hygiene should be maintained amongst the site personnel at all times. All personnel coming into contact with the soil, ground workers in particular, should be instructed to use gloves when on site to avoid dermal contact and restrict inadvertent hand-to-mouth ingestion. Washing facilities should be provided for the site staff to use and should be used prior to eating or smoking. Reference should be made to the HSE Document, "Protection of Workers and the General Public during Development of Contaminated Land" for further guidance.

ASBESTOS

Although no asbestos was identified in the soils at the site, during the site investigation, fibres of asbestos have been identified during laboratory testing. Fibres were detected at concentrations of 0.001% in one sample of Made Ground from TP905 at 1.0m bgl.

Asbestos fibres were not encountered in the overlying sample of Made Ground from TP905 at 0.50m. Based on the depth of the encountered Asbestos, it is considered that only construction workers may be at risk from the elevated concentrations of asbestos.

During previous investigations, around 12m³ of asbestos impacted soil had been identified and removed from the site.

Generally, within moist soils and if covered with hardstanding or Topsoil, asbestos does not pose a significant risk. However, if excavated and allowed to dry out and become dusty, during the digging of services trenches or construction processes for example, it would become a risk.

A watching brief will be employed during any excavation works in the Made Ground and any suspected asbestos double-bagged and removed from site.

Any developer undertaking construction works on this site where the Made Ground will be disturbed will have a duty of care to its employees and the general public to ensure that the Control of Asbestos Regulations 2012 are adhered to. Groundworkers should be made aware of potential risks of asbestos during the groundworks prior to beginning work.

DISCOVERY STRATEGY

The Developer will need to prepare a Discovery Strategy to cater for unforeseen ground conditions if encountered on-site during the groundworks. All groundworkers or site visitors coming into contact with the ground should be made aware of the potential for contamination.

Observations should be made during the course of the groundworks and records kept, including photographs, of the soils encountered, and any areas subject to reduced level dig or significant excavation.

Should soils or groundwater be uncovered that appear grossly contaminated or are significantly different to those encountered during the ground investigation, work must cease in that area and the incident reported to the site manager. Further assessment will be required by an independent geoenvironmental consultant and any necessary amendments made to the Remedial Strategy.

Unexpected contamination might include visual impacts of oils, oil or chemical odours, soils with high levels of made-made materials, vivid colouration of the soil or suspected asbestos. Personal physical symptoms may also be an indicator of contamination.

Any suspected materials already excavated should lie above and be covered with impermeable membrane to prevent run-off and leaching, to await sampling and testing. Unless unsafe, such excavations will not be backfilled until approval is provided by the validation engineer.

Site records and photographic evidence should be retained for inspection and a signed statement by the Developer will be required for the verification reporting, even where unexpected contamination is not encountered.

GAS PROTECTION

CARBON DIOXIDE AND METHANE

In accordance with the gas monitoring and assessment to BS8485:2015, it is confirmed that for this development, gas protection measures are not necessary with regard to methane or carbon dioxide gas as the Site is classified as Characteristic Gas Situation (CS) 1 in accordance with BS8485:2015.

RADON

As the property is proposed to have a basement, radon levels may be higher in this underground room and in accordance with BRE Quick Guide 7, Reducing Radon, Underground Rooms – Cellars and Basements, 2015, mitigation measures should be included in the basement design. It is understood that these will be verified by the installer or another suitably qualified company.

GROUNDWATER AND THE ENVIRONMENT

The groundwater risk assessment established that there was no significant risk to the groundwater and the surrounding environment from the contamination identified at the site itself. This should be reviewed should any significantly mobile contaminants be encountered during the ground works,

POST REMEDIATION VERIFICATION

The remedial measures undertaken at the site will be independently verified once completed to ensure the pollutant linkage to the end users of the site has been removed.

Validation reporting will be undertaken, and the Remediation Strategy updated as necessary for regulatory approval.

The Discovery Strategy will be implemented throughout the groundworks and a report compiled on completion, summarising the findings and any further measures enacted.

Disposal tickets for waste soils removed from the remediated areas, and transfer notes for any asbestos removed, will be retained for inclusion in the Verification report.

Details of the Radon gas protection measures installed will be provided by the developer directly to the local Authority and may require verification by the installer/an independent third party.

The chemical suitability of any Imported Topsoil and/or Subsoil will be verified by a geoenvironmental consultant.

The thickness of the clean soil cover will be independently checked by way of a small intrusive investigation using hand digging equipment and photographic evidence.

A Post Remediation Verification Report with respect to soil contamination will be prepared detailing the verification and validation works listed above.

WATER SUPPLY PIPES

The water supply service pipes on site will be installed to a suitable specification as agreed with the local water supply company.

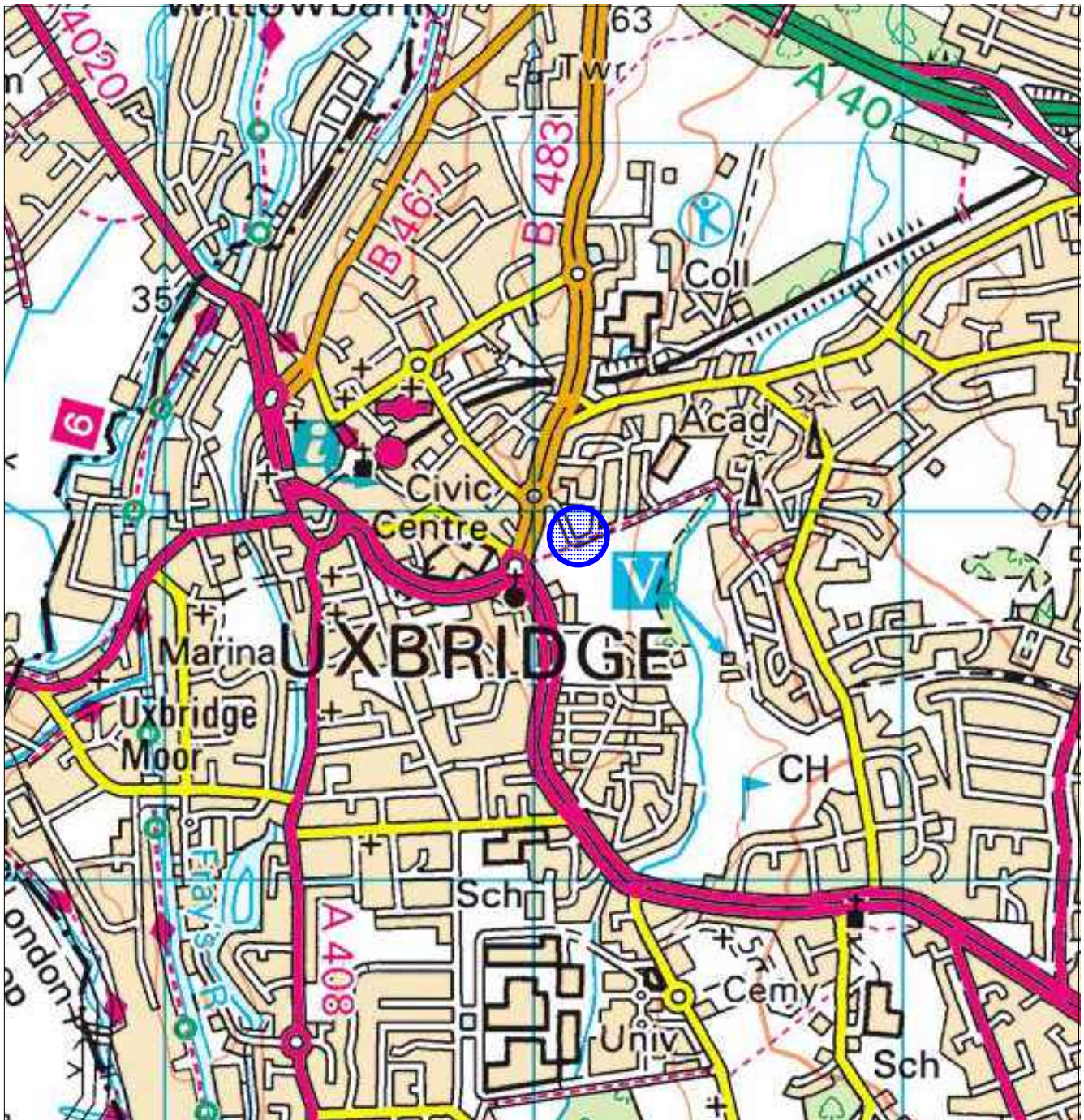
APPROVAL

This report should be agreed with the relevant local Regulatory Authority as soon as possible.

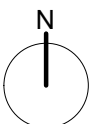
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Extract of 1:50,000 Ordnance Survey Explorer Map



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Key:  Approximate Site Location



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Title: Site Location Plan

Site: Anchor, St Andrews Park, Uxbridge, UB10 0RX

Scale: NTS

Job No: 18.11.002a

Drawn By: HC

