Land at Barty Farm, Maidstone

Mineral Resource Assessment
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1.0 INTRODUCTION

1.1 General

Crabtree & Crabtree (Bearsted) Limited has instructed SLR Consulting Ltd (SLR) to undertake an assessment of the mineral resource within a parcel of land, known as Barty Farm, near Maidstone.

Crabtree & Crabtree (Bearsted) Limited are seeking to obtain planning permission for residential development on the site, which is in an area identified in the Kent Minerals and Waste Local Plan (KMWLP) as a minerals safeguarding area for soft sand. In line with Kent County Council’s planning policy DM7, a Mineral Assessment is required to qualify the magnitude of mineral sterilisation and consider whether the prior extraction of mineral is feasible and environmentally acceptable.
2.0 THE DEVELOPMENT SITE

2.1 General

The area of the proposed development and the subject of this assessment is situated at grid reference TQ 807 556, which lies approximately 4.5km east of Maidstone and immediately east of the suburb of Bearsted.

The site is bounded to the south and west by existing residential dwellings and is currently utilised for agriculture.

The site comprises a single field, approximately 260m south-east to north-west and 150m north-east to south-west, totalling 3.7 hectares. The land is generally flat with an average elevation of 50m OD. A number of mature trees can be found along the western border, along Water Lane and a hedgerow forms the north eastern boundary.

The site location, along with the development area, is shown on drawing BAR-01.

2.2 Constraints

Details of any underground utilities crossing the site have not been obtained for this assessment.

The site is not subject to any statutory environmental designations, although it is adjacent to a number of listed buildings.

A specific agricultural land classification is not published for this site.

2.3 Hydrogeology and Hydrology

Historic site investigation records either do not record water levels beneath the ground surface, or state that boreholes were dry when drilled.

The underlying Folkestone Formation and the remainder of the Lower Greensand Group is a Principal Aquifer.

The site also lies within a ground water source protection area, which serves to safeguard the quality and amount of water available for abstraction from the aquifer.

The development site does not impact on Flood Zones 2 or 3 as defined in the National Planning Policy Guidance definitions.
3.0 REGIONAL GEOLOGY AND MINERALS

The site sits within the larger context of the regional geology of Kent and the Northern Weald. The bedrock of the region forms the northern limb of the Weald anticline; a broad ‘dome’ structure stretching from Hampshire to Kent and onwards into northern France exposing the full thickness of the Cretaceous Strata in southern England. The younger beds on the outskirts of the structure are the Chalk groups, forming the North and South Downs. Beneath the Chalk lies the Upper and Lower Greensand group, followed by the Wealden group forming the majority of the Weald landscape around a small outcrop of Jurassic Purbeck Beds at the core of the dome.

A wide variety of mineral resources are found in the Cretaceous strata, with the areas of the Medway conurbations and Maidstone providing significant volumes of chalk for cement manufacture, sand for construction, and clay for brickmaking due to their proximity to London.

The Folkestone Formation, which underlies the Gault Clay, south of the Chalk escarpment, is an important source of ‘soft’ sands for construction and industrial uses (principally glass making where the deposit is of very high purity). The Folkestone Formation comprises medium and coarse-grained, well-sorted cross-bedded sands and weakly cemented sandstones; and elsewhere includes calcareous sandstones and thin bands of iron cemented sandstones, known as Iron Pans. A number of quarries currently work the Folkestone Formation sands along the northern and western outcrop, with much of the southern outcrop sitting within the South Downs National Park, where the quarries are becoming exhausted with little prospect for further planning consents being granted for construction aggregate uses.

Superficial deposits within this area of Kent are not widespread, and comprise flint rich clays along the chalk escarpment and alluvium and terrace gravels along the routes of the rivers that drain the Weald, such as the Medway and its tributaries.
4.0 RESOURCE ASSESSMENT

4.1 Site Investigation Data

The British Geological Survey (BGS) maintain an online database, known as ‘GEOIndex’, of publicly accessible site investigation data comprising records of boreholes and trial pits, along with access to scanned paperwork detailing the findings of the boreholes and trial pits. Examples of logs in the vicinity of the development site include test boreholes drilled for the Channel Tunnel Rail Link (CTRL) and prospecting boreholes for Fuller’s Earth exploration.

Whilst there are no publicly available boreholes within the site (and nearby boreholes south of the outcrop of the Folkestone Formation would not intersect the strata underlying the site) the CTRL boreholes to the north provide some information on the thickness of the Folkestone Formation in the area.

4.2 Site Geology

A Review of the CTRL borehole data, and published literature in the form of maps and memoirs published by the BGS, indicate that the Folkestone Formation outcrops over the extent of the site, with the overlying Gault Clay outcrop occurring in the field to the north between the site and the railway line.

In this locality, the apparent thickness (i.e. taking onto account the dip of the beds, at c.5° to NNE) of the Folkestone Formation is 35-40m.

In this area, the Folkestone Formation comprise weakly cemented, or 'locked' medium and coarse silty sand, which can range in colour form a deep orange, to a light grey, depending on the occurrence and oxidation of Iron minerals coating the sand grains. Within the sand, thin lenses of clay can occur, and also the aforementioned Iron Pans are common and present problems for the extraction of the sand as they require breaking and removal during extraction.

Above the sand beds, there would likely be around 1m to 1.5m of topsoil and subsoil. Whilst no detailed site surveys have been completed, observations from aerial photos suggest that there are no significant areas of made ground or historic earthworks that would affect the volumes of mineral resources within the site.

Drawing reference BAR-02 shows the 1:50,000 scale BGS bedrock geological mapping overlaid on the site area.

4.3 Buffer Zones

In order to define and quantify a mineral resource, consideration should be given to the potential environmental impacts of the extraction of the mineral resource and the application of suitable buffer zones, or 'stand-offs', to maintain adequate distance between the operation and the potential receptor.

Buffer zones will depend upon the nature of the operation and the receptor, and the potential pathway for the impact, and thus will vary on a site-by-site basis. Kent County Council’s Minerals Local Plan does not specify typical buffer zones for mineral types, so experience of existing operations and other policy areas has been used. The following buffer zones have been applied to this assessment to reflect the environmental and economic viability of the mineral resource:
Secondary sterilisation of mineral will occur where buffer zones from new development also impinge on the mineral resources. Drawing reference BAR-03 illustrates the buffer zones applied to the existing dwellings around the site and the secondary sterilisation the new development would cause.

4.4 Potential Design Criteria for Extraction of Folkestone Formation Sands

Quarrying of the Folkestone Formation Sands occurs in many locations around the thin outcrop, with large operation near Sevenoaks and Borden in Hampshire. Many exhausted and dormant quarries occur along the outcrop, particularly north-west of Maidstone near Snodland and Aylesford.

Folkestone Formation sand quarries tend to be deep, with steep side slopes owing to the locked nature of the sands, and the need to maximise the reserves obtained from the site. Many of the sites contain large lakes where the mineral is extracted from beneath the water table, and dewatering the aquifer is not permitted. The combination of steep slopes and open water, can lead to erosion and instability in the side slopes and impacts on site boundaries. In order to prevent this, mineral excavation schemes should be designed with outer slopes in the region of 1 in 2 to 1 in 3.

4.5 Results

The area of soft sand mineral resource not already sterilised by the surrounding residential properties totals 0.36 hectares, which assuming removal of 1.2m of topsoil and subsoil, and excavation of side slopes at 1 in 2.5, would yield around 10,000 tonnes of sand.
5.0 ECONOMIC IMPORTANCE OF THE RESOURCE

As indicated above, the mineral resource for the Barty Farm site is calculated to be some 10,000 tonnes which represents that which would be directly sterilised by any built development within the site.

5.1 National policy on landbanks – the National Planning Policy Framework (NPPF)

A ‘landbank’ is a stock of planning permissions for the winning and working of minerals into the future. The size of a landbank is measured in terms of a number of years. It is calculated by working out:

- The total capacity (in tonnes) of all permitted mineral reserves with planning permission, and then,
- Dividing this total capacity by the annual rate of mineral supply provision (in tonnes per year) proposed in this Plan for the plan-period, and then,
- Expressing this calculated figure in terms of years’ equivalent (e.g., the landbank is 8.4 years).

The NPPF\(^1\) states that minerals planning authorities should plan for a steady and adequate supply of industrial minerals by, amongst others, by:

- providing a stock of permitted reserves to support the level of actual and proposed investment required for new or existing plant and the maintenance and improvement of existing plant and equipment for at least 10 years for individual silica sand site.

5.2 Adopted Kent Minerals and Waste Local Plan 2013-30 (KMWLP), 2016

At the heart of the NPPF is a presumption in favour of sustainable development. This therefore requires that policies in local plans should follow the approach of the presumption in favour of sustainable development. The KMWLP is therefore based on the principle of sustainable development and this is reflected in the Spatial Vision and the Strategic Objectives, and the policies that seek sustainable solutions.

The strategic objectives set out in the KMWLP are underpinned by an ambition to manage mineral extraction and supply according to the principles of sustainable development and as far as mineral extraction is concerned some of those general main minerals strategic objective are set out below:

**General**

1. Encourage the use of sustainable modes of transport for moving minerals and waste long distances and minimise road miles.

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\(^1\) National Planning Policy Framework, para 146
2. Ensure minerals and waste developments contribute towards the minimisation of, and adaptation to, the effects of climate change. This includes helping to shape places to secure radical reductions in greenhouse gas emissions and supporting the delivery of renewable and low carbon energy and associated infrastructure.

3. Ensure minerals and waste sites are sensitive to both their surrounding environment and communities, and minimise their impact on them.

4. Enable minerals and waste developments to contribute to the social and economic fabric of their communities through employment opportunities.

**Minerals**

5. Seek to ensure the delivery of adequate and steady supplies of sand and gravel, chalk, brickearth, clay, silica sand, crushed rock, building stone and minerals for cement during the plan period, through identifying sufficient sites and safeguarding mineral bearing land for future generations.

6. Promote and encourage the use of recycled and secondary aggregates in place of land-won minerals.

7. Safeguard existing, planned and potential sites for mineral infrastructure including wharves and rail depots across Kent to enable the on-going transportation of marine dredged aggregates, crushed rock and other minerals as well as other production facilities.

8. Enable the small-scale, low-intensity extraction of building stone minerals for heritage building products.

9. Restore minerals sites to the highest possible standard to sustainable afteruses that benefit the Kent community economically, socially or environmentally. Where possible, afteruses should conserve and improve local landscape character and incorporate opportunities for biodiversity to meet targets outlined in the Kent Biodiversity Action Plan, the Biodiversity Opportunity Areas and the Greater Thames Nature Improvement Area.

10. Encourage the sustainable use of the inert non-recyclable fraction of Construction, Demolition and Excavation Waste for quarry restoration.

**5.2.1 Barty Farm**

The site is not allocated as a Preferred or Reserve site in the adopted Kent Minerals and Waste Local Plan 2016 but as indicated in section 1.0 above is located within a Minerals Safeguarding Area for silica sand/construction sand which forms part of the Folkestone Formation.

Therefore, consideration must be given under policy DM7 and DM9 of the KMWLP to whether the mineral could be subject to prior extraction, and economic and environmental viability of extraction.
5.3 Policy DM 7 - Safeguarding Mineral Resources

Policy DM 7 of the Plan states:

Planning permission will only be granted for non-mineral development that is incompatible with minerals safeguarding, where it is demonstrated that either:

1. the mineral is not of economic value or does not exist; or
2. that extraction of the mineral would not be viable or practicable; or
3. the mineral can be extracted satisfactorily, having regard to Policy DM9, prior to the non-minerals development taking place without adversely affecting the viability or deliverability of the non-minerals development; or
4. the incompatible development is of a temporary nature that can be completed and the site returned to a condition that does not prevent mineral extraction within the timescale that the mineral is likely to be needed; or
5. material considerations indicate that the need for the development overrides the presumption for mineral safeguarding such that sterilisation of the mineral can be permitted following the exploration of opportunities for prior extraction; or
6. it constitutes development that is exempt from mineral safeguarding policy, namely householder applications, infill development of a minor nature in existing built up areas, advertisement applications, reserved matters applications, minor extensions and changes of use of buildings, minor works, non-material amendments to current planning permissions; or
7. it constitutes development on a site allocated in the adopted development plan

Further guidance on the application of this policy will be included in a Supplementary Planning Document.

5.3.1 Policy DM9 - Prior Extraction of Minerals in Advance of Surface Development

Policy DM 9 of the Plan states that:

Planning permission for, or incorporating, mineral extraction in advance of development will be granted where the resources would otherwise be permanently sterilised provided that:

1. the mineral extraction operations are only for a temporary period; and,
2. the proposal will not cause unacceptable adverse impacts to the environment or communities

Where planning permission is granted for the prior extraction of minerals, conditions will be imposed to ensure that the site can be adequately restored to a satisfactory after-use should the main development be delayed or not implemented.

It would be difficult to bring forward a case of ‘need’ for extraction for a limited volume of reserve when weighed against the possible amenity impacts associated with this type of operation. Any extraction activities of this nature have the potential to cause adverse effects
on the local environment as a result of, amongst other matters, noise, dust and traffic impacts and are likely to result in opposition from local residents in the area.

Prior extraction at the site would result in the restored landform being at a lower level than the surrounding topography and the creation of a void would result in long term negative visual impacts on the landscape.

The extraction of sand is a high cost exercise, requiring significant ‘up-front’ investment from an operator associated with securing the rights to the land and subsurface, obtaining the relevant planning permissions and permits to operate and backfill the site. In addition, costs for the purchasing of the necessary processing and mobile plant along with transportation of material would be costly.

Extraction and processing is often market led, in that the material is generally extracted and processed to order, as opposed to rapidly dug and stockpiled for later consumption. In the absence of a defined market, it would be difficult to extract and stockpile the volume of sand available without substantially prejudicing the ability to implement the proposed scheme. Any ‘compromise’ extraction scheme which sought to exploit a proportion of the sand would be faced with a similar (albeit a proportionally reduced problem), but where the benefits of such limited prior extraction then recede.
6.0 CONCLUSION

When assessed against policy DM7 of the KMWLP the small tonnage of sand identified does not constitute an economically viable deposit.

The costs associated with obtaining permission and the relevant permits to allow extraction of a deposit are such that in each case, a threshold value of the deposit must be achieved to offset the initial costs.

When viewed outside of the isolation of the site boundary for this proposal, the inclusion of this resource in a potential larger minerals site is also not viable, for the following reasons:

- the sterilisation caused by the buffer zones to the properties in the east and west, and the railway line to the north, reduce the area of available mineral to the north to below that would be suitable for investment
- Exposure and extraction of the overlying Gault Clay to the north requires a very large area for the formation of stable excavation slopes. The Gault Clay is problematic in engineering terms, as it has a very low internal shear strength, and requires slopes shallower than 1 in 10 to remain stable
- The nature of the silty sand deposit, as is typical of the Folkestone Formation, requires a washing plant to remove the ‘fines’ fraction of the sand (<0.063mm) in order to meet national specifications for building materials. Construction of a separate silt lagoon, or silting into a flooded quarry void results in very long term liabilities for restoration and after use, and is not conducive to follow-on build development, as would be the case here.
- The investment required to purchase or hire a washing plant, the associated infrastructure costs, and, when assessed against policy DM9 of the KMWLP, the environmental impacts in terms of noise, traffic movements etc., also serve to make minerals development for a small resource in a residential location both unviable and likely to cause an unacceptable adverse impact to the environment and local amenity.

7.0 CLOSURE

This report has been prepared by SLR Consulting Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Crabtree & Crabtree (Bearsted) Limited; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.
ABERDEEN
214 Union Street,
Aberdeen AB10 1TL, UK
T: +44 (0)1224 517405

AYLESBURY
7 Wormal Park, Menmarsh Road,
Worminghall, Aylesbury,
Buckinghamshire HP18 9PH, UK
T: +44 (0)1844 337380

BELFAST
Suite 1 Potters Quay, 5 Ravenhill Road,
Belfast BT6 8DN, Northern Ireland
T: +44 (0)28 9073 2493

BRADFORD-ON-AVON
Treenwood House, Rowden Lane,
Bradford-on-Avon, Wiltshire BA15 2AU, UK
T: +44 (0)1225 309400

BRISTOL
Langford Lodge, 109 Pembroke Road,
Clifton, Bristol BS8 3EU, UK
T: +44 (0)117 9064280

CAMBRIDGE
8 Stow Court, Stow-cum-Quy,
Cambridge CB25 9AS, UK
T: +44 (0)1223 813805

CARDIFF
Fullmar House, Beignon Close, Ocean Way,
Cardiff CF24 5PB, UK
T: +44 (0)29 20491010

CHELMSFORD
Unit 77, Waterhouse Business Centre,
2 Cromar Way, Chelmsford, Essex CM1 2OE, UK
T: +44 (0)1245 392170

DUBLIN
7 Dundrum Business Park, Windy Arbour,
Dundrum, Dublin 14 Ireland
T: + 353 (0)1 2964667

EDINBURGH
4/5 Lochside View, Edinburgh Park,
Edinburgh EH12 9DH, UK
T: +44 (0)131 3356830

EXETER
69 Polsloe Road, Exeter EX1 2NF, UK
T: +44 (0)1392 490152

GLASGOW
4 Woodside Place, Charing Cross,
Glasgow G3 7QF, UK
T: +44 (0)141 3535037

GRENOBLE
BuroClub, 157/155 Cours Berriat,
38028 Grenoble Cedex 1, France
T: +3 84 76 70 93 41

GUILDFORD
65 Woodbridge Road, Guildford,
Surrey GU1 4RD, UK
T: +44 (0)1483 889 800

LEEDS
Suite 1, Jason House, Kenny Hill,
Horsforth, Leeds LS18 4JR, UK
T: +44 (0)113 2530650

LONDON
83 Victoria Street,
London, SW1H 0HW, UK
T: +44 (0)203 691 5810

MAIDSTONE
Mill Barn, 28 Hollingworth Court,
Turkey Mill, Maidstone, Kent ME14 5PP, UK
T: +44 (0)1622 609242

MANCHESTER
8th Floor, Quay West, MediaCityUK,
Trafford Wharf Road,
Manchester M17 1HH, UK
T: +44 (0)161 872 7564

NEWCASTLE UPON TYNE
Sailors Bethel, Horatio Street,
Newcastle-upon-Tyne NE1 2PE, UK
T: +44 (0)191 2611966

NOTTINGHAM
Aspect House, Aspect Business Park,
Bennerley Road, Nottingham NG6 8WR, UK
T: +44 (0)115 9647280

SHEFFIELD
Unit 2 Newton Business Centre,
Thorncliffe Park Estate, Newton Chambers Road, Chapeltown,
Sheffield S35 2PW, UK
T: +44 (0)114 2455153

SHREWSBURY
2nd Floor, Hermes House, Oxon Business Park,
Shrewsbury SY3 5HJ, UK
T: +44 (0)1743 239250

STAFFORD
8 Parker Court, Staffordshire Technology Park,
Beaconside, Stafford ST18 0WP, UK
T: +44 (0)1785 241755

STIRLING
No. 68 Stirling Business Centre,
Wellgreen, Stirling FK8 2DZ, UK
T: +44 (0)1786 239300

WORCESTER
Suite 5, Brindley Court, Gresley Road,
Shire Business Park, Worcester WR4 9FD, UK
T: +44 (0)1905 751310

www.slrconsulting.com