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VOLUME 2:
INTERPRETATIVE GEOTECHNICAL REPORT FOR PLANNING APPLICATION FOR DEVELOPMENT OF LAND TO THE SOUTH OF THE BRICKPIT, ASHBY ROAD, HINCKLEY

Murray Rix Geotechnical
13 Willow Park
Stoke Golding
Warwickshire
CV13 6EU

Tel: (01455) 213311
Fax: (01455) 213969
E-Mail: ted@murrayrix.co.uk

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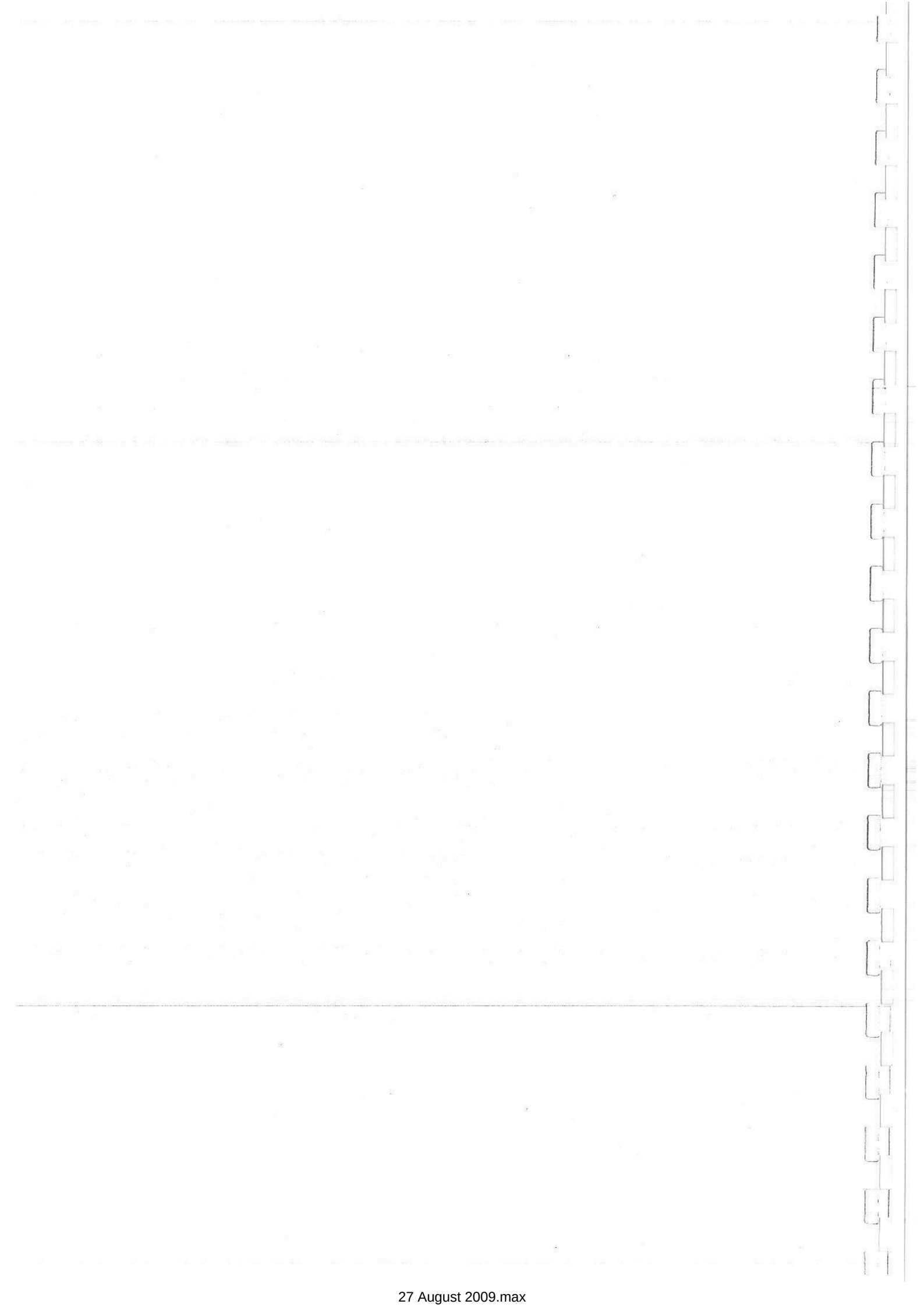

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FOR PLANNING APPLICATION
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THE BRICKPIT, ASHBY ROAD, HINCKLEY

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1. INTRODUCTION

1.1 Mr Rod Gretton of Cedar Court, Ivydene Close, Earl Shilton LE9 7NR has appointed Murray Rix Geotechnical to investigate and draw up outline proposals for the safe and satisfactory development of the site adjacent to the brickpit, Ashby Road, Hinckley. The site is to be developed for residential usage. This report (Volume 2) deals with the interpretation of the factual information contained in Volume 1 (bound separately), which contains data on the land in question and the brickpit.

1.2 The site is situated 1.2km NNE of Hinckley town centre, east behind the properties fronting Ashby Road at and around Ordnance Survey grid reference SP 4315 9495 (Reference 1). The site under consideration is shown on Figure 1, Appendix B and lies immediately south of the brickpit beyond which is an Asda store and Barwell Lane, and is bounded to the east by Barwell footpath and to the south by Hinckley cemetery.

1.3 The 'lake' is the result of flooding of an excavation, from which historically clay was extracted for brick making. A detailed Desk Study in relation to past site usage is presented in Volume 1.

1.4 The following presents an interpretation of the collected historical information on the site, consultations and an intrusive ground investigation with soil property and contamination testing.

2. STRATA PROFILE

2.1 Published geological information (e.g. Reference 2) suggests the site is in an area where the following downward strata succession of the Wolston Glacial succession exists:

Oadby Till – mainly grey pebbly clay with chalk
Wolston Sand and Gravel – yellow or red sand and gravel
Wolston Clay – grey stoneless clay and silt

No faulting is shown at or within the immediate vicinity of the site.

2.2 The published geological information indicates only the Wolston Clay as present at the site with the other glacial deposits shown in surrounding areas. However, the investigation and observations on site have shown the Oadby Till and the Wolston Sand and Gravel as overlying the Wolston Clay in the area under consideration. Within the lake area very soft, generally black and organic, sediment was encountered.

2.3 The investigation positions of prime concern to the Planning Application are BH1 and TP1 to TP3 although the other borehole, trial pit and probe hole records provide valuable information on the ground conditions locally and are taken into account in this report.

2.4 No fill materials were encountered in the investigation positions in the area to the south of the brickpit although small mounds of construction debris were seen at the site and there is a made up track close to the brickpit edge. Topsoil to a depth of 0.20 to 0.50m was encountered in the investigation positions.

2.5 Below topsoil were deposits of the Oadby Till. These deposits are shown by the insitu Standard Penetration Test (SPT's) results and laboratory triaxial strength results to comprise firm and stiffer orange-brown, brown and grey generally sandy clays with a trace of gravel. The clays extend to depths between 1.90m in TP1 and greater than 2.75m in TP3. A plasticity index test result for the Oadby Till locally indicates clays of high plasticity (CH soils) in accordance with B.S.5930:1999 (Reference 3) and of medium shrinkability in accordance with NHBC Standards (1995) (Reference 6).

2.6 Underlying the Oadby Till were deposits of the Wolston Sand and Gravel. These comprise orange-brown silty fine to medium sands with a trace of gravel (as shown by the laboratory grading analyses) and contain occasional laminations or bands of clay. The insitu Standard Penetration Test results and visual examination indicates the permeable granular deposits as being in a generally loose to medium dense or medium dense state of compaction. In BH1 where bottomed, the sands extend to a depth of 8.40m and although present around the southern part of the brickpit are absent in the investigation position to the north and north west. Evidence of sands was seen in the south-east and southern faces of the brickpit.

2.7 Below the Wolston Sand and Gravel to the south of the brickpit and elsewhere directly below the Oadby Till were strata of the Wolston Clay. This is shown to comprise locally mainly stiff and very stiff dark grey clay but includes in BH1 medium dense grey silt/fine sand. Plasticity index test results for the Wolston Clay indicate clays of intermediate plasticity (CI soils) in accordance with B.S.5930:1999 (Reference 3) and of medium shrinkability in accordance with NHBC Standards (1995) (Reference 6).

3. GROUNDWATER AND SURFACE WATER

3.1 At the time of the investigation the water in the brickpit was artificially lowered by pumping and at an assessed depth of some 13 to 14m below surrounding ground level (approximately 109m O.D.). Groundwater observations in the boreholes during drilling are given on the logs in Appendix A of Volume 1 along with details of the monitoring instruments installed in the boreholes. No free groundwater was encountered in the trial pits. Longer-term monitoring of water levels in the instruments in the boreholes is included in Table 1, Appendix D of Volume 1.

3.2 The results for BH1 are of prime concern in the area under consideration. During drilling a slow seepage was recorded at 8.50m depth within the sands of the Wolston Sand and Gravel. The water level rose after 15 minutes to 8.20m depth. Subsequent monitoring over a period of 1 month indicated a water level consistently between 6.83 and 6.88m depth (approximately 115.3m O.D.). This may be compared with the water level in the brickpit at this time of around 109m O.D. and the assessed water level in the pit when full, and the surrounding groundwater table under such conditions, of around 118 to 119m O.D. This suggests that the groundwater table to the south of the brickpit is artificially lowered by around 2.7m in BH1 by the pumping operations.

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3.3 The consequence of the lowering of the water table by pumping from the brickpit is an enhanced hydraulic gradient towards the brickpit and flow of groundwater from the south into the pit. This has resulted in the washing in of some of the sand in the southern face of the brickpit as observed on site. No sand is present in the north and north west of the brickpit and there is no evidence of similar occurrences in these areas.

3.4 The hydrology and hydrogeology of the area is discussed in Volume 1, section 4. The Environment Agency groundwater vulnerability map (Reference 5) and a report from the Environment Agency in Volume 1, Appendix F identifies the site under consideration as being on a minor aquifer. This is consistent with the published geology of the area and the findings of the investigation, which indicate permeable strata of the Wolston Sand and Gravel below the southern part of the site. The minor aquifer (Wolston Sand and Gravel) is classed as HU. The HU classification indicates soils that have little ability to attenuate diffuse source pollutants and in which non-adsorbed diffuse source pollutants and liquid discharges have the potential to move rapidly to underlying strata or to shallow groundwater. The classification HU is given as a worst case as the site is in an urban area where there is uncertainty because of limited observations.

3.5 Topographical information and site observations indicate that the surrounding ground falls gently from south-east to north-west towards Ashby Road. As discussed in section 5 of Volume 1, a number of springs are recorded on the historic maps for the area, and the surface flow direction is towards a small stream which emerges as an 'issue' at the end of Hangman's Lane some 350m north-west of the site. The stream eventually discharges into the River Tweed. The brickpit is fed from the south-east by a small stream that follows the line of Barwell footpath from the south. Pumped water from the brickpit is fed into a ditch that is believed eventually makes its way towards the River Tweed.

4. GROUND GAS CONCENTRATIONS

4.1 The Building Research Establishment (BRE) guidance (Reference 7) on radon protection indicates that the site is not in an area where radon protection is required.

4.2 In the boreholes around the brickpit, gas/water monitoring instruments were installed and have been monitored for concentrations of methane, oxygen and carbon dioxide on 4 occasions over a period of 1 month. The results are presented in Table 1, Appendix D of Volume 1. Only very low levels of methane (0 to 0.4% LEL) have been recorded. The Lower Explosive limit (LEL) of methane in air is 5%. The oxygen levels have on occasions been slightly depleted and the Carbon Dioxide (CO_2) concentrations have varied between 0 and 1.8%.

4.3 The methane levels are very low but indicate the presence of some gas, whether from the organic materials within the sediment in the brickpit or from backfilling of other brickpits in the area is uncertain. In addition, the Building Regulations state that above 1.5% CO_2 consideration should be given to adopting gas protection measures and above 5% precautionary measures have to be adopted. The CO_2 concentrations have on occasions exceeded the 1.5% value. Unless otherwise shown to be acceptable by further longer-term monitoring it is considered appropriate to incorporate a gas proof membrane below floor slabs. This is discussed further in section 7.

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5. SITE STABILITY

5.1 An assessment of the stability of the site under consideration, in relation to the brickpit, is presented below. A separate stability analysis of the side of the brickpit closest to the properties on Ashby Road has also been carried out and does not indicate instability or any other mechanism as affecting these properties.

5.2 Two possible influences need to be considered in assessing the stability of the southern face of the brickpit: (i) instability as a result of shear failure of the ground; and (ii) washing out of the sands of the Wolston Sand and Gravel.

5.3 The results of stability analyses are presented in Appendix A. The section analysed is based on the plan of Midland Survey Limited Dwg No. 7160/2 dated April, 2004 and marked as Figure 2, Appendix B. The strata profile and properties are based on the findings in BH1 and TP1 to TP3 along with the results of the insitu testing and laboratory soil property testing presented in Volume 1, Appendix B. The following effective stress parameters and soil properties have been used in the analyses:

Stratum	**Bulk Unit Weight**	**Effective Strength**	
	(kN/m^3)	**c′ (kN/m^2)**	**ϕ′ (degrees)**
1. Brickpit Bottom Material	19	1	20
2. Oadby Till	21	5	24
3. Wolston Sand and Gravel	18	0	31
4. Wolston Clay (silt/sand)	20	0	33
5. Wolston Clay (clay)	21.5	5	27

5.4 The analyses use Bishop's simplified method (Reference 20) and a large number of slip circles have been analysed for each of the stability runs S1 to S9 in order to determine the minimum factor of safety under different groundwater and slip circle conditions. The extended grid option has been used to ensure that minimum factors of safety centred on the edge of the selected grid are actual minima. The conditions associated with the analyses and the minimum factors of safety associated with each of the stability runs is summarised below:

Stability Run No.	**Groundwater Condition**	**Slip Circle Condition**	**Factor of Safety**
S1	Water drawn down	Passing through crest	1.620
S2	Water drawn down	Passing 5m behind crest	1.668
S3	Water drawn down	Passing through toe of slope	1.128
S4	Water drawn down	Passing through base of Wolston Sand and gravel	1.195
S5	Brickpit full	Passing through base of Wolston Sand and gravel	1.709
S6	Drawdown conditions	Passing through base of Wolston Sand and gravel	1.058
S7	Drawdown conditions	Passing through crest	1.492
S8	Drawdown conditions	Passing 5m behind crest	1.535
S9	Drawdown conditions	Passing 10m behind crest	1.613

5.5 A factor of safety of <1.00 would indicate instability while a factor of safety of 1.00 would indicate incipient failure. Where a building or similar construction is proposed it

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is usual to require a minimum factor of safety of around 1.5 based on moderately conservative strength parameters, as adopted in the analyses, to guard against uncertainties and unknowns.

5.6 Runs S1 to S4 based on a low water level in the brickpit under maintained conditions indicates overall stable conditions for the ground to the south of the brickpit with a minimum factor of safety of 1.62. However, within the pit face only relatively low factors of safety exist (around 1.10) against localised shallow face instability.

Run S5 indicates that an increased factor of safety of 1.709 exists against shallow face instability if the brickpit is full of water.

Runs S6 to S9 assess the conditions during drawing down the water in the brickpit. As pumping takes a period of time rapid drawdown conditions would not be expected but there would still be an elevated water level in the surrounding ground for a period of time. An assessment of likely groundwater conditions under such circumstances has been made. This reflects the condition that the brickpit is allowed to fill with water and is subsequently pumped down. A minimum factor of safety of 1.492 is indicated for a slip circle passing through the crest (S7). Circles passing further back from the crest (S8 and S9) exhibit increase stability. Run S6 indicates a very low factor of safety of 1.058 close to incipient failure for shallow slippage within the face of the brickpit during drawdown conditions.

5.7 There is visual evidence within the southern face of the brickpit of washing in of the sands of the Wolston Sand and Gravel. This is considered to be a result of the pumping of water from the brickpit leading to an elevated hydraulic gradient in the surrounding ground and consequential enhanced flows of groundwater into the pit. There is also evidence of some movement of the faces consistent with the low factors of safety against shallow face movements in the stability analyses. There is also some evidence of subsidence of the ground close to the edge of the pit. Thus although instability of the ground to the south of the brickpit is not indicated by the stability analyses, settlement or subsidence can be expected at and close to the edge of the southern face of the pit not least by general weathering and movements of materials lower down the exposed face. Thus in any development proposals it is necessary to establish a minimum distance between the edge of the brickpit and construction and to take the above factors into account in foundation design. Criteria are established in section 6.1 below.

6. STRUCTURAL FOUNDATIONS

6.1 Based on the foregoing assessment of the site stability in relation to the brickpit, and assuming traditional strip, trench fill or pad foundations are adopted in foundation construction, it is considered appropriate to leave a standoff of 10m between the edge of the pit and proposed buildings. It should be acceptable to utilise this area for road or parking although a standoff of 3m would be considered a minimum and allow traffic bunding to be established close to the pit edge. If the brickpit were suitably filled or the sides adequately buttressed the proposed construction stand off to the edge of the pit could be lifted. However, in the absence of such approaches the stand off and following recommendations are considered appropriate.

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6.2 An allowable net bearing pressure of 120kPa would be considered appropriate for strip or trench fill footings up to 0.60m wide and pad footings of side up to 2.00m carried down to bear in the firm or stiffer Oadby Till or the underlying loose to medium dense Wolston Sand and Gravel. Under such loading total settlements should be limited to no more than 25mm.

6.3 The surface clays of the Oadby Till in the area are of medium shrinkage potential (see section 2.5) and deepening of foundations in accordance with NHBC Standards (1995) (Reference 6) will be required where they are influenced by trees and other major vegetation. This could entail foundation depths of up to 3m depending on the species of tree and the proximity to foundation construction. In places, within deepened excavations the Oadby Till will be penetrated and the underlying Wolston Sand and Gravel exposed. Where this is the case no further deepening would be required as the granular soils would not exhibit shrinkage characteristics. Where stepped foundations are proposed these should also be in accordance with NHBC requirements. It will be necessary to provide compressible material against the inside faces of external foundations where these exceed 1.50m deep. Because of the possible variability in bearing strata and depths of founding, variability in structural loading and the proximity of the brickpit it would be considered appropriate to adopt reinforced foundations in building construction.

6.4 The alternative to the foregoing is to adopt a piled foundation carried down to the Wolston and Sand and Gravel and possibly into the Wolston Clay below the site. The Wolston Clay formation was encountered from 8.40m depth in BH1. A driven pile is likely to be most appropriate in penetrating the granular soils. Piles would need to allow for possible desiccation effects through the upper clays (Oadby Till) within influence distance of major vegetation. This may be accommodated in the design by the provision of adequate reinforcement or sleeving through the upper shrinkable deposits. Where influenced by vegetation, ground beams for piles would need to be provided with compressible material in accordance with NHBC requirements. As a guide to pile design, for a 0.35m diameter pile taken to approximately 8.00m an allowable pile loading of around 250kN would have a factor of safety of 2 against shear failure. For a similar pile carried down to around 10m the allowable pile loading would be likely to increase to around 480kN. Settlements under such loadings would not be expected to exceed around 10mm.

7. GROUND FLOOR SLABS

7.1 Within the zone of influence of trees and other vegetation, concrete ground floor slabs will need to be suspended over a void of at least 175mm. Although locally floor slabs may be cast on ground on the natural clays, the profusion of trees and the considerations of uniformity of construction across the site are likely to dictate that all ground floor slabs would best be suspended.

7.2 As discussed in section 4, in the absence of further justification to the contrary, it is considered appropriate to provide a gas proof membrane below ground floor slabs. This should be continued across the cavity of brickwork.

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8. EXCAVATIONS

8.1 In vertical sided excavations in excess of 1.20m depth consideration will need to be given to at least intermittent support where personnel are required to enter. Experienced personnel should carefully and continually assess the stability of all excavations.

9. CHEMICAL ATTACK ON CONCRETE

9.1 The results of soluble sulphate and pH determinations on soil samples recovered from the general area are included in Appendix B of Volume 1. The soluble sulphate concentrations are low and the pH values are near-neutral. It is suggested that as a cautious approach the site is classed as brownfield with a mobile groundwater. This is considered to represent the most severe case and suggests an ACEC class for the site of AC-1 in accordance with BRE Special Digest 1 (2001) (Reference 8). In accordance with this standard, concrete design will depend on the form of construction and performance requirements.

10. CONTAMINATION ASSESSMENT

10.1 The contamination testing contained in Appendix C of Volume 1 covers the ground surrounding the brickpit (including the area to the south under consideration) and the brickpit itself. The discussion that follows deals principally with the area to the south but takes account of the results from other boreholes and trial pits around the brickpit. The testing is described in the following in terms of fill materials and natural soils but does not deal with the pond bottom material encountered in the probing of the soft sediment in the brickpit excavation as this is outside the scope of this Planning Application. The testing regime adopted is in general accordance with the guidance given in Reference 4 of the Environment Agency and NHBC (2001) for the safe development of housing on land affected by contamination. It is standard practice to undertake such analyses in the proposed redevelopment of 'brownfield' land.

10.2 **Conceptual Model and Investigation**

A detailed desk study of past site history is included in Volume 1 and forms a major component of the investigation and contamination assessment. A conceptual model has been developed based on the available historical information on the site and the site inspection, and includes an appraisal of possible contamination. The conceptual model has been formulated based on previous site usage, proposed end use and consideration of the surrounding environment. The model identifies potential contaminants and the pathways by which receptors such as end users may be affected. The model also considers the likelihood of pollutant linkage for each combination of contaminant, pathway and receptor. The findings of the fieldwork and laboratory testing have been used to review the model. The model is outlined below.

Previous site usage:	The only known past usage of the site is as a brickpit for the extraction of clays for brickmaking. No evidence of other activities has been uncovered.
Proposed end use:	The site is to be developed with housing/flats for domestic purposes.
Receptors and Pathways:	End users – inhalation, ingestion and skin contact

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Construction workers - ingestion, inhalation, skin contact
Local environment – migration of contaminants in water
Construction materials - contact

The Desk Study information on the site and site inspection has not raised any specific concerns and general suites to cover a wide range of contaminants as detailed in section 8 of Volume 1 have been undertaken. The laboratory contamination testing and investigation take account of the methodology adopted in the Environment Agency and NHBC guidelines (Reference 4).

In accordance with the conceptual model of the site, the site investigation and testing were aimed at: (i) identifying the extent and nature of any fill materials; (ii) undertaking testing for a general suite of possible contaminants within the fill across the site; (iii) undertaking testing for a general suite of possible contaminants within the near surface natural soils. However, during the investigation olfactory and visual senses were to be used to identify other possible contaminants.

10.3 **Findings from the Intrusive Ground Investigation**

The investigation has shown only very local surface fill materials as present around the brickpit and none were encountered in the investigation in the area under consideration to the south although small mounds of construction debris were seen in this area and there is a made up track close to the edge of the brickpit. The investigation proved topsoil overlying Oadby Till, which gave way at depth to other glacial deposits. The groundwater was found to be standing at a depth of 6.83 to 6.88m (approximately 115.3m O.D.) in BH1 in the southern area. This may be compared with the water level in the brickpit at this time of around 109m O.D. and the assessed water table when the brickpit is full of water of around 118 to 119m O.D. This suggests a shallowest water table of around 3.0 to 4.0m below ground level within the Wolston Sand and Gravel.

10.4 **Risk Estimation**

Risk estimation has been carried out by comparison of the results of laboratory contamination testing with generic assessment criteria. The published guideline values used are notably:

Department for the Environment, Food and Rural Affairs and the Environment Agency, Soil Guideline Values (derived from the CLEA model) – References 11 to 17

These recent soil guidelines relate to land use for seven contaminants. Further guidelines are in the process of publication. The guideline values represent 'intervention values' above which there could be unacceptable risks to the health of site users and which indicate further investigation and/or remediation is necessary.

U.S. Environmental Protection Agency – Reference 9

This reference presents soil screening guidance levels (SSL's) for contaminants that may be used to identify areas needing further investigation and presents SSL's for risks through ingestion, inhalation and migration to groundwater for a large number of contaminants.

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Health and Safety Executive Guidelines (HSG 66) – Reference 10
This reference grades results into five categories between the two extremes of typical values for 'uncontaminated soils' and 'unusually heavy contamination'.

The Dutch Standards – References 18 and 19
The current Dutch Standard (Reference 19) presents target and intervention values for both ground and groundwater samples for a wide range of contaminants. This replaces the old Dutch Standard (Reference 18) which grades results into three categories, namely: A – background levels for uncontaminated sites; B – further investigation needed; and C – site clean up indicated. However, the older standard covers some contaminants not specifically included in the new standard.

The results indicate only slightly elevated contaminants in the made ground and natural soil around the brickpit and none within the area under consideration to the south of the site. No contamination with Asbestos, Total Petroleum Hydrocarbons (TPH), Volatile Organic Compounds (VOC's), Semi-Volatile Organic Compounds (SVOC's) or Polychlorinated Biphenyls (PCB's) has been uncovered. Of possible metal contaminants only the copper, zinc and nickel were locally slightly elevated and not in the south of the site. For completeness these are however discussed below:

Copper – The levels in two samples of fill of 36.4 and 66.9mg/kg exceed the Dutch Target Value (Reference 19) of 36mg.kg but not the Intervention Value of 190mg/kg. Copper is usually only considered phytotoxic and the levels are not considered of concern.

Zinc - The total zinc is elevated in one sample of fill at 763.4mg/kg. The Dutch Target and Intervention Values (Reference 19) are 140 and 720mg/kg respectively. The 'available' zinc in the same sample was 363mg/kg. The 'available' zinc, which like copper is usually only considered phytotoxic unless at very high levels, is less than half the total and well below the current Dutch Intervention Value and not deemed of concern.

Nickel – The total nickel concentration in one sample of natural soil of 50.3mg/kg fractionally exceeds the Soil Guideline Value of Reference 15 value of 50mg/kg for residential land with plant uptake. However, the 'available' concentration was only 1.4mg/kg and again considered of little concern.

10.5 **Risk Evaluation**
The purpose of the risk evaluation is to establish whether there is a need for remediation (risk management action) of the ground around the brickpit and depends on the presence and identification of unacceptable risk. The testing undertaken indicates minor 'total' metal contamination but not in the area under consideration to the south of the pit. No other contamination is indicated locally and the 'available' metal testing does not indicate problematic conditions.

More specifically, the risk evaluation considers individually the receptors and pathways identified in section 10.2, and represents a refinement of the original conceptual model.

Construction workers – Site workers and those involved with redevelopment of the site are potential receptors. The main risk to site workers is considered to come from ingestion by hand to mouth transfer or direct contact with contaminated ground. The

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degree of metal contamination is not considered to pose a risk to construction workers. However, good construction practice would dictate that site workers and those involved with redevelopment of the site should, in accordance with good construction practice, wear gloves, overalls and boots. They should also adopt a high standard of personal hygiene particularly in terms of washing hands prior to eating, drinking or smoking.

End users – Direct or indirect contact with the ground are possible pathways for contaminants to affect end users. Direct contact with contaminated ground can occur if end users have access to contaminated soils and indirect contact may be inferred if fruit or other vegetation grown in contaminated soils take up the contaminants. Young children may be at risk if they have a pica habit. Much of the site will be covered by buildings and pavement construction although there is likely to be some garden areas and open spaces. The risks posed are considered small and where total metal contaminants are slightly elevated the 'available' metals concentrations are low. There is not thought to be a risk to end users although removal of the local mounds of construction debris and other fill from the south of the site, where present locally, should be undertaken unless further testing indicated that these can remain.

Local Environment – Groundwater and near-by surface water can be affected by migration of contaminants. As discussed in section 3, the Environment Agency groundwater vulnerability map (Reference 5) indicates the site to the south of the brickpit as on a Minor-Aquifer (Wolston Sand and Gravel). This is overlain by a thickness of low permeability Oadby Till (1.90 to >2.75m thick). Elsewhere around the pit the permeable granular soils are absent. No contaminants of concern were encountered to the south of the brickpit and elsewhere only low levels of some metals were found. No 'leachability' testing has been carried out but the 'available' results suggest that the concentrations are of little concern and the low permeability clays will retard any contaminant migration directly to the groundwater.

Construction materials – The influence of sulphates and pH on buried concrete is dealt with in section 9. The results for TPH, VOC's and SVOCs suggest that there is no restriction to the use of plastic water supply pipes through the soils at the site.

10.6 **Remedial Action and Further Assessment**

No remedial measures are considered necessary at the site under consideration to the south of the brickpit other than removal from site of the localised mounds of construction materials.

E.J.Murray BSc, PhD, CEng, FICE, CGeol, FGS, MaPS

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APPENDIX A

RESULTS OF STABILITY ANALYSES

MURRAY RIX

Program: SLOPE Version 9.01 Revision A01.B01.R19
Licensed from GEOSOLVE

ASHBY ROAD, HINCKLEY
SOUTH FACE

| Sheet No.
| Run No. S1
| Job No. 128R
| Made by : EJM
| Date:
| Checked :

Units: kN,m

Scale = 1 : 974

---- Common point ----- ---------- Critical circle ---------
Point X Y ---- Centre ---- Radius Factor of
no. coord coord X Y safety
1 27.00 122.50 67.00 165.00 58.36 1.620

MURRAY RIX

Program: SLOPE Version 9.01 Revision A01.B01.R19
Licensed from GEOSOLVE

ASHBY ROAD, HINCKLEY
SOUTH FACE

| Sheet No. |
| Run No. S2 |
| Job No. 128R |
| Made by : EJM |
| Date: |
| Checked : |

Units: kN,m

Scale = 1 : 974

---- Common point ----- ---------- Critical circle ---------
Point X Y ---- Centre ---- Radius Factor of
no. coord coord X Y safety
1 22.00 122.77 67.00 175.00 68.94 1.668

MURRAY RIX

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ASHBY ROAD, HINCKLEY
SOUTH FACE

| Sheet No. |
| Run No. S3 |
| Job No. 128R |
| Made by : EJM |
| Date: |
| Checked : |

Units: kN,m

Scale = 1 : 974

---- Common point ----- ---------- Critical circle ---------
Point X Y ---- Centre ---- Radius Factor of
no. coord coord X Y safety
1 73.00 110.00 72.00 160.00 50.01 1.128

MURRAY RIX

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SOUTH FACE

| Sheet No. S4
| Run No.
| Job No. 128R
| Made by : EJM
| Date:
| Checked :

Units: kN,m

Scale = 1 : 974

---- Common point ----- ---------- Critical circle ---------

Point no.	Common point coord X	Common point coord Y	Centre ---- X	Centre ---- Y	Radius	Factor of safety
1	52.04	113.79	72.00	170.00	59.65	1.195

MURRAY RIX

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SOUTH FACE

| Sheet No. |
| Run No. S5 |
| Job No. 128R |
| Made by : EJM |
| Date: |
| Checked : |

Units: kN,m

Scale = 1 : 974

---- Common point ----- ---------- Critical circle ---------
Point no. X coord Y coord ---- Centre ---- X Y Radius Factor of safety
1 52.04 113.79 72.00 170.00 59.65 1.709

MURRAY RIX

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SOUTH FACE

| Sheet No.
| Run No. S6
| Job No. 128R
| Made by : EJM
| Date:
| Checked :

Units: kN,m

Scale = 1 : 974

---- Common point ----- ---------- Critical circle ---------

Point no.	X coord	Y coord	---- Centre ---- X	Y	Radius	Factor of safety
1	52.04	113.79	72.00	170.00	59.65	1.058

MURRAY RIX

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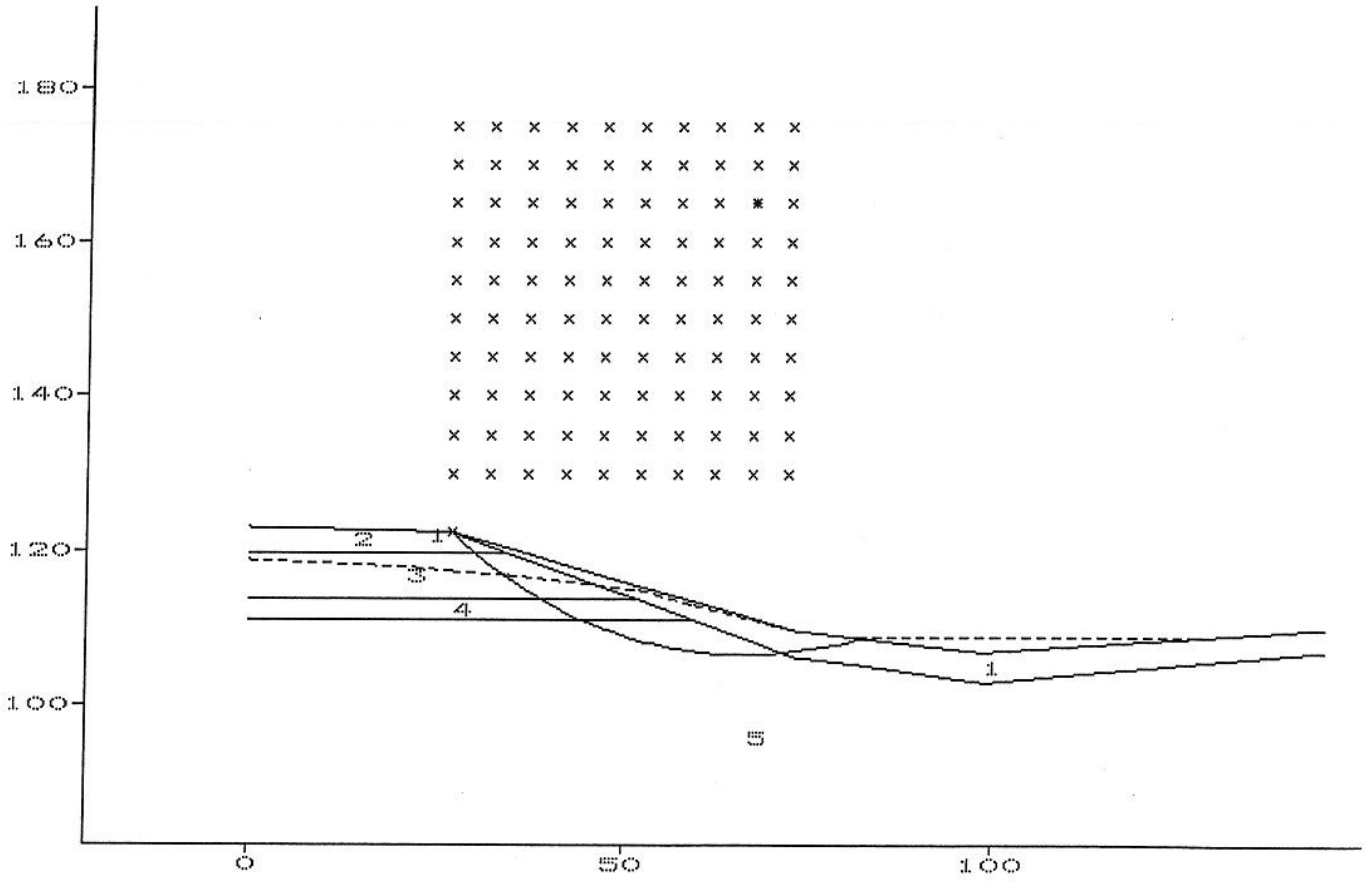
SOUTH FACE

Sheet No.	
Run No.	S7
Job No.	128R
Made by :	EJM
Date:	
Checked :	

Units: kN,m



Scale = 1 : 974

Common point			Critical circle			
Point no.	X coord	Y coord	Centre X	Centre Y	Radius	Factor of safety
1	27.00	122.50	67.00	165.00	58.36	1.492

MURRAY RIX

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ASHBY ROAD, HINCKLEY
SOUTH FACE

Sheet No.
Run No. S8
Job No. 128R
Made by : EJM
Date:
Checked :

Units: kN,m

Scale = 1 : 974

Common point			Critical circle			
Point no.	X coord	Y coord	Centre X	Centre Y	Radius	Factor of safety
1	22.00	122.77	67.00	175.00	68.94	1.535

MURRAY RIX | Sheet No.
| Run No. S9
Program: SLOPE Version 9.01 Revision A01.B01.R19 |
Licensed from GEOSOLVE | Job No. 128R
| Made by : EJM
ASHBY ROAD, HINCKLEY | Date: [illegible]
SOUTH FACE | Checked :

Units: kN,m

Scale = 1 : 974

---- Common point ----- ---------- Critical circle ---------
Point X Y ---- Centre ---- Radius Factor of
no. coord coord X Y safety
1 17.00 123.00 62.00 170.00 65.07 1.613

APPENDIX B

FIGURES

Figure 1: Site Location Plan – Area of Proposed Development to South of Brickpit
Figure 2: Investigation Location Plan

FIGURE 1: SITE LOCATION PLAN
AREA OF PROSED DEVELOPMENTTO SOUTH OF BRICKPIT

FIGURE 2: INVESTIGATION LOCATION PLAN