



Your Environment

PHASE 3: REMEDIAL STRATEGY SOUTHMERE FARM, THE MALLARDS, HAVANT, PO9 1SS

For Knightsgate UK

Your Environment

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For and on behalf of YourEnvironment				

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Executive Summary

This document presents a Phase 3: Remedial Strategy for the proposed redevelopment works at Southmere Farm, The Mallards, Havant, PO9 1SS. It summarises details of the Phase 1: Desktop Study and Risk Assessment Report, Phase 2: Site Investigation and addresses the consequent requirement for a Phase 3: Remedial Strategy.

The purpose of the report is to satisfy planning condition 5.3 attached to the redevelopment through Havant Borough Council under planning reference APP/18/00380

This report has been prepared subsequent to a Phase 2: Site Investigation, issued by YE (Report Reference: YE6611, issued: February 2019). The SI was completed subsequent to a previously published Phase 1: Desktop Study & Preliminary Risk Assessment issued by YE (Report Reference: YE6179, Issued: January 2019). These should be read in conjunction with this report. As such this report seeks to address the potential pollutant linkages identified within the Preliminary Conceptual Site Model contained within our Phase 2: Site Investigation.

We understand current plans for the redevelopment of the site include:

- Construction of three (3no.) two storey detached dwellings following the demolition of existing buildings.

Salient details from earlier reports produced in connection with the site have been included within this Remedial Strategy. The purpose of this document is to outline the activities that will be required to mitigate plausible pollutant linkages on site.

The strategy includes the following:

- Mitigation of risks to human health including future occupiers & site visitors, site workers and the general public;
- A watching brief and discovery strategy for control of unforeseen contamination;
- Mitigation of risks to Controlled Waters;
- Mitigation of risks to Building Materials;
- Mitigation of risks to Plants and Wildlife in areas of soft landscaping areas; and
- Verification reporting.

This report must be forwarded to the Environmental Health Department / Contaminated Land Officer of Havant Borough Council for their comments and approval prior to the commencement of any groundworks and/or remedial works.

1.0 Introduction

YourEnvironment (YE) was instructed by Knightsgate UK (Quote No: Q7106, Dated: April 23rd 2019) to conduct a Remediation strategy at a site known as Southmere Farm, The Mallards, Havant, PO9 1SS.

The purpose of this report is to satisfy a particular planning condition, which has been attached to the redevelopment of the site by Havant Borough Council, application reference number APP/18/00380, specifically condition 5.3

We understand current plans for the redevelopment of the site include:

Construction of three (3no.) two storey detached dwellings following the demolition of existing buildings.

This report has been prepared subsequent to a Phase 2: Site Investigation, issued by YE (Report Reference: YE6611, issued: February 2019). The SI was completed subsequent to a previously published Phase 1: Desktop Study & Preliminary Risk Assessment issued by YE (Report Reference: YE6179, Issued: January 2019). These should be read in conjunction with this report. As such this report seeks to address the potential pollutant linkages identified within the Preliminary Conceptual Site Model contained within our Phase 2: Site Investigation.

The Phase 2: Site Investigation Report established ground conditions and provided quantified data relating to contamination on site, such that any environmental issues pertaining to the redevelopment proposals can be addressed and/or mitigated appropriately. This report was reviewed by Havant Borough Council, with the requirement for a Remediation Report and Validation Report to be submitted at a later date.

Salient details from this earlier report produced in connection with the site have been summarised within this Remedial Strategy. The purpose of this document is to outline the remediation activities that will be required to mitigate plausible pollutant linkages on site.

All previous reports available for the site should be reviewed in their entirety in conjunction with this document.

2.0 Proposed Development

We understand current plans for the redevelopment of the site include:

- Construction of three (3no.) two storey detached dwellings following the demolition of existing buildings.

The proposed redevelopment plans for the site can be reviewed within **Appendix A.**

3.0 Site Investigation Conditions

The following presents a summary of the site's ground conditions and environmental settings based upon data available from third party sources and/or from the Site Investigation (SI) completed by YE at the site directly. The locations of exploratory positions were selected relative to the historic land use and current proposed redevelopment plans for the site whilst providing as broad a coverage of the site as feasibly as possible.

A plan showing the exploratory hole locations is provided for review in **Appendix B**.

For full details of the SI completed by YE, the following report should be reviewed in its entirety:

- Phase 2: Site Investigation, Report Reference: YE6611, Issued: February 2019.

3.1 Geology

The relevant British Geological Survey (BGS) online mapping information indicates the site to be underlain by superficial deposits composed of River Terrace Deposits (sand, silt and clay) across the majority of the site with Alluvium (clay, silt, sand and gravel) in the western portion, and bedrock comprised of the Lewes Nodular Chalk, Seaford Chalk, Newhaven Chalk, Culver Chalk and Portsdown Chalk Formations (undifferentiated) (chalk).

The following ground conditions were encountered during the SI;

Made Ground – Encountered within all the trial pits to a maximum depth of 0.80mbgl and generally comprised a soft/firm brown gravelly CLAY. Gravel is fine to large, angular to subangular of brick, flint, slate, plastic, glass and mixed lithology.

River Terrace Deposits and Alluvium – Encountered within TP01-TP03 from 0.45mbgl to the maximum excavated depth of 1.00mbgl and generally comprised a brown/orange gravelly CLAY. Gravel is fine to medium of flint and mixed lithology. We consider this to be representative of River Terrace Deposits and Alluvium.

The trial pit and borehole logs can be reviewed within **Appendix C**

3.2 Hydrogeology and Hydrology

The Environment Agency designate aquifers in accordance with the Water Framework Directive. These designations reflect not only the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetlands ecosystems. The aquifer designation data is based on geological mapping attained through the British Geological Survey.

As result of the geology identified on site the aquifer is designated as being a Secondary (A) Aquifer. These are defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Minor Aquifers.

As a result of the bedrock geology on site, the aquifer is designated as being a Principal Aquifer. This is defined as layers with high intergranular and/or secondary permeability capable of supporting water supplies at strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Major Aquifers.

Ordnance Survey Water Network

There are a number of records within 500m of the study site, the closest two of which are 2m northwest for an inland river. There are further entries for inland river and streams 58m southwest and 90m northwest. The remaining entries are over 100m from the site.

Surface Water Features

There are eleven records within 250m of the study site, one of which is on site for a river or stream. There are further entries for the same river 1m southwest, 58m southwest and 90m northwest. The remaining entries are over 100m from the site.

3.3 Site Investigation Contamination Findings

3.3.1 Risks to Human Health

With the exception of general anthropogenic material identified, no visual evidence of potential contamination was noted within any soils encountered during the site investigation. An organic odour was noted within WS04 at a depth of 0.50mbgl. Overall, one individual soil exceedance was noted from one of the selected soil samples from the SI which were submitted for the range of inorganic and organic analyses, which was for lead (GAC 200mg/kg) in the Made Ground of TP04 (317mg/kg).

The laboratory certificates are available for review within **Appendix D**.

The remaining samples have returned concentrations below the available SGVs and LQM guidance values for each determinant which were adopted as Generic Assessment Criteria (GAC) within YE's risk assessment for the site.

A review of the trial pit logs indicate that natural soils are present across the majority site from approximately 0.45–0.70mbgl, it would therefore be reasonable to conclude that these forms of contamination would cease at these depths. In TP04, natural soil was not encountered with refusal at 0.80mbgl.

We believe the contamination to be localised to the southwest of the site given the presence of a lead exceedance within TP04 only. We also consider the contamination to be localised to the Made Ground judging by the lack of exceedances identified in the laboratory results of the soil samples tested from the natural ground.

Despite the depth of the exceedance (0.80mbgl), given the depth and heterogenous nature of the Made Ground in this portion of the site and the location of these exceedances in the proposed soft landscaping areas, the type of contamination returned from laboratory testing are such that the continued presence of this could pose a risk in respect of ingestion, dermal contact and inhalation pathways to human health (end users and visitors for example).

3.3.2 Risk to Structures

Current guidance indicates that Made Ground is generally classified as low risk in terms of potential for gas generation. The Made Ground identified on site is not considered to pose a significant potential risk due to limited historical development and while there are records of infilled land on site, these appear to be a result of a reduced water level in a river, rather than infilling. The returned laboratory results show that there were no exceedances of any organic contaminants within the samples taken, so the risk of any volatilisation is low.

3.3.3 Risks to Plants and Wildlife

A low risk has been attributed given the concentrations of phytotoxic contaminants below elevated concentrations, often below the limit of detection returned.

3.3.4 Risks to Site Workers

Due to there being the presence of elevated concentrations of determinants precautions should be taken to minimise exposure of site workers during ground works through the implementation of site safety procedures and the use of suitable personal protective equipment (PPE). Such precautions should include, but not be limited to:

- Personal hygiene, washing and changing procedures;
- Availability of site welfare;
- Provision of PPE appropriate to the task; and
- Daily safety briefings and tool box talks.

All site works will be undertaken in accordance with the guidelines prepared by the Health and Safety Executive (1991) and all work will be carried out in accordance with the Principal Contractor's Health and Safety Plan.

3.3.5 Risks to Controlled Waters

The cable percussive borehole was dry when drilled to the full depth of borehole at 15.00mbgl, however subsequent sampling suggested ground water standing at 1.12mbgl when sampled on the 6th February 2019.

Overall, three individual groundwater exceedances were encountered from the groundwater sample which was submitted for a range of inorganic and organic testing, one of which was for aliphatic >C5-C35 (576 µg/l; GAC 10µg/l), one of which was for nitrate (54.4 mg/l; GAC 50 mg/l) and one of which was for nitrite (2.0 mg/l; GAC 2.0 mg/l). Details of these can be reviewed within tables 9 and 11 in section 9.5.

However, despite these elevated results, we would consider that the underlying groundwater is of relatively low importance as a potable resource given there are no ground/surface water or potable water abstraction licences within 1000m. Additionally, the contaminants have been compared against Drinking Water Standards, where possible, therefore this approach is considered to be conservative. The nearest surface water feature and detailed water network record is on site - 2m northwest for an inland river/stream. The aquifer within the superficial geology is designated as being a Secondary (A) Aquifer and the aquifer within the bedrock geology is designated as being Principal.

3.3.6 Risks to Buried Services

If new services will be installed as part of the redevelopment of the site we would recommend the local water board be contacted to determine their specification for the type of pipework which should be used on this site.

All services and in particular potable water supply pipework should comprise of material that is resistant to attack and degradation to chemical attack.

Further information can be found within the published guidance for the '*Selection of Water Supply Pipes to be used in Brownfield Sites*', issued in January 2011 by the UK Water Industry Research (UKWIR), this supersedes the Water Regulations Advisory Scheme (WRAS) Information and Guidance Note – '*Laying Pipes in Contaminated Land*' which has been withdrawn.

4.0 Updated Conceptual Site Model and Risk Assessment

The Conceptual Site Model has been re-formulated based upon the results from the SI in accordance with BS10175:2015. It aims to provide information regarding the sources of contamination and the pathways in which contamination can migrate to a vulnerable receptor, all of which need to be present for there to be a risk. This is in relation to the proposed end use being classified as 'residential with homegrown produce'. The following linkages have been identified:

Contaminant Source	Pathways	Receptor	Potential Severity	Probability of Risk	Level of Risk	Justification
On Site: Made Ground soils on site possibly containing elevated metals, other inorganics such as TPH & PAH.	Ingestion, dermal contact, inhalation of dusts/vapours	Future end users and site visitors	Medium	Likely	Moderate	A moderate level of risk is considered due to the returned results in which one exceedances of lead was encountered and asbestos was identified in the Made Ground of TP04 at 0.80mbgl and 0.30mbgl, respectively. Contact is likely between future residential occupiers/visitors and contaminants in the shallow soil in the soft landscaping areas of the site, soil/dust tracked back into the house and from ingestion of homegrown produce.
		Construction Workers	Medium	Likely	Moderate	Construction workers are likely to come into direct contact with soils during groundworks. Safe working practices should be implemented and appropriate personal protective equipment (PPE) should be used to mitigate any potential risk from contact with soils and shallow/perched groundwater.
	Leaching through soils and migration via groundwater or soil pore moisture	Controlled Waters	Medium	Low Likelihood	Moderate/Low	A moderate to low risk is assessed due to the lead exceedance within the Made Ground. However, it is considered that these exceedances are limited to the Made Ground considering the lack of exceedances within the natural soils encountered. Exceedances of Aliphatic >C5-C35, nitrate and nitrite were observed in the groundwater sample taken from BH01. The site has a Secondary (A) Aquifer within the superficial deposits and a Principal Aquifer within the bedrock underlying the site. The nearest groundwater and potable water abstraction licence is 1150m north. There are no surface water abstraction licences within 2000m. In addition, the nearest surface water feature and river networks is on site for a river/stream. The site is not within a source protection zone.
	Permeation of water pipes	Construction materials, future end users and site visitors	Medium	Low Likelihood	Low	As a result of the returned laboratory results and subsequent screening which shows there to be no hydrocarbon exceedances, a low risk is assessed. Hydrocarbons, especially aromatics and chlorinated solvents, are known to permeate plastic pipes. Provision of water supply pipes and connectors formed from proprietary "barrier pipe" materials (eg. polyethylene-aluminium-polyethylene) may be required by the water supply company.
	Uptake	Plant and Wildlife	Mild	Low Likelihood	Low	As a result of the returned laboratory results which shows an absence of phytotoxic contaminants, the risk is considered to be low.

On Site: Asbestos at/near ground surface in Made Ground soils	Inhalation of fibres in airborne dust	Future end users and site visitors	High	Low Likelihood	Moderate	A moderate risk is assessed as a result of the chrysotile fibre bundles in soil encountered within the shallow Made Ground of TP04. Consequently, an asbestos consultant should be contacted prior to any further works proceeding.
		Construction Workers	High	Low Likelihood	Moderate	The results of screening indicate there to be asbestos present within the shallow Made Ground on site. Consequently, an asbestos consultant should be contacted prior to any further works proceeding.
On Site: Ground Gases (CH ₄ , CO ₂) from on site Made Ground.	Gas migration and build up within buildings (explosion/ asphyxiation risk)	Future end users and building structures.	High	Low Likelihood	Low/ Moderate	Current guidance indicates that Made Ground is generally classified as low risk in terms of potential for gas generation. The Made Ground identified on site is not considered to pose a significant potential risk due to limited historical development and while there are records of infilled land on site, these appear to be a result of a reduced water level in a river, rather than infilling. The returned laboratory results show that there were no exceedances of any organic contaminants within the samples taken, so the risk of any volatilisation is low.
Off Site: Historical land uses and activities, Made Ground/infilled material possibly containing elevated metals, other inorganics such as TPH & PAH.	Leaching through soils and migration via groundwater or soil pore moisture	Future end users and site visitors	Mild	Low Likelihood	Low	Given the high clay content of the underlying geology and lack of identified sources of contamination off site, a low risk is assessed.
	Inhalation of vapours	Future end users and site visitors	Medium	Low Likelihood	Low	A low risk is assessed as a result of the returned laboratory results and subsequent screening which showed no hydrocarbon exceedances.
Off Site: Ground Gases (CH ₄ , CO ₂ , H ₂ S) from off site Made Ground historical land uses/activities.	Gas migration and build up within buildings (explosion/ asphyxiation risk)	Future end users and building structures.	High	Low Likelihood	Low	There are records of infilled land proximal to the site, however, these appear to be a result of a reduced water level in a river, rather than infilling. Current guidance indicates that Made Ground is generally classified as low risk in terms of potential for gas generation.

Table 1: Updated Conceptual Site Model and Risk Assessment

5.0 Remediation Strategy

The aim of the proposed remedial works is to reduce and/or remove unacceptable risks to identified on site receptors. The adopted remedial measures to be introduced are intended to minimise and/or break the aforementioned pollutant linkages as identified within the CSM.

A pragmatic approach has been adopted with regard to the necessary remedial works to be undertaken at the site. The outlined remedial measures have been based upon the previous investigative works completed and the proposed plans for the site.

In event of a material change to these plans, or should a more sensitive site end use be proposed, the recommendations made in this document may no longer be appropriate and a revision would therefore be required.

5.1 Asbestos

During the site investigation asbestos was identified and as such an independent asbestos consultant were contacted and have reviewed the site investigation report, their comments are noted within **Appendix E**.

5.2 Mitigation of Risks to Future Occupiers & Site Visitors

The type of contamination returned from laboratory testing are such that the continued presence would pose a risk in respect of ingestion, dermal contact and inhalation pathways to human health (end users and visitors), particularly at this shallow depth. This should be removed by means of hotspot delineation, excavation and testing or by mitigation measures such as a capping layer.

During the phase two investigation, exceedances of lead were encountered at a concentration of 317mg/kg in TP04 at a depth of 0.80mbgl. We would recommend that soils in this area is delineated to a depth of 1.0mbgl (to ensure natural soils are definitively encountered) and laterally by a proposed diameter of 1.0m. An appropriate number of soil samples should be taken from the sides and submitted to an UKAS and MCERTS accredited laboratory for the purposes of validating that none of the contamination remains *insitu*. The imported material should be tested by an Environmental Consultant in a UKAS approved laboratory to ensure that it is clean and free of contaminants at a rate of 1 sample per 100m³.

5.3 Mitigation of Risk to Site Workers

Due to there being the presence of elevated concentrations of determinants precautions should be taken to minimise exposure of site workers during ground works through the implementation of site safety procedures and the use of suitable personal protective equipment (PPE). Such precautions should include, but not be limited to:

- Personal hygiene, washing and changing procedures;
- Availability of site welfare;
- Provision of PPE appropriate to the task; and
- Daily safety briefings and tool box talks.

All site works will be undertaken in accordance with the guidelines prepared by the Health and Safety Executive (1991) and all work will be carried out in accordance with the Principal Contractor's Health and Safety Plan.

5.4 Mitigation of Risks to General Public / Off Site Receptors

During the redevelopment precautions should be taken to minimise exposure of the general public to potentially harmful substances with specific reference to earthworks involving the disturbance of contaminated soil which has the potential to expose construction workers and any nearby residents. Mitigation measures to mitigate risks to the general public should include, but not be limited to:

- Restricting off site nuisances, such as dust emissions by covering waste haulage vehicles and monitoring site boundary conditions;
- Preventing surface water run-off, tracking of site soils outside the site development demise;
- Dust suppression techniques (if required).

5.5 Mitigation of Risks to Controlled Waters

The cable percussive borehole was dry when drilled to the full depth of borehole at 15.00mbgl, however subsequent sampling suggested ground water standing at 1.12mbgl when sampled on the 6th February 2019.

Overall, three individual groundwater exceedances were encountered from the groundwater sample which was submitted for a range of inorganic and organic testing, one of which was for aliphatic >C5-C35 (576 µg/l; GAC 10 µg/l), one of which was for nitrate (54.4 mg/l; GAC 50 mg/l) and one of which was for nitrite (2.0 mg/l; GAC 2.0 mg/l). Details of these can be reviewed within tables 9 and 11 in section 9.5.

However, despite these elevated results, we would consider that the underlying groundwater is of relatively low importance as a potable resource given there are no ground/surface water or potable water abstraction licences within 1000m. Additionally, the contaminants have been compared against Drinking Water Standards, where possible, therefore this approach is considered to be conservative. The nearest surface water feature and detailed water network record is on site - 2m northwest for an inland river/stream. The aquifer within the superficial geology is designated as being a Secondary (A) Aquifer and the aquifer within the bedrock geology is designated as being Principal.

5.6 Mitigation of Risks to Plants and Wildlife

A low risk has been attributed given the concentrations of phytotoxic contaminants below elevated concentrations, often below the limit of detection returned.

5.7 Mitigation of Risks to Building Materials

5.7.1 Buried services

If new services will be installed as part of the redevelopment of the site we would recommend the local water board be contacted to determine their specification for the type of pipework which should be used on this site.

All services and in particular potable water supply pipework should comprise of material that is resistant to attack and degradation to chemical attack.

Further information can be found within the published guidance for the '*Selection of Water Supply Pipes to be used in Brownfield Sites*', issued in January 2011 by the UK Water Industry Research (UKWIR), this supersedes the Water Regulations Advisory Scheme (WRAS)

Information and Guidance Note – ‘*Laying Pipes in Contaminated Land*’ which has been withdrawn.

5.7.2 Gas Protection Measures

During the phase two site investigations the returned laboratory results show that there were no exceedances of any organic contaminants within the samples taken, so the risk of any volatilisation is low.

Current guidance indicates that Made Ground is generally classified as low risk in terms of potential for gas generation. The Made Ground identified on site is not considered to pose a significant potential risk due to limited historical development and while there are records of infilled land on site, these appear to be a result of a reduced water level in a river, rather than infilling.

5.8 Watching Brief and Discovery Strategy

A watching brief should be maintained by the Main Contractor at all times during the groundworks stage. Should any unforeseen contamination, such as oils or soils/groundwater with an unusual colour or odour, be encountered during groundworks then the following procedure should be implemented:

- Work to cease in that area to prevent exposure to ground workers and potential contaminants being spread around;
- Notify a Geo-Environmental Consultant, to attend site and sample material;
- Notify the Environmental Health Department / Contaminated Land Officer(s) of the Local Planning Authority.

If the nature and extent of the contamination is unmanageable under the procedure set out above, then a suitable management, mitigation or remediation procedure will be agreed with the CLO. However, this is considered unlikely at this particular site.

5.9 Materials Management

5.9.1 Off-site disposal

It is possible that the surplus soils that will be generated during groundworks will require disposal off site. The Contractor will be responsible for the appropriate segregation, classification and disposal of material.

All material intended for off site disposal should be transported and disposed in accordance with the Environmental Protection (Duty of Care) Regulations, 1991 and the Landfill (England and Wales) Regulations.

Based on the analytical data from the Phase 2 investigation it is likely that the majority of soils will be eligible for disposal at a non-hazardous landfill facility. The materials that will be excavated as part of the proposed development will only be eligible for inert disposal, if “inert” thresholds are not exceeded in Waste Acceptance Criteria (WAC) test results, or without the requirement for Waste Acceptance Criteria (WAC) testing, under the following criteria:

- Uncontaminated naturally occurring soils;
- Uncontaminated ‘reworked soils’ and demolition ‘stone’ comprising only materials (such as concrete, brick, glass and ceramics).

Copies of the soil logs, general contamination test results and available WAC results should be provided to a licensed landfill facility to agree upon a suitable end point for disposal of site arisings.

Waste legislation stipulates that hazardous and non-hazardous waste should be pre-treated prior to disposal. Pre-treatment can be undertaken either at the site of origin or may be carried out at a licensed off-site facility and can include selective excavation and segregation of soils conducted on site.

Excavated soils should be appropriately stored with preventative measures against infiltration/leaching and/or nuisance odours to protect the environment and human health during temporary storage on site. Ideally, site arisings would be loaded directly to waste haulage vehicles for immediate transfer off-site to a suitably licensed facility.

All waste handling procedures should be documented by the Main Contractor with appropriate Duty of Care records maintained and held on site.

Any asbestos findings on site should be disposed of in accordance to the independent consultants advisory.

5.9.2 Reduction of Waste to Landfill

There are other material management options that can be considered in order to minimise the volumes of material received at landfill. Providing the appropriate protocols are followed these options can include:

- Disposal of non-hazardous material to a soil hospital/recycling facility, where the soil can be disposed and subject to treatment for a particular end use and does not incur landfill tax;
- Recycling of materials such as metals, concrete and tarmac;
- Re-use of site won demolition concrete/hardcore for use as pile mats and/or sub-base materials in accordance with the WRAP Protocol; and/or
- Re-use of soils on/off-site (where there is a specified need for them and they do not pose a human health/environmental risk) in accordance with the CL:AIRE Definition of Waste Industry Code of Practice.

Should reuse of this material be pursued it will required to be laboratory tested for a basic range of contamination parameters to include heavy metals, speciated Total Petroleum Hydrocarbons (TPH CWG Aromatic/aliphatic split) and speciated Polycyclic Aromatic Hydrocarbons (PAH, including the more carcinogenic benzo(a)pyrene (BaP) and volatile naphthalene), MTBE, BTEX, cyanide, phenols, soil organic matter (SOM) content and an asbestos screen. A laboratory able to carry out UKAS and MCERTS accredited tests for these determinands should be used.

The results from laboratory testing shall be compared against standards, such as, against revised LQM/CIEH S4UL criteria¹ where available. These GAC have been designed for use under planning, using Health Criteria Values based on minimal risk, and updated exposure parameters. The S4UL are intended to replace the previous LQM/CIEH GAC. Or alternatively criteria such as, Soil Guideline Values (SGVs) and LQM 'CIEH' Generic Assessment Criteria for the most stringent land use classification appropriate to the proposed end use, namely; 'residential with homegrown produce'.

¹ Nathanail et al. (2015) The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, 2015. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3495

5.9.3 Imported Fill material

The imported material should be tested by an Environmental Consultant in a UKAS approved laboratory to ensure that it is clean and free of contaminants at a rate of 1 sample per 100m³, with a minimum of one sample.

5.10 Constraints

In the event of any changes proposed by the developer in the design scope and specification for the installation of any of the mitigation measures as outlined within this document, YE should be contacted to determine whether these amendments will lead to any increased risk to the receptors identified within the CSM.

Notification of these changes will be supplied to Havant Borough Council by YE, allowing for them to review and provide comments, prior to proceeding with the installation of any changes to design measures and specification.

It will be the responsibility of The Client to inform YE of any changes in the design scope and specifications.

5.11 Verification Reporting

The Verification Report will include, but not be limited to, the following:

- Site visit records and photographic records from the watching brief;
- Site visit records and photos from visits completed by a Geo-Environmental Consultant from YE;
- Validation records of the recommended delineation;
- Duty of care records for disposal of waste material including the landfill site(s) or disposal facility where the material has been disposed and a copy of the Contractor's current waste carrier's licence (to be provided by Contractor);
- Records and test certificates relating to the management and disposal or unforeseen contaminants;
- Details of source and chemical test results for imported materials.

6.0 Statutory Consultee

This report must be forwarded to Havant Borough Council in order to obtain their comments and approval and discharge of planning conditions prior to the commencement of any groundworks and/or remedial works.

7.0 Limitations

This report has been prepared by YE with all reasonable skill, care and diligence. The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources.

The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned.

Information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data with respect to site conditions. Should additional information become available which may influence the opinion expressed in this report, YE

reserves the right to review such information and, if warranted, to alter the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed.

The recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted industry practices at this time and as such is not a guarantee that the study site is free of hazardous conditions.

This report has been prepared solely for the use of the named client, and may not be relied upon by other parties without written consent from YE. YE disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

