4. Development Impact

4.1 Normally, to predict the impact of a development, it is necessary to monitor the operation of the road network during the following periods:-

(i) traffic peak conditions combined with the predicted generated levels of traffic from the development at that time, and

(ii) peak development generation combined with the road network conditions at that time.

4.2 A residential development of the type proposed, would tend to demonstrate most traffic movements during the morning and evening highway peak period. Any full capacity assessment would therefore normally be based on the number of vehicle trips generated during the busiest single hour within the morning and evening peak periods.

4.3 In the case of developments of 2 or 3 houses, however, the number of trips during any particular hour would be very low, so it is more appropriate to examine a comparison of daily traffic.

4.4 In general, estimation of the probable vehicle trip attraction by a new development is based on experience and on surveys undertaken at existing similar developments, related to a common index.

4.5 Reference has been made to the Trip Rate Information Computer System (TRICS) database Version 7.3.1), which contains data for surveys at site around Great Britain. A search was made for similar sites, so that comparable trip rates could be extracted, to be applied to the current proposal.

Daily Traffic Assessment

4.6 Table 4.1 below illustrates the calculated daily trip rates (7am to 7pm) and amount of trips generated by the development of a single dwelling over the day. The full TRICS output is included in Appendix B.

Land Use	Daily Trip Rates			
	Trip Rates In	Vehicle Trips In	Trip Rates Out	Vehicle Trips Out
3 Dwelling	2.520	8	2.363	8

Table 4.1 – Daily Development Trip Generation from TRICS

4.7 There will be a few trips overnight, bringing the total to approximately 6 trips per house, on average, or 18 vehicle trips per day.

4.8 As stated earlier, an automatic traffic count was carried out on the route, further to the west, for a period of one week, starting on Wednesday 26 February and finishing on Thursday 6 March 2016. As well as measuring traffic speeds, the counter also recorded hourly and daily traffic flows over that period.

4.9 The full results of the automatic count surveys are included in Appendix A. Table 4.2 below summarises the traffic count information, and demonstrate that the average daily traffic flow on the route is 845 vehicles per 24-hour day.

Time	Total Vehs
24-hour (0000-0000)	
Eastbound	**432**
Westbound	**413**
Total 2-way	**845**

Table 4.2 – Summary of Automatic Traffic Count Data

4.10 Comparison of these figures with Table 4.1 demonstrates that, the development now proposed would be likely to generate approximately 18 trips per day, or 2%, to traffic flows on the route over the full day.

4.11 This assumes that all of the new trips will go in and out from the same direction, i.e. either all on the section between the A904 and the site, or between the site and Borrowstoun. In practice, some trips will go one way, and some the other, so the percentage impact on any single length of the route will be closer to 1% of the existing daily traffic flow.

4.12 Examination of the hourly traffic flows indicates that even at busiest periods, traffic flows are around 60 vehicles per hour, or one per minute. With such low traffic flows, there is little likelihood of two vehicles meeting at the site access. Even if they do, then adequate visibility splays can be provided, commensurate with measured traffic speeds, to ensure that drivers can see each other at the new and existing junctions.

4.13 The development results in an insignificant increase in traffic flows on the route, and taking this into account, along with the existing injury accident record (or lack of one), it would appear unreasonable to assume that such an insignificant increase would be detrimental to capacity or road safety on the road network under examination.

5. Conclusions

5.1 The site lies to the south of an unclassified route between Borrowstoun and the A904 at Champagny, which is a lightly-trafficked historical route, constructed well before current road design standards were applicable.

5.2 The Council's Roads Development Unit have advised that the application should be refused on the grounds of road safety, stating that it would be inappropriate to create a new access or to increase vehicle use on the existing access, because their visibility standards cannot be met.

5.3 The road is subject to the National Speed Limit, but actual traffic speeds are considerably lower, being constrained by the horizontal and vertical alignment of the road along its length.

5.4 Traffic counts demonstrate that the road is very lightly trafficked, with a combined two-way traffic flow of just over 100 vehicles per day.

5.5 ACTT have examined traffic speeds past the site, which demonstrate that the appropriate "design speed" is 50 kilometres per hour (or just over 30 miles per hour). The appropriate junction visibility splay, for that design speed, is 70 metres.

5.6 Aside from some roadside vegetation which is within the control of the council as roads authority, this visibility splay is available in both directions from a point 2.4 metres back from the main road, at both the existing private access, and the proposed new access. This meets the standard prescribed in the Design Manual for Roads and Bridges, where the main road traffic speed is approximately 31 miles per hour or less.

5.7 The record of injury accidents indicates that there have been no injury accidents along the route in the last 5 years. This accident record is not indicative of a particular road safety difficulty at this location, and confirms that this route has now operated for some years with no apparent road safety difficulties.

5.8 The development will generate a minimal number of new vehicle trips on the road network in the morning and evening peak hours, or, indeed, over the full day. This report concludes that the development will not significantly affect the operation of the surrounding road network.

APPENDIX A

TRAFFIC COUNT DATA

APPENDIX B

DRAWING G120/SK01

APPENDIX C

TRICS

TRIP GENERATION DATA

SIMPSON MINING AND GEOTECHNICAL LTD

CONSULTING MINING & GEOTECHNICAL ENGINEERS

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Bridge of Allan
FK9 4DQ

MINING RISK ASSESSMENT REPORT

FOR PROPOSED NEW DWELLING HOUSES

AT BONHARD HOUSE, BONESS

Client : **N.O.W Holdings Ltd**
Beechwood Nurseries Uphall
Livingston
West Lothian
EH52 6PA

Report No : **4004/IS**

Engineer : **W. Simpson**

Issued : **16 June 2016**

2. CONTENTS.

3. SCOPE OF STUDY.

This report details the results of our investigations into the mining stability of the above site. Our report and conclusions has been based on a desk study.

It is intended to construct three new dwelling houses within the site boundaries.

4. DESK STUDY.

The desk study comprised an examination and study of the following maps and publications.

1. The Geological Survey of Scotland, Linlithgowshire, Sheet 1 SE, 1 : 10,560, 1909

2. Geology for Land Use Planning : Livingston, British Geological Survey, 1993.

3. The Economic Geology of the Central Coalfield, Area 3, H.M.S.O., 1933.

4. The Carboniferous Limestone Coalfields of West Lothian, H.M.Caddell, T.M.I.S., 1902.

5. GEOLOGY.

The desk study revealed the site to be underlain by approximately 5 metres of boulder clay which rests in turn on rock strata of the Limestone Coal Group.

The strata dip to the north at approximately 11 degrees.

6. FAULTS.

There are no known faults within the site boundaries or influencing distances from them.

7. SHAFTS AND ADITS.

There are no known shafts or adits within the site boundaries, or influencing distances from them.

The nearest known old shaft is situated 45 metres to the north-east of the north-east site corner..

8. OPEN-CAST MINING.

No open-cast mining has taken place within 200 metres of the site boundaries. The reserves of potential open-cast coal which lie beneath the site are insufficient to interest an open-cast contractor.

9. REMEDIAL WORKS.

The Client has indicated that no remedial works have been carried out by the Coal Authority within the site boundaries or influencing distances from them.

10. PAST WORKING.

Mining has taken place beneath the site in several seams of coal and an ironstone circa 1814 to 1875.

11. GAS EMISSIONS.

The site is underlain by 5 metres of boulder clay which will prevent migration of mine gases migrating on to the site.

12. PRESENT.

No workings are at present taking place beneath the site.

13. FUTURE.

No economically workable coals now exist beneath the site. It is highly unlikely that any underground working will take place in the future.

14. MINING STABILITY ASPECTS AND FOUNDATION DESIGN.

The general sequence of strata beneath the middle of the site is approximately as given below :-

BOULDER CLAY	5.00
STRATA	9.00
RED COAL (0.91)	9.91
STRATA	40.41
LOWER IRONSTONE AND COAL (0.51)	40.92

(All measurements in metres)

The desk study has revealed that the Lower Ironstone was worked beneath the site circa 1850 by the long wall method (see Appendix). The depth to the old workings, method of working and time that has elapsed since working ceased will have ensured that all subsidence due to the working of this seam will have long since taken place. It is concluded that the site is stable with regards to any old workings in this seam.

14. MINING STABILITY ASPECTS AND FOUNDATION DESIGN (continued).

The Red Coal lies at depths of 5 metres along the southern site boundary, to approximately 13 metres along the northern boundary. The coal was worked beneath the site circa 1815 to 1850. No abandonment plans are available for the workings in the coal beneath the site. The desk study has revealed that insufficient rock cover exists over the old workings to ensure stability. We have thus classified the site as unstable. It is almost certain that the site will require to be grouted prior to construction of the houses. It will be necessary to sink 3 rotary bores to ascertain the exact depths to the old workings and to draw up a Bill of Quantities for grouting of the site.

Other coals have been worked beneath the horizon of the Lower Ironstone and Coal, but are deep enough to require no further consideration

15.CONCLUSIONS AND RECOMMENDATIONS.

(1) The site has been classified as unstable due to shallow workings in the Red Coal

(2) There are no known shafts or adits within the site boundaries, or influencing distances from them.

(3) Prior to construction rotary core bores will require to be sunk at ascertain the depth to the old workings and amount of rock cover.

(4) It is considered highly probable that the site will require to be grouted prior to construction of the foundations.

(5) A trial pit investigation will require to be carried out to assess the engineering properties of the superficial deposits.

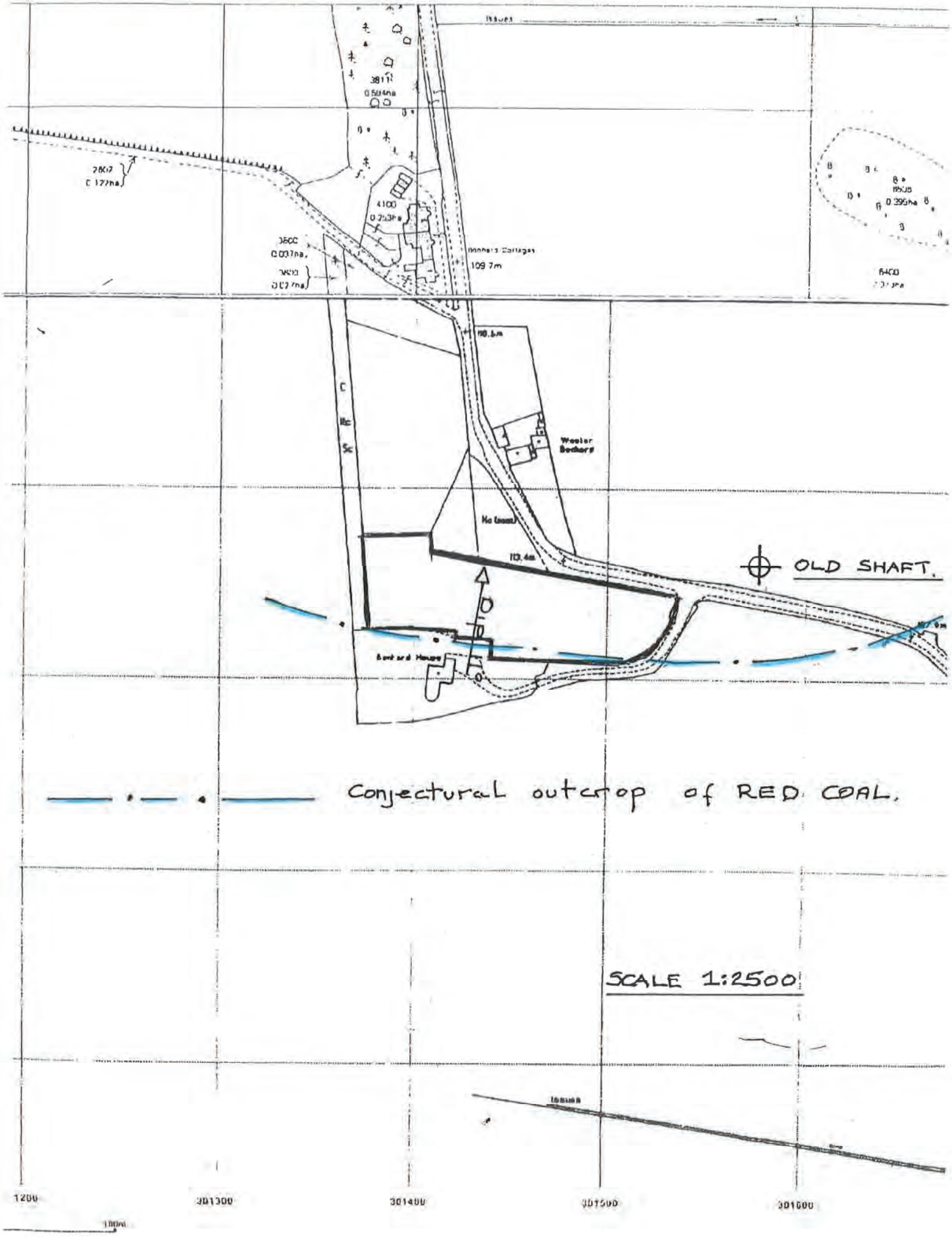
[redacted]

W SIMPSON B.Sc.(Mining), M.Sc., C. Eng., MICE, MIHT, F.G.S.

APPENDIX

APPENDIX 1

SOLID GEOLOGY OF SITE AREA


OLD SHAFT.
Conjectural outcrop of RED COAL.
SCALE 1:2500
1200
301300
301400
301500
301600

APPENDIX 2

METHODS OF MINING

METHODS OF MINING

Two methods of mining have been used in the past to extract minerals from stratified deposits, namely the stoop and room system, and the longwall system.

STOOP AND ROOM.

In this method, passage ways or rooms are driven, more or less at right angles to each other through the seam which is thus formed into square or rectangular blocks or stoops.

These stoops are formed in the "first" working, the workings being extended to the limit of the royalty. At the limit of the royalty, the stoops or part of the stoops are removed on retreating back to the shaft, this was some times referred to as the "second" working.

Depending on the depth to the mineral being extracted, thickness of mineral, and condition of the roof and floor, extraction rates of up to 80% could be achieved by this method.

The width of the rooms and pillars depended on depth to the mineral, thickness of mineral and condition of the roof and floor.

These stoops may continue to perform their function of supporting superincumbent strata for many years. However, depending on circumstances, the stoops can eventually fail causing subsidence and movement of the ground, and in the case of very shallow workings plump holes may be formed at the surface.

LONGWALL SYSTEM.

In this method the seam is completely extracted by means of dividing the seam into panels. The strata overlying the mined area is allowed to subside, and as a result all subsidence is normally completed shortly after the extraction of the seam.

However in the case where little or no rock cover exists over the workings instability could result due to the presence of old roadways remaining open.