Geotechnical & Environmental Consultants

Our Ref: 33023/PN

28th May 2013

**By Email**

Stepnell Ltd
Stepnell House
Lawford Road
Rugby
Warwickshire
CV21 2UU

**For the attention of Mr T. Sewell**

Dear Thomas

**Re: Hinckley Hub, Hinckley**

GeoDyne Ltd has recently completed formation inspections and validation of the depth of remedial capping at the above site; the following report presents our findings.

## PREVIOUS REPORTS

GeoDyne has previously produced the following reports for the site:

- '*Proposed Commercial Site, Flude Site, Rugby Road, Hinckley – Remediation Method Statement (RMS) For The Partners of MRP Hinckley No. 1 LP, Consortium Investment Management LLP & Standard Life*', Dated 28th February 2011, Ref: 29236 Proposed Commercial Site.
- GeoDyne Letter to The Partners of MRP Hinckley No. 1 LP & Standard Life Investment Funds Limited '*Previously Inaccessible Area, Proposed Commercial Site, Flude Hosiery, Hinckley*', Dated 28th June 2011, Ref: 29236/PDA.

The above referenced RMS was confirmed as being acceptable by Hinckley & Bosworth Borough Council by email on 3rd March 2011(copy of email included in Appendix III).

## CAPPING REQUIREMENTS

### Capping Materials

The following chemical analysis report was supplied by Stepnell Ltd to GeoDyne Ltd on 8th April 2013 for review and assessment to investigate that the imported topsoil may be considered to be chemically suitable for use at the site.

- '*Topsoil Analysis Report: Meriden, West Midlands Topsoil*' dated June 2012 by Soil and Land Consultants.

The results within the report indicated that the topsoil was acceptable for use in a generic commercial land use scenario, however due to the time which had passed since testing had been undertaken (approximately 10 months) it was recommended that Stepnell Ltd obtain confirmation that the soil proposed for importation

was the same as that sampled/tested (emailed correspondence with Stepnell Ltd is included within Appendix IV).

Consequently the following chemical analysis report was supplied by Stepnell Ltd to GeoDyne Ltd on 9th April 2013.

- *'Topsoil Analysis Report: Meriden, West Midlands Topsoil'* dated February 2012 by Soil and Land Consultants.

We understand from the report that the sample tested was a composite of ten separate samples taken from a stockpile of topsoil, with the topsoil being described as consistent in composition. GeoDyne has reviewed the soil test results to determine the chemical suitability of the topsoil in accordance with DEFRA and the Environment Agency CLEA soil Guidance Values (SGVs) and the Chartered Institute of Environmental Health and Land Quality Management (CIEH/LQM) Generic Assessment Criteria (GAC) for a proposed generic commercial end use. Individual determinants have been assessed only where SGVs and GACs are available. The results indicate that levels of contamination are acceptable for use within areas of landscaping at the proposed site, assuming that the test result is representative of the material tested and imported to site.

Topsoil Analysis Reports are included within Appendix V of this report.

Capping Depth

Our RMS report outlined the required capping at the site for areas of public open space, as agreed by Hinckley & Bosworth Borough Council. Recommendations from section 3.5 of the RMS are summarised as follows:

'*Where visually inert Natural Strata is exposed at formation level no remedial capping is considered necessary other than the placement of a nominal topsoil layer*' and *'the proposed minimum depth of the topsoil capping over Made Ground is summarised in Table 2'.*

*TABLE 2 - TOPSOIL CAPPING PROPOSALS*

| *Land Use* | *Topsoil (m)* | *Subsoil (m)* | *Total (m)* |
|---|---|---|---|
| *Public Open Space* | *0.15* | *Not Required* | *0.15* |

## VALIDATION WORKS

Following instruction from Stepnell Ltd an Engineer from GeoDyne visited site on 2nd May 2013 to undertake topsoil thickness validation works in soft landscaped areas at the site, these areas comprised narrow borders around the edge of hardstanding. At the time of our visit the majority of soft landscaping areas were complete (i.e. had topsoil in place).

In the completed soft landscaping areas topsoil was encountered typically as brown sandy slightly gravelly topsoil overlain by bark chippings and appeared visually suitable for use. The thickness of the topsoil within the completed soft landscaping areas varied between 0.26m to 0.48m. Hard standing (typically concrete lean mix) was generally encountered underlying the topsoil with stiff orange-brown silty natural CLAY encountered underlying the topsoil in some locations.

At the time of our visit two proposed soft landscaping areas located in the south of the site were incomplete. Both areas had been excavated and consisted of a hard-standing layer of concrete lean mix, capping the underlying strata. The depths between the proposed finished levels and the base of the excavation were generally around 0.35m, and were in excess of the 0.15m of capping recommended in the RMS.

At the time of our visit a soft landscaping area proposed in the north-west of the site was located underneath portacabins (associated with the on-going site works). Consequently soft landscaping areas had not been constructed within this area of the site. However, a small topsoil mound was present within the vicinity of the portacabins, topsoil within the mound was visually similar to topsoil encountered across the rest of the site. We understand that the Client intends to use the topsoil from the mound in the incomplete soft landscaping areas across the site.

Plans showing the site layout and Topsoil capping thickness encountered at the site (Figure No. 32023/VAL/01 & Figure No. 32023/VAL/02) are included in Appendix I and II.

The RMS states within the Unforeseen Circumstances section that '*with a site of this nature, there is the potential for previously unforeseen ground conditions to occur and/or buried tanks to be present*'. We have received emailed confirmation from Stepnell Ltd that no tanks were revealed during construction works (Stepnell Ltd correspondence included in Appendix IV).

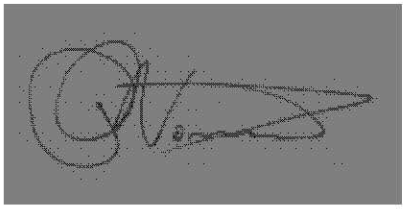
**SUMMARY**

Based on the findings of our works and information supplied by Stepnell Ltd we can confirm that all of the completed soft landscaping areas at the time of our visit comply with the recommendations detailed in our Remediation Method Statement with respect to the provision of an appropriate thickness of suitably clean remedial capping.

With regards to the soft landscaping areas which were incomplete at the time of our visit, we have no reason to suspect that these areas will not meet the requirements of the RMS, but should formal validation of these areas be required we can visit the site as necessary.

We would recommend that this letter is supplied by Stepnell Ltd to the Local Planning Authority for review and comment.

Yours sincerely
**For and on the behalf of GeoDyne Ltd**



**Patrick Norwood**
**Graduate Engineer**

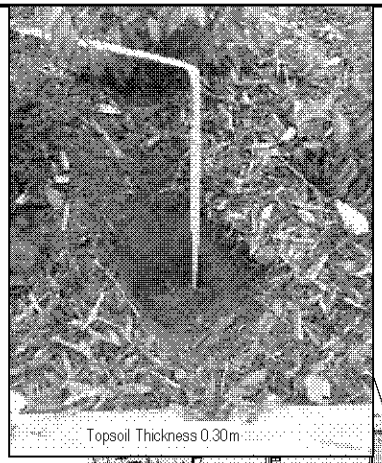
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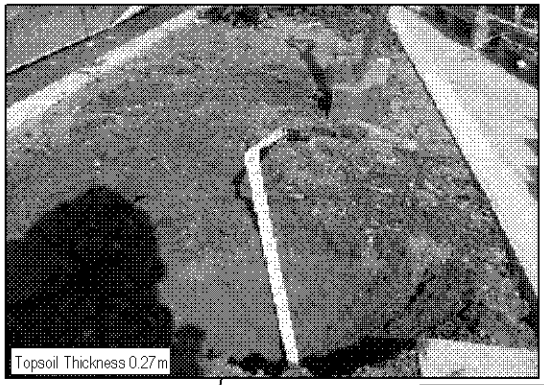
| | |
|---|---|
| Appendix I | Drawing Showing Topsoil Levels |
| Appendix II | Drawing Showing General Site Views |
| Appendix III | Correspondence Received From Local Authority |
| Appendix IV | Correspondence Received From Stepnell Ltd. |
| Appendix V | Topsoil Analysis Reports |
| Appendix VI | Conditions & Limitations |

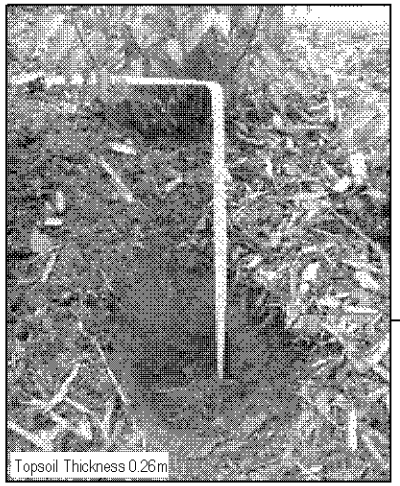
GeoDyne

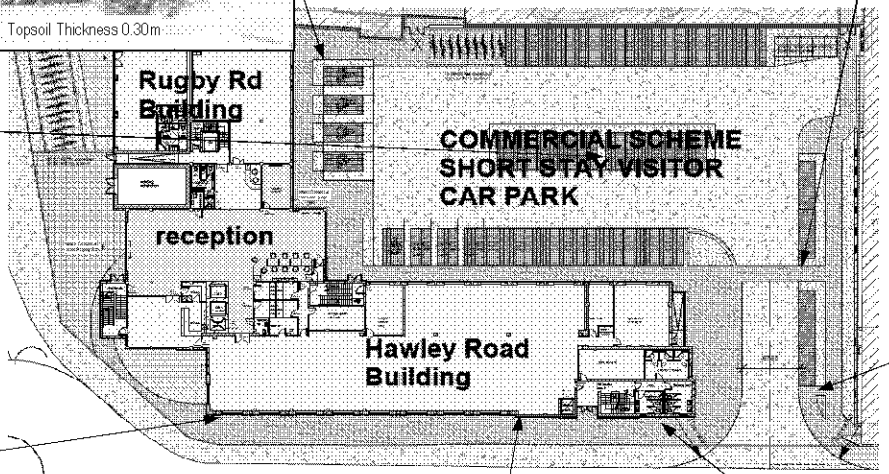
**APPENDIX I**

**Drawing Showing Topsoil Levels**
**(Figure No. 33023/VAL/01)**



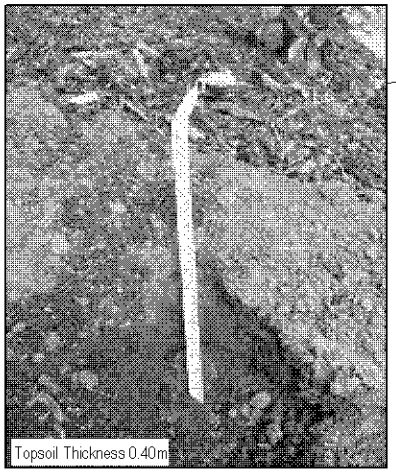



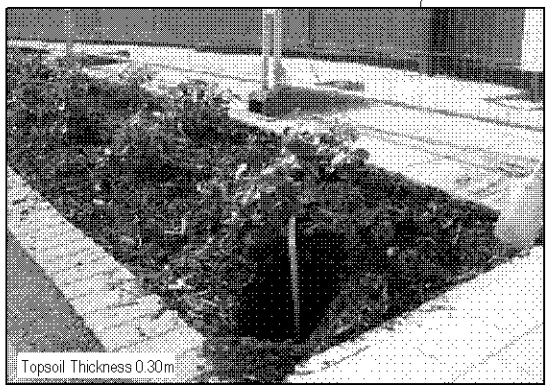













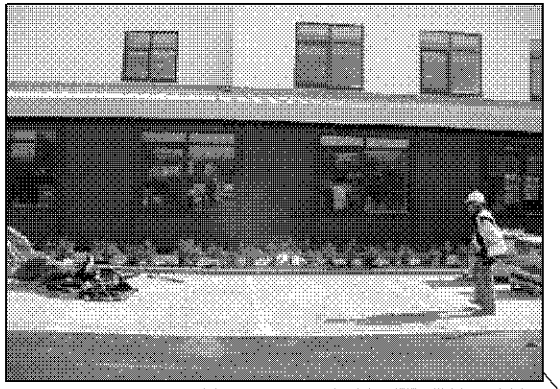
| | | | | | |
|---|---|---|---|---|---|
| **NOTE** Reproduced and edited from MRP drawing MRP/0750/ppsd/1000 dated 8.12.10 | Project No. 33023 | Title Drawing Showing Topsoil levels | Scale NTS | Drawn PN | GeoDyne |
| | Client Stepnell Ltd | | Revision | Checked PDA | |
| | Project Hinckley Hub | | Date Drawn 03/05/13 | Approved PDA | |
| **DO NOT SCALE** | | | **Figure No. 33023/VAL/01** | | |

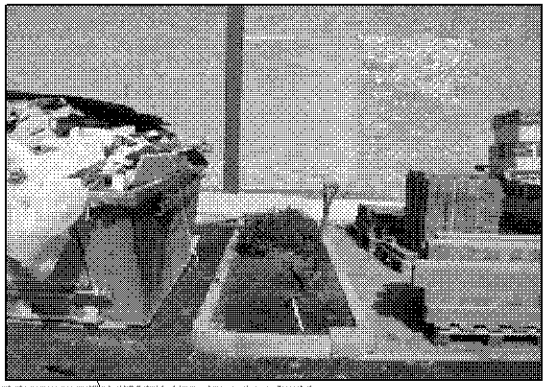
GeoDyne

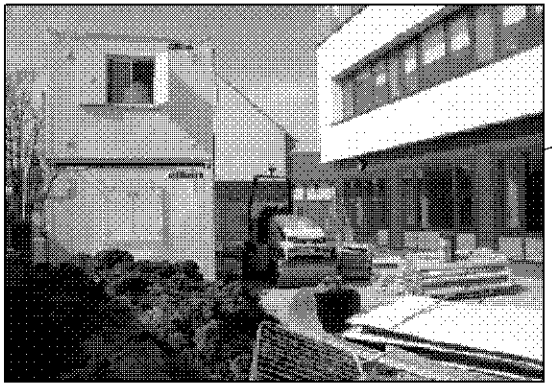
**APPENDIX II**

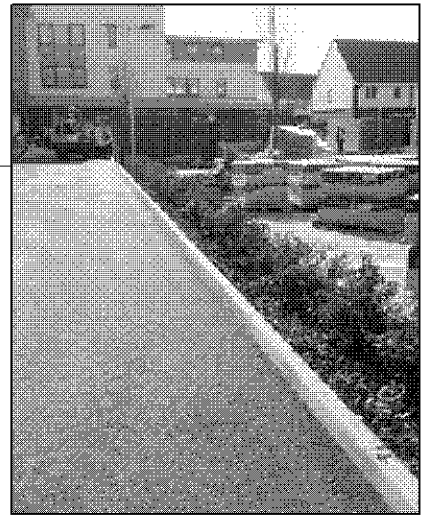
**Drawing Showing General Site Views**
**(Figure No. 33023/VAL/02)**

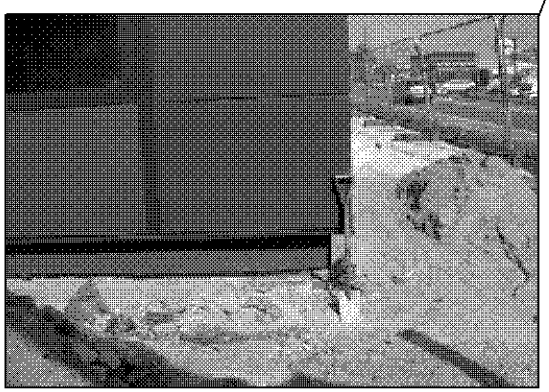














| | | | | | |
|---|---|---|---|---|---|
| **NOTE** Reproduced and edited from MRP drawing MRP/0750/ppsd/1000 dated 8.12.10 | Project No. 33023 | Title Drawing Showing General Site Views | Scale NTS | Drawn PN | DeoDyne |
| | Client Stepnell Ltd | | Revision | Checked PDA | |
| | Project Hinckley Hub | | Date Drawn 03/05/13 | Approved PDA | |
| DO NOT SCALE | | | Figure No. 33023/VAL/02 | | |

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# APPENDIX III

## Correspondence Received From Local Authority

## phil anelay

**From:** Giles Rawdon [Giles.Rawdon@hinckley-bosworth.gov.uk]
**Sent:** 03 March 2011 14:35
**To:** James Hicks
**Cc:** phil anelay
**Subject:** FW: RMS, Proposed Commercial Site, Flude Hosiery

Hello James,

Please see the email below. I am satisfied that the ground investigation and RMS have been carried out and submitted, and are suitable from an EH point of view. Can you confirm that Condition 8 can be discharged as requested?

Regards,

Giles

---

**From:** phil anelay [mailto:philanelay@geodyne.co.uk]
**Sent:** 03 March 2011 14:16
**To:** iles Rawdon
**Subject:** RE: RMS, Proposed Commercial Site, Flude Hosiery

Giles

Following our telephone conversation, thank you again for your quick review and response.

We have not issued our reports to the Environment Agency, this is typically a decision that the Planners would make. If you would like the reports issuing to the EA we would be pleased to do this upon request.

Our works and your comments are sufficient to sign off the planning condition relating to the ground investigation and RMS (Condition 8). Condition 9 is a seperate condition relating to verification that will be addressed in due course. We understand that you are satisfied that Condition 8 can be signed off based on our works.

We would be grateful if you would please provide confirmation that the foregoing is acceptable and Condition 8 can be signed off.

We look forward to your reply.

Re ds

For and on behalf of Geodyne Limited
Phil Anelay
Principal Engineer
Tel: 0115 983 0006
Fax: 0115 983 0009
Mobile: 07808 295 800
**Nottingham Office:** The Granary, Church Lane, Thrumpton, Nottingham, NG11 0AX Tel: 0115 983 0006 Fax: 0115 983 0009
**Derby Office:** Silverhill Farm, Silverhill Court, Radbourne, Derby, DE6 4LY Tel: 01332 824115 Fax: 01332 824970

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**From:** Giles Rawdon [mailto:Giles.Rawdon@hinckley-bosworth.gov.uk]
**Sent:** 03 March 2011 13:54
**To:** phil anelay
**Subject:** RE: RMS, Proposed Commercial Site, Flude Hosiery

Phil,

Thank you for the Remediation Method Statements. I have reviewed both the commercial and residential RMS' and am satisfied that these are suitable. I assume that the Environment Agency have been contacted for their approval.

With regard to the signing off of the planning condition, this would, I believe, be done when the final verification are received and approved.

Regards,

Giles Rawdon

Environmental Health Officer (Pollution)
Hinckley and Bosworth Borough Council
1st Floor, Florence House
St Marys Road
Hinckley
Leics.
LE10 1EQ
Fax: 01455 234590
01455 255684
Mobile: 07966 201812

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**From:** phil anelay [mailto:philanelay@geodyne.co.uk]
**Sent:** 02 March 2011 13:24
**To:** iles Rawdon
**Cc:** 'Mark Willmott'
**Subject:** RMS, Proposed Commercial Site, Flude Hosiery

Giles

Further to our recent discussions regarding the Flude Site and issue of our Remediation Method Statement for the proposed residential part of the Flude Hosiery site, Hinckley, please find attached a copy of our RMS for the proposed commercial part of the site.

We would be grateful if you would review the report and confirm that it is suitable for your requirements, and that planning condition 8 can be signed off.

Please do not hesitate to call if you have any questions in relation to the RMS.

We look forward to your reply, your soonest response would be gratefully received.

Kind regards
**For and on behalf of GeoDyne Limited**

**Phil Anelay**
**Principal Engineer**
**Tel: 0115 983 0006**
**Mob: 07808 295800**

**Nottingham Office:** The Granary, Church Lane, Thrumpton, Nottingham NG11 0AX Tel: 0115 983 0006 Fax: 0115 983 0009

**Derby Office:** Silverhill Court, Radbourne, Derby, DE6 4LY Tel: 01332 824115 Fax: 01332 824970

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# APPENDIX IV

## Correspondence Received From Stepnell Ltd

## Patrick Norwood

**From:** Thomas Sewell <Thomass@stepnell.co.uk>
**Sent:** 02 May 2013 18:22
**To:** Patrick Norwood
**Cc:** SteveG@stepnell.co.uk; Phil Anelay
**Subject:** RE: Hinckley Hub Topsoil Validation

Patrick,

We confirm that no tanks were encountered during the works.

Regards

Thomas Sewell
**Operations and Commercial Manager**
Tel 01788 574511
Mobile 07788 340270

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Stepnell House, Lawford Road, Rugby, Warwickshire, CV21 2UU
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**From:** Patrick Norwood [mailto:patricknorwood@geodyne.co.uk]
**Sent:** 30 April 2013 11:00
**To:** Thomas Sewell
**Cc:** SteveG@stepnell.co.uk; Phil Anelay
**Subject:** Hinckley Hub Topsoil Validation

Thomas,

Following my telephone conversation with Steve Gordon I have been made aware that only 50% of the topsoil is currently in place at the Hinckley Hub site, with the final 50% due to be placed on Thursday 2nd May.

A final Topsoil Validation report can not be issued until all the topsoil is in place at the site and therefore we won't be able to send a report to you by Wednesday 1st May as previously requested.

Can either yourself or Steve contact me when all the topsoil is in place and we will look to visit the site as soon as possible.

Also Steve verbally confirmed that no buried tanks were encountered during works on the site, can you please confirm this in writing for us to include within our report (an email will be fine).

Kind regards
**For and on behalf of GeoDyne Limited**

**Patrick Norwood**
**Graduate Geo-Environmental Engineer**
**Tel: 0115 983 0006**
**Mob: 07867 498655**

## Patrick Norwood

**From:** Richard Spencer
**Sent:** 07 May 2013 15:36
**To:** Patrick Norwood
**Subject:** FW: Topsoil Hinckley Hub site Stepnell ltd

**From:** Richard Spencer
**Sent:** 09 April 2013 15:52
**To:** 'Lee Harris'
**Cc:** Thomas Sewell; Steven Gordon
**Subject:** RE: Topsoil Hinckley Hub site Stepnell ltd

Lee,

With regards to the test results sent through, we understand from the SLC letter that the sample tested was a composite of ten separate samples taken from a stockpile of topsoil, with the topsoil being described as consistent in composition. The result indicates that levels of contamination are acceptable for use within areas of landscaping at the proposed site, assuming that the test result is representative of the material tested and of the material proposed for importation.

The recent date of the test result, together with the composite nature of the sample and the visually consistent recorded nature of the soils suggests that the sample result should be representative of the materials to be imported to site, but it would be worthwhile obtaining written confirmation of such from the topsoil supplier.

I trust that this is suitable for your requirements, but if you have any queries please do not hesitate to contact me.

Kind regards
For and on behalf of GeoDyne Limited

**Richard Spencer**

**Director**
**Tel: 0115 983 0006**
**Mob: 07789 432274**

Nottingham Office: The Granary, Church Lane, Thrumpton, Nottingham NG11 0AX. Tel: 0115 983 0006 Fax: 0115 983 0009
Derby Office: 9 Brunel Parkway, Pride Park, Derby, DE24 8HR Tel: 01332 290798 Fax: 01332 208074

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**From:** Lee Harris [mailto:Lee.Harris@stepnell.co.uk]
**Sent:** 09 April 2013 15:02
**To:** Richard Spencer
**Cc:** Thomas Sewell; Steven Gordon
**Subject:** Topsoil Hinckley Hub site Stepnell ltd

Richard
Please see attached report from our supplier that was done this February. We intend to start top soiling this coming Monday so if you could give us the all clear to start importing as soon as possible it would be much appreciated.

Regards
Lee Harris

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http://www.star.net.uk

## Patrick Norwood

**From:** Richard Spencer
**Sent:** 07 May 2013 15:36
**To:** Patrick Norwood
**Subject:** FW: Hinckley Hub

**From:** Richard Spencer
**Sent:** 08 April 2013 15:02
**To:** Thomas Sewell
**Subject:** FW: Hinckley Hub

Thomas,

Phil is on holiday this week and I have looked at your email in his absence.

With regards to the test results sent through, the results indicate that levels of contamination are acceptable for use within areas of landscaping at the proposed site, assuming that the test result is representative of the material tested and of the material proposed for importation.

We understand from the SLC letter that the sample tested was a composite of ten separate samples taken from a stockpile of topsoil, with the topsoil being described as consistent in composition. The samples were taken in July 2012 and therefore due to the timescale since taking the samples, we would recommend that you obtain confirmation that the soil proposed for importation is the same as that sampled/tested, and that the testing is therefore representative of the imported topsoil.

I trust that the above comments are suitable for your requirements but please do not hesitate to contact us if you require any further advice or have any further queries.

Kind regards
**For and on behalf of** GeoDyne Limited

**Richard Spencer**

**Director**
**Tel: 0115 983 0006**
**Mob: 07789 432274**

**Nottingham Office:** The Granary, Church Lane, Thrumpton, Nottingham NG11 0AX Tel: 0115 983 0006 Fax: 0115 983 0009
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**From:** Thomas Sewell
**Sent:** 08 April 2013 13:13:51 (UTC) Dublin, Edinburgh, Lisbon, London
**To:** Phil Anelay
**Subject:** Hinckley Hub

Phil,

Please find attached the information for the topsoil on the above.

Can you please confirm your acceptance of this as we are looking to install the topsoil this week.

Regards

Thomas Sewell
**Operations and Commercial Manager**
Tel 01788 574511
Mobile 07788 340270

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**From:** Lee Harris
**Sent:** 08 April 2013 13:07
**To:** Thomas Sewell
**Subject:** FW: Lee Harris Stepnell

Tom
Please see attached topsoil report for a local source we can use at Hinckley Hub site.
Regards
Lee

---

**From:** Ben Forrester [mailto:benforrester@grsroadstone.co.uk]
**Sent:** 08 April 2013 12:44
**To:** Lee Harris
**Subject:** RE: Lee Harris Stepnell

Lee,

Please find attached the topsoil paper work as discussed.

I hope that this is acceptable.

Regards,

Ben Forrester

Warwickshire Sales representative

**GRS Roadstone Ltd**
07971 825803
benforrester@grsroadstone.co.uk

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**From:** Lee Harris [mailto:Lee.Harris@stepnell.co.uk]
**Sent:** 08 April 2013 12:24
**To:** Ben Forrester
**Subject:** Lee Harris Stepnell

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GRS Bagging Ltd, Registered in England No. 391 6174
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Tel. 02476 580800, Fax. 02476 580888
www.grsroadstone.co.uk www.grsbagging.co.uk
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**APPENDIX V**

**Topsoil Analysis Reports**

Soil SLC & Land Consultants

Freeland Horticulture Ltd
Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Attention: Philippa Lambourne

Our Ref: SLC-12-AN-0162-SA

26 March 2013

Dear Philippa

***Topsoil Analysis Report : Meriden, West Midlands Topsoil – February 2013***

We have completed the analysis of the topsoil sample recently taken from the above site and have the pleasure of reporting our findings. The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes.

Received Horticulture Limited 01322619161

## *SOIL SAMPLING & EXAMINATION*

At the time of our sampling visit the topsoil was stored in a stockpile. A series of 10 hand augered trial holes were constructed across the stockpile for the purpose of soil examination and sample collection. As the soil examination confirmed a consistent topsoil composition, the ten samples were combined together to form one composite sample for analysis purposes. The soil was described as a dark brown, very moist, friable *sandy loam* with a moderately developed, medium to coarse granular structure. The soil contained a low fraction of small stones and no deleterious materials (eg. building waste materials, glass, etc) or unusual odours (eg. hydrocarbons) were recorded.

## *LABORATORY ANALYSIS*

The topsoil sample was submitted to a UKAS accredited laboratory for routine physical and chemical parameters to confirm the composition and fertility of the soil. The following parameters were determined:

- pH & electrical conductivity values;
- major plant nutrients (N, P, K, Mg) & organic matter content;
- particle size distribution and stone content;
- heavy metals & potentially toxic elements (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, B);
- sulphate, sulphur, sulphide;
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16);
- banded aromatic and aliphatic petroleum hydrocarbons ($C_5$-$C_{35}$).

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

## COMMENTS

### pH & Electrical Conductivity (salinity) Values

The sample was alkaline in nature (pH 7.6) with a pH value that would be considered suitable for general landscaping purposes.

The electrical conductivity value using the soil:water extract was moderate (1500µS/cm) indicating that soluble salts are not present at levels that would be harmful to plants.

### Organic Matter & Nutrient Status

The sample contained adequate levels of organic matter and all major plant nutrients. No further additions of compost or fertiliser are required, or indeed recommended, for at least the first growing season.

It should be noted that the levels of extractable potassium (1471 mg/l) exceeded its maximum set in the current British Standard for topsoil (BS3882: 2007, 900 mg/l). In some cases, high potassium levels could be associated with saline soils that could inhibit healthy plant development. However, this topsoil was shown by the electrical conductivity test not to be excessively saline. Therefore, we would not anticipate that these high nutrient levels found here will be problematic in any way.

### Particle Size Distribution & Stone Content

The sample contained 80% sand and fell into the *sandy loam* texture class. This particle size distribution is considered suitable for a broad range of landscape applications, including tree and shrub planting, turfing and seeding.

The sample was free from stones of 50 mm and upwards in diameter and only contained a slight fraction of smaller stones (3.2%). As such, stones will not restrict the use of the soil for landscaping purposes.

Freeland Horticulture Limited
01322 612111

## Potential Contaminants

We are not aware of any specified contaminant levels set for the proposed end-use of this topsoil so the following comments are based on the Soil Guideline Values (SGVs) for residential end-use presented in the Contaminated Land Exposure Assessment (CLEA) Model (EA/DEFRA:2002). The SGVs currently only consider a limited range of parameters so where a potential contaminant is not covered by the CLEA Model other relevant schedules for contamination assessment, such as the Dutch Guidelines, and professional judgement have been used.

Of the potential contaminants determined, none was found at levels that would indicate significant contamination.

### CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes. From the soil examination and laboratory analysis, the soil is described as an alkaline, non-saline, sandy loam. The organic matter and nutrient levels are acceptable and no significant contamination was found with respect to the parameters determined. The level of potassium determined does not indicate salinity and therefore will not adversely affect the performance of the soil in any way. This soil would adhere to all other aspects of the current BS3882 specification for 'multipurpose grade'.

To conclude, based on our findings, the topsoil would be considered well-suited to general landscaping purposes provided the physical condition of the soil is maintained.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if you have any queries or comments.

Freeland Horticulture Limited
01322 619361

| | |
|---|---|
| Client | Freeland Horticulture Ltd |
| Job Name | Topsoil Analysis |
| Site | Meriden, West Midlands |
| Month/Year | February 13 |
| Our Ref | SLC-13-AN-0162-SA |
| Date | 26 March 2013 |

| pH Value & Salinity | | Composite sample |
|---|---|---|
| pH value (1:2.5 soil/water ext) | units | 7.6 |
| Electrical Conductivity (1:2.5 soil/water ext) | µS/cm | 1500 |

| Organic Matter & Nutrient Status | | |
|---|---|---|
| Organic Matter (LOI) | % | 5.9 |
| Organic Carbon (Derived) | % | 3.4 |
| Total Nitrogen | % | 0.31 |
| Carbon:Nitrogen Ratio | :1 | 11 |
| Available Phosphorus | mg/l | 75 |
| Available Potassium | mg/l | 1471 |
| Available Magnesium | mg/l | 209 |

| Particle Size Analysis & Stones | | |
|---|---|---|
| Clay (<0.002mm) | % | 11 |
| Silt (0.063-0.002mm) | % | 12 |
| Sand (2.0-0.063mm) | % | 77 |
| Texture Class | UK Class | Sandy Loam |

| | | |
|---|---|---|
| Stones >2 mm | % by DW | 3.2 |
| Stones >20 mm | % by DW | 0.0 |
| Stones >50mm | % by DW | 0.0 |

| Potential Contaminants | | |
|---|---|---|
| Total Arsenic (As) | mg/kg | 3.7 |
| Total Cadmium (Cd) | mg/kg | 0.14 |
| Total Chromium (Cr) | mg/kg | 26.7 |
| Total Copper (Cu) | mg/kg | 36.6 |
| Total Lead (Pb) | mg/kg | 19.4 |
| Total Mercury (Hg) | mg/kg | 0.04 |
| Total Nickel (Ni) | mg/kg | <10.0 |
| Total Selenium (Se) | mg/kg | <0.09 |
| Total Zinc (Zn) | mg/kg | 59.4 |
| Hot Water Soluble Boron (B) | mg/kg | 2.4 |
| Total Cyanide (CN) | mg/kg | <1.0 |
| Elemental Sulphur (S) | mg/kg | <5.0 |
| Easily Liberated Sulphide ($S^{2-}$) | mg/kg | <10.0 |
| Water Soluble Sulphate ($SO_4^{2-}$) | g/l | 0.09 |

Soil Land Consultants, Ltd, 96 High Street, Tunbridge Wells, Kent TN1 1YF. Phone: 01322 667076
Fax: 01322 619135 Email: enquiries@soil-land.com

| | |
|---|---|
| Client | Freeland Horticulture Ltd |
| Job Name | Topsoil Analysis |
| Site | Meriden, West Midlands |
| Month/Year | February 13 |
| Our Ref | SLC-13-AN-0162-SA |
| Date | 26 March 2013 |

**Polyaromatic Hydrocarbons**

| | | |
|---|---|---|
| Naphthalene | mg/kg | <0.05 |
| Acenaphthylene | mg/kg | <0.05 |
| Acenaphthene | mg/kg | <0.05 |
| Fluorene | mg/kg | <0.05 |
| Phenanthrene | mg/kg | <0.1 |
| Anthracene | mg/kg | <0.05 |
| Fluoranthene | mg/kg | 0.1 |
| Pyrene | mg/kg | 0.1 |
| Benzo[a]anthracene | mg/kg | <0.1 |
| Chrysene | mg/kg | <0.1 |
| Benzo[b]fluoranthene | mg/kg | <0.1 |
| Benzo[k]fluoranthene | mg/kg | <0.1 |
| Benzo[a]pyrene | mg/kg | <0.1 |
| Indeno[1,2,3-cd]pyrene | mg/kg | <0.1 |
| Dibenzo[a,h]anthracene | mg/kg | <0.1 |
| Benzo[g,h,i]perylene | mg/kg | <0.1 |
| Total PAHs sum US EPA 16 | mg/kg | <1.0 |

**Banded Petroleum Hydrocarbons**

| | | |
|---|---|---|
| Aliphatic TPH >$C_5$-$C_6$ | mg/kg | <0.01 |
| Aliphatic TPH >$C_6$-$C_8$ | mg/kg | <0.01 |
| Aliphatic TPH >$C_8$-$C_{10}$ | mg/kg | <0.01 |
| Aliphatic TPH >$C_{10}$-$C_{12}$ | mg/kg | <1.5 |
| Aliphatic TPH >$C_{12}$-$C_{16}$ | mg/kg | <1.2 |
| Aliphatic TPH >$C_{16}$-$C_{21}$ | mg/kg | <1.5 |
| Aliphatic TPH >$C_{21}$-$C_{35}$ | mg/kg | 6.8 |
| Aliphatic TPH >$C_{35}$-$C_{44}$ | mg/kg | 155 |

| | | |
|---|---|---|
| Aromatic TPH >$C_5$-$C_7$ | mg/kg | <0.01 |
| Aromatic TPH >$C_7$-$C_8$ | mg/kg | <0.01 |
| Aromatic TPH >$C_8$-$C_{10}$ | mg/kg | <0.01 |
| Aromatic TPH >$C_{10}$-$C_{12}$ | mg/kg | <0.9 |
| Aromatic TPH >$C_{12}$-$C_{16}$ | mg/kg | 0.6 |
| Aromatic TPH >$C_{16}$-$C_{21}$ | mg/kg | <0.6 |
| Aromatic TPH >$C_{21}$-$C_{35}$ | mg/kg | 6.9 |
| Aromatic TPH >$C_{35}$-$C_{44}$ | mg/kg | 155 |
| Total Petroleum Hydrocarbons | mg/kg | 155 |

Freeland Horticulture Limited 01322 619161

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Fax: 01322 619135 Email: enquiries@soil-land.com

Soil & Land Consultants

Freeland Horticulture Ltd
Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Attention: Philippe Lambourne

Our Ref: SLC-12-AN-0086-SA

4 July 2012

Dear Philippe

***Topsoil Analysis Report : Meriden, West Midlands Topsoil – June 2012***

Freeland Horticulture Limited
01322 619161

We have completed the analysis of the topsoil sample recently taken from the above site and have the pleasure of reporting our findings. The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes.

***SOIL SAMPLING & EXAMINATION***

At the time of our sampling visit the topsoil was stored in a stockpile. A series of 10 hand augered trial holes were constructed across the stockpile for the purpose of soil examination and sample collection. As the soil examination confirmed a consistent topsoil composition, the ten samples were combined together to form one composite sample for analysis purposes. The soil was described as a dark brown, very moist, friable *sandy loam* with a moderately developed, medium to coarse granular structure. The soil contained a low fraction of small stones and no deleterious materials (eg. building waste materials, glass, etc) or unusual odours (eg. hydrocarbons) were recorded.

***LABORATORY ANALYSIS***

The topsoil sample was submitted to a UKAS accredited laboratory for routine physical and chemical parameters to confirm the composition and fertility of the soil. The following parameters were determined:

- pH & electrical conductivity values;
- major plant nutrients (N, P, K, Mg) & organic matter content;
- particle size distribution and stone content;
- heavy metals & potentially toxic elements (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, B);
- sulphate, sulphur, sulphide;
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16);
- banded aromatic and aliphatic petroleum hydrocarbons ($C_5$-$C_{35}$).

*Phone: 01322667076 Fax: 01322619135 Email: enquiries@soil-land.com*

*Soil & Land Consultants Ltd. Registered in England: High Street, Tunbridge Wells, Kent TN1 1YF*
*Company Registration No: 4293320*

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

*COMMENTS*

***pH & Electrical Conductivity (salinity) Values***

The sample was alkaline in nature (pH 8.2) with a pH value that would be considered suitable for general landscaping purposes.

The electrical conductivity value using the soil:water extract was moderate (1130 µS/cm) indicating that soluble salts are not present at levels that would be harmful to plants.

***Organic Matter & Nutrient Status***

The sample contained adequate levels of organic matter and all major plant nutrients. No further additions of compost or fertiliser are required, or indeed recommended, for at least the first growing season.

It should be noted that the levels of extractable potassium (1197 mg/l) exceeded its maximum set in the current British Standard for topsoil (BS3882: 2007, 900 mg/l). In some cases, high potassium levels could be associated with saline soils that could inhibit healthy plant development. However, this topsoil was shown by the electrical conductivity test not to be excessively saline. Therefore, we would not anticipate that these high nutrient levels found here will be problematic in any way.

***Particle Size Distribution & Stone Content***

The sample contained 76% sand and fell into the *sandy loam* texture class. This particle size distribution is considered suitable for a broad range of landscape applications, including tree and shrub planting, turfing and seeding.

The sample was free from stones of 50 mm and upwards in diameter and only contained a slight fraction of smaller stones (7.1 %). As such, stones will not restrict the use of the soil for landscaping purposes.

Freeland Horticulture Limited
01322 613697

## Potential Contaminants

We are not aware of any specified contaminant levels set for the proposed end-use of this topsoil so the following comments are based on the Soil Guideline Values (SGVs) for residential end-use presented in the Contaminated Land Exposure Assessment (CLEA) Model (EA/DEFRA,2002). The SGVs currently only consider a limited range of parameters so where a potential contaminant is not covered by the CLEA Model other relevent schedules for contamination assessment, such as the Dutch Guidelines, and professional judgement have been used.

The level of soluble boron (3.9 mg/kg) slightly exceeded its SGV value of 3 mg/kg; however, boron is not harmful to humans or the environment at these concentrations, nor will it affect plant growth.

Of the potential contaminants determined, none was found at levels that would indicate significant contamination.

### CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes. From the soil examination and laboratory analysis, the soil is described as an alkaline, non-saline, sandy loam. The organic matter and nutrient levels are acceptable and no significant contamination was found with respect to the parameters determined. The level of potassium determined does not indicate salinity and therefore will not adversely affect the performance of the soil in any way. This soil would adhere to all other aspects of the current BS3882 specification for 'multipurpose grade'.

To conclude, based on our findings, the topsoil would be considered well-suited to general landscaping purposes provided the physical condition of the soil is maintained.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if you have any queries or comments.

Yours sincerely

Dr Eric Crouch

Freeland Horticulture Limited
01322 619167

| | |
|---|---|
| Client | Freeland Horticulture Ltd |
| Job Name | Topsoil Analysis |
| Site | Meriden, West Midlands |
| Month/Year | June 12 |
| Our Ref | SLC 12-AN-0086-SA |
| Date | 03 July 2012 |

| | | Composite sample |
|---|---|---|
| **pH Value & Salinity** | | |
| pH value (1:2.5 soil/water ext) | units | 8.2 |
| Electrical Conductivity (1:2.5 soil/water ext) | uS/cm | 1180 |
| **Organic Matter & Nutrient Status** | | |
| Organic Matter (LOI) | % | 10.4 |
| Organic Carbon (Derived) | % | 6.0 |
| Total Nitrogen | % | 0.20 |
| Carbon:Nitrogen Ratio | :1 | 30 |
| Available Phosphorus | mg/l | 61 |
| Available Potassium | mg/l | 1197 |
| Available Magnesium | mg/l | 237 |
| **Particle Size Analysis & Stones** | | |
| Clay (<0.002mm) | % | 10 |
| Silt (0.063-0.002mm) | % | 14 |
| Sand (2.0-0.063mm) | % | 76 |
| Texture Class | UK Class | Sandy Loam |
| Soil Density | g/l | 980 |
| Stones 2-20mm | % by DW | 5.6 |
| Stones 20-50mm | % by DW | 1.5 |
| Stones >50mm | % by DW | 0.0 |
| **Potential Contaminants** | | |
| Total Arsenic (As) | mg/kg | 3.3 |
| Total Cadmium (Cd) | mg/kg | <0.1 |
| Total Chromium (Cr) | mg/kg | 28.3 |
| Total Copper (Cu) | mg/kg | 12.1 |
| Total Lead (Pb) | mg/kg | 18.5 |
| Total Mercury (Hg) | mg/kg | <0.02 |
| Total Nickel (Ni) | mg/kg | 13.6 |
| Total Selenium (Se) | mg/kg | 0.16 |
| Total Zinc (Zn) | mg/kg | 45.1 |
| Hot Water Soluble Boron (B) | mg/kg | 3.9 |
| Total Cyanide (CN) | mg/kg | <1.0 |
| Total Phenols Index | mg/kg | <1.0 |
| Elemental Sulphur (S) | mg/kg | <20.0 |
| Easily Liberated Sulphide ($S^{2-}$) | mg/kg | 16.2 |
| Water Soluble Sulphate ($SO_4^{2-}$) | g/l | 0.07 |

Freeland Horticulture Limited
01322 619161

| | |
|---|---|
| Client | Freeland Horticulture Ltd |
| Job Name | Topsoil Analysis |
| Site | Meriden, West Midlands |
| Month/Year | June 12 |
| Our Ref | SLC-12-AN-0086-SA |
| Date | 03 July 2012 |

**Polyaromatic Hydrocarbons**

| | | |
|---|---|---|
| Naphthalene | mg/kg | <0.05 |
| Acenaphthylene | mg/kg | <0.05 |
| Acenaphthene | mg/kg | <0.05 |
| Fluorene | mg/kg | <0.05 |
| Phenanthrene | mg/kg | 0.1 |
| Anthracene | mg/kg | <0.05 |
| Fluoranthene | mg/kg | 0.3 |
| Pyrene | mg/kg | 0.2 |
| Benzo[a]anthracene | mg/kg | 0.1 |
| Chrysene | mg/kg | 0.2 |
| Benzo[b]fluoranthene | mg/kg | 0.1 |
| Benzo[k]fluoranthene | mg/kg | <0.1 |
| Benzo[a]pyrene | mg/kg | 0.1 |
| Indeno[1,2,3-cd]pyrene | mg/kg | <0.1 |
| Dibenzo[a,h]anthracene | mg/kg | <0.1 |
| Benzo[g,h,i]perylene | mg/kg | 0.1 |
| Total PAHs sum US EPA 16 | mg/kg | <1.0 |

Freeland Horticulture Limited 01322 619161

**Banded Petrofeum Hydrocarbons**

| | | |
|---|---|---|
| Aliphatic TPH >$C_5$-$C_6$ | mg/kg | <1.0 |
| Aliphatic TPH >$C_6$-$C_8$ | mg/kg | <2.5 |
| Aliphatic TPH >$C_8$-$C_{10}$ | mg/kg | <1.5 |
| Aromatic TPH >$C_{10}$-$C_{12}$ | mg/kg | <5.0 |
| Aliphatic TPH >$C_{10}$-$C_{12}$ | mg/kg | <2.0 |
| Aliphatic TPH >$C_{12}$-$C_{16}$ | mg/kg | <3.0 |
| Aliphatic TPH >$C_{16}$-$C_{21}$ | mg/kg | <5.0 |
| Aliphatic TPH >$C_{21}$-$C_{35}$ | mg/kg | 23.3 |

| | | |
|---|---|---|
| Aromatic TPH >$C_5$-$C_7$ | mg/kg | <0.1 |
| Aromatic TPH >$C_7$-$C_8$ | mg/kg | <0.2 |
| Aromatic TPH >$C_8$-$C_{10}$ | mg/kg | <0.4 |
| Aromatic TPH >$C_{12}$-$C_{16}$ | mg/kg | <15.0 |
| Aromatic TPH >$C_{16}$-$C_{21}$ | mg/kg | <15.0 |
| Aromatic TPH >$C_{21}$-$C_{35}$ | mg/kg | <35.0 |

| | | |
|---|---|---|
| Total Petroleum Hydrocarbons ($C_5$-$C_{35}$) | mg/kg | 66 |

Authorised by:

Dr Eric Crouch

GeoDyne

# APPENDIX VI

## Conditions & Limitations

# Conditions & Limitations

**Phase I Desk Studies**

1. Works undertaken to provide the basis of the Phase I Desk Study report comprise a review of information available from a number of sources/parties (potentially also including the Client) together with a walk over of the site (where applicable and included within the quotation). The opinions given in the Phase I Desk Study are based on the information available from third parties/sources that has been obtained within the available timeframe. GeoDyne Limited assumes all third party information to be true and correct and therefore cannot accept liability for the accuracy of such information supplied.

2. Should additional information become available that may affect the comments and opinions made within the Phase I Desk Study, GeoDyne Limited reserves the right to review such information and make modifications to comments/opinions as appropriate.

3. It should be borne in mind that a Phase I Desk Study collates available information to generate a conceptual model of the site. The actual geotechnical and environmental considerations can only be fully quantified by intrusive investigation works to confirm the accuracy of the conceptual site model.

**Phase II Intrusive Investigations**

1. Our quotation assumes that access to the site will be arranged by others at no cost to ourselves.

2. We have assumed that free access is available throughout to the entire site and that works can be undertaken during a single mobilisation. Where restricted access is encountered, or where additional unscheduled mobilisations are required, additional costs may be incurred to the client.

3. We have assumed that all available information relating to buried services will be supplied by the Client at no cost to ourselves. No responsibility will be accepted for damage to underground services that have not been brought to our prior attention by the Client.

4. All excavations/boreholes will be backfilled with compacted arisings upon completion, with any excess arisings left proud of ground levels. Excess arisings will not be removed from the site unless specifically requested by the Client. Where we are requested to remove excess arisings, all associated costs will be passed to the Client.

5. We will attempt to leave the site in a clean and tidy state, however, it must be understood that some disturbance of the site is unavoidable during intrusive works.

6. Exploratory holes are positioned approximately on site by GeoDyne Limited. Should the client require precise locations of all exploratory points, additional fees will be incurred. It must be borne in mind that backfilled trial pits can create 'soft spots', therefore, should the Client wish to designate 'no dig' zones, for example under the footprint of proposed structures, these must be brought to our attention prior to commencement of works.

7. Groundwater observations relate to conditions encountered at the time of investigation. It must be understood that groundwater levels may vary as a result of recent climatic conditions or seasonal variation.

8. Trial pits and boreholes examine only a small proportion of the total site area. No liability can be accepted for conditions not revealed in exploratory holes, particularly between positions. All extrapolations of available data are given in good faith.

**Payment**

1 Payment terms are strictly 28 days from the invoice date.

2 Prior to commencement of works, we require receipt of formal written instruction from the party accepting full financial responsibility for the work. In the absence of such an instruction, we would expect the instructing Consulting Engineers/Architects to accept full financial responsibility for the works.

3 Receipt of instruction to commence work shall be taken as acceptance and compliance of the foregoing conditions.

**Liability**

1. GeoDyne Limited offer £5,000,000.00 Professional Indemnity Insurance (in aggregate over the year). This shall be the limit of our liability for works undertaken. No individual liability shall be implied to, or accepted by, any employee for works undertaken for and on the behalf of GeoDyne Limited.