

Essex County Council

Replacement Minerals Local Plan

A Review of Building Sand supply in Essex: Consideration of a Separate Building Sand Landbank Topic Paper

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Prepared by:

John Cowley

Mineral & Resource Planning Associates Ltd



Essex County Council

A REVIEW OF BUILDING SAND PROVISION IN ESSEX AND THE NEED OR OTHERWISE FOR A BUILDING SAND LANDBANK SEPARATE FROM CONCRETING SAND

1.0 INTRODUCTION

“This European Standard specifies the properties of aggregates and filler aggregates obtained by processing natural, manufactured or recycled materials and mixtures of these aggregates for use in mortar. The particle shape of fine aggregates smaller than 4mm is not normally relevant in the behaviour of mortars.”

British Standards Institution

Aggregates for Mortar: BS EN 13139: 2002

“The ‘building sands’ may be obtained from (a) dry or wet pits (b) the sea or estuaries by dredging (c) from dunes or (d) from crushed rock.”

The Sand and Gravel Association of Great Britain

Sand and Gravel Handbook: 1960

Chapter VI: Building sands for Plasters, Rendering and Mortars

Background

1.1 This report has been prepared for Essex County Council to form part of the evidence base for the Replacement Essex Minerals Local Plan (REMLP), and to address those representations made in respect of the Pre-Submission Draft of that Plan. The report refers to the provision of ‘building sand’ because that is the product that the representations in effect relate to. However, the relevant representations mainly refer to ‘soft sand’. ‘Soft sand’ is an imprecise, confusing and misleading term which is used to mean different things. The difficulties arising from the continued use of that term are considered in this report and it is clear that the operation of the planning process in Essex (and elsewhere) would benefit from discarding that term and instead refer to ‘building sand’, which is the term used in national specifications, in national statistics and in national policy and is the product sought by the construction industry. In the Decision Letter following the recent appeal at Elsenham in October 2012, the Inspector noted that while various terms were used to describe the mineral proposed to be extracted, that on hearing the evidence that the mineral was best described as ‘building sand’

1.2 The main substance of the representations is a call for a landbank for ‘soft sand’ separate from a landbank for concreting sand. The form of the representations is not to be equated with a call for a building sand landbank but to link that landbank to a particular sand dominated horizon. This narrow concept flies in the face of both commercial and geological reality in relation to supply. In addition there is call for the sub-division of such a ‘soft sand’ landbank into two elements which the representations describe generally as (a) “naturally arising soft building sand” and (b) “soft washed sand”. The terms used in the representations to describe these two elements may vary. This is in effect seeking a split in the landbank between a product produced by dry-screening and a product produced by washing and screening respectively. There is no national policy requirement, nor any

specification consideration, which would justify a split of a landbank by the method of processing.

1.3 This report demonstrates that the term 'soft sand' is being used in a confusing and confused manner in representations to the REMLP and that the call to split the landbank in Essex so as to provide (i) for a 'soft sand' landbank separate from that for concreting sand and (ii) a further split to provide a dry screened landbank is neither practical nor justified. In considering the evidence at the Elsenham appeal the Inspector concluded that the evidence of the appellant exactly identified the difficulties in trying to identify building sand reserves and construct a separate building sand landbank, because it relied on estimates of sand which could be sold either for building sand or concreting sand. The Inspector concluded that it is not possible to identify a landbank for building sand separate from that for concreting sand in Essex that would be both reliable and unambiguous

'Soft Sand' in the Mineral Planning Process

1.4 The term 'soft sand' is used in the mineral planning process to describe various materials. 'Soft sand' is often identified as having specific and even unique properties such that it may be considered to be the only source of building sand for use in mortar. The term is often specifically linked to certain geological lithostratigraphic units and to the products that such units are perceived, erroneously, to be capable of only producing. This interpretation is based on deterministic assumptions that are an irrelevance or incorrect as demonstrated by the current specification. The assumptions are often contradicted by the actual properties of the material. Those assumptions have also been irrelevant or incorrect for many decades. Due to those erroneous assumptions, using the term 'soft sand' creates confusion in the mineral planning process both as to available resources and actual demand for building sand. The erroneous assumption confuses the supply picture for building sand but also confuses the supply picture for concreting sand.

1.5 National policy seeks a supply of aggregates for the construction industry. Mineral planning should support the construction industry by enabling the supply of aggregate products as required from acceptable locations. Inaccurate and irrelevant assumptions in the mineral planning process as to the properties of 'soft sand' may not support or achieve those objectives. It may harm those objectives. It can be said to have harmed those objectives by, for example, apparently requiring extraction from within an AONB on the premise that resources of 'soft sand', and hence supplies of building sand, are only available within an AONB. Similarly it may harm those objectives by not taking due account of the production potential from deposits and thereby deny industry allocations or permissions because of a perception of production limitations (the presumption that concreting sand cannot be produced from any 'soft sand' bedrock deposit, for example).

1.6 In relation to landbanks the REMLP notes in paragraph 3.82 that it is considered "unnecessary and impractical to maintain separate landbanks to distinguish between building sand and concreting aggregates". This approach continues that in the adopted Essex Minerals Local Plan 1997.

1.7 The evidence in this report demonstrates that the landbank issue for some authorities, and the operation of a separate landbank for 'soft sand', does not in fact

relate to end use (as required by national policy), but to the dominance of sand (which is suitable for either concreting sand or building sand) in the landbank due to permissions to work bedrock sands. Such bedrock sand units can produce large quantities of fine aggregate for use in building sand and/or concreting sand. They may not contain any significant deposits of coarse aggregate ('gravel') in some parts of the country (although outside SE England bedrock deposits may be a main resource for coarse aggregate). Thus a combined landbank could be dominated by fine aggregate and thereby not meet the actual demands of the construction industry.

1.8 That position can be an important consideration because it could lead to a shortage of available coarse aggregate and an oversupply of fine aggregate. However, that issue needs to be resolved in a manner which addresses the supply of coarse aggregate, not the dominance of reserves in bedrock sands. In any event it is not a matter which can be resolved by splitting the sand landbank, because, as demonstrated in Bedfordshire, Dorset, Hampshire, Kent, etc, it is generally impossible to split reserves of bedrock sand in the ground into (i) that component suitable only for building sand, and (ii) that component suitable only for concreting sand. There are no significant deposits of bedrock sands in Essex and all building sand production is derived from the various superficial deposits.

What is 'Soft Sand'

1.9 There is no definition or specification for 'soft sand'. It is a generic historical term originating in the construction industry to describe the properties of mainly fine 'natural' sand aggregate suitable for use in mortar, but unsuitable for use in concrete due to a large proportion of fines, poor grading and the presence of deleterious materials. The term is used sometimes to convey a narrow meaning and sometimes used to encompass a very broad spectrum of materials. The term may be used as a synonym of building sand or mortar sand, or to describe the typical properties of bedrock sand, or as an analogy of bedrock sand.

1.10 What is perceived to be 'soft sand' for one user in one part of the country may not be recognized as 'soft sand' in another part of the country. What is currently sold colloquially as 'soft sand' (but in essence is sand produced to the relevant standard for mortar sand) often has constituents and properties which directly contradict the perceived constituents and properties of 'soft sand'.

1.11 'Soft sand' was formerly extracted from a number of bedrock and superficial sand dominated resources throughout the UK (such as the Bagshot Beds of the Thames Valley or various blown sand deposits) for use as mortar. Such resources were typified as being very fine sand, that were often almost single sized, with sub-rounded to rounded particles and a variable, but often very large proportion of 'fines' (silt and clay). Many, but not all, of those resources may no longer meet the relevant specification for mortar sand after processing, or would be difficult to process to match that specification. Many never did meet the relevant specification. Some of those deposits are of little commercial interest today, other than a source of fill or for tip cover.

1.12 Terminology and the understanding, or misunderstanding, of the application of terms is part of the 'soft sand' problem. While representations to the REMLP may

refer to 'soft sand' (and this report notes references to 'soft sand', where used in other documents), it will be clear from the content of this report that the term 'soft sand' is an imprecise term which has produced and continues to produce misleading implications for the mineral planning process. The term 'building sand' or 'mortar sand' is used in national policy, in national statistics and in nationally relevant specifications. Mortar sand is a subset of building sand and this report therefore refers to building sand to properly reflect the relevant aggregate product. To assist in clarification a glossary of terms is enclosed at the rear of this report.

Separate Landbanks

1.13 Contrary to representations to the REMLP, and many statements and presumptions made elsewhere, there is in fact no reference in any extant national policy document to the need to provide a landbank for 'soft sand'. Neither has there ever been such a requirement in any previous statement of national policy. In relation to landbanks national policy is focussed on products for specific end use markets and has therefore recognised that a separate landbank for products such as building sand should be provided, where that can be calculated. Also contrary to some statements, national policy does not require that a split of the landbank must be made. Such a split can be provided but only where the landbank, the reserves, can be calculated separately.

1.14 This report confirms that it is not possible to separately calculate the resources or reserves of sand suitable for use as building sand in Essex nor is it possible, practical or a function of the planning process to direct, or control, how the extractive industry chooses to process reserves or to what end use market processed sand is sold, or used. In such circumstances it is not possible to operate a landbank for building sand ('soft sand' of representations) in Essex and any such landbank would be misleading and unworkable.

National Statistics

1.15 The term 'soft sand' is not used in national statistics on production of sand and gravel collected annually in accordance with the Statistics of Trade Act 1947. Such production has been tabled according to the relevant end use of 'building sand' or 'concreting sand', even when production statistics were collected in cubic yards not tonnes.

The 'Soft Sand' Presumption in Mineral Planning

1.16 There continues to be an unfortunate and misleading deterministic presumption with regard to the term 'soft sand' in mineral planning. It is a strange anomaly that while the term is generally accepted to be imprecise in commercial and resource terms, and is not referenced in specifications, that the term continues to be used in the planning process (outside colloquial use) in such a deterministic manner. As used in mineral planning it implies, or categorically states, that 'soft sand', and the reserves or resources from which it is considered to arise, has particular and unique characteristics, which clearly differentiates it from other materials in building sand end use, and precludes the use of other materials in that end use.

1.17 The primary presumption is that 'soft sand' is the only material capable of producing building sand, with a corollary that sand from 'soft sand' resources cannot be used in concrete, and that other aggregates, including recycled aggregates, are unacceptable for use as building sand. That primary presumption creates a series of associated presumptions which require to be held as true for the primary assumption not to be undermined.

1.18 Such associated presumptions include that 'soft sand' is only capable of being produced from 'sand' dominated geological horizons (themselves described as 'soft sands'); and that as dry-screening keeps the 'fines' content high, that a dry-screened 'soft sand' has preferential properties as a building sand in mortar to washed mortar sand. The focus on the sand being 'soft' creates the presumption that the particles of sand are well-rounded and that this characteristic is itself a necessary condition.

1.19 Those presumptions are in direct contradiction with the relevant Standard Specification (formerly British Standard now European Standard) and with the properties of many 'soft sands' as described and sold. The BS EN specification confirms that fine aggregate for use as mortar sand can be sourced from a wide variety of deposits including recycled wastes, that the shape of the fine aggregate is irrelevant and that grading, including the reduction in fines, is important.

Controls on Processing

1.20 Representations to the REMLP have suggested that in determining 'soundness' of the REMLP it is necessary to give consideration to a detailed assessment of the ability to provide the required range of aggregate products such as gravel or concreting sand (the reference is to 'sharp sand' not concreting sand) and also to the method by which a product is produced. In the latter case the example is given of building sand (the reference is to 'soft sand') being produced by washing as opposed to dry screening with the implication that the REMLP should somehow identify a separate provision for dry-screened building sand. The NPPF gives no support to nor does it require such a detailed analysis

1.21 That suggestion implies that washed building sand is somehow not acceptable or is less acceptable to the construction industry. Washed or dry-screened building sand serve the same market and it is not possible to differentiate or reflect the changing demands of that market. There are no fundamental advantages in using dry-screened sand. There are however, advantages in quality control in using washed sand and it is generally expected that the construction industry will preferentially seek supply of washed sand.

1.22 As part of those representations it is further suggested that the REMLP should also consider the ability of industry, which in effect must consider the current and future ability of every operator, to make changes to their processing plant to meet a particular market demand and if this would have environmental consequences. However, such considerations are clearly matters that lie within the control of commercial decisions of the extractive and construction industry and not the control of the MPA. In any event, changes to capacity, the elements of the processing plant and the products produced from a processing plant can be made in the space of a few hours. National policy relates to products. The method by which that is produced is immaterial in national policy terms.

Alternatives

1.23 The concept that mineral resources other than 'soft sand' are not acceptable as a source of building sand is a commonly held but erroneous conclusion in mineral planning in some areas. The relevant BS EN specification does not specify what resources are or are not suitable. This is because the specification purposely leaves this open (subject to demonstration that the resource matches the physical and chemical thresholds) because a wide range of resources (including crushed rock fines and marine dredged sand) have always been used and because the specification is very flexible. However, as worded, it does enable the use of what are commonly termed secondary or recycled aggregates recovered from 'wastes'. The inclusion of such alternative materials in the BS EN is a reflection of historic and current practice by the extractive and construction industries in the UK and the latent potential of such materials. The use of such materials is in line with sustainability considerations.

1.24 In practice 'alternatives' have been used as a source of building sand, (either on their own or in combination) for many years and in some parts of the UK have been the most significant source for decades. In some locations that practice has been the direct result of there being no substantive 'sand' or fine aggregate resources in the area (no 'soft sand') and/or the presence of large quantities of 'fine' mineral waste or other waste arising from crushed rock quarries or other mineral processing or other industrial activity.

1.25 In Cornwall, for example, there are no significant deposits of 'natural' fine aggregate and the demand for such material for both building sand and concreting sand is mainly met by processing 'sand' from China Clay extractive waste and from crushed rock fines. There are substantial deposits of China Clay sand in Cornwall and Devon and annual use of that waste in forms of aggregate has been around 1.5 million tonnes per annum from arisings of around 10 million tonnes per annum. China Clay sand has been exported to other parts of the UK notably to London for the 2012 Olympics.

1.26 There are no effective sand resources in south east Wales and crushed rock fines are a major resource either on their own, or blended with marine dredged sand or natural sand imported from SW England for the provision of building sand.

1.27 More recently, the introduction of the aggregates levy has encouraged the upgrading of crushed rock quarry wastes by washing and screening to produce sand for concreting and building sand end uses. While this has been a significant development in the traditional crushed rock resource areas of western and northern parts of the UK, it has also taken place in Kent in relation to 'fines' arising from the crushing of Ragstone.

1.28 The extractive industry is very innovative and has taken the use of alternatives further by blending recycling wastes arising from crushing concrete etc, with primary sand so as to create a 'hybrid' material (which thereby conserves primary aggregate) and by utilising the potential in other 'wastes' (such as glass). Similarly the recycling industry is very innovative and in areas of demand, such as the London conurbation, has produced building sand directly from construction waste. It is to be expected that the recycling and aggregates industries will further

exploit the potential of fine waste, as building sand, so as to find a use for material that is otherwise of no value.

Coverage

1.29 This report considers the position in Essex. But to put that into context the report reviews practice in other parts of England in relation to the identification or not of a landbank for building sand from within the total sand and gravel landbank, including, where identifiable the basis for that decision. It also reviews if any such separation actually reflects a building sand landbank or not.

Summary

1.30 This report demonstrates (i) that the assumptions that flow from the use of the term 'soft sand' are distorting the mineral planning process in Essex, and elsewhere, (ii) that building sand for use as mortar sand is available in Essex from a range of resources, and (iii) that it is not practicable, or necessary or desirable to provide a building sand landbank separate from concreting sand in Essex.

1.29 In any future discussion on aggregates in Essex (and indeed elsewhere), whether such discussions are specifically related to landbank or any other consideration, the use of the term 'soft sand' should be avoided because of its erroneous and misleading connotations. As advised in national policy, the focus should be on the options of supply of 'products', such as concreting sand or building sand.

2.0 GEOLOGICAL AND COMMERCIAL CONSIDERATIONS

“The Woburn Sands formation has an extensive outcrop (of).... sands which are suitable for one or another of several traditional uses however, the flexibility of the British Standards for construction sand specificationsmakes it difficult to equate resources in the ground with precise end uses”

British Geological Survey

Geology of the Leighton Buzzard – Ampthill district: Technical Report WA/88/1: 1988

“Unwashed dryscreened sand whilst sometimes complying with British Standards requirements, tend to produce mortars having a high water demand. As a result they are relatively weaker and more prone to shrinkage than mortars made with well-washed sand”

The Geological Society

Aggregates: Sand, gravel and crushed rock aggregates for construction purposes, 2001

“Kingsley Quarry produces a fine, soft sand that is used as concreting or building sand”

Quarryplan (GB) Ltd

Evidence submitted to the Hampshire Minerals and Waste Plan EIP: April 2012

The Term ‘Soft Sand’

2.1 There are no defined properties for ‘soft sand’. The term ‘soft sand’ is an imprecise term that has been used for many decades by the extractive and construction industry as a colloquial generic term to approximately describe any fine aggregate that is generally suitable for use principally in mortar for brick and block laying. The term is not referenced in national policy, in national specifications or national statistics. It has no definitive geologically relevant characteristics or significance.

2.2 In the era prior to the production of standard specifications the use of the term ‘soft sand’ enabled the artisan to discriminate, merely by touch, material which could be used in mortar from that material used in concrete. The presence of a large percentage of ‘fines’ (or the presence of un-quantified volumes of other material such as ash or shell, etc) did not preclude the use of a particular sand in mortar, but would preclude its use in concrete. Sand for use in concrete was washed to remove the majority of ‘fines’ and other deleterious materials. This created a product, which compared with mortar sand, had a rougher feel and was termed ‘sharp sand’.

2.3 ‘Soft sand’ could be produced merely by dry screening and did not require to be processed by washing and screening. Indeed washing the sand would, in many cases, have meant the loss of much of the potentially saleable product with the wash water to silt lagoons. ‘Soft sand’, and hence sand for mortar, thereby became synonymous with dry screened sands with a significant proportion of fines. ‘Soft sand’ would therefore include sands which were single sized or gap-graded or even contained relatively coarse angular particles, provided they contained a high proportion of fines.

2.4 However, primarily because of the poor and variable grading and the variability in the properties of fines the actual properties of such ‘sands’, the mix ratio, the amount of water in the mix, and the mortar laying characteristics, were often very specific to each sand and point of use. When used elsewhere, or in different construction works, a bricklayer’s unfamiliarity with the specific limitations of the sand could cause errors to be made in mixing (too much or too little water, etc) generating problems in the laying of, or the subsequent strength, of the resulting mortar.

Specifications

2.5 Problems relating to the variability in properties of many materials became widely acknowledged historically through all sections of manufacturing and construction industry. The British Standards Institution was formed in 1931 following the formation of the Engineering Standards Council in 1901 to produce ‘standards’ defining the advisory properties for certain products both as raw materials and as manufactures. The work of the BSI expanded to cover construction aggregates and a standard for mortar and other end uses has been guiding both the extraction and construction industry for decades. The relevant standard has been in place, subject to various updates and amendments to reflect experience and developing practice, since that time. Changes to the standard are made to reflect experience with its application and the constraints on suitable resources.

2.6 The term ‘soft sand’ is not used in specifications in relation to the production and supply of fine aggregate for building sand for use in mortar. Since at least 1955 the relevant descriptive term is ‘sand’ (BS1200:1955, “Building sands from natural sources”); which could consist entirely of sand from ‘natural’ sources, including crushed particles and crushed stone sand, and marine dredged sand; with a specific grading. The shape of the particles was not and is not now a consideration.

2.7 The significance of this is that specifications define acceptable sand as being fit for the purpose by reason of its measured grading and performance, rather than by reference to some inaccurate and vague idea of compliance related to a geological resource. For important technical reasons, therefore BS 6100, part 6.3, 1984, specifically recommended that the terms ‘sharp’ and ‘soft’ sand are not used in construction terminology and that sands for different uses should be designated by the particular use in relation to the relevant BS specification for that use.

2.8 Specifications for aggregate products have always allowed for considerable flexibility, provided the product meets the grading and performance requirements. This flexibility does make it very difficult to separate out both resources and reserves into that suitable for building sand and that suitable for concreting sand. That difficulty is clearly seen in relation to the comparison between sand produced to meet the specification for fine concreting sand and that for mortar sand. Indeed sand produced and sold to comply with the former BS 882F (concreting sand) would commonly match the specification for the former BS1200S (mortar sand) and vice versa.

2.9 To reflect the potential from recycled materials and the contribution they may make to supply the current specification (BS EN 13139:2002) is titled “Aggregates for Mortar” and such fine aggregate includes both ‘natural sand’ and manufactured or

recycled material, including crushed particles. The term 'fine aggregate' is now used instead of 'sand' to reflect the wide variety of materials suitable for use in mortar and so as not to imply that only 'natural' sand is suitable.

2.10 Problems with the use of dry screened sand, the need to comply with specification and the increasing diversion of production into bagged and factory mixed mortar sand and mortars, where the product might eventually be used at a distance from its source and where the prime consideration is the reproducibility of properties when used in any construction by any bricklayer, has produced a substantial shift away from dry screened sand into washed sand.

2.11 One effect of that is that some 'soft sand' resources previously used to supply mortar sand (such as the Thanet Beds) have not been of any significant commercial value as a source of aggregate for mortar sand for decades and are only viable for use as fill. Such resources in any event could only supply dry-screened building sand due to their high fines content. A number of such 'soft sand' resources were non-compliant (too much fines, too much fine sand, single sized or gap graded) with the relevant specifications even when in production. A study in 1976 confirmed that circa 40% of mortar sand as sold (and after processing) did not comply with the grading requirements of the relevant specification. Such resources certainly complied with the term 'soft' as it is used but did not comply with the relevant building sand specification.

Geological Considerations

2.12 The term 'soft sand' has no direct geological significance or relevance. Mineral resource geology recognises that certain deposits may be dominated by fine or coarse particles of rock fragments and that these may have different end uses. That may be described in relation to terms used in the construction industry and hence refer to 'soft sand', or 'building sand', or 'fine aggregate' for use as building sand. However, the problem of defining the mineral potential of a deposit of fine aggregate, given the flexibility of construction standards, and the end uses to which that potential might be put, as described in the Leighton Buzzard report above, are widely recognised in mineral resource geology. The exception is that some fine sands are so fine that they can only be used as fill or, when processed by dry screening, as mortar sand.

2.13 Sand used to produce fine aggregate for construction, other than that arising from crushed rock fines or wastes, is derived from superficial and bedrock resources. Superficial resources consist of material arising from fluvial or glaciofluvial processes, or more rarely beach or aeolian processes and are young deposits laid down in the Pleistocene (circa 2.6 million years before present or younger). Bedrock resources are considerably older with the major resources in the UK being from Permian to Palaeogene age and deposited in marine, estuarine or fluvial environments.

2.14 The source rocks, the local palaeogeography and the sedimentary processes at the time of deposition, plus the impact of subsequent erosion and induration will have significantly affected the thickness and characteristics of the deposits. Siliceous rocks may dominate the deposits in most of S E England but limestone 'sand and gravel' is present in north Oxfordshire and adjoining areas.

2.15 The thickness and constituents of any mineral deposits can vary significantly across an outcrop in a subtle and gradual way across many metres or kilometres or dramatically within a few metres. Grain size distribution may change slowly or suddenly. That may just involve a change from finer to coarser (or vice versa) but may also lead to a deposit being gap-graded or single sized. Such variations can be identified to a varying but limited degree by exploration but normally can never be precisely evaluated until extraction commences.

2.16 While therefore it may be presumed that deposits are consistent across their outcrop that is not true. In relation to deposits of bedrock sand this can be vividly seen by the local development of 'gravel' dominated outcrops (such as in the Orsett Depot Quarry at Grays in Essex where up to 10 metres of coarse gravel with sand replaces up to 6 metres of sand in the otherwise 'sand' dominated Upnor Formation) or by an increase in silt or clay either as well defined seams or lenses or distributed throughout the sand, which may thereby turn the deposit into a unworkable 'clay'. Similarly superficial 'gravel' deposits may become clay bound or with gravel forming only a small proportion in a clay matrix, and incapable of being economically processed. 'Gravel' in such deposits may be entirely replaced by clay or silt.

2.17 In relation to the production of aggregate, some of these changes can exclude commercial extraction. Minor variations are normally managed in an extraction operation by blending at the face or during processing. If that is not possible then it may be viable to blend materials from different quarries so as to create a product that is in specification. The typical ratio of coarse to fine aggregate in concrete is 2:1. Some deposits match that ratio or may be coarser. Such deposits therefore may have no surplus of fine aggregate or indeed may have a shortfall of fine aggregate. Other deposits may be almost entirely composed of sand.

Commercial Considerations

2.18 While the term 'soft sand' may be used in the mineral planning process in a very deterministic manner to define the characteristics, limitations and opportunities of 'soft sand' that is not what happens in the construction industry. When the construction industry seeks a supply of building sand the primary concern is to find a supply that matches the relevant British Standard, now European, specification. The geological resource involved is irrelevant as is any predetermined assumptions as to the ability of that resource to provide building sand. Further, the development of factory mixed mortar and the use of filled mortar silos transported to moderate to large construction sites, coupled with the parallel growth of bagged mortar for smaller volumes, has created a very different market place in relation to the distribution and use of mortar aggregate. Such aggregate may be extracted in county 'A' then transported to a mortar manufacturing plant (perhaps located on an industrial estate) in county 'B', then finally consumed many miles away in county 'C'.

2.19 The planning process should not try to manipulate or dictate how the industry should respond to changes in market demand and it therefore should not use incorrect assumptions as to how the industry can respond to those changes. Neither should it prevent how industry responds by a false or preconceived perception of what can or cannot be produced from a particular operation. The planning process does not have that detailed knowledge nor should it interfere in commercial decisions.

2.20 Further the planning process does not have the detailed or up-to-date knowledge as to the reserve (how much is suitable for processing to produce each product); how detailed evaluation shows how reserves are changing in character; how the economics of changing, or not changing, the processing plant are arrived at (the decision to produce washed building sand so as to reduce waste and maximise recovery, for example); how much potentially saleable material is currently wasted; and what commercial drivers in the construction industry influence the decision to change production.

2.21 While some changes to processing plant may require a variation to a specific scheme (in those situations where GPDO rights have been removed), other changes to processing ability can be enabled by simply changing the screens in the processing plant, or by modification to the plant or by the provision of mobile processing plant, none of which normally require planning consent. Relaxation of a GPDO restriction may merely involve a 'non-material amendment' submission and even where the relaxation may be more substantial there would have to be a substantive environmental constraint to prevent such relaxation. That may be a valid consideration, but that can only be determined on a case by case basis as they arise. In any event the REMLP cannot predetermine (and certainly cannot require sites to change or not change their processing plant) which operating sites may in the future seek to change their processing plant.

2.22 The extractive industry is, for sound site specific operational and economic reasons, highly adaptive to the changes that arise in the market and in the characteristics of each operating site. Such adaption may require changes to processing plant to, for example, deal with a lignite problem, or with a greater volume of fine sand or oversize than was estimated. They may include the decision to produce a washed building sand (as opposed to just a dry-screened sand) so as to enable a more consistent product, or to replace part of the processing plant by an element that can enable the processing of excessively clayey gravel, or wash waste to produce aggregate, or import material to blend with on-site reserves so as to create a new product or larger reserves of an existing product.

2.23 Such actions will also have a consequence on the reserve. The crushing of large gravel cobbles which are too large for use as concrete aggregate will also produce crushed fine aggregate as an inescapable consequence. That extra fine aggregate may be useful for fine aggregate for concreting sand or for building sand, or maybe an undesired, but unavoidable, residue because of an adequacy of fine aggregate in the reserve. By selection of crushing plant it is possible to minimise the production of fine aggregate from crushing oversize. However, all those actions, which affect recovery of mineral and the volumes available for each product, are at the discretion of the operator and essentially beyond the power of a planning authority to direct or enforce.

2.24 The method by which a product is produced is clearly wholly irrelevant to the REMLP. That may be relevant to specific sites (although amenity thresholds are common regardless of the processing methodology) and may thereby need to take into account sustainability considerations of resource maximisation, energy conservation, etc but those matters can only be identified, considered and resolved in relation to specific planning applications.

Summary

2.25 In practice, material sold and described as building sand or mortar sand today may not be 'soft sand' as termed. It can include coarse angular particles; it may include crushed or uncrushed material; it may be dominantly crushed rock fines; it may be dredged from the sea: it will be better graded than many materials historically considered to be 'soft sand' suitable for use in mortar; it may be a blend of different natural sands, or natural sands and different materials including waste, or may not include any natural sand; it will have considerably lower percentages of fines; and most may now be produced by washing and screening. In effect, sand referred to as 'soft sand' and sold compliant with specification for use as mortar today may no longer share those original 'soft sand' characteristics, or those characteristics considered essential in some mineral planning documents. It may indeed be thought of as 'sharp sand' due to its clean nature, low fines content and the presence of angular particles.

2.26 The term 'soft sand' has therefore become contradictory and confusing. The term is still used colloquially in the construction industry to describe a generic fine aggregate suitable for use in mortar (much as the term 'muck' is still used as a colloquial term for any type of mortar by bricklayers). Where used by artisans, industry and the planning process in a manner which acknowledges the limitations of the term that does not cause problems. However, the term is still used in many instances in the mineral planning process in a deterministic way that often may confuse and harm that process.

3.0 NATIONAL POLICY ON SEPARATE LANDBANKS

“Minerals planning authorities should plan for a steady and adequate supply of aggregates by calculating and maintaining separate landbanks for any aggregate materials of a specific type or quality which have a distinct and separate market”

Department for Communities and Local Government

Paragraph 145, National Planning Policy Framework: March 2012

“Where there is a distinct market for a specific type or quality of aggregate such asbuilding sand or concreting sand, a separate landbank calculation based on provision to that market may be justified for that material”

Department for Communities and Local Government

Paragraph 28: Guidance on the Managed Aggregate Supply System: October 2012

“Policy M2 of the Bedfordshire and Luton Minerals and Waste Local Plan adopted in 2005 set out the intention to maintain seven year landbanks of both concreting sand and gravel and building sand operator’s state that they cannot anticipate how much of their reserves will turn out to be within each of these broad categories In the absence of good quality information concerning the breakdown of mineral reserves.... then the existing policy.... cannot be maintained.”

Bedford Borough, Central Bedfordshire and Luton Borough Council

Minerals Technical Evidence Paper 3: Aggregates Landbank Assessment: July 2012

Policy and Guidance

3.1 Current national policy in the NPPF states that MPAs should apply separate landbanks for a “specific type or quality” of aggregate but clearly only where one can calculate and maintain such a landbank for “a specific type or quality” and where there is “a distinct and separate market”. There is no mandatory requirement to provide separate landbanks. The products which are referred to as “specific type or quality” in the NPPF are clarified in the MASS guidance where reference is made to examples of relevant aggregate products such as “building sand or concreting sand”. National policy therefore clearly requires that any division of the landbank shall be based on the ability to separate specific products.

3.2 The form of words used in both the NPPF policy and the MASS guidance continues the same form of words used in guidance or policy on the point in previous published statements by central government. The current policy and guidance does not refer to ‘soft sand’ but to products. Previous policy and guidance did not refer to ‘soft sand’ either, but again only referred to products.

3.3 The NPPF policy and MASS guidance effectively set four tests which must be satisfied to justify a separate landbank policy and the continuation of that policy. In reality all four tests must be satisfied otherwise a separate landbank becomes unworkable. The four tests are:

1. the ability to define a distinct and separate market
2. the ability to identify a different quality or type of aggregate
3. the ability to calculate a separate landbank, and
4. the ability to maintain a separate landbank

The Status of ‘Soft Sand’ in Landbank Policy and Guidance

3.4 There is no reference to the provision of a ‘soft sand’ landbank in either the NPPF or the MASS guidance. Although often erroneously assumed to be one and the same, in practice the materials often described as ‘soft sand’ do not equate only to the supply of ‘building sand’ (or mortar sand) and thereby to a distinct and separate market and to a different quality or type of aggregate. Substantial quantities of concreting sand are produced from resources that are typically termed ‘soft sand’ and substantial quantities of building sand are produced from resources that are not termed ‘soft sand’. A ‘soft sand’ landbank therefore cannot meet the terms of tests 1 and 2 in the NPPF.

3.5 For those reasons, and also because it is not possible to calculate and split the reserves into that proportion only suitable for use as building sand or only suitable for use as concreting sand, it is not possible to calculate a separate landbank and then ensure that future permissions can maintain such a separate landbank. A ‘soft sand’ landbank therefore cannot meet the terms of tests 3 and 4 in the NPPF.

Difficulties in Operating and Maintaining a Building Sand Landbank

3.6 The difficulties in trying to operate a split landbank are clearly identified in the Bedfordshire example. In this case the landbank was related to separate markets and specific products (building sand or concreting sand) so met the terms of tests 1 and 2 of the NPPF. However, because the reserves could not be assigned to products (partly because the characteristics of those reserves are unknown and partly because of the flexible nature of specifications and processing) it was not possible to calculate the size of the landbank or to maintain the landbank and therefore it was not possible to comply with tests 3 and 4 in the NPPF. These difficulties have also been recognised in Northamptonshire and in Dorset.

Subdivision of a Building Sand Landbank by Production Method

3.7 There is no reference in the NPPF or MASS guidance, and there never has been such a reference or policy, to requiring that a product landbank should be, or could be, provided based on the method of production of building sand or any other product.

Summary

Policy and guidance at national level has always focussed on products. ‘Soft sand’ as used neither equates to a product or the resources from which that product can be produced. The use of the term ‘soft sand’ and the provision of ‘soft sand’ landbanks do not match the requirements of policy in the NPPF or the MASS guidance.

Where policies have sought to provide separate landbanks such policies have in a number of areas been shown to be unworkable and have been or will be discarded. The fundamental reason for discarding such a policy is the inability to differentiate reserves in the ground to different products.

4.0 BUILDING SAND IN ESSEX

Introduction

4.1 Building sand can and is being sourced from various horizons within the superficial deposits in Essex. Evidence supplied to ECC from industry and presented to the recent Elsenham public inquiry demonstrated that many of the active sand and gravel workings in the County can produce building sand. The decision to produce building sand and the actual level of production reflects demand. Existing operations could produce more if demand increased. Evidence from sales statistics within the representations themselves confirm that most of the demand for building sand is satisfied by production from a range of active quarries. Evidence collected by ECC from site promoters in relation to the preferred sites identified in the REMLP confirm that they all could produce building sand, if there was demand.

Building Sand Resources in Essex

4.2 Essex has no commercially significant bedrock sand resources of building sand. The available bedrock resources of Palaeogene age are insignificant in extent and dominated by fine sediments (clays and very fine sands) with occasional bands of pebbles.

4.3 There are a range of superficial sand and gravel deposits in Essex. These consist of early Pleistocene deposits such as the Red Crag and the Chillesford Sand; the Kesgrave Sands and Gravels deposited prior to the Anglian Glaciation; glacial sands and gravels; and glaciofluvial and fluvial terrace deposits. The reference to different deposits should not be seen as suggesting that they are easily identifiable as distinct deposits in the field. In reality it has often proved impossible to distinguish deposits one from another and there may be more variation laterally within a deposit than where two deposits overlie each other.

4.4 The Kesgrave Sands and Gravels, which are the principle sand and gravel resource in Essex, consist of a sequence of overlapping terraces laid down on the course of the proto-Thames before it was diverted by the Anglian Glaciation. The terraces are variably affected by erosion and a cover of till of the Anglian Glaciation. The sequence can be broadly divided into two lithologies, consisting of a 'sand' deposit, where sand typically forms over 95% of the deposit and 'gravelly sand' where sand typically forms over 60% of the deposit.

4.5 The other superficial resources in Essex are also dominated by sand and only some of the terrace deposits in the south of the County have a dominant gravel fraction. This shows that there is a substantial sand resource available.

4.6 A number of detailed assessments reports were produced by BGS Mineral Assessment Unit on the resources of Essex. Those reports use a common base and included, inter alia, descriptions of the particle size of samples. Those reports confirm the dominance of sand within the superficial deposits in Essex. Individual reports prepared by the BGS for specific geological maps give a varied description of the characteristics of deposits and the sand and gravel resources of the map area. Where detailed, those reports also confirm the dominance of sand.

4.7 Data available from exploration and evaluation work submitted in support of planning applications may give a general description of the deposit but may not

provide any particle size analysis such that the percentage of sand may not be defined. However, 'sand' seams may be identified in borehole logs and the descriptions often used suggest the dominance of sand in the logged 'sand and gravel'.

4.8 The dominance of sand in the resources of Essex has been well documented and acknowledged for many decades. This indicates that there is no shortage of sand in the superficial resources across Essex but rather that there is an abundance of sand, across the outcrops and across the County in relation to demand. There is no clear picture on how the extractive industry deals with this dominance of sand.

Sales of Building Sand

4.9 Evidence from national statistics suggests that total sales of all types of sand (for asphalt, building and concreting sand end uses), has been around 40% to 50% of total sales in Essex. Sales of building sand for mortar in Essex were 427,000 tonnes in 2010 but have varied over the last decade. Detailed production data for every operational site is not available but a number of sites have confirmed that they produce building sand. Production from a few units in the County is dominated by or entirely used as building sand because of the lack of coarse sand or gravel in such deposits. Other units in the County have a more diverse resource base potential and produce building sand, concreting sand, gravel for concrete and gravel for other end uses.

4.10 The contribution that the sand only sites and the sand with some gravel sites make to sales was a topic considered at the Public Inquiry in 2012 into an extension at Elsenham Quarry. Sales from the Quarry were not disclosed at the Inquiry. However, in support of representations to the REMLP, the operator at Elsenham has tabled a schedule of sales (appendix 7 to the representations) which show that sales of building sand were 46,283 tonnes.

4.11 It is acknowledged that both reserves and sales from other sand only sites are relatively insignificant. Therefore, just over 10% of sales of building sand were derived from the sand only sites and just under 90% of sales of building sand (circa 380,000 tonnes) were derived from sites producing sand and gravel.

4.12 The production of building sand from those sites producing sand and gravel is a reflection of the potential of the existing processing plant on site and the response of the operator to demand. It is understood that many of the current operators of such sites contribute to the supply. Actual demand varies considerably year to year and the ability to satisfy that demand, without any evidence of a shortfall in supply, demonstrates the potential and flexibility of such processing plant and the operators to respond quickly to demand changes and meet the requirements of their customers.

4.13 It has been suggested in representations to the REMLP that the reserves of suitable sand as at 2010 were only 402,000 tonnes against a requirement of 450,000 tonnes. Given sales of 427,000 tonnes, that would imply that production of suitable sand would have stopped in late 2010 on the basis that all reserves would have been worked out. The postulated crisis in supply and sales would probably have surfaced at an earlier date. There has been no such crisis and there is no shortage of reserves suitable for sale as building sand in Essex.

The Ability to Separate Building Sand in Reserves

4.14 While there are particular sand dominated horizons and units in Essex that only work sand and can only produce building sand, such units and their reserves make a minor contribution to sales of building sand. The majority of the production of building sand has been from the sand with gravel deposits in the majority of operational units and which contain a substantial reserve and contribute most to the landbank.

4.15 It is not possible to separate those reserves in the sand with gravel deposits into that quantity of sand suitable only for use as building sand and that quantity only suitable for use as concreting sand. That is fundamentally not possible because of the ease with which either product can be processed from the same resource. Further, the data on the characteristics of the reserve is too imprecise to quantify the potential and processing plant will, in response to demand, be operated so as to meet demand for either sand as required.

4.16 As the majority of production and reserves of building sand are held in combination with concreting sand in sand with gravel deposits it is not possible to operate a building sand landbank in Essex.

Future Supply Potential

4.17 All the preferred sites in the REMLP are capable of producing both building sand and concreting sand but it is not possible to separate out the reserves that would arise or the production potential.

Summary

4.18 The majority of building sand in Essex is produced from deposits of sand with gravel which sites also produce concreting sand. It is not possible to separate those reserves into the two products. The preferred areas in the REMLP also can produce either building sand or concreting sand. It therefore is not possible to provide a separate landbank for building sand.

5.0 REVIEW OF LANDBANK AND BUILDING SAND IN OTHER AREAS

Introduction

5.1 The current adopted Essex Minerals Local Plan considered and rejected the need for a separate landbank for building sand. The REMLP continues that approach. The Inspector at the Elsenham appeal confirmed that it is not possible to operate a separate building sand landbank. In assessing the justification of that approach in Essex a review of the approach of other MPAs has been undertaken and included as an Appendix to this report.

5.2 The purpose of the review is to consider the approach of other authorities in relation to building sand and the historic and current guidance. As will be seen a number of authorities refer to 'soft sand' in a generic sense, or to rock units and not to building sand. This does not reflect the historic and current guidance. The focus of the review is the extent to which a separate building sand landbank has been adopted or not.

5.2 Commercial and geological factors will influence the decision to call for, assess the need for, and adopt or reject a separate landbank. Those factors may be significantly or subtly different from the position in Essex. In some locations it appears that the concept of splitting the landbank has never been considered or debated. Commercial or geological factors have been the main influence in those areas where a split landbank has been applied but then rejected in favour of a change back to a single landbank.

Coverage

5.3 The review considers the policy position in a number of areas in England. These are mainly based on 'county' areas. In some areas, including those where the 'county' is now split into unitary authorities, the relevant policy has been in place for many years.

5.4 The first section describes the position in all the adjoining authorities. The second section describes the position in those authorities which, like Essex, have no significant, or no significantly worked, bedrock resources. The third section describes the position in authorities with significant bedrock resources. Each section concludes with a table summarising the position.

Geological Context

5.5 The geological context is an important consideration. In and around Essex and in other areas in the SE of England bedrock resources are mainly associated with sand. However, the bedrock resources in Devon and Staffordshire include very significant resources of coarse aggregate ('gravel'). Superficial resources also vary significantly such as where, for example, the terrace gravels of Hampshire have high percentages of coarse 'gravel' in contrast to the mainly 'sand' content in Cheshire. There are, of course, variations within that overall position in such areas.

Alternatives

5.6 The supply of building sand other than from superficial or bedrock sand or sand and gravel is not generally considered because the issue is the justification for

splitting the sand and gravel landbank. The supply and the potential for the supply of 'fine aggregate' for use as building sand or mortar sand from other sources is generally ignored. This does create a false picture because in many areas crushed rock fines and other materials have always contributed to meeting the demand for such products. That supply, and supply from processed waste, will continue and continue to grow and will impact on the call on superficial and bedrock sand and gravel resources to supply building sand.

5.7 Similarly the supply of building sand from marine dredging is not included because the issue relates to the land-won sand and gravel landbank. That also creates a false picture because marine dredged supply is significant in certain areas and typically contributes around 8% of total GB sales of building sand.

Results

5.8 The review confirms that there are very few areas where a landbank split has been applied on the basis of products. Notably, some areas which formerly split the landbank no longer apply or propose not to apply a split. The main reason for now rejecting a split is the inability to separate reserves into that suitable only for building sand.

5.9 Some areas still retain a split landbank, but in many cases this is a split by geological units and not a split by product potential. That has created a situation where the two elements of the split landbank can both produce building sand and concreting sand. The reason why a split landbank has been applied would appear to be the otherwise dominance of sand (concreting sand and building sand) over gravel in the landbank.

5.10 A few areas split the landbank into geographical units, but do not separate the components within those units.

5.11 Each area has its own characteristics and therefore its own response. There is no direct analogue with Essex. However, adjoining areas such as London, Hertfordshire, Cambridgeshire and Suffolk have a similar resource base (no, or no significant bedrock resources, with some sand dominated superficial resources) and do not apply a separate landbank. Buckinghamshire and Northamptonshire are also similar but do not apply a separate landbank (Northamptonshire sought such previously but has subsequently rejected the concept as unworkable).

5.12 Cheshire and Lincolnshire, like Essex, produce significant volumes of building sand from superficial resources which are almost totally sand dominated in Cheshire. As in Essex it is not possible to separate the reserves and both apply a single product landbank, although Lincolnshire splits the landbank into three areas.

5.13 North Yorkshire produces a small volume of building sand and has provided a split in the landbank in a manner which provides a separate landbank for a specific deposit which can produce building sand but not concreting sand. The rest of the landbank is split into two geographical areas. However, it appears that most of the production from that specific deposit is used as fill and that the reserves in the rest of the landbank also provide building sand.

Summary

5.14 The review indicates that few areas apply a separate landbank and those that do may in fact be applying a landbank split based on geological units and not products. Where a landbank split has been considered and rejected, the reason for rejection has substantially been that reserves cannot be split making it impossible to calculate or maintain a separate landbank.

6.0 CONCLUSION

6.1 National policy requires that any landbank split should be based on products. It also requires that the volume of such material can be calculated in the reserve base and that the landbank can be maintained in the future. This has proved difficult to achieve and some areas where a landbank split was formerly applied have now rejected that approach because of the impossibility of splitting reserves. Some other areas have a split landbank but this is mainly on the basis of a split by geological units and not products. The review confirms that the majority of areas in England do not split the landbank.

6.2 Sales of building sand in Essex are dominantly (circa 90%) from those deposits of sand with gravel. Those deposits can also produce concreting sand. It is impossible to split the reserves into that proportion only suitable for use as building sand from that proportion only suitable for use as concreting sand. The resources in Essex are dominated by sand and there is no sand shortfall either in relation to building sand or concreting sand.

6.3 Existing reserves and the preferred areas in the REMLP contain sand with gravel. It will be impossible to split the reserves in the preferred areas into that only suitable for building sand and that only suitable for concreting sand.

6.4 The provision of a split landbank in Essex is neither practical nor justified. The Inspector at Elsenham confirmed that such a split was not practical. The review confirms that the decision of Essex to operate a single landbank is in line with the majority of other parts of England and in particular with those parts with a similar resource base. The review confirms that the problems identified with trying to split the landbank in Essex are common to many other areas in England and that such problems, where identified, have created a shift back from a split landbank into a single landbank.

6.5 The term 'soft sand' is often used as a corollary of building sand. It implies erroneous and contradictory properties. The term is not referenced in specifications, in statistics or policy at the national level. Its application may be harming the mineral planning process and should be avoided in the REMLP. The term 'building sand' should be used instead.

GLOSSARY

Aeolian	In relation to sediments refers to sediments transported by wind including dune (beach) sand or 'blown sand'.
Aggregate	Granular material used in construction. Aggregate can include that arising from natural disintegration of rock to produce deposits of 'sand' or 'gravel'; or from the crushing of rocks (such as limestone or igneous rock); as by-products from other quarried materials (such as metal mine waste or China Clay sand); from a recycled material (such as concrete or glass); from a recycled industrial waste (such as slag or spent foundry sand); or from a manufactured product (such as a lightweight aggregate manufactured from clay). Aggregate is used in bound (with cement, lime, bitumen, etc.) or unbound condition.
Anglian Glaciation	Glacial stage of the Quaternary when the Pleistocene ice sheet advanced the furthest over the UK leading to the diversion of the River Thames to its present course.
Bedrock	Normally pre-Quaternary rocks which may be consolidated to a greater or lesser degree
Bedrock sand	'Sand' derived from a bedrock deposit which typically is loosely consolidated.
Building sand	A fine aggregate with grading making it suitable for use in mortar or asphalt.
Clast	A rock fragment.
Coarse aggregate	Aggregate which is larger than 4mm.
Concrete aggregate	Aggregate, both fine and coarse, with grading suitable for use in the manufacture of concrete.
Concreting sand	A fine 'sand' aggregate with grading making it suitable for use in concrete.
Devensian	The most recent glacial stage of the Quaternary Ice Age, beginning about 110,000 years before present and ending about 11,000 years before present.
Dry screening	Processing sand over a screen (including vibrating and non-vibrating screens), without the addition of water, to remove oversize and to produce sand suitable for mortar.
Fine aggregate	Sized aggregate less than 4mm but greater than 0.063mm.
Fines	Those particles which pass a 0.063mm sieve. Normally this describes silt and clay.
Fluvial	Being related to a river; including deposition and sediments produced by and laid down by a river.

Gap graded	An aggregate with a particle size distribution in which certain sizes are wholly or substantially absent. Can describe the properties of the aggregate prior to processing (as found in the deposit), or following processing. A gap graded deposit may not meet specifications without blending. Original sedimentation features will create the size distribution of particles within a deposit. Process technology can help to maximise production from a gap graded deposit.
Glacial	Being related to ice. The periods in the Quaternary Ice Age when large ice sheets covered parts of the UK.
Glaciofluvial	Those sediments transported by rivers discharging from an ice mass and then deposited by those rivers on the bed or flanks of the river.
Glaciolacustrine	Those sediments transported by rivers discharging from an ice mass and then deposited by those rivers into a lake or the lake shore.
Grading	Particle size distribution expressed as the percentage by mass passing a specified number of sieves
Gravel	Used to describe clasts larger than sand in a granular deposit or as a shorthand term to describe sand and gravel deposits.
Holocene	The current interglacial of the Quaternary Ice Age, beginning about 11,000 years ago.
Ice Age	A period of time when the Earth experiences 'permanent' ice cover in part or in whole. The Earth is currently in the Quaternary Ice Age which is normally considered to have started circa 2.6 million years before the present with the onset of ice rafting in the Northern Hemisphere. However, evidence from Antarctica indicates that the first stages of ice cover started over 3.5 million years ago. Ice has advanced ('glacial' periods) and retreated ('interglacial' periods) a number of times over the Quaternary and will advance again in the future.
Interglacial	Warmer non-glacial periods in an ice age. Interglacials, such as the present interglacial, the Holocene, have been considerably shorter (< 15,000 years) than glacial periods (> 100,000 years) during the current Quaternary Ice Age.
Lignite	Organic material formed from peat and other woody material. Lignite is a deleterious material in aggregate leading to both cosmetic effects (staining) and to a reduction in strength. Processing, by washing, can remove most of the lignite in a deposit.
Lithostratigraphic	The characteristics of a rock body defined by both its lithological and stratigraphical relationships

Mortar sand mortar.	A fine aggregate with grading making it suitable for use in mortar.
Matrix	The fine rock fragments within a mixture of fine and coarse clasts such as the sand fragments in a sand and gravel deposit which may support or fill in the spaces between coarse fragments.
Oversize	Those clasts larger than the limits of specification. Typically used to describe large clasts, 'rejects', in a sand and gravel deposit in relation to concrete specification. However, these 'rejects' may either have a use in fill or in drains or may be crushed in size by processing in a crushing plant to produce coarse and fine clasts to fit specifications. Crushing oversize to produce coarse clasts will produce fine clasts.
Palaeogene present.	The geological period between 65-23 million years before the present.
Palaeogeography	The physical geography and landscape and the location of rivers, land and seas in the past.
Permian	The geological period between 299-251 million years before the present.
Pleistocene	The period of Earth's time from the start of the Quaternary (2.6 million years before the present) to the beginning of the Holocene.
Poorly graded	Describing the properties of a fragmental deposit such as sand and gravel. In quarrying an aggregate is poorly graded if it has a narrow distribution of particles across the relevant specification range. Conversely, geologists will term a deposit to be poorly graded or poorly sorted if it has wide distribution.
Quaternary	The period from 2.6 million years before the present. Includes both the Pleistocene and the Holocene.
Reserve	Generally that part of a mineral deposit of proven commercial viability but specifically in a planning context that part which has a valid planning permission for extraction.
Resource	Generally that part of a mineral deposit of potential commercial viability but specifically in a planning context that part which does not have a valid permission for extraction.
Sand	Used to describe particles smaller than gravel or as a shorthand term to describe sediments composed of fine granular material including those with sand too fine for use as an aggregate.
Sharp sand	Generally used to describe (i) sand from all superficial deposits of sand and gravel and/or (ii) to describe the perceived end use for sand as fine aggregate in concrete. It relates to the 'feel' of

sand in the hand where the sand feels sharp because the sedimentary process has created more angular particles and because of the lack of fines compared with 'soft sand'. The angularity and lack of fines may be an original feature but will also arise due to the need to remove fines and other deleterious materials from concreting sand by washing so as to match specifications and due to the incorporation of crushed sand. Not all superficial 'sand' deposits contain 'sharp sand'. Bedrock sand may be significant sources of concreting sand ('sharp sand' as described). Material sold as 'sharp sand', and meeting the relevant specification, may include, or be composed entirely of, fine aggregate derived from crushed rock fines and various waste streams and not contain any 'sand' at all.

Silt	Used to describe granular particles (therefore excluding clay non-granular particles) smaller than sand.
Single-sized	A term to describe a deposit or a processed aggregate where the clast sizes fall within a very narrow range. Aeolian and marine sedimentary processes at the time of deposition can winnow clasts into such narrow ranges. A single-sized deposit may not be of commercial value unless it can be blended with material from other parts of an extraction area or with material from another quarry.
Soft sand	Generally used to describe (i) sand from any bedrock deposit and/or (ii) to describe the perceived end use for such sand as fine aggregate in mortar. It relates to the 'feel' of sand in the hand where the sand feels less sharp because of the presence of a large proportion of fines. Such sand may be dry-screened to produce sand for mortar. It may be unsuitable for use as mortar and only be suitable for use as fill. The material is often deemed unsuitable for use as concrete sand. However, many bedrock deposits of 'soft sand' (as termed) are significant sources of concreting sand (the 'sharp sand' as described). Material sold as 'soft sand', and meeting the relevant specification, may include, or be composed entirely of, fine aggregate derived from crushed rock fines and various waste streams and not contain any 'sand' at all.
Superficial	Various deposits laid down on bedrock in the Quaternary by a range of processes. Superficial deposits can include materials such as blown sand, glacial sand and gravel, peat and alluvium.
Well graded	Describing a fragmental deposit such as sand and gravel. In quarrying, an aggregate is well graded if it has a broad distribution of particles across the relevant specification range. Conversely, geologists will term a deposit to be well graded or well sorted if it has a narrow range.

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In preparing this report an extensive range of information sources were referenced. These included the following sets of data:

- 1 The relevant mineral policy documents for Essex and the areas reviewed in the Appendix and such documents, evidence and reports of Inspectors relevant to the adopted policy document as well as documents relating to current reviews or replacement of policy as available.
- 2 The reports and maps prepared by the British Geological Survey for Essex and those areas reviewed in the Appendix under the auspices of the project Mineral Resource Information in Support of National, Regional and Local Planning.
- 3 The Memoirs and the relevant maps prepared by the British Geological Survey for the 1:50,000 scale geological maps covering Essex and for other relevant areas.
- 4 The Mineral Assessment Reports prepared by the British Geological Survey in relation to Sand and Gravel Resources for Essex and other relevant areas.
- 5 Extracts from trade journals and the websites of producing companies, plant manufacturers and trade organisations.
- 6 Past and current guidance and policy from central government on aggregates and landbanks, including Circulars, MPGs and MPSs.
- 7 Planning applications and appeal decisions in Essex and other areas.
- 8 Publications of various Aggregate Working Parties or regional planning bodies.
- 9 British and European Standards

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APPENDIX

A ADJACENT AUTHORITIES

Thurrock

Representations to the REMLP have drawn attention to the conclusion of the Inspector into the Thurrock Core Strategy.

There are only limited areas of bedrock sand or superficial sand and gravel in Thurrock which have not been worked or sterilised by urban development. Current production is mainly from the bedrock sand for fill.

The representations to the Thurrock Core Strategy drew attention to the fact that the landbank was composed mainly if not exclusively of bedrock Thanet Sand and that this material is unsuitable for construction uses other than as fill. It was therefore suggested that combining the two resources into a single landbank did not ensure a supply of construction aggregate products.

The Inspector concluded that the Council must take account of the different types of material and markets but did not require a separation of the landbank into fill and aggregates.

London

London is a minor producer of building sand. Neither The London Plan, which sets out the strategic policies for London, nor the relevant development plans for individual boroughs, apply a separate landbank for specific types of aggregate.

There are significant superficial resources in London although most are now sterilised by development. There are limited bedrock resources of sand in the London area. The superficial resources supply most of the current production and form the majority of the resources. The bedrock resources are mainly in the Thanet Sand in the eastern boroughs. The Thanet Sand is fundamentally not suitable for use as building sand due to poor grading and the fineness of the particles and has recently only been produced for fill. Some building sand could be produced but this would require extensive processing. The only recent operation in the Thanet Sand is a single permission in Bromley where the material was extracted for use as fill or tip cover.

Policy 5.20 in the London Plan is the relevant strategic policy. In relation to landbanks subsection 'C' sets out the total provision and subsection 'D' defines the apportionment to those four boroughs (Havering, Redbridge, Hillingdon and Hounslow) which contain the majority of reserves and resources of sand and gravel. The provision is for 'land won aggregates' and no split by type or quality is required. Resources in other boroughs may provide further potential but no specific requirement is identified either in total or by type.

The Bromley Unitary Plan policies on minerals are still in force. Policy G14 requires that applications should demonstrate the quality of the mineral to demonstrate that

working would be economically viable. A landbank policy in total or by type is not in force.

The London Aggregates Working Party collects statistics on reserves and sales of sand and gravel. The published statistics refers to 'soft' sand and 'sharp' sand, not to building sand or concreting aggregate or fill, and it is not clear what products are included in the sales statistics. It is not clear if the collected information on sales of 'soft sand' only relates to the Thanet Sand workings, and therefore only refers to fill, or includes building sand produced from the superficial terrace sand and gravel workings. National statistics on sales within London do not disclose sales of building sand due to the need to preserve confidentiality but do indicate that building sand was and is produced. This production will have been from the superficial terrace sand and gravel workings.

Hertfordshire

Hertfordshire is a minor producer of building sand. Hertfordshire does not apply a separate landbank for specific types of aggregate.

There are significant superficial resources in Hertfordshire. There are very limited bedrock resources of sand in Hertfordshire and superficial terrace sand and gravel form the current production and resources. Small deposits of Reading Beds sand occur across the County but these have not been worked at a commercial scale for the production of sand and gravel. Building sand has been produced from the County and all this production will have come from superficial terrace sand and gravel.

The Hertfordshire Local Aggregates Assessment (November 2012) identifies minor sales of building sand in 2011. National statistics on sales within Hertfordshire have not been disclosed for any production for many years (due to confidentiality restrictions) but do indicate that building sand was and is produced. This production will have been from the superficial terrace sand and gravel workings.

Cambridgeshire

Cambridgeshire is a minor producer of building sand. Cambridgeshire does not apply a separate landbank for specific types of aggregate.

However, Policy CS4 in the adopted Minerals and Waste Core Strategy Development Plan requires the combined landbank provision to be split between three geographical areas.

There are significant superficial resources in Cambridgeshire. There are limited bedrock resources of sand in in the Woburn Sands but these are not currently worked. Small quantities of building sand have been produced from the County and all this production will have come from superficial sand and gravel.

Suffolk

Suffolk is a minor producer of building sand. Suffolk does not apply a separate landbank for specific types of aggregate.

There are significant superficial resources in Suffolk. There are no bedrock resources of sand in Suffolk, although there are sand dominated superficial resources including the Chillesford Sand. There are no recent workings in the Chillesford Sand.

Production of building sand in Suffolk has ranged between 0.1 to 0.3 million tonnes per annum over the last decade and the majority of this production will have come from superficial terrace sand and gravel.

Kent

Kent is a significant producer of building sand. Kent does not apply a separate landbank for specific types of aggregate.

There are significant superficial and bedrock sand resources in Kent. The bedrock resource in the Folkestone Formation is substantial and worked in a number of locations in the County. Kent considers that there are differences between the production potential of the bedrock and the superficial resources and it is suggested in the Local Aggregate Assessment (December 2012) that the bedrock resources are predominantly used for the production of mortar and asphalt with the remainder used as fill, whereas the superficial resources are mainly used for concreting aggregate end uses. Nevertheless due to difficulties in assessing sales it is not proposed to provide a split landbank.

However, the bedrock sands of the Folkestone Formation have always been an important source of concreting sand. This was an important consideration at the time of the Waters report in 1948 and is equally true today with production from some units being primarily used in concrete sand end uses. This is confirmed in the recent report undertaken by Capita Symonds for the South Downs National Park Authority (Capita Symonds, August 2012).

Production of building sand in Kent has ranged between 0.4 to 1.0 million tonnes per annum over the last decade. No data is available to assign this production to bedrock or superficial units.

There is a further complication in Kent arising from the presence of crushed rock resources. The rock (Ragstone) occurs interbedded with a sandy silt. This sandy material is processed to produce fine aggregate for concreting and building sand and thereby contributes to meeting the market for such end uses.

Summary Table

AUTHORITY	'Soft sand' landbank	Split landbank	Superficial Deposits	Bedrock Deposits	Building Sand produced from Superficial deposits	Concreting Sand produced from Bedrock deposits
Thurrock	No	No	Minor	Minor	?	Fill only
London	No	Yes*	Yes	Minor	Yes	Fill only
Hertfordshire	No	No	Yes	Not worked	Yes	Not worked
Cambridgeshire	No	Yes**	Yes	Not worked	Yes	Not worked

Suffolk	No	No	Yes	No	Yes	N/A
Kent	No	No	Yes	Major	?	Yes
ESSEX	No	No	Yes	Minor	Yes	Not worked

*landbank is split by area to four boroughs

**landbank is split into three geographical areas

B AREAS WITH LIMITED BEDROCK RESOURCES

Buckinghamshire

Buckinghamshire is a minor producer of building sand. Buckinghamshire applies a single landbank. There are limited bedrock sand resources in Buckinghamshire. There are no current workings in that resource and all building sand is produced from the superficial sand and gravel resources.

Cheshire

Cheshire is a significant producer of building sand. Cheshire applies a single landbank. There are substantial superficial sand and gravel resources in Cheshire but no bedrock resources. The superficial resources are dominantly sandy and produce both building and concreting sand.

Leicestershire

Leicestershire is a minor producer of building sand. Leicestershire applies a single landbank. There are no bedrock sand resources in Leicestershire and all building sand is produced from the superficial sand and gravel resources.

Lincolnshire

Lincolnshire is a significant producer of building sand. Lincolnshire applies a single landbank. This is split into three geographical areas but not by resource or sales of aggregate type. There are significant superficial sand and gravel resources in Lincolnshire but no bedrock resources. All production of building sand comes from these superficial deposits.

Northamptonshire

Northamptonshire is a minor producer of building sand. In the previous Minerals Local Plan Northamptonshire sought to split the landbank into 'sharp sand and gravel' and 'soft sand'. However, the resources identified to supply that split landbank were capable of supplying both building and concreting sand and a split landbank was not practical or achievable. The current adopted Core Strategy applies a single landbank.

There are significant superficial resources in Northamptonshire. There are no bedrock resources of sand in Northamptonshire, although there are sand dominated superficial resources including the Milton Sand. There are no current workings in the Milton Sand which was worked to produce both concreting and building sand. Small quantities of building sand have been produced in Northamptonshire. All of this will have come from superficial sand and gravel resources.

North Yorkshire

North Yorkshire is a minor producer of building sand. The area has no bedrock sand resources and all production is from superficial resources. North Yorkshire splits the landbank into three consisting of two geographical areas ('north' and 'south') of superficial 'sand and gravel', and a specific 'sand' producing location. The 'sand' is a glaciolacustrine deposit worked to produce building sand and fill. Workings in the other two areas also produce building sand.

Shropshire

Shropshire is a minor producer of building sand. Shropshire applies a single landbank. Bedrock resources in Shropshire are of minor significance and are not worked. All production of building sand comes from superficial sand and gravel deposits.

Warwickshire

Warwickshire is a minor producer of building sand. Warwickshire applies a single landbank. There are no bedrock sand resources in Warwickshire and all production of building sand comes from superficial sand and gravel deposits.

Summary Table

AUTHORITY	'Soft sand' landbank	Split landbank	Superficial Deposits	Bedrock Deposits	Building Sand Produced from Superficial deposits	Concreting Sand Produced from Bedrock deposits
Bucks	No	No	Yes	Minor	Yes	Not worked
Cheshire	No	No	Yes	No	Yes	N/A
Leicestershire	No	No	Yes	No	Yes	N/A
Lincolnshire	No	Yes*	Yes	No	Yes	N/A
Northamptonshire	No	No	Yes	No	Yes	N/A
North Yorkshire	No	Yes**	Yes	No	Yes	N/A
Shropshire	No	No	Yes	Minor	Yes	Not worked
Warwickshire	No	No	Yes	No	Yes	N/A
ESSEX	No	No	Yes	Minor	Yes	Not worked

*landbank is split into three geographical areas

** landbank is split into three (two geographical areas and a 'sand' area)

C AREAS WITH SIGNIFICANT BEDROCK RESOURCES

Bedfordshire

Bedfordshire is a significant producer of building sand. Bedfordshire previously split the landbank into 'building sand' and 'concreting sand and gravel'.

However, the Bedfordshire authorities have identified that the split landbank policy cannot be maintained because it is not practical to split reserves and the submitted Core Strategy (May 2012) provides for a single landbank. There are significant superficial and bedrock sand resources in Bedfordshire. The main bedrock resource is the Woburn Sands which is worked to produce significant quantities of both building sand and concreting sand.

Berkshire

Berkshire is a minor producer of building sand. The relevant policies set out in the Berkshire RMLP (1995) are still in force and applied by the constituent unitary authorities. Those policies provide for a single landbank and do not apply a separate landbank for specific types of aggregate.

There are significant superficial and bedrock sand resources in Berkshire. The main bedrock resource is the Reading Beds which is only worked to a very limited extent for both building sand and concreting sand and for fill. Building sand is also produced from the superficial sand and gravel deposits.

Cumbria

Cumbria is a minor producer of building sand and applies a single landbank. There are substantial superficial and bedrock resources in Cumbria. The superficial resources produce building sand and concreting sand and the bedrock resources produce concreting sand.

Devon

Devon is a minor producer of building sand and applies a single landbank.

There are significant and diverse superficial and bedrock resources in Devon. The bedrock resources range from the Permian to the Eocene. The Triassic pebble beds are the primary sand and gravel resource and are worked to produce concreting aggregate (coarse and fine) and building sand. Bedrock sands in the Dawlish Sandstone bedrock were previously worked for building sand but such working has recently ceased. This resource was too fine for use as concreting sand.

Dorset

Dorset is a significant producer of building sand.

Dorset has previously provided a landbank split between 'sand' (both concreting and building sand and sand used as fill) and 'gravel' (the coarse aggregate element in superficial deposits which would not just relate to concreting end uses), provided that the reserves of 'sand' and 'gravel' could be identified separately and unambiguously. The submitted Core Strategy has shifted from that approach and now the proposed approach is to provide a single landbank where the contribution from resources will

be monitored. The basis for that decision is that a single landbank is clear and unambiguous given that the reserves are difficult to separate.

There are substantial superficial and bedrock resources in Dorset. The bedrock resources are mainly in the Poole Formation and are worked to provide concreting sand and building sand. The superficial resources provide gravel and concreting sand and building sand. It is not possible to assign the reserves in the bedrock resources to concreting or building sand as they may be worked to produce either.

Durham

Durham is a minor producer of building sand and applies a single landbank. There are substantial superficial and bedrock resources in Durham but current extraction is within the bedrock sand. This resource mainly produces building sand with minor quantities of concreting sand.

Hampshire

Hampshire is a significant producer of building sand. Hampshire has provided a separate landbank for 'soft sand' and proposes to maintain such a landbank into the future.

There are substantial bedrock sand and superficial resources in Hampshire. The bedrock sand resources are the Folkestone Formation and younger Tertiary rocks. Some of the Tertiary deposits are too fine for concreting or building sand but the Folkestone Formation is a major resource of concreting and building sand.

In effect the landbank is based on a split between bedrock sand resources ('soft sand' as termed) and superficial resources and not by aggregate type. The 'soft sand' landbank includes sand sold for both concreting sand and building sand and building sand is sold from the superficial resources.

Lancashire

Lancashire is a minor producer of building sand. Lancashire applies a single landbank.

There are substantial superficial sand and gravel and bedrock sand resources but the bedrock resource is currently only worked to produce fill. The superficial resources are dominated by sand and worked to produce both concreting and building sand. The superficial resources include resources that are only viable as fill. Such resources cannot contribute to the demand for concreting or building sand and Lancashire seeks to ensure that future reserves are suitable for such uses.

Norfolk

Norfolk is a minor producer of building sand. Norfolk applies a single landbank. There are significant bedrock sand and superficial resources in Norfolk. Building sand is produced from the bedrock sands and the superficial sand and gravel resources.

Nottinghamshire

Nottinghamshire is a significant producer of building sand.

Nottinghamshire has split the landbank between superficial resources and bedrock resources (Sherwood Sandstone). The basis for this is that the superficial resources are primarily a source of concreting aggregate while the bedrock sand resources are used for the production of building sand. However, sands within the superficial resource are a source of building sand. There are significant bedrock sand and superficial sand and gravel resources in Nottinghamshire.

Oxfordshire

Oxfordshire is a significant producer of building sand. Oxfordshire provides for a split in the landbank between 'soft sand' and 'sharp sand and gravel'.

There are significant resources of bedrock sands and superficial sand and gravel in Oxfordshire. Concreting sand is produced with building sand from bedrock sand and building sand has been produced from the superficial sand and gravel resource.

Staffordshire

Staffordshire is a significant producer of building sand and consistently the major producer of sand and gravel aggregate in England. Staffordshire applies a single landbank.

There are substantial resources of superficial and bedrock resources in Staffordshire. The bedrock resources are primarily conglomerates of Triassic age which consist of coarse gravel in a fine matrix. The coarse gravel is crushed and the resulting fines are processed to produce concreting and building sand. The sand dominated parts of the sequence are worked to produce building sand. Similarly sand dominated superficial resources are worked to produce building sand.

Surrey

Surrey is a significant producer of building sand.

Surrey applies a single landbank but within that also proposes that extraction of 'soft sand' will be concentrated within the Lower Greensand bedrock resources and the production of concreting aggregates (which will include concreting sand) will be concentrated on the superficial sand and gravel resources in north west Surrey. No split in terms of production or landbank for those two areas/resources has been made.

There are significant resources of bedrock sands and superficial sand and gravel in Surrey. The bedrock sand includes sand suitable for concreting sand.

West Sussex

West Sussex is a major producer of building sand. West Sussex currently provides separate landbanks for 'sand' and 'gravel'. The actual outcome of that terminology is to provide a landbank split based on bedrock ('sand') and superficial sand and gravel ('gravel'). Consideration is being given to continuing a landbank split into 'soft sand' and 'sharp sand and gravel' based again on bedrock sand and superficial sand and gravel respectively.

There are substantial bedrock sand resources in West Sussex in the Folkestone Formation and this resource is worked to produce both concreting sand and building sand typically from within the same operation.

The current 'sand' landbank therefore includes sand sold for both concreting sand and building sand, and the current 'gravel' landbank includes sand sold for concreting sand and building sand.

Summary Table

AUTHORITY	'Soft sand' landbank	Split landbank	Superficial Deposits	Bedrock Deposits	Building Sand Produced from Superficial deposits	Concreting Sand Produced from Bedrock deposits
Bedfordshire	No	Yes*	Yes	Yes	?	Yes
Berkshire	No	No	Yes	Yes	Yes	Yes
Cumbria	No	No	Yes	Yes	Yes	Yes
Devon	No	No	Yes	Yes	?	Yes
Dorset	No	Yes**	Yes	Yes	Yes	Yes
Durham	No	No	Yes	Yes	Not worked	Yes
Hampshire	Yes	Yes	Yes	Yes	Yes	Yes
Lancashire	No	No	Yes	Yes	Yes	Fill only
Norfolk	No	No	Yes	Yes	Yes	?
Nottinghamshire	Yes	Yes	Yes	Yes	Yes	?
Oxfordshire	Yes	Yes	Yes	Yes	Yes	Yes
Staffordshire	No	No	Yes	Yes	Yes	Yes
Surrey	No	No***	Yes	Yes	Yes	Yes
West Sussex	No	Yes****	Yes	Yes	?	Yes
ESSEX	No	No	Yes	Minor	Yes	Not worked

*landbank split into (i) building sand and (ii) concreting sand and gravel – proposed to reject the split and operate a single landbank

**landbank split into (i) 'sand' (fine aggregate from both bedrock and superficial) and (ii) 'gravel' (coarse aggregate from superficial) – proposed to reject the split and operate a single landbank

***landbank is not split but production of building sand and concreting aggregate is focussed on bedrock sand and superficial deposits respectively

****landbank split into (i) 'sand' (bedrock sand) and (ii) 'gravel' (superficial)