



Remediation Validation Report v01

Site Address	Granville Gardens Hinckley, LE10 0JD
Client	Wynbrook Ltd
Our Ref.	P21031
Report Date	23 rd August 2023
Prepared by	Dave Taylder CEng BSc (Hons) MICE Director For and on behalf of Howard Ward Associates Ltd

HOWARD WARD ASSOCIATES Ltd
BREWERY HOUSE, WALKERS YARD, NOTTINGHAM NG12 2FF



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1. Introduction

- HWA are appointed by Wynbrook Ltd to compile Validation Report to demonstrate the remediation works set out in the Remediation Methodology agreed with Statement provided by Delta Simons in connection with the development.

- The requirements of the Planning Approval state:

No development approved by this permission shall be commenced until a scheme for the investigation of any potential land contamination on the site has been submitted in writing to and agreed in writing by the Local Planning Authority which shall include details of how any contamination shall be dealt with. The approved scheme shall be implemented in accordance with the agreed details and any remediation works so approved shall be carried out prior to the site first being occupied.

1.1 The findings and recommendations of the following documents have been considered in the production of this report:

- Delta Simons –Geo-environmental Assessment – Granville Gardens, Hinkley. Report Reference 21.0449.02 Dated March 2022.
- Record photographs, test results and delivery certificates provided by the contractor.

2. Summary of Previous Findings and Remediation Requirements

The contractor in their excavations and site strip on site have carried out a watching brief for potential contamination and are aware they needed to call in the site investigation company to sample and test any observed potential contamination.

The contractor then followed the below recommendations, and the recommendations detailed in the Phase II Site Investigation undertaken by Delta Simons:-

- Localised exceedances of PAHs and asbestos have been identified in shallow Made Ground. The main exposure pathways are direct contact/ ingestion and inhalation of dust/ soil and asbestos fibres, therefore, the contaminant linkage to future residents can be broken by the installation of a clean cover system (450 mm) in proposed landscaped areas.
- No elevated concentrations of contaminants have been identified within the groundwater at the Site.
- Based on the limited Made Ground encountered on-Site (<1.6m) and the concentrations of total organic carbon noted within the Made Ground (0.6 - 2.2%), assumed to be in place for >20 years, preliminary analysis as per BS8485:2015 indicates the Site may be characterised as CS2 and ground gas protection measures should be designed as such, in the absence of Site-specific monitoring data.
- No potential sources of volatile contaminants have been identified.
- Based on the absence of organic contamination within the soils at the Site, the use of standard plastic infrastructure is likely to be suitable in the event that new water supply pipes are required. This should be confirmed by the local water company.

3. Remediation Validation

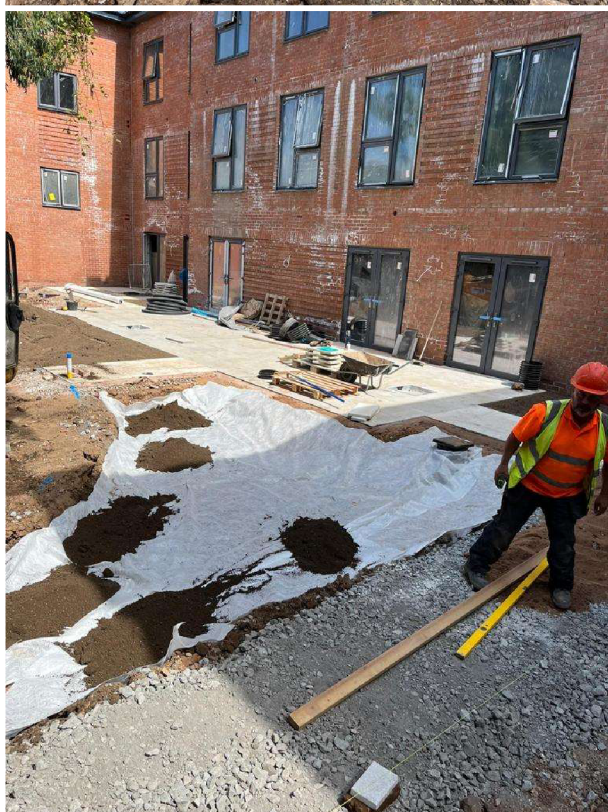
- It has been reported that no Contamination Hotspots were discovered during the groundworks on site.
- The 450mm thick topsoil comprised of the material supplied by Broughton Loam Limited. Please refer to the test data from NRM Laboratories for the contamination testing for this imported topsoil.
- A Terram T1000 Non-Woven Geotextile Membrane was installed to act as the marker layer. Please refer to the photographs in Appendix A.
- Refer to the data included in Appendix A for the photographic evidence of the geotextile and 450mm min depth of topsoil installation.
- Refer to the data included in Appendix B for the soil testing information and delivery tickets.
- No site won material from the site was reused in the soft landscaped areas.

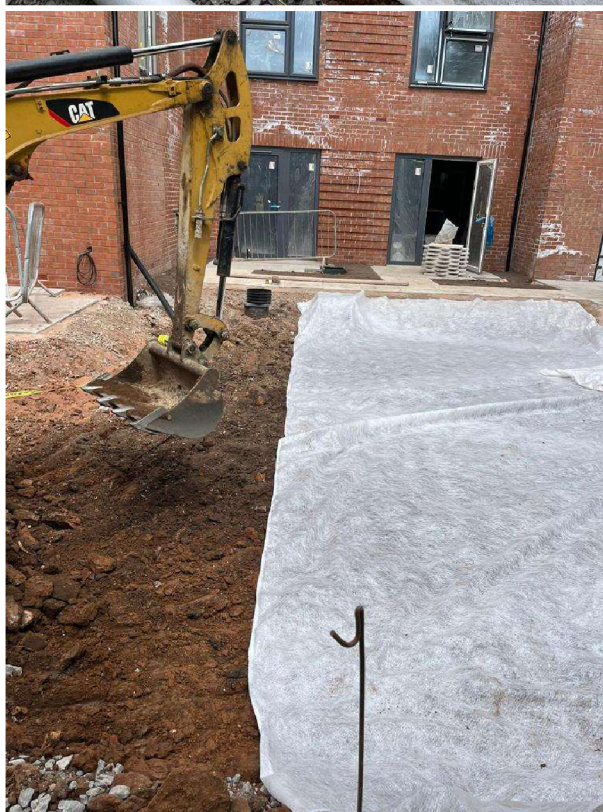
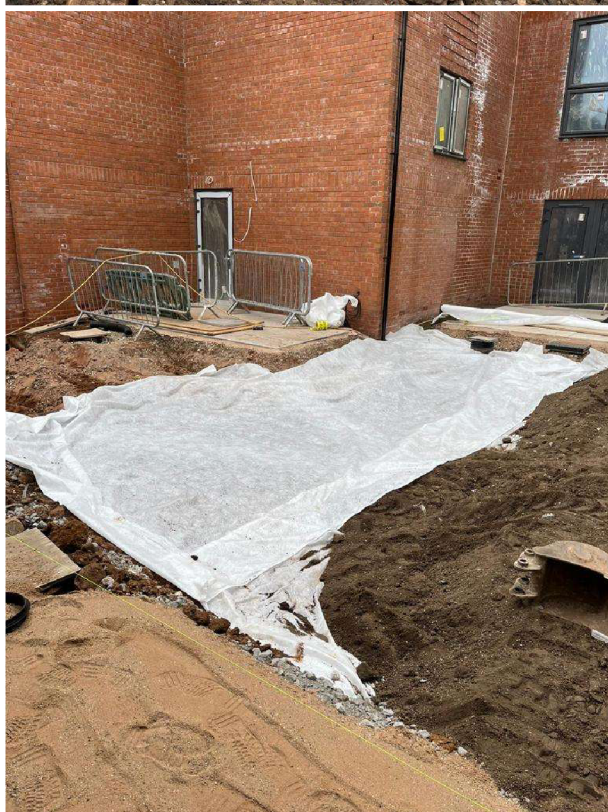
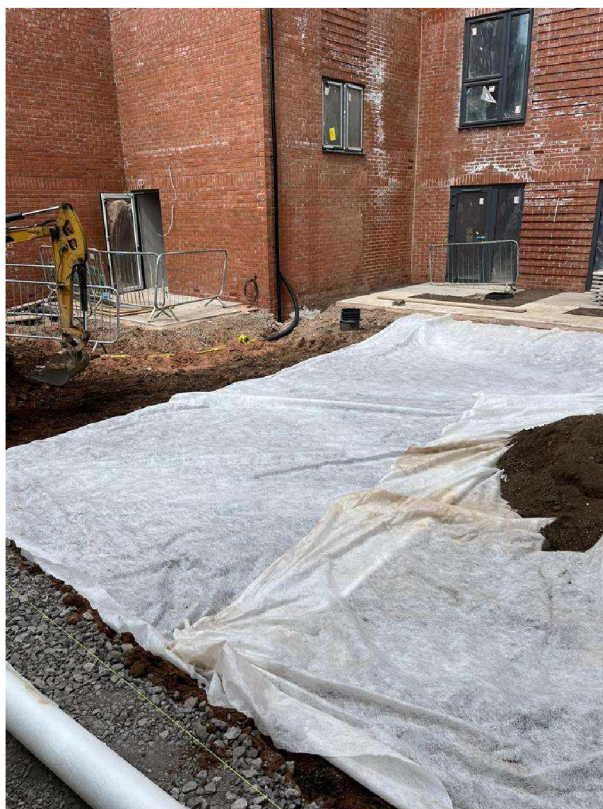
4. Conclusions

- Based on the information provided it is considered that the Site has been appropriately remediated in accordance with the agreed remediation methodology.

Appendix A

Photographic evidence of topsoil and marker layer.







Appendix B

Source testing of imported topsoil and delivery tickets



Certificate of Analysis

Client: BOUGHTON LOAM LIMITED
(W883) MARSHALL HOUSE
CRANFORD ROAD
BURTON LATIMER
NORTHAMPTONSHIRE
NN15 5TB

Originator: O STONE MM
20-3-23
SOIL

Lab ID: 64820 - 620455
Sample ID: OSTONE MM 20/3/22
Sample Weight: 1735g

Date Received: 21/03/2023
Date Reported: 20/04/2023

BS 3882 : 2015 SPECIFICATION FOR TOPSOIL Multipurpose Grade

				Multi-P	Compliant with range (Y/N)				
					Acid	Calc	Low-F	Low-F Acid	Low-F Calc
Texture:	Clay	% w/w	23						
	Silt	% w/w	16						
	Sand	% w/w	61						
	Textural Class		Sandy Clay Loam	Y	Y	Y	Y	Y	Y
					See area of permitted soil textural classes in Fig. 1.				
Organic Matter:		% w/w	6.9	Y	Y	Y	Y	Y	Y
Coarse	>2 mm	% w/w	0.8	Y	Y	Y	Y	Y	Y
Fragment	>20 mm	% w/w	0.0	Y	Y	Y	Y	Y	Y
Content:	>50 mm	% w/w	0.0	Y	Y	Y	Y	Y	Y
Soil pH:			7.3	Y	N	N	Y	N	N
Carbonate:		% w/w	3.8			Y			Y
Available	Nitrogen	% w/w	0.382	Y	Y	Y			
Plant	Phosphorus	mg/l	66.0 (4)*	Y	Y	Y	N	N	N
Nutrients:	Potassium	mg/l	538.2 (4)*	Y	Y	Y			
	Magnesium	mg/l	142.9 (3)*	Y	Y	Y			
Carbon:Nitrogen Ratio:		:1	10.5	Y	Y	Y	Y	Y	Y
Exchangeable Sodium Percentage:		%	0.6						
Phytotoxic	Total Zinc	mg/kg	124	Y	Y	Y	Y	Y	Y
Contaminants:	Total Copper	mg/kg	15.1	Y	Y	Y	Y	Y	Y
	Total Nickel	mg/kg	26.6	Y	Y	Y	Y	Y	Y
Visible	> 2mm	% w/w	0.00	Y	Y	Y	Y	Y	Y
Contaminants:	Plastics	% w/w	0.00	Y	Y	Y	Y	Y	Y
	Number of Sharps		0	Y	Y	Y	Y	Y	Y
Additional	Available Sodium	mg/l	17.0						
Analysis:	Available Calcium	mg/l	2025.0						
	Conductivity	uS/cm	2352	Y					
Compliance:				Y	N	N	N	N	N

Results are expressed on a dry matter basis.

* Soil indices from RB209

Released by:

Daniel Petty

Date: 20/04/2023

DECLARATION:

I certify that this sample has been analysed by NRM in accordance with BS 3882 Specification for Topsoil (2015).

NRM Coopers Bridge, Braziers Lane, Bracknell, Berkshire RG42 6NS

Tel: +44 (0) 1344 886338 **Fax:** +44 (0) 1344 890972 **Email:** enquiries@nrm.uk.com **www:** nrm.uk.com



Analytical Report

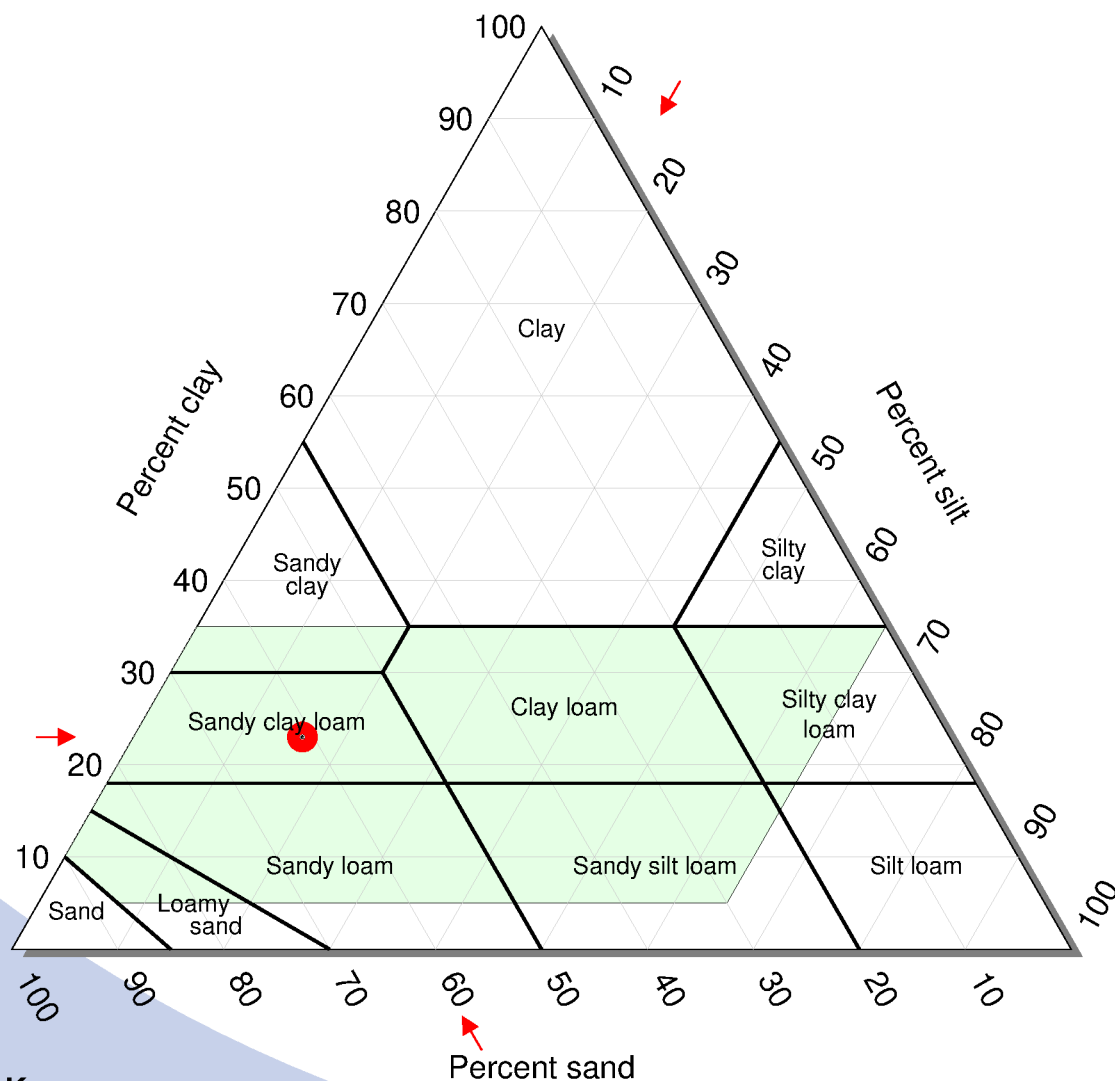
Client: BOUGHTON LOAM LIMITED
(W883) MARSHALL HOUSE
CRANFORD ROAD
BURTON LATIMER
NORTHAMPTONSHIRE
NN15 5TB

Originator: O STONE MM
20-3-23
SOIL

Lab ID: 64820 - 620455
Sample ID: OSTONE MM 20/3/22
Sample Weight: 1735g

Date Received: 21/03/2023
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Fig. 1. Textural Class: Sandy Clay Loam (compliant)



Key

 Area within which texture of topsoil is required to fall.

Appendix C

YALPG Guidance document.



VERIFICATION REQUIREMENTS FOR COVER SYSTEMS

Technical Guidance for
Developers,
Landowners and
Consultants



**Yorkshire and Lincolnshire
Pollution Advisory Group**

Version 3.4 – November 2017

The purpose of this guidance is to promote consistency and good practice for development on land affected by contamination. The local authorities in Yorkshire, Lincolnshire and the North East of England who have adopted this guidance are shown below:



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Disclaimer

This guidance is intended to serve as an informative and helpful source of advice. It is intended to review this guidance annually, but readers must note that legislation, guidance and practical methods are inevitably subject to change and therefore should be aware of current UK policy and best practice. This note should be read in conjunction with prevailing legislation and guidance, as amended, whether mentioned here or not. Where legislation and documents are summarised this is for general advice and convenience, and must not be relied upon as a comprehensive or authoritative interpretation. Ultimately it is the responsibility of the person/company involved in the verification of land contamination to apply up-to-date working practices and requirements.

Acknowledgments

The author, Wakefield Council [David Jackson], would like to acknowledge the assistance provided by the following organisations: City of York Council, City of Lincoln Council, Leeds City Council and City of Sheffield Council. The author would also like to acknowledge Liverpool City Council's Contaminated Land Team, Coopers Consulting Engineers for allowing us to use their guidance document and photographs and WSP Environmental Ltd for also donating photographs.

Consultation

39 Local Authorities and 6 Environmental Consultants were consulted over a four week period in 2010 during the production of the initial guidance. At that time, consultation comments were considered by the review panel and a number of revisions were made to the guidance to reflect these comments. Given that no major changes have subsequently taken place, only Local Authorities were consulted during the production of this version [3.1] of the guidance.

Introduction

This guidance has been produced to help developers ensure that they can demonstrate that material brought onto a development site for gardens or areas of soft landscaping are suitable for use and do not present harm to people, the environment and/or property. It is intended to improve the quality of reports submitted to Local Authorities on this matter and to give contractors/consultants a point of reference to obtain approval for such work from their client. This guidance does not cover the geotechnical suitability of soils or material or chemical suitability that does not affect human health e.g. sulphates.

The verification of cover systems should be an integral part of the remediation project and agreed between developers and regulators at an early stage in the project.

There are some UK guidelines regarding verification, for example CLR 11¹ and the document on verification of remediation². This guidance note should be considered as supplementary advice in conjunction with these documents.

This guidance relates to the remediation of land contamination by using cover systems; however, the verification of the quality of imported material is equally important in other situations, such as raising levels for flood prevention or general landscaping works. This guidance could also be used in such instances.

The Process of Verification

Implementation plans for remedial works should always be site specific. Where a cover system and potentially, excavation, is the main remedial method or a component of an overall site remediation, specific goals will need to be set that are linked directly to the risk management strategy for the site in question.

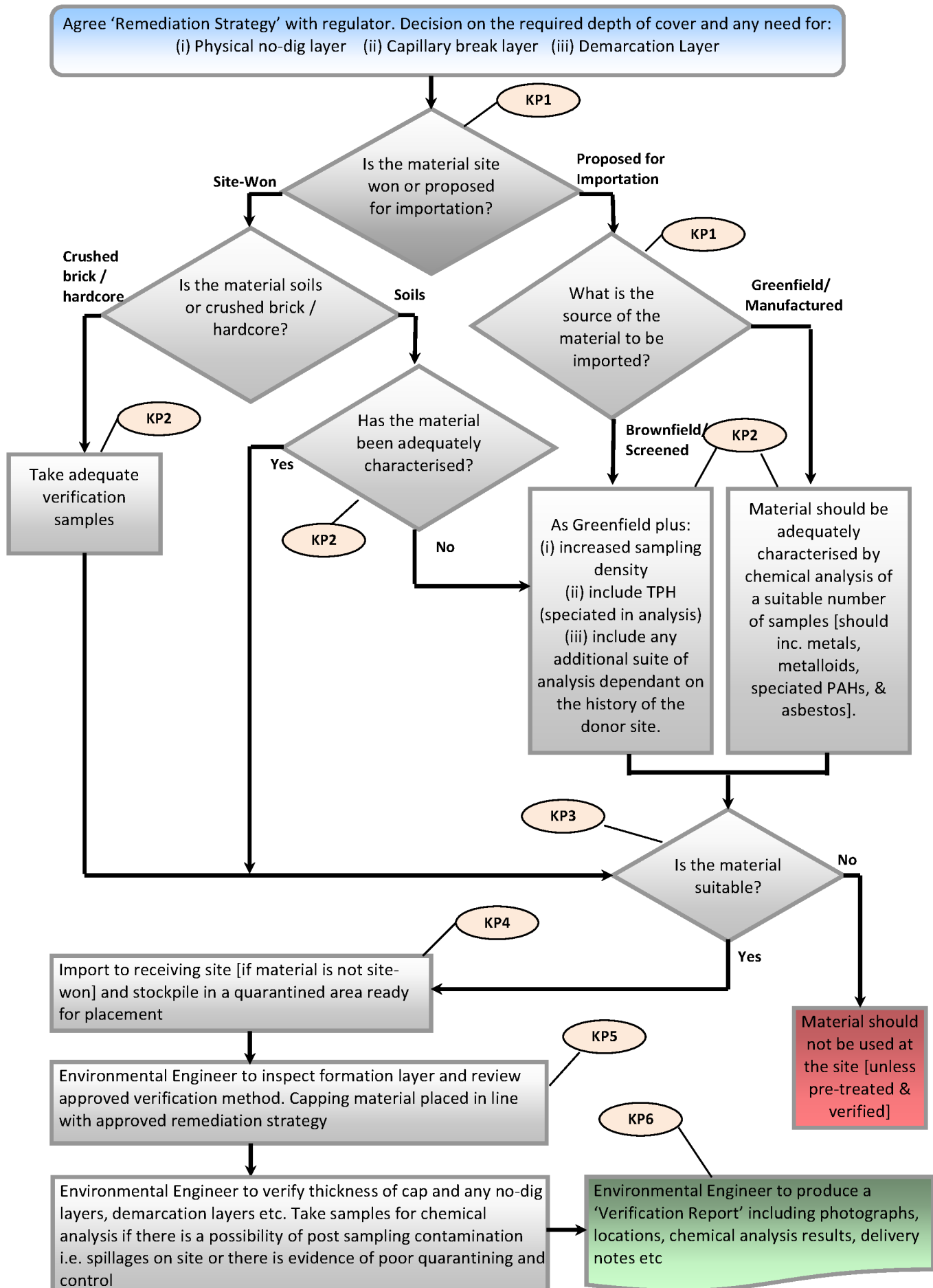
For cover and containment systems, verification will normally depend upon the provision of defensible measurements, observations and records. Critical factors to be considered are:

- What should be measured?
- When should they be measured?
- Where measurements need to be taken, what is the appropriate monitoring regime i.e. number and frequency of samples?
- Statistical constraints on sampling.

¹ "Contaminated Land Report 11 - Model Procedures for the Management of Contaminated Land". Environment Agency, September 2004.

² "Verification of Remediation of Contaminated Land. Environment Agency, 2010 [draft report].

Overview Flowchart



Key Points

KP1 Source of Material	Material can be sourced from site won material i.e. crushed brick /hardcore or site-won soils from existing open or landscaped areas. In the interest of sustainability, Local Authorities promote the use of such site-won material providing that they are suitable for the intended end use of the site. Alternatively, material can be sourced from other developments and commercial companies. Dependent on the source of the material it can be classified as either from a '<u>Greenfield/Manufactured</u>' or '<u>Brownfield/Screened</u>' source. Broadly speaking material can be classified as follows: Greenfield - if it can be demonstrated that it has not been developed and that no past contaminative uses have occurred at the site. Manufactured – from a commercial company who manufacture material by mixing or blending mineral soils (subsoil or sand) with an organic amendment (compost). Brownfield – material from a donor site that has previously been developed Screened – material from a company who deal with skip/demolition waste which is screened for unsuitable material i.e. bricks, wood, plastic etc.
KP2 Characterisation of Material	It is essential that material is inert and suitable for its intended use. Evidence of the source of the material should be provided to the Local Authority. What is required is a defensible method to ensure the verification proposals are site specific and that the level of sampling reflects the need to ensure that imported material are suitable for their intended use. When Should this be Done? Sampling of material should be undertaken as early as possible i.e. <u>prior to placement</u> [for site won material] and <u>prior to importation</u> [for imported material]. This is to avoid the costly exercise of re-excavating <u>unsuitable</u> material and the possibility of cross contamination. Where the assessor has confidence that the material is of sufficient quality (i.e. tested by supplier, used previously) it is acceptable to test the material on site but prior to placement. Although, if it is deemed <u>unsuitable</u> it would have to be either removed off site or pre-treated at the cost and time of the developer. What about Certificates from Commercial Suppliers? Where the material is provided by a commercial company, certificates or other industry Quality Protocol compliance i.e. WRAP, will normally be accepted. This is on the proviso that it (i) relates to

	the actual material being imported to the site and the type and amount of analysis is in line with what is prescribed in Appendix 1a and (ii) the certificates are less than two months old. <u>Extreme caution</u> should be given to importing material that has been recycled from demolition or skip waste as they could be easily be contaminated e.g. asbestos containing materials. [Please refer to questions you should be asking your supplier in Appendix 1b and include the responses in your report] British Standard Imported topsoils should be as specified in BS 3882:2007 as 'suitable for their intended purpose'. BS3882:2007 relates to nutrient content of topsoil and phytotoxic contamination and <u>does not</u> consider contaminants that pose a risk specifically to human health. Soils should be tested for contaminants that are considered to pose a risk to human health in addition to BS3882:2007 to ensure that they are suitable for their intended use. Initial Screening A visual / olfactory inspection of the material should be carried out by an Environmental Engineer to ensure that: • it is a suitable growing medium • it is free from obvious contamination i.e. staining / free product etc • it has not come from areas where Japanese Knotweed or other invasive or injurious plants, as specified by the Environment Agency, are suspected to have been growing. • it is not odorous (could be considered a statutory nuisance) • it is free from unsuitable material i.e. bricks, brick ties, timber and glass etc) • there are no visible signs of asbestos containing material (ACM's) Testing Schedule & Number of Samples Chemical testing will normally be required on any materials that are to be used as cover material, even where this includes first generation quarried material. This should be carried out by a suitably qualified Environmental Engineer. Please refer to the <u>Characterisation of Material Matrix</u> in Appendix 1a which details the number of samples to be taken; the testing schedule to be utilised dependant on the nature and source of the material and the acceptance criteria to be used.
KP3 Suitability of Material	Based on the characterisation of material above, the material should be either deemed suitable or unsuitable. Obviously unsuitable material should not be used [unless it is treated to reduce levels of contaminants below agreed target levels i.e. bioremediation – this would have to be agreed and included within the Remediation Strategy] and an alternative source of material should be sought by the developer. If the material is considered suitable it can be

	imported [if not site won] and stockpiled in a suitably quarantined area [refer to KP4].
KP4 Stockpiling & Quarantining of Material	It is essential that the 'suitable' material is either placed in its intended area straight away i.e. soft / landscaped areas or stockpiled in a suitable quarantine area to prevent on-site contamination. In the event that an assessor finds material has been stored in an unsuitable area, samples should be taken to confirm that no cross contamination has occurred [including a visual/olfactory check of the material]. The material should then be suitably quarantined or placed at its intended location immediately.
KP5 Verification of Required Depth	In line with the agreed 'Remediation Strategy', it is important to establish that the required depth has been achieved and is consistent across the site. There are two main ways to achieve this: <u>Depth testing in situ</u> – small trial pit excavated to allow measurement of its depth by tape measure or measuring staff. <u>Topographical surveys</u> – accurate survey of the base and final formation layer height to establish the depth of cover. Specific Local Authority Policy Please check with the local Contaminated Land Officer to establish: • which type of method for testing depth is accepted; and • the number of verification areas per property, plot, landscaped area or garden area [some Local Authorities recommend at least 2 per plot] Important Note: Where demarcation, physical no-dig and capillary break layers exist they should be verified for their thickness and presence during the time of their installation. Details of the demarcation layer should be agreed with the Contaminated Land Officer prior to placement. This will include the design, type and strength of the geotextile separator or visual warning membrane. The verification of depth and confirmation of such layers should be carried out by a suitably qualified environmental engineer.
KP6 Reporting	The purpose of verification documentation is to provide transparent reasoning why the remediation was required, a methodology about how it was to be undertaken and proof that the specified works have been undertaken and to provide confirmation that the site is 'suitable for its intended use'. The document is utilised not only to satisfy conditions of planning permissions but also is to be kept on record by the Local Authority should queries be raised during the lifetime of the development and to confirm to future purchasers that the site is suitable for use. Therefore, the presence of good quality photographs is essential to

prove beyond doubt that the remediation has been done as specified both by method and position.

It is also essential that other supporting documentation is included within a report e.g. laboratory analysis results, delivery tickets for material, certificates for imported material, trial pit logs etc. A checklist has been included in Appendix 2 to give an idea on what information should be recorded.

The reporting should be carried out by a suitably qualified Environmental Engineer.

To include details of any measures required to maintain the cover system integrity in the future e.g. successive construction phases (management plans) and longer term (restrictive covenants on title deeds).

Photographic Evidence for Validating the Depth of Cover

The Local Authority ideally would recommend the following programme of photographs to be taken of the placement of inert cover:

- Photographs of any stockpiles and quarantine areas
- Proof that the depth of inert cover has been installed
- Proof of the quality of the material to be used as inert cover
- Proof there is a geotextile separator and visual warning membranes if used between the made ground and suitable for use soils.
- Proof of the method of placement and different layers if appropriate
- Proof of the completed project
- Inclusion of geographic background features which will aid locating the photograph
- Inclusion of site identification boards within the photos which show the date, position taken i.e. corner of plot 3 and the site name.
- Inclusion of photographs of site stockpiles and quarantine areas.

The photographs have to prove beyond doubt that the images have been taken from the specific area stated.

Refer to Appendix 3 for examples of good photographic evidence.

Appendix 1a – Sampling & Testing Matrix

Type	Number of Samples	Testing Schedule	Assessment Criteria
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)	This needs to be agreed with the Local Authority. The Assessment criteria needs to be UK based, e.g. LQM S4UL's, Defra C4SL's or other similarly derived GAC's.
Crushed Hardcore, Stone, Brick	Minimum 1 per 1000m ³	Standard metals/metalloids (As above) PAH (16 USEPA speciation) Asbestos	
Greenfield/ Manufactured Soils	Minimum 3 or 1 per 250m ³ (whichever is greater)	Standard metals/metalloids (As above) PAH (16 USEPA speciation) Asbestos	
Brownfield/ Screened Soils	Minimum 6 or 1 per 100m ³ (whichever is greater)	Standard metals/ metalloids (As above) PAH (16 USEPA speciation) TPH (CWG banded) Asbestos Any additional analysis dependant on the history of the donor site.	

Appendix 1b – Questions to Ask Your Soil Supplier Relating to Soil Quality

- What is the source of the material (refer to KP1)?
- Will all of the material be coming from the same source?
- Are you satisfied that the material is a suitable growing medium for the proposed end use?
- Has the supplier used an appropriate sampling protocol to ensure a representative sample is analysed? What volume of soil is represented by the analysis and does it comply with Appendix 1a?
- Does the testing include analysis of contaminants identified in Appendix 1a?
- Does the laboratory conducting the analysis have UKAS and MCERTS accreditation for the tests they are carrying out?
- Can I have a copy of the whole analysts report and does it include an interpretive section?
- Will the provided certificate be dated within the last 2 months?

Appendix 2 – Checklist for Verification Reports

Example only. Not to be considered as typical minimum requirements. Additional information should be included for non cover systems aspects of the remediation i.e. gas protection measures etc.

Site Details	
Site Name / location	
Developer name	
Development use	
Plot No / description of landscaped area (inc plan of inspection areas)	
National Grid Reference	
Inspection visit date	
Supporting Evidence	
Description of remediation (as per agreed Remediation Method Statement including depths / thickness checks, topographical readings)	
Material tracking information (including way tickets etc)	
Name of groundwork's remediation contractor	
Name of supervising environmental consultant	
Site Specific chemical analysis results	
Verification Photographs (inc. remarks)	
Recommendations	
Pass / fail	
If material fail, how will this be managed i.e. removed, treated	
Detail any further remedial works and / or inspection	
Signed off	

Failure to provide any of the above information may prevent planning conditions from being discharged.

Appendix 3 – Examples of Good Quality Photographs



Photograph 1: Depth check of inert cover within area of public open space. Physical break layer and topsoil visible.



Photograph 2: Depth check of inert cover with Site & Location Information Board.



Photographs 3 & 4:
Depth check of inert
cover within areas of
front gardens.





© Coopers Consulting Engineers

Photographs 5 and 6: Depth check of inert cover within rear gardens. Taut string line spans across excavation.



© Coopers Consulting Engineers

Photograph 7 shows the spatial location of the verification pit.



Photograph 8:
Excavation within public open space and verification pit showing the presence of a remediation break layer at the base, a crushed sandstone inert fill overlain by topsoil.



Photographs 9 and 10: Inert crushed sandstone being delivered with remediation break layer visible in Photograph 10. The spatial area of the remediation can be observed from these photographs (old terrace housing in Photograph 9 and traffic lights in photograph 10).





Photographs 11 and 12 show the remediation of the rear garden, with a significant depth (1.0m) of inert cover. Remediation break layer visible at the base of the excavation. Photograph 11 has been stitched to form a panoramic photograph and

Appendix D

Keating Projects Ltd Gas Membrane Integrity Testing Results



Keating Projects Ltd
Dell View, Cawley Farm
Swettenham Rd
Swettenham
Cheshire
CW12 2JY

Our Ref: SS4C1111/LRV667
Purchase Order: 007531/LB

13th October 2022

Wynbrook Ltd,
82 Grantham Road
Radcliffe on Trent
Nottingham
NG12 2HY

MEMBRANE INTEGRITY TESTING FOR Granville Gardens - Hinckley, Leicestershire

Keating Projects Ltd has been commissioned by Wynbrook Ltd to complete membrane integrity confirmation, by means of air lancing, visual examination, and pick testing, at Granville Gardens, Hinckley, Leicestershire. The Gas Barrier has been installed by Wynbrook operatives.

Context: A site visit, an agreed inspection was conducted on 7th October 2022 between 11:30-12:45 and 100% of the area EPS Total Gas Barrier MEMBRANES installation was inspected to ensure seals between sheets, to steel stanchions and pipe penetrations.

The visual and pick testing tests conducted over the whole area. The installation was found to be sealed to an excellent professional standard. No remediation or repairs required.

VISUAL AND PICK TEST STATUS: PASS

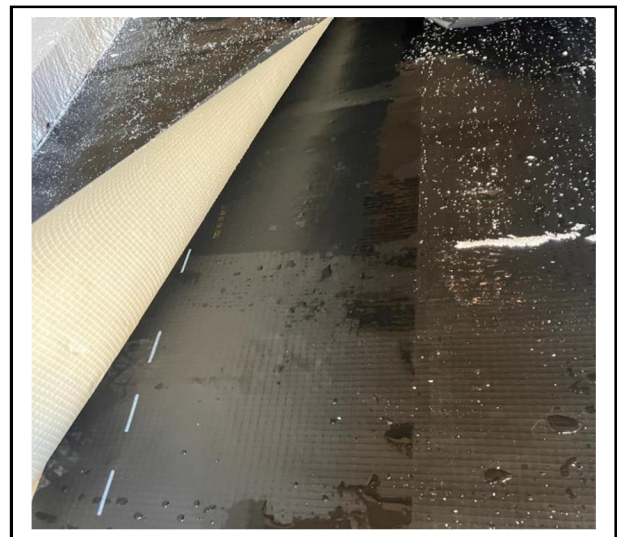
If you have any questions regarding the above, please do not hesitate to contact me.

Yours sincerely,

William Keating, MCIQB, MCABE, MIIRSM

Photographic Evidence

Area: Side Laps



Side Laps – 150mm overlap secured with double sided butyl tape as per manufacturers guidance.

Photographic Evidence

Area: Pipe Penetrations



Pipe Penetrations – Installed with Top Hat & Jubilee clips – Main floor area connected underneath internal walls. Good Level of Installation achieved.