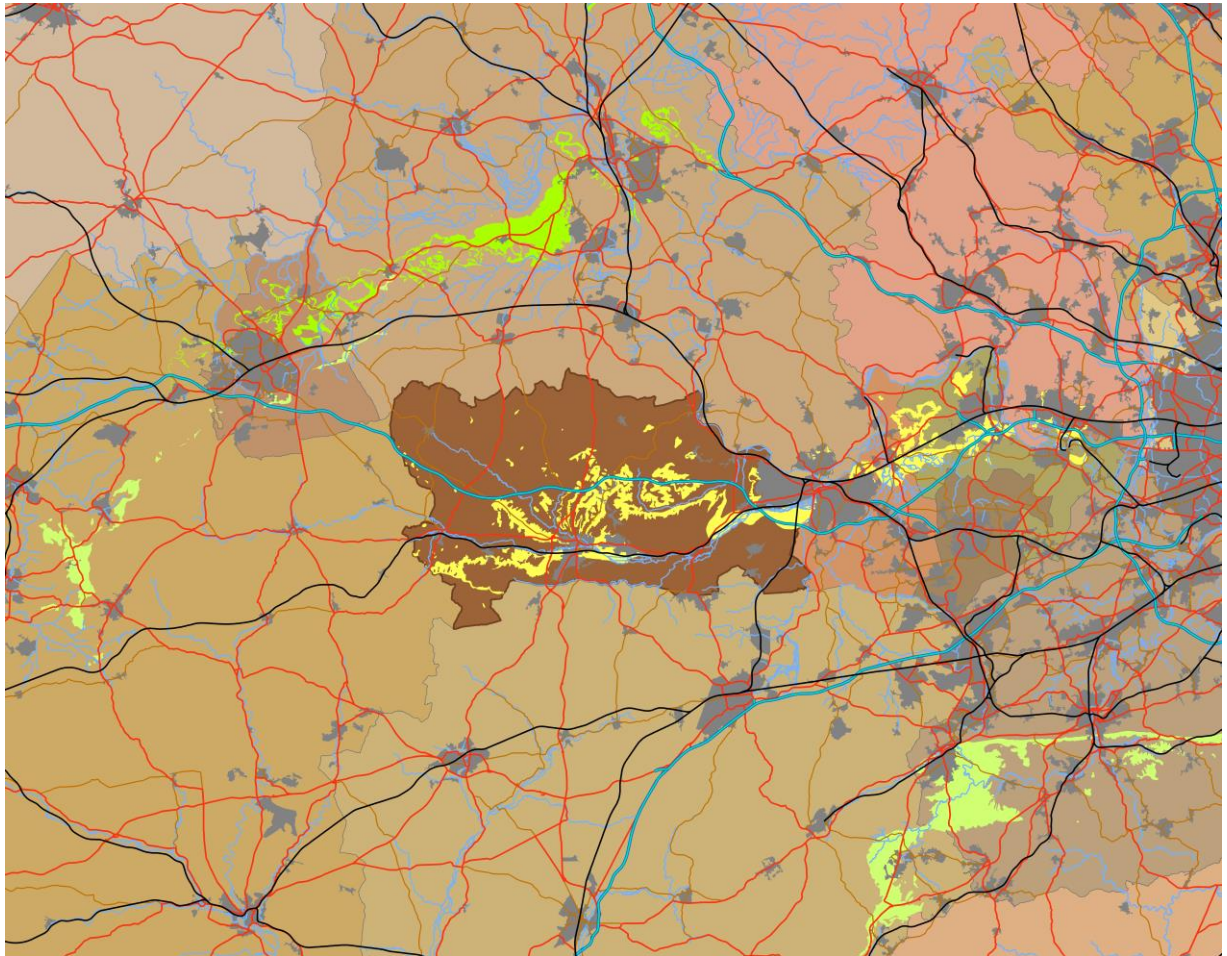


West Berkshire District Council

Soft Sand Study



Final Report

Cuesta Consulting Limited

13th May 2019

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1. Introduction and Terms of Reference

Introduction

- 1.1 West Berkshire Council is currently preparing its Minerals and Waste Local Plan (MWLP) which will provide the planning framework for Minerals and Waste Development in West Berkshire until 2036. In preparing for submission of the Plan, it has become apparent that further evidence and research regarding the provision of soft sand is required, in order to support the MWLP through examination.
- 1.2 To date, soft sand sites have not been proposed for allocation in the MWLP due to confidentiality issues preventing the publication of soft sand sales and reserves figures. However, the mineral companies which have been involved in extracting soft sand locally have recently indicated that they will forego commercial confidentiality in order that separate soft sand production figures can be published. Therefore, a separate landbank, annual requirement and requirement over the plan period can now be determined.
- 1.3 This has shown that the landbank for soft sand within the District is now approaching zero, and that approximately 0.79 million tonnes of new soft sand reserves will therefore be required over the plan period (to 2036) in order to deliver the requirement of 43,730 tonnes per annum, as set out in the latest Local Aggregate Assessment.
- 1.4 In order to be found sound, the MWLP will need to identify how this shortfall will be provided for over the plan period in order to provide a 'steady and adequate supply of aggregate minerals' as required by paragraph 207 of the revised (2018) National Planning Policy Framework.
- 1.5 Historically, the majority of the soft sand deposits that have been worked in West Berkshire have been those found in the North Wessex Downs Area of Outstanding Natural Beauty (AONB), in particular an outcrop found around Junction 13 of the M4. Resource mapping by the British Geological Survey (BGS), indicates that there are soft sand deposits in West Berkshire that are located outside the AONB, but these deposits have not been worked in recent years and their extent, quantity and quality of resource are unknown.
- 1.6 Paragraph 205 of the revised NPPF (1st bullet point) requires MPAs to *"as far as is practical, provide for the maintenance of landbanks of non-energy minerals from outside National Parks, the Broads, Areas of Outstanding Natural Beauty and World Heritage Sites, scheduled monuments and conservation areas"*.
- 1.7 In circumstances where major development (which includes mineral extraction) is being considered within any of these designated areas, paragraph 172 of the NPPF sets out the 'exceptional circumstances' and 'public interest' tests which would need to be applied. These require an assessment of (inter-alia): *"the cost of, and scope for, developing outside the designated area, or meeting the need for it in some other way"*.

- 1.8 For West Berkshire, there is therefore a need to examine the scope for making provision for future soft sand supplies from outside the AONB, including from sources located both within West Berkshire and beyond.

Aims and Objectives

- 1.9 The aim of the project, as stated in the Brief, is therefore to assist West Berkshire Council in providing a robust and sound evidence document which can be used in formulating a policy approach for soft sand in the future.

- 1.10 In order to achieve this aim, the study is required to deliver on a number of more specific objectives. Modified and expanded slightly from the wording stated in the Brief (with the intention of defining the scope of work more precisely, in places), these objectives are to:

- Provide a GIS-based analysis of the distribution of workable and viable soft sand resources and reserves within the study area¹, using existing BGS resource maps, BGS industrial mineral assessment (IMAU) reports, and information provided by Mineral Planning Authorities (MPAs);
- Identify the nature and extent of the market for soft sand supplied from within the study area²;
- Identify (to the extent possible) the sources of supply for existing markets within West Berkshire (including supplies to those markets from sources within adjoining and nearby authorities);
- Provide an assessment of the potential for alternative supplies of soft sand from outside the North Wessex Downs AONB (but within West Berkshire) and from outside West Berkshire, and whether these sources could fulfil current and future demand. This assessment is to include:
 - (i) Comment on where this is already occurring.
 - (ii) Review of the relevant local authorities' available permitted reserves and sales/movement data (where available) for soft sand and implications for supply to the study area.
 - (iii) Comment on any sustainability issues and environmental impacts that would arise from alternative sources.
 - (iv) Comment on relative security of supply.
- Comment on the availability, feasibility and sustainability issues relating to the sourcing of potential alternatives to natural soft sand (e.g. secondary and recycled materials, mineral waste, marine sand etc.);

¹ The Study Area was not defined in the Brief but, **for the purpose of considering resource availability**, was agreed to comprise the West Berkshire Unitary Authority area, together with those parts of adjoining and nearby authorities which also contain soft sand deposits (i.e. Oxfordshire, Wiltshire, Hampshire, Reading, Wokingham, Windsor & Maidenhead, Slough, Surrey and West Sussex)

² **For the purpose of considering the market area for soft sand**, it was agreed that this relates to markets currently (or potentially) supplied from sites within West Berkshire, since it is only those market areas (which themselves may extend into neighbouring authorities) for which alternative sources of supply need to be considered.

- Review the current and likely future end-uses and demand for soft sand arising from within the study area, including any emerging markets; and
- Comment on the feasibility of the five options noted in para. 2.5.3 of the Brief for provision of soft sand in the study area and, where relevant, suggest alternative approaches (with appropriate justification).

2. Soft Sand Resources in West Berkshire & Adjoining Areas

Introduction

- 2.1 ‘Soft sand’ is generally fine-grained sand in which the individual grains are well-rounded, imparting a relatively soft texture and free-flowing nature to the sand. The characteristics of such sands lend themselves especially to products which are required to ‘flow’ or be easily ‘workable’ by hand when they are being used - particularly mortars, but also plaster, in the case of very fine-grained sand. These are collectively known as building sands.
- 2.2 Soft sands normally comprise a high proportion of silica (quartz), but also impurities such as iron oxide, which impart colour to the sand (mostly in shades of yellow, orange, brown and red). Similar sands but with fewer impurities and thus lighter in colour and with a silica content of more than 95%, are classed as ‘silica sands’, though these are not known to occur within West Berkshire.
- 2.3 The distribution of soft sand resources within West Berkshire and neighbouring authorities, based on the British Geological Survey’s (BGS) latest available digital resource mapping, is shown on Figure 2.1, below. The resources shown are all ‘bedrock’ sands, i.e. consolidated (or weakly consolidated) deposits contained within strata that are older than the most recent ‘Quaternary’ Period of Earth history – older than about 2.6 million years. As such, they are all very distinct from the more recent, superficial ‘sharp’ sands and gravels of Quaternary age, which sometimes overlie the bedrock deposits.
- 2.4 The resources depicted in Figure 2.1 fall into three quite separate geological groupings, each with subtly different characteristics:
- Palaeogene deposits: those which are between 23 and 66 million years old, including the **Poole Formation** in southern Hampshire, and the somewhat older **Lambeth Group** deposits which occur within Berkshire, Hampshire and south-east Wiltshire.
 - Cretaceous deposits: those which are between 113 and 126 million years old, including the **Lower Greensand** in Wiltshire and the **Folkestone Formation** in Surrey, Hampshire and West Sussex.
 - Jurassic deposits: including the Upper Jurassic **Kingston Formation** (157 to 164 million years old) in south Oxfordshire and the Middle Jurassic **Horsehay Sand Formation** (166 to 170 million years old) in North Oxfordshire.
- 2.5 Also shown on Figure 2.1 are the currently operational quarries within these areas which supply soft sand (or, in some cases, more specialist silica sand). These sites, together with a number of additional proposed, nominated or allocated sites, are discussed below, as are the main characteristics of the resources in each area.

West Berkshire Resources

- 2.6 The soft sand resources within West Berkshire are primarily associated with bedrock sands of Palaeogene age – specifically those of the ‘Lambeth Group’ (previously known, in this area, as the ‘Reading Beds’). The Lambeth Group in general is described, by the BGS, as *“Vertically and laterally variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate”*.
- 2.7 In the Industrial Mineral Assessment Unit (‘IMAU’) reports for this area, produced by the former Institute of Geological Sciences – now the BGS – (Gozzard, 1981, and Squirrell, 1976), the Reading Beds are described as comprising up to 4m of sandy clay, overlain by 2 to 4m of white, buff and green sand, overlain by 10 to 12m of variable-coloured clay with beds of sand. In neither of these areas were the sands within the Reading Beds investigated in any detail as potential resources, with the focus being instead on the superficial sands and gravels contained within river terrace deposits and plateau gravels. Most of the boreholes drilled as part of that study were too shallow to penetrate more than a short distance into the Reading Beds. Samples obtained from just four boreholes, as reported in Table 9 of Gozzard (1981) demonstrated that the sands were predominantly fine- to medium-grained with an average fines (silt & clay) content of 24% (mostly of silt).
- 2.8 A very large number of other borehole logs within the resource outcrop are recorded within the BGS online ‘Geindex Onshore’ database. Some of these relate to previous mineral prospects which have since been worked, but most of the boreholes were drilled for purposes other than mineral assessment and many provide only limited information. Whilst a detailed analysis of all such records is beyond the scope of this study, those which have been inspected confirm the general BGS description of the Lambeth Group deposits as being highly variable in nature, with clay predominating in many areas.
- 2.9 It would seem that only in some parts of the deposit do sands predominate. In the Newbury area, Gozzard (1981) recognised that these are locally an important resource and noted that a 24m-high face was exposed, at that time, in the former quarry at Hermitage. Sand resources in the same general area have since been worked at a number of other sites and are currently worked at **Copyhold Farm** (where extraction was completed during 2018, leaving only stockpiled material for sales at the time of our visit). Until recently, similar deposits were also worked at **Old Kiln Farm, Chieveley**. The locations of both sites are shown in Figure 2.2. At both of these sites, the deposits were processed only by means of dry screening, leaving sands with a fairly high silt & clay content (as suggested by the IMAU data). Such material is understood to be preferred by local builders for use as mortar, in preference to cleaner sands.
- 2.10 At least three other parts of the deposit – the **‘60-acre field’** close to Copyhold Farm; the **Chieveley Services** site and the **Long Lane** site at Cold Ash – are known to contain workable deposits, comparable to those at the existing / recently closed sites, and all of these are nominated as potential site allocations for future working (Figure 2.2).

The first two, however, are located within the AONB, whilst the third (located outside the AONB) is understood to have significant access difficulties.

- 2.11 As shown on Figure 2.2, the overall extent of available resources (as mapped by the BGS) outside the AONB is very limited. Further restrictions are that large parts of those areas are constrained by existing built development (e.g. beneath central Newbury and most of Thatcham) or lie within the floodplain of the River Kennett and/or large areas of flooded gravel pits (to the south of Theale). Of the remaining, relatively unconstrained areas, available borehole records suggest once again that the Reading Beds deposits are highly variable in nature. Thicknesses of up to 6m of silty or clayey sand are found in some boreholes, whilst others reveal only (or predominantly) clay.
- 2.12 A prospect at Stockcross, located to the north-west of Newbury town centre, was assessed in detail in a site investigation carried out for one of the local operators in 2013. The report and associated borehole logs (seen by Cuesta) reveal a predominantly clayey deposit with only localised areas of silty fine sand.
- 2.13 Whilst the possibility of finding viable resources within West Berkshire, beyond the existing nominated sites, and outside the AONB cannot be categorically ruled out without considerable further work, the prospects would seem to be very limited.

Central and Eastern Berkshire Resources

- 2.14 The Lambeth Group soft sand resources continue eastwards through the neighbouring unitary authorities of Reading, Wokingham, Windsor and Maidenhead and Slough. None of these areas support active sand quarries, however. **Knowl Hill**, also known as the **Star Brick & Lime works** is a currently inactive site at the eastern edge of Wokingham. Although primarily a source of clay for brick-making, soft sand has also been extracted here, but the remaining permitted reserves cannot be worked until new planning conditions have been agreed. The site operators have investigated potential sand prospects around that area but have found these to be of poor quality and/or too constrained. The site at **Kingsmead** in Windsor & Maidenhead has previously been identified as a supplier of soft sand, but this related to material brought in from West Heath Common in West Sussex and blended with local sharp sand for supply into the London market. It is not a local resource, and the site is reported (in the 2017 LAA) to have closed.

Oxfordshire Resources

- 2.15 In Oxfordshire, the soft sand resources form part of a much older sequence of deposits from the Jurassic Period. In southern parts of the county, to the south and south-west of Oxford, they occur within the Kingston Formation – a weak sandstone unit within the ‘Corallian Group’ of the Upper Jurassic. The resource is primarily contained within the Highworth Grit, a 10 – 20m thick unit within that formation, and is quarried by one operator at **Upwood** and **Chinham Farm**, and by others at **Hatford** and **Shellingford**. In the south western part of this area, in particular, the sands are worked beneath the overlying Stanton Formation Limestone (which is presumably sold separately for use as a general aggregate).

- 2.16 The BGS resource mapping for this Kingston Formation sand resource excludes areas which extend beneath the Stanton Formation (where they could be – and are currently – worked), but includes outcrops of the underlying Hazelbury Bryan Formation and Beckley Sand Member – neither of which are actually worked. The resource outcrop as shown by the BGS maps is therefore somewhat misleading.
- 2.17 **Farringdon Quarry**, although geographically very close to those listed above, extracts material known locally as ‘sponge gravels’ from a completely separate geological formation (part of the Lower Greensand Group). The material is described by the BGS as interbedded sandstone and conglomerate, but by the operator as very clayey material which is used only for compacting into paths. Although soft sand forms part of the deposit, it is not physically separated from it during extraction or processing.
- 2.18 In north Oxfordshire, soft sand resources occur within the Horsehay Sand Formation of the older (Middle Jurassic) Great Oolite Group and are quarried for use as building sand at **Dun’s Tew Quarry**. The sand is variable within the quarry, ranging from almost pure white sand to heavily iron-stained orange silty sand with ironstone concretions. The sand is dry-screened to remove both the ironstone and lumps of clay and blended to ensure a consistent, orange-coloured building sand product.

Wiltshire Resources

- 2.19 In Wiltshire, the main soft sand resources are those of the Cretaceous Lower Greensand Group. These were, until recently, worked at **Sands Farm** and at **Compton Bassett** to the east of Calne, but are now largely worked out. Consented reserves remain at **Freeth Farm** (360,000 tonnes) but this is a stalled (dormant) ROMP permission where modern conditions have yet to be agreed, and there is an allocation of approx. 450,000 tonnes on ‘**Land Near Compton Bassett**’ which has yet to be worked. A former operator in this area has suggested that estimated yield to be very optimistic, due to the presence of clay within that part of the deposit.
- 2.20 Extensive unworked deposits in the Bromham area, between Calne and Devizes, are mapped as resources by the BGS and have been investigated as prospects by at least two operators, but very few of the landowners appear willing to consider extraction. 18 potential sites in this area were identified by Wiltshire CC in 2010 but proved to be highly controversial (as detailed in the report of the results of consultation on initial site options for sand and gravel extraction (August – October 2010) ([available here](#)) and were subsequently withdrawn. The proposals were met with unprecedented levels of local opposition – not least because of the presence of high quality soils and high grade agricultural land associated with these deposits.
- 2.21 In southern Wiltshire, younger deposits of Palaeogene age are worked at **Brickworth Quarry**. These form part of the Reading Formation, within the Lambeth Group, and are comparable in age and origin to those seen in West Berkshire. In this area, at least, they are predominantly of sand but, as with other parts of the Lambeth Group, elsewhere they are often predominantly clay.

Hampshire Resources

- 2.22 In Hampshire, soft sand is worked in two separate areas: In eastern Hampshire, the Cretaceous Folkestone Formation is worked at **Kingsley Quarry (Rookery Farm)** (where it is primarily sold as specialist silica sand for horticultural, sports and leisure activities), and at **Frith End Quarry**. A planning application, currently being prepared for a 1 million tonne extension at Kingsley would be the last opportunity to extend the quarry without encroaching back into the South Downs National Park (where the original quarry was located, prior to the Park's designation). Future applications may need to be contemplated within the National Park, unless alternatives can be found elsewhere. One such possibility lies to the east of Kingsley, on land currently occupied by the MOD. The permitted reserves at Frith End Quarry are understood to be almost exhausted and, even if a further extension is granted, are expected to last only a few more years.
- 2.23 In south-west Hampshire, soft sand from younger Palaeogene deposits – in this case from the Parkstone Sand Member of the Poole Formation – are worked beneath a cover of Quaternary sand & gravel deposits. **Blashford Quarry** is a processing site, receiving sand extracted from the nearby **Nea Farm** and **Plumley Wood** sand pits. The sands here are described by the operator as a variable deposit of medium- to coarse-grained sand with significant fine sand and clay content in places. Similar deposits are also extracted at **Bleak Hill (Hamer Warren)**. At each of these sites, the soft sand forms only part of the overall output and reserves.
- 2.24 An allocation has been made in the Minerals Local Plan for an extension to Bleak Hill Quarry. This is primarily for sharp sand & gravel but may include some soft sand. An allocation has also been made for a large new site at **Purple Haze**, which would primarily be for soft sand (from both the Poole Formation and the overlying Branksome Sand Formation), with a relatively small quantity of sharp sand & gravel from superficial Quaternary river terrace deposits.

Surrey Resources

- 2.25 The Cretaceous Folkestone Formation continues into the neighbouring county of Surrey, where it has been worked at a number of sites near to Farnham (currently at **Runfold South Quarry** operated in conjunction with landfill operations and at **Home Field Sandpit**). Previous workings in this area at Runfold North and Seale Lodge are now thought to have ceased extraction, whilst the site at **Alton Road**, though currently inactive, is expected to be reactivated soon, to extract the remaining reserves.
- 2.26 The Folkestone Formation resources have also been worked in various locations further east: to the south east of Guildford, at Woodhill Quarry (now closed); to the west of Reigate (most recently at Reigate Road and Tapwood Quarry); to the east of Redhill, at **North Park Quarry** (including extensions around Pendell Farm) and at **Mercer's Farm Quarry**; and to the east and west of Oxted, including the former Oxted Sandpit and the two **Moorhouse Sandpits**.

- 2.27 The deposits at North Park Quarry, and its extensions, together with those at the former Tapwood Quarry, and an Area of Search located at **Chilmead Farm** are associated specifically with the production of specialist silica sand, for non-aggregate use. The operators of Mercer’s Farm quarry also claim to be able to supply silica sand. It is not clear whether or not this is from that site, but the deposit is directly adjacent to the silica sand operation at Pendell Farm, so it could well prove to be suitable, if processed.
- 2.28 An important factor in relation to the soft sand resources within Surrey is that much of it lies within either the North Downs AONB or the South Downs National Park. Areas outside these designations are located in close proximity to them.

West Sussex Resources

- 2.29 The Folkestone Formation deposits also continue, east of Hampshire, into West Sussex, where they are worked, either as building sand or as silica sand, at a number of active quarries: **West Heath Common, Minsted, Sandgate Park, Hampers Lane and Rock Common**. Cuesta’s recent (2016) study for West Sussex County Council and the South Downs National Park Authority demonstrated that the deposits in this area, though variable in colour and silica content, are all capable of yielding good quality silica sands. Based on visual comparisons (only) with the samples obtained in the present study, they probably have a lower silt and clay content than the sands of the Lambeth Group in West Berkshire, making them more suitable for a wider range of applications. At least one part of the deposit in West Sussex, within the National Park, has been shown to be suitable for glass-making and sodium silicate production (Thompson & Poole 2016, Thompson 2017).
- 2.30 As with Surrey, an important factor in relation to the soft sand resources within West Sussex is their location within, or directly adjacent to the South Downs National Park.

3. The Market for Soft Sand from West Berkshire Sources.

Introduction

- 3.1 During the course of this study, interviews were carried out with a number of operators responsible for soft sand sites both within West Berkshire and in neighbouring authorities (Oxfordshire, Wiltshire and Hampshire). These included Raymond Brown, Grundon, Hills Aggregates, Tarmac and Smiths (Bletchington) Ltd. Relevant information from Sibelco (in Surrey) and CEMEX (in West Sussex) was also available from Cuesta's previous work on soft sand & silica sand for West Sussex County Council and the South Downs National Park Authority (Thompson & Poole, 2016). An interview was also carried out with Marley Tiles, as one of the main consumers of soft sand within West Berkshire. The following account is compiled from the information obtained from these various sources.

Scale of Production

- 3.2 Both at Copyhold Farm and at the former site at Old Kiln Farm, Chieveley, rates of extraction have typically been in the order of 25,000 to 30,000 tpa (tonnes per annum), although rates as high as 40,000 to 50,000 tpa per site are said to have been achieved in the past. Taking account of the slow-down in demand during the recent recession, and the progressive depletion of permitted reserves including the closure of Chieveley, the 10-year average sales figure for all soft sand in West Berkshire (2008-2017) as reported in the Council's latest LAA, has been only 43,730 tpa.
- 3.3 These rates are said to reflect the scale of demand from local builders and builder's merchants and both operators have a preference to maintain these markets for the longer term, rather than pushing for larger annual sales over a shorter period. In Appendix C of the Council's latest LAA, a range of methods have been used to estimate the scale of local consumption of soft sand, within West Berkshire. These estimates range from 4,719 to 32,177 tpa. Given that sales figures have been higher than this, however, it would be prudent to assume there is a requirement for *at least* 43,730 tpa to be maintained in future years. On this basis, the total requirement over the Plan Period (to 2036) would therefore be at least 0.79 million tonnes.
- 3.4 If, as suspected, there is a degree of pent-up, unfulfilled demand in the area, because of the depletion of local reserves and output capacity in recent years, there may be a justification for higher levels of output in future. At present, that additional demand appears to be supplied primarily from other sources within neighbouring south Oxfordshire.
- 3.5 For the nominated 60-acre field site, the operator has suggested that the sand could theoretically be extracted at a rate of up to 100,000 tpa in future, but that a maximum of 60,000 tpa would be more likely. For the other nominated site adjacent to Chieveley services, the anticipated future output rate would be around 30,000 tpa.
- 3.6 Higher rates of output could theoretically be achieved by marketing the sand differently, to specialist users such as Marley Tiles, but that would require significant investment in additional processing plant to wash the sand and provide a consistent,

cleaner product over a number of years. That option is being considered by one of the local operators.

- 3.7 The combined reserves available within these two sites, subject to planning permission, is understood to be in the order of 1 million tonnes.

Markets and End-Uses

- 3.8 As indicated above, the main markets for soft sand produced within West Berkshire are sales of dry-screened (unwashed) sand to local builders and to builder's merchants within the area. The sand is used primarily in mortar for brick-laying and masonry work.
- 3.9 Although there are permanent, fixed mortar plants at Theale, in West Berkshire, these are understood to be supplied by dried sand and cement delivered by rail from other parts of England. As such, they are quite separate from the local market supplied from resources within West Berkshire itself.
- 3.10 Temporary Dry Silo Mortar (DSM) batching plants are increasingly being used by major house-building firms on large housing developments. Again, however, these utilise washed and dried sand to precise specifications imported from outside the area as part of an integrated supply chain arrangement with accredited factory production control systems. They do not utilise local 3rd party suppliers.
- 3.11 One of the local operators has previously supplied sand to Marley Tiles, which has a production unit within the area, and would do so again if the required specifications and consistency can be met, as would the other operator. At present, however, and for the foreseeable future without investment in new washing plant, that option is not likely to be available for suppliers within West Berkshire.
- 3.12 **For the time being, therefore, the supplies for which alternatives need to be found are simply those of dry-screened soft sand for use by local builders, at a rate of at least 43,730 tpa.** The total requirement over the Plan period (to 2036) is therefore at least 0.79 million tonnes. This compares with a total of around 1 million tonnes of potential reserves within the two potentially deliverable nominated sites.

Specification Requirements

- 3.13 Formal specification requirements for aggregates (sand) used in the production of mortar are set out in the British Standard BS EN 13139:2013 Aggregates for mortar. The standard is concerned primarily with the grading (particle size distribution) of the sand, and with properties such as the fines (silt & clay) content, which is generally required to be less than 8% for masonry mortars produced from natural sands or less than 5% for plasters. Also important are properties such as particle density, water absorption, frost and thaw resistance, chloride content, sulphate content and organic content. Particle shape (i.e. roundness – one of the main properties which distinguish soft sand from sharp sand) is not, in fact, a specified requirement.
- 3.14 These requirements are of critical importance for factory-produced, CE-marked mortars, and for the sands used as feedstock in concrete tile production, but not

necessarily for mortars produced locally by individual builders. As noted and explained by Smith & Collis (1993), it is common practice in the UK for builders to use sands which differ considerably in their properties and characteristics to those which are specified in British Standards, simply because local sources generally provide the cheapest available form of fine aggregate (i.e. sand). Smith & Collis (*ibid.*) also note that particle shape, as well as grading, has a marked effect on the workability or handling properties of a mortar, with rounder particles being preferred.

- 3.15 This is entirely for practical reasons but it also has both cost and environmental implications: the more angular particles of sharp sands have a greater surface area for a given particle size, and thus require the addition of more cement, more water and/or more chemical additives to achieve the same level of consistency, cohesion and workability (at greater cost). Similar benefits, in terms of workability and cohesiveness, are achieved by the presence of a certain amount of silt and clay within the sand. This provides the ‘fattiness’ typically required by artisan builders (McIntosh, 1970).
- 3.16 **It follows that, in order to meet the requirements of the very localised markets currently (or until recently) supplied from sites within West Berkshire, any alternative or new supplies would need to be of soft (rounded and fine- to medium-grained) sand, with a limited but measurable content of fines (silt & clay) - perhaps up to 12%. Ideally, the sand should also be of similar colour to that found locally.**
- 3.17 These requirements would rule out the option of supplying sharp sand (e.g. from local Quaternary river terrace deposits) but also, potentially, substantially cleaner and/or differently-coloured soft sands from (for example) the Cretaceous Greensand resources in Wiltshire or the Folkestone Formation resources in West Sussex, Hampshire and Surrey.

Transportation Modes and Distances

- 3.18 It is commonly supposed that low-value bulk commodities such as construction aggregates are limited in their distribution to something like 30 miles by road haulage. A 30 mile radius (48km) of Chieveley (the current and recent supply area) is shown – for reference purposes only – on the resource map (Figure 2.1). Whilst 30 miles is often a reliable approximation, it is not a hard and fast rule. In the case of dry-screened soft sand used for mortar in West Berkshire (and neighbouring parts of Oxfordshire), the radius of distribution would seem to be rather less. For the Copyhold Farm and Chieveley sites, most deliveries have been within roughly a 10-mile radius (covering the whole of West Berkshire), but extending up to around 20 or even 30 miles in an eastward direction, towards the higher value markets nearer to London, including Reading, Maidenhead, Marlow and Bracknell. Deliveries towards Oxford (to the north), towards Swindon (to the west), and towards Andover and Basingstoke (to the south), are affected by competition from other supply sources in South Oxfordshire, Wiltshire and Hampshire, respectively, and are therefore reduced in distance, by comparison.
- 3.19 Higher value products, including bagged rather than bulk-delivered sand, and dry sand mortar can justify much greater travelling distances, e.g. 50 or 60 miles, but

neither of those options are currently available from West Berkshire sources. Bagged sand from Brickworth Quarry in southern Wiltshire, for example, is known to travel by road to the CPI Euromix depot in Avonmouth (a distance of around 75 miles). The same is true of bagged, dried sand from Upwood quarry in south Oxfordshire.

- 3.20 For sites which have direct access to rail transportation, economically viable distances are greater still. Again, this does not apply to the West Berkshire sources, but it does apply to a small number of soft sand sites elsewhere in the country, some of which are known to supply into the area. It is understood, for example, that Marshall's mortar plant at Theale, near Reading, receives sand imported by rail from both Kent and Rugby, for blending into a consistent, higher value building sand product which is then used within the local area (including West Berkshire).

4. Potential Alternative Sources of Supply.

- 4.1 This chapter examines the scope for supplying soft sand to the markets supplied by existing West Berkshire quarries from alternative sites (outside the AONB) in future years. This is done at two levels: firstly, as a theoretical exercise, based on geological suitability and broad economic feasibility; and secondly at a more practical level, taking account of the extent to which landbanks of suitable permitted reserves, or at least allocations for future working, are currently identified in each of the relevant minerals local plans. This seeks to avoid the deficiencies in the approach used in West Sussex where, at Examination, the Inspector found that the reliability of suggested alternative sources had not been adequately demonstrated.
- 4.2 In order to be found sound, the West Berkshire Plan would need not only to show that alternative resources exist, but also that the authorities concerned have acknowledged the need to supply from those areas into West Berkshire. Such acknowledgement – either within adopted Plans or perhaps in the form of Statements of Common Ground or other formal documents – would need to be obtained by the Council through the statutory Duty to Cooperate with other authorities. The scope of the present study is limited to identifying potential options.

Alternatives within West Berkshire

- 4.3 As noted in para's 2.11 et seq., above, the prospects of finding alternative, commercially viable deposits of soft sand within West Berkshire, outside of the North Wessex Downs AONB, appear to be extremely limited.
- 4.4 Whilst the possibility cannot be entirely ruled out without detailed, site-specific ground investigations, nothing more definite than possible Areas of Search could be identified at this stage. Even if such areas were identified, they would not be sufficiently robust to demonstrate that viable alternatives to extraction within the AONB exist within the District.
- 4.5 Consideration must therefore be given to other prospects within neighbouring LPA areas.

Other Alternative Resources - Availability and Transport Feasibility

- 4.6 As detailed in Chapter 2 of this report, soft sand resources which are comparable to those available within West Berkshire, are available within Oxfordshire, to the north. Similar or better sands (but different in colour and therefore not ideal substitutes) are also available in Wiltshire to the west and south-west, Hampshire to the south, and in both Surrey and West Sussex to the south-east.
- 4.7 The resources within south Oxfordshire are the closest - within about 21 to 25 miles (33 to 40km) by road from Newbury - and it is understood that at least some of the active sand quarries within that area already form part of the existing supply pattern into West Berkshire.
- 4.8 Those further away tend not to supply into the area, or at least not on a significant, regular or continuing basis. Sand from the Calne/Compton Bassett area in Wiltshire

would be the next closest source of supply (approximately 32 miles from Newbury by road) but permitted reserves in that area are very low and, although there are large areas of unworked resources nearby, these have met with very strong local opposition and do not, at this time, at least, constitute a viable alternative source of supply.

- 4.9 Very small amounts of sand from Frith End Quarry in Surrey (approx. 36 miles from Newbury by road) are brought by one local operator into their Kennetholme depot, near Thatcham, for one specific customer. This again, however, does not constitute a reliable alternative source of larger-scale bulk supply. The quarry at Dun's Tew in north Oxfordshire (some 44 miles by road from Newbury) does not attempt to supply into West Berkshire – not least because it would be disadvantaged, competitively, by the much closer quarries in south Oxfordshire.
- 4.10 One operator has supplied sharp concreting sand into West Berkshire from their Blashford Quarry in South Hampshire (a distance of around 53 miles) but has not attempted to do so for bulk supplies of soft sand.
- 4.11 Another operator formerly brought soft sand from West Heath Common in West Sussex to their Kingsmead depot in Slough (around 54 miles by road), but that was as part of an established in-house supply chain with inherent economic benefits.
- 4.12 Another considered supplying soft sand from their Brickworth Quarry in Wiltshire to Marshall's mortar plant at Theale (a distance of around 56 miles by road), as part of a substantial, longer-term supply contract, but the transport economics did not work out, and no contract was established.
- 4.13 It would seem, from these examples, that distances of more than 50 miles are of borderline viability, at best, in current circumstances. It follows that resources at greater distance, such as those located further into West Sussex and Surrey, as well as potential sources of marine-dredged soft sand, imported via the south coast or from the Bristol Channel, would not be economically viable prospects for supplying into West Berkshire.
- 4.14 It is important to note that these observations relate to low-cost bulk transportation of dry-screened soft sand, directly comparable with the material currently being supplied from Copyhold Farm (and until recently from Old Kiln Farm, at Chieveley). As noted in the previous chapter, washed, dried and bagged products command higher prices and can be transported further, but would not be competitive in the localised West Berkshire market for bulk supplies to local builders.
- 4.15 If local supplies from within West Berkshire were to cease altogether, the immediate market response would probably be for bulk supplies from the south Oxfordshire quarries to increase, but also for prices to go up, in the absence of local competition. That, in turn, could increase the feasibility of bringing-in sand from a wider radius of potential supply sources, including many of those mentioned above. That scenario, however, would have adverse sustainability implications, in terms of transport costs, material costs, fuel emissions and traffic impacts, compared with the existing supply

pattern. The possibility cannot be discounted but should not be relied upon without being properly addressed by means of a thorough Sustainability Appraisal.

- 4.16 **For the purposes of this exercise, therefore, only the resources which are already viable prospects for supplying into West Berkshire will be considered in more detail: i.e. those in South Oxfordshire.**

Availability of Permitted Reserves

- 4.17 As explained in Chapter 1, an important aspect of this study has been to check that any alternative sources of supply are realistic, in terms of having permitted reserves, or at least planned allocations, which allow for future provision over an area that is ‘wider than local’. They need to have capacity to provide for exports as well.
- 4.18 In the case of Oxfordshire, the Minerals and Waste Local Plan: Part 1 - Core Strategy (adopted in September 2017) acknowledges that the county’s contribution of primary aggregate towards the needs of other areas is a strategic issue. Oxfordshire’s Local Aggregate Assessment (2014) identified a requirement for soft sand at the rate of 0.189mtpa, based on its historical levels of contribution, and the 2017 version has confirmed that this requirement should continue, unless and until annual monitoring indicates otherwise.
- 4.19 That said, Oxfordshire has advised West Berkshire Council, in response to the Council’s recent ‘Duty to Cooperate’ request, that, although figures regarding exports of soft sand are not actually recorded, its understanding is that *“very little, if any of the sand and gravel exported from Oxfordshire to Berkshire in 2014 comprised soft sand. It was almost all, if not totally, sharp sand and gravel”*. This conflicts with the information provided to Cuesta by operators of the Upwood and Chinham Farm quarries in south Oxfordshire, that soft sand from those sources is supplied into West Berkshire. One explanation could be that this is a relatively recent development, reflecting the decline in indigenous sales within West Berkshire. The same operator noted that sales from Oxfordshire are also being exported to neighbouring Wiltshire and Gloucestershire
- 4.20 Information published on the Oxfordshire County Council website reveals that the County’s landbank for soft sand at the end of December 2017 stood at 3.105 million tonnes, which equated to 16.4 years based on the LAA 2017 provision figure, but only 13.1 years if based on the average sales over the last three years (2015-17). This reflects the fact that sales of soft sand in Oxfordshire have increased in recent years. No explanation is given by OCC but one possibility is that it *might* be due, in part, to exports into West Berkshire, following the closure of Old Kiln Farm at Chieveley and the reduction in output from Copyhold Farm.
- 4.21 With regard to its emerging Site Allocations Plan, at present, Oxfordshire has concluded that there will be zero additional requirements for soft sand. However, its Issues and Options paper recognised that the situation may change over time and a number of nominated new sites for soft sand provision were therefore included in the recently completed consultation. Therefore, there may be scope for Oxfordshire to make explicit provision in due course to accommodate need from neighbouring

areas. Ongoing dialogue between minerals planning officers in West Berkshire Council and Oxfordshire County Council will monitor this issue.

- 4.22 For the time being, at least, the South Oxfordshire quarries do have sufficient reserves to be able to supply at least some material into West Berkshire, over and above being able to provide a minimum seven year land bank within Oxfordshire itself. This is based on Cuesta’s discussions with the main quarry operator involved in January 2019. That operator’s Upwood Quarry contains over 50% of the county’s total permitted soft sand reserve, and their quarry at Chinham Farm received permission for a 1.6mt soft sand extension in 2017 (figures from Oxfordshire’s 2017 LAA). Further extensions would be required, however, if these sites were needed in future as alternatives to new permissions being granted in West Berkshire.

Potential Alternatives to Natural Soft Sand.

- 4.23 As noted earlier (para’s 2.1 to 2.2 and 3.13 to 3.17) natural soft sand has particular characteristics which make it suited for use as a building sand in traditional mortars and plastering. Whilst other types of sand can be, and are, used in larger-scale mortar production plants, and can provide the economic benefits of high volumes, consistency and long-term security of supply, they may also be associated with other (economic and environmental) disbenefits. As explained in para. 3.15, these include the need for increased quantities of cement, water and chemical additives. Factory-produced mortars may also differ from locally-derived artisan mortars in terms of colour, as well as in price.
- 4.24 Such differences will often be of importance to local builders but, even where that is not the case, at a more strategic level, mineral planning authorities need to give careful consideration to any decisions relating to future supply patterns which may have design, cost and/or sustainability implications overall.
- 4.25 Within this context, potential alternative sources of fine aggregate (sand) may include:
- natural sharp sand from land-won or marine-dredged sources;
 - crushed rock sand;
 - secondary aggregates such as china clay sand, ball clay sand, pulverised fuel ash, furnace bottom ash and blast furnace slag; and
 - recycled materials including processed demolition and construction wastes and crushed glass cullet.
- 4.26 All of these are more angular materials, compared with soft sand, and would therefore be associated with all of the disadvantages noted above. In most cases they would also require further transportation (adding further to the cost and sustainability effects) and would not match the colour of existing mortars.
- 4.27 None of these alternatives would therefore provide an acceptable substitute for natural soft sand in the markets for which this is currently used.

The specific feasibility of supply options noted in the Brief.

- 4.28 The Brief noted that five specific options were being considered by West Berkshire Council regarding the approach to future soft sand provision within the study area, and requested observations to be made on each one, in light of the findings from this study. These observations are set out below for each option.
- 4.29 **Option 1:** *“Allocate specific sites for soft sand, including from within the AONB. Future planning applications would have to pass the exceptional circumstances test in para. 172 of the NPPF³”*. Two of the three nominated sites within West Berkshire appear to be viable candidates in terms of (jointly) being able to address the identified shortfall of supply, subject to due planning process. However, because these sites are located within the AONB, the NPPF requires that this should be the option of last resort, becoming valid only if and when other options of supplying from locations outside National landscape designations have been thoroughly examined and rejected (thereby demonstrating exceptional circumstances). At present, those circumstances cannot be confirmed, since the option of relying on future supplies from south Oxfordshire (Option 2, below) may well prove to be feasible, at least within the short to medium term. Further discussions with Oxfordshire County Council are needed to confirm whether or not such supplies can be relied upon for the duration of the Plan period. If they cannot, then ‘exceptional circumstances’, in the context of the NPPF would appear to exist, and Option 1 may thus provide a valid solution.
- 4.30 **Option 2:** *“Do not allocate specific sites within the AONB – work with surrounding authorities and/or rely on alternative sources (e.g. marine sand) to secure supply”*. Subject to further discussions with Oxfordshire County Council, this option has the merit of being able to provide a reliable, practical solution for at least the short to medium term. In order to be fully relied upon, however, there would need to be a formal commitment from Oxfordshire to make adequate provision for supplying West Berkshire as well as addressing its own requirements. Subject to similar provisos, reliance on other LPAs might also be possible but would involve longer transportation distances and associated adverse impacts. These would need to be assessed against the option of working within the AONB by means of a Sustainability Appraisal. Reliance upon marine aggregates would also require a Sustainability Appraisal since, depending on source, these may not provide an adequate substitute for land-won soft sand and would also require longer transportation, with associated adverse impacts.
- 4.31 **Option 3:** *“Do not allocate specific sites within the AONB - identify preferred areas, or areas of search outside of the AONB”*. Preferred Areas and, more especially, Areas of Search, do not provide the level of confidence offered by Specific Site allocations in terms of maintaining an adequate and steady supply of minerals, in accordance with NPPF requirements. Reliance upon such allocations (only) may therefore weaken the soundness of the Plan and may well be rejected at Examination.

³ This has been updated from the wording in the Brief, which originally referred to paragraph 116 of the old NPPF.

- 4.32 **Option 4:** *“Combination of options 1 and 3. Seek to allocate the most appropriate specific sites (whether within the AONB or not) and where this is not sufficient to deliver the requirement over the plan period, identify preferred areas or areas of search outside of the AONB”.* As noted for Option 1, this should only be considered if and when other options have been ruled out. If it should prove possible to identify one or more specific site allocations, then the identification of *additional* Preferred Areas and Areas of Search outside the AONB would provide a means of addressing any shortfall over the latter part of the Plan period. The situation would need to be kept under review, however, to ensure that other sites come forward within the required timescale. For this reason, Option 4 may be seen as providing less confidence than either Option 1 or Option 2.
- 4.33 **Option 5:** *“Do not allocate specific sites in the AONB - identify preferred areas, or areas of search both within and outside of the AONB”.* As noted for Option 3, these do not provide sufficient confidence for maintaining an adequate and steady supply of minerals, as required by the NPPF.
- 4.34 Whichever option is selected, it would be prudent *in addition* to seek to identify Areas of Search for further exploration of resources within West Berkshire, outside the AONB. The purpose of doing so would NOT to be to rely on them for supply within the Plan period (for the reasons already stated), but rather, to encourage exploration work by mineral operators in the area, which might, in turn, enable proposals for Specific Sites to be brought forward by industry in future years (possibly within or beyond the current Plan period).
- 4.35 In view of the overall shortage of soft sand resources, and in the interests of minimising transport impacts and thereby optimising sustainability, it would also be prudent to allow proposals for extraction within West Berkshire (both within and outside the AONB) to be brought forward and assessed against **criteria-based policies**. This would allow such proposals to be judged on their individual merits, irrespective of whether or not they have already been identified as allocations within the Plan. A similar approach was adopted recently in relation to silica sand provision within the West Sussex / South Downs National Park Joint Minerals Local Plan.

5. Conclusions

- 5.1 Soft sand has traditionally been worked within West Berkshire on a relatively small scale. It has been used, primarily, by local builders in the production of mortar for brick laying and masonry work.
- 5.2 Permitted reserves of soft sand from sites within West Berkshire have recently been exhausted. Three potential new sites put forward by operators are available but two of these fall within the North Wessex Downs Area of Outstanding Natural Beauty (AONB) and the other is understood to have significant access difficulties. Together, the two nominated sites within the AONB could provide the volume of soft sand required over the Plan period (to 2036) but, in accordance with the NPPF, cannot be allocated for future working without demonstrating exceptional circumstances, including the lack of any viable alternatives.
- 5.3 Soft sand resources within West Berkshire occur within deposits known as the ‘Lambeth Group’ (previously known, in this area, as the ‘Reading Beds’). These are extremely variable deposits and only certain parts of the outcrop actually contain workable sand resources. Resource mapping of these areas by the BGS does not distinguish areas of sand from other parts of the same formations making it impossible to assess the scope for identifying viable prospects without detailed site investigations. In addition, a very large proportion of the outcrop falls within the AONB.
- 5.4 Alternative soft sand resources do exist in most of the adjoining local authorities but, with the exception of those in neighbouring parts of south Oxfordshire, these would not represent economically viable solutions. Imports from those areas would also necessitate significant transport impacts. Supplies into West Berkshire from some of the south Oxfordshire quarries is already taking place, in response to the gradual depletion of indigenous reserves.
- 5.5 Of the options suggested in the Brief, Option 1 (allocating specific sites for soft sand including from within the AONB) offers a potential solution, but only if viable alternatives cannot be confirmed. Option 2 (relying on supplies from neighbouring south Oxfordshire) may prove to be such an alternative, and would then be preferred, but only if a formal commitment to this arrangement is offered by Oxfordshire County Council.
- 5.6 Whichever option is selected, it would be prudent in addition to seek to identify Areas of Search within West Berkshire, outside the AONB, in order to encourage exploration work by mineral operators in the area, with a view to longer-term supply options (beyond the Plan period).
- 5.7 In view of the overall shortage of soft sand resources, and in the interests of minimising transport impacts, it would also be prudent to allow proposals for extraction within West Berkshire (both within and outside the AONB) to be brought forward and assessed against criteria-based policies.

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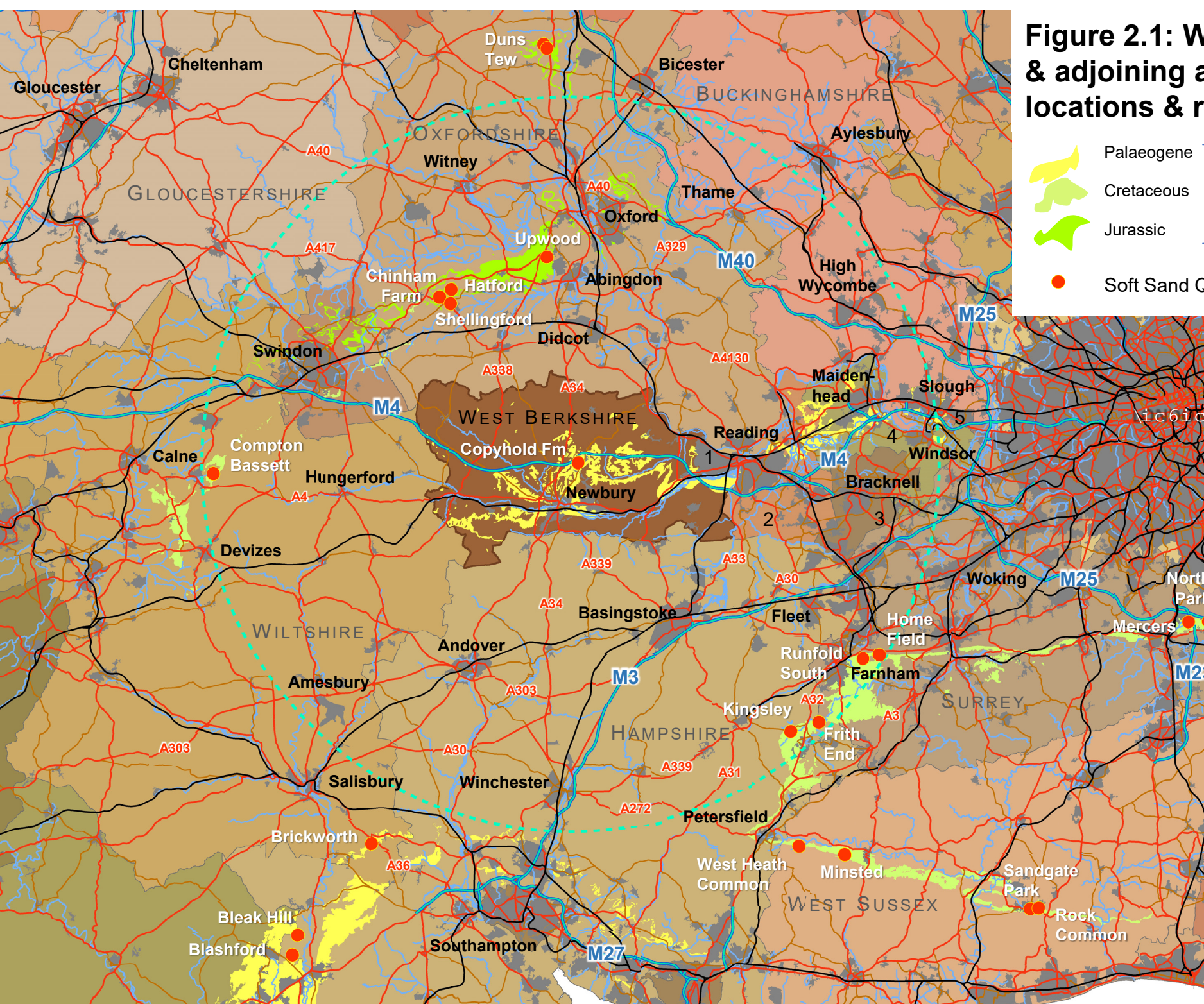
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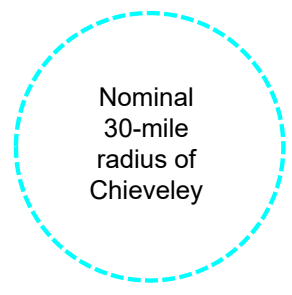
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Figure 2.1: West Berkshire & adjoining areas – locations & resources.



■ Palaeogene
■ Cretaceous
■ Jurassic
● Soft Sand Quarries

Soft Sand Resources



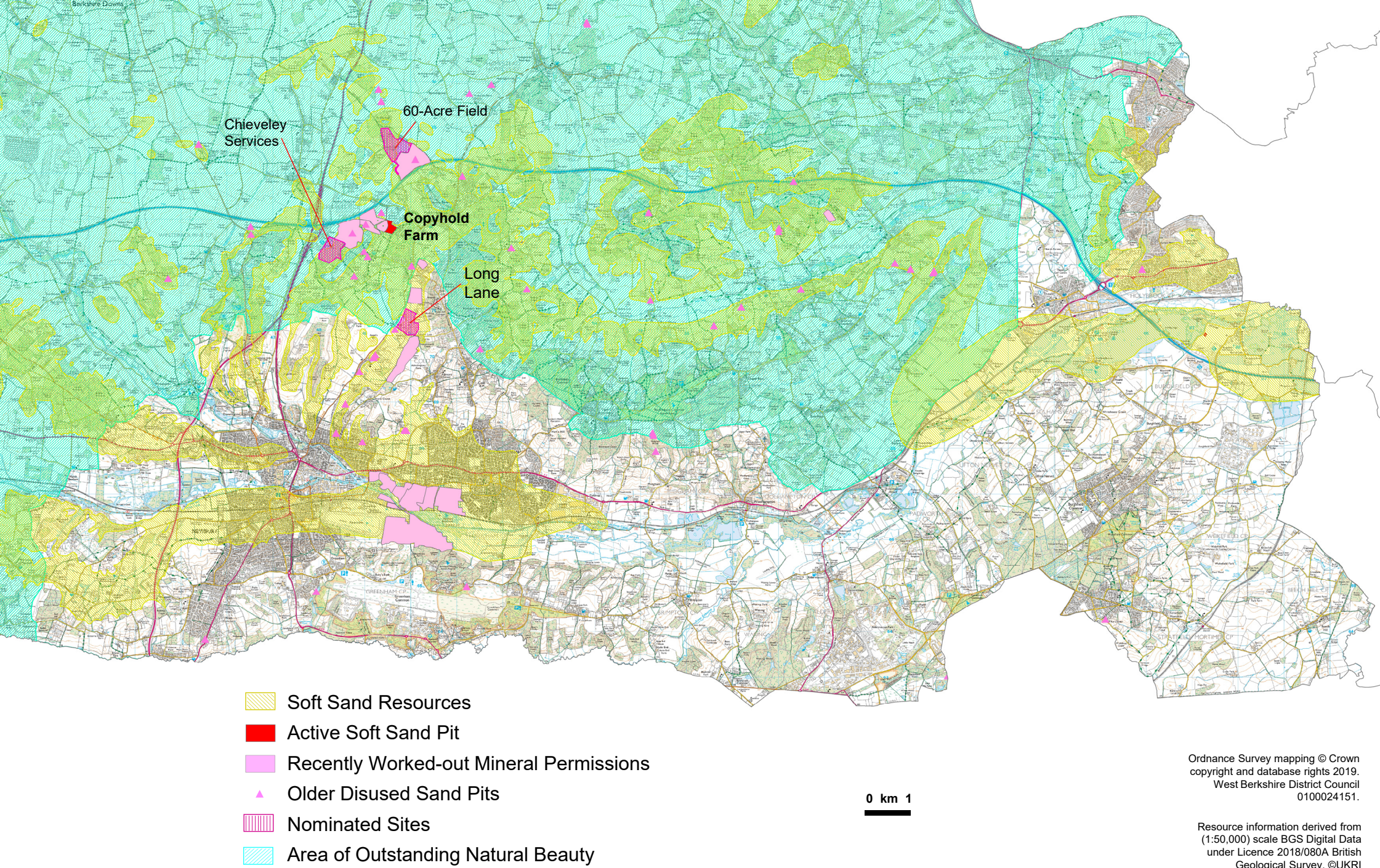
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Central & Eastern Berkshire Unitary Authorities:

- 1: READING
- 2: WOKINGHAM
- 3: BRACKNELL FOREST
- 4: WINDSOR & MAIDENHEAD
- 5: SLOUGH

Resource information derived from (1:50,000) scale BGS Digital Data under Licence 2018/080A British Geological Survey. ©UKRI

Figure 2.2: Soft Sand Resources and Sites in West Berkshire outside the AONB.



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