Land east and west of Hyde End Road, Shinfield, Berkshire

Mineral (Sand & Gravel) Resource Assessment Desk Study

On behalf of **Bloor Homes and the University of Reading**

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For and on behalf of Stantec UK Limited				

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0	12/11/2024	First issue	LT	OB	OB
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1 Introduction

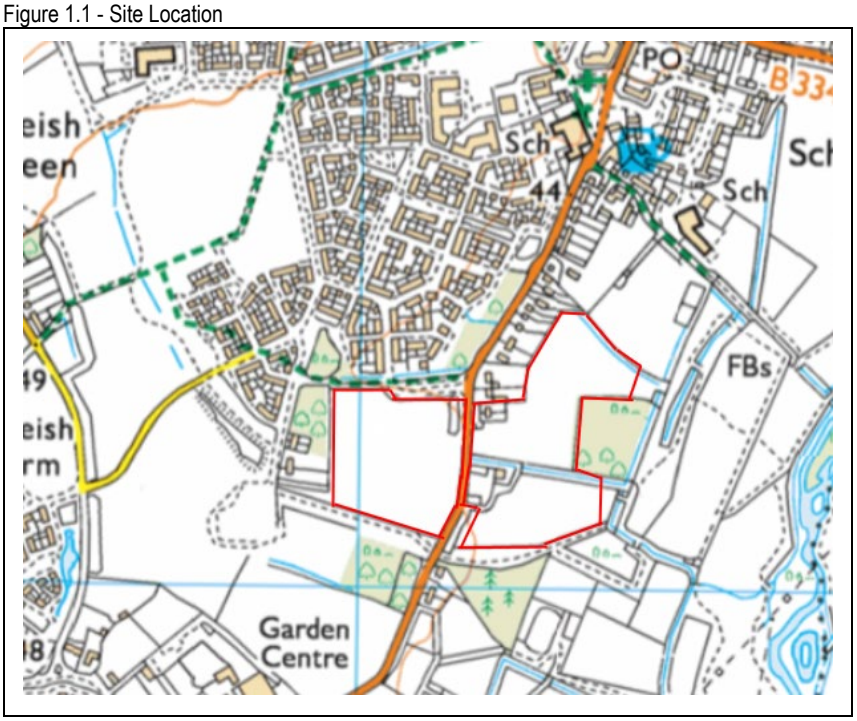
1.1 Brief

1.1.1 Stantec UK Ltd has been commissioned by Bloor Homes and the University of Reading to prepare a Qualitative Mineral (Sand and Gravel) Resource Assessment (desktop study) for a proposed residential development at land off Hyde End Road, Shinfield, Berkshire.

1.2 Site Location

1.2.1 The site is centred on National Grid Reference 473203, 167218 about 500m south of Shinfield town centre.

Figure 1.1 - Site Location



1.3 Background

1.3.1 The site lies within the area covered by the Central and Eastern Berkshire Joint Minerals & Waste Plan (MWP)[1]. The MWP was informed by a British Geological Survey (BGS) report for the area[2]. Section 17 of the National Planning Policy Framework (NPPF)[3] includes the UK Government policy for sustainable use of minerals.

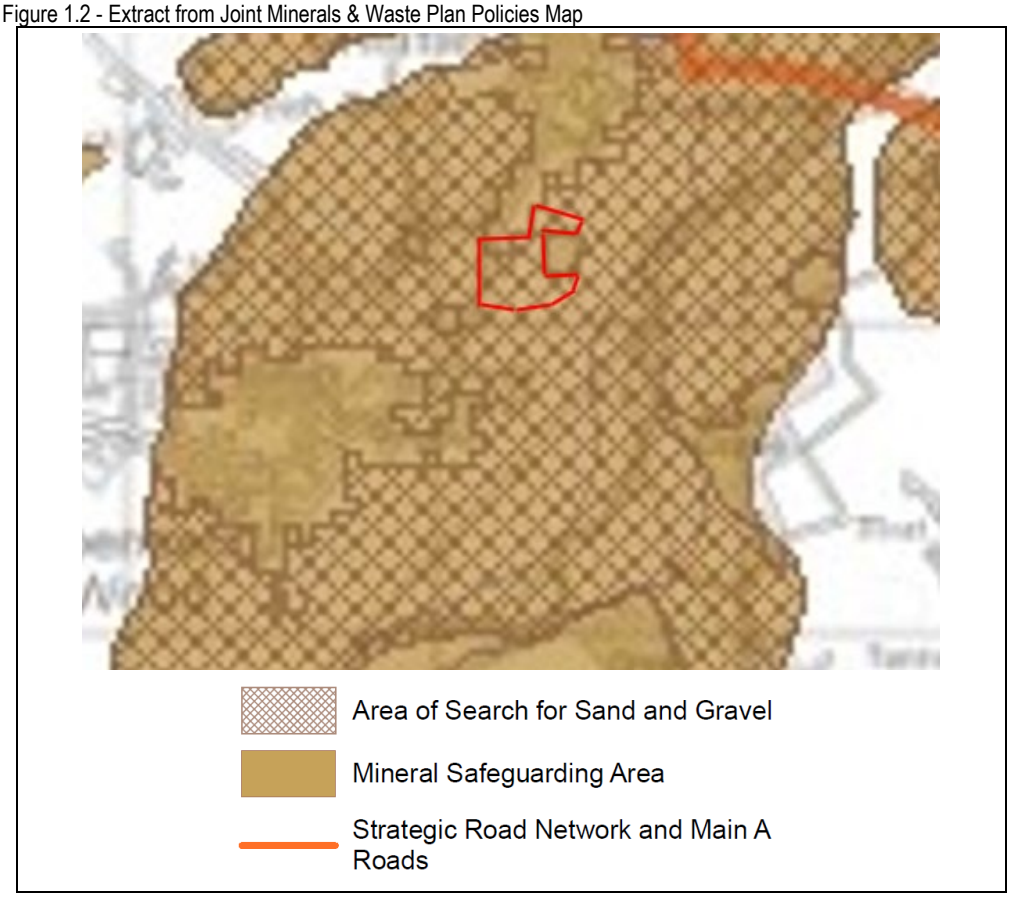
1.3.2 The Policies Map that accompanies the MWP shows the study site to lie within a Mineral Safeguarding Area and an Area of Search for Sand and Gravel. An extract of the plan covering the study site is given in Figure 1.2 below.

[1] Central and Eastern Berkshire Joint Minerals & Waste Plan. Adopted by Royal Borough of Windsor & Maidenhead – November 2022. Hampshire Services.

[2] McEvoy, FM, and 8 others. 2003. Mineral Resource Information for National, Regional and Local Planning: Berkshire (comprising West Berkshire, Reading, Wokingham, Windsor and Maidenhead, Bracknell Forest and Slough). British Geological Survey Commissioned Report CR/03/074N.

[3] https://www.gov.uk/government/publications/national-planning-policy-framework--2

Figure 1.2 - Extract from Joint Minerals & Waste Plan Policies Map



1.3.3 Policy M2 of the MWP provides advice on the safeguarding of sand and gravel mineral resources, reproduced below for ease of reference:

Policy M2
Safeguarding sand and gravel resources

1. Sharp sand and gravel and soft sand resources of economic importance, and around active mineral workings, are safeguarded against unnecessary sterilisation by non-minerals development.

2. Safeguarded mineral resources are defined by the Minerals Safeguarding Area illustrated on the Policies Map.

3. Non-minerals development in the Minerals Safeguarding Area may be permitted if it can be demonstrated through the preparation of a Mineral Resources Assessment, that the option of prior extraction has been fully considered as part of an application, and:

   a. Prior extraction, where practical and environmentally feasible, is maximised, taking into account site constraints and phasing of development; or
   b. It can be demonstrated that the mineral resources will not be permanently sterilised; or
   c. It would be inappropriate to extract mineral resources in that location, with regard to other policies in the wider Local Plans.

1.3.4 The first stage in the assessment of the potential mineral resource is a desktop study using data obtained from the BGS and other sources where available. Where the initial desktop study suggests that there are significant mineral resources of potential value that are likely to be sterilised by the proposed development, a site-specific investigation would need to be

implemented as a second stage of works to inform a quantitative assessment of the mineral reserves.

1.4 Minerals Assessment Desk Study

1.4.1 This report comprises a first stage (qualitative) desktop study. The report describes the geology of the site and presents an initial assessment of the potential mineral resources and resultant potential sterilisation from development based on a review of the BGS and MWP documents described above and the following reports and information:

- Geological data from the British Geological Survey including mapping, historical borehole records and other publications/ data sets in the public domain[4];
- Review (undertaken in September 2024) of public domain aerial imagery of the site and surrounding land via the Google Earth and Bing Maps;
- A desk study report[5] for the site; and
- Groundsure Enviro+Geo Insight Report[6] (appendix to the desk study report).

[4] Including online access to the National Geoscience Data Centre collection of scanned borehole, well and shaft records (through the BGS OpenGeoscience website https://www.bgs.ac.uk/data/boreholescans/home.html).

[5] Desk Study Report for Land Off Hyde End Road Shinfield, Wokingham RG2 9EP. Ref. GE22615/DSR/AUG24. August 2024. Geo-Environmental Services Limited (GESL).

[6] Enviro+Geo Insight Report. Ref. GS-N5O-GA6-VUS-SHW. 04/07/24. Groundsure.

2 Site Setting

2.1 Site Description

2.1.1 The site covers approximately 10.7 hectares and is split in two by Hyde End Road. To the west of the road the site comprises a field under arable crop and to the east it comprises two fields (one under crop and one pasture), a farm track and a collection of farm buildings. The site is relatively flat with very gentle slopes locally downhill towards the eastern boundaries.

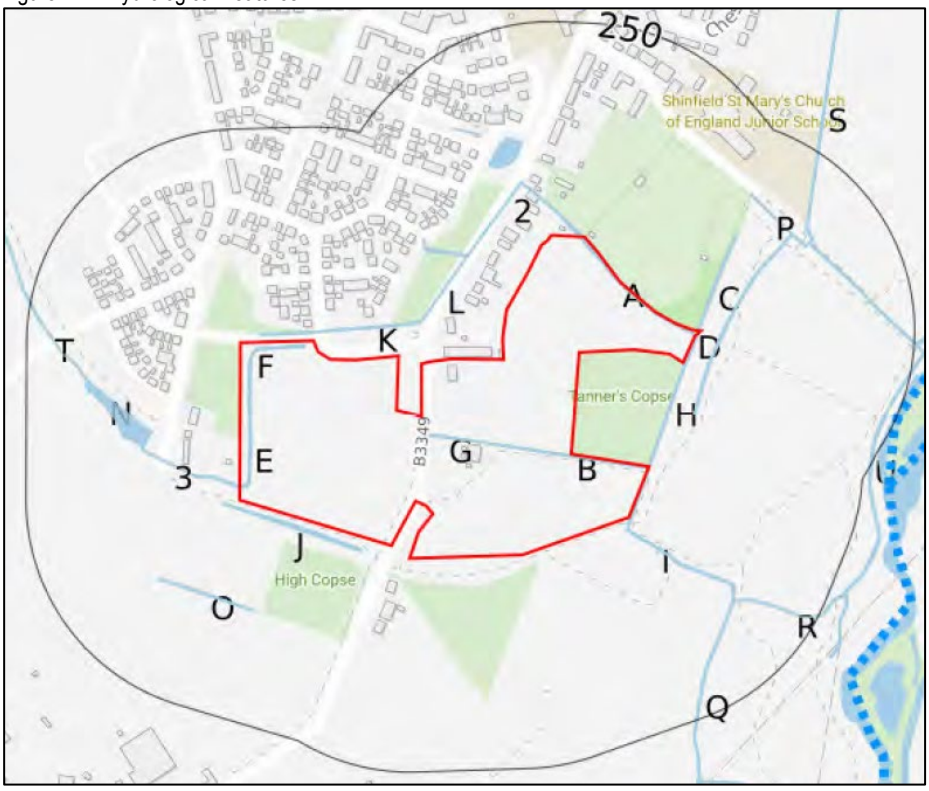
2.1.2 The site is bordered by various land uses as follows:

- North - Residential properties and a sports field.
- West - Residential properties and a small wooded area.
- East - Wooded area and fields.
- South - Wooded areas and fields

2.2 Hydrological Setting

2.2.1 The site lies in the catchment of the River Loddon which lies around 250m to the east at its closest. Two watercourses cross the site (labelled E/F and B/G on Figure 2.1 below). These are classified as Inland Rivers and the Groundsure report states that section F and parts of section G are 'underground', presumably in culverts. Other watercourses designated as Inland Rivers (labelled A, D and J on Figure 2.1) border the north-eastern, eastern and southern sides of the site.

Figure 2.1 - Hydrological Features



2.3 Hydrogeological Setting

2.3.1 With regard to hydrogeology, the strata underlying the site (refer to Section 3) are classified as follows:

- **River Terrace Deposits - Secondary A Aquifer**. Defined by the Environment Agency as 'Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers'.

- **London Clay Formation - Unproductive**. Defined as 'These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow'.

2.3.2 There are no groundwater source protection zones within 500m of the site.

2.3.3 Mapping in the Groundsure report shows the site to be at Moderate or Moderate to High risk of groundwater flooding.

2.4 Historical Setting

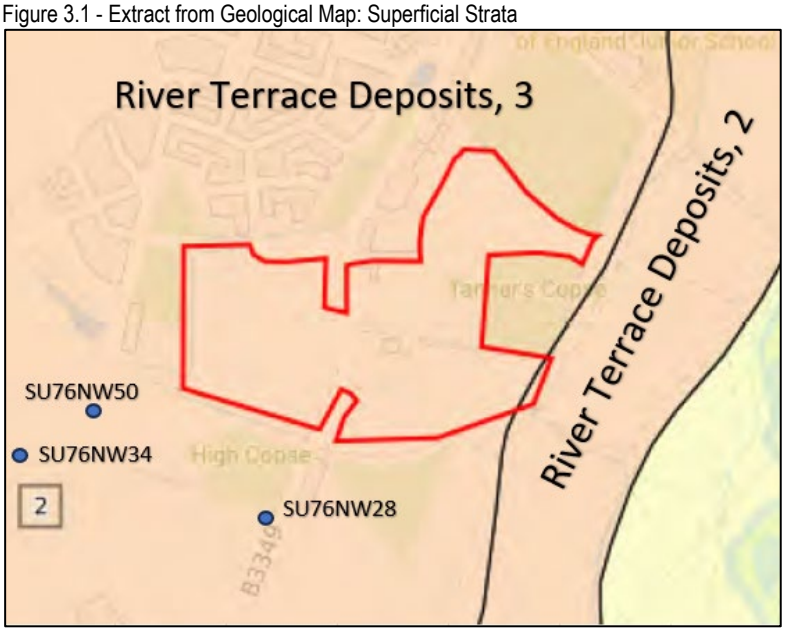
2.4.1 The desk study report refers to historical Ordnance Survey (OS) map evidence which indicates that the site has remained as fields from the 1870's to the present day.

3 Ground Conditions

3.1 Published Geology

3.1.1 Geological mapping indicates that the site and surrounding area is underlain by bedrock strata of the London Clay Formation. This is overlain over the entire site and surrounding area by superficial strata of the River Terrace Deposits. Figure 3.1 below is an extract from the geological map taken from the EnviroInsight report.

Figure 3.1 - Extract from Geological Map: Superficial Strata



3.1.2 River Terrace Deposits, 3 is described by the BGS as typically comprising a 'Sand and gravel with subsidiary clay and silt'[7].

3.1.3 River Terrace Deposits, 2 is described by the BGS as typically comprising a 'Sand and gravel, locally with lenses of silt, clay or peat'[8].

3.1.4 The London Clay Formation is described by the BGS as typically comprising a 'blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay[9]'.

3.2 Historical Borehole Records

3.2.1 The BGS GeoRecords Database[10] includes three historical records from exploratory holes sunk within 250m of the site (see Figure 3.1 above) that recorded River Terrace Deposits (RTD). Table 3.1 below provides details of the composition of these.

[7] https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=RTD3
[8] https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=RTD2
[9] https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=LC
[10] https://mapapps2.bgs.ac.uk/geoindex/home.html

Table 3.1 - Detail of River Terrace Deposits

Exploratory Hole	RTD Thickness	Detail from Borehole Records
SU76NW50 Water well	3.5m*	The 'Drift' is described as 'Gravel and clay'.
SU76NW28 Mineral prospecting borehole	2.7m	General description on borehole record: Very clayey sandy gravel. Gravel: Fine to coarse (mainly fine above 1.9m), angular to subrounded with occasional rounded flint. Sand: mainly fine to medium with some coarse flint. Mean Grading: Fines (clay and silt) 20%, Sand 53%, Gravel 27%.
SU76NW34 Mineral prospecting borehole	2.9m	General description on borehole record: Gravel. Gravel: Fine to coarse, angular to subrounded with occasional very dark brown rounded flint, and traces of fine quartz. Sand: mainly fine to coarse quartz and flint. Mean Grading: Fines (clay and silt) 5%, Sand 43%, Gravel 52%.
* thickness probably includes the overlying topsoil		

3.2.2 The mineral prospecting boreholes show that the RTD are variable with particle size distribution testing and contain elevated fines contents locally (comprising clay and silt below 63 micron particle sizes) of up to 20%. It is possible that bands of clay may also be present if the description in the water well borehole is accurate.

3.3 Groundwater Levels

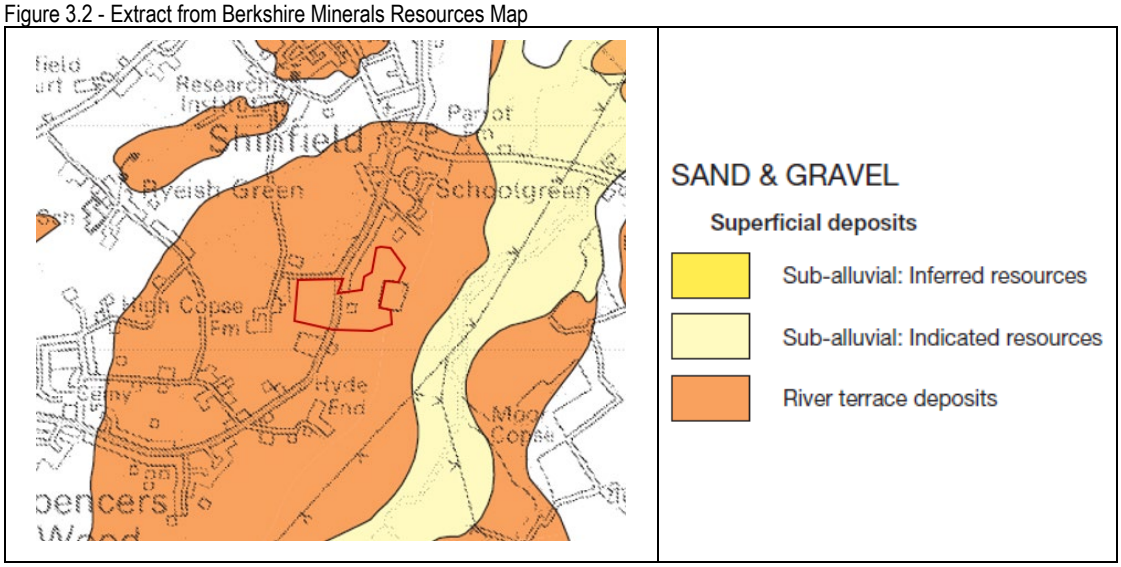
3.3.1 The record for borehole SU76NW34 states that at the time it was drilled in December 1974 that groundwater was struck 0.7m below ground level. The other borehole records do not give groundwater data.

3.4 Sand and Gravel Resources

3.4.1 The current Berkshire Mineral Resources Map[11] identifies that the site is underlain by sand and gravel resources (see Figure 3.2 below). These are associated with River Terrace Deposits under the entire site.

[11] McEvoy, FM, and 8 others. 2003. Mineral Resource Information for National, Regional and Local Planning: Berkshire (comprising West Berkshire, Reading, Wokingham, Windsor and Maidenhead, Bracknell Forest and Slough). British Geological Survey Commissioned Report CR/03/074N.

Figure 3.2 - Extract from Berkshire Minerals Resources Map



3.4.2 The Area of Search for Sand and Gravel shown on the MWP Policies Map (see Figure 1.2) coincides with the River Terrace Deposits sand and gravel resource and the Sub-alluvial inferred resource mapped by the BGS, but excludes areas that have been developed (see Figure 3.2 above).

3.4.3 The Mineral Safeguarding Area (see Figure 1.2) covers all the mapped areas of sand and gravel resource associated with the Alluvium and River Terrace Deposits.

3.5 Other Mineral Resources

3.5.1 No other relevant potential mineral resources are identified by BGS[12] on or within influencing distance of the site.

[12] McEvoy, FM, and 7 others. 2003. Berkshire (comprising West Berkshire, Reading, Wokingham, Windsor and Maidenhead, Bracknell Forest and Slough) Mineral Resource Information for National, Regional and Local Planning. Mineral Resources Scale 1:100,000. British Geological Survey Commissioned Report CR/03/074N.

4 Constraints to Mineral Extraction

4.1.1 There are significant constraints to the extraction of sand and gravel mineral from the study site ahead of development. These are:

1) The River Terrace Deposits beneath the site are assessed as potentially not an economically viable mineral resource, because:

   a. It is apparent from the available borehole records to be a relatively thin deposit (<3m thick) and therefore it is considered that it is not present on site in economically sufficient volumes.

   b. It is not a particularly 'clean' (i.e. low fines content) sand and gravel, as indicated in the borehole records, which show it to contain elevated fines (clay and silt) contents, which would generate additional costs associated with processing the mineral to remove them.

2) The site is relatively small and is constrained by the presence of residential properties around it to the north. The MWP (in paragraph 5.92) states: "It is recommended practice for operational mineral extraction and inert waste recycling sites to have a minimum buffer zone of 100 metres, where appropriate, from the nearest sensitive human receptors, such as homes and schools…". A buffer of 100 metres from the nearest houses would leave most of the site unsuitable for quarrying. A typically used buffer of 50 metres from mineral extraction sites to roads and watercourses of 50m would also significantly limit how much of the site could be quarried.

3) The practicalities of the quarrying and the requirement to ensure that it does not harm adjacent infrastructure and property present significant constraints to quarrying at the site, as follows:

   a) Any quarry side slopes would need to have a standoff zone between the crest of the quarry slopes and the site boundaries due to the site being bounded by watercourses and roads. Furthermore, the quarry slope angles would need to be sufficiently shallow to prevent them becoming unstable and endangering the stability of the watercourses and roads. Any standoff zones and quarry side slopes cannot then have mineral extracted from them which limits the volume of mineral that can be won.

   b) Excavation required to win mineral from the site would likely be below the groundwater table which the topographical, hydrological and hydrogeological evidence suggests would be relatively high on the site. Quarrying would either have to; i). dewater the site with its attendant costs and potential implications for the water levels and therefore the ecology of the local watercourses and the stability of the surrounding highway infrastructure, or 2) win the mineral in the wet which presents additional challenges due to non mineral layers present not being visible and becoming mixed with the mineral during recovery.

5 Conclusions

5.1.1 The study site is mapped as being underlain by bedrock strata of the London Clay Formation and by superficial deposits of River Terrace Deposits. The River Terrace Deposits are classified as sand and gravel mineral resources.

5.1.2 The Central and Eastern Berkshire Joint Minerals & Waste Plan designates the area within which the study site lies as a Mineral Safeguarding Area and an Area of Search for Sand and Gravel.

5.1.3 Study of historical borehole records in the vicinity of the site indicates that the sand and gravel strata of the River Terrace Deposits are relatively thin and are likely to contain elevated levels of fines (clays and silts). For these reasons it is unlikely that this geological formation would be economically viable to extract and is thus not a viable mineral resource.

5.1.4 Other reasons of practicality associated with the site, including shallow groundwater also make mineral extraction unviable on economic grounds. The required standoff/buffer zones around the watercourses that border and locally cross the site, and around the site edges which border roads and watercourses would significantly reduce the workable area and extractable mineral volume.

5.1.5 With regards to Policy M2: Safeguarding sand and gravel resources, part 3a, the study has identified that whilst the proposed development is likely to sterilise a potential mineral resource at the site, the sand and gravel mineral would be very unlikely to be either practical to extract or of economic value because of its limited extent and the identified constraints.

5.1.6 The development of the study site would sterilise off site minerals in the land surrounding the study site. However, the surrounding land within 100m of the site suffers from the same constraints to extraction as the study site and therefore it would be impractical and uneconomic for these areas to be quarried for sand and gravel.

Essential Guidance on the Context of the Report

This report has been prepared within an agreed timeframe and to an agreed budget that will necessarily apply some constraints on its content and usage. The remarks below are presented to assist the reader in understanding the context of this report and any general limitations or constraints. If there are any specific limitations and constraints, they are described in the report text.

The opinions and recommendations expressed in this report are based on statute, guidance, and best practice current at the time of its publication. Stantec UK Ltd (Stantec) does not accept any liability whatsoever for the consequences of any future legislative changes or the release of subsequent guidance documentation, etc. Such changes may render some of the opinions and advice in this report inappropriate or incorrect and the report should be returned to us and reassessed if required for re-use after one year from date of publication. Following delivery of the report, Stantec has no obligation to advise the Client or any other party of such changes or their repercussions.

Some of the conclusions in this report may be based on third party data. No guarantee can be given for the accuracy or completeness of any of the third-party data used.

Historical maps and aerial photographs provide a “snapshot” in time about conditions or activities at the site and cannot be relied upon as indicators of any events or activities that may have taken place at other times. It is possible for developments to have occurred between surveys that are not shown or for the map record to have been censored for military security.

The absence of cavity records in the Stantec natural and mining cavities (non-coal) databases is not considered as conclusive as to the absence of these features and we do not warranty that the data is complete or error free.

The conclusions and recommendations made in this report and the opinions expressed are based on the information reviewed and/or the ground conditions encountered in exploratory holes and the results of any field or laboratory testing undertaken. There may be ground conditions at the site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be considered in any analysis and reporting.

It should be noted that this report is a land condition assessment and does not purport to be an ecological, flood risk or archaeological survey and additional specific surveys may be required.

The identification of invasive and/or noxious plants such as Japanese Knotweed is outside the remit of our appointment.

This report has been written for the sole use of the Client stated at the front of the report in relation to a specific development or scheme. The conclusions and recommendations presented herein are only relevant to the scheme or the phase of project under consideration. This report shall not be relied upon or transferred to any other party without the expressed written authorisation of Stantec. Any such party relies upon the report at its own risk.

The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not considered the perceptions of, for example, banks, insurers, other funders, lay people, etc., unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.

Public or legal consultations or enquiries, or consultation with any Regulatory Bodies (such as the Environment Agency, Natural England, or Local Authority) have taken place only as part of this work where specifically stated.