

BOURNEMOUTH, DORSET & POOLE MINERAL SITES PLAN EXAMINATION

Representations on behalf of M B Wilkes Ltd

John Cowley, Director, Mineral & Resource Planning Associates Ltd

Inspectors Matters, Issues and Questions

Issue C

Matter 1

(iv) Areas of Search

Q169-177

1 It is normally understood that reference to 'sand and gravel' relates to all sources of sand or gravel be they (i) bedrock deposits, (ii) superficial deposits, (iii) beach or 'blown' sand, (iv) dredged deposits, (v) 'in-situ' weathered sandstone deposits, (vi) etc., and not just a superficial deposit composed of roughly equal parts of 'sand' and 'gravel'. In reality, some superficial 'sand and gravel' deposits may be almost entirely composed of sand (such as part of the Kesgrave Sands in Essex, or the glacial deposits of NW England) while some bedrock deposits, such as some conglomerates in Staffordshire, essentially are resources entirely of gravel (the matrix sand between the gravel clasts is too fine to meet specification).

2 Policy MS-2 should be interpreted in that manner. However, the question does raise or relate to the underlying problem of the lack of acknowledgement or understanding of the disproportionate provision of terrace deposits and hence 'gravel' in the allocations (and the lack of 'sand' allocations) and therefore the additional obligation or burden on Areas of Search to ensure adequate sand supply. Providing more terrace deposits through the AoS is probably not going to help resolve that. To that extent providing clarity that demand may be for 'sand' as opposed to 'gravel' may be desirable. Clearly, new resources of sand are more likely to arise in sufficient volumes and in a more sustainable way through the release of resources in the bedrock sands but perhaps to keep it simple it would be better if MS-2 I referenced "the supply of sand or gravel". A similar change would assist in relation to paragraph 3.13.

3 It is agreed that the wording of paragraph 3.13 should be changed to reflect the provisions of MS-2 iv a, or perhaps 3.13 should just cross reference to MS-2 iv a.

4 The AoS is related to the supply of construction aggregates. It should relate to the primary sand/sand and gravel 'mineral' resources of the Poole Formation, Branksome Sand and the terrace deposits. Unfortunately, the AoS as defined on Figure 2 in the Plan include substantial areas which are not 'mineral' in terms of any aggregate potential, other than as fill (for which just about any rock may be suitable).

5 This position was noted in representations and was the subject of subsequent discussions between myself and Mr Badley. At his suggestion I have prepared the attached note (Appendix JFC 3) setting out the substance of those discussions. That note deals, inter alia, with questions 173 to 177 raised by the Inspector.

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APPENDIX JFC 3

BOURNEMOUTH, DORSET & POOLE MINERAL SITES PLAN

AREAS OF SEARCH

INTRODUCTION

1 This note has been prepared in relation to the Pre-Submission Bournemouth, Dorset and Poole ('Dorset') Mineral Sites Plan ('the Plan') and relates to representations submitted on Policy MS2, 'Sand and Gravel Areas of Search' and subsequent discussions with Trevor Badley, Dorset County on the adequacy of the Plan and the aggregates Areas of Search to maintain future supply of construction sand.

BACKGROUND

2 Sand is an essential mineral for use in construction and other uses (glass, metallurgy, ceramics, fracking, water purification etc) to maintain our society. Global demand is increasing significantly although there is no definitive production figure or forecast.

3 For decades Dorset has been a significant supplier of construction sand (both concreting sand and building sand to the original relevant BS and now BS EN specification) to the construction industry within Dorset and elsewhere.

4 Construction sand mainly meets two end uses, concreting sand (for use as a fine aggregate in concrete) and building sand (for use as the aggregate in mortar). These end uses have an overlapping specification such that in many cases a resource can be processed to produce either or both. Continuation of this supply of sand from Dorset is essential to meet the construction needs of the country.

EXPERIENCE

5 I have over 50 years of experience in these matters. I was the Minerals Officer for Dorset from 1971 to 1985. Since 1985 I have acted as an independent consultant. I have undertaken assessment of many sand resource deposits in Dorset and elsewhere across the UK. I have also considered the contribution of crushed rock 'sand' and secondary and recycled aggregate.

6 I was the planning advisor to the BGS on the Factsheet on Construction Aggregates and to the BGS maps and reports produced for the 'Mineral Resource Information for Development Plans' project. I was an author of the BGS report 'Mineral Resources of East Dorset'.

7 I have prepared reports and evidence for industry and various planning authorities in relation to planning applications and appeals and local plan provisions for sand in the UK. I have considered resources and advised clients on 'sand' resources elsewhere including off-shore resources, glacial and arid land resources across Europe; in the Caribbean; and in North America.

THE ISSUES

8 The two fundamental and inter-related issues arising and dealt with in this note are therefore:

1. Dorset produces and exports a considerable volume of sand. The identified sand and gravel sites in the Plan are primarily located over the thin superficial terrace deposits of gravel and sand and mainly do not provide for future supply from the thick bedrock sands. They are unlikely therefore to enable Dorset to maintain its local and regional contribution of construction sand into the future. To resolve this position either (i) additional Preferred Areas containing substantial resources of bedrock sand need to be identified in the Plan, or (ii) the Areas of Search should be redefined to include such areas of bedrock sand but in addition provide no more rigorous development management constraints or obligations than apply to a Preferred Area.
2. The Areas of Search currently defined in Figure 2 and Policy MS-2 often do not relate to viable resources of bedrock sand but include significant areas which may consist of small or shallow deposits of marginal or non-mineral resources and therefore do not represent suitable areas to make up for the shortfall in sand production identified in 1 above.

THE SAND RESOURCES

The Resources

9 The resources of sand in Dorset have historically been and remain:

- (i) The bedrock sands of the Poole Formation and the Branksome Sand. However, the Branksome Sand now only irregularly contributes a 'windfall' supply primarily from excavated material arising from construction activity in the conurbation as the outcrop is heavily urbanised and the resource significantly sterilised.
- (ii) Sand produced from the Quaternary terrace sand and gravel deposits.

'Windfall' Supply

10 The 'windfall' supply of sand from construction activity in the Poole/Bournemouth conurbation is a particular feature of the area, where any excavation into the ground produces excavated 'waste' which is essentially 'mineral' consisting of either or both terrace sand and gravel and bedrock sand. The timing of this windfall supply is variable reflecting construction activity and type of construction but can produce in a short period up to 0.5 million tonnes, although no reliance can be given that further supply will arise in the future. The recent works in Bournemouth Town Centre for the new Hilton Hotel etc produced significant quantities of sand.

Export of Sand from Dorset

11 The 'export' of construction sand primarily reflected/reflects two factors (i) the inadequacies of sand resources in those importing areas, coupled (ii) to the significant potential to produce sand from the relatively thick bedrock sand deposits of the Palaeogene in Dorset.

12 The first point was/is due either to (a) a physical (geological) shortage (or lack) of specification compliant sand, or (b) due to high demand which was/is incapable of being satisfied by local supply.

13 Sand from the overlying superficial terrace deposits would also be utilised in this supply but it was/is the volume in the bedrock deposits but provided the sufficient resources and impetus to meet these external demands.

14 This export market has skewed/skews production/sales figures in Dorset for decades such that sand has consistently formed between 65%-75% of Dorset aggregate sales, whereas gravel has formed the minor residual. This is roughly the reverse of sales nationally.

15 The 'export' destinations (which for this note excludes short movements of local sales merely crossing administrative boundaries) have shown some variation over the last few decades. The Bristol/Bath and Somerset/Wiltshire area has always been a major market and remains so. London and the adjacent area to the west of the City out to Berkshire have been of varying significance. More recently, Devon and South Wales have become more important.

Factory Mixed Mortar

16 Any discussion of sand should reflect the dramatic rise in the market capture by factory mixed mortar. This has significantly changed movements and markets of building sand. Factory mixed mortar is produced in central facilities and delivered premixed in silos to construction sites. This has a number of significant economic and environmental advantages in both ensuring consistent quality and properties but also has drastically reduced waste.

17 The Mineral Products Association has calculated that some 80% of all mortar is now provided from factory mixed facilities in silos, or in bags/tubs. Building sand is still provided unmixed for small works or where specific materials are required in conservation works or to match extensions.

18 Due to the requirements of the factory mix process this shift has created two impacts on the production and use of building sand. First, the process requires certainty of a substantial supply of suitable sand of consistent properties. This means that small, marginal or previously locally acceptable sands are too inconsistent in properties to be of interest. Secondly, the factories are strategically located near major urban areas, they are not local. So a silo of mortar delivered to a development site in Dorchester may have come from a factory in Bristol or Southampton, and the same factory might also deliver to Barnstable or Truro.

Industrial Sand

19 Any discussion of sand in Dorset should also include reference to the industrial use and potential of the sand resources because the significance of this consumption of sand for industrial purposes is that (i) it may call upon the same resource (sands in the Poole Formation) as suitable for sand for aggregate; or alternatively (ii) it may exploit sand resources unsuitable for use as aggregate (sands in the London Clay).

20 The sand resources in Dorset are typically high silica sands as dug (>90% silica). They have suitable physical and chemical properties for use in a range of industrial uses in

ceramics, metallurgy and horticulture/sports facilities etc. Such sands may serve very specific end uses and some sand from Dorset is transported a significant distance. However, for some industrial uses the sand is too distant from manufacturing plants to be of economic interest in those uses.

Fracking

21 The scale of future fracking development in the UK is unknown. Sand provides the essential proppant to enable fracking and considerable quantities will be required if fracking becomes a significant activity.

THE TERRACE 'SAND' RESOURCE

22 The sand resources in the terrace deposits are contained as the matrix with fines and clay between the gravel clasts. The yield of sand can vary considerably. As sand generally makes up a lesser proportion of the resource and because these deposits are normally thin the yield is not as significant as that from the thicker bedrock sands.

THE BEDROCK 'SAND' RESOURCE

23 It is the bedrock sand resource that is of primary significance in meeting the demand both internal to Dorset and in exports. These sands are located in South East Dorset in the Wareham Basin and are of Palaeogene (and mainly Eocene) age, deposited unconformably on top of the Chalk. The sequence of rocks consists of thick 'clay' or 'sand' dominated lithologies within which both significant and insignificant lateral and vertical changes in deposition and contemporaneous erosion has produced variation in sediments and their potential economic value.

24 The deposits tend to have a complicated overlapping form, lithology and structure as one follows exposures such that an extensive surface exposure may actually consist of merely a thin and marginal deposit, sometimes contained by block faulting, so that the depth of potential mineral cannot be ascertained without drilling.

25 The junction with the underlying Chalk is mainly very irregular (reflecting a 15-20 million year deposition/erosion gap) complicating both the assessment of and the recovery of sand where it overlies the Chalk. 'Swallow holes' (sink holes) are present and are still active where the Palaeogene rocks are subsiding into the underlying Chalk which is being affected by karst processes due to chemical erosion of the limestone of the Chalk.

26 In ascending order (oldest first), the bedrock sands consist of:

1. Sand within the Reading Formation, however, these are mainly at considerable depth beneath other strata in Dorset and not economic and can be discounted;
2. Sand units within the clay dominated London Clay Formation, which are mainly thin or lensoidal, consisting of sand within the locally named units of (i) the West Park Farm Member, (ii) the Warmwell Farm Sand Member, and (iii) the Lytchett Matravers Sand Member, outcropping around the fringes of the Basin. These sands are mainly very fine grained and with a narrow grading distribution such that they are not suitable for either concreting or building sand;

3. Sand within the Poole Formation, occurring in up to four 'named' upward fining, erosion based sand/clay sequences outcropping in the main part of the Basin from Dorchester to Poole;
4. Sand within the Branksome Sand Formation, outcropping mainly under the western part of the conurbation and northwards; and mainly sterilised by development
5. Sand within the Boscombe Sand Formation, outcropping in the eastern part of the conurbation. These sands are also mainly very fine grained and with a narrow grading distribution such that they are not suitable for either concreting or building sand;

27 The most significant bedrock sand in economic terms is the sand within the Poole Formation which is some 180 metres thick at maximum. This consists of clean fine to coarse siliceous sands contained in units averaging around 10 metres but sometimes thicker particularly where interbedded clay units have either not been deposited or have been eroded. This sand is well graded in economic mineral terms consisting of or capable of being processed to produce a range of sized product necessary to meet the continuous grading specification for either concreting or building sand.

28 The Branksome Sand, up to 70 metres of typically finer sand, was formerly of direct economic importance for concreting or building sand but due mainly to urbanisation there are currently no extraction operations in this sand, although significant quantities may arise from construction activity in the conurbation.

29 Sand arising from sand members in the London Clay Formation has been worked in the past (principally for building sand for mortar when compliance with specification was not important). However, they consist primarily of fine to very fine well-rounded single sized clasts and therefore the sand does not meet current specification. Some sand could be blended in with coarser sand to meet specification but there is no significant volume of such coarser sand available for that purpose. The single sized and well-rounded nature of this sand does however make it suitable for various industrial end uses.

THE RELATIONSHIP OF THE AREAS OF SEARCH TO SAND RESOURCES

30 The Areas of Search are defined in Figure 2. Further detail is provided on these areas but the boundaries are both somewhat indistinct or are difficult to apply to mineral outcrops. This does make it difficult to precisely define what is included or not, and although one would expect an AoS to be broadly defined it should, for clarity, use identifiable boundaries.

31 However, there is a much more fundamental problem with the AoS. This is that substantial parts of the AoS extend over non-mineral or mineral deposits which are thin, patchy and unlikely to yield commercial deposits. That problem is heightened by the apparent failure of the AoS to thereby address the inadequacies of the allocations to maintain sand supply into the future.

32 I have undertaken an appraisal of much of the AoS in relation to resources with the following conclusions:

1. The AoS north of the Frome between Waddock Cross and Dorchester contains some thin terrace deposits and alluvium lying on either clay of the West Park Farm Member (WPFM) or sand within that Member. The sand will not meet relevant specifications. The terrace gravels are unlikely to be economic, but in any event would not satisfy sand demand. This area will be unlikely to produce any significant sand resources.
2. The extensive AoS running from West Knighton to Tadnoll contains in the west limited isolated thin terrace and Poole Formation outliers resting directly on Chalk or WPFM clay. In the east the thin terrace lies partly on sand within the WPFM or on clay of the WPFM. The terrace and Poole Formation sands in the west will be significantly affected by the eroded nature of their basal junction with the underlying Chalk. The WPFM sand will not meet relevant specifications. The terrace gravels are unlikely to be economic, but in any event would not satisfy sand demand. This area will be unlikely to produce any significant sand resources.
3. The AoS running alongside the A35 from Bakers Arms roundabout to Morden and then south to Sandford is underlain in the north west and north by clay of the London Clay, and to the south by a surface outcrop of Poole Formation Oakdale Clay. Poole Formation sand may or may not underlie the Oakdale clay at depth. There are some very small isolated patches of terrace. The defined AoS in this location is unlikely to produce economic deposits and unlikely to produce any significant sand resources.
4. The linear AoS in the Stour Valley from Blandford Forum to Wimborne and south to Lytchett Matravers is primarily based on terrace deposits of the Stour. However, while these deposits do contain flint gravel, past workings and exploration has confirmed that considerable quantities of Chalk are entrained within the deposit and that the deposit is sand poor with fines consisting of chalk, clay and 'rotten' flint debris. There have been attempts to process the deposit to recover gravel but these have been less than successful. It is unlikely that any significant deposits of sand can be produced from this terrace deposit. To the south, the AoS runs over outcrops of Chalk and London Clay and associated sand units within the London Clay. These sands will not meet specifications. The AoS does not extend further south where it could extend over Poole Formation sand.

CONCLUSION

33 The potential supply from much of the defined Areas of Search is limited and will not enable the release of sand resources needed for the future. The principal failure of the defined AoS is that they appear to be defined taking account of a number of factors, except the presence of deposits of potentially commercial minerals in demand. There would appear to be areas outside the AoS which contain such mineral deposits.

34 Given that the allocations in the Plan may fail to enable sand supply to be maintained the AoS should be amended/extended/added to so as to extend over suitable resources. That might thereby identify potential conflicts between extraction and other interests. Those are matters that may be resolvable or capable of mitigation or compensation and the Plan should not preclude such opportunities. Neither should it fail to address the demands of society for an adequate supply of minerals.

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