

REF: 1970/GLA/Plot 1 & 3/RepLet/mjs

Andrew Hughes Lloyd
Ellbay Properties Ltd
8 Grango Lane
Ponciau
Wrexham LL14 1ER

9th August 2017

Dear Andrew,

RE: GRANGO LANE PONCIAU: PLOTS 1 & 3: SHALLOW MINING ASSESSMENT

1.0 Introduction

Mr Andrew Hughes Lloyd (AHL) proposes to purchase Plots 1 and 3 from Ellbay Properties Ltd (EPL) at a site off Grango Lane in Ponciau, near Wrexham.

Previously a shaft search has been carried out for EBP prior to selling the plots, and a report presented to the Coal Authority Report, see Appendix A.

Subsequently, AHL has appointed GroundSolve Ltd (GSL) to undertake drilling works to prove whether shallow abandoned mine workings are an issue at the site.

This report presents the findings of a desk study and several site investigations in the vicinity of the site and makes recommendations to address the risk identified.

2.0 Site Location and Description

The site is located immediately north of Grango Lane in Ponciau at National Grid Reference SJ 295 469. An aerial photograph showing the site obtained from the internet is presented below.

The site is bounded by Grango School playing fields to the north, with existing housing to the south and west. Open land lies immediately east of the site. The site itself is largely overgrown and slopes gently in a northerly direction towards the school playing fields.

Grango Lane itself is tarmaced where it leaves Bank Street, before turning into a lane with gravel covering. The existing site layout is presented below and in Figure 1, with photographs presented in Appendix B.



3.0 Geology

The geology of the site has been studied on the following sources:

- Wrexham Applied mapping project at a scale of 1:25,000,
- 1:50,000 scale geology plan, Sheet 121,
- Historical geology plans for the site,
- Geological memoirs.

The 1:50,000 scale plan shows the site to be underlain by glacial till overlying mudstone and sandstone bedrock. The Main and Lower Bench (Crown) coal seams are shown outcropping across the site with the outcrops trending north to south.

However, the historical plans at 1: 10,560 show the Main coal seam outcropping on the eastern site boundary, with sandstone bedrock to the east of the Main seam and mudstone bedrock to the west. It also records the Main coal having been worked close to surface and the being the site of Briscoe's Pits.

A major fault is shown immediately north of the site, trending in an east to west direction, with its downthrow to the south (Ty-Gwyn fault). Opencast coal mining is shown immediately north of the fault.

The geological memoirs record that on the south side of the Ty-Gwyn fault, Briscoe's Pits, now obliterated, are said to have reached the Brassy Coal at a depth of 64' (19.50m), and the Wall and Bench at 352' (107.30m). It records the Main coal having been dug to surface and the separation between the Brasseys and the underlying coal (Upper Yard) being 8.23m.

4.0 Mining

A Coal Authority Report has been supplied by the client, dated May 2005, the main points are summarised below and presented in full in Appendix A. However, it should be noted that this report covers a larger area than the site currently under investigation.

- The site is in the likely zone of influence from workings in two seams of coal at 80 to 110m, the last date of working being 1867,
- In addition, the site is in an area where coal is believed to exist at or close to surface that may have been worked in the past,
- Within or within 20m of the property are three mine entries,
- There are no records of any treatment to these shafts,
- The site is not in an area that has been open casted,
- There are no subsidence records at the site.

In addition, a Mine Entry Interpretive Report has been provided by the client, dated November 2016. The findings are summarised below and presented in full in Appendix A. Only the two shafts being considered at this stage are reported.

Shaft 529

- Source - OS plan at 1:2,500 – 1900 edition,
- Depth of superficial deposits 1.0m.
- Depth of shaft 77m,
- Diameter 2.0m.

An extract of the register held by the BGS revealed the following sequence for the shaft.

Main Coal	13 yds,
Brassey coal	20 yds,
Crank	27 yds,
Red	45 yds,
New	56 yds,
?	84 yds.

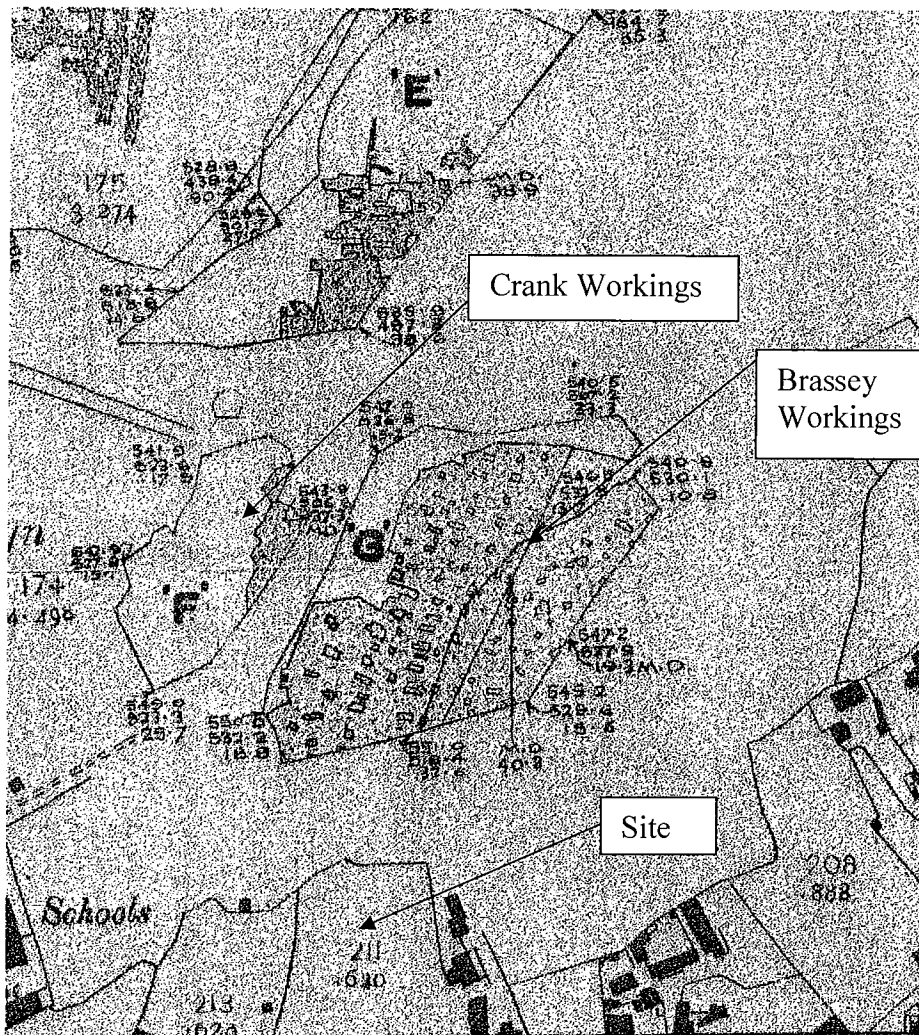
Shaft 060

- Source - former NCB shaft register,
- Depth of superficial deposits 1.0m,
- Shaft diameter 2.0m.

The locations of both shafts are presented in Appendix A.

In addition, mine plan NW 38 held in GSL archives was inspected. This shows the opencast workings immediately north of the site, and immediately south of the Ty-Gwyn fault. This shows workings in the Top and Bottom Brassey seams and Crank seam, which would put the Brassey

seam outcropping immediately west of the site. It was proved to have been extensively worked with the top and bottom seams being some 3' thick (0.91m) and the underlying Crank seam being 1.807' thick (0.51) A section of this plan is presented below.



Plan NW 38

5.0 Proposed Development

The proposed development comprises four detached dwellings, Plots 1 to 4, although this report only covers plots 1 and 3. The road leading to the plots is to be to adoptable standards, with the road accessing Plots 1 and 2 being to non-adoptable standards.

The present proposed layout is presented on Figure 2.

6.0 Previous Investigations

Nkc Geotechnical 2006

A previous investigation was carried out on the adjacent site in Grango Lane by nkc in March 2006, see Figure 2.

The findings are summarised below and presented in full in Appendix C.

It encountered colliery spoil up to 2.10m in thickness, overlying brown, sandy clay, with shale bedrock at 3.50m. The brown sandy clay is considered to be glacial till.

Predominantly collapsed pillar and stall workings in the Brassey coal seam were encountered at 7.0m, with the Crank coal at 18.10m. The Brassey seam workings were subsequently grouted by nkc in March 2006. Of the thirteen boreholes drilled, seven proved the Brassey coal seam to be intact, with the others proving backfilled/collapsed workings. Only one borehole recorded any cavitation.

The sequence encountered was as follows:

Depth (m)	Strata
0.00 - 2.0	Grey and black shale (Colliery Spoil)
2.00 – 3.50	Brown sandy Clay (Glacial Till)
3.50 – 7.00	Dark grey Mudstone
7.00 – 8.60	Brassey Coal
8.60 – 18.10	Grey Mudstone
18.10 – 19.00	Crank Coal
19.02 – 30.0	Grey Mudstone

Nkc Geotechnical 2003

In addition, nkc also investigated the location of the house called Thorlie, in 2003, see Figure 2.

It encountered colliery spoil up to 1.50m thick, overly brown sandy clay, with grey shale rock head at 2.80m.

Predominantly collapsed pillar and stall workings were encountered in the Brassey Coal at 7.50m. The Crank coal was at 18.10m, but any workings in this seam were considered too deep to affect surface stability.

The Brassey Seam was grouted with 11.5 tonnes being recorded going into the workings. Of ten boreholes drilled, only one encountered solid coal, with six encountering backfilled/collapsed workings and two encountering cavitation.

The sequence encountered was as follows:

Depth (m)	Strata
0.0-1.50	Grey and black shale (Colliery Spoil)
1.50 – 2.80	Brown sandy Clay (Glacial Till)
2.80 – 7.80	Dark grey Mudstone
7.80 – 8.80	Brassey Coal
8.80 – 18.10	Grey Mudstone
18.10 – 19.20	Crank Coal
19.20 – 30.0	Grey Mudstone

7.0 Shaft Investigation

The shaft investigation was carried out between the 13th December 2016 and the 4th January 2017 using a 13T tracked excavator provided by Harvey Plant Hire. The works were supervised on a full-time basis by a chartered geologist from GSL. The locations of the shafts were set out on the ground by the client based on the information provided by the Coal Authority.

The report is presented in Appendix A.

8.0 This Investigation

This investigation was carried out on the 30th May 2017 and comprised drilling three boreholes to a maximum depth of 28.0m. The works were undertaken by CCGeosciences using water flush and were supervised on a full-time basis by a chartered geologist from GSL.

BH 01 was drilled in the centre of Plot 1, to a depth of 28.0m and failed to encounter the same sequence as the nkc boreholes despite being drilled only 7m away from the closest nkc borehole. Consequently, BH 02 was drilled to a depth of 13.0m some 1.5m away from BH 01.

BH 3 was drilled in the centre of Plot 3.

The location of the boreholes is presented in Figure 2 and the logs in Appendix D.

9.0 Ground Conditions

The excavations for the shafts typically encountered made ground comprising colliery spoil between 0.40m thick in the east, increasing to almost 2.0m in the west beneath Plot 1. It comprised loose, dark grey/black sandy gravel of mudstone, with occasional ash and clinker, with a little masonry, brick and lime mortar. In places substantial amounts of building debris was encountered probably derived from previous buildings on site, see historical plans in Appendix A.

In TP 1 the glacial till was encountered to a depth of 2.60m and was described as soft to firm, orange/yellow brown mottled light grey clay, with a little fine to coarse gravel, becoming brown and firm to stiff with depth.

The underlying bedrock was encountered between 2.60 and 3.90m and comprised very weak, becoming weak with depth, grey, very thinly bedded, highly weathered mudstone, with a little clay matrix, excavated as a platy grey gravel with a little clay matrix. A thin weak black coal was encountered at the base of the pit, see Appendix A.

No groundwater was encountered in the trial pit or any of the excavations for the shafts.

BH 1 drilled in the centre of Plot 1 encountered 2.50m of made ground overlying 1.5m of glacial till, with bedrock encountered at 4.0m. From 4.0m to 28.0m mudstone was encountered, with no coal seams, or workings encountered, and no loss of flush or groundwater encountered.

As the strata encountered was completely different from the strata encountered by nkc despite them only being drilled some 7m from the closest nkc borehole, BH 2 was drilled some 1.50m from BH 1. This encountered weather bedrock to a depth of 7.0m, and then encountered a wet clay that was squeezing in around the drill rods. No returns were encountered between 7.0 and 12.0m before hitting solid drilling at 12.0 to 13.0m. While no returns were observed no voidage was encountered and this is discussed in more detail in Section 10.0. Of interest is that BH 01 was drilled without any obvious water seepage, while the strata in BH 2 was very wet between 7 and 12.0m as observed from the drill rods.

BH 3 drilled at the centre of Plot 3 proved 0.50m of made ground, with the glacial till extending to 3.50m. Mudstone was then encountered from 3.50m to 18.0m, with a coal seam between 18.0 and 18.50m. Mudstone was then encountered to 25.0m

10.0 Discussion and Conclusion

BH 1 was drilled only 7m away from the 2006 nkc boreholes, which proved the Brassey and Crank seams at shallow depth. This encountered completely different strata, which is considered unusual, but could be explained by several geological features, i.e.

- The presence of a geological fault,
- Coal seams being washed out,
- The opencast plan immediately north of the site shows a high percentage of workings in the Brassey seam, and consequently the roof and floor could have closed up.

In fact, BH 1 and BH 3 failed to reveal the presence of any coal or workings, with the exception of a thin coal seam in BH 3, which could be the Crank coal seam, although this would mean the Brassey is absent at this location. BH 2 did encounter some soft/wet ground, and this could represent a fault line being encountered, or alternatively the edge of a bell pit. However, this latter option is considered unlikely, because this area has been subject to a shaft search.

However, it is possible to work the geology out using the information obtained, especially from the opencast mine immediately north of the site, the location of which is shown on Figure 1, and which is only 35m north of the site.

This records the ground level, depth of excavation and also the underside of the coal seam encountered in the investigation.

This then makes it possible to calculate the dip and the strike of the seam. The dip was calculated as 8°, with a dip direction towards the south east, which corresponds closely to the values quoted in the geological memoirs.

This has enabled the structure contours for the Brassey seam to be drawn across the site, which show the base of the Brassey coal seam being at an elevation of 160m AOD though the centre of Plot 2, rising to 161mAOD beneath Plot 1, and falling to 159mAOD beneath Plot 3.

The ground levels can be obtained from the 1850 Public Health plan presented in Appendix A, which presents spot heights on the buildings and in the surrounding open fields. These record ground levels of around 172mAOD beneath the existing house to the west of the site, with the structure contours indicating an elevation on the base of the Brassey of 162mAOD, which given a thickness of 1.0m, would give an elevation of 163mAOD, and a depth of 9.0m to the Brassey seam, which was encountered at a depth of around 7.0m in the nkc investigation.

Therefore, beneath Plot 1 the Brassey would have been expected to be between 10 and 11m depth beneath Plot 1. While the ground level is slightly lower beneath Plot 3 the Brassey would be expected to be at a similar depth.

It is also possible to calculate the approximate separation between the Brassey and Crank seams from the information on the opencast plan, which was calculated between 12 and 14m.

Based on the information available, I.e. the variation in ground conditions between the opencast information and the boreholes, it is not possible to give firm recommendations, although this is discussed below.

11.0 Recommendations

It is recommended that the elevation of the Brassey coal seam is subjected to a drill and grout contract to prove if it is present, or has been worked beneath the site.

It is not considered necessary to drill and grout the underlying Crank seam, as it is at sufficient depth that a raft foundation can be used to address the risk. This is in line with the grouting work and recommendations given by nkc for the adjacent plots where the Crank seam would be at shallower depth than Plots 1 and 3.

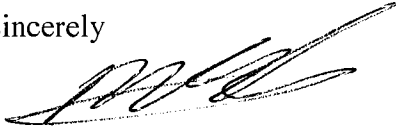
If proved to have been worked the plots should then be founded on raft foundations designed to span potential voids of 3m and cantilever 1.5m at its edge. For Plot 1 the ground has already been turned over during the shaft search. Consequently, it will be necessary to either extend the edge of the raft to sufficient depth, i.e. around 2m, or alternatively, excavate and recompact the material that has been excavated in the search for the shaft.

However, these foundation recommendations should be reviewed once the drill and grout contract has been completed.

We have already sent the works out to obtain tender costs and will be in touch shortly.

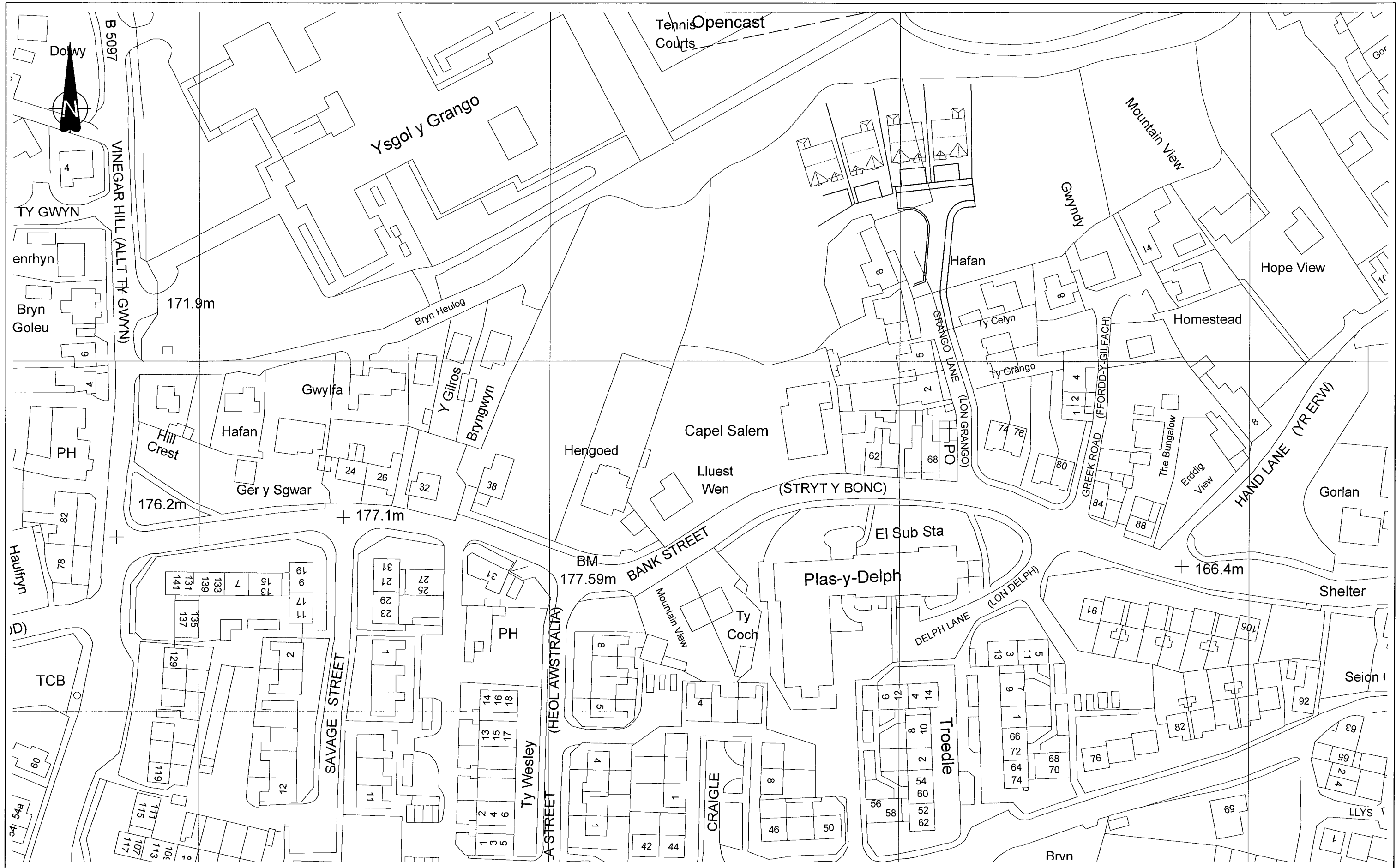
We trust this is satisfactory, should you have any queries please call Mike Scott on 01244 661361.

Yours sincerely

A handwritten signature in black ink, appearing to be 'M J Scott', written in a cursive style.

M J Scott

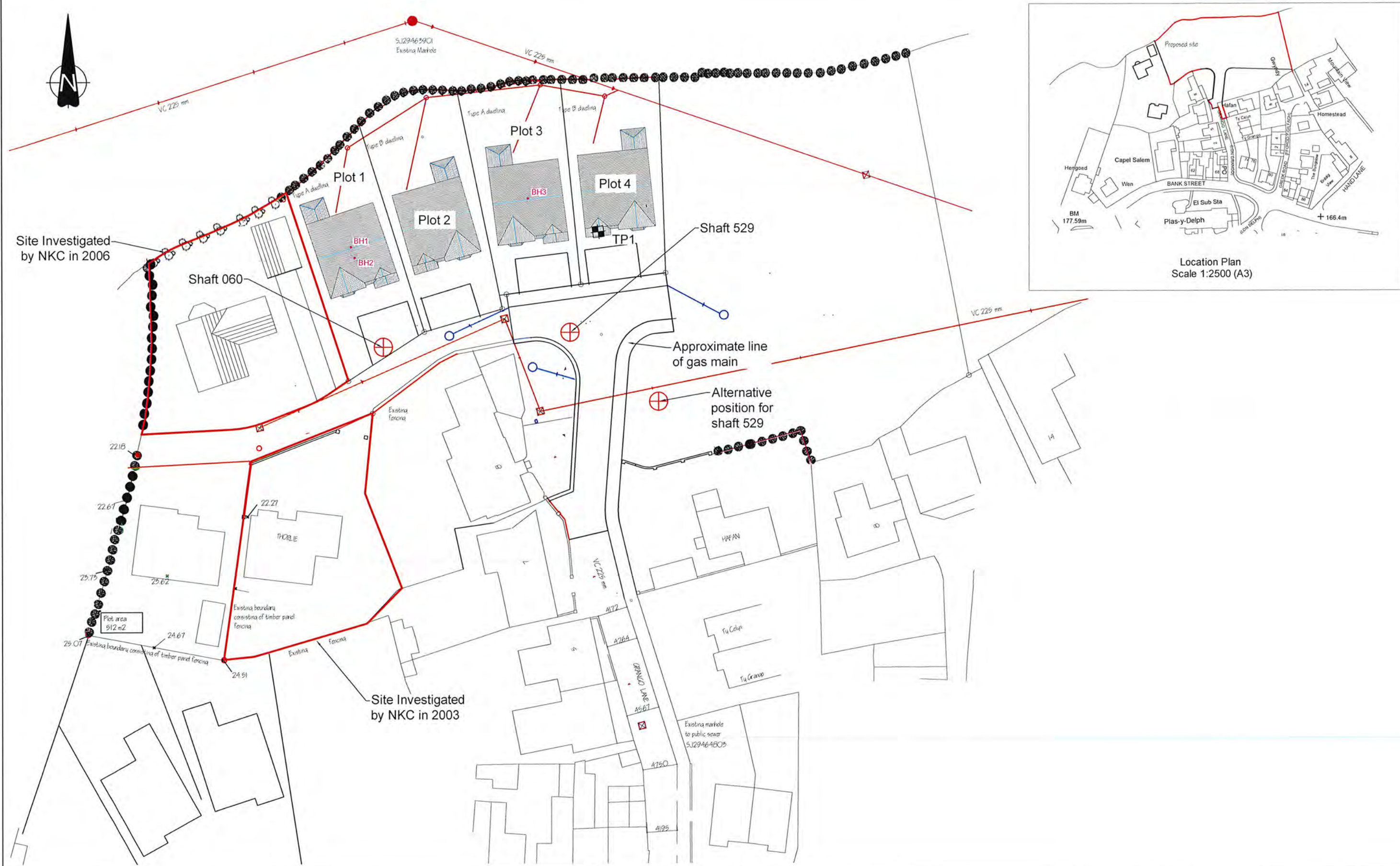
FIGURES



SCALE 1:1000 @ A3

Figure Title
EXISTING SITE LAYOUT

FIGURE 1



SCALE 1:500 @ A3

Figure Title

PROPOSED LAYOUT

FIGURE 2

APPENDIX A

Shaft Report

REF: 1909/GLA/RepLet/mjs

John Hughes Lloyd
Ellbay Properties Ltd
8 Grango Lane
Ponciau
Wrexham LL14 1ER

2nd March 2017

Dear John,

RE: GRANGO LANE PONCIAU: SHAFT SEARCH

1.0 Introduction

Ellbay Properties Ltd (EPL) proposes to market four building plots off Grango Lane in Ponciau, near Wrexham.

Prior to selling the plots, it is necessary to search for two coal shafts that have been identified by a Coal Authority Report.

Consequently, Mr Lloyd has appointed GroundSolve Ltd (GSL) to find the shafts and provide recommendations to treat the shafts.

2.0 Site Location and Description

The site is located immediately north of Grango Lane in Ponciau at National Grid Reference SJ 295 469. An aerial photograph showing the site obtained from the internet is presented below.

The site is bounded by Grango School playing fields to the north, with existing housing to the south and west. Open land lies immediately east of the site. The site itself is largely overgrown and slopes gently in a northerly direction towards the school playing fields.

Grango Lane itself is tarmaced where it leaves Bank Street, before turning into a lane with gravel covering. The existing and proposed site layout is presented in Figure 1, with photographs presented in Appendix A.



3.0 Geology

The geology of the site has been studied on the following sources:

- Wrexham Applied mapping project at a scale of 1:25,000,
- 1:50,000 scale geology plan, Sheet 121,
- Historical geology plans for the site,
- Geological memoirs.

The 1:50,000 scale plan shows the site to be underlain by glacial till overlying mudstone and sandstone bedrock. The Main and Lower Bench (Crown) coal seams are shown outcropping across the site with the outcrops trending north to south.

The historical plans at 1:10,560 show the Main coal seam outcropping on the eastern site boundary with sandstone bedrock to the east of the Main seam and mudstone bedrock to the west. It also records the Main coal having been worked close to surface and the being the site of Briscoe's Pits.

A major fault is shown immediately north of the site, trending in an east to west direction, with its downthrow to the south (Ty-Gwyn fault). Opencast coal mining is shown immediately north of the fault.

The memoirs record that on the south side of the Ty-Gwyn fault, Briscoe's Pits, now obliterated, are said to have reached the Brassy Coal at a depth of 64' (19.50m), and the Wall and Bench at 352' (107.30m). It records the Main coal having been dug to surface.

4.0 Mining

A Coal Authority Report has been supplied by the client, dated May 2005, the main points are summarised below and presented in full in Appendix B. However, it should be noted that this report covers a larger area than the site currently under investigation.

- The site is in the likely zone of influence from workings in two seams of coal at 80 to 110m, the last date of working being 1867,
- In addition, the site is in an area where coal is believed to exist at or close to surface that may have been worked in the past,
- Within or within 20m of the property are three mine entries,
- There are no records of any treatment to these shafts,
- The site is not in an area that has been open casted,
- There are no subsidence records at the site.

In addition, a Mine Entry Interpretive Report has been provided by the client, dated November 2016. The findings are summarised below and presented in full in Appendix B. Only the two shafts being considered at this stage are reported.

Shaft 529

- Source - OS plan at 1:2,500 – 1900 edition,
- Depth of superficial deposits 1.0m.
- Depth of shaft 77m,
- Diameter 2.0m.

An extract of the register held by the BGS revealed the following sequence for the shaft.

Main Coal	13 yds,
Brassey coal	20 yds,
Crank	27 yds,
Red	45 yds,
New	56 yds,
?	84 yds.

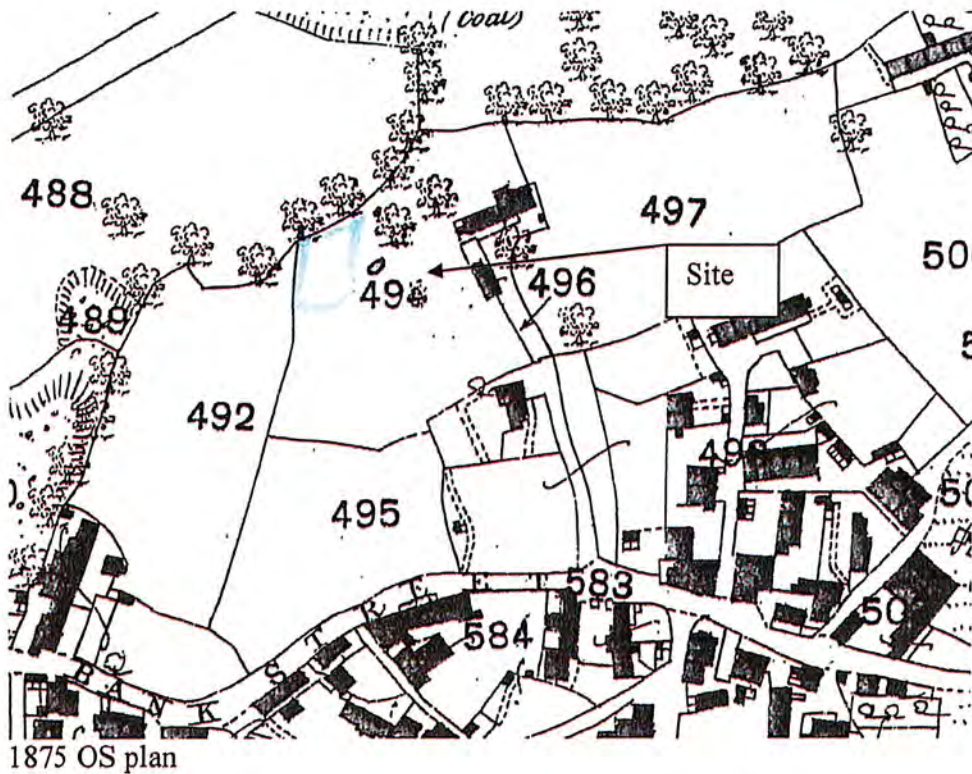
Shaft 060

- Source - former NCB shaft register,
- Depth of superficial deposits 1.0m,
- Shaft diameter 2.0m.

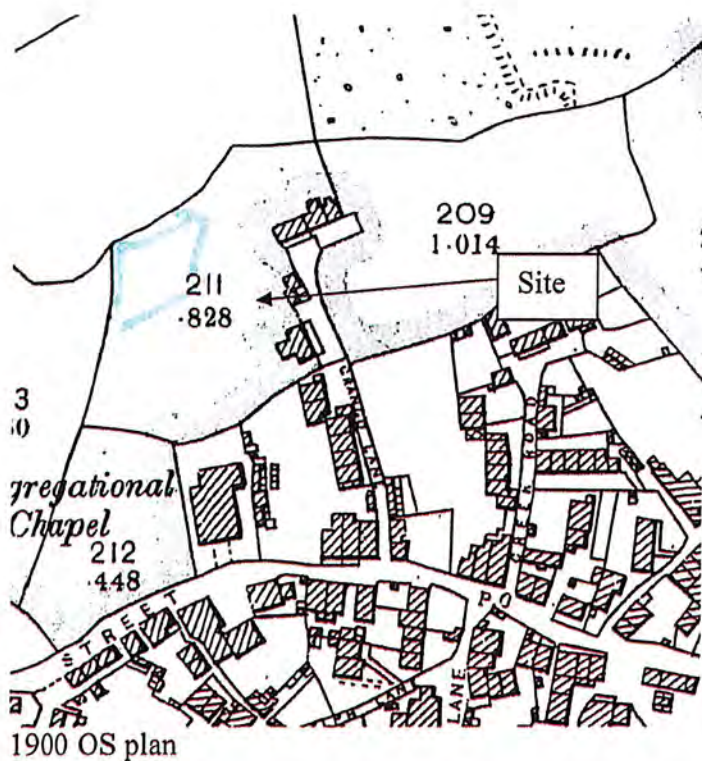
The locations of both shafts have been plotted on Figure 1 using the approximate grid references provided by the Coal Authority.

Consequently, the source information for the shafts was researched, as if on primary source data, such as the 1900 OS plan, they can usually be identified and located quickly. It should also be noted that the NCB shaft register is a secondary source and was notoriously unreliable.

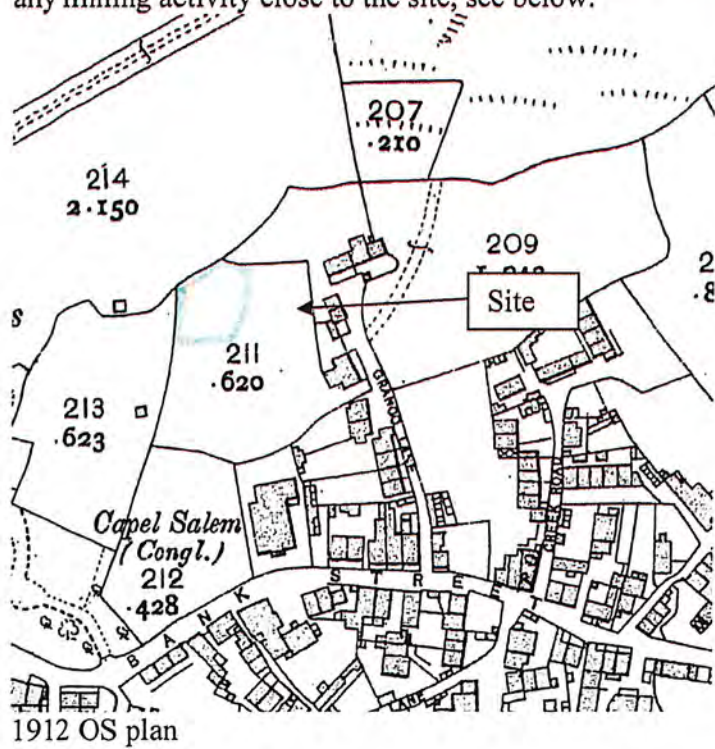
The 1875 OS plan held in GSL archives is reproduced below and fails to record any mining activity in the vicinity of the site.



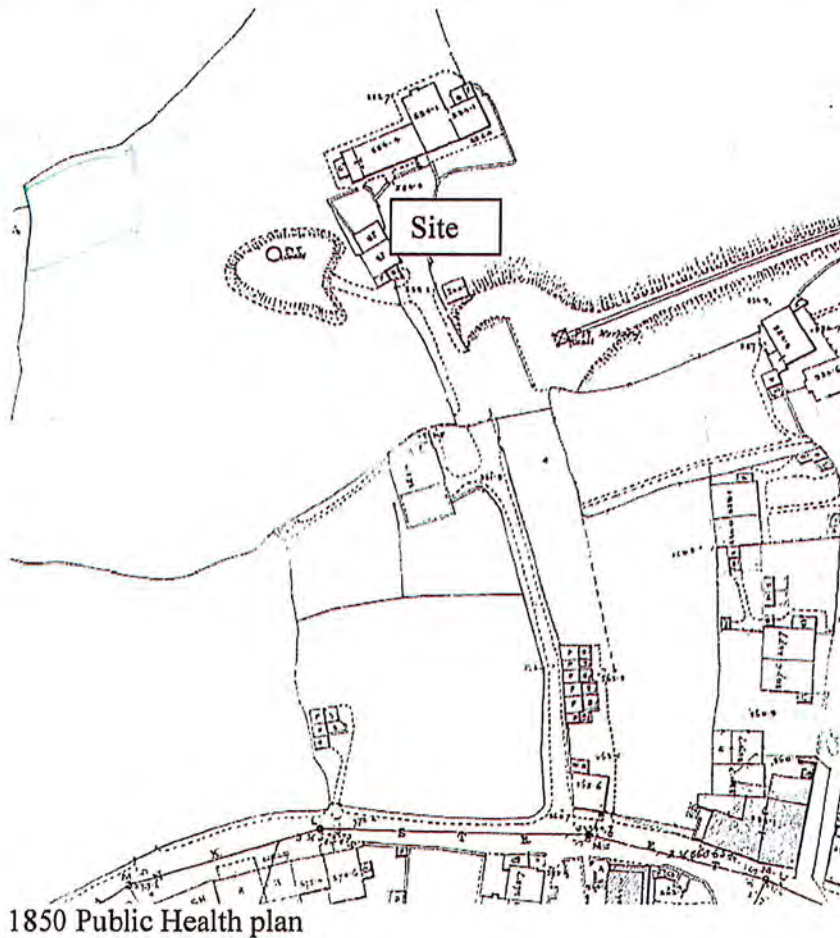
The 1900 OS plan, which was the recorded source for shaft 529, failed to record any evidence of the mine shafts within the site boundary.



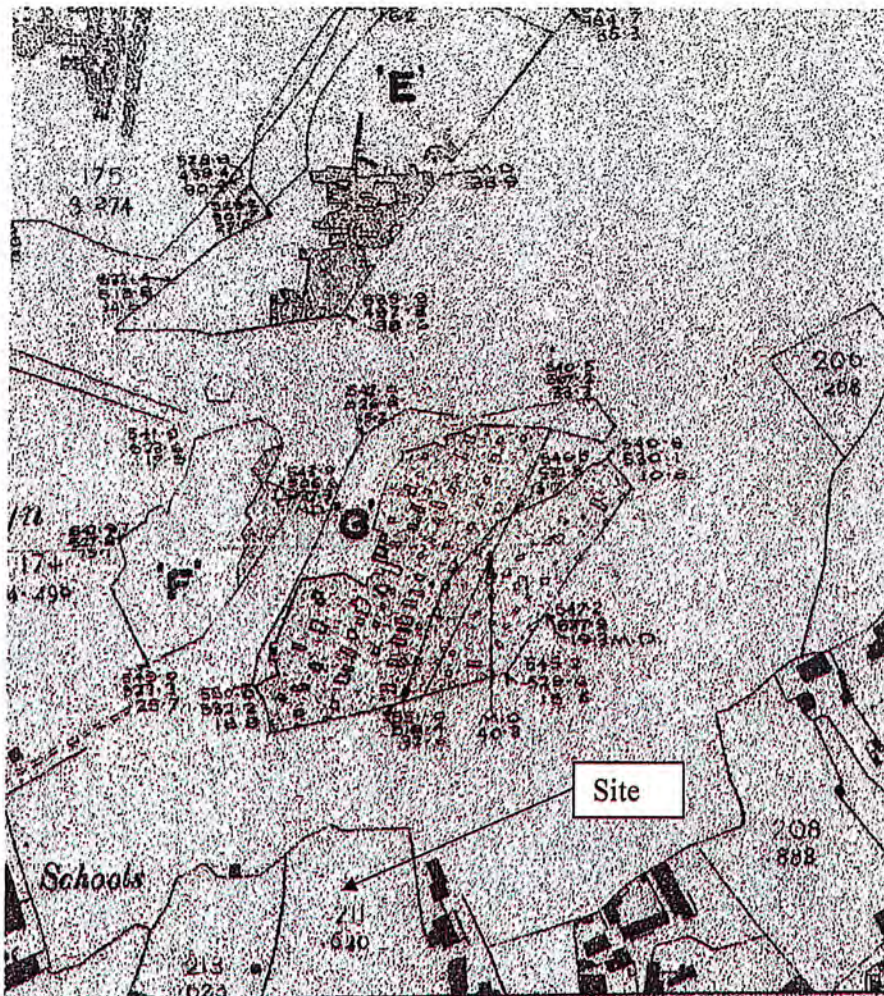
In addition, the later 1912 OS plan was checked and this also failed to record any shafts on site or any mining activity close to the site, see below:



However, GSL also hold the 1850 Public Health plans for this area at a scale of 1:500. Examination of these plans revealed two mine shafts on site, see below. The positions of both of these have been plotted using common features between this plan and the later OS plans. The position of shaft 060 was in the same location as plotted from the Coal Authority information. However, shaft 529, which was reported to have been plotted from the 1900 OS plan was found to be in a different position, which is also shown on Figure 1. These pits had become dis used between the 1850 and 1875 OS plans. This plan also failed to reveal any surface evidence of any older shafts.



In addition, Mine plan NW 38 held in GSL archives was inspected. This shows the opencast workings immediately north of the site, and immediately south of the fault. This shows workings in the Top Brassey and Crank seams, which would put the Top Brassey seam outcropping immediately west of the site. It was proved to have been extensively worked and some 3' thick (0.91m). A section of this plan is presented below.



Plan NW 38

5.0 Proposed Development

The proposed development comprises four detached dwellings. The road leading to the plots is to be to adoptable standards, with the road accessing Plots 1 and 2 being to non adoptable standards.

The present proposed layout is presented on Figure 1.

6.0 Previous Investigation

A previous investigation was carried out on the adjacent site in Grango Lane by nkc in March 2006. The findings are summarised below and presented in full in Appendix C.

It encountered colliery spoil up to 2.10m in thickness, overlying brown, sandy clay, with shale bedrock at 3.50m. The brown sandy clay is considered to be glacial till.

Predominantly collapsed pillar and stall workings in the Brassey coal seam were encountered at 7.0m, with the Crank coal at 18.10m. The Brassey seam workings were subsequently grouted by nkc in March 2006.

As part of this investigation shaft 060 was searched for but not found, the extent of the search is shown in Figure 1 (Area A).

7.0 This Investigation

This investigation was carried out on the 13th December 2016 and the 3rd and 4th January 2017 using a 13T tracked excavator provided by Harvey Plant Hire. The works were supervised on a full time basis by a chartered geologist from GSL. The locations of the shafts were set out on the ground by the client based on the information provided by the Coal Authority.

On the 13th December 2016 the works were curtailed as the route of several critical services to surrounding properties were encountered, i.e. gas and water. Consequently a trial pit (TP 1) was excavated to prove the depth to bedrock to enable any shaft capping works to be designed. The findings of the trial pit are presented below.

Before any further excavation was undertaken a mini excavator was mobilised to site to determine the exact location of the gas and water services. Photographs are presented in Appendix A.

Other services that needed to be avoided or care taking included overhead power lines and drains. The line of the drains extended from MH 1 through to MH 2 in the non adoptable section of road in front of Plots 1 and 2. The drain then turns at 90° to the south to meet MH 3 in front of No 8 Grango Lane, where it meets the main drainage run that takes foul drainage off site.

In Area B excavated on the 3rd January 2016 the works were undertaken using a 600mm wide bucket with trenches excavated at 1m gaps to ensure disturbance to the road was limited and the shaft was not missed. In Area C once the location of the services was known the bucket was changed to a 1.80m diameter bucket with trenches excavated at 1.0m gaps.

All trenches were excavated typically 200mm into the underlying glacial till to ensure that the shafts could be located. Photographs of several of the excavations are presented in Appendix A.

8.0 Ground Conditions

The excavations typically encountered made ground comprising colliery spoil between 0.40m thick in the east, increasing to almost 2.0m in the west beneath Plot 1. It comprised loose, dark grey/black sandy gravel of mudstone, with occasional ash and clinker, with a little masonry, brick and lime mortar. In places substantial amounts of building debris was encountered probably derived from previous buildings on site, see historical plans.

In TP 1 the glacial till was encountered to a depth of 2.60m and was described as soft to firm, orange/yellow brown mottled light grey clay, with a little fine to coarse gravel, becoming brown and firm to stiff with depth.

The underlying bedrock was encountered between 2.60 and 3.90m and comprised very weak, becoming weak with depth, grey, very thinly bedded, highly weathered mudstone, with a little clay matrix, excavated as a platy grey gravel with a little clay matrix. A thin weak black coal was encountered at the base of the pit.

No groundwater was encountered in the trial pit or any of the excavations for the shafts.

8.0 Discussion and Conclusion

A walkover of the site failed to reveal any surface evidence in the form of minor depressions for the shafts and Mr Hughes Lloyd, whose family have owned the land for several generations were also unaware of the exact location of the shafts.

The excavation for shaft 529 failed to reveal the presence of a shaft or any evidence in the form of an increased thickness of colliery spoil. The 1850 plan shows both shafts to be surrounded by colliery spoil and their linings would have been anticipated to extend to surface.

Based on the evidence from the desk study the actual presence of this shaft must be questioned. The source for this shaft was the 1900 OS plan, whereby the location should have been able to have been plotted with an accuracy of several metres. However, a copy of this plan was obtained and it failed to prove the presence of this shaft. It is therefore considered likely that the shaft recorded on the 1850 Public Health plan actually exists and shaft 529 may actually have been a miss plot of this shaft location. Its revised location is presented on Figure 1.

Consequently, no further work is considered necessary beneath the section of adoptable road in search of shaft 529.

However, for shaft 060, while the source information is dubious, the 1850 Public Health plan confirmed the presence of this shaft. The plotted location for this shaft from both the Coal Authority and GSL plotting were within 1m of each other and were approximately 2m north of the gas and water main. The search for the shaft extended from the service location northwards beneath Plots 1 and 2. These failed to encounter any evidence of a shaft. The excavation was also extended to ensure the shaft did not present a risk to Plots 1 and 2 (Area C).

The fact that the ground level rises slightly beneath the road suggests that this shaft is present at this location. However, it was not possible to search beneath the road due to the presence of a water main; gas main and the main drainage run servicing the nearby properties, see Figure 1.

Investigation of numerous nearby shafts has failed to reveal any that have been left open, with all shafts having been backfilled. Since this shaft has been backfilled for around 150 years, it is unlikely to suddenly collapse. In any case, any potential movement of the backfill in this shaft

would be covered by the Coal Subsidence Act, whereby it would be the responsibility of the Coal Authority to rectify any damage caused. In addition, the location of the shaft is such that any collapse would not affect any of the proposed properties.

It is therefore concluded that the possible collapse of shafts 529 and 060 does not present a risk to the proposed properties, Plots 1 through to 4.

However, with any old mining area, it is possible that mine entrances have been wrongly plotted and also there may be unrecorded mine entrances.

Should any mine entrances be encountered, the depth to rock head means that the following treatment would be appropriate.

- Excavate to rock head, approximately 3-3.50m,
- Excavate some 2D into the shaft below rock head and place a 2.0m thick concrete plug,
- Construct a reinforced concrete cap at rockhead, some 4m x 4m in plan and 450mm thick, reinforced top and bottom with T40's at 200mm centres.

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

Yours sincerely

M J Scott

FIGURES



APPENDIX A

Site Photographs



Photograph 1 Existing access lane looking west



Photograph 2 Existing access lane looking east



Photograph 3 Site at end of Grango lane



Photograph 4 Grango Lane leading to site



Photograph 5 Line of gas and water main looking west (posts)



Photograph 6 Line of gas and water main looking east (posts)



Photograph 7 Gas main and overhead lines



Photograph 8 Manhole 2



Photograph 9 Overhead and line of gas main



Photograph 10 MH 3



Photograph 11 Line of gas main



Photograph 12 Line of gas main



Photograph 13 typical Excavation



Photograph 14 Typical excavation

APPENDIX B

Coal Authority Reports



JOHN HUGHES LLOYD,
JHL CONSULTANTS LTD,
BRYN GOLAU,
8 GRANGO LANE,
PONCIAU,
WREXHAM,
WREXHAM BOROUGH,
LL14 1ER

This matter is being dealt with by Simon Leeming

Our Ref: 00012972-05

Your Ref:

Electronic Ref:

RRUID: 007.00006485910001

Date: 18 May 2005

Dear Sir,

Coal Mining Report
GRANGO LANE DEVELOPMENT, PONCIAU, WREXHAM, CLWYD

I refer to the enquiry dated 13th May 2005, received 13th May 2005, in connection with the above.

This report is based on and limited to the records in the possession of The Coal Authority at the time the search is answered.

Ordnance Survey (O.S.) is undertaking a Positional Accuracy Improvement Programme of its mapping data. The Coal Authority (CA) has no control over the timing of issue of Positionally Improved mapping data by O.S. or over users of that data. In some instances the relative position between surface features and coal mining features may alter as a consequence of this programme. The CA will ensure that the integrity of its database is maintained by replotting some mining information to sustain the relationship between that mining information and the improved O.S. surface positions, some of which are now being released. However, mining reports are currently being produced against pre improved O.S. mapping whilst the Authority updates its database in line with the O.S. changes.

Past Underground Mining

The property is within the likely zone of influence on the surface from workings in 2 seams of coal at 80m to 110m depth, the last date of working being 1867.

Ground movement from the above mentioned past coal workings should by now have ceased.

In addition you may wish to know that the property is in an area where coal is believed to exist at or close to the surface that may have been worked at some time in the past.

Present Underground Mining

The property is not within the zone of likely physical influence on the surface from any present underground coal workings.

Future Underground Mining

The property is not within a geographical area for which a licence to extract coal by underground methods is awaiting determination by the Coal Authority.

The property is not within a geographical area for which a licence to extract coal by underground methods has been granted.

The property is not within the zone of likely physical influence at the surface from plans of future workings in our possession.

However reserves of coal exist in the locality which could be worked at some time in the future subject to feasibility, licences, and planning consents.

We have no record of any notice of the risk of the land being affected by subsidence being given under S.46 of the Coal Mining Subsidence Act 1991.

Shafts and Adits

Within or within 20 metres of the property there are 3 mine entries, the approximate positions of which are shown on the attached plan. Your attention is drawn to the statements made on that plan.

We have no record of what steps, if any, have been taken to treat the mine entries.

The records held by the Coal Authority may be incomplete. Consequently, there may exist in this locality mine entries of which we have no knowledge.

Surface Geology

Records in our possession do not disclose any fault or other line of weakness at the surface as having affected the stability of the property.

Past Opencast Mining

The property is not located within the geographical boundary of an opencast site from which coal has been extracted by opencast methods.

Present Opencast Mining

The property does not lie within 200 metres of the geographical boundary of an opencast site within which coal is being extracted by opencast methods.

Future Opencast Mining

The property is not within 800 metres of the geographical boundary of an opencast site for which a licence to extract coal by opencast methods is awaiting determination.

The property is not within 800 metres of the geographical site boundary of an opencast site for which a licence to extract coal by opencast methods has been granted.

Subsidence

The records in our possession do not disclose any damage notice or claim having been given, made or pursued in respect of the property since 1 January 1984.

The records in our possession do not disclose any current "Stop Notice" affecting the property.

The records in our possession do not show any request having been made to execute preventative works under S.33 of the Coal Mining Subsidence Act 1991.

Withdrawal of Support

The property does not lie within a geographical area in respect of which a notice of entitlement to withdraw support has been published.

The property does not lie within a geographical area in respect of which a notice has been given under S.41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working Facilities Orders

The property is not within a geographical area that is the subject of an Order made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to Owners of Former Copyhold Land

The property is not within an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Additional Remarks

In view of the mining circumstances a prudent developer would seek appropriate technical advice before works are undertaken on site. All proposals should have regard to good engineering practice in mining areas as identified in authoritative publications on mining stability problems. In any event, no activities should be undertaken that intersect, disturb, or interfere with any coal or mines of coal without permission of the Coal Authority.

According to our records a site investigation was carried out in 2003 by NKC Geotech Ltd 25 Grosvenor Road, Wrexham, LL11 1BT .

These replies are prepared in accordance with the 2003 editions of the Coal Authority's Terms and Conditions, User Guide and the Law Society's Guidance Notes.

Copyright in coal mining reports and certificates belongs to the Coal Authority. Information used to compile this report is protected by the Coal Authority's database right. All rights are reserved and unauthorised use is prohibited. Copyright and other intellectual property is not transferred to external parties by possession of a mining report or certificate, however those for whom the report is supplied have the right to use it.

We acknowledge the receipt of your remittance in payment of our fee.

Yours faithfully



Stephen Pennell

Director of Mining Information and Services



Crown Copyright.

PLAN NOT TO SCALE

This map is reproduced from the Ordnance Survey material by The Coal Authority [or division thereof] with the permission of the Controller of Her Majesty's Stationery Office, Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number: AL51060A001.

This is a plan of the boundaries of the property in respect of which this report has been prepared. It is the responsibility of the user to ensure that the boundaries shown correspond with those of the property.

APPROXIMATE POSITION OF ENQUIRY BOUNDARY SHOWN



APPROXIMATE POSITION OF DISUSED MINE SHAFTS SHOWN



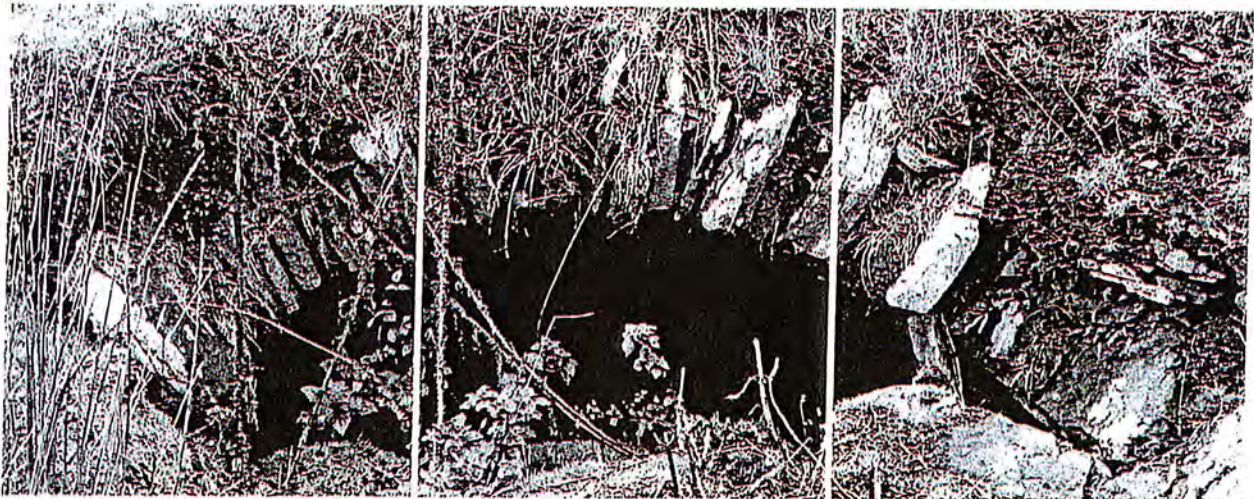
This plan shows the approximate location of the disused mine entry/entries referred to in the attached mining report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan. Properly owners have the benefit of statutory protection (under the Coal Mining Subsidence Act 1991). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A DTI leaflet setting out the rights and the obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by telephoning 0845 762 6848. If you wish to discuss the relevance of any of the information contained in the attached report you should seek the advice of a qualified mining engineer or surveyor. If you or your adviser wish to examine the source plans from which the information has been taken these are available at our Mansfield office, free of charge, by prior appointment, telephone 01623 638233. Should you or your adviser wish to carry out any physical investigations that may enter, disturb or interfere with any disused mine entry the prior permission of the owner must be sought. For coal mine entries the owner will normally be the Coal Authority. The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). Our emergency telephone number at all times is 01623 646333.



The Coal
Authority

Resolving the impacts of mining

Mine Entry Interpretive Report



8 GRANGO LANE, PONCIAU, WREXHAM, WREXHAM, LL14 1ER

Date of enquiry:	10 November 2016
Date enquiry received:	10 November 2016
Issue date:	10 November 2016

Our reference:	51001288391001
Your reference:	

Mine Entry Interpretive Report

This report has been prepared using the records held by the Coal Authority at the time the report was produced.

Client name

John Hughes Lloyd

Enquiry address

8 GRANGO LANE, PONCIAU, WREXHAM,
WREXHAM, LL14 1ER

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

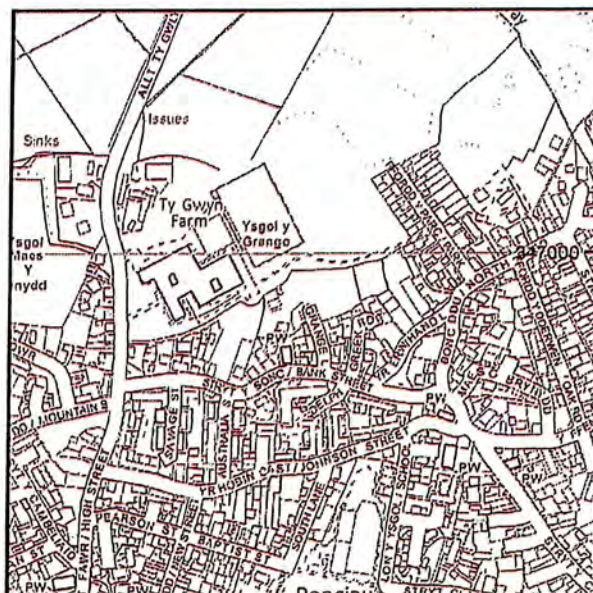
200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

 /company/the-coal-authority

 /thecoalauthority

 /coalauthority



Approximate position of property



Reproduced by permission of
Ordnance Survey on behalf of
HMSO. © Crown copyright and
database right 2016. All rights
reserved.

Ordnance Survey Licence number: 100020315

Mine entry information

If you live in a coal mining area there is a very small risk that your home or other property may be affected by coal mining subsidence.

To work out if your property is within the area of possible ground movement the report will take into account the actual or plotted position of the mine entry, its known or assumed diameter and the thickness of deposits above rockhead. For more information, please see our general information section.

In the unlikely event of your property being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner. The mine owner will treat the mine entry and arrange for repairs to the property to be carried out to the reasonable satisfaction of the property owner. The mine owner may also be liable to pay compensation for damage to moveable property such as furniture.

Please Note - The Coal Mining Subsidence Act 1991 does not cover subsidence damage caused by extraction of minerals other than coal.

Any insurance given with previous mining reports does not cover this report.

Shaft or adit	Shaft
Mineral worked	Coal
Source	Other: Original source unknown obtained from former NCB shaft register.
Colliery name	Unknown
Entry name	Unknown
Date abandoned	Unknown
Depth of superficial deposits (m)	1.0
Depth of shaft (m)	Unknown
Diameter/maximum width (m)	2.0
Probable adit azimuth	Not Applicable
Treatment details	Unknown
Conveyance	Not Applicable
Other information	Yes

The risk

If coal mining subsidence was to occur because of ground movement due to the mine entry, the main building (as shown on the plan) is within the area likely to be affected. Our opinion takes into account the thickness of the superficial deposits, the potential difference between the actual and the plotted positions of the mine entry and its diameter/maximum width.

The possibility of subsidence damage is very small but should not be discounted completely.

The remedies

In the unlikely event of your property being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner. Depending on where you live, responsibility for dealing with your claim rests either with a mining company or the Coal Authority. Details of how to make a claim can be found on our website www.gov.uk/claim-for-subsidence-damage-caused-by-coal-mining. If you need any help or advice, please contact us.

The conclusion

In our opinion, the main building (as shown on the plan) is within the area likely to be affected if coal mining subsidence was to occur because of ground movement.

The statistical risk of the main building being damaged by subsidence however is very small.

In the unlikely event of your property being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner to have the damage repaired.

Shaft or adit	Shaft
Mineral worked	Coal
Source	OS: 1/2500 plan DB 35/2 - 1900 edition.
Colliery name	Unknown
Entry name	Unknown
Date abandoned	Unknown
Depth of superficial deposits (m)	1.0
Depth of shaft (m)	77.0
Diameter/maximum width (m)	2.0
Probable adit azimuth	Not Applicable
Treatment details	Unknown
Conveyance	Not Applicable
Other information	Yes

The risk

If coal mining subsidence was to occur because of ground movement due to the mine entry, the main building (as shown on the plan) is outside the area likely to be affected. Our opinion takes into account the thickness of the superficial deposits, the potential difference between the actual and the plotted positions of the mine entry and its diameter/maximum width.

The possibility of subsidence damage to the garden areas/other buildings is very small but should not be discounted completely.

The remedies

In the unlikely event of your property being damaged by coal mining subsidence, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner. Depending on where you live, responsibility for dealing with your claim rests either with a mining company or the Coal Authority. Details of how to make a claim can be found on our website www.gov.uk/claim-for-subsidence-damage-caused-by-coal-mining. If you need any help or advice, please contact us.

The conclusion

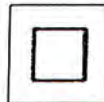
In our opinion, the main building (as shown on the plan) is not at risk of coal mining subsidence damage from the subject mine entry. This is because it is not within the area of possible ground movement.

In the unlikely event of other parts of your property being damaged by coal mining subsidence such as outbuildings, you can, under the provisions of the Coal Mining Subsidence Act 1991, make a claim against the mine owner to have the damage repaired.

Enquiry boundary

Key

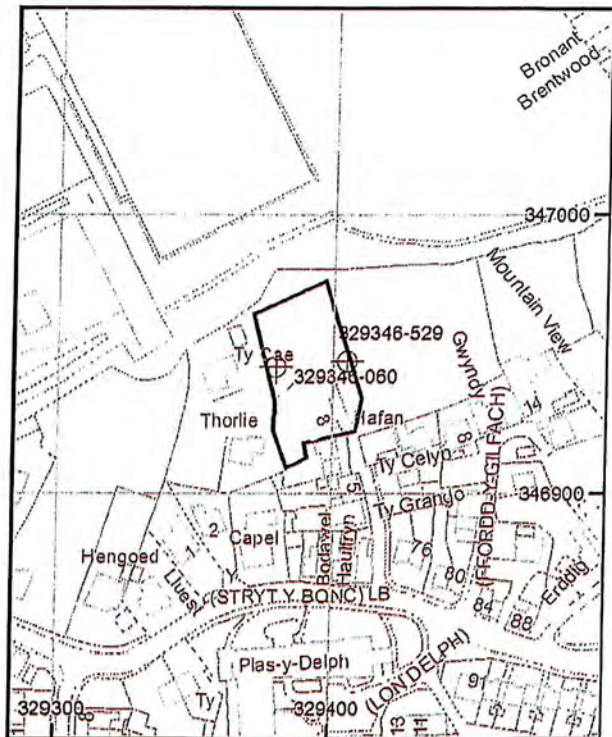
Approximate position of enquiry boundary shown



Approximate position of main building shown



Disused mineshaft



How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com



 /company/the-coal-authority

 /thecoalauthority

 /coalauthority



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2016. All rights reserved.

Ordnance Survey Licence number: 100020315

General information

The following information is based on the Authority's interpretation of the facts in its possession at the time the report was produced and on the Ordnance Survey's (OS) improved data. A site inspection has not been carried out.

1. Some of the source documents used may be very old and can have varying standards of accuracy. As a result, the plotted positions of mine entries can be different, to varying degrees, to their actual positions.
2. The thickness of superficial deposits has been taken from the records of the Authority and/or those of the British Geological Survey. © NERC All rights reserved. Where the Authority has information about activities such as infill operations or excavation, which may have affected the thickness of deposits above rockhead, this will also be taken into account.
3. The Authority will only provide the depth of a mine entry where this is known.
4. Where information about the diameter of a shaft is not known, it will be assumed. The assumption will be based on other shafts in the vicinity, the likely date it was sunk and any other relevant information, for example the depth of seams the shaft is thought to have accessed. Where a shaft is not circular, the maximum diagonal dimension will be used.
5. The zone of possible ground movement of an adit will be calculated for the estimated position of the mouth of the adit. It will not apply to the underground length of the adit. The approximate adit direction, where applicable, will be quoted in degrees from North.
6. Where treatment details are recorded, this information will be given. Where records are not available, "Unknown" will be reported.
7. The issue of ownership of mine entries is extremely complicated. Where details of the sale of a mine are known these will be provided. Where no sale details are available, in most instances, ownership will rest in the Coal Authority. Whatever the position with ownership, if coal mining subsidence damage does occur, statute provides for the 'responsible person' to provide a remedy. The 'responsible person' is either the Coal Authority or a licensed mining operator.
8. The report has been prepared by experienced mining surveyors with knowledge in the management and interpretation of coal mining information.

Disclaimer

The Coal Authority owns the copyright in this report and the information used to produce this report is protected by our database rights. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

Alternative formats

If you would like this report in an alternative format, please contact our communications team.

Terms and conditions

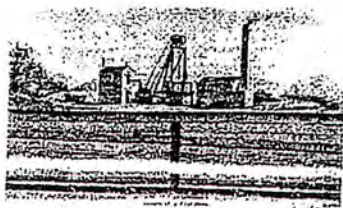
Our full terms and conditions can be found on our website – www.groundstability.com.

VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	10 November 2016
Issued to	JOHN HUGHES LLOYD 8 GRANGO LANE PONCIAU WREXHAM WREXHAM LL14 1ER
Property search for	8 GRANGO LANE PONCIAU WREXHAM WREXHAM LL14 1ER
Reference number	51001288391001
Date of issue	10 November 2016
Cost	£100.00
VAT @ 20%	£20.00
Total received	£120.00
VAT registration	598 5850 68

APPENDIX C

Nkc Investigation

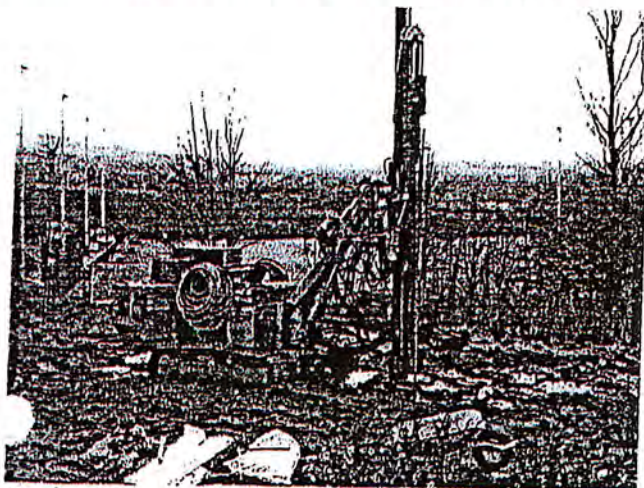


Nkc Geotech Ltd

25 Grosvenor Road
Wrexham
LL11 1BT

tel
01352 762080
fax
01352 762081
email
nell@nkc.co.uk

Mining Investigation Report



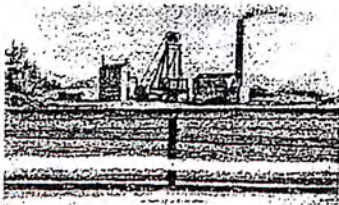
Grango Lane, Ponciau

0517
27 March 2006

JHL Consultants Ltd
8 Grango Lane
Ponciau
Wrexham
LL14 1ER
3 0517 27 March 2006



Printed on recycled paper



contents

- 5 site description and investigation results
- 6 management of geotechnical hazards
- 7 borehole plan
- 8 results of remedial work
- 9 drilling logs and section
- 10 method statement

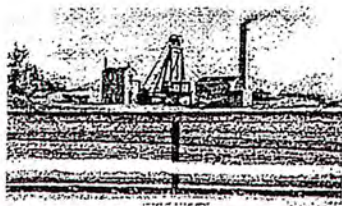
extract

This report meets NHBC D5 and D6 requirements
The site is undermined by old workings which have been stabilised by grouting

4 0517 27 March 2006



Printed on recycled paper



Site

A plot for one dwelling at Grango Lane, Ponciau.

Investigation and site work by

Neil Catlow B.Sc F.G.S Engineering geologist.

Records inspected

Coal Authority at Mansfield.

Geological Survey.

My previous investigations in this vicinity.

Investigation results

Ground level

Unchanged throughout the investigation.

Site history

The site was formerly agricultural land.

Gas testing

There were no methane or carbon dioxide emissions during the investigation period. See borehole logs for gas testing results.

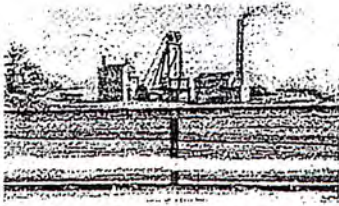
Radon

The site lies in an area susceptible to radon. Radon can only be accurately detected over a three month test period, beyond the scope of this investigation. Precautions against radon accumulation should be taken in the absence of evidence of no radon presence.

Foundation soils

Colliery derived shale fill upto 2.1m in thickness overlying brown sandy clay. Brown weathered shale rockhead at predominantly 3.5m. See borehole logs for SPT testing results.





Shallow mineworkings

Predominantly collapsed pillar & stall workings in the Brassey Coal at 7.0m. The Crank Coal is at 18.1m but any workings in this seam are too deep to affect surface stability. See log for Bh1.

Disused mineshafts

There are no records of any shafts on the site, but the Brassey Coal workings are so shallow that old unrecorded shafts are very probably present. Disused mineshaft 329346-060 is shown 10m east of the eastern site boundary and an area on site upto 20m from this position was searched but no shaft was found.

Hazard management

There are old and unrecorded mineworkings present in the Brassey Coal. Subsidence of these workings could cause crown holes to be formed on the site, with dimensions of upto 2.0m deep and 2.0m diameter. There may also be old and unrecorded mineshafts upto 2.0m in diameter present under the fill.

Ground improvement

Stabilise the mineworkings by grouting to prevent further void migration under the proposed buildings. I have personally carried out this remedial work - see results of remedial work.

Specialist foundations

Use a structural foundation designed to span 3.0m in case there are old infilled crown holes and unrecorded shafts present.

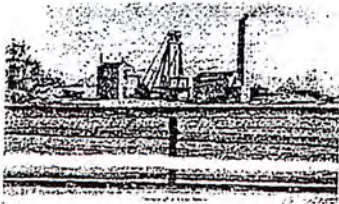
For Nkc Geotech Ltd

Neil Catlow, B.Sc, F.G.S

6 0517 27 March 2006

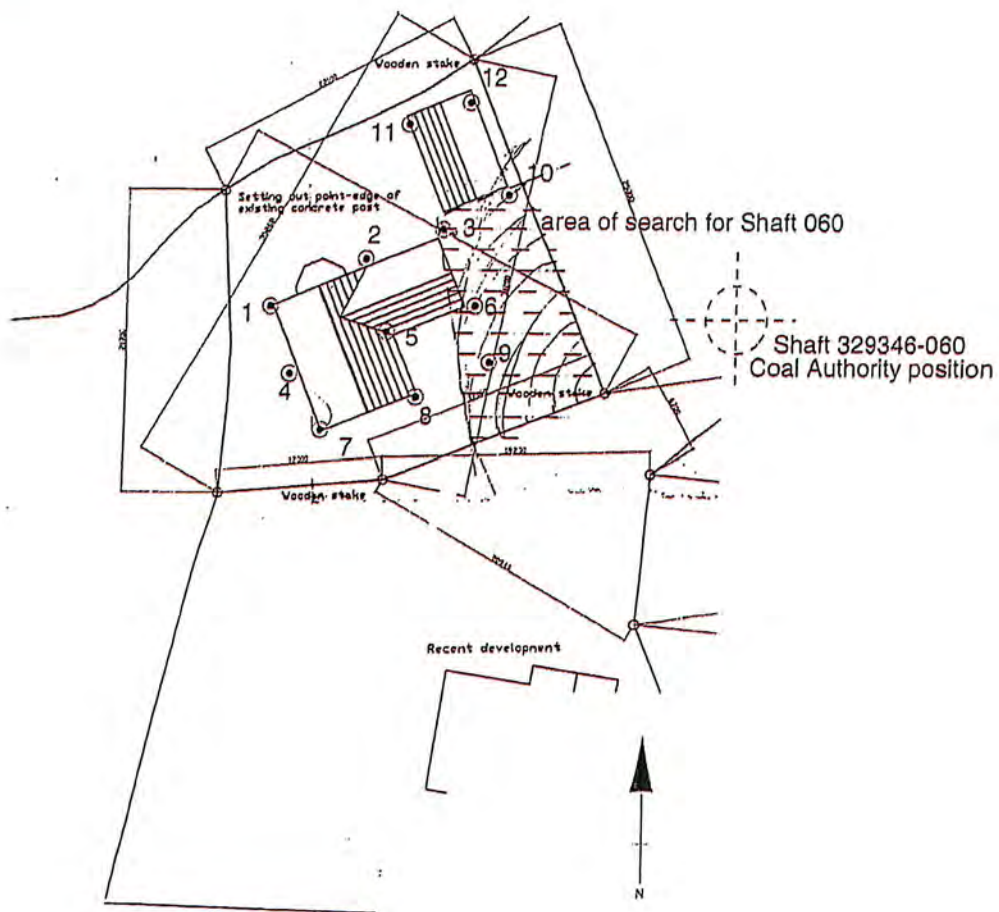


Printed on recycled paper



Borehole plan

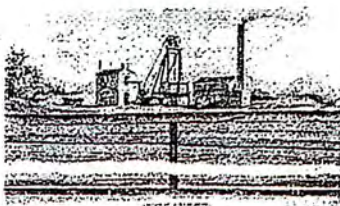
Scale 1:500



7 0517 27 March 2006



Printed on recycled paper



Results of remedial work

hole	seam depth*	hole depth	grout take	status code	comments
Bh 1	7.0m	30.0	0.0	sd	2.0m fill - see log
Bh 2	6.2	12.0	0.0	sd	1.8m fill
Bh 3	5.2	12.0	2.4	cd	1.2m fill
Bh 4	4.8	12.0	0.0	sd	2.0m fill
Bh 5	4.8	12.0	0.0	sd	1.0m fill
Bh 6	4.8	12.0	0.0	sd	1.3m fill
Bh 7	7.3	12.0	2.1	cd	1.6m fill
Bh 8	5.5	12.0	3.6	cn	1.0m fill
Bh 9	6.1	12.0	1.7	cd	1.0m fill
Bh 10	5.8	12.0	0.0	cd	1.3m fill
Bh 11/	6.5	12.0	1.8	sd	1.3m fill
Bh 12/	6.6	12.0	1.2	sd	1.3m fill

Grout mix 4:1 rockdust/PFA/cement and measured in dry tonnes

Injection pressure <150kN/m²

All work carried out by Neil Catlow B.Sc, F.G.S

Total grout take dry tonnes 12.8 tonnes

* or depth to mineworkings or migrating cavity

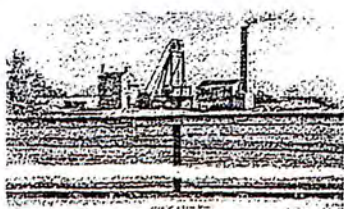
Status codes sd solid cd collapsed cn cavitation vd void

Borehole numbers with a / suffix are inclined

8 0517 27 March 2006



Printed on recycled paper



Method statement for remedial works

Stabilisation of mineworkings by grouting

This work follows an initial investigation of a site which has shown that a coal seam of economic importance is present at shallow depth and has been mined. There are therefore geotechnical hazards present.

Shallow mineworkings are stabilised by drilling a grid of holes 65mm or 75mm diameter down through the coal seam on an initial 6.0m grid pattern over the bearing area of the proposed building, reducing to 3.0m spacing when open workings are encountered. The workings are grouted using 4:1:1 sand/PFA/cement ready-mixed grout injected by casing to the bottom of the hole, and pressurised to 150 - 200kN/m² when filled.

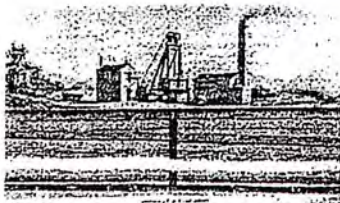
I carry out all this site work personally, and keep full records of each hole.

The report is submitted on completion is required for NHBC Validation D7.

9 0517 27 March 2006



Printed on recycled paper



Bh 1

REF	0517	SITE	Grango Lane, Ponclau	DATE	27 March 2006
Bh	1	CLIENT	JHL Consultants Ltd	SCALE	1:200
		TITLE	n/a	OSGN	
		ORIGIN	printout direct from rig on site drilled & logged by Neil Callow	ORIENTATION	vertical
				FLUSH	water
				BIT	1/2 75mm
				SPT	SECTION
				N value	
DEPTH	STRATA	GRAPHIC	DESCRIPTION		
0.0	0.0	fill	grey and black shale		ground level
0.5				7 @ 1.0m	
1.0					
1.5				9 @ 2.0m	
2.0	2.0	clay	brown, sandy	9 @ 3.0m	
2.5				14 @ 4.0m	
3.0					
3.5	3.5	shale	dark grey, firm drilling		rockhead
4.0					
4.5					
5.0					
5.5					
6.0	6.1	shale	black, soft drilling		
6.5					
7.0	7.0	coal	black, soft drilling		Brassey Coal old workings
7.5					
8.0					
8.5	8.6	shale	dark grey, firm drilling		
9.0					
9.5					
10.0					
10.5					
11.0					
11.5					
12.0					
12.5	12.4	mudstone	grey, firm drilling		
13.0					
13.5					
14.0					
14.5					
15.0					
15.5					
16.0					
16.5					
17.0					
17.5					
18.0	18.1	coal	black, soft drilling		Crank Coal
18.5					
19.0	19.0	mudstone	grey, firm drilling		
19.5					
20.0					
20.5					
21.0					
21.5					
22.0					
22.5					
23.0					
23.5					
24.0					
24.5					
25.0					
25.5					
26.0					
26.5					
27.0					
27.5					
28.0					
28.5					
29.0					
29.5					
30.0	30.0		bottom of hole		

IN HOLE GAS TESTING

% oxygen	20.7
% methane	0.0
% carbon dioxide	0.0
% LEL	0.0

Nkc Geotech Ltd
25 Grosvenor Road
Wrexham
LL11 1BT

www.nkc.co.uk



Printed on recycled paper

APPENDIX D

Trial Pit Log

TRIAL PIT 1

Depth (m)	Strata
0.00 – 0.45	Loose dark grey/black sandy GRAVEL of ash and clinker with a little masonry, brick and lime mortar (MADE GROUND)
0.45 – 2.60	Soft to firm orange/yellow brown mottled light grey CLAY with a little fine to coarse gravel becoming brown and firm to stiff with depth (GLACIAL TILL)
2.60 – 3.70	Very weak becoming weak with depth grey very thinly bedded highly weathered MUDSTONE with a little clay matrix, excavated as a platy grey gravel with a little clay matrix (BEDROCK)
3.70 – 3.90	Weak black COAL

Notes

1. Sides of pit stable.
2. No groundwater seepage encountered.





APPENDIX B

Site Photographs



Photograph 1 Existing access lane looking west



Photograph 2 Existing access lane looking east



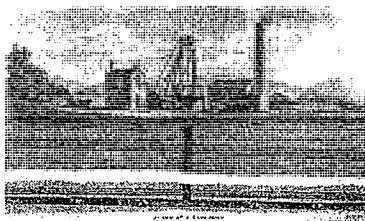
Photograph 3 Site at end of Grango lane



Photograph 4 Grango Lane leading to site

APPENDIX C

Previous Investigations



Nkc Geotech Ltd

25 Grosvenor Road
Wrexham
LL11 1BT

tel

01352 762080

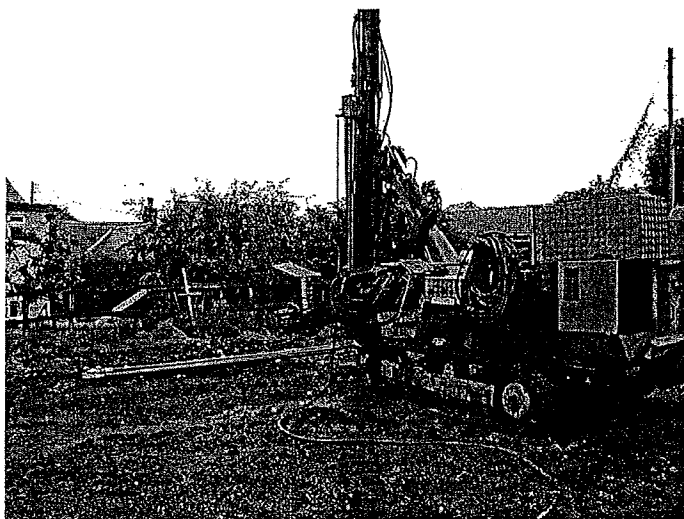
fax

01352 762081

email

neil@nkc.co.uk

Mining Investigation Report



Grango Lane, Ponciau

0309

1 September 2003

Mr A P Hughes Lloyd

Newlyn

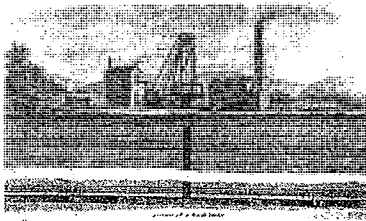
1 Duke Street

Rhos

Wrexham LL14 1SU

3 0309 1 September 2003





contents

- 5 site description and investigation results
- 6 management of geotechnical hazards
- 7 borehole plan
- 8 results of remedial work
- 9 drilling logs and section
- 10 method statement

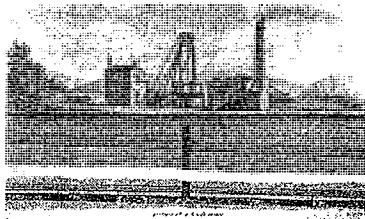
extract

This report meets NHBC D5 and D6 requirements
The site is undermined by old workings which have been stabilised by grouting

4 0309 1 September 2003



Printed on recycled paper



Site

A plot for one dwelling at Grango Lane, Ponciau.

Investigation and site work by

Neil Catlow B.Sc F.G.S Engineering geologist.

Records inspected

Coal Authority at Mansfield.

Geological Survey.

My previous investigations in this vicinity.

Investigation results

Ground level

Unchanged throughout the investigation.

Site history

The site was formerly agricultural land.

Gas testing

There were no methane or carbon dioxide emissions during the investigation period. See borehole logs for gas testing results.

Radon

The site lies in an area susceptible to radon. Radon can only be accurately detected over a three month test period, beyond the scope of this investigation. Precautions against radon accumulation should be taken in the absence of evidence of no radon presence.

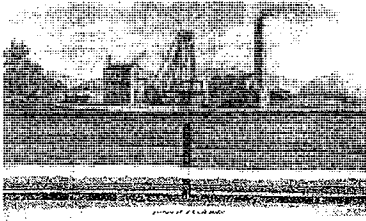
Foundation soils

Colliery derived shale fill upto 1.5m in thickness overlying brown sandy clay. Grey shale rockhead at predominantly 2.8m. See borehole logs for SPT testing results.

5 0309 1 September 2003



Printed on recycled paper



Shallow mineworkings

Predominantly collapsed pillar & stall workings in the Brassey Coal at 7.5m. The Crank Coal is at 18.1m but any workings in this seam are too deep to affect surface stability. See log for Bh1. The grout holes show that the Main Coal outcrops across the eastern part of the site, and has been worked from the surface with the result that there is a variable fill thickness in the grout holes.

Disused mineshafts

There are no records of any shafts on or within 20 metres of the site, but the Brassey Coal workings are so shallow that old unrecorded shafts are very probably present.

Hazard management

There are old and unrecorded mineworkings present in the Brassey Coal. Subsidence of these workings could cause crown holes to be formed on the site, with dimensions of upto 2.0m deep and 2.0m diameter. There may also be old and unrecorded mineshafts upto 2.0m in diameter present under the fill.

Ground improvement

Stabilise the mineworkings by grouting to prevent further void migration under the proposed buildings. I have personally carried out this remedial work - see results of remedial work.

Specialist foundations

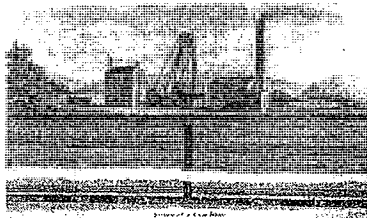
Use a structural foundation designed to span 3.0m in case there are old infilled crown holes and unrecorded shafts present.

For Nkc Geotech Ltd

Neil Catlow, B.Sc. F.G.S

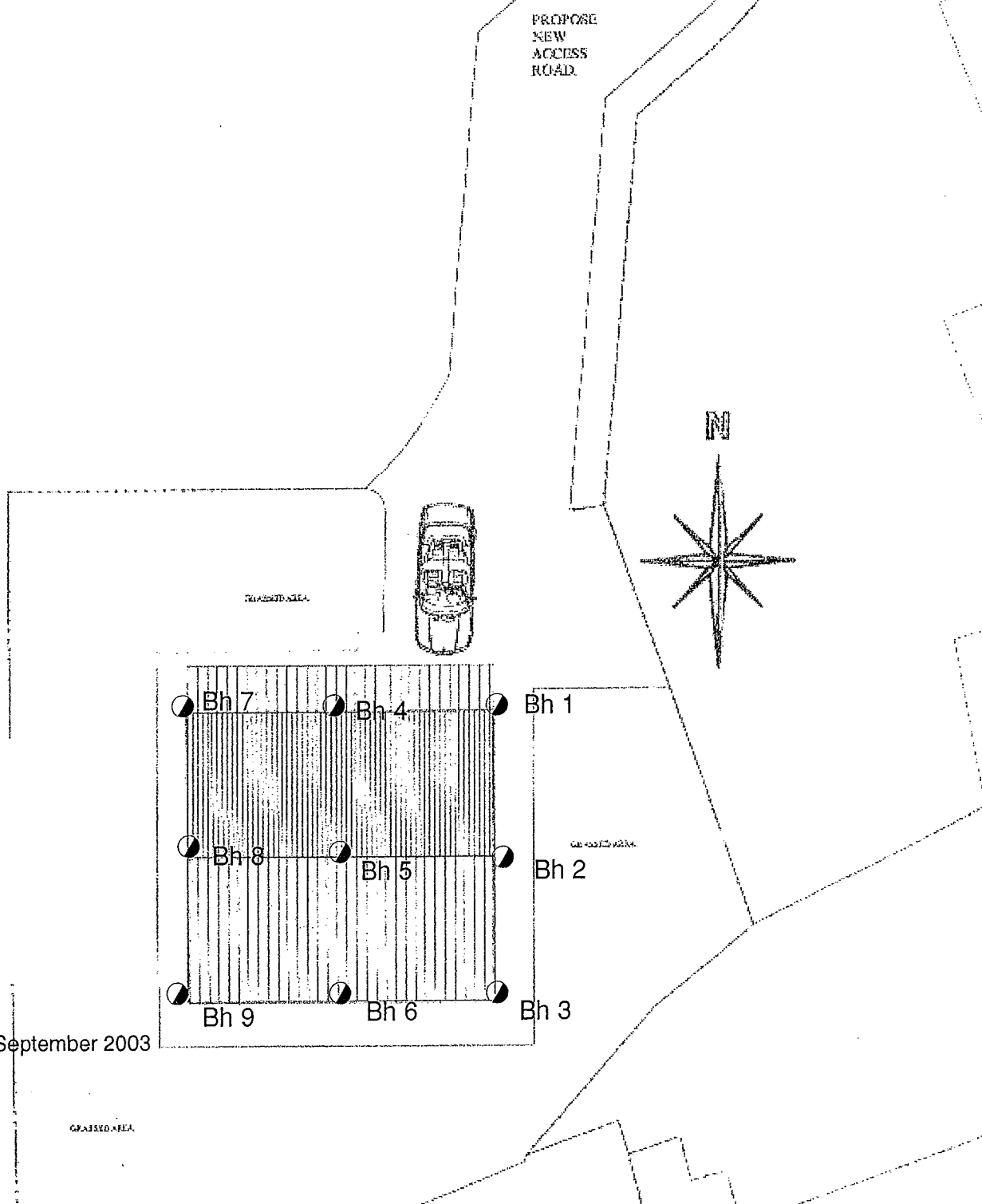
6 0309 1 September 2003





Borehole plan

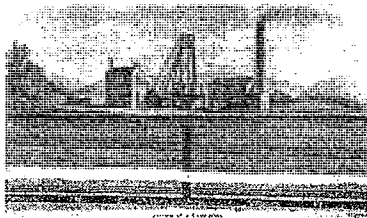
Scale 1:200



7 0309 1 September 2003



Printed on recycled paper



Results of remedial work

hole	seam depth*	hole depth	grout take	status code	comments
Bh 1	7.8	30.0	0.0	sd	1.5m fill
Bh 2	8.0	12.0	1.0	cd	2.0m fill
Bh 3	7.2	12.0	2.8	cn	1.5m fill
Bh 4	8.0	12.0	1.2	cd	1.5m fill
Bh 5	8.0	12.0	1.0	cd	1.5m fill
Bh 6	7.7	12.0	1.0	cd	3.0m fill
Bh 7	7.0	12.0	1.8	cn	1.0m fill
Bh 8	7.5	12.0	1.3	cd	1.5m fill
Bh 9	7.5	12.0	1.4	cd	1.0m fill

Grout mix 4:1 rockdust/PFA/cement and measured in dry tonnes

Injection pressure <150kN/m²

All work carried out by Neil Catlow B.Sc, F.G.S

Total grout take dry tonnes 11.5 tonnes

* or depth to mineworkings or migrating cavity

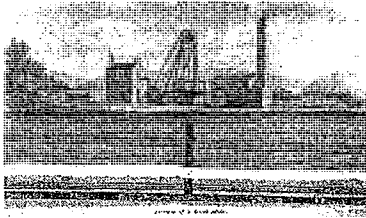
Status codes **sd** solid **cd** collapsed **cn** cavitation **vd** void

Borehole numbers with a i suffix are inclined

8 0309 1 September 2003



Printed on recycled paper



Method statement for remedial works

Stabilisation of mineworkings by grouting

This work follows an initial investigation of a site which has shown that a coal seam of economic importance is present at shallow depth and has been mined. There are therefore geotechnical hazards present.

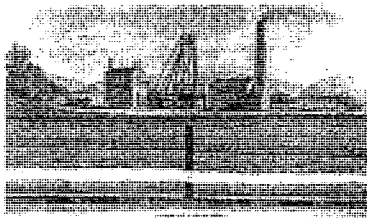
Shallow mineworkings are stabilised by drilling a grid of holes 65mm or 75mm diameter down through the coal seam on an initial 6.0m grid pattern over the bearing area of the proposed building, reducing to 3.0m spacing when open workings are encountered. The workings are grouted using 4:1:1 sand/PFA/cement ready-mixed grout injected by casing to the bottom of the hole, and pressurised to 150 - 200kN/m² when filled.

I carry out all this site work personally, and keep full records of each hole.

The report is submitted on completion is required for NHBC Validation D7.

9 0309 1 September 2003





Bh 1

REF Bh 1	0309	SITE CLIENT	Grango Lane, Ponciau Mr A P Hughes-Lloyd		DATE SCALE OSGN	1 September 2003 1:200
		TITLE	n/a		ORIENTATION FLUSH BIT	vertical water t/c 75mm
		ORIGIN	printout direct from rig on site drilled & logged by Neil Catlow		SPT N value	SECTION
DEPTH	STRATA	GRAPHIC	DESCRIPTION			
0.0	0.0	fill	////	grey and black shale		ground level
0.5			////			
1.0			////		4 @ 1.0m	
1.5	1.5	clay	=====	brown, sandy	5 @ 2.0m	
2.0			=====			
2.5			=====			
3.0	2.8	shale	=====	black, soft drilling	9 @ 3.0m	rockhead
3.5			=====			
4.0	4.1	shale	=====	dark grey, firm drilling	9 @ 4.0m	
4.5			=====			
5.0			=====			
5.5			=====			
6.0			=====			
6.5			=====			
7.0			=====			
7.5	7.8	coal	=====	black, soft drilling		Brassey Coal
8.0			=====			
8.5			=====			
9.0	8.8	shale	=====	dark grey, firm drilling		
9.5			=====			
10.0			=====			
10.5			=====			
11.0			=====			
11.5			=====			
12.0			=====			
12.5			=====			
13.0	13.2	mudstone	=====	grey, firm drilling		
13.5			=====			
14.0			=====			
14.5			=====			
15.0			=====			
15.5			=====			
16.0			=====			
16.5			=====			
17.0			=====			
17.5			=====			
18.0	18.1	coal	=====	black, soft drilling		Crank Coal
18.5			=====			
19.0			=====			
19.5	19.2	mudstone	=====	grey, firm drilling		
20.0			=====			
20.5			=====			
21.0			=====			
21.5			=====			
22.0			=====			
22.5			=====			
23.0			=====			
23.5			=====			
24.0			=====			
24.5			=====			
25.0			=====			
25.5			=====			
26.0			=====			
26.5			=====			
27.0			=====			
27.5			=====			
28.0			=====			
28.5			=====			
29.0			=====			
29.5			=====			
30.0	30.0		=====	bottom of hole		

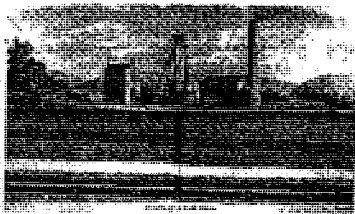
IN HOLE GAS TESTING

% oxygen	20.7
% methane	0.0
% carbon dioxide	0.0
% LEL	0.0

Nkc Geotech Ltd
25 Grosvenor Road
Wrexham
LL11 1BT

www.nkc.co.uk





Nkc Geotech Ltd

25 Grosvenor Road
Wrexham
LL11 1BT

tel
01352 762080
fax
01352 762081
email
neil@nkc.co.uk

Mining Investigation Report



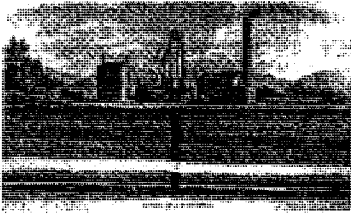
Grango Lane, Ponciau

0517
27 March 2006

JHL Consultants Ltd
8 Grango Lane
Ponciau
Wrexham
LL14 1ER
3 0517 27 March 2006



Printed on recycled paper



contents

- 5 site description and investigation results
- 6 management of geotechnical hazards
- 7 borehole plan
- 8 results of remedial work
- 9 drilling logs and section
- 10 method statement

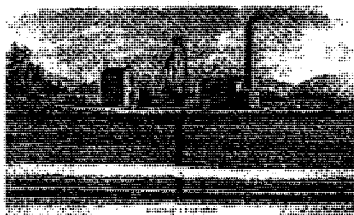
extract

This report meets NHBC D5 and D6 requirements
The site is undermined by old workings which have been stabilised by grouting

4 0517 27 March 2006



Printed on recycled paper



Site

A plot for one dwelling at Grango Lane, Ponciau.

Investigation and site work by

Neil Catlow B.Sc F.G.S Engineering geologist.

Records inspected

Coal Authority at Mansfield.

Geological Survey.

My previous investigations in this vicinity.

Investigation results

Ground level

Unchanged throughout the investigation.

Site history

The site was formerly agricultural land.

Gas testing

There were no methane or carbon dioxide emissions during the investigation period. See borehole logs for gas testing results.

Radon

The site lies in an area susceptible to radon. Radon can only be accurately detected over a three month test period, beyond the scope of this investigation. Precautions against radon accumulation should be taken in the absence of evidence of no radon presence.

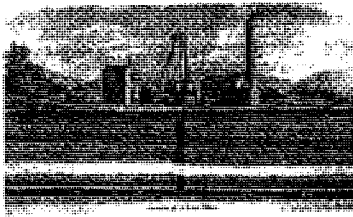
Foundation soils

Colliery derived shale fill upto 2.1m in thickness overlying brown sandy clay. Brown weathered shale rockhead at predominantly 3.5m. See borehole logs for SPT testing results.

5 0517 27 March 2006



Printed on recycled paper



Shallow mineworkings

Predominantly collapsed pillar & stall workings in the Brassey Coal at 7.0m. The Crank Coal is at 18.1m but any workings in this seam are too deep to affect surface stability. See log for Bh1.

Disused mineshafts

There are no records of any shafts on the site, but the Brassey Coal workings are so shallow that old unrecorded shafts are very probably present. Disused mineshaft 329346-060 is shown 10, east of the eastern site boundary and an area on site upto 20m from this position was searched but no shaft was found.

Hazard management

There are old and unrecorded mineworkings present in the Brassey Coal. Subsidence of these workings could cause crown holes to be formed on the site, with dimensions of upto 2.0m deep and 2.0m diameter. There may also be old and unrecorded mineshafts upto 2.0m in diameter present under the fill.

Ground improvement

Stabilise the mineworkings by grouting to prevent further void migration under the proposed buildings. I have personally carried out this remedial work - see results of remedial work.

Specialist foundations

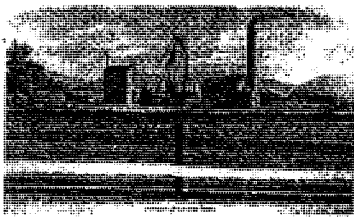
Use a structural foundation designed to span 3.0m in case there are old infilled crown holes and unrecorded shafts present.

For Nkc Geotech Ltd

Neil Catlow, B.Sc, F.G.S

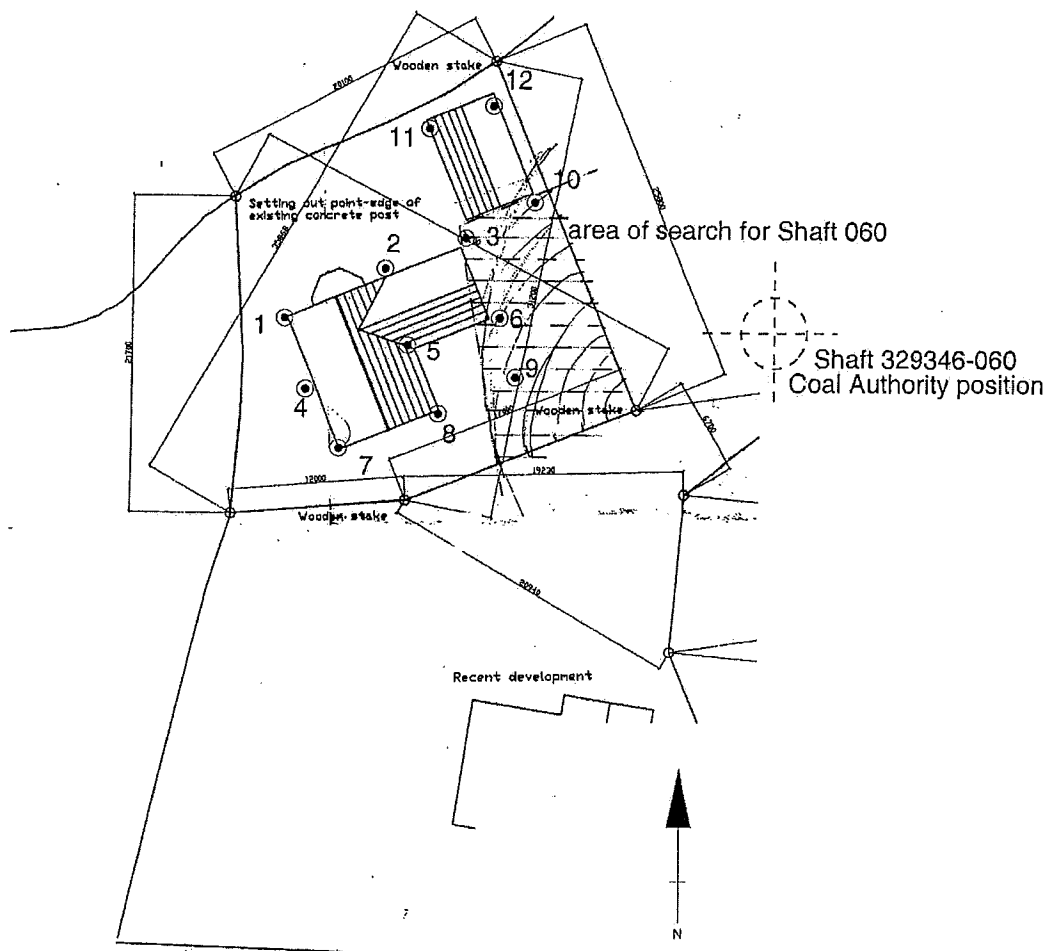
6 0517 27 March 2006





Borehole plan

Scale 1:500



7 0517 27 March 2006



Printed on recycled paper



Results of remedial work

hole	seam depth*	hole depth	grout take	status code	comments
Bh 1	7.0m	30.0	0.0	sd	2.0m fill - see log
Bh 2	6.2	12.0	0.0	sd	1.8m fill
Bh 3	5.2	12.0	2.4	cd	1.2m fill
Bh 4	4.8	12.0	0.0	sd	2.0m fill
Bh 5	4.8	12.0	0.0	sd	1.0m fill
Bh 6	4.8	12.0	0.0	sd	1.3m fill
Bh 7	7.3	12.0	2.1	cd	1.6m fill
Bh 8	5.5	12.0	3.6	cn	1.0m fill
Bh 9	6.1	12.0	1.7	cd	1.0m fill
Bh 10	5.8	12.0	0.0	cd	1.3m fill
Bh 11/	6.5	12.0	1.8	sd	1.3m fill
Bh 12/	6.6	12.0	1.2	sd	1.3m fill

Grout mix 4:1 rockdust/PFA/cement and measured in dry tonnes

Injection pressure <150kN/m²

All work carried out by Neil Catlow B.Sc, F.G.S

Total grout take dry tonnes 12.8 tonnes

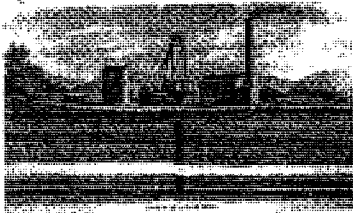
* or depth to mineworkings or migrating cavity

Status codes sd solid cd collapsed cn cavitation vd void

Borehole numbers with a / suffix are inclined

8 0517 27 March 2006





Method statement for remedial works

Stabilisation of mineworkings by grouting

This work follows an initial investigation of a site which has shown that a coal seam of economic importance is present at shallow depth and has been mined. There are therefore geotechnical hazards present.

Shallow mineworkings are stabilised by drilling a grid of holes 65mm or 75mm diameter down through the coal seam on an initial 6.0m grid pattern over the bearing area of the proposed building, reducing to 3.0m spacing when open workings are encountered. The workings are grouted using 4:1:1 sand/PFA/cement ready-mixed grout injected by casing to the bottom of the hole, and pressurised to 150 - 200kN/m² when filled.

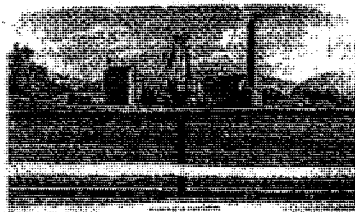
I carry out all this site work personally, and keep full records of each hole.

The report is submitted on completion is required for NHBC Validation D7.

9 0517 27 March 2006



Printed on recycled paper



Bh 1

REF	0517	SITE	Grango Lane, Ponciau	DATE	27 March 2006
Bh	1	CLIENT	JHL Consultants Ltd	SCALE	1:200
		TITLE	n/a	ORIENTATION	vertical
		ORIGIN	printout direct from rig on site drilled & logged by Neil Catlow	FLUSH	water
				BIT	t/c 75mm
DEPTH	STRATA	GRAPHIC	DESCRIPTION	SPT	SECTION
				N value	
0.0	0.0	fill	grey and black shale		ground level
0.5				7 @ 1.0m	
1.0				9 @ 2.0m	
1.5				9 @ 3.0m	
2.0	2.0	clay	brown, sandy	14 @ 4.0m	rockhead
2.5					
3.0					
3.5	3.5	shale	dark grey, firm drilling		
4.0					
4.5					
5.0					
5.5					
6.0	6.1	shale	black, soft drilling		
6.5					
7.0	7.0	coal	black, soft drilling		Brassey Coal old workings
7.5					
8.0					
8.5	8.6	shale	dark grey, firm drilling		
9.0					
9.5					
10.0					
10.5					
11.0					
11.5					
12.0					
12.5	12.4	mudstone	grey, firm drilling		
13.0					
13.5					
14.0					
14.5					
15.0					
15.5					
16.0					
16.5					
17.0					
17.5					
18.0	18.1	coal	black, soft drilling		Crank Coal
18.5					
19.0	19.0	mudstone	grey, firm drilling		
19.5					
20.0					
20.5					
21.0					
21.5					
22.0					
22.5					
23.0					
23.5					
24.0					
24.5					
25.0					
25.5					
26.0					
26.5					
27.0					
27.5					
28.0					
28.5					
29.0					
29.5					
30.0	30.0		bottom of hole		

IN HOLE GAS TESTING

% oxygen	20.7
% methane	0.0
% carbon dioxide	0.0
% LEL	0.0

Nkc Geotech Ltd
25 Grosvenor Road
Wrexham
LL11 1BT

www.nkc.co.uk

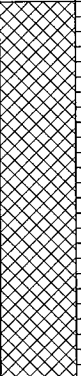
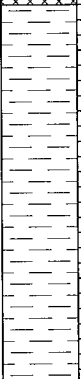


APPENDIX D

Borehole logs (This Investigation)

BOREHOLE LOG

Project Grango Lane				BOREHOLE No BH1	
Job No 1970	Date	Ground Level (m)	Co-Ordinates ()		
Contractor				Sheet 1 of 4	

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
						(2.50) 2.50	Made Ground	
						(2.50) 5.00	Brown Clay (Glacial Till)	
							Light grey Mudstone weathered to 7m, quickly becoming weak to moderately strong	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Dia. mm	Water Dpt	From	To	Hours	From	To	
											Notes 1. No loss of flush observed 2. No coal or workings encountered 3. No groundwater seepage encountered
All dimensions in metres Scale 1:50			Client			Method/ Plant Used			Logged By MS		

AGS3 UK BH 1970 GRANGO LANE.OPJ GINT STD AGS 3_1.GDT 10/8/17

BOREHOLE LOG

Project Grango Lane				BOREHOLE No BH1	
Job No 1970	Date	Ground Level (m)	Co-Ordinates ()		
Contractor				Sheet 2 of 4	

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick-ness)		
						(7.00)		
						12.00		
						12.30		
						(1.70)		
						14.00		
						(2.00)		
						16.00		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Dia. mm	Water Dpt	From	To	Hours	From	To	
											Notes 1. No loss of flush observed 2. No coal or workings encountered 3. No groundwater seepage encountered

All dimensions in metres Scale 1:50	Client	Method/ Plant Used	Logged By MS
--	--------	-----------------------	------------------------

AGS3 UK BH 1970 GRANGO LANE GPJ GINT STD AGS 3 1 GDT 10/8/17

BOREHOLE LOG

Project Grango Lane				BOREHOLE No BH1	
Job No 1970	Date	Ground Level (m)	Co-Ordinates ()		
Contractor					Sheet 3 of 4

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
						(3.00)		
						19.00		
						(9.00)		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Notes 1. No loss of flush observed 2. No coal or workings encountered 3. No groundwater seepage encountered

All dimensions in metres Scale 1:50	Client	Method/ Plant Used	Logged By MS
--	--------	-----------------------	------------------------

AGS3 UK BH 1970 GRANGO LANE GPJ GINT STD AGS 3 1.GDT 10/8/17

GroundSolve
Ltd

GroundSolve Ltd
Unit 1 Well House Barns
Flintshire CH4 0DH
Telephone: 01244 661361
Fax: 01244 661289

BOREHOLE LOG

Project Grango Lane				BOREHOLE No BH1
Job No 1970	Date	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 4 of 4

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION		
							Grey Mudstone with occasional ironstone band <i>(continued)</i>		
						28.00			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Notes 1. No loss of flush observed 2. No coal or workings encountered 3. No groundwater seepage encountered
All dimensions in metres Scale 1:50		Client				Method/ Plant Used					Logged By MS

AGS3 UK BH 1970 GRANGO LANE.GPJ GINT STD AGS3 1.GDT 10/8/17

BOREHOLE LOG

Project Grango Lane				BOREHOLE No BH2	
Job No 1970	Date	Ground Level (m)	Co-Ordinates ()		
Contractor				Sheet 1 of 2	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
						(3.00)	Made Ground		
						(1.00)	Brown Clay (GLACIAL TILL)		
						(1.00)	Dark grey/black clay with coal fragments		
						(2.00)	Weathered carbonaceous Mudstone with clay and coal fragments		
							Steady drilling but no returns as clay from 7m squeezing in on hole preventing returns		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Notes 1. Water seepage at 7m making further progress 2. Rods pulled and cased to 3m 3. Unable to get past 10m because of clay squeezing on rods 4. No voids or evidence of collapsed ground
All dimensions in metres Scale 1:50			Client			Method/ Plant Used			Logged By MS		

GroundSolve Ltd
Unit 1 Well House Barns
Flintshire CH4 0DH
Telephone: 01244 661361
Fax: 01244 661289

BOREHOLE LOG

Project Grango Lane				BOREHOLE No BH2
Job No 1970	Date	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 2 of 2

SAMPLES & TESTS			Water				STRATA		Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION			
						(5.00)	Steady drilling but no returns as clay from 7m squeezing in on hole preventing returns (<i>continued</i>)			
						12.00	Solid Drilling			
						(1.00)				
						13.00				

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Notes 1. Water seepage at 7m making further progress 2. Rods pulled and cased to 3m 3. Unable to get past 10m because of clay squeezing on rods 4. No voids or evidence of collapsed ground
All dimensions in metres Scale 1:50		Client				Method/ Plant Used					Logged By MS

AGS3 UK BH 1970 GRANGO LANE.GPJ GINT STD AGS 3 1.GDT 10/8/17

BOREHOLE LOG

Project Grango Lane				BOREHOLE No BH3	
Job No 1970	Date	Ground Level (m)	Co-Ordinates ()		
Contractor					Sheet 1 of 4

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
						(0.50) 0.50	Made Ground	
						(3.00) 3.50	Brown Clay (Glacial Till)	
						(2.50) 6.00	Dark grey Mudstone with a little coal	
							Light grey Mudstone	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Notes 1. No loss of flush or workings encountered 2. Notes no groundwater seepage observed 3. No casing used
All dimensions in metres Scale 1:50			Client			Method/ Plant Used				Logged By MS	

BOREHOLE LOG

Project Grango Lane				BOREHOLE No BH3	
Job No 1970	Date	Ground Level (m)	Co-Ordinates ()		
Contractor				Sheet 2 of 4	

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
						(5.00)		
						11.00		
						(1.00)		
						12.00		
						(6.00)		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Notes 1. No loss of flush or workings encountered 2. Notes no groundwater seepage observed 3. No casing used
All dimensions in metres Scale 1:50			Client			Method/ Plant Used			Logged By MS		

BOREHOLE LOG

Project Grango Lane				BOREHOLE No BH3	
Job No 1970	Date	Ground Level (m)	Co-Ordinates ()		
Contractor				Sheet 3 of 4	

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
						18.00		
						(0.50) 18.50		
						(6.50)		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Notes 1. No loss of flush or workings encountered 2. Notes no groundwater seepage observed 3. No casing used
All dimensions in metres Scale 1:50			Client			Method/ Plant Used				Logged By MS	

AGS3 UK BH 1970 GRANGO LANE.GPJ GINT STD AGS 3.1 GDT 10/8/17

GroundSolve Ltd
Unit 1 Well House Barns
Flintshire CH4 0DH
Telephone: 01244 661361
Fax: 01244 661289

BOREHOLE LOG

Project Grango Lane				BOREHOLE No BH3
Job No 1970	Date	Ground Level (m)	Co-Ordinates ()	
Contractor				Sheet 4 of 4

[illegible]

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Notes 1. No loss of flush or workings encountered 2. Notes no groundwater seepage observed 3. No casing used
All dimensions in metres Scale 1:50		Client				Method/ Plant Used					Logged By MS

AGS3 UK BH 1970 GRANGO LANE.GPJ GINT STD AGS3 1.GDT 10/8/17