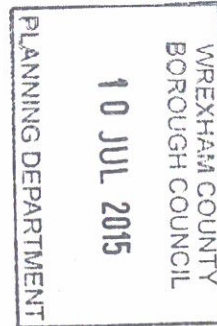


Mr Phil Forster
Planning Department
WCBC
Contact
16 Lord Street
Wrexham
LL11 1LG

9th July 2015
Our Ref: P079-007



Blueprint Planning and Building Design Ltd.
Office 3K4
Redwither Tower
Redwither Business Park
Wrexham LL13 9XT

Wrexham 01978 356500
e design@blueprintarchitectural.com
w blueprintarchitectural.com

Dear Sir/Madam:

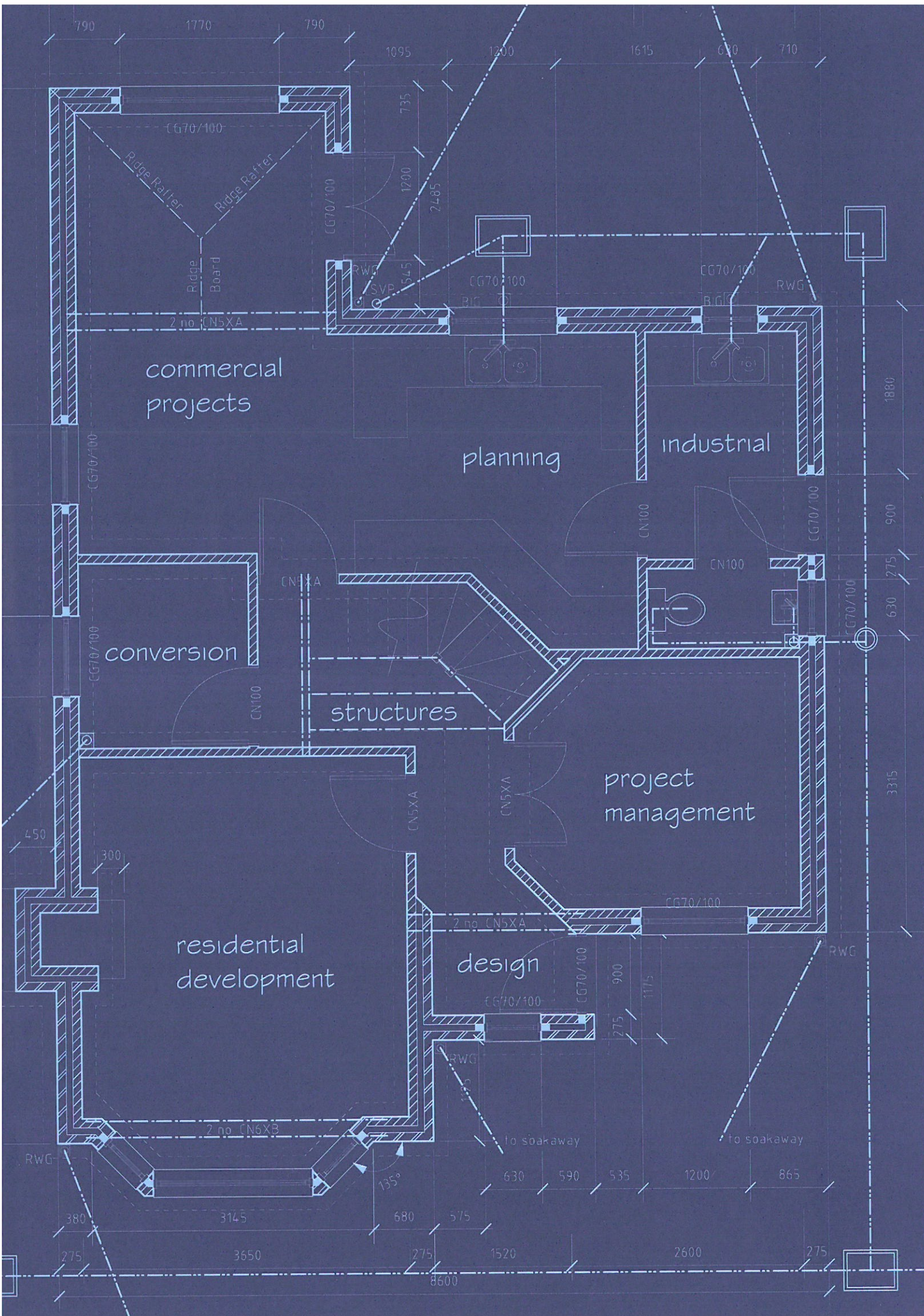
Re: P/2015/0219 - 44 Broughton Road, The Lodge, Brymbo, Wrexham, LL11 5NG.

Please find enclosed a Geotechnical report from Groundsolve, which should now satisfy condition 9 on planning approval P/2015/0219.

We trust the enclosed proves suitable.

Yours sincerely,

Lisa Parry
Office Administrator and Accounts
for Blueprint Architectural Services



REF: 1718/BRL/Rep/pbg

Mr Richard Staniszewski
44 Broughton Road
Lodge
Wrexham LL11 5NG

8th July 2015

Dear Richard,

RE: 44 BROUGHTON ROAD, LODGE: STABILITY ASSESSMENT

1.0 Introduction

Mr Richard Staniszewski (RS) is proposing to create a small parking area just off Broughton Road, to access his property. The Local Authority Highways Department have requested that a geotechnical report and detail of retaining walls be undertaken to ensure that the parking area can be provided without causing land stability problems, which may ultimately result in danger to surrounding properties and public safety at the highway frontage. Blueprint architectural services (BPA) are the architects for the scheme.

RS has appointed GroundSolve Ltd (GSL) to undertake a ground investigation of the site and give recommendations to address the Local Authorities concerns.

This letter report presents the findings of the investigation and gives geotechnical recommendations for the development.

2.0 Site Location and Description

The site is located to the east of Broughton Road, Lodge, Wrexham, at National Grid Reference SJ 300 530, see Figure 1.

Housing lies to the north and south of the site with the boundaries comprising wooden and wire fencing with some hedges. To the east of the site is a steep hill side covered with trees. The western site boundary is defined by a masonry retaining wall and wooden fencing, with Broughton Road beyond. A line of mature conifer trees are present behind the wall. The site is rectangular in shape and roughly 62.5m in length and 27m in width. The existing property which is a bungalow, lies on the higher eastern side of the site, see Figure 2.

The topography of the site comprises two distinct terraces, the highest terrace containing the house, with a slope down to the west to a second flat terrace, both of which are about 7m wide. The second terrace then slopes down to the back of the masonry retaining wall, which is 2.20m high, with steps

leading up from Broughton Road. In the south west corner of the site the slope reduces to grade with Broughton Road at a gradient of 22° (1 in 2.5).

Photographs of the site are shown in Appendix A.

3.0 Geology

The geology of the site has been studied using the published 1:50,000 Geological Sheet, Sheet 121, Wrexham. In addition, the Wrexham applied geological mapping study at a scale of 1:25,000 has been researched.

No superficial deposits are recorded on the site, but alluvium is shown on the western site boundary, which comprises clay, silt, sand and gravel, formed during the Quaternary period in a local environment dominated by rivers.

The solid geology is the Bettisfield Formation, which is the Productive Coal Measure formed during the Carboniferous Period. Four coal seams are shown out cropping on the eastern half of the site, a further seam called the Hollin outcrops on the western site boundary. Consequently, the seams across the site are the Powell, Drowsell, Smiths and the Lower Stinking.

No shafts are shown on the site, although numerous shafts are shown in the immediate vicinity.

4.0 Proposed Development

It is proposed for the southern part of the existing masonry retaining wall to be lowered to below 1m in height, with the slope behind battered back. Immediately south of the retaining wall, a parking and turning area is proposed, this will extend some 13.5m back from the site boundary, and will be around 6m wide.

This will entail excavation of the slope to create a level parking area, off Broughton Road. At this stage it is understood that retaining structures are proposed to support the slopes either side of the car parking area.

It is proposed to reuse the masonry from the existing retaining wall to create a new retaining wall behind the parking area, see Figure 2.

5.0 Site Investigation

The investigation was undertaken on the 23rd June 2015 and comprised three machine dug trial pits (TP01-TP03) to a maximum depth of 2.55m, excavated with a 3T mini excavator. The location of the trial pits are presented on Figure 2, with the logs presented in full in Appendix B.

The trial pits were supervised by an engineer from GSL, who logged the trial pits in general accordance with BS 5930.

6.0 Ground Conditions

The general stratigraphy is presented below, with cross sections in Figures 4a and 4b.

TP No.	Depth		
	Topsoil (m)	Made Ground (m)	Alluvium (m)
TP01	0.00-0.25	0.25-2.15	
TP02	0.00-0.10	0.10-2.15	
TP03	0.00-0.10	0.10-2.40	2.40-2.55

Topsoil

The topsoil was described as loose to medium dense, brown to dark brown, sandy, gravelly, silt, locally with some sub angular cobble.

Made Ground

Made ground was encountered in all of the trial pits, but varied slightly with depth between trial pits. In TP01 and TP03 the material comprised firm to stiff, dark brown, mottled yellowish brown, gravelly, silty, clay, to a maximum depth of 1.20m. This is considered to have derived from local excavations, probably in glacial till.

This overlay, medium dense to dense, dark brown, slightly sandy, clayey, silt, with a little sub angular brick gravel, to a maximum depth of 2.40m in TP03, which is considered to comprise colliery spoil. In TP02 from 0.10-1.20m it is described as very stiff/ very dense, dark brown, mottled yellowish brown, gravelly, silty clay/ clayey silt, with a little sub angular cobble. A pocket penetrometer reading was taken at 0.50m which exceeded 440 kPa. This then changes to a very dense, sandy, gravelly, silt with much sub angular to sub rounded cobble, to a maximum depth of 2.15m.

Alluvium

Alluvium was only encountered in TP03 at a depth of 2.40m and was described as stiff, friable, grey mottled orangish brown, silty clay.

Groundwater

Groundwater was not encountered in any of the trial pits.

7.0 GEOTECHNICAL RECOMMENDATIONS

Excavations and Site Preparation

Firstly it will be necessary to remove the trees and reduce the height of the masonry retaining wall, which should be stored on site for later reuse.

Subsequent excavations will be in made ground and alluvium and will be possible using conventional earth moving equipment.

Groundwater seepages are not anticipated.

Retaining Walls and Slope Stability

The masonry wall fronting Broughton Road is up to 2.20m high and while it appears to be in good condition, the proximity to trees and their roots behind it means that the removal of the trees and the lowering of the wall will improve the stability of the wall.

On the southern site boundary construction will result in the ground levels being lowered to being at grade with the property to the south, consequently removing any stability issues.

For the northern and eastern sides of the car parking area, although a topographical survey has not been provided, it is estimated that any retaining structures will be around 3m in height. To enable the retaining walls to be constructed safely, it will be necessary to batter the slopes back.

This will probably involve taking material off site, as there is no storage area available on site. This would result in the need to import suitable granular material to reinstate ground levels behind the retaining walls. In which case, it makes sense for a hybrid solution to be considered, this would involve reducing the height of the proposed retaining wall, and battering back the slopes behind the wall to a gradient of 1 on 2 (26.5°), space allowing.

Options worth consideration are reusing the existing masonry, or alternatively a single line of gabions, possible back filled with the masonry could be used.

The anticipated construction, which would ensure the most cost effective solution and the stability of the works, is presented in Figure 3. To ensure the above can be constructed within the space allowed, it is recommended that a topographic survey be carried out to enable the works to be designed and hence ensuring a stable solution that satisfies the Local Authority.

Following the topographic survey if space allows it is also a possibility that the slopes can be regraded without the need for any retaining walls. Any cut slopes should either be top soiled or hydro seeded to ensure quick vegetation to reduce the possibility of erosion of the slopes during heavy rainfall.

We trust this is satisfactory, should you have any queries please call Phil Green on 01244 661361.

Yours Sincerely



P.B. Green

FIGURES

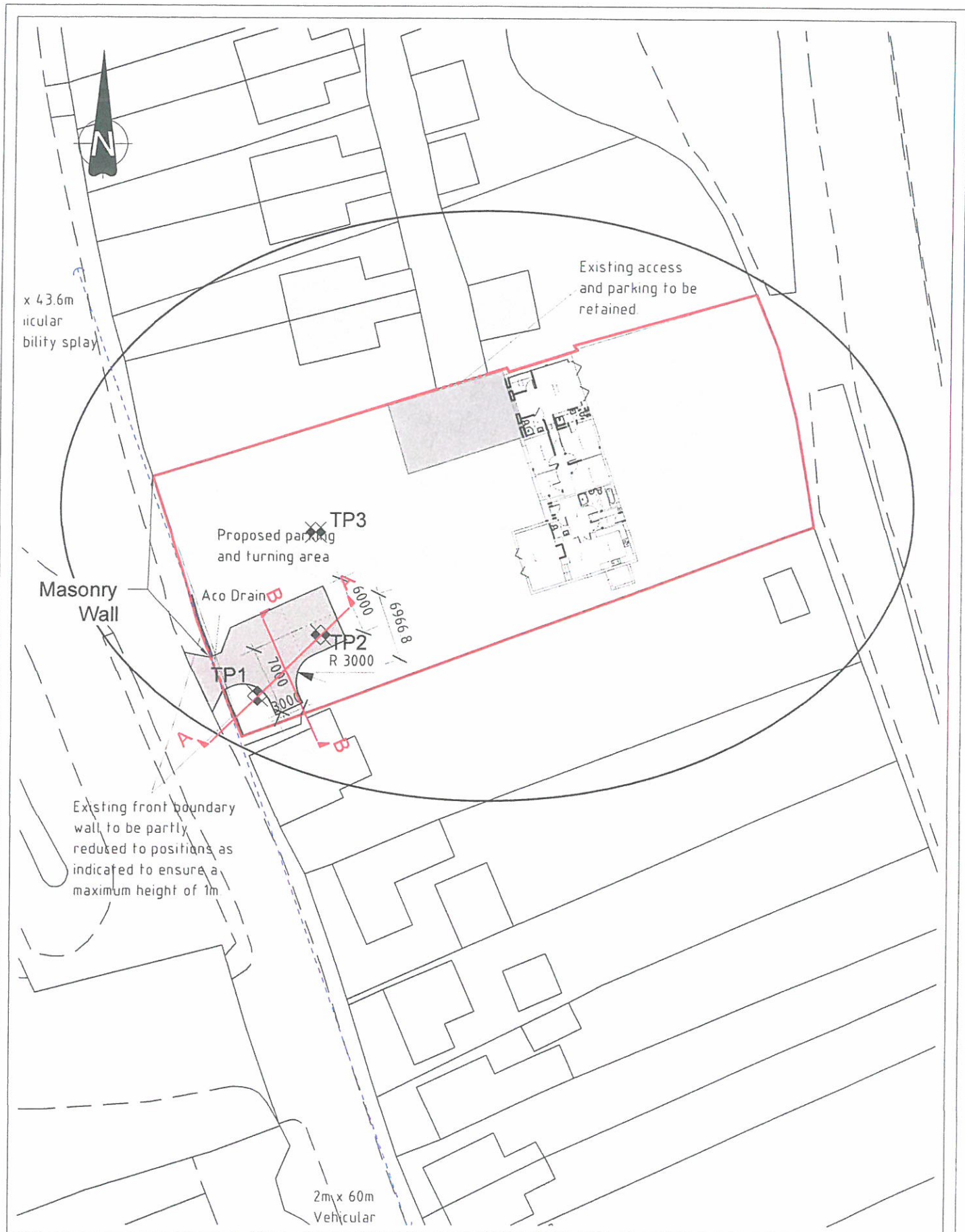


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SCALE 1:50,000 @ A4

Figure Title
BROUGHTON ROAD LODGE

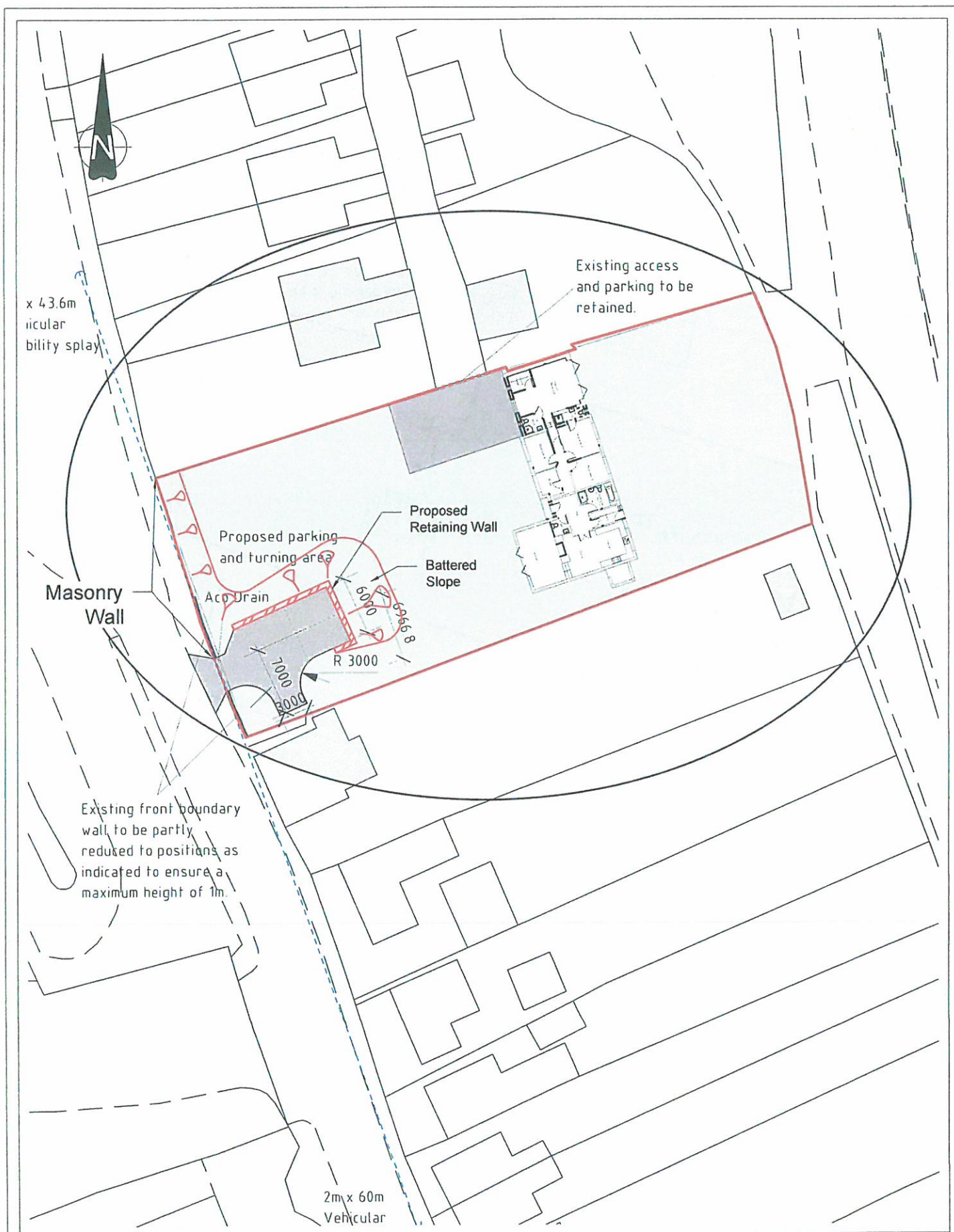
FIGURE 1



SCALE 1:500 @ A4

Figure Title
**PROPOSED SITE LAYOUT
 & TRIAL PIT LOCATIONS**

FIGURE 2

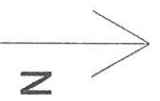


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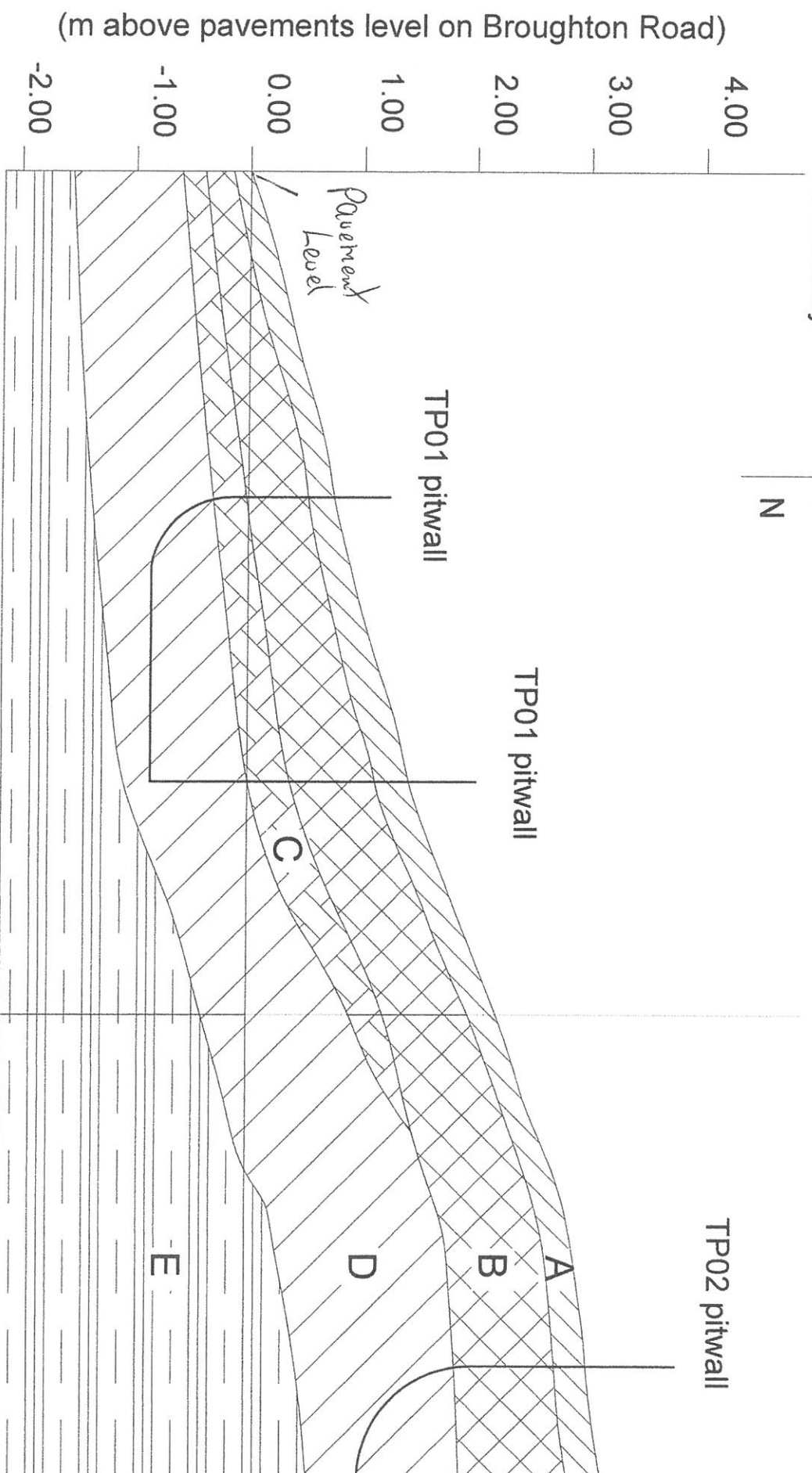
Figure Title
**PROPOSED DEVELOPMENT
 SHOWING RETAINING WALL**

FIGURE 3

Western Site
Boundary



Transect of cross section B



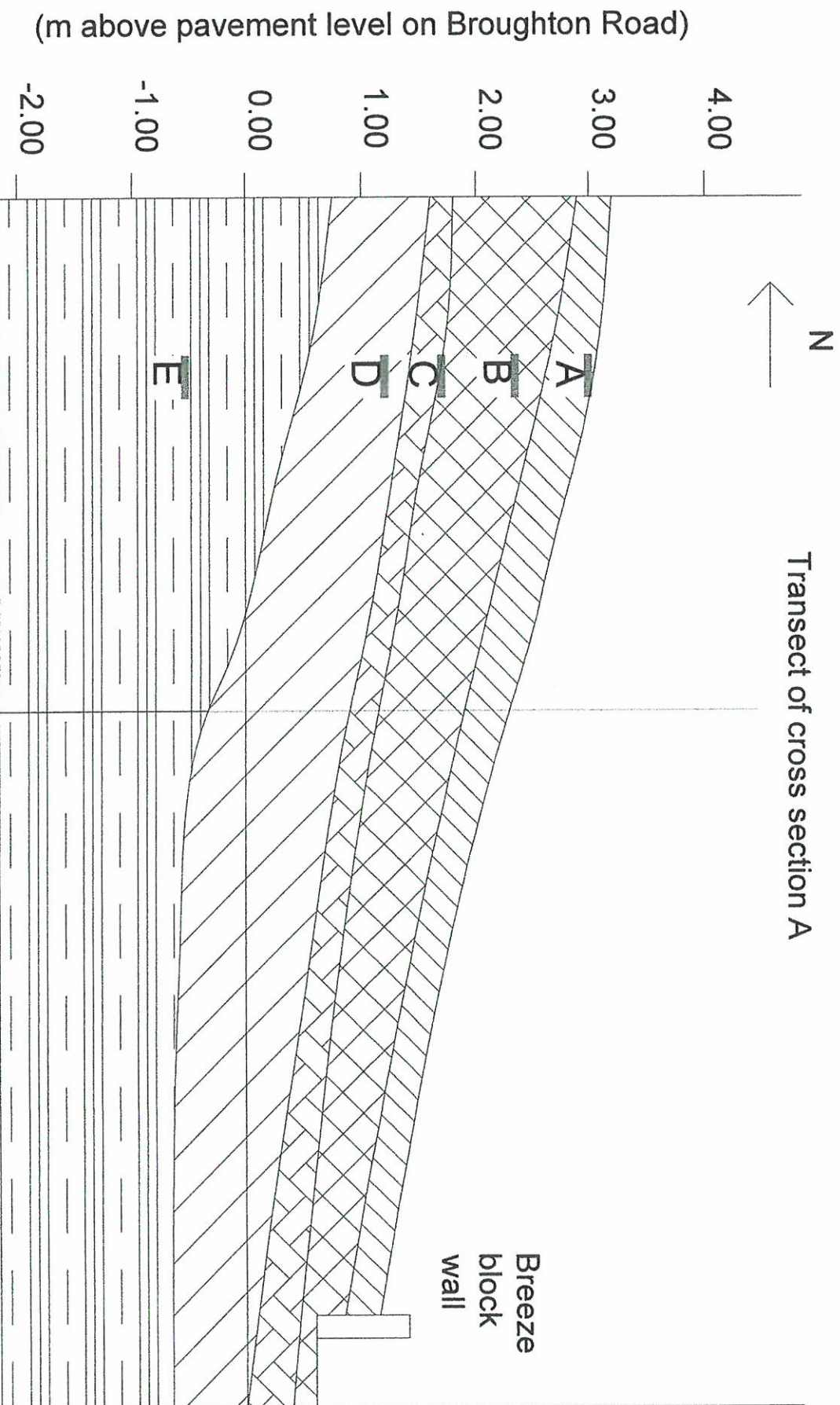
SCALE 1:50 @ A4

- A Loose to medium dense brown sandy gravely SILT (TOPSOIL)
- B Firm to very stiff/very dense dark brown mottled yellowish brown gravely silty CLAY/clayey SILT (MADE GROUND)
- C Medium dense to dense dark brown gravely sandy SILT with a little to some subangular brick and burnt shale cobble (MADE GROUND)
- D Dense/very dense dark brown gravely clayey SILT with some sub angular to sub rounded cobble (MADE GROUND)
- E Silty friable light grey mottled orangish brown silty CLAY (ALLUVIUM)

Figure Title

CROSS SECTION A-A

FIGURE 4a



SCALE 1:50 @ A4

- A Loose to medium dense brown sandy gravelly SILT (TOPSOIL)
- B Firm to very stiff/very dense dark brown mottled yellowish brown gravelly silty CLAY/clayey SILT (MADE GROUND)
- C Medium dense to dense dark brown gravelly sandy SILT with a little to some subangular brick and burnt shale cobble (MADE GROUND)
- D Dense/very dense dark brown gravelly clayey SILT with some sub angular to sub rounded cobble (MADE GROUND)
- E Silty friable light grey mottled orangish brown silty CLAY (ALLUVIUM)

Figure Title
CROSS SECTION B-B

FIGURE 4b

APPENDIX A

Site Photographs



Photograph 1 Looking east at the south west corner of the site from Broughton Road



Photograph 2 looking east at the retaining wall on the western boundary, from Broughton road



Photograph 3 looking towards south west corner of the site from top of steps to the north of the site



Photograph 4 showing south west corner site boundary with 43 Broughton Road looking east



Photograph 5 showing slope in the south west corner, looking north east.



Photograph 6 showing drain in the south west corner of the site.

APPENDIX B

Trial Pit Logs

TRIAL PIT 01

Depth (m)	Strata
0.00-0.25	Grass over loose to medium dense brown sandy gravelly SILT with some sub angular cobble and some roots. Gravel is sub angular to sub rounded fine to coarse (TOPSOIL)
0.25-0.90	Firm to stiff dark brown mottled yellowish brown gravelly silty CLAY with a boulder sized pocket of medium dense medium sand with a few cobble sized pockets of rounded medium gravel to the east of the pit. Gravel is sub angular tabular fine to coarse mudstone (MADE GROUND)
0.90-1.10	Medium dense to dense dark brown gravelly sandy SILT with a little to some sub angular brick and burnt shale cobble. Gravel is angular to sub rounded fine to coarse (MADE GROUND)
1.10-2.15	Dense to very dense dark brown mottled yellowish brown gravelly sandy SILT with some to much sub angular brick and sandstone cobble and local boulder sized horizontal slab of tarmac. Gravel is angular to sub rounded fine to coarse (MADE GROUND)

Notes

1. Pit dimensions 0.90m x 2.70m x 2.15m,
2. Pit sides were stable,
3. Groundwater was not encountered,
4. Becoming difficult to excavate from 1.10m,
5. Tub Sample was taken at 1.00m.



Trial Pit 01



Trial Pit 01

TRIAL PIT 02

Depth (m)	Strata
0.00-0.10	Medium dense dark brown slightly sandy SILT with a little sub rounded fine gravel and some roots (TOPSOIL)
0.10-1.20	Very stiff/ very dense dark brown mottled yellowish brown gravelly silty CLAY/ clayey SILT with a little sub angular brick cobble. Gravel is sub angular tabular fine to coarse mudstone (MADE GROUND)
1.20-2.15	Very dense dark brown gravelly clayey SILT with some sub angular to sub rounded cobble. Gravel is sub angular to sub rounded fine to coarse (MADE GROUND)

Notes

1. Pit dimensions 0.80m x 2.60m x 2.15m,
2. Pit sides were stable,
3. Groundwater was not encountered,
4. Excavations becoming difficult from 1.20m,
5. Tub Samples were taken at 0.50, 1.00, 1.50 and 2.00m.
6. Pocket penetrometer reading at 0.50m= >440 kPa



Trial Pit 02



Trial Pit 02

TRIAL PIT 03

Depth (m)	Strata
0.00-0.10	Medium dense dark brown slightly sandy SILT with a little sub rounded fine gravel and some roots (TOPSOIL)
0.10-1.20/ 0.40-1.20	
West pit wall	Firm to stiff dark brown mottled yellowish brown gravelly silty CLAY. Gravel is sub angular tabular fine to coarse mudstone (MADE GROUND)
0.10-0.40	Medium dense to dense dark brown slightly sandy SILT with a little to some coarse gravel sized pockets of stiff clay and a little sub angular coarse brick gravel (MADE GROUND)
1.20-1.50	Dense becoming very dense dark grey locally mottled yellowish brown sandy gravelly SILT with some to much sub angular cobble. Gravel is sub angular to sub rounded fine to coarse. (MADE GROUND)
1.50-2.40	Very dense brown mottled orangish brown sandy gravelly SILT with much sub angular to sub rounded cobble. Gravel is sub angular to sub rounded fine to coarse. Strong sulphur odour (MADE GROUND)
2.40-2.55	Stiff friable light grey mottled orangish brown silty CLAY (ALLUVIUM)

Notes

1. Pit dimensions 0.75m x 2.90m x 2.55m,
2. Pit sides were stable,
3. Groundwater was not encountered,
4. Tub Sample was taken at 1.00m.



Trial Pit 03



Trial Pit 03

