

Remediation & Risk-Reduction Strategy

Rear of 70, West St, Havant



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Contract No./Report Type: 26-062/RMS
Produced for Courtyard Mews Holbury Ltd

AG Geo-Consultants Ltd

Remediation & Risk-Reduction Strategy
Rear of 70, West St, Havant

Report Title
Remediation & Risk-Reduction Strategy

Project	Project No./Report Type
Rear of 70, West St, Havant	26-062/RMS

Client Name
Courtyard Mews Holbury Ltd

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8 th July 2026	Final	For LA review
17 th July 2026/V2	Final	Clarifications and further assessment added (see changes in yellow)

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Executive Summary

(notable aspects of the report are highlighted orange)

Client	Courtyard Mews Holbury Ltd
Site and Location	Rear of 70, West St, Havant Approximate postcode = PO9 1LM
Proposed Development	Backland development of 4 No. One bedroom cottages
Client Brief	Address remaining pre-commencement contaminated land planning conditions.
Desk Study Findings	<p>Site A number of different structures have been located on site, within the last circa 100 years. The former small building (where the new houses will stand) has been demolished. The site is shown to be covered in a large amount of (fly) tipped material in recent years (this has now gone).</p> <p>Surroundings. Nothing significant is marked. Currently mix of shops and residential premises, with gardens, E, W & S of the site and a fast-food restaurant to the N.</p>
Site Investigation Findings	<p>BGS Mapping Suggests:</p> <ul style="list-style-type: none"> • Drift Deposits: Head • Solid Geology: Chalk <p>The site investigation found</p> <ul style="list-style-type: none"> • Ashy Made ground (sand/gravel) to 0.8-1.2m depth (historically imported for land-raising?), over • Made ground (sandy clayey gravel, containing just brick fragments), to 1.2-1.7m depth (0.4-0.7m thickness), over • Head (sandy clayey GRAVEL) from 1.5-1.7m to 2.4-3.9m, over • Stiff silty sandy CLAY (Lambeth) from 2.4-3.9m to >5m depth
Hydrogeology & Hydrology	<ul style="list-style-type: none"> • Groundwater (GW): Struck at 1.6-1.8m depth (perched water, Secondary Aquifer). Standing in wells at 1.4m and 1.8m depth. Being perched but disconnected from the ditch, flow direction is unknown. • The deep principal aquifer groundwater was not found within 5m of ground level. • Watercourses: Immediately N there is "Brockhampton stream", which is actually a ditch because it is dry almost all the time. That ditch has a (good-condition) concrete base (which lies ~1m above (and disconnected from) perched GW level) and alongside the site, has a good-condition brick retaining wall. Flow is shown to be westwards. • Aquifers: Superficial Deposits = Secondary 'A', Bedrock= Principal • Source Protection Zones (SPZ): the site lies within a SPZ1. • Abstractions: Nearest is 490m away.
Contamination Considerations	<ul style="list-style-type: none"> • At the time of this report the buildings are above DPC level, gardens have been topsoiled and the drained areas of the site are complete except for final addition of the block paving itself. • No significant risk is considered to remain from the fly-tipping on site. Ground levels on site are the same as original. The material was screened. concrete and brick elements were kept on site whilst the remainder was disposed of off-site. • Anthropogenic components of the made ground comprise wood, glass and brick, plus ash content that decreased with depth. • There were no visual or olfactory indications of contamination. • No risks have been found that require protection against Radon, ground gas and chemical vapours. • Ashy Made ground risks to humans (from asbestos, PAH, Lead (Pb) and Cyanide (Cn)) and plants (from Lead and Zinc) have been found on site. • In respect of water resources (i.e. risks from Pb & Cn), it is just perched water, disconnected from the ditch, the Cn results for GW fall below drinking water standards and so Cn poses no significant risks to water resources. <p>Ashy Made Ground</p> <ul style="list-style-type: none"> • The ashy made ground extends to 0.8-1.2m depth at the 7no. exploratory hole locations. This depth is above the perched water table.

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	<ul style="list-style-type: none"> • This depth of ashy made ground, it being ~1m depth near the site boundaries, it deepening slight from the S to N of the site (approaching the ditch), it being mostly originally concrete covered and it's location next to the brook, suggests that the ashy made ground is imported historically for land-raising and accordingly probably extends under adjacent sites too. ~80% of the site was originally covered in hardstanding (in varying condition). • Cyanide concentrations in groundwater are therefore considered to be just as much due to the wider surrounding area, although our site could be contributing. • 3no. of 4no. slightly ashy MG samples at 0.2m depth, had Cn results above the LOD. Samples of 2no. ashy MG, 2no. non-ashy MG and 1no. natural soil at 0.3-2m depth had Cn results <LOD. This could suggest that it is not leaching and that Cn appears to be confined to the near-ground-level soils. 0.5-0.95m of the 0.8-1.2m thick ashy MG, has been removed from across the entire site, in order to accommodate new engineered layers.
Strategy for Remediation & Risk Reduction	<p>The investigation has revealed the development site to only exhibit a risk from soil contamination, with such contamination being the same type and degree as found on most urban brownfield sites. Such risks are easily remedied and therefore this report concludes that the principle of residential development is a suitable use for the site in terms of contamination.</p> <ul style="list-style-type: none"> • The risks are just made ground risks to groundworkers and site end-users. • No significant risks are considered to exist due to fly tipped material, not leachability of the ashy MG. • No "remediation" is required. • No long-term monitoring and maintenance of remediation is required. • To remove the human health risks: <ul style="list-style-type: none"> ○ Site, landscape and maintenance workers should wear gloves, boots and overalls and wash their hands before eating, drinking and smoking. Excessive dust generation should be avoided. ○ Install Barrier water supply pipes. ○ For ecological/BNG reasons, the site has soft landscaping and gardens and these are almost complete apart from tree planting. For the grassed and landscaping areas, a "clean cover" layer has been placed over any contaminated soils that remain in place. The client has installed 0.25m thickness of imported topsoil, over >0.7m thickness of recycled crush derived from site. ○ For garden paved/slabbed areas, slabs are underlain by 0.1m MOT Type 1, over 0.1m grit & cement and then the recycled crush. • Infiltration through the remaining ashy made ground (MG) needs to be minimised. An impermeable membrane has been installed under all roads, driveways and parking areas, up to the E, W and S boundaries, plus under the communal garden. If required then the client can insert into sales contracts, wording to either prevent or minimise residents from breaking through the membrane. • Although no impermeable membrane has been lain in the private gardens (grassed and patio landscaping areas), across ~2/3 of the site groundwater quality betterment has been achieved because rainwater cannot now infiltrate through the ashy MG and in the remaining ~1/3 most ashy MG has been removed. • A watching brief should be kept during siteworks for asbestos containing materials (ACM) in the soils and any other unforeseen/unsuspected contamination. If such is found, then work should stop and a competent person should be contacted for advice and assessment. Also watch for potential UXO. • Any asbestos cement fragments spotted during groundworks, should be litter picked and removed off site. • Any recycled aggregates that are planned to be imported to site, should be assessed for contamination (especially asbestos) prior to import and relevant records retained for validation purposes. • Topsoil has already been imported and lain, but will be tested. • No other risk reduction measures are required (e.g. gas and Radon protection, etc). • Validation: 3no. tests of the site-derived recycled aggregates for asbestos; test the as-placed topsoil; prove where impermeable membrane exists; prove clean cover thickness to grassed areas in rear gardens; barrier pipes; any unforeseen contamination.

The above table is only a summary and should not be read in isolation from the main text.

1 Introduction

1.1 Introduction and Brief

AG Geo-Consultants Ltd (AGGC) were commissioned by and on behalf of Courtyard Mews Holbury Ltd (the Client) to produce a Remediation Strategy report for an approved residential development at a site known as Land Rear of 70, West St, Havant, PO9 1LM (the "Site", see red-line site boundary in Appendix A).

The client's brief was to address remaining pre-commencement contaminated land planning conditions.

1.2 Proposed Development

The proposed development (see location plan in Appendix A) comprises 4no. One-bedroom cottages, with parking, driveway and private gardens.

At the time of this report the buildings are above DPC level, gardens have been topsoiled and the drained areas of the site are complete except for final addition of the block paving itself.

1.3 Scope of Works

The client accepted AGGC's proposed detailed scope of work to review previous reports and produce this remediation & risk-reduction strategy, followed by validation of the measures at a later date.

1.4 Limitations

Until all invoices associated with the production of this report have been paid in full (e.g. drillers, site engineer), then it remains the property of AGGC and not the client, and AGGC do not grant legal reliance upon it to satisfy (or remove) planning permission conditions, or to be used for engineering design, etc.

This report is provided for the benefit only of the party to whom it is addressed and their advisors. No other developer or party may use it without our express written permission (i.e. reassignment). We do not accept responsibility to any other third party for the whole or any part of the contents and we exercise no duty of care in relation to this report to any third party.

Where intrusive investigations have been completed, information, comments and opinions given in this report are based on the ground conditions encountered during the site work and on the results of laboratory and field tests performed during the investigation. However, subsoils are inherently variable and hidden from view such that no investigation can be exhaustive to the extent that all soil conditions are revealed. Conditions may therefore be present beneath the site that were not apparent in the data reviewed as part of this assessment. In particular, it should be noted that groundwater levels vary due to seasonal and other effects, and may at times differ to those measured during the investigation.

This assessment has been based to some extent on data acquired from Third Parties. This data has been accepted as correct and has not been subjected to any additional validation.

Unless specifically noted to the contrary, it should be assumed that this report has not been submitted to any other regulatory authorities for approval.

2 Planning Conditions

Relevant planning permissions and **contaminated land planning conditions** are as follows:

Planning Application: APP/19/00542

Condition 8. Prior to the commencement of any specific phase of development approved by this planning permission (or such other date or stage in development as may be agreed in writing with the Local Planning Authority and notwithstanding any assessment provided with the planning application), an assessment of the nature and extent of contamination at the site, whether originating from within or outside the curtilage, shall be submitted to and approved in writing by the Local Planning Authority. The assessment shall be undertaken by competent persons, and the findings presented as a written report.

The assessment may comprise separate reports as appropriate, but unless specifically excluded in writing by the Local Planning Authority, shall include;

1) A [site walk-over survey & / or sufficient desk-based research](#) to identify;

- All relevant previous uses of the site
- Potentially significant contaminants associated with those uses
- Uncertainties relating to previous use or associated potential contaminants
- A conceptual site model identifying all relevant sources, exposure pathways and receptors, and;
- A summary of potentially unacceptable risks arising from contamination at the site.

2) [Site investigation](#) based on (1), to provide sufficient data and information to adequately identify & characterise any physical contamination on or affecting the site, and to inform an appropriate assessment of the risks to all receptors that may be affected, including those off site.

3) The results of an appropriate risk assessment based upon (1) & (2), and where unacceptable risks are identified, a [Remediation Strategy](#) that includes;

- appropriately considered remedial objectives,
- an appraisal of remedial & / or risk mitigation options, having due regard to sustainability, and;
- clearly defined proposals for mitigation of the identified risks.

4) A [verification plan providing details of the data that will be collected](#) in order to demonstrate that the works set out in the Remediation Strategy (3) are complete, identifying any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action. All elements shall be adhered to unless agreed in writing by the Local Planning Authority.

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Condition 9. Prior to the occupation of any relevant part of the permitted development, any **verification report** required in accordance with condition 8 shall be submitted to and approved in writing by the Local Planning Authority.

The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan, and must demonstrate that site remediation criteria have been met. Where longer-term monitoring of pollutant linkages is identified as being necessary, the report shall clearly set out plans for monitoring, provision for maintenance, relevant triggers and contingency actions (a "long-term monitoring and maintenance plan"). The long-term monitoring and maintenance plan shall be implemented as approved.

Planning Application: APP/22/01207

Application for Approval of Reserved Matters (Access, Appearance, Landscaping and Layout and Scale) pursuant to Outline Planning Permission ref. APP/19/00542 for backland development of 4 No. One bedroom cottages. Partial Discharge of Conditions 7 (Construction Management Plan), 8 (Contamination), 16 (Ecological Enhancements), Condition 18 (Traffic Control) and discharge of Condition 19 (Means of Enclosure).

Contains the Nov 2022 site investigation report.

Planning Application: APP/25/00964

Request to Discharge condition 8 of APP/19/00542.

The Phase 1 & 2 reports (see Table 2.1) have been accepted and condition 8.1 and 8.2 have been signed off.

This report addresses conditions 8.3 and 8.4.

As well as reference to the planning conditions, the reader should refer to the requirements in the latest LA EHO email to the planning department, 3rd Jul 2026, 1743hrs, Subject "RE: Condition 8 - 70 West Street, Havant, PO9 1LN - APP/25/00964".

3 Summary of Phase 1 Desk Study & Phase 2 Site Investigation Findings

3.1 Introduction

There have been a **desk study** and site investigation conducted for the site, and the reports for those provide useful information for this site. The detailed findings are included in:

Table 3.1

Report type	Details	Notes
Phase 1 Preliminary Risk Assessment (Desk Study)	Environmental Desk Study and Preliminary Risk Assessment (PRA) (Ref: CL/3384/WS; by Apple Environmental Ltd, dated November 2022	Significant points from this are summarised into the Phase 2 report
Phase 2 Site Investigation report	Stage 1: Tier 2 Site Investigation GQRA Project Reference: P25.205.GQRA.02 Ltr 70-76, West St Havant, by Impact Geo, dated 06/05/26	-

The following sections contain information located/obtained by ourselves, with any new significant information from the above reports, added.

3.2 Findings Summary

Table 3.2: Findings

History of site and surroundings N=North E=East S=South W=West	<p>Site A number of different structures have been located on site, within the last circa 100 years. The former small building (where the new houses will stand) has been demolished.</p> <p>Surroundings. Nothing significant is marked. Currently mix of shops and residential premises, with gardens, E, W & S of the site and a fast-food restaurant to the N.</p>
Aerial Photographs (Dec 99- date)	<p>On Site: The only significant aspect is that the site is shown to be covered in a large amount of (fly) tipped material in recent years (this has now gone).</p> <p>In the Surroundings: Show nothing extra of significance</p>
Other	Exploratory holes WS3 and WS4 were fitted with gas/groundwater monitoring wells, but due to damage, were later replaced by wells WS101 and WS102.
Ground Conditions	<p>BGS Mapping Suggests:</p> <ul style="list-style-type: none"> • Fault Lines: None lie significantly close enough to the site. • Made ground (MG): None >1m thickness shown. • Drift Deposits: Head • Solid Geology: Chalk <p>The site investigation found</p> <ul style="list-style-type: none"> • Made ground (sand/gravel) to 1.2-1.7m depth, over • Head (sandy clayey GRAVEL) from 1.5-1.7m to 2.4-3.9m, over • Stiff silty sandy CLAY (Lambeth) from 2.4-3.9m to >5m depth • Anthropogenic components of the MG comprised wood, glass and brick, plus ash content that decreased with depth. • No visual or olfactory evidence of contamination.
Hydrology and Hydrogeology	<p>Watercourses: Immediately N there is "Brockhampton stream". Flow is shown to be W.</p> <p>Aquifers: Superficial Deposits = Secondary 'A', Bedrock= Principal</p> <p>Source Protection Zones (SPZ): the site lies within a SPZ1.</p>

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	<p>Abstractions: Nearest is 490m away.</p> <p>Groundwater: Struck at 1.6-1.8m depth (perched water, Secondary Aquifer). Standing in wells at 1.4m and 1.8m depth. Being perched but disconnected from the ditch, flow direction is unknown.</p> <p>The deep principal aquifer groundwater was not found within 5m of ground level.</p>
Contaminants of Concern	<ul style="list-style-type: none"> Contaminants of concern that 8no. soil samples were tested for comprised arsenic, cadmium, copper, total chromium, chromium VI, lead, mercury, nickel, selenium, zinc, Speciated Polyaromatic Hydrocarbons (PAH), speciated Total Petroleum Hydrocarbons (TPH-CWG, incs BTEX & MTBE), soil organic matter content (SOM), pH, phenols, cyanide and asbestos screen. Leachate was derived from soil samples and was tested for Lead Groundwater was tested for Cyanide at the request of the LA EHO. <p>A Radon report for Nos.74-76 (see Appendix D) finds 1-3% of properties exceed the action level, with no Radon protection required.</p>
Landfills?	<p>No licensed ones shown on or significantly near to the site.</p> <p>No other potential unlicensed landfilling is evident.</p>
Ground Risks, Conceptual Model & Risk Assessment	<p>The following Environmental/Contaminated Land Type risks exist:</p> <ul style="list-style-type: none"> made ground: <ul style="list-style-type: none"> Chrysotile & Amosite asbestos was found in 1no. of 8no. locations (Moderate risk to site end-users and “Low to Moderate” risk to groundworkers); elevated Lead concentrations were found in 7no. of 8no. locations; 6no. of 8no. samples had elevated PAH concentrations (“Moderate risk” to site end-users and “Low to Moderate” risk to groundworkers. “Moderate risk” to water supply pipes). The Phase 2 report does not comment on cyanide results, but we comment as follows. One large UK consultancy use 1.4mg/kg GAC for residential-with-plant-uptake (1% SOM) and also 40mg/kg for no plant uptake. Another consultancy uses 34mg/kg for both end-uses. There were a few results at <0.6m depth of 1.6-2.4mg/kg and so Cyanide could pose risks to humans. Lead and Zinc could pose risks to plants (see Section 4) Leachable contaminants (1no. of 6no. leachate samples had elevated Lead. (“Low risk” to water resources). Groundwater contaminants (wells purged and sampled using bailers)(LA EHO asked that samples be tested for Cyanide. The 2no. results were 7.1ug/l and 8.5ug/l, versus drinking water limit of 50ug/l and a freshwater EQS limit of 1ug/l)(“Low risk” to water resources). <p>There was not considered to be any significant risk from ground/landfill type gases nor chemical vapours (“low risk”). There is no significant risk from Radon.</p>

The risks are therefore:

- Made ground risks to end-users and groundworkers.
- Made ground leachability risks to water resources.

No significant risk is considered to remain from the **fly-tipping** on site. Ground levels on site are the same as original (the client states that they’ve “kept to the original floor levels”). With this material, the client screened/separated out the brick and concrete rubble (then crushed it. Aerial photos show the process) and the remaining materials & fines they had tested by Envirochem and it came back as non-hazardous. As a result, **the surface-dumped materials have been fully removed (as has the surface layer of historic (ashy) MG, as discussed elsewhere herein).**

4 Additional Assessment

The following additional assessment has been conducted by ourselves.

Brockhampton Stream

The client has supplied a large number of photos which show the following.

This is actually a **ditch** because it is dry almost all the time and at other times it mostly just has puddles (our client notes that “it’s been dry “nearly every month since we bought it (2yrs ago) and a few months before then as well”, they only recall water in the ditch a couple of times in that 2+yrs. Even in the wettest months (March 2025 and spring 2026) the client noted that there was just a puddle in the stream at the upstream end.

That ditch has a concrete base (in good condition) along the full boundary of the site. It has a brick retaining wall (in very good condition with occasional weep holes) forming the side of the channel against our site for all of the site boundary length (apart from a small length at the upstream end)

Relative to the original site ground levels at the time of ground investigation, the ditch’s base lies ~1.0m above the perched groundwater level (Drainage GA shows ditch base at 7.1-7.2mOD and original site levels at ~7.6mOD (FRA reports refers). GW was found at 1.4-1.8m depth, 5.8-6.2mOD).

As a result, there is no hydraulic connection between perched groundwater and the watercourse (and so the perched water results are better compared to **drinking water standards**, which the 2no. water results were below).

Soils Risks to Ecosystems

The following is the same assessment as used by at least one major UK contaminated land consultancy.

The criteria used by AGGC to assess the potential for soil chemistry **to harm ecosystems** are given below. These limits are solely for **phytotoxic** risks and do not assess the suitability as a growing medium (i.e. organic matter content, nutrients, clay content, etc).

Phytotoxicity refers to the harmful or toxic effects that certain substances can have on plants. It can range from reduced growth to severe damage, or plant death.

It is not possible to produce a definitive list of phytotoxic substances on account of numerous variables. However, a number of **metals** are repeatedly cited as commonly occurring priority pollutants. As a result, the following list is adopted as indicators of the potential for phytotoxicity: As, B, Cr, Cu, Ni and Zn.

For the guideline values, the most authoritative source is the British Standard for topsoil (**BS3882**), but this only lists three elements (metals). The former CLR 11 stated that the **ICRCL Guidance Note 70/90** can be used for initial screening criteria. This approach has been adopted where BS3882 is lacking, but where an ICRCL 70/90 criterion is lacking, the next lowest criterion, has been adopted.

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Table 4.1: GAC for Phytotoxic Risks

Compound	Generic Assessment Criteria (GAC)(mg/kg)				GAC Source
	pH 5.0 - <5.5	pH 5.5 - <6.0	pH 6.0 - <7.0	pH >7.0	
Boron	3				1987: ICRL 59/83 (also New Zealand)
Chromium VI	25				1990: ICRL 70/90
Chromium III	400				1998: MAFF Agricultural Practice for sewage sludge
Arsenic	250 ("applicable to plants")				
Copper (Cu)	80	100	135	200	2015: BS3882 & 1996: DoE #
Nickel (Ni)	50	60	75	110	
Zinc (Zn)	200	200	200	300	

#: Department of the Environment Publication, Code of Practice for Agricultural Use of Sewage Sludge, 1996

The MAFF guidelines for spreading sewage on farmland, were derived in order to “prevent harmful effects on soil, vegetation, **animals** and man”. Those guidelines contain no limit values for TPH, nor other organic contaminants, they only contain limits for inorganic contaminants (primarily heavy metals).

In addition to the above, there are Soil Screening Values (SSVs)[Environment Agency (EA) report 2017a (ShARE id26, revised 2022)] for ecological risks, which discuss a number of organic contaminants (e.g benzo(a)pyrene (BaP), dioxins, furans, PCBs, Phthalates, etc). **There are no SSVs for PAHs (except BaP), nor BTEX (petrol), nor TPH.**

The pH results were 7.3 and 7.6 and so concentrations determined of Cu and Ni did not exceed the stated guidelines. Some Zn concentrations exceeded the guidelines. Additionally, other than Lead, there were not any significant results for other heavy metals (which can also be potentially phytotoxic).

Ashy Made Ground

The **ashy made ground** extends to 0.8-1.2m depth at the 7no. exploratory hole locations.

This is above the perched water table.

The site is the same ground level as adjacent sites. This depth of ashy made ground, it being ~1m depth near the site boundaries, it deepening slight from the S to N of the site (approaching the ditch), it being mostly originally concrete covered, see below) and it's location next to the brook, suggests that the ashy made ground is **imported historically for land-raising** and accordingly probably extends under adjacent sites too.

The client reports that when they bought the site it was ~80% covered in hardstanding (in varying condition). **Cyanide concentrations in groundwater are therefore considered to be just as much due to the wider surrounding area**, although our site could be contributing.

3no. of 4no. slightly ashy MG samples at 0.2m depth, had Cn results above the LOD. Samples of 2no. ashy MG, 2no. non-ashy MG and 1no. natural soil at 0.3-2m depth had Cn results <LOD. This could suggest that it is not leaching and that Cn appears to be confined to the near-ground-level soils. 0.5-0.95m # of the 0.8-1.2m thick ashy MG, has been removed from across the entire site, in order to accommodate new engineered layers (crush and drainage layers).

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#: The MG has been removed to the following depths to accommodate new construction/crush layers:

- 0.5mbogl (below original ground level) under driveway, parking areas, communal grass and extending up to the E, W and S boundaries
- ≥ 0.95 mbogl under lawns.
- It was also removed from under the new houses in order to form a base for the raft foundations and so avoid the risks that piling could cause.

5 Strategy for Risk Reduction & Remediation

5.1 Introduction

The client must pass this strategy to the site contractor and/or groundworker, get them to full digest the content and confirm that they understand their obligations to implement the measures herein.

The risks are:

- Made ground risks to end-users and groundworkers.

There are not considered to be any risks from the following:

- Made ground leachability. Such only poses risks to perched water, which is not in continuity with the ditch and so is assessed to Drinking Water Standards, the limits for which the 2no. tests results were below. Furthermore 0.5-0.95m of the 0.8-1.2m thick ashy MG, has been removed from across the entire site, in order to accommodate new engineered layers. It would have been useful to test that formation level for Cn concentrations, but such did not occur (and is difficult now given construction progress).
- No significant risk is considered to remain from the fly-tipping on site.

There are two ways to reduce contamination/environmental type risks:

- “**remediation**” of soil and/or groundwater.
- Other **risk reduction measures** (that can only be completed post-commencement, such as clean cover in final garden areas, gas protection, or special water supply pipe materials).

Carbon & Sustainability

Final site levels should be designed to accommodate as much surplus soils/materials[#] from construction, as is legitimately possible (without been seen to be trying to lose such on site, in which case they would class as “waste”).

Conduct a cut/fill assessment to establish any surpluses or deficits of soil/materials[#].

Any deficit can be resolved by obtaining surplus soils from other development sites by using a **U1 Waste Exemption** or the **Definition of Waste Code of Practice (DoWCoP)**.

It may be possible for any surplus soils/materials[#] posing hazards, to be reused in areas where they will not pose hazard.

[#]: e.g. brick, tiles, concrete and tarmac, crushed for reuse as fill, provided that tarmac/asphalt does not contain hazardous concentrations of **coal-tar**.

No long-term monitoring and maintenance of remediation is required.

Timescales for the construction and implementation of risk-reduction measures, are unknown.

5.2 General

Given the existence of made ground on the site and the site’s past usage, vigilance should be maintained during site clearance, in case any further areas of suspected contamination are encountered. If areas are found, then work will stop in that area, a suitably qualified and experienced geo-environmental engineer will be contacted to assess the situation and potentially undertake appropriate sampling, testing and further risk assessment. The Engineer may also

contact the Local Authority (LA) Environmental Health Officer (EHO) to discuss the situation and agree a way forward.

If any amendments to this Remediation Method Statement are required as a result of unforeseen contamination, then these will be agreed in writing with the Contaminated Land Officer before being carried out on site.

5.3 Pre-Commencement “Remediation” Requiring Validation

The following measures require implementation before the “development” can proceed.

There is no “remediation”, and are no risk reduction measures, that can be completed pre-commencement.

5.4 Post-Commencement Risk Reduction Measures Requiring Validation

General

The following measures are undertaken as part of the development/construction and are “post-commencement”.

Measures to overcome unacceptable risks identified in the previous sections are as follows.

All validation shall be undertaken by a suitably qualified and experienced geo-environmental engineer.

Soil Risks to Water Resources (Leaching)

Infiltration through the **remaining** ashy made ground (MG) needs to be minimised.

The design of the project seeks to minimise excavations, e.g. by using a **raft for the house** and by use of permeable block paving # and a granular collection layer **under all roads, driveways and parking areas, underlain by a 1200g black impermeable membrane (see plans and sections in Appendix C), with the membrane extending up to the E, W and S boundaries, plus under the communal garden.** The membrane wraps up at the edges and slopes down towards the outlets to the 2no. attenuation tanks, before discharging to the **adjacent ditch.**

The only areas where infiltration could still occur are:

- The grassed areas of back gardens,
 - A few tree pits (say 0.4m diameter) for Acer trees in the communal garden area (where the root bowls cannot be tanked and yet they need rainwater),
- and even then, most of the ashy MG has been removed, as discussed earlier.

#: installed on a substantial engineered sub-base and would be extremely difficult to remove without significant excavation works. Whilst it is not possible to make removal physically impossible, any alteration would require major construction work rather than simple gardening activities. If required then the client is *able to include appropriate clauses within the sale documentation. These could either prohibit the removal of block paving and creation of gardens, or alternatively explain that an impermeable contamination barrier exists beneath the external areas and must not be disturbed or penetrated due to the underlying made ground. A copy of the amended sales contract can be provided if required.*

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Soil Risks to Humans

Made ground has been proven to between 1.2m and 1.75m depth.

For ecological/BNG reasons, the site has soft landscaping and gardens and these are almost complete apart from tree planting.

A practical solution to the presence of soil contaminants that pose a risk to humans is often to provide a clean cover layer in any garden or landscaped areas to any contaminated soils **that will be left in place** (or if contaminated soil is relocated to beneath such areas). This could be achieved either by placing uncontaminated soil (i.e. **topsoil and subsoil**) directly onto the contaminated soils, hence raising ground levels, or by removal of part of the contaminated soil and backfilling with uncontaminated topsoil and subsoil, or by a combination of these means. The cover system is designed to reduce the exposure to contaminants of residents and other site users to an acceptable level. The cover layer should also reduce any risks to plant growth.

For this site clean topsoil and subsoil could be required to be as much as 0.6m thick. For sustainability reasons the amount of MG removed from site is to be limited and to do this the thickness of any MG removal is to be limited.

The client **has already constructed the following** for **grassed garden areas**, and **landscaping areas**, is for:

- 0.25-0.3m thickness of clean imported topsoil, over
- >0.7m thickness of recycled crush derived from site (such from a significant dig-deterrent), over
- the made ground.

There is no membrane. The cost of installing one now is out of proportion to the benefit to be gained, apart from which most of the ashy MG has been removed to accommodate new engineered layers.

For garden paved/slabbed areas, slabs will be underlain by 0.1m MOT Type 1, over 0.1m grit & cement and then the recycled crush.

Although no impermeable membrane is planned for the private gardens (grassed and patio landscaping areas), across ~2/3 of the site, groundwater quality betterment has been achieved because rainwater cannot now infiltrate through the ashy MG.

The BRE report recommends a minimum clean cover thickness of 300mm and that any clean cover layer should ideally incorporate a topsoil layer at least 150mm thick (or 30% of the total cover depth, whichever is the greater). The report also states that clean cover should not be used on slopes greater than 1 in 12.

The total thickness of clean cover is subject to council approval and the type of soil should be adequate for plant cultivation (e.g. testing of Topsoil to BS3882 and subsoil to BS8601).

The proposed imported topsoils should be tested to confirm that they are uncontaminated (see **Risks from Imported Materials and Recycled Aggregates** section) and the final thickness of the cover will require validating. **The** developer will form 2no. pits in rear gardens and video record the pit and material depths (i.e. tape measure against a horizontal bar/staff), plus their positions relative to the houses.

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For imported soils, if available, a certificate (test results) for the imported soil from the supplier shall be obtained and included in the validation report.....

Water Supply Pipe Risks

Red 25mmID diameter **barrier pipe** materials **have already** installed.

Risks from Imported Materials and Recycled Aggregates

The client has confirmed that there are no plans to **import recycled aggregates**. Any **imported recycled aggregates** shall be assessed for asbestos content (and any other contaminants that might be present at the source site), prior to import.

The client advises that the original building on site *had already been demolished before our involvement @. We did not undertake the demolition works. Prior to reusing the existing demolition material (principally brick and concrete), the material remaining on site was surveyed and no asbestos-containing materials were identified. We are attempting to obtain the original pre-demolition asbestos survey and any associated demolition records from the previous owner/contractor.*

@: *resulting material comprised broken brick and concrete foundations.*

Site-derived recycled aggregates shall be tested for asbestos...

All **imported fill, topsoil and sub-soil** shall be sourced from a reputable supplier (accompanied by contamination test results, plus ideally: BS3882 testing for any topsoil; and BS8601 for any subsoil) and shall be tested for a general suite of contaminants (e.g. TPHCWG, 16no. speciated PAHs, pH, arsenic, cadmium, copper, total chromium, chromium VI, lead, mercury, nickel, selenium, zinc), plus asbestos if derived from brownfield or recycling. Target concentrations shall be as per the industry GAC (i.e. C4SL; Cl:AIRE/EIC/AGS; S4ULs) for **residential with plant uptake** end-use. For topsoil and subsoil, chemical test results shall be obtained from the supplier prior to import, or if no testing is available, then the client shall arrange their own testing.

Topsoil and subsoil can contain naturally occurring contamination such as arsenic and lead. The results shall be assessed for any exceedances of guidelines. **The material shall be tested** at a rate of:

- Greenfield/manufactured soils: 1 sample per 250m³ or minimum of three (whichever is greater)
- Natural soils from brownfield sites: one sample per 100m³ or minimum of six (whichever is greater)

Unforeseen Contamination

A site investigation samples a very small portion of the overall site soils. Given the existence of made ground on the site, vigilance should be maintained during site clearance and construction, in case any areas of suspected **unforeseen contamination** are encountered. If areas are found then a suitably qualified person (e.g. AGGC) should undertake appropriate sampling, testing and further risk assessment.

5.5 Post-Commencement Risk Reduction Measures Not Requiring Validation

UXO

With regard to possible UXO risk, and to satisfy CDM requirements for assessments of risks to construction works, the client should consider the recommendations of CIRIA C681 and either:

1. Undertake a preliminary UXO assessment, or
2. Require their site contractors (once appointed) to consider such.

Either way, an UXO watching brief should be implemented.

Other

Asbestos has been noted in the ground at one location. **Risks from asbestos can be reduced by removing such fragments from site..** We advise the following:

- Before any heavy plant tracks the site (i.e. before site clearance), fragments lying at ground level should be litter picked and disposed of off-site.
- Litter picking should be repeated once the site is cleared and again for any fragments spotted during all excavations and groundworks.

Site, landscape and maintenance workers should wear gloves, boots and overalls and wash their hands before eating, drinking and smoking. Excessive dust generation should be avoided.

Excavations or below ground voids should be checked for the presence of harmful gases and vapours prior to personnel entry.

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5.6 Summary of Risk Reduction and Remediation Measures and Validation

The measures required, the data that will be gathered to prove correct implementation and parties to validate them are as follows:

Of the aforementioned measures, there is no “remediation” that can feasibly be undertaken pre-commencement, all is post-commencement, as follows:

Table 5.1: Post-Commencement Validation

Measure:	Data to be gathered:	Party to validate:
Check thicknesses of clean cover in rear garden areas	<ul style="list-style-type: none"> Provide a clear statement of the thickness of capping installed in each of the plots. A site plan with inspection pit locations shown. Plot-specific photographic/video evidence of the appropriate soils being used. Plot-specific photographic/video evidence of the appropriate thickness being in place using a rigid measuring staff. 	Developer (else Contaminated Land Engineer (e.g. AGGC)).
Impermeable Membrane presence	<ul style="list-style-type: none"> Provide a clear statement of where placed. Photographic/video evidence of the membrane in place. 	Developer.
Test any imported topsoil and subsoil	<ul style="list-style-type: none"> Information on the history of the donor site(s). Estimate on the volume of soil/aggregate imported. Contamination concentrations required for imported soils/aggregates (not just BS3882). 	Developer & Contaminated Land Engineer (e.g. AGGC).
Test any imported recycled aggregates and any site won aggregates	Confirmatory sampling and testing of: <ul style="list-style-type: none"> 3no. samples per soil type <u>after placement</u>. Imported recycled aggregates, 1no. sample per 100m³ <u>after delivery to site</u>. 	
Special water pipe materials (if required by water company)	Paperwork from Water Company confirming acceptable installation.	Water Company via Client/client's contractors
Assess any unforeseen/new contamination found	Not possible to determine scope at present.	Contaminated Land Engineer (e.g. AGGC).

Once all of the above risk reduction measures have been completed, and then a Validation Report will be prepared to confirm that such measures have been undertaken in accordance with the requirements herein.

5.7 Validation Report

If planning conditions require such, then in order to achieve sign-off by the Regulators, a final Validation Report will be established for their review and agreement, following substantial completion of the development (but prior to first occupation). Validation might still be prudent in order to satisfy lenders or site purchasers. The report's aim is to validate the measures in Section 5.4 as having been completed, and completed correctly.

Validation shall be undertaken by a suitably qualified and experienced geo-environmental engineer. Any Validation Report shall include the following information as a minimum:

- Validation of the aforementioned measures (where required).
- Copies of all chemical testing results of soils and for all materials tested.
- Figures and drawings (or discussion) detailing the locations of all samples retrieved for chemical testing.
- A copy of the certificate and associated test results for the imported material from the supplier.
- Photographic evidence (as outlined in Table 5.1).
- Copies of any correspondence with the Regulators.

The client shall separately maintain copies of all Duty of Care Consignment Notes for off-site treatment, re-use and/or disposal of materials. Information regarding such materials and their volumes will be required to validate any DoWCoP *Materials Management Plan* (MMP). This information is usually provided within a final Verification report and such can be one in-the-same as the Validation report for contamination risks.

A copy of the final Validation Report (following sign-off by the Regulators if applicable) shall be incorporated within the Site File in accordance with the CDM Regulations (2015).

Appendices

- A. Proposed Development Plan
- B. Exploratory Hole Locations
- C. Drainage Strategy & X-sections
- D. Radon Report

Appendix A