



**Site Investigation for the Foundations and Wall for the Development off Dovehouse
Close Whitefield near Bury**

For Mr.Khawaja.

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Produced By:

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ASSESSMENT OF THE GROUND CONDITIONS FOR THE DETACHED HOUSE AT DOVEHOUSE CLOSE, WHITEFIELDS, BURY M45 7PE

1 EXECUTIVE SUMMARY

Mr Khawaja has instructed Cromwell Wood Estate Company Limited to undertake a site investigation and assessment of the land for the excavation of the remnant face from the sand pit and to erect a detached house. It is proposed to build a house with an integral garage. The footprint of the house is in the corner of a former sand pit that was worked from 1845 to 1930 before the bottom of the quarry was levelled off and the land developed for housing alongside Park Lane in the 1930's and then apartments and houses built in the early 1980's on the floor of the quarry. A place of worship has also been built to the east of the subject site and the apartments on Dovehouse Close.

There is a public footpath which connects Dovehouse Close to Ringley Drive which on the remnant sand face and has steps from the level of the Close to Ringley Drive. The height difference is approximately 13.5 metres. The plan of the house and garage is included in appendix A and this plan, figure 1, shows the cross sections through the site for the proposed retaining wall.

The site is in sand and there is approximately 80 metres of sand and gravel, fine sand and clay beneath the site so rainwater runoff from the property can be placed in a soakaway or into the rainwater sewer in the road.

The excavation has been considered for the development of one house and the sand would have to be excavated from the back of the public footpaths into the site. The excavation could be from the middle of the site and out to the boundaries where the sand could be excavated in sections so that retaining blocks can be installed in sections. Blocks can be erected temporarily and then moved into position.

The 1997 SI has been reviewed and found sand and gravel and fine sand that was dry and non-cohesive. The engineer supervised two boreholes being drilled to a depth of 6 metres and found that the holes were dry and on the standard penetration test the sand and gravel gave a bearing capacity of 250kN/m² whilst the finer sand was softer with a bearing capacity of 75kN/m².

There is a property above the site to the west and it was built on a triangular piece of land on top of the face. It has been extended over the years so that the building occupies the flat land off Ringley Drive to the north of the face. The development of this parcel of land will need to ensure that the land above is supported.

In summary it is feasible to develop the land on Dovehouse Close and retain the support for the neighbouring bungalow at 7 Ringley Drive and the wall on the west side of the public footpath. The public footpath can be retained with a concrete block wall with mesh in the cavity and then concrete poured in the cavity. Drainage pipes will need to be installed through the wall to control the moisture content in the strata but with it being sand it will be free draining. The excavation on the north and west sides can be carried out in phases and concrete blocks installed as shown in figures B and C in appendix 1.

- 1.1 The geology of the site was considered to assess the ground conditions and the historical maps to review the past history of the site as there is a former sand pit on the site and the floor of the quarry has been developed for housing. On the crest of the old sand pit the land has been developed for housing as well and there is a level difference of 12 metres.
- 1.2 The site was inspected in May and at the time the vegetation on site was coming into leaf and the semi mature trees on the outer edges of the site were in good condition so it can be presumed that the root stock will be good and will hold the sand and gravel face.
- 1.3 There is a public footpath the east side of the site and beyond that an electricity substation and also a storage building and garages for the apartments on Dovehouse Close. The height of the footpath above the base level of the site is 1.5 metres so this wall can be built in concrete block work 440 mm by 200mm by 100 mm with a cavity between each leaf and tied with A393 mesh and wall ties before being concreted in. Drainage pipes should be installed in the wall.
- 1.4 The historical maps have been reviewed from 1854 and the site was undeveloped until 1933 when houses were built on Park Lane. Dove House existed to the north of the sand pit as it was opened up so this property has been used to locate the historical features on the maps to the present day features.
- 1.5 The sand pit was operated from 1854 until 1930 and then left as a remnant face. The pit floor was developed in the 1960's for houses on Dovehouse Close and apartments in the quarry floor. The public footpath was redirected to climb in a zig zag up the face when the site was developed as it used to follow the route of the close and run direct north to Ringley Drive.
- 1.6 The face has been left at a natural angle of repose of 1 in 1.5 since the 1930's until part of the face was excavated to accommodate the garages for the apartments. The investigation of the site undertaken for the contamination assessment and a previous site investigation undertaken in 1997 has proven the strata which is superficial glacio fluvial sand and gravel some 80 metres thick.
- 1.7 There is no risk of subsidence from coal mining as the last mining was in 1966 from Agecroft Colliery situated some 4 kilometres to the south of the site and the workings were mechanised longwalls and over 250 metres below the base of the superficial deposits which means a depth of at least 300 metres.

2 SITE LOCATION

- 2.1 The site is located at the north side of Dovehouse Close off Park Lane in Whitefields near Bury and the post code is M45 7PE. It is in a parcel of land that was the corner of the sand quarry and is constrained by the difference in level to the north and the close to the south.
- 2.2 The sewer system was installed at the same time as the apartments to the east of the site were built. There are manhole chambers in the road to access the sewer network which have not been inspected.

- 2.3 The site is within the area of Whitefields which is mix of housing along Park Lane and Ringley Drive with most of the houses have been built between 1950 and 1980 along the roads as the agricultural land was developed. The sewers accept the storm water and foul water in a combined system.
- 2.4 There is a place of worship to the east that was built in the 1960's and the school has been expanded in the area to the east on Park Lane. There is a large park and playing field to the south of the site.

3 TOPOGRAPHY

- 3.1 The topography of the site is a plateau to the north on Ringley Drive at a level of 130 metres aod and the land at the base of the slope is between 113 metres and 118 metres aod. Park Lane is at 113 metres aod and the close gradually rises to the subject site and the apartment blocks. The road falls to the east on the bend in Dovehouse Close. Surface water on the gardens and the roads will flow across the area to the east as there is slight cross fall over the land.
- 3.2 The existing combined sewer at the west side of the subject property can take water from the houses as it falls to the south draining to the sewer in road around this property.
- 3.3 The site will have to be excavated to create the footprint for the house and the retaining walls will be high in the north west corner at 7 metres.

4 GEOLOGY

- 4.1 The geology of the site is within the superficial deposits of sand and gravel and clay laid down between 116,000 and 11,000 years ago over the concealed coal measures of the Carboniferous period where there were productive coal seams that have been worked by collieries in the Manchester area.
- 4.2 The geology of the area is competent and will provide a solid base for the development of the site. The geology of the area has been proven by boreholes drilled in the site and around it to prove the depth of the natural ground.
- 4.3 Previous site investigation trial pits and boreholes in the site have proven the geology which is discussed in the 1997 report included in appendix C. A borehole drilled for the National Coal Board in Park Lane playing field proved there was 78 metres of drift as it was called then over the bedrock.
- 4.4 The ground will allow the house and integral garage to be built on strip footings with an oversite slab. There is no evidence of techtonic movement due to past coal mining from Agecroft between 1959 to 1991 and whilst there are faults nearby, they are very unlikely to cause instability in the subject land after coal mining ceased in 1991 due to the overlying drift of sand and gravel.

5 HYDROLOGY AND HYDROGEOLOGY

Hydrology

- 5.1 As the area is located on the sand and gravel there are no watercourses within the area and the levels on the land show there to be a likelihood that water will percolate into the ground in open country. The runoff from the properties in the village run to a combined or storm water sewers and this development will be connected to the sewer system on site and will not increase the risk of flooding in the sewerage system around area.

Hydrogeology

- 5.2 The sand and gravel of the area as shown on the geological records is classed as an aquifer / minor aquifer and has capability to store water in times of rainfall. The groundwater table will have risen since the mine closed in the early 1990's within the coal measures and the water table is responsive to rainfall in the drift deposits as the water is utilised for the golf courses nearby. The system of rainwater disposal will be connected to the sewer network as there are sewers in the Close.
- 5.3 The method of rainwater disposal is into the existing combined sewer pipe in the subject property in the southeast corner of the subject property. A layout of the system is included in planning application.

6 ENVIRONMENTAL INFORMATION

- 6.1 The site has been open fields from the earliest Ordnance Survey publication in 1852 when information is taken from the first edition Ordnance Survey Map. The site is a former sand pit that has been worked over 100 years from 1845 before being developed for houses and apartments in the late 1960's
- 6.2 The subject land is a corner piece of land that appears never to have been used other than for the sand pit and the buildings that are part of Dovehouse Close apartments with garages are located to the east. There was no development on the site until the mid-1960's when the new apartment blocks are shown. The site has been stripped of topsoil as part of the sand pit which has regenerated over time after the building of the apartments and number 7 Ringley Drive.
- 6.3 The area has been the subject of redevelopment for houses. Prior to that there is evidence of sand working and there has been no contaminative use at all.
- 6.4 From the information on the historical maps and the site investigation report in appendix C it was decided not to investigate the area as there is sufficient information to provide a scheme for the planning application. Once planning permission is granted detailed design work can be undertaken for the building regulations application and to discharge any planning conditions.

7 DESIGN

- 7.1 The location of the house and garage have been designed by the architect of the client company and a drainage plan has been prepared for the storage of storm water off the roofs of the buildings before going to sewer. Refer to the application drawings.
- 7.2 The excavation should be undertaken in 7 phases as shown on figure D in appendix A so that the shallowest part of the site is excavated after the area has been dug out in the centre so the footpath and the house on Ringley Drive can be supported with blocks as the sand is removed in those phases. The phases of excavation allow continuous monitoring of the site conditions and further inspections on the crest for rotational or tension cracking.

8 SITE INVESTIGATION

- 8.1 The site investigation took place on the site 1997. The work involved excavating the sand to inspect the face and the drilling 2 boreholes to take standard penetration tests to assess the compaction and bearing capacity of the sand.
- 8.2 Once planning permission is granted then more investigation can be undertake on site for undisturbed samples of sand to be obtained to provide information on the moisture content, the type of sand and the likelihood of failure from shearing forces if the sand is exposed for any length of time. Refer to photographs in appendix B.
- 8.3 Whilst digging out the material for the house the excavation can be in phases I the shallowest parts first away from the house above and the steps on the public footpath so that the geotechnical properties can be ascertained and the appropriate measures taken to protect the footpath on the northside and the bungalow at number 7 Ringley Drive.

9 CONCEPTUAL MODEL FOR THE SITE

- 9.1 From the inspection of the subject site and adjacent area, with the site investigation data that includes borehole information from the area, and the observed excavation on sand quarries the mode of failure of the excavations will be rotational if the sand is dig to a vertical face over a longer distance that a section. The excavation has been designed in 7 phases as shown on figure D in appendix A so that the properties of the sand and gravel can be investigated as work progresses and if need be, ceased until a revised design for the support of the neighbouring property is completed.

10 RISK ASSESSMENT

Table 1 Risk Assessment	
<i>Risk Description</i>	<i>Risk Category</i>
On-Site Flooding	L
Ground Conditions	L
	L
Potential for Settlement	L
OVERALL RISK	L
Key:- L - Low Risk M - Medium Risk H - High Risk	

11 OTHER ASSESSMENT

- 11.1 Whilst on the site the samples and soil profile were considered for the design of the roads, sewers, water supply, electric and gas so that there was no risk to the cables or pipes becoming damaged due to lack of cover from the surface levels in the sand at a depth of 0.8 metres from the surface.
- 11.2 The retaining wall can be built in concrete blocks that are overlapped on each level as shown on the figures B and C in appendix A.
- 11.3 Soil contamination is negligible on site and there is no risk to the environment from the migration of pollutants due to the past use as a sand pit.

12 OBSERVATIONS & RECOMMENDATIONS

- 12.1 The drainage should be designed to accept the rainwater and place into the sewer system or to a soakaway.
- 12.2 In conclusion the site is an ideal site for building with good foundation material at a depth of 750 to 900 mm on the compacted sand and gravel like the other houses in the area.
- 12.3 It is a difficult site due to the topography but the footprint can be excavated safely to retain the sand on a slope until the block walls are built. Sand quarries that the undersigned engineer inspects carries out for building materials clients and photographs of excavations are shown in photograph numbers 11 and 12. The faces are stable over the short term and it is expected that the faces would only be exposed for a few days on the subject site.
- 12.4 Sufficient soil for the landscaping of the site can be retrieved before importing good quality topsoil for the gardens to the front and rear. The sand from the excavations for the construction work will have to be removed from site and there is no contamination on site so the material is naturally occurring soil and is inert. It can be used for secondary

materials for pipe laying or paving if a builder requires it. It should not be discarded as waste.

- 12.5 There are some difficulties presented to the developer and the current phased design can be expanded upon once planning permission is granted so that the sand can be supported to provide the footprint and also support the surrounding land.

13 LIMITS AND LIABILITY

Cromwell Wood Estate Company Limited have produced this report on the land, that was formerly a sand pit, for the house on Dovehouse Close, Whitefields M45 7PE solely for the use of the client and his professional advisor on matters appertaining to the planning application for the erection of one detached dwelling. The report is on the development of the site and the investigation has concluded that the ground conditions are suitable for strip footings and the sand can be supported by a retaining wall to create the footprint and support the footpath and neighbouring house.

Both the findings and opinions expressed within the report are relevant to the period of site visit in April and May 2023 and data supplied for a period of 12 months from the date of the report. Therefore, the information should not be relied upon beyond a period from that report date without referring back to the engineer and this company. No part of the report may be reproduced or relied upon by any third party who may subsequently advise of the client or undertake his own investigation without the prior written consent of Cromwell Wood Estate Company Limited. It is recommended that any other potential developer consult with the writer of this report prior to undertaking any site investigation work as the contents of this report cannot be relied upon for the design of a site investigation.

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APPENDIX A

ARCHITECT'S PLANS FOR THE SITE WITH CROSS SECTION POSITIONS AND SECTIONS THROUGH THE SITE.

APPENDIX B

PHOTOGRAPHS

APPENDIX C
1997 S I REPORT

APPENDIX D

BROCHURE FOR INTERLOCKING CONCRETE BLOCKS

