COMPETITION COMMISSION

ANGLO AMERICAN/LAFARGE JOINT VENTURE INQUIRY

Anticipated construction materials joint venture between Anglo American PLC and Lafarge S.A.

Provisional findings report

Published: 23 February 2012

The Competition Commission has excluded from this published version of the provisional findings report information which the Inquiry Group considers should be excluded having regard to the three considerations set out in section 244 of the Enterprise Act 2002 (specified information: considerations relevant to disclosure). The omissions are indicated by [✂]. Some numbers have been replaced by a range. These are shown in square brackets. Non-sensitive wording is also indicated in square brackets.

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Summary

1. On 2 September 2011, the Office of Fair Trading (OFT) referred to the Competition Commission (CC) for investigation and report under the Enterprise Act 2002 (the Act) the anticipated construction materials joint venture between Anglo American PLC (Anglo American) and Lafarge S.A. (Lafarge Group). Following two extensions to the original inquiry period ending on 16 February 2012, we are required to publish our final report by 1 May 2012.

2. The reference requires us to determine:
   (a) whether arrangements are in progress or in contemplation which, if carried into effect, will result in the creation of a relevant merger situation; and
   (b) if so, whether the creation of that situation may be expected to result in a substantial lessening of competition (SLC) within any market or markets in the UK for goods or services.

3. The operations that Anglo American and Lafarge Group plan to contribute to the proposed JV are, in broad terms, their UK activities in the production of cement, aggregates, asphalt and ready-mix concrete (RMX).

4. We found that the proposed JV would result in the creation of a relevant merger situation because the share of supply test was met.

The products

5. Cement is the ‘glue’ that binds together the components of building materials including RMX. Cement is made from a mixture of finely ground limestone or chalk (or other materials with a high calcium content), clay and sand (or other sources of silica and alumina). This mixture is processed to create an intermediate product, cement

clinker. The finished cement is produced by grinding together clinker with a small percentage of additives.

6. Different types of cement are produced by blending ground clinker with other materials, including ground granulated blast furnace slag (GGBS) and pulverized fly ash (PFA). These different types of cement (also known as blended cements) are defined by their strength development and setting times, which are determined by the proportions and nature of the different products used to make them. CEM l is the basic, and the most widely produced, cement in Great Britain. CEM II and CEM III are the other two main types of cement supplied in the UK.

7. Aggregates are the granular base materials used in the construction of roads, buildings and other infrastructure and are also a key component of asphalt and RMX. Aggregates may be divided into:

(a) primary aggregates, which are extracted from quarries, pits and (in the case of marine aggregates) the seabed; primary aggregates may come from either sand and gravel pits or crushed rock quarries;

(b) secondary aggregates, which are by-products of industrial and mining processes; and

(c) recycled aggregates, which are produced, for example, from demolition sites and construction waste.

8. There are also specific types of primary aggregates for certain ‘specialist’ applications. They include:

(a) rail ballast, used as a bedding material underneath railway tracks; and

(b) high purity limestone (HPL), which is used in particular for flue gas desulphurization (FGD) at coal-fired power plants.

9. Asphalt is produced by heating and mixing aggregates and a viscous binding agent, usually bitumen. Its principal applications are in the surfacing of roads, car parks, footpath pavements and other surfaces.

10. RMX is concrete that is manufactured at the supplier's site for delivery to a customer's construction site in a freshly mixed and unhardened state. RMX is made from cement and (if desired) other materials such as GGBS and PFA, mixed with fine aggregates and coarse aggregates, water and other additives.

11. Five vertically integrated companies with national coverage ('the majors') are involved in the production and supply of cement, aggregates, asphalt and RMX in the UK:

(a) Aggregate Industries UK Ltd (Aggregate Industries)—the UK operations of Holcim Limited, a global building materials producer listed on the SIX Swiss stock exchange;

(b) Cemex UK Operations Limited (Cemex)—the UK operations of Cemex SAB de CV, a global building materials company listed on the Mexican stock exchange;

(c) Hanson—we use this term to refer to both the UK operations of Hanson and the operations of HeidelbergCement AG, Hanson's ultimate parent company, which is a global provider of building materials listed on a number of German stock exchanges;

(d) Lafarge Group (through its UK Cement and Aggregates & Concrete divisions); and

(e) Anglo American's Tarmac business.

Anglo American and Tarmac

12. Anglo American is a global mining and industrial business. It will contribute to the proposed JV Tarmac Group's entire UK operations with the exception of Tarmac

Building Products Limited (TBP), a producer of heavy building materials including concrete blocks. Tarmac is active in the production and sale of cement, aggregates, asphalt, RMX and lime, as well as providing services in asphalt surfacing and maintenance, and waste management. In FY10, Tarmac generated revenues of just over £1 billion, all of which were generated in the UK.

13. Tarmac's cement operations comprise a quarry and cement plant located in Tunstead, Derbyshire and some cement depots.

14. Tarmac produces and supplies primary aggregates from quarries in the UK and operates a dredging business around the UK coast for the extraction of marine aggregates. Tarmac also operates recycling and secondary aggregates sites, as well as a small number of railheads (or rail-fed depots).

15. Tarmac also has a large number of fixed asphalt production sites and fixed RMX plants.

Lafarge

16. Lafarge Group is a multinational producer and supplier of construction and building materials, focusing on cement, aggregates, concrete and gypsum. Lafarge Group will contribute its UK Cement and Aggregates & Concrete divisions to the proposed JV (together, Lafarge). In FY10, Lafarge generated total revenues of around €920 million.

17. In Great Britain, Lafarge operates four cement plants and a number of cement depots and cement import terminals. In Northern Ireland, Lafarge operates one cement plant and one depot.

18. In the UK, Lafarge operates aggregates quarries and depots, along with several marine aggregates wharves and aggregates recycling sites, with additional recycling activity taking place on an occasional basis at Lafarge quarries and depots.

19. Lafarge currently operates a number of fixed asphalt plant sites and owns several mobile asphalt plants (plants which can be located at the customer's site). It also has a considerable number of fixed RMX plants, and several additional RMX plants which are located on the sites of precast concrete producers dedicated to supplying those customers. Lafarge also operates several mobile RMX plants.

The counterfactual

20. We found that, had the JV transaction not been proposed, the prevailing competition between Tarmac and Lafarge would have been likely to continue largely unchanged.

The relevant markets

21. We found that the relevant product markets for the purposes of our inquiry were:

(a) the supply of bulk cement. However, we recognized that differing constraints might characterize different products within this market, for example in relation to CEM I, which was the main input for the production of the other types of cement, and in relation to imported and domestically produced cement. Therefore, in the competitive assessment, we also considered the competitive constraints arising for these products;

(b) the supply of bagged cement;

(c) the supply of primary aggregates (of all grades) for construction applications. We recognized that differing constraints might characterize different products within this market and that constraints might also arise from products outside this market. Therefore, in our competitive assessment, we considered a market segmentation into crushed rock aggregates and sand and gravel aggregates, and we

considered specific products within these two segments. We also considered the possible constraints arising from secondary and recycled aggregates when available in a given geographic market;

(d) the supply of rail ballast;

(e) the supply of HPL. We recognized that the extent to which customers could switch between different grades of HPL depended on the specific application in which HPL was used and that for FGD, in particular, the specification of the product was tight. We therefore considered in our competitive assessment the constraints in relation to this specific use of HPL;

(f) the supply of asphalt (produced either by fixed or by mobile plants); and

(g) the supply of RMX (produced either by fixed or by site plants). We did not include volumetric trucks (ie trucks which carry RMX ingredients separately and mix them on site) in the relevant market but we considered competitive constraints from them in our competitive assessment.

Theories of harm

22. We identified four ways in which the proposed JV might harm competition ('theories of harm'), namely:

(a) 'Unilateral horizontal effects.' Loss of competition between Tarmac and Lafarge as a result of the proposed JV might enable the JV entity to increase prices, worsen quality or service levels and/or reduce capacity through plant closures (or mothballing) in one or more of the relevant markets.

(b) 'Coordinated effects.' In relation to any one or more of aggregates, asphalt, cement or RMX, the proposed JV might make any pre-existing coordination between the majors more stable or effective or, in the absence of pre-existing coordination, might create the conditions where such coordination was likely. Coordinated effects may arise when firms operating in the same market

recognize that they are mutually interdependent and that they can reach a more profitable outcome if they coordinate to limit their rivalry.

(c) 'Vertical effects arising from unilateral market power.' The proposed JV might create or enhance vertical integration in certain local areas, such that the JV entity would have the ability and incentive to engage in partial or full input foreclosure[1] in certain local areas in relation to:

(i) cement sold to RMX-producing customers;

(ii) aggregates sold to RMX-producing customers; and/or

(iii) aggregates sold to asphalt-producing customers.

(d) 'Vertical effects arising from coordination.' By making coordination between the majors likely to arise, or by making any such pre-existing coordination more effective, the proposed JV might result in partial or full input foreclosure in certain local areas (as in the case of vertical effects arising from unilateral market power).

Unilateral effects

Primary aggregates for construction applications

23. We carried out a local competitive analysis in catchment areas around primary aggregates sites, as primary aggregates for construction applications are, on the whole, transported over relatively short distances (unlike aggregates for specialist applications such as rail ballast, which travel much greater distances and for which there generally appeared to be national markets). Having established the relevant catchment areas, we then identified in which of these areas Tarmac and Lafarge both had plants ('overlap areas'). We then used filters to identify in which of these overlap areas there might be competition problems ('possible problem areas'). The final step

[1] Full input foreclosure occurs when a supplier refuses to supply an input to customers which use that input to compete with it in downstream markets. Partial input foreclosure occurs when a supplier increases (to a greater extent than otherwise might be expected) the prices of an input to customers which use that input to compete with it in downstream markets.

was to analyse the competitive dynamics in each of the possible problem areas individually so as to decide where there was likely to be a competition problem.

24. We also carried out a price concentration analysis (PCA) to help inform our view on whether the proposed JV was likely to lead to competition problems. The PCA involved developing econometric models to determine the extent to which competition from rivals constrained pricing in a particular market.

25. Having identified around 40 possible problem areas, we considered the competitive dynamics in each possible problem area on an individual basis. We looked at shares of production (for all aggregates, primary aggregates, crushed rock and sand and gravel as appropriate) and the number of competitors. We also took into account the existence of local sources of recycled and secondary aggregates, the geographical distribution of sites and demand and any geographical barriers that might limit the scope of competition between plants that otherwise appeared to be in the same local market.

26. We identified 23 local primary aggregates markets in which we considered that the proposed JV was likely to result in an SLC.

Rail ballast

27. Network Rail buys around 99 per cent of the rail ballast produced in the UK. There are only a few suppliers of rail ballast and relatively few shipping points (ie quarries or depots) in the UK. The main suppliers are: Lafarge; Midland Quarry Products (MQP), a JV between Tarmac and Hanson; Aggregate Industries; and Cemex.

28. We found that:

(a) The proposed JV would bring together the largest supplier of rail ballast (Lafarge) and the second largest supplier (Tarmac, through MQP). After the JV there would be no other remaining suppliers of rail ballast with a significant share.

(b) It was unlikely that the remaining competitors would have the ability to constrain the proposed JV's pricing. This was due to the effect of the remaining competitors' quarry locations on the cost to supply rail ballast into certain geographic areas and, therefore, on the price the remaining competitors would charge to Network Rail in those areas.

(c) Network Rail's position as the near-unique purchaser of rail ballast had not given it countervailing buyer power.

(d) It was unlikely that entry or imports could constrain the proposed JV's pricing.

29. We therefore concluded that the proposed JV was likely to result in an SLC in the supply of rail ballast.

HPL

30. We found that the proposed JV would be unlikely to result in an SLC in the supply of HPL for non-FGD customers, as there appeared to be sufficient alternative suppliers.

31. For HPL for use in FGD, we found that:

(a) There are only a small number of power station customers for HPL for FGD, they issue tenders for the supply of HPL and they are all currently supplied by either Tarmac or Lafarge.

(b) Suppliers of HPL for FGD had to meet the technical specification for this application and have rail-linked quarries located sufficiently close to the coal-fired power stations to allow them to bid competitively for tenders. Our analysis confirmed that HPL for FGD did not travel long distances.

(c) Limestone powder producers did not appear to represent a significant competitive constraint, both as a result of lack of rail-linked quarries and existing FGD equipment being tailored for the use of specific grades of HPL.

(d) Imports were unlikely to be a relevant competitive constraint due to the higher transport costs involved.

(e) There was no evidence of countervailing buyer power.

(f) Other than the small number of suppliers which bid to supply HPL for FGD in recent tenders (which included Tarmac and Lafarge), no other supplier of HPL in Great Britain produced the grade of HPL suitable for customers' existing FGD equipment and/or had a rail-linked quarry sufficiently close to the coal-fired power stations to allow competitive supply.

32. The proposed JV would therefore significantly reduce the number of alternative suppliers of HPL for FGD. We considered that this reduction was likely to compromise considerably the competitive dynamic in tenders, making it easier for competing bidders to anticipate the competitor's behaviour and take this into account. We therefore concluded that the proposed JV would be likely to result in an SLC in the supply of HPL for FGD customers.

Asphalt

33. Our local competition assessment methodology for asphalt was very similar to the one we used for primary aggregates and RMX. Our initial filtering produced two possible problem areas, and, following a local competitive assessment in each of these areas, we found two local asphalt markets in which we considered that the proposed JV was likely to result in an SLC.

RMX

34. Our local competition assessment methodology for RMX was very similar to the one we used for primary aggregates and asphalt. Our initial filtering produced eight possible problem areas, and, following a local competitive assessment in each of these areas (in which we took account of possible constraints from local volumetric truck operators), we found seven local RMX markets in which we considered that the proposed JV was likely to result in an SLC.

Coordinated effects

Bulk cement

35. We assessed whether the proposed JV might be expected to give rise to an SLC in the bulk cement market through coordinated effects.

36. The CC's merger assessment guidelines (the Guidelines) set out that all three of the following conditions must be satisfied for coordination to be possible:

(a) firms need to be able to reach and monitor the terms of coordination;

(b) coordination needs to be internally sustainable among the coordinating group, ie firms have to find it in their individual interests to adhere to the coordinated outcome; and

(c) coordination needs to be externally sustainable, in that there is little likelihood of coordination being undermined by competition from outside the coordinating group.

37. In accordance with the Guidelines, we analysed whether there was evidence that UK cement producers were coordinating in the bulk cement market currently and the extent to which the three conditions for coordination were satisfied. Among other things, we looked at:

(a) observed market outcomes (trends in market shares, changes in margins over time, evidence from our PCA and evidence from customers on the behaviour of UK cement producers);

(b) data on customer switching; and

(c) internal documents from the main parties and the other UK majors.

38. We did not come to a conclusion whether or not there was pre-existing coordination in the bulk cement market. However, we found that the evidence on market outcomes that we reviewed, when taken together, indicated that there were shortcomings in the way the market functioned and was consistent with a degree of pre-existing tacit coordination. That evidence included:

(a) the degree of stability of shares of production at the time of large changes in demand and consolidation in the industry;

(b) pricing behaviour and sustained margins that did not appear to be consistent with the excess capacity in the industry, in particular increases in the variable profits per tonne of cement over the period 2007 to 2010, which appeared inconsistent with cement producers competing for customers in a market with falling demand and excess capacity; and

(c) the results from our PCA, which were consistent with the existence of a degree of coordination in the market.

39. Our analysis also indicated that the three conditions for coordination were likely to be satisfied in the current market.

40. Condition 1 (the ability to reach and monitor the terms of coordination) seemed likely to be satisfied at present. The bulk cement market is very concentrated and not particularly complex. Cement is a relatively homogeneous product. Coordination on shares of production and/or wins and losses of customers appeared feasible. The

practice of sending out price announcement letters was likely to assist the UK cement producers in coming to a common understanding on the timing and direction of price movements. Further, we found that the UK producers could with a fair degree of accuracy monitor their own shares of production with a one-month time lag, and this could be complemented with monitoring of gains and losses of their own customers and sales volumes.

41. It was also likely that condition 2 (internal sustainability of coordination) was satisfied at present, for the following reasons:

(a) The lack of differentiation between cement made by different UK producers (within each type of cement) creates large incentives to coordinate, because without coordination, it is likely that competition would be strong in bringing prices down in periods of excess capacity.

(b) There was sufficient excess capacity in the market and customers were able to switch sufficiently easily between cement producers to enable punishment strategies based on taking business from a deviator to be effective.

(c) One available mechanism for punishment would be to reduce prices to the deviator's customers so as to reduce the deviators' sales volumes and margins. Such a mechanism appeared likely to be effective in this market given the lack of long-term contracts, regularity of cement purchasing, and customer price sensitivity. The scope for such a punishment mechanism to disrupt the market in general (in pushing industry prices down) was limited by the limited transparency of realized prices for cement, and it would therefore not be particularly costly to the punishing firm to implement.

(d) Repatriation of cement volumes (the bringing of volumes purchased from another producer back into in-house supply) was potentially also an effective signalling and/or punishment mechanism. This was because it was swift, targeted and (if used as a signalling mechanism) could reduce the risk of more costly punishment

being required and (if used as a punishment mechanism) could be very costly to deviating firms while having a low risk of destabilizing the market. We found that repatriation had occurred regularly in the past three years. However, Lafarge was at present constrained, compared with the other UK major producers, in its ability to repatriate because it was not currently a large buyer of cement for its own use. Tarmac was constrained in its ability to repatriate because it could not easily increase its self-supply of cement.

42. We considered that condition 3 (external sustainability) was likely to be satisfied at present because:

(a) there was evidence to suggest that the constraint from imports was not sufficient to prevent the UK majors exercising a degree of collective market power;

(b) we found high barriers to entry into the production of cement in the UK and no evidence of countervailing buyer power; and

(c) although the evidence suggested that Tarmac was likely to have different incentives to coordinate than the other UK cement producers and was likely to be part of a competitive fringe, it currently operates at, or close to, full capacity, suggesting that it cannot expand sales further in the short term and therefore that it would not at present be able to further undermine a coordinated outcome other than by expanding its current capacity.

43. We examined the effect of the proposed JV on the likelihood and effectiveness of coordination. In doing so, we noted that, following the proposed JV, there would be:

(a) increased concentration in UK cement production;

(b) increased consolidation in RMX production at a UK level; and

(c) a more balanced position in terms of the degree of vertical integration between the JV entity, Hanson and Cemex (compared with the present position of Lafarge, which does not control as large a RMX business as Hanson and Cemex).

44. We considered that the proposed JV would strengthen both the ability to reach and to monitor coordination (Condition 1) because:

(a) there would be fewer cement producers; and

(b) there would be increased information available to the JV entity regarding RMX and cement purchases compared with Lafarge's current position, since the JV entity would have a larger and more widespread RMX business than Lafarge does currently.

45. We considered that the proposed JV would enhance the internal sustainability of coordination (Condition 2) because:

(a) The reduction in the number of producers following the proposed JV would mean that members of any coordinating group would obtain a larger share of the overall profits from coordination.

(b) The level of the JV entity's variable production costs would have greater similarities to those of Hanson and Cemex than either Tarmac or Lafarge's costs have at present, resulting in greater alignment of incentives to coordinate and to punish deviation from coordination.

(c) The JV entity would have a larger RMX business than Lafarge currently has, and this would make its vertically integrated position closer to that of Hanson and Cemex. This would further align incentives to coordinate and ability to punish deviation from coordination compared to the present market structure, and give the JV entity increased flexibility and options in its punishment actions.

(d) If the JV entity had greater cross-sales with Hanson and Cemex than Lafarge does currently, then it would have an enhanced ability compared with Lafarge to use repatriation as a cheap signal to deviators from the coordinated outcome to cease doing so, short of entering a more costly punishment phase.

(e) It would also increase the effectiveness of mechanisms to punish deviation by virtue of the increased information about the RMX markets available to the JV

entity compared with Lafarge at present, allowing punishment to be better targeted.

46. We considered that the proposed JV would enhance the external sustainability of coordination (Condition 3) because it would eliminate an existing market participant (Tarmac) that appeared likely to be part of a competitive fringe and that had a strong incentive to expand (rather than reduce) its output. In particular:

(a) The JV entity would have stronger incentives to reduce production than Tarmac currently does because it would, on average, be a less efficient cement producer than Tarmac is currently.

(b) After the proposed JV, the threat that the JV entity might expand its capacity further (as Tarmac has done on two occasions in the last ten years) would be lower as the JV entity would already benefit from Lafarge's excess capacity.

47. We noted that some of the ways in which the proposed JV was likely to increase firms' abilities and incentives to coordinate in cement would arise from the combination of Tarmac and Lafarge's cement businesses, and some would arise from the combination of Tarmac and Lafarge's RMX businesses. The latter would arise even if it were not proposed to combine Tarmac and Lafarge's cement businesses, and therefore these effects may have additional implications for remedies.

48. We found that the proposed JV was likely to result in each of the three conditions for coordination being satisfied to a greater extent than at present in the bulk cement market. Taken together with the other evidence we considered, we found that this would make coordination in the market more likely (if there were no pre-existing coordination), as well as increasing the effectiveness and sustainability of any pre-existing coordination. We concluded that the proposed JV would be likely to result in an SLC in the bulk cement market.

Bagged cement

49. Bulk cement is a key input into the production of bagged cement. As set out above, we found that the proposed JV would make coordination in the bulk cement market likely (if there were no pre-existing coordination), as well as increasing the effectiveness and sustainability of any pre-existing coordination. We found that Tarmac had only a very small share of the bagged cement market. In light of these factors, we reached no conclusion on the effect of the proposed JV in the bagged cement market specifically as we considered that any possible concerns would be captured by our findings in relation to the bulk cement market.

Coordination in other relevant markets

50. In light of our views on unilateral effects in the aggregates, asphalt and RMX markets, we have come to no conclusions at this point on the scope for coordinated effects in these markets as a result of the proposed JV.

Vertical effects

51. The Guidelines set out the framework for assessing the likelihood of input foreclosure in terms of assessing the ability and incentive of the JV entity to harm rivals following the proposed JV, and whether the effect of any such foreclosure would be sufficient to reduce competition downstream to the extent that it gives rise to an SLC.

Aggregates into asphalt and/or RMX

52. We found that the JV entity would not have the ability to foreclose non-integrated asphalt or RMX producers because it would not have a sufficient share of supply of aggregates to non-integrated asphalt and RMX producers in any local area. We therefore did not consider the JV entity's incentives to foreclose, nor the ability of downstream aggregate customers to undermine any attempts at foreclosure.

53. We therefore found that the proposed JV was not likely to result in an SLC as a result of vertical effects in relation to aggregate supply into asphalt and/or RMX.

Cement into RMX

54. We have not concluded at this point on whether there are likely to be vertical effects as a result of the proposed JV in relation to cement as an input to RMX.

Countervailing factors

55. We considered whether the following factors would prevent or reduce an SLC that might otherwise arise as a result of the proposed JV:

(a) rivalry-enhancing efficiencies;

(b) expansion by existing market participants or entry by new market participants; and

(c) buyer power.

56. We did not receive any evidence that either efficiencies arising from the proposed JV or buyer power might be expected to prevent or reduce the SLCs we identified as a result of the proposed JV.

57. In relation to expansion:

(a) For cement, we found that the existing overcapacity in the market meant that three of the four UK cement producers had the ability to expand their output, if they had the incentive to do so. However, we considered that such expansion was unlikely to offset the SLC we identified in the bulk cement market, since, following the proposed JV, any coordinating group of firms would be likely to recognize that expansion of production would undermine the coordinated outcome.

(b) For primary aggregates, asphalt and RMX, there was evidence of overcapacity nationally. However, we did not find evidence of specific expansion plans in those local primary aggregates, asphalt and RMX markets in which we found that the proposed JV would be likely to result in an SLC. We also did not find evidence of expansion plans in relation to rail ballast and HPL for FGD that might offset an SLC in those markets.

58. In relation to entry, we found that for all the relevant markets, substantial excess capacity at a national level would act as a barrier to entry by reducing the incentives for new entry. In addition, we identified specific barriers to entry to particular relevant markets:

(a) For cement, the large capital investment required to build a new cement plant means that small-scale entry would not be feasible (ie there are significant economies of scale which would deter entry). Entry via setting up a grinding station (to grind clinker) or an import terminal would require economic access to a supply of clinker (in the case of a grinding station) or cement (in the case of an import terminal), both of which would either have to be imported or come from a rival UK cement supplier. This would be likely to weaken the business case for entry via either of these routes.

(b) For both primary aggregates and cement, the limited availability of suitable greenfield sites, along with the difficulties and costs in obtaining planning permission, would make any entry slow and expensive.

(c) For aggregates, the supply of raw materials for the production of secondary and recycled aggregates appears likely to be sufficiently limited (because of finite resources) and confined to specific geographic locations to make entry into production of these types of aggregates on a large scale unlikely.

(d) For asphalt, the initial capital requirements to serve a limited local market, combined with current market conditions (ie both excess capacity and falls in market demand), appeared to make entry unlikely.

59. In light of significant barriers to entry into the cement market and the uncertain plans for future entry, we found that entry into the bulk cement market was unlikely to offset the SLC we identified in this market.

60. For primary aggregates, asphalt and RMX, we did not find evidence of specific entry plans in those local primary aggregates, asphalt and RMX markets in which we found that the proposed JV was likely to result in an SLC. We also did not find evidence of specific entry plans in the rail ballast or HPL (for FGD) markets. Taken together with barriers to entry into these markets that we had identified, we therefore found that entry was unlikely to offset the SLCs we identified in these markets.

Provisional findings

61. We provisionally concluded that the proposed JV may be expected to result in an SLC in the following markets, leading to prices that are higher than might otherwise be the case:

(a) the market for the supply of bulk cement in the UK, as a result of coordinated effects;

(b) 23 local markets for the supply of primary aggregates for construction applications, as a result of unilateral effects;

(c) the market for the supply of rail ballast in the UK, as a result of unilateral effects;

(d) the market for the supply of HPL in the UK, in relation to HPL supplied for FGD applications, as a result of unilateral effects;

(e) two local markets for the supply of asphalt, as a result of unilateral effects; and

(f) seven local markets for the supply of RMX as a result of unilateral effects.

Provisional findings

1. The reference

1.1 On 2 September 2011, the OFT, in exercise of its duty under section 33(1) of the Act, referred to the CC for investigation and report the anticipated construction materials joint venture ('the proposed JV') between Anglo American and Lafarge Group (together 'the main parties'). The reference requires us to determine:[2]

(a) whether arrangements are in progress or in contemplation which, if carried into effect, will result in the creation of a relevant merger situation; and

(b) if so, whether the creation of that situation may be expected to result in a substantial lessening of competition (SLC) within any market or markets in the UK for goods or services.

1.2 Following two extensions to the original inquiry period ending on 16 February 2012, we are required to report by 1 May 2012. Our terms of reference are in Appendix A, together with an explanation of how we have conducted our inquiry.

1.3 This document (together with its appendices) constitutes the provisional findings that we are required to notify to the main parties and publish under the CC's rules of procedure. Non-commercially sensitive versions of the main party and third party written submissions are on our website, along with other documents relevant to this inquiry. We cross-refer to them where appropriate.

2. The products and companies

2.1 In this section, we describe those products which both main parties supply in the UK (the overlap products). We also set out details of the structure and activities of Anglo

[2] Section 36 of the Act.

American and Lafarge Group, focusing on their activities which are to be contributed to the proposed JV.

The overlap products

2.2 The operations that Anglo American and Lafarge Group plan to contribute to the proposed JV are, in broad terms, their UK activities in the production of cement, aggregates, asphalt and ready-mix concrete (RMX).

Cement

2.3 Cement is the 'glue' that binds together the components of building materials including RMX. Cement is made from a mixture of finely ground limestone or chalk (or other materials with a high calcium content), clay and sand (or other sources of silica and alumina). This mixture is heated almost to melting point (around 1,450ºC) in a large rotating kiln, creating an intermediate product, cement clinker, which has specific chemical proportions of lime, alumina, silica and iron. The finished cement is produced by grinding together around 95 per cent cement clinker with 5 per cent additives including gypsum[3] to produce a fine powder. When cement is mixed with water, the hydration of calcium silicates and aluminates cause the cement to set.

2.4 Cement may be grey or white in colour. White cement is similar to grey cement in many respects except for its colour. Obtaining this colour requires substantial modification to the method of manufacture, and because of this, it is considerably more expensive than the grey product. White cement is not produced in the UK, and previously has not been considered part of the same relevant product market as grey

[3] A very soft mineral composed of calcium sulphate dihydrate. The addition of gypsum helps to control the time taken for the cement to harden when water is added. Anhydrite (anhydrous calcium sulphate) may also be used.

cement.[4] Throughout this report we use the term 'cement' to refer to grey cement only.

2.5 As well as RMX, cement is an input into (among other building products) the production of concrete and concrete products. Concrete products include concrete blocks and pre-cast concrete products.[5]

2.6 Cement is supplied in bulk or bagged. Bagging can take place either at a cement production plant, or at a depot or import terminal, where facilities exist. Bulk cement may reach the customer by bulk road tanker or very rarely by bulk rail tanker. Bagged cement is distributed to customers using ordinary lorries.

Cementitious products

2.7 Different types of cement are produced by blending ground clinker with other materials. In this report, we refer to these materials collectively as 'cementitious products'.[6] The materials include:

(a) *Ground granulated blast furnace slag (GGBS)*. GGBS is a by-product of the blast furnaces used to make iron (which is part of the steel-making process).[7] It is a cementitious material, which means that it is (like ground clinker) capable of a hydraulic reaction with water to form a solid crystalline structure. On its own it would develop strength extremely slowly. It is normally blended with ground clinker to produce a product that strengthens more quickly (albeit not as quickly as ground clinker on its own). Performance of concretes manufactured using clinker and GGBS is normally consistent and predictable.

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[4] See the OFT's decision in Lafarge Cement UK/Port Land Cement Company Ltd, 2005.
[5] Concrete blocks are prefabricated building blocks made out of concrete. Pre-cast concrete products are concrete structures produced by casting concrete in a reusable mould or form which is then cured in a controlled environment and transported to a specific construction site to be lifted into place.
[6] We use the term 'cementitious products' for ease of reference, although these materials vary in the extent to which they are cementitious.
[7] There are two steelworks operational in the UK, both of which are owned by Tata Steel, though a third is expected to reopen under new ownership in early 2012. [✂] GGBS is imported into Great Britain from [✂] by [✂] and from Germany by Holcim. Cemex has previously imported GGBS from Germany but does not presently because the price has increased.

(b) *Pulverized fly ash (PFA)*. PFA is a by-product of pulverized fuel (typically coal)-fired power stations.[8] It consists of very fine particles of silica. PFA is a pozzolanic material, which means that it is capable of reactions to form solid crystalline structures (as for a cementitious material) but only in the presence of an alkaline environment. PFA is more variable in its properties and 'compatibility'[9] with different cements than GGBS.

(c) *Limestone*. Limestone has almost no cementitious properties, but it is used (i) in the production of the cement clinker itself; (ii) as a minor additional constituent in the production of all cement types, when clinker is ground to produce cement; and (iii) as an additive in the production of blended limestone cement, in which it is used to replace some clinker.

2.8 Cement types (also known as blended cements) are defined by strength development and setting times, which are determined by the proportions and nature of the different raw cementitious products used to make that particular cement type, as shown in Table 1. CEM l is the basic, and the most widely produced, cement in Great Britain. CEM II and CEM III are the other two main types of cement supplied in the UK.

TABLE 1 **Types of cement for concrete (BS EN 197-1) and typical uses**

Type	*Ingredients*	*Typical uses*
CEM I	Clinker and up to 5% additives	RMX; pre-cast concrete; as a base for formulated products, eg grouts cement-based floor and tile adhesives; mortars and screeds; and site-mixed concrete
CEM II	Clinker and between 6% and 35% other single constituents, eg PFA, GGBS, limestone	RMX; general concreting; ground engineering; and soil stabilization
CEM III	Clinker and >36% GGBS	RMX

Source: British Geological Survey (2005) Mineral Profile: Cement Raw Materials and Anglo American.

[8] Depending on the power station and fuels used, PFA can be used directly in concrete manufacture following classification. However, a high proportion of PFA produced at UK power stations in its raw form cannot be used directly for cementitious applications, because of the high carbon content or other impurities, and requires further processing. The main exception to this is the Drax power station, which produces PFA of sufficient quality that it can be used directly as a cementitious product. [✂] There is also another technology available to produce PFA, Rocktron, which has recently been installed at the Fiddlers Ferry power station in Cheshire (owned by Scottish and Southern Energy). Rugeley power station in Staffordshire (owned by International Power) also produces and markets a cementitious grade of PFA. Key suppliers of PFA in Great Britain include EON, EDF, Cemex and Lafarge. PFA is also imported from [✂] by Cemex.

[9] The chemistry of the cement can be varied to increase its compatibility with PFA.

2.9 Blended cements are produced because they tend to be cheaper than CEM I, because they have a lower carbon footprint[10] and because they can impart certain beneficial characteristics to the cement (such as sulphate resistance).

2.10 Any cement works which has milling, blending and storage facilities for additives can produce different types of cement. As an alternative to buying bulk CEM II and CEM III, which are blended at the production site, some customers may buy CEM I and additives, such as GGBS or PFA, separately and mix these directly at their own sites (either using their own blending and storage facilities, or by using their RMX plants to mix together the required quantities of materials to produce the RMX specification desired).

Aggregates

2.11 Aggregates are the granular base materials used in the construction of roads, buildings and other infrastructure. Aggregates may be divided into:

(a) primary aggregates, which are extracted from quarries, pits and (in the case of marine aggregates) the seabed;

(b) secondary aggregates, which are by-products of industrial and mining processes;[11] and

(c) recycled aggregates, which are produced, for example, from demolition sites and construction waste.[12]

2.12 Primary aggregates comprise sand and gravel and crushed rock (and a number of products within these two broad categories):

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[10] Clinker manufacture is very energy intensive, and generates around 0.8 tonnes of CO_2 for each tonne of clinker produced, including the energy derived from the fuels used to heat the kiln. Therefore the clinker content of cement is a key factor driving its cost and its CO_2 emissions profile. Blended cements are also known as 'low carbon cements'.

[11] For example, steel and blast furnace slag (by-products of steel and iron manufacturing processes respectively) and china clay and slate quarry waste.

[12] Other sources include highway resurfacing (which produces asphalt planings), rail ballast, excavation, municipal waste and utility operations. Secondary and recycled aggregates are thus different products. Secondary aggregates may be more suitable for some applications and recycled aggregates for others. We have noted differences between them where appropriate.

(a) crushed rock is quarried from mainly hard, naturally occurring rock deposits (eg granite, gritstone and limestone); and

(b) sand and gravel is sourced from naturally occurring alluvial deposits on land or on the seabed.

2.13 To produce crushed rock, rock is blasted from a quarry, then crushed and screened (ie sorted into different sizes—this process is also known as 'grading'). The production of sand and gravel aggregates involves crushing (where necessary), washing, screening and clarification processes.

2.14 Great Britain has a 'rock line' which extends roughly from Weymouth in the South-West to Kingston-upon-Hull in the North-East. To the north of the rock line, particularly in Scotland, Wales and north England, there are large natural deposits of rocks of the type that can be accessed to extract crushed rock. By contrast, to the south of this line, particularly in East Anglia and the South-East, naturally occurring deposits of sand and gravel are abundant but there is little or no accessible rock. Some exceptions to this exist, for example there are large deposits of granite in Leicestershire.

2.15 Aggregates are classified by the grade (ie size) of the material:[13]

(a) Fine aggregates are generally materials with a particle size of less than 5mm diameter. Fine aggregates include dust produced by crushing rock, gravel, recycled or secondary materials as well as naturally occurring sands.

(b) Coarse aggregates are materials that are produced to a specific grading above 5mm diameter. In most applications the sizes used are 10mm, 14mm, 20mm, 28mm and 40mm, although larger materials may be produced.

[13] Different producers may adopt slightly different classifications of these grades.

(c) Granular aggregates do not have a uniform size and are used to provide stability in foundation layers and bulk fill applications. They are composed of a combination of coarse and fine materials. The coarse materials provide strength and bulk while the finer component binds the material together and provides stability when compacted.

2.16 Producing a specific grade of primary aggregate necessarily results in a variety of grades being co-produced.

2.17 Aggregates are primarily used for construction purposes[14] as follows:

(a) as a sub-base (the layer of stone which forms the foundation for many construction projects) and for other structural fills. In this report, we refer to these uses as 'general construction uses';

(b) in the production of RMX;

(c) in the production of other concrete products; and

(d) in the production of asphalt.

2.18 There are also specific types of primary aggregates for certain 'specialist' applications. They include (but are not limited to):

(a) Rail ballast, which is a specific type of crushed rock aggregate used as a bedding material underneath railway tracks. Rail ballast is resistant to pressure and breakage and inhibits the growth of plants under the tracks.

(b) High purity limestone (HPL), which is limestone with a calcium carbonate content over 95 per cent, and which is used for its chemical characteristics. It is also known as chemical stone, and is used in applications including flue gas desulphurization (FGD) at coal-fired power plants[15] and the production of chemi-

[14] The main parties estimate that 95 per cent of aggregates (by volume) are used for construction applications.
[15] FGD is the abatement of acid gas emissions from coal-fired power stations. Coastal stations use seawater to scrub acids from the combustion gases, while inland stations use a slurry of limestone, created by milling of HPL with water at the power

cals.[16] Limestone powders derived from HPL are also used in the agricultural and horticultural sectors, although the chemical composition is not a key property of limestone used in this application.

(c) High polished stone value[17] (PSV) aggregates, which are derived from crushed rock or sand and gravel sources.[18] High PSV aggregates are used for asphalt road surfacing in situations where there are high levels of traffic, high-speed roads or accident risk areas such as school crossings.[19]

2.19 Further details of the proportion of aggregates used in these different applications in the UK are set out in Appendix G.

Asphalt

2.20 Asphalt is produced by heating and mixing aggregates and a viscous binding agent, usually bitumen (which, in the UK, is predominantly obtained from petroleum processing). Its principal applications are in the surfacing of roads, car parks, footpath pavements and other surfaces. The specification of each type of asphalt is a function of the mix of aggregates, bitumen and additives, and is made according to a producer's proprietary design mix, to BS/EN standards, to specifications set by the Highways Agency or to one of a series of standard European Union asphalt mix specifications.

2.21 Asphalt can be produced at fixed plants or using mobile plants located at the customer site. Some plants (whether fixed or mobile) have planning permission to operate 24 hours a day seven days a week (also referred to as '24/7' plants). This

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stations. The slurry is injected into the gas stream to react with the acids, principally sulphur dioxide, to form gypsum, which is created as a by-product of this process.

[16] Including soda ash, precipitated calcium carbonate and sinter.

[17] Polished stone value is an attribute of aggregates. The higher the PSV of a particular aggregate, the greater the skid resistance of the asphalt produced using that aggregate.

[18] High PSV materials are also produced from secondary aggregates (in particular, slag).

[19] We note that rail ballast and high PSV aggregates for road surfacing could strictly be considered construction applications, but, for the purposes of this report, we have found it clearer to deal with them as specialist applications.

permission allows suppliers to provide road-surfacing services overnight and during weekends.

RMX

2.22 RMX is concrete that is manufactured at the supplier's site for delivery to a customer's construction site in a freshly mixed and unhardened state. RMX is manufactured by mixing highly specific quantities of cement and (if desired) other cementitious products with fine aggregates and coarse aggregates, water and other additives. The specific composition (and resulting properties) of RMX can be customized to suit different applications.

2.23 RMX can be produced *(a)* in a fixed plant and distributed to site by a concrete mixer; *(b)* in a mobile plant at (or near) the customer site (also known as a 'site plant'); or *(c)* in a volumetric truck which carries the ingredients separately and mixes them on site (also known as 'on-site batching'). Approximately 87 per cent of RMX is mixed at a dedicated plant then delivered to the customer's site, 9 per cent is supplied by volumetric trucks and 5 per cent is mixed at site plants (and supplied to the same site).[20]

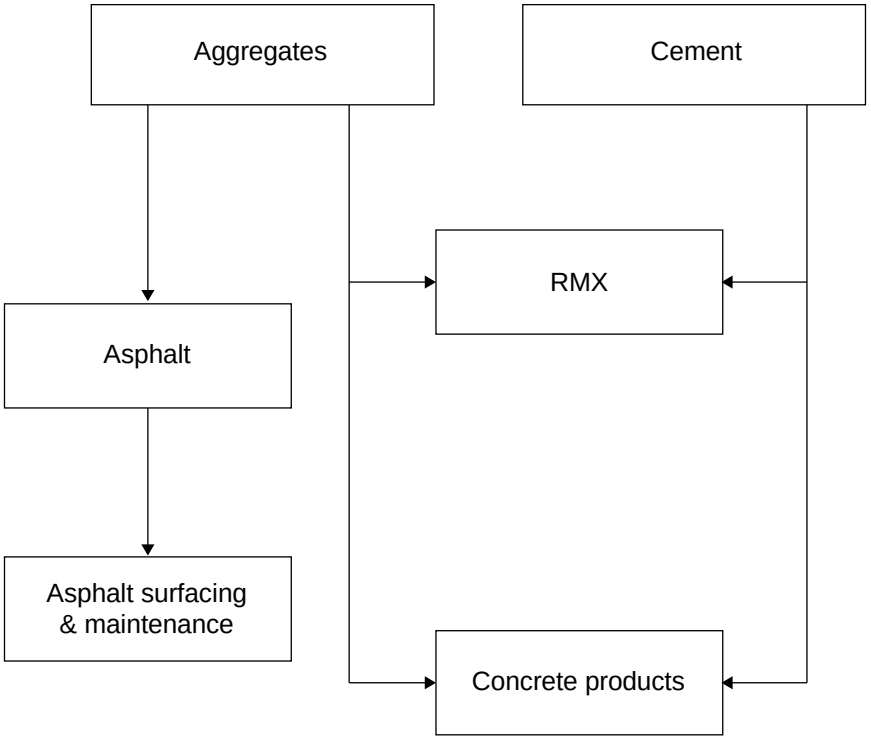
Summary of key relationships between products

2.24 As explained in paragraphs 2.20 and 2.22, cement is a key input into the production of RMX, and aggregates are key inputs into the production of both RMX and asphalt. The most significant input relationships for the purposes of our assessment of the proposed joint venture are summarized in Figure 1.

[20] CC calculations based on BDS Marketing Research Ltd (BDS) 2010 data. Figures add to more than 100 due to rounding.

FIGURE 1

Key construction material input relationships



Source: CC.

Supply structure in the UK

2.25 The production and supply of cement, aggregates, asphalt and RMX in the UK is characterized by the involvement of five vertically integrated companies with national coverage ('the majors') comprising (in alphabetical order):

(a) Aggregate Industries UK Ltd (Aggregate Industries)— the UK operations of Holcim Limited, a global building materials producer listed on the SIX Swiss stock exchange;

(b) Cemex UK Operations Limited (Cemex)¯the UK operations of Cemex SAB de CV, a global building materials company listed on the Mexican stock exchange;

(c) Hanson¯we use this term to refer to both the UK operations of Hanson and the operations of HeidelbergCement AG, Hanson's ultimate parent company, which is a global provider of building materials listed on a number of German stock exchanges;

(d) Lafarge Group (through its UK Cement and Aggregates & Concrete divisions); and

(e) Anglo American's Tarmac business.[21]

2.26 All the majors produce aggregates, asphalt and RMX in the UK and they all (with the exception of Aggregate Industries) produce cement in the UK. Cemex, Hanson, Lafarge and Tarmac are the only producers of cement in the UK.

Anglo American

2.27 Anglo American is a global mining and industrial business. As set out above, Anglo American will contribute to the proposed JV its Tarmac business (comprising Anglo Industrial Mineral Holdings Limited, Tarmac Group Limited and their respective subsidiaries[22]).

2.28 Anglo American is headquartered in London[23] with a primary listing on the London Stock Exchange[24] and a current market capitalization of around £38 billion. For its financial year ended 31 December 2010 (FY10), Anglo American reported total consolidated revenues of US$32.9 billion and an EBITDA[25] of US$12.0 billion.[26]

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[21] In this report, we use the term 'Tarmac' to refer to Anglo American's UK construction materials businesses which will be contributed to the proposed JV with Lafarge Group. Tarmac comprises Anglo Industrial Mineral Holdings Limited, Tarmac Group Limited and their respective subsidiaries. We use the term 'Tarmac Group' to refer to the international construction and heavy building materials operations of Anglo American, of which Tarmac is a part. (Our term 'Tarmac Group' should not be confused with Tarmac Group Limited, which is one of the holding companies that Anglo American will contribute to the proposed JV.)

[22] The two parent companies Tarmac Group Limited and Anglo Industrial Minerals Holdings Limited (both ultimately held by Anglo American) hold the group of companies being contributed to the proposed JV (ie Tarmac). They are holding companies with no commercial activities.

[23] www.angloamerican.com/about/ataglance.

[24] Anglo American has secondary listings on the Johannesburg Stock Exchange, the Swiss Exchange, the Botswana Stock Exchange and the Namibian Stock Exchange.

[25] Earnings before interest, tax, depreciation and amortization.

[26] Anglo American FY10 Annual Report.

The Anglo American business to be contributed to the proposed JV: Tarmac

2.29 Tarmac comprises Tarmac Group's entire UK operations with the exception of Tarmac Building Products Limited (TBP),[27] which is active in the production and sale of heavy building materials.[28] Anglo American will also contribute Tarmac Fleming Quarries Limited to the proposed joint venture, which has one mothballed aggregates quarry in the Republic of Ireland.

2.30 Tarmac is active in the production and sale of cement, aggregates, asphalt, RMX, and lime,[29] as well as providing services in asphalt surfacing and maintenance, and waste management. In FY10, Tarmac generated revenues of just over £1 billion, all of which was generated in the UK. Further details of Tarmac's financial performance are set out in Appendix B.

2.31 Tarmac has a number of JVs with third parties which will be transferred to the proposed JV with Lafarge Group (see Appendix C). Anglo American told us that these JV arrangements (including their current activities) were expected to transfer to the proposed JV with Lafarge Group unchanged.

2.32 Tarmac has around [✂] employees. During FY09, Tarmac reorganized itself into three main business divisions:

(a) Buxton Lime & Cement (BL&C), which is based in Buxton and has around [✂] employees. BL&C carries out Tarmac's cement, lime and HPL operations (see paragraph 2.18);

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[27] Whilst Tarmac and TBP are both part of the Tarmac Group, following an internal reorganization in FY09 Tarmac and TBP became stand-alone businesses and their shared services were separated.
[28] TBP's heavy building product activities include the production of mortar, concrete blocks, bagged aggregates, binding products, sports surfaces and foundry sands. Under the proposed JV arrangements, Tarmac, which [✂], will instead have a supply agreement in place with TBP (which will continue to apply in respect of the JV following the transaction) to ensure business continuity. Anglo American told us that it planned to divest its interest in TBP once an appropriate sale could be agreed.
[29] Lime (calcium oxide) is made by heating limestone (calcium carbonate) in a kiln at about 1,000ºC. It is used among other things in iron and steel manufacture, the production of construction materials (eg mortar and plaster), the food and drink industry and in water treatment. We found that there was no material overlap between Tarmac and Lafarge in either the production or supply of lime in the UK, given that Lafarge had no lime production activities in the UK and minimal activities in its sale.

(b) UK Regions, which has around [✂] employees and carries out Tarmac's activities in aggregates, asphalt and RMX, as well as recycling. UK Regions is further divided into four multi-product operating regions: Central, North & Scotland, South East, and West regions; and

(c) National Contracting, which has around [✂] employees and provides asphalt surfacing and maintenance activities across the UK.

Tarmac's cement operations

2.33 Tarmac's cement operations are carried out by its BL&C division, which has one quarry and cement plant located in Tunstead, Derbyshire, with an annual production capacity of around [✂].

2.34 BL&C [✂] has [✂] depots (at [✂]), to which cement is delivered by rail. The cement is then transferred to road bulk tankers for onward distribution by road, as required.

2.35 In FY10 BL&C's production activities were as follows: chemical stone [✂], cement [✂], lime [✂] and limestone powders [✂].[30] In addition, BL&C produces some limestone aggregates for construction purposes which are subsequently sold to external customers by the Tarmac Central region (part of the UK Regions division).

2.36 Tarmac produces and supplies two grades of bulk grey cement: CEM I and CEM II, [✂].

2.37 Based on its total cement production of [✂] in FY10:

(a) [✂] went to Tarmac's downstream RMX operations;

(b) [✂] was sold externally; and

[30] Chemical stone and limestone powders are both forms of HPL.

(c) [✂] went to TBP.[31]

2.38 Appendix D, Figure 1, provides further details of the flows of internally-produced and externally-purchased cement into Tarmac's downstream operations. Among other sources of externally produced cement, Tarmac receives cement 'under a contractual swap arrangement with [✂]', whereby Tarmac supplies cement to [✂] plants in the [✂] of England and [✂] supplies a corresponding volume to Tarmac's plants in the [✂] of England.

2.39 [✂] Tarmac sources its GGBS requirement [✂] from [✂], which is the only source of UK-produced GGBS. [✂] produces GGBS by grinding the granulated slag supplied to it by [✂].[32,33] In FY10, Tarmac purchased [✂].

2.40 Tarmac does not have any JV or partnership arrangements in relation to its cement activities.

Tarmac's aggregates operations

2.41 Tarmac produces and supplies land-based primary aggregates (ie sand, gravel and crushed rock), from its 105 aggregates quarries[34] in the UK. Tarmac operates a dredging business around the UK coast and owns four dredgers for the extraction of primary aggregates from the seabed (known as marine aggregates). These dredged marine aggregates are then offloaded on to wharves (and harbours) for further

[31] [✂]
[32] [✂]
[33] [✂]
[34] Quarrying operations involve not only the extraction of material from the ground but also the crushing and screening processes that make the quarried material suitable for onward use.

processing and/or onward sale. Tarmac also operates 38 recycling and secondary aggregates sites, as well as a small number of railheads (or rail-fed depots).[35]

2.42 In FY10, Tarmac's total aggregates production was [✂],[36] of which [✂] were sold externally, with the remaining [✂] sold internally to Tarmac's various downstream operations, and TBP,[37] as follows:[38]

(a) [✂] went to Tarmac's asphalt operations;

(b) [✂] went to Tarmac's RMX operations;

(c) [✂] went to TBP; and

(d) [✂] went to Tarmac's cement operations (ie BL&C).

2.43 Appendix D, Figure 1, provides further details of the flows of internally-produced and externally-purchased aggregates into Tarmac's downstream operations.

2.44 Tarmac has [✂] JVs or partnership arrangements which produce and/or supply aggregates.[39] Many of these JVs are with the other majors, which are also key competitors of Tarmac in the supply of aggregates in the UK. Further details of these JVs are set out in Appendix C. Anglo American told us that these arrangements 'enable Tarmac to share the fixed cost investment required for the extraction and production of aggregates'.

Tarmac's asphalt operations

2.45 Tarmac operates [✂] fixed[40] asphalt production sites.

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[35] Railheads can be inward or outward. Inward railheads receive aggregates from nearby quarries for onward distribution by rail to outward railheads. Aggregates received at outward railheads are primarily for internal downstream uses either on site or at nearby locations, but in some more limited cases they are used for further external distribution to the point of demand by road.
[36] [✂]
[37] We define internal transactions as any transaction taking place: *(a)* between Tarmac's own operations, or *(b)* between Tarmac's operations and its JVs; and *(c)* between Tarmac and any Tarmac Group or Anglo American company, eg TBP.
[38] Due to rounding and sales between Tarmac entities, percentage figures do not add up to 100 per cent.
[39] In addition, Tarmac has a partnership with Hanson for an aggregates storage facility at King's Cross, London.
[40] [✂]

2.46 Tarmac has in the past also used mobile asphalt plants[41] on occasion. [✂]

2.47 For the production of asphalt, whilst Tarmac sources all of its bitumen requirements from external suppliers, in FY10 around [✂] per cent of aggregates inputs were sourced internally from Tarmac's own aggregates operations (ie in total Tarmac used [✂] of aggregates for asphalt production of which [✂] were sourced internally—see Appendix D, Figure 1).

2.48 In FY10, Tarmac's asphalt operations produced [✂] of asphalt, of which [✂] was sold externally and [✂] was sold internally to Tarmac's National Contracting division.

2.49 In FY10, Tarmac's National Contracting division used a total of [✂] of asphalt for its road surfacing activities, of which [✂] was sourced from Tarmac's own asphalt operations, and [✂] was sourced from external suppliers. [✂]

2.50 Tarmac has several JV/partnership arrangements with Lafarge in relation to asphalt (see Appendix C).

Tarmac's RMX operations

2.51 Tarmac operates [✂] fixed RMX plants,[42] including one plant which is located on the site of a pre-cast concrete product producer that is dedicated to supplying this customer.

2.52 In FY10, Tarmac sold around [✂] cubic metres of RMX, with around [✂] per cent of RMX sales to external customers (see also Appendix D, Figure 1). Deliveries by

[41] Unlike a fixed asphalt plant, which is a fixed processing plant located at a quarry, depot or stand-alone site, a mobile asphalt plant is a processing plant which can be moved to a job or contract site for the period of the contract.
[42] The sites listed include some which are mothballed.

Tarmac from its RMX plants are made using RMX trucks[43] and minimix trucks (which have around half the capacity of RMX trucks).

2.53 For its production of RMX, Tarmac sourced around [✂] per cent of its entire aggregates requirement from its own aggregates operations in FY10 (ie Tarmac's total aggregate requirement was [✂], with [✂] being sourced internally). Tarmac's RMX operations required [✂] of cement in total in FY10, of which [✂] was sourced internally from Tarmac's BL&C division, and the remaining [✂] from external suppliers, namely [✂]. The flow of internally and externally sourced aggregates and cement into Tarmac's RMX business are shown in more detail in Appendix D, Figure 1.

2.54 Tarmac's [✂] JV in relation to RMX is described in Appendix C.

Lafarge Group

2.55 Lafarge Group is a multinational producer and supplier of construction and building materials, focusing on cement, aggregates, concrete and gypsum. Lafarge Group is the ultimate parent company of Lafarge's UK construction materials businesses which will be contributed to the proposed JV.

2.56 Lafarge Group is headquartered in Paris and listed on the Paris Stock Exchange with a current market capitalization of around €9 billion. In FY10, Lafarge Group reported total consolidated revenues of €16.2 billion and EBITDA of €3.6 billion.

2.57 Lafarge Group manages its global operations along three business divisional lines:

(a) Cement (60 per cent of Lafarge Group's consolidated FY10 revenues);

(b) Aggregates & Concrete (31 per cent of FY10 revenues); and

[43] [✂] volumetric trucks, which are vehicles that can carry aggregates, cement and water in separate compartments to the customer's site and mix the concrete on-site.

(c) Gypsum (9 per cent of FY10 revenues).[44]

The Lafarge Group business to be contributed to the proposed JV: Lafarge

2.58 Lafarge Group will contribute its UK Cement and Aggregates & Concrete divisions to the proposed JV, together with a small number of its other UK entities, which are not active in the production and sale of construction materials (together, Lafarge).[45] In FY10, Lafarge generated total revenues of around €920 million (around 6 per cent of Lafarge Group's total consolidated revenues). Further details of Lafarge's financial performance are set out in Appendix B.

2.59 Lafarge operates its Cement and Aggregates & Concrete Divisions in the UK through two wholly-owned trading subsidiaries:

(a) Lafarge Cement UK plc's UK operations (the UK Cement division), which produces and supplies cement; and

(b) Lafarge Aggregates Limited (the UK Aggregates & Concrete division), which conducts the business of all its UK operations in aggregates, asphalt, RMX, and road contracting and waste disposal services.

2.60 The following Lafarge Group interests, which include activities in the construction materials sector, will not be contributed to the proposed JV:

(a) the UK Gypsum division[46] and its UK businesses which are active in the production of anhydrite binders and suspended ceilings;[47] and

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[44] Gypsum (calcium sulphate) is used in a wide variety of industrial applications, including in the production of plaster and plasterboard. Following its announcement in April 2011 of plans to sell its gypsum division, Lafarge Group completed the sale of its Asian and Australian gypsum businesses in July 2011, and combined its European and South American gypsum businesses (which in Lafarge's case includes Lafarge Group's UK Gypsum division) with those of Etex Group SA, with Lafarge Group retaining a 20 per cent stake in the combined entity. Lafarge Group has a mandatory holding period of five years for its 20 per cent stake, after which it has an option to sell its stake to Etex Group SA.

[45] These are: *(a)* Island Barn Aggregates Limited (a JV), which will no longer be active in construction materials following an exhaustion of reserves during 2010); *(b)* Blue Circle Ebbsfleet Limited and Blue Circle Properties Limited, which are purely investment or property holding companies; *(c)* Hertfordshire Road Maintenance Limited, which is not active in construction materials; and *(d)* LAL-GRS Limited (a [✂] JV between GRS (Roadstone) Limited and Lafarge Aggregates Limited), which is active in inert waste disposal.

[46] The UK Gypsum division is operated through the Lafarge Plasterboard Limited subsidiary.

[47] These businesses were contributed to the separate unrelated transaction described in the footnote to paragraph 2.57.

(b) the freehold interests in Lafarge Group's Medway Greenfield site in Kent, which has received planning consent for a new cement plant. Lafarge Group will instead grant the proposed JV entity a [✂] option to enter into a lease agreement to develop and use the Medway site; and

(c) As part of the proposed transaction, all non-UK subsidiaries owned by Lafarge[48] will be transferred to Lafarge Group.

2.61 Lafarge has around 2,800 employees in total, of which shared support services account for around 180 staff.[49] The UK Cement division has 1,047 employees and the UK Aggregates & Concrete division has 1,580 employees and is further divided into three business units: Aggregates, Asphalt & Contracting and RMX.

Lafarge's cement operations

2.62 In Great Britain, Lafarge operates four cement plants (Hope, Cauldon, Dunbar and Aberthaw),[50] 12 cement depots[51] and two cement import terminals.[52] In Northern Ireland, Lafarge operates one cement plant (Cookstown) and one depot. Lafarge told us that its UK cement plants had an annual production capacity of around 4.5Mt. Lafarge produces both CEM I and CEM II for bulk cement sales[53] and largely CEM II for its bagged cement sales. Lafarge does not produce lime, and only acts as a re-seller for a small amount of bagged lime that it purchases from various third parties.

2.63 In FY10, Lafarge's Cement division sold [✂] of cement, of which [✂] was accounted for by external sales and [✂] by internal sales.

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[48] Lafarge Cement UK plc legally holds certain Malaysian and Nigerian subsidiaries.
[49] Based on Lafarge's total employees of 2,800 less the 970 and 1,250 employees at its two divisions.
[50] Lafarge's cement plants are located on the site where the key raw materials (limestone and shale) are extracted, and then processed to form clinker and then cement. These plants also have facilities to store, blend, pack and dispatch cement. In addition, Lafarge has a cement plant at Barnstone that does not have its own kiln, but instead uses raw materials from Lafarge's other cement plants to produce value-added cement products.
[51] Most of Lafarge's depots (cement storage and dispatch points) have a rail connection to receive cement from the plant to the depot, but can also be supplied with cement by road tankers and by boat (depending on the depot's location).
[52] A cement import terminal imports finished cement products (received by vessels with a capacity of up to 20Kt) and supplies customers directly. Import terminals can have facilities for storing, blending, packing and dispatching cement.
[53] In FY10, around 60 per cent of Lafarge's total bulk sales were CEM I and around 70 per cent of Lafarge's external bulk sales were CEM I.

2.64 For the production of blended (ie non-CEM I) cement:

(a) Lafarge imports a maximum of around [✂] each year of GGBS under a short-term contract with [✂], which is based in [✂].

(b) Lafarge purchases PFA through a variety of JVs, partnerships and supply agreements. In Scotland, Lafarge has a [✂] JV, ScotAsh, with ScottishPower,[54] which owns a power station from which ash is extracted and converted into PFA as an input into Lafarge's cement production at its Dunbar cement plant. Other arrangements in relation to PFA exist for South Wales and Nottinghamshire.[55]

2.65 Lafarge's partnership arrangements with third parties in relation to its cement operations are described in Appendix C.

Lafarge's aggregates operations

2.66 Lafarge operates 34 active aggregates quarries, three marine aggregates wharves, 13 depots and three aggregates recycling sites, with additional recycling activity taking place on an occasional basis at Lafarge quarries and depots. Together, these operations produce around [✂] of aggregates a year. Lafarge's aggregates operations primarily engage in the extraction of minerals and the production of crushed rock,[56] sand and gravel, but also involve other activities including landfill[57] and recycling operations, which process waste materials to produce recycled aggregates for sale to customers. Lafarge does not produce any secondary aggregates.

2.67 In FY10, internal sales of aggregates to Lafarge's own downstream RMX operations accounted for [✂] per cent of aggregates revenues, and internal sales to its down-

[54] www.scotash.com/about_scotash.html.
[55] Lafarge has a supply agreement with RWE to supply ash to its Aberthaw cement plant (South Wales); and a [✂] JV with Cemex at EDF's power stations (Nottinghamshire).
[56] Crushed rock includes granite and limestone, as well as high PSV, which is mainly sold to its asphalt operations.
[57] Waste and landfill sites are usually located within a quarry. Materials are transported to and deposited in the void space created by the quarrying operation.

stream asphalt operations accounted for [✂] per cent of aggregates revenues, with the balance largely accounted for by external sales. See also Appendix D, Figure 2.

2.68 Lafarge has several JV or partnership arrangements in place in relation to aggregates (see Appendix C).

2.69 Lafarge Group also has a 48 per cent stake in Carrières de la Vallée Heureuse, an aggregates producer in northern France, which exports aggregates (around 50Kt to 100Kt a year) to the UK. This stake will not be contributed by Lafarge Group to the proposed JV.

Lafarge's asphalt operations

2.70 Lafarge currently operates 15 fixed asphalt plant sites and owns three mobile[58] asphalt plants.

2.71 Lafarge estimated that in FY09, its asphalt plants sourced around [✂] per cent of their aggregates needs internally (excluding those aggregates sourced from Lafarge's JVs). See also Appendix D, Figure 2.

2.72 Details of Lafarge's JVs and partnership arrangements in relation to asphalt are set out in Appendix C.

Lafarge's RMX operations

2.73 Lafarge currently has 92 active fixed RMX plants, and two additional RMX plants which are located on the sites of pre-cast concrete producers dedicated to supplying those customers. Lafarge also operates five mobile RMX plants. In addition, Lafarge operates three local minimix businesses serving the Midlands, the North-East and

[58] Lafarge's mobile plants are used from time to time on airfield contracts or major projects.

Manchester, Leicester and Nottingham, which supply RMX in minimix trucks to local customers.

2.74 Lafarge sells around [✂] cubic metres of RMX a year, with revenues largely from external sales, with a small amount of internal sales to its asphalt paving business.

2.75 During FY10, Lafarge's RMX plants sourced their aggregates and cement requirements mainly from Lafarge's own upstream operations ([✂] per cent and [✂] per cent of total requirements respectively).

2.76 Lafarge has no JVs[59] or partnership arrangements in respect of its RMX production activities.

3. The merger and the relevant merger situation

Outline of merger situation

3.1 As set out in paragraphs 2.29 to 2.54 and 2.58 to 2.76, Anglo American's and Lafarge Group's UK activities in aggregates, asphalt, RMX, cement, waste management and asphalt surfacing will be contributed to the proposed JV. Excluded from the proposed JV are Anglo American's UK activities in building products (ie its TBP subsidiary), and Lafarge Group's UK activities in gypsum (ie plaster, plasterboard, plaster blocks and joint compounds).[60] The pro forma FY10 revenues for the proposed JV are around £2 billion with EBITDA of around £210 million.

3.2 Anglo American and Lafarge Group will each hold a 50 per cent stake in the pro JV's share capital.

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[59] [✂]

[60] Lafarge Group has announced plans to sell Lafarge Plasterboard Limited and Lafarge Gyvlon Limited to Etex Group SA. This will be executed through the combination of Lafarge Group's and Etex Group SA's European and South American gypsum businesses. Lafarge Group will retain a 20 per cent stake in the combined entity for a minimum five years.

3.3 A condition precedent for completion of the transaction is regulatory clearance from the relevant competition authorities. The main parties have stated that 'Both Lafarge UK and Tarmac UK operations will continue to operate independently until obtaining such approvals'.

3.4 Further details of the structure of the proposed JV are set out in Appendix E, along with an outline of the events leading up to the proposal to create the JV.

The rationale for the joint venture

Anglo American's rationale

3.5 Following an internal restructuring in October 2009 to streamline its management structure and focus on its core mining portfolio, Anglo American formed seven core business units: Platinum, Diamonds, Copper, Nickel, Iron Ore & Manganese, Metallurgical Coal and Thermal Coal. The restructuring also set in motion a planned divestment programme for a number of its non-core assets,[61] among them Tarmac Group, its international construction and heavy building materials arm, of which Tarmac (the business to be contributed to the proposed JV) is a part.

3.6 [✂]

3.7 Anglo American's strategy to dispose of its non-core international Tarmac Group businesses is documented in both its market announcements and internal documents. [✂]

Lafarge Group's rationale

3.8 In their joint Initial Submission, the main parties stated that 'Lafarge is seeking to expand its aggregates quarrying activities and its production of asphalt and RMX

[61] Anglo American's non-core assets together accounted for around 7 per cent of its consolidated FY10 EBITDA.

within the UK', and therefore the proposed JV 'will provide an opportunity for Lafarge to expand its geographic footprint in an important area for its business, to expand the sale of its research-driven products through the wider distribution base and achieve logistical efficiencies'. Lafarge Group also stated that the proposed JV would provide an opportunity to 'achieve significant cost synergies' and [✂].

3.9 The proposed JV also [✂]. We do not consider that such a development ([✂]) would materially alter our assessment of the effect of the proposed JV on competition, because the competition assessment would be the same [✂].

3.10 [✂] Lafarge also told us that the significant growth in size and geographical reach of the JV entity's RMX business compared to Lafarge at present would create additional distribution channels for Lafarge's value-added RMX products (for example, self-levelling RMX). An internal Lafarge Group document described the transaction as a [✂].

3.11 The main parties told us that the proposed JV would bring together two broadly complementary businesses, which would:

(a) enable the main parties to realize synergy benefits; and

(b) allow the proposed JV to be more efficient and competitive than the main parties on an individual basis. [✂]

3.12 Further details of the main parties' estimates of the synergy benefits arising from the proposed JV are set out in Appendix E.

Jurisdiction

3.13 Under section 36(1)(a) of the Act, and pursuant to our terms of reference (see Appendix A), we are required to investigate and report on whether arrangements are

in progress or in contemplation which, if carried into effect, will result in the creation of a relevant merger situation as defined by the Act.

3.14 Section 23 provides that a relevant merger situation is created if:

(a) two or more enterprises have ceased to be distinct within the statutory period for reference; and

(b) if either the share of supply test or the turnover test specified in that section of the Act is satisfied.

3.15 We are satisfied that each of the businesses that Anglo American and Lafarge intend to contribute to this proposed JV constitutes an enterprise for the purposes of the Act.

3.16 Enterprises will 'cease to be distinct' if they are brought under common ownership or control (section 26 of the Act). In the case of this JV, each of the main parties will hold 50 per cent of the ordinary share capital and will have equal representation on its board of directors. Therefore the enterprises forming the joint venture will cease to be distinct and Anglo American and Lafarge together will enjoy common ownership and control of the combined enterprises.

3.17 The share of supply test in section 23(3) is met if, as a result of the JV, the enterprises ceasing to be distinct have a share of supply of goods or services of any description in the UK, or in a substantial part of the UK, of at least one-quarter, or if one of the enterprises already supplied at least one-quarter, it must have increased its share as a result of the joint venture.

3.18 Tarmac and Lafarge both supply cement, aggregates, RMX and asphalt, and a number of specific subcategories of aggregates. According to figures provided by the

main parties (based on their own data, BDS data and the main parties' estimates), in bulk cement on a national basis, Lafarge's share of supply in 2010 was [✂] per cent and Tarmac's share of supply was [✂] per cent; Tarmac had a national share of supply of asphalt of [✂] per cent in 2010 with Lafarge holding a share of [✂] per cent; and national shares for RMX in 2010 amounted to [✂] per cent for Tarmac and [✂] per cent for Lafarge. As such, the JV entity would have increased shares of supply nationally in bulk cement, asphalt and RMX compared with Tarmac and Lafarge, and its shares of supply would be greater than one-quarter in relation to each of these products.

3.19 We therefore concluded that the proposed JV would result in the creation of a relevant merger situation pursuant to section 23(1) of the Act.

4. The counterfactual

4.1 We considered what was likely to have happened in the absence of the merger ('the counterfactual'). The CC's merger assessment guidelines[62] (the Guidelines) state that, in assessing the counterfactual, events or circumstances and their consequences should be foreseeable.[63] Furthermore, in making a judgement on the likely counterfactual, several possible scenarios may be examined, but only the most likely scenario will be selected as the counterfactual.[64]

4.2 In this section, we set out our assessment of Anglo American's and Lafarge Group's plans for the businesses they intend to contribute to the JV, had the JV not been proposed.

[62] Merger Assessment Guidelines, CC2, www.competition-commission.org.uk/our_role/ms_and_fm/pdf/100916_merger_assessment_guidelines.pdf.
[63] The Guidelines, paragraph 4.3.2.
[64] The Guidelines, paragraph 4.3.6.

Anglo American's plans for Tarmac absent the proposed JV

4.3 Anglo American told us that, since the announcement of its intention to dispose of Tarmac in 2007, it had been considering various exit options. [✂]

4.4 [✂]

4.5 [✂]

4.6 Further details of Anglo American's plans for Tarmac absent the proposed JV are set out in Appendix F.

Lafarge Group's plans for Lafarge absent the proposed JV

4.7 In its JV press release announcement, Lafarge Group stated that the proposed JV 'illustrates [Lafarge Group's] strong commitment to the UK market'. There was no evidence to suggest that Lafarge would have pursued another major JV or acquisition to rebalance its product portfolio absent the proposed JV.

4.8 Lafarge Group's Medway Greenfield site[65] in Kent has the benefit of planning permission dating back to November 2001 for the winning and working of minerals comprising chalk, chalk marl and clay from the quarry and construction of a new 1.4Mt cement plant. Further details of Lafarge's plans for this site are set out in Appendix F.

[65] The Medway site will not be contributed to the JV. However, Lafarge Group will grant a [✂] option for the JV to enter into a lease agreement for the Medway site, [✂].

Our conclusions on the counterfactual

4.9 [✂], we considered that for the foreseeable future, Tarmac would remain under Anglo American's ownership.[66] This is because market conditions (in both the credit and the relevant product markets) do not appear to have improved significantly since [✂] to allow Anglo American to dispose of Tarmac on terms it would been likely to find favourable. Further, in their joint Initial Submission, the main parties stated that, based on production forecasts to 2014, difficult market conditions were expected to continue for each of their aggregates, asphalt, RMX and cement product categories.

4.10 We did not consider that Anglo American's potential expansion plans at Tunstead were sufficiently certain or near-term to form part of an appropriate and foreseeable counterfactual, given the lead time to bring the second kiln into operation and the prevailing market conditions.

4.11 We found no evidence that Lafarge Group was seeking an alternative JV or major acquisition absent the proposed JV and we noted [✂]. Therefore, absent the proposed JV, we expected the prevailing pre-merger conditions for Lafarge to continue.

4.12 In addition, we considered it unlikely that Lafarge would proceed with building a new cement plant at its Medway site in the absence of the proposed JV, given prevailing market conditions and the capital outlay required.

4.13 In light of paragraphs 4.9 to 4.12, we therefore concluded that, had the proposed JV not been proposed, the prevailing competition between Tarmac and Lafarge would be likely to continue largely unchanged.

[66] Even if Anglo American had been able to sell Tarmac, the structure of the market would remain unchanged if the purchaser were not an existing competitor in the UK construction materials market.

5. Market definition

5.1 The Guidelines state that the purpose of market definition in a merger inquiry is to provide a framework for the analysis of the competitive effects of the merger.[67] The Guidelines go on to state that the CC will identify the market within which the merger may give rise to an SLC (the relevant market). In defining the relevant market, we will aim to include the most relevant constraints on behaviour of the merger firms. The Guidelines explain that, in assessing whether a merger may give rise to an SLC, the CC may take into account constraints outside the relevant market, segmentation within the relevant market, or other ways in which some constraints are more important than others.[68]

5.2 The Guidelines also note that, in practice, the analysis leading to the identification of the market or markets and assessment of competitive effects will overlap, with many of the factors affecting market definition being relevant to the assessment of competitive effects and vice versa.[69] Market definition and the assessment of competitive effects should not be viewed as two distinct analyses.

5.3 In this section we identify the relevant markets in which we have assessed the effects of the proposed JV and the reasons why we have identified those markets. We also signpost where we have addressed certain issues in our competitive assessment rather than in the context of market definition. These issues have been considered as part of our competitive assessment rather than as part of our analysis of market definition to the extent that we have considered this to be more appropriate and given that the Guidelines do not view these as distinct types of analysis.

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[67] The Guidelines, paragraph 5.2.1.
[68] The Guidelines, paragraph 5.2.2.
[69] The Guidelines, paragraph 5.1.1.

5.4 In accordance with the Guidelines,[70] we will define the relevant product markets with reference in particular to demand-side substitution (ie the ability and willingness of customers to switch to other products). The starting point of the analysis of substitution will be the products which the JV partners both produce ie the overlap products (see paragraph 2.2). We will then assess whether it is appropriate to consider wider or narrower markets around these overlap products.[71] In this analysis, we may also take into account supply-side substitution to the extent that:

(a) suppliers may easily and quickly shift production between products; and

(b) the same suppliers compete to supply the products concerned and the conditions of competition are the same for each product.[72]

5.5 We will consider the geographic extent of the relevant product markets we identify in our competitive assessment.

The relevant product markets for cement

5.6 In order to define the relevant product market(s) for cement, we considered the extent of demand- and supply-side substitutability between:

(a) different types of (bulk) cement;

(b) different forms of packaging of cement (ie bulk cement and bagged cement); and

(c) domestically-produced and imported cement.

Substitutability between types of (bulk) cement

5.7 The main parties told us that there was a single relevant market for all types of grey cement.

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[70] The Guidelines, paragraphs 5.2.6, 5.2.7 & 5.2.17.
[71] The Guidelines, paragraph 5.2.11.
[72] The Guidelines, paragraph 5.2.17.

5.8 We investigated the extent to which CEM II and CEM III were substitutes for CEM I, with a focus on bulk cement.[73] In particular, we assessed the evidence regarding:

(a) whether and to what extent customers were able and willing to switch between CEM I and blended cements in response to price changes;

(b) whether some customer groups, defined in terms of the applications for which cement is used, were more 'locked in' to the use of CEM I as opposed to blended cements than others. If this were the case (and if suppliers could target different prices at different customers), we might have needed to consider the existence of different competitive constraints for different groups of customers; and

(c) the degree of supply-side substitution between cement types.

5.9 We took into account evidence from the main parties, third parties and our survey (see full evidence in Appendix G).

5.10 We found that there was a degree of demand-side substitutability between cement types, but that the ability and willingness of customers to switch from CEM I to other types of cement differed depending on the application (being, for example, higher for RMX producers).

5.11 In relation to supply-side substitution, we found that:

(a) Cement producers appeared to have different abilities to source the various cementitious products which are required to produce CEM II and CEM III. In particular, PFA appeared to be more accessible than GGBS, in that there was only one ultimate source of UK-produced GGBS while there were multiple sources of UK-produced PFA. The conditions of competition in the supply of different types of cement were therefore likely to be different.

[73] We examine the distinction between bulk and bagged cement in paragraphs 5.13 to 5.15 of our market definition analysis.

(b) Subject to point *(a)*, and provided that the required facilities were in place, producers appeared to be able to easily switch the production from CEM I to other types of cement.

5.12 We concluded that, for the purposes of assessing the proposed JV, all types of (bulk) cement formed part of the same relevant product market. However, we also noted that: *(a)* CEM I was the main input for the production of the other types of cement; and *(b)* the ability and willingness of customers to switch from CEM I to other types of cement appeared to differ depending on the application. Therefore, in the competitive assessment, we also considered the competitive constraints arising for CEM I separately.

Substitutability between bulk and bagged cement

5.13 The main parties told us that, while there was a degree of supply-side substitutability between bulk and bagged cement (with most suppliers having the equipment in place to supply both forms and the ability to switch relatively quickly), from a demand-side perspective substitutability was limited. Consequently, the main parties considered that it was appropriate to distinguish between bulk and bagged cement.

5.14 We took into account evidence from the main parties and third parties (see full evidence in Appendix G).

5.15 We found that there was very little, if any, demand-side substitutability between bulk and bagged cement. Overall, on the basis of a lack of demand-side substitutability, we found that, for the purposes of assessing the proposed JV, bulk and bagged cement belonged to different relevant product markets.

Substitutability between domestically-produced and imported cement

5.16 The main parties told us that no distinction should be made between imported and domestically-produced cement as, from a demand-side perspective, the two sources were fully substitutable and competed directly with each other.

5.17 We examined the extent to which domestically-produced and imported cement were substitutes for each other. Given that the majority of imported cement is bulk cement, we focused on the constraints placed by imported bulk cement on domestic bulk cement rather than on bagged cement.[74] We assessed whether customers were able and willing to switch between imported and domestically-produced cement in relation to the quality of the product and the reliability and security of its supply.[75]

5.18 We took into account evidence from the main parties, third parties and our survey (see Appendix G for full evidence).

5.19 We found that, in relation to the proposed JV, it was not appropriate to segment the relevant product market into domestic and imported cement on the basis of quality or security of supply differences. However, we also noted that price differences and availability of imports in certain geographic markets might limit the competitive constraints exerted by imported cement on domestically-produced cement. We will consider these constraints in the competitive assessment.

The relevant product markets for cement: conclusions

5.20 We concluded that the relevant cement product markets for the purposes of assessing the proposed JV were:

[74] The main parties told us that imports of grey cement were typically (although not always) transported in bulk form in cargo ships. From the import terminal, cement would then be distributed to customers in bulk form or packed into bags at the import terminal.
[75] The ability and willingness of customers to switch between imported and domestically-produced cement depending on the relative prices of the two products (and customers' locations) is analysed in our competitive assessment.

(a) the market for the supply of bulk cement (which includes all types of cement as well as domestically-produced and imported cement); and

(b) the market for the supply of bagged cement (which includes all types of cement as well as domestically-produced and imported cement).

5.21 However, we recognized that differing constraints might characterize different products within these markets (see paragraphs 5.12 and 5.19). We will consider these constraints in the competitive assessment.

The relevant product markets for aggregates

5.22 As set out in paragraphs 2.17 and 2.18, aggregates may be divided into two high-level categories based on their end-use, namely aggregates used in construction applications and aggregates used in specialist applications. We considered these two categories to be sufficiently distinct from each other so that it was appropriate to conduct our product market analysis separately for each of them. In particular, aggregates used for construction applications cannot generally be substituted for aggregates used in specialist applications on either the demand or the supply side.

Aggregates used in construction applications

5.23 We examined whether different types of aggregates used for construction applications ('construction aggregates') are part of the same relevant product market. We reviewed evidence from the main parties, third parties, market data and our survey on the extent to which:

(a) secondary and recycled aggregates were substitutes for primary aggregates;

(b) crushed rock aggregates and sand and gravel aggregates were substitutes; and

(c) different grades of aggregates were substitutes for each other.

5.24 There are specific requirements for aggregates used in each of the four sub-categories of construction application set out in paragraph 2.17 (ie general construction uses, the production of RMX, the production of other concrete products and the production of asphalt). Therefore we considered that the degree of substitution between different types and different grades of aggregate was likely to vary depending on the application, and that the evidence on substitutability should be assessed separately for each application.

Demand-side substitutability between primary and secondary/recycled aggregates

5.25 The main parties submitted that there was a single product market for construction aggregates which included primary, secondary and recycled aggregates. Appendix G sets out the full evidence we took into account in assessing the degree of demand-side substitutability between primary and secondary/recycled aggregates, which came from the main parties, third parties and our survey, as well as market data.[76]

5.26 Taking all the evidence together, we found that:

(a) Aggregate input requirements varied significantly across applications.

(b) There had been some switching from primary to secondary and recycled aggregates, as evidenced by the decline in the share of primary relative to secondary/recycled aggregates and our survey results, but switching appeared to have levelled off since 2008.

(c) There appeared to be more scope for switching to recycled and secondary aggregates for general construction uses than for RMX production and for asphalt production. For general construction uses, there is a high (slightly less than 50 per cent) penetration of secondary and recycled aggregates. Our survey confirmed that about half of aggregate customers (other than RMX and asphalt

[76] There is no scope for supply-side substitution from recycled and secondary aggregate production to primary aggregate production, so we did not consider this further.

producers) had switched from primary to recycled/secondary aggregates in the past three years (although our survey did not explore the proportions of volumes switched). However, our survey also suggested that the scope for further switching to secondary and recycled aggregates might be more limited: 73 per cent of aggregate customers, and 83 per cent of RMX competitors, said that they could not switch any purchases to secondary/recycled aggregates, or that they could switch only a quarter or less of their purchases.

5.27 On balance, we considered that, while recycled and secondary aggregates did to some extent constrain primary aggregates for some uses, these constraints were not sufficient for us to conclude that overall, primary, secondary and recycled aggregates were all in the same relevant product market. We therefore concluded that, in relation to the proposed JV, primary aggregates and secondary/recycled aggregates were in separate relevant product markets. However, we consider any competitive constraint posed by secondary/recycled aggregates on primary aggregates in our local competitive effects analysis (see paragraphs 6.6 to 6.27).

Demand-side substitutability between crushed rock and sand and gravel

5.28 We considered whether there were separate markets for crushed rock and sand and gravel aggregates.

5.29 As can be seen from the data in Appendix G, for some applications of construction aggregates (RMX production and concrete products production), crushed rock and sand and gravel aggregates are both used in substantial proportions. However, for other applications (asphalt production and general construction), crushed rock appears to be the main primary aggregate used. We therefore examined whether the

scope for demand-side substitution from crushed rock to sand and gravel might be limited for certain applications (and in particular asphalt production).[77]

5.30 The main parties submitted that crushed rock and sand and gravel aggregates were used interchangeably depending upon the grade required and local availability. We looked at the main parties' evidence alongside data from our survey and other available evidence (see full evidence in Appendix G).

5.31 We found that the scope for substitution between crushed rock and sand and gravel depended primarily on the application (though we noted that local availability of the products affected the proportion in which the different products were used in different regions to some extent). For asphalt production, there appeared to be very limited scope for substituting from crushed rock to sand and gravel aggregates. For RMX production, the two types of primary aggregates appeared to be used interchangeably in many cases.

5.32 On balance, we concluded that, in relation to the proposed JV, crushed rock and sand and gravel aggregates should be considered part of the same relevant product market for primary aggregates. However, in view of the limited substitutability between crushed rock and sand and gravel for certain applications (especially asphalt production), in the competitive assessment we consider the possible different competitive constraints arising for these two market segments, as well as specific products within these segments (see paragraphs 6.6 to 6.27).

Substitutability between grades

5.33 We considered evidence on whether different grades of primary aggregates were in the same relevant market.

[77] For geological reasons, there is limited scope for supply-side substitution between crushed rock and sand and gravel, so we did not consider it.

5.34 The main parties told us that, for market definition purposes, there should be no distinction between different grades of aggregate. We took into account evidence from the main parties, third parties and our survey in our assessment (see Appendix G).

5.35 All the evidence we received suggested that different grades were unlikely to be easily substitutable on the demand side. We therefore examined whether different grades (of the same type of primary aggregate) were supply-side substitutes. Supply-side substitutability depends on: *(a)* how easy and quick it is for producers to switch production from coarse to fine and from fine to coarse aggregates; and *(b)* whether the same suppliers compete to supply these products and the conditions of competition are the same for each product.

5.36 The evidence submitted to us on supply-side substitutability suggested that: *(a)* fine and coarse aggregates were not typically quarried separately and the production of one typically involved the production of the other, although the grade could vary; and *(b)* within an aggregate quarry there was some scope to switch production from coarse aggregates to fine aggregates, but this entailed additional costs. On balance, although supply-side substitution seemed to be constrained to some extent, we concluded that, in relation to the proposed JV, different grades of the same type of primary aggregate should be considered part of the same relevant product market.

Summary: product market definition for aggregates used in construction applications

5.37 We concluded that, for construction aggregates, the relevant product market in relation to the proposed JV is the market for the supply of primary aggregates (of all grades).

5.38 However, we recognized that differing constraints might characterize different products within this market and constraints might also arise from products outside this market. For this reason, in our competitive assessment we consider a market segmentation into crushed rock and sand and gravel and we consider specific products within these two segments. We also consider the possible constraints arising from secondary and recycled aggregates when available in a given geographic market (see paragraphs 6.6 to 6.27) and Appendix I.

Aggregates used in specialist applications

High PSV aggregates

5.39 In light of the lack of specific concerns about the effect of the proposed JV on competition in relation to this product (both in the OFT's reference decision and in evidence submitted to us), we have not undertaken any market definition analysis for high PSV aggregates at this point. High PSV aggregates are not considered further in this report.

Rail ballast

5.40 The main parties submitted that there was a separate product market for rail ballast. They noted, however, that rail ballast represented only a part of the output of the quarries from which it was produced, reflecting the multiple product grades that were necessarily produced at the same time. We examined evidence from the main parties and third parties (see Appendix G for a full discussion) and concluded that, in relation to the proposed JV, there was a separate relevant product market for the supply of rail ballast, which was distinct from all other (primary) aggregates.

High purity limestone

5.41 The main parties argued that HPL was a primary product, interchangeable for a number of different applications. In particular, the main parties did not consider that

HPL for FGD applications (see paragraph 2.18) represented a separate market from HPL for the other uses. Further details of the main parties' and third parties' views on HPL are set out in Appendix G.

5.42 In light of the evidence set out in Appendix G, we concluded that, on the basis of supply-side substitution considerations and in relation to the proposed JV, there was a separate relevant product market for the supply of HPL, which is distinct from all other (primary) aggregates. We recognized that the extent to which customers could switch between different grades of HPL depended on the specific application in which HPL was used, and that for FGD uses, in particular, the specification of the product was tight. We therefore consider in our competitive assessment whether the competitive constraints for this specific use of HPL are different (see paragraphs 6.50 to 6.76).

The relevant product market for asphalt

5.43 In order to define the relevant product market for asphalt, we assessed:

(a) whether asphalt produced at mobile plants was a substitute for asphalt produced at fixed plants; and

(b) whether asphalt produced at non-24/7 plants was a substitute for asphalt produced at 24/7 plants.

5.44 The main parties submitted that there was a single product market for the production and supply of asphalt.

5.45 Taking into account evidence from the main parties, third parties and our survey (see Appendix G), we concluded that, in relation to the proposed JV, it was appropriate to define a single relevant market for the supply of asphalt (produced either by fixed or

by mobile plants). We did not consider it appropriate to define a separate market for asphalt produced by 24/7 plants.

5.46 In relation to fixed and mobile asphalt plants, we noted that they appeared to serve different segments of the market (in terms of type and size of the project in which they were used, with mobile plants typically being used for large-volume highway, airfield or airport projects).

The relevant product market for RMX

5.47 In order to define the relevant product market for RMX, we assessed:

(a) whether RMX produced at site plants was a substitute for RMX produced at fixed plants; and

(b) whether RMX produced by volumetric trucks was a substitute for RMX produced by (fixed and site) plants.

5.48 The main parties submitted that there was a single relevant market for the supply of RMX.

5.49 Taking into account evidence from the main parties, third parties and our survey (see Appendix G), we concluded that, in relation to the proposed JV, it was appropriate to define a single product market for the supply of RMX (produced either by fixed or by site plants). On the basis of the evidence we examined, we did not consider it appropriate to include volumetric trucks in the definition of the relevant market but we consider competitive constraints from them in the competitive assessment (see paragraphs 6.84 to 6.90).

5.50 In relation to fixed and site RMX plants, we noted that they appeared to serve different segments of the market (in terms of the size of the project on which they are used, with site plants typically being typically used for large-volume projects).

5.51 In relation to volumetric trucks, we noted that not only did they appear to serve a different segment of the market (ie small-volume projects), but the product itself was likely to be (or was at least perceived to be) of a lower quality in terms of specification and strength. For this reason, we considered that volumetric trucks were likely to pose a limited constraint on RMX produced by fixed plants. Taking both these factors into account, we considered that, in relation to the proposed JV, volumetric trucks should not be included in the relevant market for the supply of RMX. However, as set out above, we consider the competitive constraints exerted by volumetric trucks in our competitive assessment.

Summary of conclusions on the relevant product markets

5.52 For the reasons set out in paragraphs 5.6 to 5.51, we concluded that the relevant markets for the purposes of our inquiry were:

(a) the supply of bulk cement;

(b) the supply of bagged cement;

(c) the supply of primary aggregates (of all grades) for construction applications;

(d) the supply of rail ballast;

(e) the supply of high purity limestone;

(f) the supply of asphalt (produced either by fixed or by mobile plants); and

(g) the supply of RMX (produced either by fixed or by site plants).

5.53 Paragraphs 5.12, 5.19, 5.38, 5.42 and 5.49 explain the segmentations within these markets that we consider to be appropriate, and how we take into account certain

constraints from outside these markets in our competitive assessment of the proposed JV.

6. Assessment of the competitive effects of the proposed JV

Theories of harm

6.1 The Guidelines explain theories of harm (TOH) as follows:[78]

> Theories of harm are drawn up by the Authorities to provide the framework for assessing the effects of a merger and whether or not it could lead to an SLC. They describe possible changes arising from the merger, any impact on rivalry and expected harm to customers as compared with the situation likely to arise without the merger ….

6.2 In our issues statement,[79] we identified four TOH, namely:

(a) 'Unilateral horizontal effects': loss of competition between Tarmac and Lafarge as a result of the proposed JV may enable the JV entity to increase prices, worsen quality or service levels and/or reduce capacity through plant closures (or moth-balling) in one or more of the relevant markets.

(b) 'Coordinated effects': in relation to any one or more of aggregates, asphalt, cement or RMX, the proposed JV may make any pre-existing coordination[80] between the majors more stable or effective, or, in the absence of pre-existing coordination, may create the conditions where such coordination is likely.

(c) 'Vertical effects arising from unilateral market power': the proposed JV may create or enhance vertical integration in certain local areas, such that the JV

[78] The Guidelines, paragraph 4.2.1.
[79] www.competition-commission.org.uk/our-work/anglo-american-lafarge/.
[80] Coordinated effects may arise when firms operating in the same market recognize that they are mutually interdependent and that they can reach a more profitable outcome if they coordinate to limit their rivalry. Coordination can be explicit or tacit.

entity has the ability and incentive to engage in partial or full input foreclosure[81] in certain local areas in relation to:

(i) cement sold to RMX-producing customers;

(ii) aggregates sold to RMX-producing customers; and/or

(iii) aggregates sold to asphalt-producing customers.

(d) 'Vertical effects arising from coordination': by making coordination between the majors likely to arise, or by making any such pre-existing coordination more effective, the proposed JV may result in partial or full input foreclosure in certain local areas in relation to:

(i) cement sold to RMX-producing customers;

(ii) aggregates sold to RMX-producing customers; and/or

(iii) aggregates sold to asphalt-producing customers.

6.3 In this section, we set out our analysis of these TOH.

Unilateral effects

Bulk cement

6.4 Given our provisional findings in relation to coordinated effects in the bulk cement market as a result of the proposed JV (see paragraphs 6.227 to 6.231), we have not concluded at this point whether the proposed JV would also give rise to unilateral effects in this market.

Bagged cement

6.5 Bulk cement is a key input into the production of bagged cement, and the effect of the proposed JV on competition in the bulk cement market is assessed in paragraphs 6.184 to 6.231. We found that Tarmac had a market share of only about [✂] per cent

[81] Full input foreclosure occurs when a supplier refuses to supply an input to customers which use that input to compete with it in downstream markets. Partial input foreclosure occurs when a supplier increases (to a greater extent than otherwise might be expected) the prices of an input to customers which use that input to compete with it in downstream markets. Input foreclosure would thus make it harder for rivals in downstream markets to compete.

in bagged cement, and therefore there was no material overlap between Tarmac and Lafarge in this market (see Appendix J). In light of these factors, we reached no conclusion on the effect of the proposed JV in the bagged cement market specifically as we considered that any concerns would be captured by our competitive assessment of the bulk cement market.

Primary aggregates for construction applications

6.6 In our competitive assessment we considered whether there might be unilateral effects as a result of the proposed JV in relation to primary aggregates for construction applications. As explained in paragraphs 5.37 and 5.38, we considered the primary aggregates market and market segmentations into crushed rock, sand and gravel and specific products within these two segments. We also considered the possible competitive constraints arising from secondary and recycled aggregates when available in a given geographic area.

6.7 We carried out a local competitive analysis as primary aggregates for construction applications are, on the whole, transported over relatively short distances. In order to determine the relevant distances, we carried out catchment area analysis, which identified the geographic area around plants within which those plants derived a large percentage of their business. Having established the relevant catchment areas, we then identified in which of these areas Tarmac and Lafarge plants overlapped (ie those areas in which there was both a Tarmac plant and a Lafarge plant) ('overlap areas'). We then used filters to identify in which of these overlap areas there might be competition problems ('possible problem areas'). In using filters, our goal was to capture possible problem areas, so we could focus our detailed competitive assessment on those areas. Our approach to filters was therefore conservative, for example we generally opted for thresholds for our filters that would result in fewer rather than more areas being filtered out. The final step in our unilateral effects assessment in

these markets was to analyse the competitive dynamics in each of the possible problem areas individually so as to decide in which of them there was likely to be a competition problem.

6.8 We carried out price-concentration analysis (PCA) as one piece of analysis (among others) to inform our view on whether the proposed JV was likely to lead to competition problems.[82] In the PCA, we estimated an econometric model based on market data. We then used the results from the estimated model to form predictions on market outcomes. Predicted outcomes are less reliable at data points which are somewhat atypical in the sample. Certain local areas, where, as a consequence of the JV, the number of different competitors within the catchment area would fall from three to two or from two to one, are relatively atypical in the aggregates data.[83] In such cases, we considered the PCA to be less informative. Therefore, in constructing our filters for the catchment areas analysis, we combined information from the PCA with information on the reduction in the number of competitors ('fascia reduction') (see paragraph 6.19).

PCA

6.9 The aim of the PCA was to determine the extent to which competition from rival sources of supply constrains the pricing of primary aggregates (the same analysis was also carried out for asphalt, bulk cement and RMX). Of particular interest is the extent to which Anglo American (Tarmac) and Lafarge presently constrain each other's pricing. The PCA methodology and results are described in more detail in Appendix H.

[82] As the PCA informed our decision on filters and possible problem areas, we discuss the PCA first.
[83] In the sample there is a small proportion of catchment areas that would, as a result of the proposed JV, experience a fascia reduction from two to one and from three to two.

6.10 In terms of the primary aggregate products considered, Lafarge's plants tend to have a negative effect on Tarmac's prices, ie a reduction in the number of Lafarge plants nearby leads to an increase in Tarmac's prices (we term this result 'negative effects' in what follows). The presence of other majors' plants nearby also tends to have a negative effect on the main party's prices: the effects are typically much weaker for Lafarge prices than for Tarmac prices. These negative effects are consistent with these companies constraining Tarmac's prices for some primary aggregates products. The effects were not observed for all primary aggregate products and there were a small number of counterintuitive results, where a reduction in nearby competitor plants would lead to a reduction in prices. Where we found negative effects, these were less than 0.5 per cent per nearby plant for most products. The negative effects were higher for two high-selling Tarmac crushed rock products—roadstone sub-base and graded (40mm max)—where negative effects on price were respectively 2 to 3 per cent per nearby plant and 1 to 2 per cent per nearby plant (in each case depending on whether or not there is also a Tarmac plant nearby, with the higher effect in each range being where there is a Tarmac plant nearby). The negative effects of Lafarge plants nearby on Tarmac's prices are consistent with a unilateral theory of harm. Since Lafarge's presence nearby currently appears to constrain Tarmac's pricing for a number of primary aggregates products, this analysis suggests that the disappearance of Lafarge as a competitor would be likely to lead to an increase in Tarmac's prices.

Catchment area analysis

6.11 Our catchment area analysis is described in more detail in Appendix I. We used the main parties' 2010 transactions data to calculate catchment areas. The radii of the catchment areas were the distances (in a straight line) within which 80 per cent of plants' external sales volumes were delivered. A figure of 80 per cent has been used

in a number of CC and OFT investigations.[84] Weighted average radii were calculated separately for Tarmac's urban and non-urban plants and for Lafarge's urban and non-urban plants. Separate calculations were done for primary aggregates, sand and gravel, crushed rock and all aggregates. We tested the sensitivity of these radii using sales volumes of 70 and 90 per cent. Table 2 shows the radii we used.

TABLE 2 **Radii of catchment areas for aggregates based on 80 per cent of sales, 2010**

miles

	Lafarge		*Tarmac*	
	Urban	*Non-urban*	*Urban*	*Non-urban*
Primary aggregates	[✂]	[✂]	[✂]	[✂]
Crushed rock	[✂]	[✂]	[✂]	[✂]
Sand and gravel	[✂]	[✂]	[✂]	[✂]
All aggregates	[✂]	[✂]	[✂]	[✂]

Source: CC calculations based on data provided by the main parties.

6.12 The main parties told us that different average delivery distances for Lafarge and Tarmac sites did not justify the application of different catchment areas. They argued that delivery distances were likely to be affected by 'network density effects', ie where a supplier had several sites in a given area, there was greater scope to supply the customer from the nearest site, hence a firm with a denser plant/site network would tend to deliver within shorter distances than a firm with a less dense network. The main parties said that this did not mean that rival competitors with a less dense network and plants located further away from certain customers could not exert a competitive constraint on suppliers located closer to those customers. The main parties indicated that the economically viable delivery distance for aggregates was typically around 30 miles.

6.13 The main parties made a similar point in relation to using different distances for urban and non-urban areas. They said that smaller distances for urban plants were likely to reflect the fact that these sites were located close to a source of demand as opposed

[84] *Commentary on retail mergers*, March 2011, OFT1305/CC2 com 2.

to some intrinsic difficulty in competing over greater distances. For instance, the source of demand was often in urban areas and so sites located in urban areas naturally had lower delivery distances. They said that the fact that a site based in an urban area typically had a delivery distance below that of a site based in a non-urban area did not mean that the urban site could not compete over the same distance as a non-urban site, and neither did it imply that a non-urban site would not constrain the urban site.

6.14 We did not agree that we should use the same average distance for both of the main parties and for all of their plants. First, averages can hide differences between suppliers and areas. As shown in Appendix I, the confidence intervals[85] around the mean radii of each of the main parties are fairly narrow, indicating little variation in the averages of individual sites of the main parties. This suggests that using averages for all the sites of each of the main parties is not misleading. Further, the differences in the averages for Tarmac and Lafarge and their associated confidence intervals suggest that it could have been misleading to combine the averages of Lafarge and Tarmac. Secondly, there are reasons to expect competition to take place over a shorter distance in urban areas due to slower travel speeds due to congestion. This can have an impact on costs for low-value products such as aggregates and can have an impact in other ways for asphalt and RMX as these products are perishable.

6.15 As explained in paragraph 6.7, we identified catchment areas where there were overlaps between the plants of the proposed JV.

6.16 We then considered filters which would identify overlap areas possibly giving rise to competition problems ('possible problem areas'). The methodology used for the

[85] A 95 per cent confidence interval is a range of values for a variable of interest that, if the sample were taken 100 times, in 95 cases the true estimate of the variable would lie within this range. The upper and lower levels are called the confidence limits.

construction of filters is aimed at reflecting the results of our PCA. It combines two approaches, which in turn use different filters. We decided to use filters based on the PCA results as they were based on empirical relationships we had identified between price and concentration.

6.17 We used different filters for the two crushed rock products (roadstone sub-base and graded 40mm max) where the PCA had found a negative price effect of about 1 per cent or more per nearby plant and for the products where it had found a price effect of less than 0.5 per cent per nearby plant or no price effect.

6.18 For the two Tarmac crushed rock products with price effects of 1 per cent or more per nearby plant, we identified as possible problem Tarmac/Lafarge plants those which were within 22.5-mile radii of customer locations where the customer had purchased roadstone sub-base (or graded 40mm max) in 2010, there was at least one Tarmac plant producing roadstone sub-base (or graded 40mm max) within the radius[86] and there was at least one Lafarge plant that produced crushed rock within the radius. These filters are referred to as 'PCA' filters in what follows.

6.19 For the products with a price effect of less than 0.5 per cent per nearby plant or no price effect, we identified possible problem areas, based on plant-centred catchment areas for primary aggregates and the crushed rock and sand and gravel segments, where there was a fascia reduction from two to one or from three to two or from four to three (where the fourth competitor's market share by production volume was lower than 5 per cent). We selected these changes in fascia count to take into account the possibility that the PCA would not capture the price effects resulting from a step change in competition—from duopoly to monopoly. We also noted that the PCA pre-

[86] Five Tarmac plants identified were reselling roadstone sub-base (or graded 40mm) rather than producing it. These plants, and the associated plant-centred catchment areas, have not been considered further in the local competitive assessment (see Appendix I).

dictions might not be accurate for areas with fascia reduction from two to one or from three to two, since these areas are not typical in the data (see paragraph 6.8). This filter is referred to as the 'fascia reduction' filter in what follows.

6.20 These filters produced 40 possible problem areas (which reduced to 39 as one area was identified by both sets of filters). These are shown in Appendix I.

Competition dynamics in the possible problem areas

6.21 In our assessments we took account of the views of the main parties, the location of the plants and depots of the main and third parties, the location of the customer sites of the main parties and the shares of production held by the main and third parties in each local area. Shares of production were considered in relation to the primary aggregates market as well as in relation to the crushed rock and sand and gravel segments and the wider aggregates product group, which also includes secondary and recycled aggregates. We considered all these factors in combination in order to reach a conclusion on whether or not there was a competition problem in any given area.

6.22 We sent the main parties a list of the possible problem areas (and sites) and asked for their views. We constructed maps of the local areas showing the locations and types of the plants of the main and third parties and the location and size of customer sites of the main parties. We sent these to the main parties. The main parties made a number of general points on the possible problem areas, all of which we considered in our local assessment (see Appendix I). According to the main parties:

(a) In looking at volumes, we should focus on external and not internal volumes as internal volumes had a limited impact on competition for supply to third parties.

(b) Where appropriate, we should take into account the importance of demand outside the catchment area. Even though some plants were located in the same

catchment area, the locations of these plants might mean that they competed for different customer sites due the location of the sites relative to the major conurbations.

(c) Where appropriate, we should consider competitive constraints exerted by competitors of the JV entity that were located outside the radials, in particular where those competing sites outside the radial were well placed to serve a demand centre that would be the main source of customers for one of the parties' sites located within the radial in question.

(d) Where appropriate, we should consider any relevant topographical features in the local competitive assessment, for example instances where different sites located in the same radials were effectively serving different markets due to the presence of a river or an estuary.

(e) Where appropriate, we should consider the fact that some sites were mothballed which might result in little effective overlap currently in certain local areas.

(f) Remaining companies, many of which had substantial excess capacity, would continue to constrain the JV entity.

(g) Secondary and recycled aggregates would continue to constrain the JV entity, in particular for the supply of roadstone sub-base material to general construction, since this was the end-use for which the major part of recycled aggregate was used. Volumetric trucks would also continue to impose a competitive constraint for the supply of RMX.

(h) Existing RMX site plants should be excluded from the local radial analysis since competition between fixed plants and site plants occurred only during the competitive tender stage. Once a site plant had been set up it did not compete in the local area to serve the general market.

6.23 Our response to these points is as follows:

(a) We did not agree that we should focus on internal volumes as the parties have the ability to switch between internal and external volumes.

(b) We took account of locations of customer sites in our local assessment.

(c) We took account of locations of plants in our local assessment.

(d) We took account of topographical features in our local assessment and, in one case, as part of our decision not to consider an area in the local assessment.[87]

(e) We considered mothballed plants. We include those that produced output in 2010 as they could be reopened in the short term.

(f) We took account of constraints from competitors' plants in calculating our shares of production.

(g) We took account of constraints from secondary and recycled aggregates in calculating shares of production. We note, however, that the evidence provided to us by the main parties on the extent of the constraints that secondary and recycled aggregates imposed on primary aggregates in specific local areas tended to be limited to whether such types of aggregate were available in certain local areas and not on the extent to which they constrained primary aggregates.[88] For this reason, we attached more weight to the constraints between primary aggregates.

(h) We calculated the radial distances for RMX including and excluding site plants and found very little difference between the two. For the purposes of assessing catchment area radials, we used a radial calculated excluding site plants (see Appendix I). When considering radial shares of production, RMX site plants were included. We considered that site plants are in competition with fixed plants for customers. Suppliers assess whether to supply a customer via a fixed or mobile plant depending not only on the size of the job but also on the fixed plants they have available in the local area. We also note that the location and size of site

[87] Dumbarton Concrete was not found to be a problem because the two relevant plants do not compete as they are separated by the Clyde Estuary.
[88] Such evidence could include primary aggregates being replaced by secondary and/or recycled aggregates or prices of primary aggregates responding to sales being lost or potentially lost to secondary and/or recycled aggregates.

plants are considered on a case by case basis in the assessment of possible problem areas.

6.24 We used production shares as opposed to market shares as we had more comprehensive and comparable data for the former. A possible disadvantage with using production shares is that production in a local area may not be sold in the same local area.[89] On the other hand, production shares could be seen as indicating the potential strength of a firm in a local area as its production may show its ability and potential to compete for sales in this local area.

6.25 In its assessment, the OFT used a market share threshold approach to identify local overlap areas where there was no realistic prospect of competition concerns arising. The thresholds used were 33 per cent share for aggregates and a 40 per cent for asphalt and RMX.[90] The 40 per cent figure is referred to in the Guidelines as being used in previous OFT decisions where products are undifferentiated.[91] The OFT considered a threshold level lower than 40 per cent appropriate for aggregates for the following reasons: *(a)* differing levels of closeness of competition may exist between suppliers located in different positions within a given radial, thereby meaning that suppliers are geographically differentiated; *(b)* transport costs indicate a significant cost differential between differently located production sites; and *(c)* the parties' gross margins in the supply of aggregates are high.[92]

6.26 The Guidelines note that when products are undifferentiated, unilateral effects are more likely where: the market is concentrated; there are few firms in the affected market post-merger; the merger results in a firm with a large market share; and there

[89] Market shares are shares of sales in the market. The data available did not allow us to distinguish, for both the main parties and competitors, between sales from a specific plant which remained in the local area and sales into a different area.
[90] Source: ME/5007/11, paragraphs 151, 171 and 200.
[91] Guidelines, paragraph 5.3.5.
[92] Source: ME/5007/11, paragraph 7.

is no strong competitive fringe of firms.[93] The Guidelines further note that market shares of firms in the market, both in absolute terms and relative to each other, can give an indication of the potential extent of a firm's market power. The combined market shares of the merger firms, when compared with their respective pre-merger market shares, can provide an indication of the change in market power resulting from a merger. In horizontal mergers in markets involving undifferentiated products, unilateral effects are more likely where the merger results in a firm with a large market share.[94] We examined the approach taken by the OFT to market share thresholds in detail. We noted that, in relation to market shares, the Guidelines explain that previous OFT decisions in mergers in markets where products are undifferentiated suggest that combined market shares of less than 40 per cent will not often give the OFT cause for concern over unilateral effects.[95] However, to the extent that the OFT uses and relies on market shares, the Guidelines note that it will normally not have regard to market share and concentration thresholds on anything other than the narrowest market that satisfies the hypothetical monopolist test.[96] The OFT noted that catchment areas were likely to be no wider than the narrowest market satisfying the hypothetical monopolist test.[97]

6.27 For the reasons set out in paragraph 6.16, we adopted an approach to the construction of filters and the identification of possible problem areas not based on market share thresholds. However, as explained in paragraph 6.21, we considered shares of production, together with other evidence, in our more detailed local assessment. In particular, we decided not to pursue possible problem areas with combined shares of production of less than 33 per cent. As a result, 13 primary aggregate areas dropped

[93] Guidelines, paragraph 5.4.4.
[94] Guidelines, paragraph 5.3.4.
[95] Guidelines, paragraph 5.3.5.
[96] Guidelines, paragraph 5.3.5.
[97] Source: ME/5007/11, paragraph 138.

out of our analysis and are not discussed in our local assessment.[98] Taking account of all the factors set out in paragraph 6.21, we found a competition problem in the remaining 23 areas, of which 19 areas are centred on plants and 4 are centred on depots. These areas are discussed and listed in Appendix I. We found that the proposed JV was likely to result in an SLC in each of these markets.

Rail ballast

Market conditions

6.28 Network Rail buys around 99 per cent of the rail ballast produced in the UK. Network Rail told us that it had purchased approximately 2–2.5 million tonnes of rail ballast a year over the last five years, corresponding to a total spend of approximately £20 million a year (out of a spending for track renewal of £700–£800 million a year).

6.29 There are only a few suppliers of rail ballast and relatively few shipping points (ie quarries or depots) in the UK. The main suppliers are Lafarge; Midland Quarry Products (MQP), a [✂] JV between Tarmac and Hanson; Aggregate Industries; and Cemex. Lafarge has one quarry producing rail ballast (Mountsorrel),[99] which is rail-linked. Tarmac is active in the production of rail ballast almost solely through MQP, from MQP's Cliffe Hill quarry.[100] Tarmac also produces small quantities of rail ballast from Tarmac's Minffordd, Barrasford and Park quarries. The MQP site at Cliffe Hill is rail-linked, but Minffordd, Barrasford and Park are not.[101] Hanson is currently only active in rail ballast through MQP. Aggregates Industries has two quarries (Bardon Hill and Meldon) and one depot (Isle of Grain) which receives rail ballast shipped by sea from Aggregate Industries' Glensanda quarry. Cemex has one quarry (Shap

[98] In total, 16 areas were dropped. Five plants (and their associated areas) were dropped as they did not produce roadstone sub-base (or graded 40mm). Two of these areas had shares of less than 33 per cent and are therefore part of the 13 dropped areas; three areas had shares over 33 per cent and were additional to the 13 dropped areas.
[99] Rail ballast from Mountsorrel is also resold through other Lafarge quarries. Lafarge told us that it did not have any depots which supplied rail ballast on a regular basis, although any Lafarge depot could in theory handle ballast should the need arise.
[100] In our assessment of competitive effects in rail ballast, we attribute 100 per cent of the MQP rail ballast volumes to Tarmac, since MQP is a [✂] JV between Tarmac and Hanson, and we have no evidence that Hanson operates as an independent competitive constraint in the market separately from Tarmac.
[101] According to figures from Tarmac, [✂]. Park Quarry is not shown on the map in Appendix J due to the volumes produced being negligible.

Blue) and one depot (Salford). The rail ballast production sites of Lafarge, MQP, Tarmac, Aggregate Industries and Cemex are shown in Appendix J, Figure 1.

6.30 Network Rail told us that it contracted with its suppliers using five-year nil value frameworks and accordingly the volumes taken from each supplier could vary depending on Network Rail's requirements. Network Rail told us that the current shares of supply (by volume) to Network Rail of rail ballast (for a 12-month period) were: Lafarge ([✂] per cent); MQP ([✂] per cent); Aggregate Industries ([✂] per cent); Cemex ([✂] per cent); and others ([✂] per cent). Over the last ten years supply to Network Rail has become more concentrated on a smaller number of sources.

Geographic constraints

6.31 We considered that, in order to assess the competitive effects of the proposed JV in the rail ballast market, it was appropriate to define the geographic market as being national in scope because Network Rail buys rail ballast nationally through tender processes and all main suppliers compete in these tenders.

6.32 However, Network Rail told us that, in selecting the winning bidders in these tender processes and the corresponding volumes of supply, the specific geographic location of the quarries mattered, as it had an impact on the 'delivered' price Network Rail had to pay.[102] Network Rail told us that in most cases the difference between competing bids reflected differences in transport costs from the different points of production to the point or area of use.[103] This evidence suggested to us that, in assessing the com-

[102] Network Rail told us that the analysis of the competing bids was done on a geographical basis and that Network Rail decided how much volume it wanted to buy from each supplier, depending on the forecast of its requirements by geographic area.
[103] By way of example, Network Rail noted that the price quoted by [✂] for a supply via [✂] into the South of England was [✂] than the price [✂] quoted for a supply from its quarry [✂], while the two quarries were considered to be equally efficient.

petitive effects of the proposed JV in the rail ballast market, there was a geographic dimension of competition which we needed to take into account.

Competitive effects

- *Main parties' views*

6.33 In the main parties' view, Cemex, Hanson, Aggregates Industries and Stema[104] were all credible suppliers of rail ballast. Lafarge told us that it recognized that there were a limited number of suppliers of high-quality rail ballast. It believed there was going to be more reuse of rail ballast in future for further use as rail ballast (rather than, as currently, the recycling of used rail ballast in other applications). Anglo American told us that Network Rail had buyer power (and referred to evidence provided by Network Rail that it had managed to negotiate away higher initial bid prices in the last tender process—see paragraph 6.36—as demonstrating this point) and that rail ballast could also be imported. Furthermore, Anglo American submitted that rail ballast could be loaded on to the rail network for delivery.

- *Network Rail's view*

6.34 Network Rail told us that Lafarge and MQP were very close competitors, both owning large quarries in Leicestershire[105] which had stone reserves which met Network Rail's rail ballast specification. Network Rail was concerned about the potential consequences of the merging of two specific rail-connected quarries supplying about [✂] per cent of its rail ballast requirements: Lafarge's Mountsorrel quarry and MQP's Cliffe Hill quarry.

[104] Stema is an importer of primary aggregates from Norway into the UK. Stema Shipping (UK) Ltd is effectively a 50:50 JV between Heidelberger Sand und Kies Gmbh and Mr Hans Jürgen Hartmann, which each own 50 per cent of Mibau Holding. Stema Shipping A/S is a 100 per cent subsidiary of Mibau Holding (and in turn Stema Shipping UK is wholly owned by Stema Shipping A/S).
[105] Aggregate Industries also has a quarry in Leicestershire.

6.35 Network Rail concluded a competitive tender process in 2011 for the following five-year period and provided us with details of the tender. Details of the bids received (including pricing), the tender assessment criteria and the outcome of the tender process are set out in Appendix J.

6.36 Network Rail told us that the initial bid prices in the last tender process in 2011 were higher than in the previous one in 2006, but that it managed to eliminate the gap through post-tender negotiation.

6.37 Network Rail told us that its demand for rail ballast was price inelastic (ie volumes were unlikely to decrease in response to a price increase), as the track renewal programme was driven by the asset condition, and by safety and performance considerations. [✂]

6.38 In relation to imports, Network Rail told us that [✂] submitted a bid during Network Rail's most recent tender process. However, the bid submitted by [✂] was [✂] of the best price offered, and Network Rail believed that this was due to the transport costs to import the product. More generally, Network Rail told us that it had never contracted an importer in the past because this, while possible, had never proven to be financially viable.

6.39 In relation to entry, Network Rail explained to us that there were two criteria that a new entrant would have to meet in order to supply rail ballast to it:

(a) having 'Link-up'[106] approval; and

(b) product acceptance by Network Rail. This involved Network Rail trialling the product to ensure that it met the required performance standards, before a certificate of acceptance was issued. The process took between 6 and 12 months.

[106] Link-up is the UK rail industry supplier qualification scheme.

- *Third party views*

6.40 We contacted a number of small rail ballast customers. One of these indicated that the ability of a supplier to deliver to all its sites was very important in its choice of supplier.[107] Two of these customers told us that it was difficult to get competing quotes for rail ballast. One explained that this was because there were not enough alternative suppliers in certain geographic locations,[108] whilst the other said that there were not enough alternative suppliers due to the limited number of quarries producing ballast to Network Rail standards.[109]

6.41 We also contacted Stema to understand better the constraints possibly exerted by imports of primary aggregates, and in particular of rail ballast. Stema told us that, while it won tenders for bagged products, it could not bid for bulk supply of rail ballast to Network Rail because Stema did not have rail-connected wharves. Stema also indicated that its import of rail ballast had decreased in the past five years due to the completion of contracts in Kent and the lack of rail links to its terminals. Finally, Stema estimated the transport costs from Norway into the UK at [£4–£5] per tonne.

- *Our assessment*

6.42 We noted from Network Rail's evidence that its demand for rail ballast was fairly price inelastic. In particular, Network Rail told us that rail ballast had a very high specification (ie substitutes were not available) and it was a safety critical component of the rail network. It therefore must be renewed as and when required.

6.43 We considered whether, given Network Rail's position as the near-unique buyer of rail ballast, countervailing buyer power might offset any SLC that would otherwise arise in the rail ballast market.

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[107] Skanska.
[108] Balfour Beatty.
[109] Story Rail.

6.44 The existence of a large buyer is not sufficient to confer countervailing buyer power if this buyer is dependent on particular suppliers in the market. For there to be countervailing buyer power in the rail ballast market, Network Rail would need to be able credibly to threaten to switch suppliers.

6.45 Another way in which Network Rail's position as a near-unique buyer could confer some 'buyer power' is if this made the process for supplying rail ballast very competitive. In the presence of a unique buyer, if each supplier has sufficient capacity to supply all the demand, and if none of the suppliers has a material cost advantage over the others, the fact that suppliers are dependent on a unique buyer could make the tendering process very competitive even if there are only a limited number of bidders. This could be the case if Aggregate Industries and/or Cemex had sufficient capacity to supply Network Rail's requirements for rail ballast and at similar costs to Tarmac and Lafarge, and if Aggregate Industries and/or Cemex had strong incentives to sell their rail ballast (eg high fixed costs which would be incurred even if they only supplied a small amount of rail ballast).

6.46 However, we considered that this was unlikely to be the case. While capacity constraints do not appear to exist, given the importance of transport costs in the supply of rail ballast (alongside the ex-works price and ability to meet the specification), different suppliers enjoy cost advantages in different geographic areas. Network Rail confirmed that no single supplier could meet all its needs and that its tender process resulted in a number of suppliers being selected (for different volumes) depending on which supply was most cost-effective in each geographic area. Therefore, we considered it unlikely that other existing competitors would be able credibly to supply Network Rail's requirements at a price similar to the current one across different geographic areas.

6.47 We considered it unlikely that Network Rail would sponsor entry. Further, given the importance of transport costs in the supply of rail ballast, it appeared unlikely that increasing imports into the UK would be sufficient to prevent the JV exercising any market power.[110]

- *Conclusions on rail ballast*

6.48 Taking all the evidence together, we found that:

(a) The proposed JV would bring together the largest supplier of rail ballast (Lafarge with [✂] per cent share of supply) and the second largest supplier (Tarmac, through MQP, with [✂] per cent share of supply). After the JV there would be no other remaining suppliers of rail ballast with a significant share.

(b) It was unlikely that the remaining competitors would have the ability to constrain the proposed JV's pricing, due to the effect of their quarry locations on the cost to supply rail ballast into certain geographic areas and, therefore, on the price the remaining competitors would charge to Network Rail in those areas.

(c) Network Rail's position as the near-unique purchaser of rail ballast had not given it countervailing buyer power.

(d) It was unlikely that entry or imports could constrain the proposed JV's pricing.

6.49 We therefore concluded that the proposed JV was likely to result in an SLC in the supply of rail ballast.

High purity limestone

6.50 We considered the potential for unilateral effects in the HPL market. In our analysis we examined whether the competitive constraints for HPL used for FGD were

[110] In light of evidence on bid prices, the fact that rail ballast is supplied by sea to the South of England from a quarry in Scotland (see paragraph 6.29) does not establish that (as argued by Lafarge) imports of rail ballast could be equally competitive.

different from those for HPL used for other applications, for the reasons set out in paragraph 5.42.

Market conditions

6.51 Anglo American told us that no British or European Standards applied in most HPL applications. Instead, customers had a desired chemical specification which they required the limestone to meet. Typically this meant that customers would not only seek a calcium carbonate content of above 95 per cent, but they would have specific limits on trace elements that made up the balance of the limestone supplied. Anglo American also told us that, in relation to HPL for FGD, the main requirement of customers was for consistency in terms of the chemical composition of the product supplied, given that different trace elements reacted differently with sulphur during the desulphurization process and this affected the gypsum produced.

6.52 The main applications in which HPL is used are listed in Appendix J, and include limestone powders, soda ash manufacture, FGD, production of precipitated calcium carbonate, iron production and sugar refining.

6.53 Purchasers of HPL are (among others) producers of steel, glass, paper products and animal feed, as well as generators of electricity at coal-fired power stations.

6.54 Evidence submitted by the main parties and third parties suggested that there were several suppliers of HPL.[111] Anglo American told us that there were reserves of HPL in the Peak District, the Mendips, South and North Wales, parts of the northern Pennines and around the fringes of the Lake District. Appendix J, Table 4, shows the market shares estimated by Anglo American for HPL in Great Britain in 2010.

[111] [✂] Hanson told us that it supplied HPL.

Appendix J, Figure 2, shows the locations of production sites of HPL for Lafarge and Tarmac.

6.55 However, the current sources of supply of HPL for FGD appear much more limited. Anglo American estimated that it supplied approximately [✂] per cent of HPL for FGD in 2010 with Lafarge supplying the remainder. The total volume of sales of HPL for FGD in 2010 was about 0.9Mt with a total value of about £7 million. There are eight customers [✂] for HPL for FGD. [✂][112,113]

6.56 Cemex confirmed that it did not supply HPL for FGD but had bid for contracts in the past. Cemex believed that it could potentially supply HPL for FGD from any one of its Dove Holes, Raynes or Halkyn quarries. Hanson confirmed that it did not supply HPL for FGD uses (and had not done so for many years), but supplied HPL for other uses. Hanson told us that it could potentially supply HPL for FGD purposes out of any one of its Batts Combe, Shap, Horton and Pateley Bridge quarries.

6.57 Appendix J, Figure 3, shows the locations of the production sites of HPL for FGD for Lafarge and Tarmac, together with the location of their customers. [✂] Cemex's Dove Holes site is in the same location in Buxton.[114]

6.58 Appendix J, Table 5, shows the volumes and value of sales of HPL for FGD, for Tarmac and Lafarge, by customer in 2010.[115] As supply to FGD customers is based on competitive tendering and long-term contracts, we considered that actual volumes sold were unlikely accurately to reflect competition in the market, rather suppliers' bidding behaviour in tenders would be more relevant (see paragraph 6.67).

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[112] [✂]
[113] HPL for FGD is supplied by Lafarge to SSE its Ferrybridge power station. However, the direct customer for the purposes of these sales is not SSE but Lafarge Plasterboard Limited (LPL) which is no longer part of the Lafarge Group. LPL operates a gypsum wallboard plant at Ferrybridge which uses the gypsum produced in the FGD process.
[114] Eggborough Power told us that Lafarge, Tarmac and Cemex quarried the product from the same seam in Derbyshire.
[115] [✂]

Geographic constraints

6.59 There is evidence that HPL is transported over greater distances than construction aggregates. Based on 2010 transaction data provided by the main parties, 80 per cent of Tarmac HPL external sales (by volume) are delivered within a distance of [✂] miles from the production site.[116] The average delivered distance for Lafarge is [✂] miles.[117]

6.60 HPL used for FGD applications is always delivered by rail to power stations. For Tarmac, the average delivered distance for FGD customers is [✂] miles. For Lafarge, the average delivered distance is [✂] miles.

Competitive effects for non-FGD applications

6.61 We received few submissions from non-FGD customers of HPL. None of the customers who replied to our questionnaire raised concerns regarding the proposed JV.

6.62 On the basis of the evidence in paragraphs 6.51 to 6.61, we concluded that the proposed JV would be unlikely to result in an SLC in the supply of HPL for non-FGD customers, as there appeared to be sufficient alternative suppliers.

Competitive effects for FGD application

- *Main party views*

6.63 The main parties argued that there would be no SLC in relation to the supply of HPL for FGD because:

(a) there were only eight customer contracts and these were long term, [✂];

(b) contracts were subject to competitive tender;

(c) [✂];

[116] Average distances from catchment area analysis covering 70 or 90 per cent of external delivered volumes are [✂] miles and [✂] miles respectively.
[117] [✂]

(d) Cemex could be expected to present a significant competitive constraint on any contract renewal;[118] and

(e) further competition could come from other suppliers of limestone powders, such as Longcliffe, Singleton Birch and Ben Bennett. The main parties, however, noted that these suppliers did not currently supply HPL for FGD, in so far as they were aware.

6.64 In addition, Anglo American told us that power stations could take HPL for FGD at a particular power station from more than one source, although they currently chose not to. Anglo American also argued that imports of HPL for FGD were a constraint in the market, and that there was countervailing buyer power. To the extent that quarries of potential competitors were not rail-linked, Anglo American considered that HPL for FGD could be transported by road from these quarries to rail depots where it could be loaded on to the rail network. The main parties noted that the volumes of HPL for FGD that were supplied from Tunstead and Dowlow were small proportions of the total volumes of aggregates produced at each of these quarries. Lafarge also recognized that power stations wanted a consistent quality of HPL for FGD.

- *Third party views—tendering and loss of existing competition*

6.65 Appendix J, Table 6, presents information on customers' latest tenders. Contracts vary between customers but appear to be between five and ten years in length with some exercising a renewal option.

6.66 The power stations that responded to our questionnaire told us that there were very few suppliers that could supply HPL for FGD uses. The reasons were that the technical specification of HPL for FGD was stringent[119] and that, due to high transport

[118] The main parties told us that Cemex started supplying chemical stone (for FGD) from the Dove Holes quarry in 2006, [✂].
[119] [✂], E.ON, SSE and Eggborough Power.

costs, the production site had to be close to the power station[120] and deliveries had to be made by rail.[121]

6.67 Customers' views as to the identity of the potential suppliers of HPL for FGD varied slightly between customers. We looked at historic data on the identity of bidders in tender processes as well as customers' current views on potential suppliers. Tarmac and Lafarge were always mentioned, along with a small number of other possibilities (see Appendix J).

6.68 As noted in paragraph 6.56, Cemex does not currently supply HPL for FGD but has tendered to supply HPL for FGD on one or two occasions (see Appendix J).

6.69 Apart from the proposed JV, customers did not think the competitive landscape had changed since they had last tendered and/or negotiated for their contracts and did not expect any change in terms of potential suppliers available to them in the next few years.[122]

6.70 As set out in Appendix J, a number of customers who responded to our questionnaire expressed concerns about what they saw as the detrimental effect on competition of the removal of a competitor for supply of HPL for FGD, given the small number of existing competitors.

- *Third party views—demand for HPL for FGD and negotiating power*

6.71 Customers told us that demand for HPL for FGD uses was price inelastic (ie volumes consumed would not vary much if the price changed by a small but material amount) as FGD was required to ensure compliance with environmental regulations regarding

[120] E.ON.
[121] [✂]
[122] [✂], E.ON, Rugeley, Eggborough and SSE.

sulphur dioxide emissions. However, the volume consumed does depend on the amount of power being generated and the sulphur content of the different coals used.

6.72 As illustrated in Appendix J, Table 6, customers appear to source from a single supplier for each individual power station.

6.73 We did not receive any specific views on countervailing buyer power from third parties. However, there was evidence that the small number of alternative suppliers of HPL for FGD meant that customers considered that they had difficulty finding alternative suppliers that could supply the volume they needed at a competitive overall cost (see Appendix J). Customers considered potential competition (eg from limestone powder producers such as Longcliffe, Singleton Birch and Ben Bennett) to be limited due to their lack of rail-linked quarries (Singleton Birch)[123] and customers' inability to use their products without substantial expenditure to change customers' existing FGD plants.

6.74 Third parties also considered imports unlikely to be viable (see Appendix J).

- *Conclusions on HPL for FGD*

6.75 On the basis of the evidence in paragraphs 6.51 to 6.74, we found that:

(a) Suppliers of HPL for FGD had to meet the technical specification for this application and have rail-linked quarries located sufficiently close to the coal-fired power stations to allow them to supply competitively. Our analysis of the geographic scope of the market (see paragraph 6.60) confirmed that HPL for FGD did not travel long distances.

[123] We noted that, as Anglo American argued, it might be possible to transport HPL for FGD by road to a rail depot for loading on to the rail network. However, we have not observed happening in the past and the evidence indicates that being rail linked is an important factor. [✂]

(b) Cemex tendered for one or two HPL contracts for FGD issued in the last few years and, although it did not currently supply any HPL for FGD, it might represent a constraint on any contract renewal.[124]

(c) Limestone powder producers did not appear to represent a significant competitive constraint, both as a result of lack of rail-linked quarries and existing FGD equipment being tailored for the use of specific grades of HPL.

(d) Imports were unlikely to be a relevant competitive constraint due to the higher transport costs involved.

(e) There was no evidence of countervailing buyer power.

6.76 Overall, we considered that FGD customers currently had [✂] possible suppliers of HPL—Tarmac, Lafarge [✂]—and that no other supplier of HPL in Great Britain produced the grade of HPL suitable for customers' existing FGD equipment and/or had a rail-linked quarry sufficiently close to the coal-fired power stations to allow competitive supply. [✂] The proposed JV would therefore reduce the number of alternative suppliers of HPL for FGD from [✂] to [✂]. We considered that this reduction was likely to compromise considerably the competitive dynamic in tenders, making it easier for competing bidders to anticipate the competitor's behaviour and take this into account. We therefore concluded that the proposed JV would be likely to result in an SLC in the supply of HPL for FGD customers.

Asphalt

6.77 Our local competitive assessment methodology for asphalt is very similar to the one we used for primary aggregates. As such, we only discuss the differences with methodology used for primary aggregates and show the results of the methodology

[124] There are currently eight customers for FGD. Based on the contract information submitted to us, most contracts are ten-year contracts; two out of eight contracts are likely to be out to tender in the next two years (see Appendix J, Table 6).

used for asphalt. As explained in paragraph 5.45, in our competitive assessment we considered the market for asphalt (produced either by fixed or by mobile plants).

PCA

6.78 For the asphalt products considered, our PCA found fewer instances of negative price effects than it did for primary aggregates and all of these were less than 0.5 per cent per nearby plant. The results were consistent with Tarmac being the strongest constraint for one of Lafarge's product and with independents, and for one product, other majors, being stronger constraints than Lafarge for Tarmac's products.

Catchment area analysis

6.79 In addition to catchment areas for urban and non-urban areas, we also used separate catchment areas for Greater London as in some cases these were substantially different from those for urban and non-urban areas, particularly for Tarmac. Table 3 shows the radii we used.

TABLE 3 **Radii of catchments areas for asphalt based on 80 per cent of sales, 2010**

miles

	Lafarge	*Tarmac*
Greater London	[✂]	[✂]
Urban	[✂]	[✂]
Non-urban	[✂]	[✂]

Source: CC calculations based on data provided by the main parties.

6.80 We identified catchment areas where there were overlaps between the plants of the proposed JV.

6.81 As our PCA identified a price effect of less than 0.5 per cent per nearby plant or no price effect for the asphalt products considered, we selected the possible problem areas using a fascia reduction filter (see paragraph 6.19). In particular, we identified possible problem areas, based on plant-centred catchment areas, where there was a

fascia reduction from two to one or from three to two or from four to three (where the fourth competitor's market share by production volume was lower than 5 per cent).

6.82 This filter produced two possible problem areas. These are shown in Appendix I.

Competition dynamics in the possible problem areas

6.83 Of the two possible problem areas, we found that both were problem areas for asphalt. These are discussed and listed in Appendix I. We found that the proposed JV was likely to result in an SLC in both of these markets.

RMX

6.84 Our local competitive assessment methodology for RMX is very similar to the one we used for primary aggregates and asphalt. As such, we only discuss the results of the methodology used for RMX. As explained in paragraphs 5.48 to 5.50, in our competitive assessment we considered the market for RMX (produced either by fixed or by site plants). The location and size of site plants are considered on a case by case basis in the assessment of possible problem areas. Constraints from volumetric trucks are also considered in the local assessment of possible problem areas.

PCA

6.85 In terms of RMX, the PCA results did not show any relationship between Tarmac's RMX prices and the presence of a Lafarge plant nearby, nor between Lafarge's RMX prices and the presence of a Tarmac plant nearby. They did show some negative effects between Tarmac (and Lafarge) prices and the presence of independents and other majors nearby.

Catchment area analysis

6.86 Table 4 shows the radii we used.

TABLE 4 **Radii of catchments areas for RMX based on 80 per cent of sales, 2010**

	miles	
	Lafarge	*Tarmac*
Greater London	[✂]	[✂]
Urban	[✂]	[✂]
Non-urban	[✂]	[✂]

Source: CC calculations based on data provided by the main parties.

6.87 We identified catchment areas where there were overlaps between the plants of the proposed JV.

6.88 As our PCA did not identify a price effect between the main parties, we selected the possible problem areas using a fascia reduction filter (see paragraph 6.19). In particular, we identified possible problem areas, based on plant-centred catchment areas, where there was a fascia reduction from two to one or from three to two or from four to three (where the fourth competitor's market share by production volume was lower than 5 per cent).

6.89 This filter produced eight possible problem areas. These are shown in Appendix I.

Competition dynamics in the possible problem areas

6.90 We found seven problem areas for RMX.[125] These are discussed and listed in Appendix I. We found that the proposed JV was likely to result in an SLC in each of these seven markets.

Coordinated effects

6.91 Coordinated effects may arise when firms operating in the same market recognize that they are mutually interdependent and that they can reach a more profitable

[125] Dumbarton Concrete was not found to be a problem because the two relevant plants do not compete as they are separated by the Clyde Estuary.

outcome if they coordinate to limit their rivalry.[126] As set out in the Guidelines, co-ordination can be explicit or tacit. Explicit coordination is achieved through communication and agreement between the parties involved. Tacit coordination is achieved through implicit understanding between the parties, but without any formal arrangements.[127]

6.92 When assessing coordination, the Guidelines set out that the CC will analyse the characteristics of the market that could be conducive to coordination. The CC will examine whether there is evidence that firms in the market were coordinating pre-merger. If so, they will examine whether the merger makes coordination more stable or effective, given the characteristics of the market. If there is no evidence of pre-merger coordination, the CC will examine whether the merger makes it more likely that firms in the market will start to coordinate, given the characteristics of the market.[128]

6.93 The Guidelines set out that all three of the following conditions must be satisfied for coordination to be possible:

(a) firms need to be able to reach and monitor the terms of coordination;

(b) coordination needs to be internally sustainable among the coordinating group—ie firms have to find it in their individual interests to adhere to the coordinated outcome; and

(c) coordination needs to be externally sustainable, in that there is little likelihood of coordination being undermined by competition from outside the coordinating group.[129]

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[126] The Guidelines, paragraph 5.5.1.
[127] The Guidelines, paragraph 5.5.3.
[128] The Guidelines, paragraph 5.5.4.
[129] The Guidelines, paragraph 5.5.9.

6.94 We assessed whether the proposed JV might be expected to give rise to an SLC in the bulk cement market through coordinated effects, using the framework set out in the Guidelines. As part of our assessment, we examined the extent to which the three conditions set out in the Guidelines were met in the current market, and the extent to which they would be met following the proposed JV. However, in addition to our analysis of these three conditions, we also took into account all the available evidence in the round in judging whether the proposed JV was likely to result in an SLC on the basis of coordinated effects. In light of our views on unilateral effects in the aggregates, asphalt and RMX markets (see paragraphs 6.27, 6.49, 6.76, 6.83 and 6.90), we have come to no conclusions at this point on the scope for coordinated effects in these markets as a result of the proposed JV.

Pre-existing coordination

6.95 In accordance with the Guidelines, we analysed whether there was evidence that UK cement producers were coordinating in the bulk cement market currently. We examined whether there was evidence of pre-existing coordination between all four major UK producers of cement (ie Lafarge, Tarmac, Cemex and Hanson) or a subset of these, given certain distinctive features of Tarmac's position in the market—see paragraphs 6.179 to 6.182.

6.96 Whilst analysing the evidence of pre-existing coordination is an important step in investigating a coordinated theory of harm,[130] finding such evidence is neither a necessary nor a sufficient condition for finding an SLC based on coordinated effects. If there is no evidence of pre-merger coordination, the Guidelines set out that the CC

[130] Paragraph 5.5.8 of the Guidelines sets out that, in general, a merger in a market already showing coordinated outcomes would be likely to make coordination more sustainable or more effective, unless the structure and scale of the merged firm is so different from those of its predecessors that the incentive to coordinate has been removed.

will examine whether the merger makes it more likely that firms in the market will start to coordinate, given the characteristics of the market.[131]

6.97 We noted that coordination was not an 'all or nothing' outcome, and different degrees of coordination were possible. Coordination may not be perfect, ie it may not lead to the same profits that a monopolist would achieve. Rather, it may lead to any level of profit between the competitive and monopolistic levels. In addition, coordination may not be continuous, it may not involve all market participants and there may be periods when it breaks down, with intense competition between firms during which there might be (for example) increased levels of customer switching activity and/or rapid reductions in prices.[132]

6.98 To assess whether there was evidence of pre-existing coordination, we looked (among other things) at observed market outcomes (production volumes, capacity utilization, market shares and margins). We examined whether these market outcomes, taken together, were consistent with a competitive market. In particular, we looked at:

(a) the trend in market shares over time;

(b) evidence on the changes in cement margins over time in relation to changes in demand and available capacity;

(c) evidence from the price concentration analysis on cement; and

(d) evidence from customers on the behaviour of UK cement producers in relation to cement sales.

6.99 We also looked at data on customer switching and evidence from internal documents from the main parties and the other UK majors to assist us in understanding the

[131] The Guidelines, paragraph 5.5.4.
[132] See p10 of *The economics of tacit collusion*, final report for DG Competition by Ivaldi, Jullien, Rey, Seabright and Tirole and p246 of *The theory of industrial organisation*, by Jean Tirole.

nature of competition between UK cement producers and interpreting the evidence on market outcomes.

Market and production shares of the UK cement producers over time

6.100 Our detailed analysis of data on the shares of the UK cement producers in terms of sales and production of UK produced cement over time is set out in Appendix K, and our analysis of the overall share of UK cement producers in terms of total sales of bulk cement (including imported cement) is set out in Appendix Q.

6.101 Table 5 shows the market shares for 2008 to 2010 for sales of bulk cement in Great Britain (including both internal and external sales).[133] Our detailed analysis of cement imports is set out in Appendix Q. We find that Lafarge has lost share between 2008 and 2010, from [✂] per cent in 2008 to [✂] per cent in 2009 and 2010, whereas Tarmac increased its share (from [✂] to [✂] per cent) and the shares of Cemex and Hanson remained stable. The share of importers increased, from [✂] per cent in 2008 to [✂] per cent in 2009 and 2010. From this table, it appears that most of the increase in market share by importers between 2008 and 2010 was at the expense of Lafarge volumes, while Cemex and Hanson maintained stable shares and Tarmac increased its share.

TABLE 5 **Great Britain market shares for bulk cement by volume**

per cent

	2008	*2009*	*2010*
Lafarge	[30–40]	[30–40]	[30–40]
Tarmac	[0–10]	[10–20]	[10–20]
Cemex	[20–30]	[20–30]	[20–30]
Hanson	[20–30]	[10–20]	[20–30]
Aggregate Industries*	[0–10]	[0–10]	[0–10]
Importers (non-domestic)	[10–20]	[10–20]	[10–20]

Source: CC, based on UK producers' data and MPA estimates.

*Shares for Aggregate Industries are based on its total sales of the cement which it imports to its downstream businesses and external customers.

[133] We excluded production and sales of cement in Northern Ireland since the market structure appeared to be different there for several reasons, including *(a)* Lafarge is the only UK major that produces cement in Northern Ireland; and *(b)* Northern Ireland's land border with the Republic of Ireland may make imported cement more competitive than elsewhere in the UK.

6.102 In Table 6, we show each of the UK producers' share of Great Britain cement production between 2001 and 2010, as well total Great Britain production in each year and the year-on-year change in total Great Britain production.

TABLE 6 **Shares of Great Britain production of cement by volume, 2001 to 2010**

	Lafarge *%*	*Tarmac* *%*	*Castle/ Hanson* *%*	*RMC/ Cemex* *%*	*Total GB production kT*	*Year-on-year change in total production* *%*
2001	[50–60]	[0–10]	[20–30]	[10–20]	[✂]	
2002	[50–60]	[0–10]	[20–30]	[10–20]	[✂]	0
2003	[50–60]	[0–10]	[20–30]	[20–30]	[✂]	2
2004	[40–50]	[0–10]	[20–30]	[10–20]	[✂]	1
2005	[40–50]	[0–10]	[20–30]	[20–30]*	[✂]	–2
2006	[40–50]	[0–10]	[20–30]	[20–30]	[✂]	3
2007	[40–50]	[0–10]	[20–30]†	[20–30]	[✂]	4
2008	[40–50]	[0–10]	[20–30]	[20–30]	[✂]	–16
2009	[40–50]	[10–20]	[20–30]	[20–30]	[✂]	–25
2010	[40–50]	[10–20]	[20–30]	[20–30]	[✂]	5

Source: CC, based on data on cement production provided by the main parties and other majors.

*Cemex acquired RMC in 2005.
†HeidelbergCement acquired Castle Cement in 1998 and Hanson in September 2007.

6.103 Over the time period covered by Table 6, there were a number of significant changes in the UK cement market:

(a) Changes in ownership: Hanson (which previously had no in-house supply of cement) was acquired by Heidelberg in September 2007; RMC Group was acquired by Cemex in 2005; and Hanson acquired the remainder of Civil & Marine (the exclusive UK producer of GBS) in 2006. These changes were followed by large changes in cross-sales of cement between the majors (see Appendix P).

(b) There were also some changes in capacity in the period. Tarmac invested in a new cement plant at Buxton in 2004 (increasing capacity from [✂] to [✂]), and then increased capacity at Buxton by a further [✂] in 2008.

(c) Taken together, the changes in ownership in the UK cement industry and Tarmac's capacity expansion have resulted in the present structure of the industry, which is characterized by four vertically integrated UK producers of cement which—with the exception of Tarmac—are part of global construction businesses (see paragraph 2.25).

(d) There was a large fall in demand for cement, and thus in production, in 2008 (a 16 per cent drop in production in Great Britain) and an even larger fall in 2009 (a 25 per cent drop in production in Great Britain).

(e) There was a large reduction in Lafarge's cement production capacity in 2009 with the closure of its Northfleet plant, which was Lafarge's largest plant in terms of cement capacity (about 1.5Mt of cement per year). Hanson also reduced capacity during the period. Hanson mothballed about [✂] of capacity in 2008 (at Ketton).

6.104 There has been some variation in the shares of Great Britain production held by the major UK cement producers over the past ten years: Lafarge has lost share (from [✂] to [✂] per cent) as has Hanson (from [✂] to [✂] per cent in ten years). Cemex and Tarmac have both increased their share (from [✂] to [✂] per cent for Tarmac, and from [✂] to [✂] per cent for Cemex). Nevertheless, the data shows a degree of stability in the shares of the cement majors in the face of major changes in demand, capacity and ownership from 2007 to 2010.[134] The relative share of Hanson and Lafarge in relation to each other has remained broadly stable, with Lafarge consistently having almost [✂] the share of Hanson since 2003.

6.105 The degree of stability of these shares of production when market demand increased in 2006 and 2007 and then fell sharply in 2008 and 2009, and where there has been significant excess capacity for cement production since 2008, appears on the face of it surprising.

6.106 As set out in Appendix K, we also calculated shares by product type and by type of customer (internal and external sales, including shares of external sales to indepen-

[134] Lafarge did not agree that the changes in share were significant. It also said that changes in ownership were not something that could be expected to cause changes to market share as there was no consolidation in the cement market during this period. However, we considered that changes in ownership were relevant, since *(a)* one of the changes (Heidelberg's acquisition of Hanson) made an existing non-vertically-integrated competitor (Castle) vertically integrated into RMX and *(b)* all changes of ownership had the potential to change the relevant firm's strategy.

dent customers). However, we were not able to calculate these shares over long time periods at these more disaggregated levels because of lack of data on sales prior to 2008 for some of the majors. We found that *(a)* there was more variation in shares by product type (CEM I and CEM II/III) compared with the data for shares of total cement production,[135] and *(b)* in terms of relative shares of external sales and relative shares of external sales to independent customers, there had been changes in Hanson and Cemex's shares in 2009, but Lafarge's share had remained constant between 2008 and 2010. However, we continued to consider that it was appropriate to focus our assessment on shares of total production, since this would drive each cement producer's overall profitability.

6.107 We found that the degree of stability in shares of production at the time of large changes in demand, changes in ownership and, to a lesser extent, changes in capacity in the industry was consistent with the existence of a degree of tacit co-ordination between at least some of the UK producers over that time period.

Cement margins

6.108 We analysed the variable profit margins and the variable profit per tonne achieved by UK cement producers on their external sales (ie excluding sales to their downstream operations) of cement for the years 2007 (for Lafarge and Tarmac only, due to lack of data for the other majors), 2008, 2009 and 2010 (see Appendix L). We analysed profit margins on external sales, because internal prices are not necessarily a good benchmark to assess margins as each firm is free to set its own internal prices. As set out in Table 7, we found that all four major UK cement producers increased their variable profits per tonne in 2009 compared with 2008, despite the large reduction in demand for cement in 2009. These increasing variable profits per tonne sold and

[135] At an individual product level, we were only able to calculate shares for the past three years (2008 to 2010) due to limited availability of data.

increasing variable profit margins appear to be inconsistent with cement producers competing for sales in a market with falling demand and excess capacity.

6.109 In a competitive market, we would expect cement margins to have dropped in 2008 and 2009 when there was a large drop in demand (particularly when combined with large increases in the costs of key inputs to cement production at this time, ie fuel and electricity). Indeed, with falling demand and large excess capacity, cement producers in a competitive environment would have strong incentives to compete on prices to increase their sales. In our view, this should have been likely to result in reductions in the variable profit per tonne sold in 2009 (possibly, quite substantial falls).

TABLE 7 **Variable profits per tonne and variable profit margins for cement**

	FYE 31 December			
	2007	*2008*	*2009*	*2010*
Tarmac				
Variable profit/t (before carbon trading) (£/t)	[✂]	[✂]	[✂]	[✂]
Variable profit margin (before carbon trading) (%)	[✂]	[✂]	[✂]	[✂]
Lafarge				
Variable profit/t (before carbon trading) (£/t)	[✂]	[✂]	[✂]	[✂]
Variable profit margin (before carbon trading) (%)	[✂]	[✂]	[✂]	[✂]
Cemex				
Variable profit/t (before carbon trading) (£/t)	[✂]	[✂]	[✂]	[✂]
Variable profit margin (before carbon trading) (%)	[✂]	[✂]	[✂]	[✂]
Hanson				
Variable profit/t (before carbon trading) (£/t)	[✂]	[✂]	[✂]	[✂]
Variable profit margin (before carbon trading) (%)	[✂]	[✂]	[✂]	[✂]

Source: Anglo American, Lafarge, Cemex and Hanson.

6.110 Lafarge told us that the fact that margins had not reduced when demand fell in 2009 was not evidence of the CC's apparent theory of coordination. It told us that the market evidence indicated substantial switching activity in 2009: switching increased and prices fell. We agreed that there was an increase in switching activity in 2009 (both for customers won and lost), as we would expect in a market experiencing a large change in demand. However, we did not agree with Lafarge that this increased switching activity had resulted in any substantial reduction in prices. Lafarge told us

that its prices for bulk external CEM I cement sold to non-majors had [✂] between January 2009 and December 2010 (£[✂] per tonne fall over the period) and by £[✂] over the period February 2009 to December 2010. Similarly, Anglo American also submitted data from Tarmac showing a [✂] in prices of £[✂] per tonne between January 2009 and 2010.[136] However, our analysis of the average prices paid by Lafarge and Tarmac's external customers showed that, in fact, any reduction had taken place in 2010 rather than 2009, and that average prices had increased in 2009. We did not agree that the data showed that prices had decreased between January 2009 and December 2010. Our analysis of the average prices paid by Lafarge's external customers showed that average prices for bulk cement had in fact increased in 2009, both to independent customers and to majors. For independent customers, the average price per tonne increased by [✂] per cent for CEM I and CEM II. There was a reduction in average prices in 2010, but this reduction was very small compared with the increases in the previous years (reduction by [✂] per cent for CEM I and [✂] per cent for CEM II).

6.111 The main parties also told us that in 2008 they had to increase prices mid-year because of a spike in energy costs. This had the potential to put pressure on cement producers' gross margins (because producers might compete on the extent to which such cost increases were passed through to customers) but our analysis showed that in fact this had limited impact: average variable margins did not reduce between 2007 and 2008 (as set out in Table 7 above).

6.112 Lafarge told us that, when setting prices for cement, it measured performance of the cement business by the return on capital employed (ROCE), and did not consider margins over variable cost to be the correct metric for our assessment. It told us that prices were not excessive at present (since Lafarge's ROCE did not systematically

[136] On average prices of cement of the order of £75 per tonne.

and substantially exceed its weighted average cost of capital) and therefore lowering prices would not be sustainable.[137] However, we considered that, given the lack of transparency in prices of cement (see Appendix M), it would have been possible for Lafarge to offer reduced prices to some customers in order to increase volumes without affecting margins on all of its existing customers. We therefore considered that any such increase in volumes sold should increase profits (all other things being equal), and would therefore appear rational in such a market.

6.113 During our margin analysis, we noted that the variable cost ratios and variable costs per tonne figures for Lafarge, Cemex and Hanson showed similarities in cost structures. Similarities in cost structures are a factor that may facilitate coordination by increasing the transparency in the market and by making the incentives of the majors more aligned (this is discussed further in paragraphs 6.203 to 6.204). We also noted that overall, in recent years Lafarge was the highest-cost producer and Tarmac was the lowest-cost producer in terms of variable costs.

Price-concentration analysis

6.114 As set out in paragraph 6.8, we conducted a price-concentration analysis (PCA) for cement sales in the UK. Details of the methodology we used and the results are set out in Appendix H. Results from this PCA suggest that the presence of a Hanson or of a Cemex plant within 50 miles has no statistically significant effect on Lafarge's external sales price for cement.[138]

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[137] Lafarge also argued that our taking into account the main parties' analysis showing that [✂] would be consistent with the CC's approach to profitability in the CC's final report on the Wienerberger Financer Service/Baggeridge Brick merger inquiry (2007), in which coordinated effects were also considered in a merger assessment. However, our argument is not that profits are excessive, but that in a fully competitive market, we would have expected margins to have dropped in 2009 when there was a large drop in demand (particularly when combined with large increases in the costs of key inputs to cement production at this time, ie fuel and electricity).

[138] The presence of a Tarmac plant had a weak statistically significant effect on Lafarge's external prices of cement, but this result was only apparent when the largest customers were excluded, and the main parties' advisers told us that this result was driven by a small number of job sites which were within 50 miles of Tunstead but were not within 50 miles of Lafarge's nearby Hope plant.

6.115 These results are consistent with a market in which Hanson and Cemex do not impose a strong constraint on Lafarge's prices for cement. We recognized that the results of our PCA were consistent with, but did not prove, pre-existing coordination (between Cemex, Hanson and Lafarge) in the market and that there were also other possible explanations for the results we obtained. As set out in paragraph 6.94, we considered the results of our PCA with the other evidence available to us in the round in assessing whether market outcomes were consistent with some degree of pre-existing coordination between cement producers.

Evidence from customers on the behaviour of cement producers

6.116 We examined some evidence from cement customers about the behaviour of the UK cement producers, including claims that, on occasion, certain producers had appeared to refuse to supply cement. This evidence was inconclusive. We noted that, in any event, it would not be necessary for the UK producers to refuse to supply particular customers in order to coordinate (for example) on shares of production or wins and losses of customers.

Our views on pre-existing coordination

6.117 As explained in paragraph 6.92, finding pre-existing coordination is not a necessary or sufficient condition for finding an SLC based on coordinated effects. We did not come to a conclusion whether or not there was pre-existing coordination in the bulk cement market, rather we found that the evidence on market outcomes that we reviewed, when taken together, indicated that there were shortcomings in the way the market functioned and was consistent with a degree of pre-existing tacit coordination.[139] That evidence included:

(a) the degree of stability of shares of production at the time of large changes in demand and consolidation in the industry;

[139] We noted that some of the evidence could also be consistent with non-coordinated behaviour, but we assessed all the evidence in the round in coming to our view.

(b) pricing behaviour and sustained margins that did not appear to be consistent with the excess capacity in the industry, in particular increases in the variable profits per tonne of cement over the period 2007 to 2010, which appeared inconsistent with cement producers competing for customers in a market with falling demand and excess capacity; and

(c) the results from our PCA were consistent with several explanations, including the existence of a degree of coordination in the market.

6.118 The evidence on customer switching (which is reviewed in Appendix O) was not conclusive. This showed that there was more switching activity in 2009 compared with 2010, which could indicate that the reduction in demand for cement resulted in more competition between UK cement producers and/or otherwise destabilized the market. It could also suggest that, if UK cement producers had been tacitly coordinating, the reduction in demand resulted in some deviations and/or retaliation. Our calculations showed that any increase in switching did not appear to translate into a decline in cement prices. However, we noted that the relatively low levels of switching observed in 2010 could be due to the threat of switching acting as a constraint on cement producers, and therefore could also be consistent with a competitive market.

6.119 Some of the evidence set out in paragraphs 6.122 to 6.183 regarding whether the conditions for coordination are satisfied (such as evidence from our review of internal documents, and the evidence on the timing of price increase announcements) is also consistent with a degree of pre-existing coordination.

6.120 In light of our analysis set out in paragraphs 6.100 to 6.116 and 6.122 to 6.183, we considered that coordination in the bulk cement market, if it existed prior to the JV, would be most likely to operate in the following way:[140]

(a) During times of excess capacity, the coordinating group (which would not include Tarmac or importers) would coordinate on the basis of shares of production and/or wins and losses of customers, rather than directly on prices.

(b) The coordinating firms could monitor coordination via monitoring of wins and losses of their own customers and/or by monitoring the changes in their share of production (total and/or sales to independent RMX providers), as well as signalling future intention to change price through issuing price announcement letters and monitoring of others' price announcements.

(c) Repatriation (ie the bringing of volumes purchased from another producer back into in-house supply) of small volumes could act as a signal to potential deviators to stop current deviations without necessarily getting into costly retaliatory actions. Deviations could be punished by lowering cement prices to independent cement customers, or by reducing prices charged by integrated RMX businesses to RMX users. In some circumstances, repatriation of sales could also be used as a punishment.

(d) The coordination would result in higher prices for UK cement overall to all end-users of cement including RMX end-customers (not just for cement sold externally, or for cement sold externally to independent customers) than if the market was competitive.

6.121 We now review the evidence on the extent to which the necessary conditions for co-ordination to emerge (as set out in the Guidelines) are likely to be satisfied. We note that there is a degree of judgement in assessing whether these conditions are satisfied, and that a finding that all conditions are satisfied is not sufficient to establish

[140] We set out this model for coordination now in order to provide context for the analysis and discussion which follows.

coordinated effects, but will indicate the extent to which the market is susceptible to coordination. It is a further matter of judgement whether the proposed JV is likely to result in an SLC on the basis of coordinated effects.

Condition 1: ability to reach and monitor coordination

6.122 The Guidelines state that, for coordination to emerge, the firms involved need to be able to reach a common understanding about their objectives (for example, a price below which they cannot sell).[141] To sustain coordination, firms will generally need to be able to monitor each other's behaviour sufficiently to ensure that deviation from the coordinated outcome can be detected.[142]

6.123 We therefore assessed the evidence on whether cement producers have the ability to reach a common understanding and whether they have the ability to monitor co-ordination.

Ability to reach a common understanding

6.124 The Guidelines state that, in assessing whether the firms in a market would be able to reach an understanding on the terms of coordination, the CC may consider, for example:

(a) the number of firms in the market—the fewer the firms, the easier it will be to reach an understanding; and

(b) the degree of complexity in the environment in which firms interact, for example in terms of the number and type of products sold, number of relevant competitive variables (price and non-price factors), differences in product portfolios, customer mix, strategies—the more complex this environment, the more difficult it will be for firms to reach a common understanding.

[141] The Guidelines, paragraph 5.5.10.
[142] The Guidelines, paragraph 5.5.12.

6.125 The UK cement industry is very concentrated. There are only four UK cement producers, and this number would decrease to three after the JV. No new entry has occurred over the last decade and only limited capacity expansion (mainly by Tarmac) has taken place. In addition, there are a number of 'structural' and 'non-structural' links between these producers. They are all involved in various JVs with one another (see Appendix C), although most of these are for aggregates and there are only two JVs for the supply of cement. They all belong to the Mineral Products Association (MPA).[143] The majors tend to buy, regularly and in significant amounts, cement from one another (although this has become less prevalent in recent years), and therefore are involved in customer/supplier relationships. All these links may facilitate reaching a common understanding.

6.126 The environment in which UK cement producers interact does not appear particularly complex. The product is relatively homogeneous[144] and the geographic areas over which cement can be transported are quite large. Also, there are only 12 plants producing cement in the UK, and the cost structures of Lafarge, Cemex and Hanson are not dissimilar (see paragraph 6.113) which would enhance firms' ability to reach a common understanding. This lack of complexity means that the number of variables on which cement producers would need to have a common understanding is likely to be small.[145]

6.127 The fact that shares of cement production had not changed much in the face of major changes in demand and when there has been significant excess capacity (see paragraphs 6.101 to 6.107) suggested to us that the main variables on which cement producers could coordinate were likely to be shares of production and/or wins and

[143] The MPA is the trade association for the aggregates, asphalt, cement, concrete, lime, mortar and silica sand industries. It has a membership of 430 companies.
[144] This is set out in more detail in paragraphs 5.8 to 5.12.
[145] The Guidelines state in paragraph 5.5.11 that 'Where there are fewer products and the aspects of competition over which firms compete are simpler, it may be easier for the firms in the market to identify a focal point around which to coordinate'.

losses of customers. We also analysed evidence on price announcement letters to see if these had been, or could be, used by UK cement producers to signal to each other the timing and direction in which cement prices should evolve under a coordinated outcome. The details of our analysis are set out in Appendix M.

6.128 Cement producers regularly send out letters to their existing customers to notify them that the producer in question plans to increase its prices for cement. We found that there was a considerable degree of parallelism between the UK cement producers in both the dates of announced price increases for cement and in the amounts of increases announced.

6.129 Many of these price increase announcements were for January in each year, which is standard practice in many industries. However, there was one mid-year price announcement (August 2008) which was notable because the timing was unusual: the majors announced the price increase within less than a week of each other (and three of the four majors announced the price increase within two days of each other) and the sizes of the announced price increases were particularly close. Lafarge told us that the August 2008 announcement was driven by increased distribution costs, which all cement producers faced equally and at the same point in time, which explained the similarities in the timing and amount of the increases. Anglo American told us that the August 2008 announcement followed a spike in the price of oil [✂]. Further, Anglo American told us that customers were generally aware of impending price increases before they happened, as a result of being forewarned by their cement suppliers, and that this information then travelled from customers to other cement suppliers, which explained the parallelism in price announcements. Hanson told us that the August 2008 price increase was wholly driven by unprecedented levels of fuel and energy costs.

6.130 The analysis of the letters also revealed that Lafarge usually acted as the first mover for price increase announcements, and that usually the response of the other majors was accommodating in that they followed by announcing a slightly larger increase than the first mover. This tendency was noted in various internal documents from Lafarge and other majors. Anglo American told us that, [✂]. This suggested to us that the UK cement majors might have been signalling that they would accommodate the price increases of the other majors. The price increases announced were often in the same format (ie £ per tonne for bulk cement, rather than in percentage terms[146]), and very close to each other.

6.131 We also conducted an analysis of the extent to which realized price increases followed price increase announcements. We found that:

(a) in almost all cases that we analysed, [✂]; and

(b) the majors were generally [✂].

6.132 Overall, we considered it likely that the price announcement letters were one mechanism that the UK cement producers could have been using to signal to each other the timing and direction in which cement prices should evolve. The main parties and Hanson advanced other rationales for sending out the letters, including (according to Anglo American) that customers wanted to know that they were all being treated fairly, that customers felt the letters set a ceiling for subsequent negotiations, and that price announcement letters were a practical way of contacting a large number of customers. Lafarge told us that price negotiations with customers took place on a near-continuous basis and the price announcement letters served as a starting point annually for the next round of negotiations. In addition, Lafarge said that some customers required the letters in order to show internally or to their own customers as evidence of cost increases. Hanson submitted that it sent out price

[146] Hanson told us that price increases were set in £ per tonne solely to ensure that they were clearer for customers.

announcement letters to make customers aware of any increases, and that the customer then had the option to negotiate the level of increase (if any). Further, Hanson told us that in some cases, customers required price announcement letters, and that Hanson would expect that sending out such letters (to be followed by negotiation with customers) was standard practice in many sectors where there were a large number of customers. We accepted that there might be other motivations for sending out price announcement letters. However, we thought that they could also be used by UK cement producers to signal to each other the timing and direction in which cement prices should evolve.

6.133 We therefore found that price announcement letters could assist the UK cement producers in coming to a common understanding on the timing and direction of price movements. However, we considered that the main variable on which UK cement producers might be able to reach a common understanding was unlikely to be realized prices, because these prices were individually negotiated and were not transparent. Rather, for the reasons set out in paragraph 6.127, we considered that the main variables that could act as focal points for coordination were more likely to shares of production and/or wins and losses of customers.

6.134 Nonetheless, price announcements provide information to cement producers as to the level of price increases from which each cement producer will start negotiating. They may therefore have some role in reducing the risk of future deviations. For example, they reduce the risk that a cement producer may start negotiations from too low a price—in other words, they reduce the risk that a cement producer may inadvertently engage in negotiations that may lead to deviations (a risk that would otherwise arise as a result of the lack of transparency of actual prices). In addition, a customer that receives—or is aware of—price announcement letters showing very similar levels of price increases being announced by different suppliers may have

reduced incentives to change supplier. This is because the customer may expect the negotiated or realized price to be similar irrespective of the supplier.

Ability to monitor the coordination

6.135 We reviewed the evidence on whether cement producers had the ability to monitor each other's behaviour sufficiently to ensure that deviation from a coordinated outcome could be detected.[147]

6.136 Our analysis is set out in detail in Appendix N. We found that, although realized prices for cement were not very transparent, there was a high degree of transparency on total production of cement, capacity and companies' own market shares. Cement producers have many sources of information available to them on industry outcomes. Information provided by Lafarge showed that it was part of its commercial strategy to gather a significant amount of market intelligence through its sales force on cement users, their suppliers, and the volumes purchased, and that it was able to do so. In addition, our review of internal documents showed that UK cement producers had a high awareness of each other's actions.

6.137 We found that a company could with a fair degree of accuracy monitor its own share of total UK production and sales of cement with a one-month lag using publicly available information from the MPA. Even without knowing the market shares of competitors, this may in many cases be sufficient to detect whether a deviation is likely to have occurred.

6.138 We also reviewed the evidence on whether cement producers could complement market share monitoring with monitoring of whether their own customers were switching to other UK cement producers (given the evidence that Lafarge was

[147] The Guidelines, paragraph 5.5.12.

already doing this through its sales force). We found that, although there was a relatively large number of cement purchasers, the customer base was concentrated. This means that, by actively monitoring a relatively limited number of customers (around 50 customers each in total), cement manufacturers would cover most of their own cement volumes. This monitoring could be carried out through contacts between sales representatives and these large customers to find out, in the event that these customers' volumes reduced, where they had started purchasing from and in what volume.

6.139 As an alternative or in addition to direct monitoring of large customers, cement producers could also complement information on market production and market share with information on lapsed customers. We found that, because customers tended to be regular purchasers, buying cement for use at fixed delivery points, and because they purchased from a single source in the majority of cases, monitoring of lapsed customers could also have been used to enable cement producers to identify whether a deviation has occurred.

Conclusions on Condition 1: ability to reach and monitor coordination

6.140 For the reasons set out in paragraphs 6.124 to 6.139, we concluded that it was likely that UK cement producers currently had the ability to reach and monitor the terms of coordination.

Condition 2: internal sustainability

6.141 Coordination will be internally sustainable (ie within a coordinating group of firms) only where the additional profit from coordination is sufficiently high, and there is a credible and effective mechanism to punish deviations. If coordination is not suf-

ficiently profitable, or the punishment is not believed to be sufficiently likely, swift and costly to the deviator, a firm may prefer to deviate.[148]

6.142 To assess internal sustainability, we therefore reviewed evidence on:

(a) the potential profit from coordination compared with the profit from competition; and

(b) the existence of a mechanism (or mechanisms) for punishment which is swift and costly to the deviating firm.

The benefits from coordination

6.143 Cement is a relatively homogeneous product. Although there are different types of cement (CEM I, CEM II and CEM III), within these categories it appears that there is very little differentiation within each type of cement, eg CEM I produced by one UK producer and CEM I produced by another UK producer.[149] The only differentiation, within a type of cement, appears to be the location of the plant producing the cement. However, catchment areas are generally large for cement so there is little geographical differentiation.

6.144 The implication of this lack of differentiation is that, absent some form of coordination, competition between cement producers on prices is likely to be strong absent capacity constraints (and hence returns low) because customers are readily able to switch between suppliers. The absence of switching costs for customers would also point towards strong competition being more likely, absent coordination.

[148]The Guidelines, paragraph 5.5.15.

[149] Hanson told us that there were some specific technical issues that could affect a customer's ability to swap CEM I purchases from one producer to another, including alkalinity (restricting the ability to use certain cements with certain aggregates) and chloride levels (restricting the ability to use certain cements in certain applications). However, we had no evidence that such technical issues reduced the interchangeability of CEM I to any material extent.

6.145 In these circumstances, the incentives to coordinate are high, because otherwise there is likely to be strong competition and limited returns in periods of excess capacity.

Mechanisms for punishment of deviations

6.146 The fact that coordination profits are potentially much larger than profits from competition is not sufficient for coordination to be internally sustainable: firms must also have an incentive to adhere to the coordinated outcome, rather than unilaterally deviating from the coordinated outcome to further increase their profits. If a firm thought that the other firms in a coordinating group would not respond to it reducing its prices (which would lead to an increase in its sales and returns), that firm would have incentives to deviate from the coordinated position. Coordination will be internally sustainable if coordinating firms believe that deviations will be followed by a period of punishment, such that the losses of profit due to punishment are larger than the benefits from deviation.

6.147 As set out in paragraphs 6.135 to 6.139, we concluded that companies within a coordinating group of UK cement producers would be able quickly to detect deviation from a coordinated outcome. We then examined the evidence on their ability to punish any deviation by imposing costs on the deviator. We also assessed whether such punishment would be sufficiently swift and costly to a deviating firm that it would not regard deviation to be an attractive option, and sufficiently cheap to the punishing firm for it to be attractive to the punisher.

6.148 We considered three ways in which UK cement producers might punish a potential deviator. In doing so, we noted that punishment mechanisms that maximized the cost imposed on the deviating firm while minimizing the costs for producers more generally (eg by limiting the downward pressure on prices across the market) would be

more effective than ones that did not. The three main punishment mechanisms we considered[150] were:

(a) targeting the cement customers of the deviator;

(b) repatriating cement volumes; and

(c) punishing the deviator in a related market (eg targeting the aggregates customers of the deviator or repatriating aggregates volumes from the deviator).

6.149 The first two of these punishment strategies rely on the availability of sufficient spare cement capacity among the coordinating firms to enable them to punish the deviator by taking business from it.[151] We therefore analysed whether there was average spare capacity for cement production in the UK.[152] This analysis is presented in Appendix K.

6.150 Table 8 summarizes the amount of average spare capacity for each major UK cement producer in 2010 (the last year for which we had complete data). Table 8 shows that all the majors had large amounts of average spare capacity in 2010, with the exception of Tarmac whose average spare capacity was low ([✂]). Lafarge has the largest total average capacity in the UK ([✂].

TABLE 8 **Great Britain cement capacity, production and utilization in 2010**

	Capacity tonnes	*Production tonnes*	*Utilization %*	*Excess capacity tonnes*
Hanson*	[✂]	[✂]	[✂]	[✂]
Cemex	[✂]	[✂]	[✂]	[✂]
Tarmac	[✂]	[✂]	[✂]	[✂]
Lafarge	[✂]	[✂]	[✂]	[✂]
Tarmac/Lafarge JV	[✂]	[✂]	[✂]	[✂]

Source: Hanson, Cemex, Anglo American and Lafarge

*Hanson excess capacity figures do not take account of capacity which has been mothballed but could be brought back into operation within three to six months. These figures are therefore likely to underestimate Hanson's total excess capacity. [✂]

[150] Over the period of time for which we had data, we did not see evidence that would suggest that there had been a significant breakdown in any possible pre-existing coordination, for example a price war. Therefore we noted that it was difficult to find evidence as to precisely how deviation would be punished.
[151] The third punishment strategy would depend on spare capacity in the related markets.
[152] We acknowledge that the main parties told us that there was some seasonality in the demand for cement and that hence in some periods there might be limited spare capacity while in others there might be more, compared with the average spare capacity indicator.

6.151 After the proposed JV, the JV entity will have the largest capacity in the UK and total spare capacity will be more balanced, although [✂].

6.152 The results of our capacity analysis also showed that [✂].

6.153 The ability to punish also depends on whether customers can easily switch volumes between cement producers if they are given the incentive to do so. We therefore looked at whether there were any long-term contracts between cement producers and their customers that might prevent customers from switching and therefore limit the effectiveness of punishment strategies (as well as the profitability of deviation in the first place, since any potential deviator would have fewer 'out-of-contract' customers to target). This did not appear to be the case:

(a) The main parties and the other cement majors told us that most purchases of cement were negotiated bilaterally, on a relatively informal basis. Lafarge told us that there were relatively few formal, stand-alone contracts for cement.

(b) We were not aware of any long-term formal contracts between cement producers and their independent customers.

(c) Even between the majors, we found that cross-sales were ad hoc in most cases and, as we set out below, there were frequent examples of majors switching or repatriating purchases of cement, which suggested to us that it was easy to do so.

(d) The only more formal arrangement for cement purchases between the majors of which we were aware [✂].[153]

6.154 Having established that there was sufficient spare cement capacity to enable punishment strategies to be effective, and that there were very few long-term contractual arrangements for cement purchasing which might undermine such strategies, we

[153] [✂]

then considered each of the punishment strategies set out in paragraph 6.148 further.[154] We also noted, however, that the existence of spare capacity would increase the incentives to deviate from coordination as well as increasing the ability to punish deviations.

- *Punishment by targeting the cement customers of the deviator*

6.155 This strategy would entail members of a coordinating group punishing deviators by targeting reduced-price cement at the deviator's customers in order to reduce the deviator's sales of and/or margins for cement.

6.156 As explained in paragraphs 6.136 and 6.153, customers of deviators could be targeted effectively given the lack of long-term contractual arrangements for cement purchasing and the data currently gathered and held by cement producers (which provides information on the identity of other cement producers' customers). Further, as set out in Appendix N, cement purchasers tend to purchase on a regular basis which means that the impact of punishment through independent customers could be swift, particularly if the larger customers of the deviator were targeted such that large volumes were at risk. There was evidence from our survey that cement purchasers were price sensitive (given the homogeneity of the product), and therefore we considered that they were likely to be easily convinced to switch if they were given a price incentive to do so.[155]

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[154] Cemex submitted that there were limitations to these punishment mechanisms that would make them logistically difficult and costly due to *(a)* a free-riding problem, in that each coordinating firm would prefer others to punish, to avoid incurring the costs of punishment itself; *(b)* there would be a lack of clarity in that non-punishing firms would not be able to monitor whether punishment had taken place; and *(c)* there would be a significant lag between the decision to increase capacity (to enable punishment) and when capacity became available. However, we considered that it was likely to be understood that the punisher would be the firm that had suffered the reduction in its share of production, Non-punishing firms would therefore not need to be able to monitor whether punishment had taken place. Further, punishment would not require additional investment in capacity in order to be feasible and effective. In particular, we noted that, with the exception of Tarmac, all domestic cement producers had excess capacity (to differing degrees) and therefore could expand production if they wished to do so to punish deviations.

[155] Our survey found that, for cement customers and RMX competitors who had switched cement suppliers in the past three years, price was the key reason for switching. *Source: p61 of the GfK report.* The survey also found that price was the most important factor in deciding which type of cement to use for 54 per cent of cement customers and 48 per cent of RMX competitors.

6.157 Our analysis of cement switching data (see Appendix O) suggested that patterns in customer switching were consistent with the existence of some signalling or retaliatory strategies based on volumes purchased by independent and integrated customers. We found that there was evidence of symmetry in the patterns of gains and losses between the majors: years with large losses of volumes to a particular major were often characterized by large gains from that major, and years with low losses of volumes to a particular major were often characterized by low gains from that major. [✂] We considered that this evidence was consistent with the existence of some form of retaliatory strategy. Lafarge told us that there had been high levels of switching and that the number of customers who were able to secure lower prices without switching (by threatening to switch) was comparable to those who actually switched. Lafarge argued that this was not consistent with coordination. We agreed that there had been relatively high levels of switching in some years, and particularly in 2009 at the time when the overall market demand reduced substantially. However, we were not convinced by the evidence from Lafarge that customers were able to secure lower prices by threatening to switch: in particular, we did not find that this had resulted in a reduction in cement prices or in margins in 2009. In any case, we disagreed that coordination would necessarily result in low switching: periods with high switching could indicate periods of breakdown in the extent of coordination (see paragraph 6.97).

6.158 We recognized that punishing deviators by targeting competitors' customers with reduced-price cement could also impose costs on coordinating firms as a whole if it destabilized prices throughout the market, with other customers demanding the same low prices being offered to the targeted customers. However, as noted in paragraph 6.133, we found that realized prices for cement were not very transparent, which would reduce the risk of such price 'leakage' because customers would not usually be aware of the prices being paid by other customers. Indeed, under these circum-

stances, punishment through targeted price reductions could be a relatively cheap way to punish deviations.

- *Signalling and punishment through repatriation of cement volumes*

6.159 Appendix O shows that repatriation of cement volumes has in the past been common in the industry and that large volumes of cement have been repatriated by cement producers, in particular in 2009.[156] We also found that there was evidence in internal documents that repatriation of volumes had been used in a targeted manner and the analysis also suggested the existence of retaliatory strategies and/or the use of repatriation as a signalling device.

6.160 We analysed cross-sales of cement between the majors, since it is the existence of these cross-sales that makes repatriation possible. Our analysis is set out in Appendix P. We found that Lafarge is a net seller of cement (ie in total it produces more than it needs for its in-house cement-consuming businesses such as RMX production), and Tarmac is a net purchaser of cement. We recognized that Lafarge currently purchased less cement from the other majors than it had done previously, and therefore we considered that Lafarge did not currently purchase sufficient volumes from the other majors (and in particular from Hanson) to permit much repatriation by Lafarge. Therefore Lafarge was more recently limited in its ability to use repatriation as a mechanism for discouraging deviation from the coordinated outcome or for signalling to the other members of a coordinating group that deviation had been detected (see paragraph 6.162). [✂] and [✂] are [✂]. [✂] and [✂] are [✂].

[156] Anglo American told us that any internalization of cement volumes that occurred was a one-off in 2009, as a result of increased vertical integration in the industry and the economic downturn. However, this was not consistent with our analysis (see Appendix O).

6.161 Currently, Lafarge has less in-house demand for cement than Hanson, Cemex and Tarmac because its in-house RMX business is small compared with the RMX business of Cemex, Tarmac and Hanson. This in turn leads to Lafarge having less need and less ability to purchase cement volumes externally, and less ability therefore to repatriate cement volumes in response to deviations or as a signalling device. Conversely, because Tarmac sells very small volumes to the other majors because of its position as a net purchaser of cement, it is difficult for the other majors to punish Tarmac by repatriating volumes away from Tarmac if Tarmac deviates. The main parties argued that any repatriation of particular cement volumes could only be done once, which would also limit the effectiveness of repatriation as a punishment mechanism.

6.162 Small-scale repatriation could be used as a signalling mechanism between the majors to indicate that deviation from the terms of coordination had been detected. Such signalling would only require minimal volumes of cross-sales and would be more effective, the greater the extent to which each market participant maintained a cross-sales arrangement with each other market participant. It would be a very cheap way to signal that deviations had been spotted, and would reduce the risk and costs of undertaking actual punishment either via lower prices or large scale repatriation.

6.163 In our review of internal documents provided to us by the majors, we found some documents that discussed the use of repatriation as a mechanism to signal to and/or retaliate against other cement producers. The relevant extracts from these internal documents included:

(a) An internal 2006 Lafarge email exchange between [✂] and [✂] discusses losses to Dudman Cement (which was purchasing cement from Teutonia, owned by Heidelberg, ie Castle's parent). The email states: [✂].

(b) In an email exchange between [✂] and [✂] regarding Cemex losses, it is stated: [✂].

(c) A set of Lafarge's internal documents in 2003 (memo, email and proposal) discuss a possible [✂]. In Lafarge's proposal, [✂].

- *Punishment by targeting the customers of the deviator in other related markets*

6.164 We noted that, as a result of the extent of multi-market contact between the majors, it was possible to envisage punishment of deviators in related markets (such as aggregates). We also noted that there were some indications in internal documents that the majors considered such options (see paragraph 6.163). Lafarge told us that, given the large gap between margins on incremental sales of aggregates and RMX products compared with cement, punishment in aggregates and/or RMX would need to be on a significant scale to effectively punish deviation in the cement market. Lafarge added that levels of cross-sales in aggregates were generally too low for repatriation to be a credible punishment mechanism. Anglo American told us that punishment in aggregates would be unrealistic, given the large number of local markets with different competitors in each market. We did not analyse the feasibility of such punishment mechanisms in detail, given our views on the effectiveness of the other punishment mechanisms available (see paragraphs 6.155 to 6.163).

Conclusions on Condition 2: internal sustainability

6.165 In light of our assessment in paragraphs 6.143 to 6.164, we found that:

(a) Given the lack of differentiation between cement made by different UK producers (within each type of cement), the incentives to coordinate were large because, without coordination, it was likely that competition would be strong in bringing prices down in periods of excess capacity.

(b) We found that (i) there was sufficient excess capacity in the market and (ii) customers were able to switch volumes sufficiently easily between cement producers

to enable punishment strategies based on taking business from a deviator to be effective.

(c) One mechanism for punishment was to reduce prices to the deviator's customers so as to impact on the deviator's volumes and margins. Such a mechanism appeared likely to be effective in this market given the lack of long-term contracts, regularity of cement purchasing and customer price sensitivity. The scope for such a punishment mechanism to disrupt the market in general (in pushing industry prices down) was limited by the limited transparency of realized prices for cement, and it might therefore not be particularly costly to the punishing firm to implement.

(d) Repatriation of cement volumes was potentially also an effective signalling and/or punishment mechanism. This was because it was swift, targeted and (if used as a signalling mechanism) could reduce the risk of more costly punishment being required and (if used as a punishment mechanism) could be very costly to deviating firms while having a low risk of destabilizing the market. We found that repatriation had occurred regularly in the past three years, but that Lafarge was constrained, compared with the other UK major producers, in its ability to repatriate because it was not currently a large buyer of cement for its own use.

6.166 For these reasons, we concluded that it was likely that coordination among the UK cement producers would be internally sustainable at present.

Condition 3: external sustainability

6.167 Coordination will be sustainable only if the outside constraints on the firms involved in coordination are relatively limited. It is not necessary for all firms in the market to be

involved in coordination, but those firms which coordinate need to be able collectively to exercise a degree of market power.[157]

6.168 We therefore considered the following external factors which might undermine co-ordination:

(a) the existence of a competitive fringe;

(b) entry into the production of cement in the UK;

(c) countervailing buyer power; and

(d) the existence of a current UK cement supplier with different ability and/or incentives in relation to coordination.

The competitive fringe

6.169 Any sales of cement in the UK not made by Lafarge, Tarmac, Hanson and Cemex are of cement which is produced abroad and imported into the UK.

6.170 Table 5 above set out the share of Great Britain sales of bulk cement of each of the four UK cement producers, and total share of sales of imports of bulk cement in Great Britain.

6.171 Collectively, the four UK cement producers accounted for about [✂] per cent of all bulk cement sales in Great Britain in 2010. This strongly suggests that they will be able to exercise a degree of market power collectively.

6.172 Our analysis of the constraint from imports is set out in Appendix Q. The evidence we reviewed shows that imports of cement into the UK were somewhat of a constraint in Great Britain and that [✂]. There is evidence of spare capacity for imports, both at

[157]The Guidelines, paragraph 5.5.17.

terminals and more generally, because of the existence of considerable spare capacity for production of cement in mainland Europe.

6.173 There is also evidence that imports have increased their share of Great Britain cement sales (from [✂] per cent of all cement sales in 2006 to [✂] per cent in 2010) and of Great Britain bulk cement sales (from [✂] per cent in 2008 to [✂] per cent in 2009 and 2010). This is also found in our analysis of switching data, in that importers have tended to gain some volumes from the majors, and that gains and losses to importers were larger than we would expect from diversion ratios. Also, although there is some evidence that some independent importers have small catchment areas (less than 40 miles), evidence provided by Lafarge and Tarmac suggests that many cement customers are within 80 miles of an import terminal, and therefore that many cement customers could potentially purchase imported cement.

6.174 However, there is also evidence that the constraint from imports is not sufficient to prevent the UK majors exercising a degree of collective market power:

(a) Despite the increase in the market share of imports between 2006 and 2009, and particularly the increase from [✂] per cent of bulk cement sales in Great Britain in 2008 to [✂] per cent in 2009, we did not find evidence that the rise in import share had a noticeable impact on prices charged by UK cement producers. We found that both the average variable margins and the average cement prices of Lafarge and Tarmac had in fact increased between 2008 and 2009.

(b) The results from the PCA suggested that the presence of an independent import terminal was not a strong constraint on Lafarge's cement prices, and that the significance of any effect reduced if we did not include Aggregate Industries as an independent importer.

(c) The estimates we obtained from independent importers showed that the total costs of delivering cement to Great Britain customers were substantially higher

for importers than for UK cement producers, because importers incurred additional transport costs for shipment.

(d) The fact that UK producers have a substantial cost advantage over importers on a marginal basis (and have excess capacity) is likely to limit the extent to which importers can constrain Great Britain cement prices. Given the lack of transparency in prices of cement, UK producers would be able to undercut importers profitably. Importers can anticipate that UK producers are able to undercut them, and therefore may find it in their interest to behave as price followers.

(e) Imports also suffer from exchange rate risks. The strength of the constraint from imports is therefore subject to variation, depending on the £/€ exchange rate as well as on total demand in mainland Europe. At the moment, total demand is low, which has resulted in spare capacity, but in the longer term excess capacity in Europe may reduce and/or exchange rates may move against the pound which could result in a reduction in imports.

Entry into the production of cement in the UK

6.175 Our analysis of entry into the production of cement in the UK is presented in Appendix S. All the evidence we received from the main parties and third parties was that there were high barriers to entry into cement production.

Countervailing buyer power

6.176 We did not receive any submissions on the existence of buyer power in relation to bulk cement.

6.177 Aggregate Industries is one of the major construction material producers in the UK. However, as set out in paragraph 2.26, it does not produce cement in the UK. It is therefore a very large buyer of cement and it buys both domestically-produced and

imported cement.[158] It is possible that Aggregate Industries could threaten to increase its imports if prices for UK-produced cement were too high. However, it is also possible that the UK cement producers could use strategies to prevent Aggregate Industries from increasing its imports (eg by keeping prices of cement to Aggregate Industries relatively low). [✂], which indicated that, even if it had some bargaining power in relation to cement purchasing due to its large size, such bargaining power would not protect independent customers from price increases.

Existence of a cement supplier with different ability or incentives in relation to coordination

6.178 The Guidelines state that, in assessing whether coordination would be externally sustainable, the CC may consider whether there is a 'maverick'. Coordination will be harder to sustain where there is a firm with substantially different incentives to coordinate than its rivals, and with the capacity to take significant share from any group of firms that tried to coordinate without its participation.[159]

6.179 Tarmac may have different incentives to coordinate than Lafarge, Hanson and Cemex, as evidenced in part by its past behaviour:

(a) As noted in paragraph 6.152, Tarmac has been operating at much higher capacity utilization rates than the other three UK cement producers in the past ten years. It reached full capacity in 2007 (and was very near to full capacity in 2005 and 2006).

(b) Anglo American told us that [✂]. This means that Tarmac has been selling its whole production capacity (internally via its own RMX operations as well as via independent RMX operators) at the market price. This suggested to us that Tarmac, unlike Cemex, Hanson and Lafarge, had chosen not to reduce output to maintain the market price.

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[158] [✂]
[159] The Guidelines, paragraph 5.5.18.

(c) Of the four UK cement producers, Tarmac appears currently to be the lowest-cost producer in terms of variable costs (see paragraph 6.113). This means that reducing output would have a higher opportunity cost for Tarmac than for the other less efficient producers,[160] making it less likely to do so.

(d) Tarmac has been historically strong in RMX production and in the last decade has increasingly integrated backward into cement. As set out in paragraph 6.103, Tarmac invested in a new cement plant at Buxton in 2004 (increasing capacity from [✂] to [✂]), and then increased capacity at Buxton by a further [✂] in 2008. As set out in paragraph 4.5, Tarmac also received planning permission in January 2011 to add a second kiln to its cement plant at Buxton (although we accept that, in current market conditions, Tarmac would be unlikely to expand its capacity in the near future in the absence of the proposed JV). For many recent years, Tarmac has operated its plant at, or very close to, full capacity (see Appendix K).

(e) We found that, prior to the proposed JV, Tarmac may have not had strong incentives to monitor customer wins and losses (see Appendix N).

6.180 There is also evidence in the internal documents of the other UK cement producers that they perceived Tarmac as behaving in a different way from other market participants:

(a) Lafarge's Cement Strategic Review of 2009 states: [✂].

(b) Cemex's UK business plan for 2010 states: [✂].

(c) Tarmac wrote a letter to Lafarge in 2008 [✂].

6.181 On the basis of the evidence set out in paragraphs 6.179 and 6.180, we found that it was likely that *(a)* Tarmac did not, at present, have the same incentives to coordinate

[160] If Tarmac were to cut production, this would raise the market price of cement. Tarmac would benefit (and share this benefit with all other producers) from higher prices on its remaining sales, but it would give up profits on the lost sales. As Tarmac's profits on its marginal sales are higher than those of other cement producers, it will have reduced incentives to cut production.

as the other UK cement producers, and *(b)* it was likely to be part of a competitive fringe. However, as set out in paragraph 6.152, Tarmac currently operates at, or close to, full capacity, suggesting that it cannot expand sales further in the short term and therefore that it would not at present be able to further undermine a coordinated outcome other than by expanding its current capacity.

6.182 Nonetheless, Tarmac may benefit from any coordination that exists because it would be able to produce at capacity, whilst selling its output at prices arising from any such coordination (which would be higher than those that would prevail in a competitive market).

Conclusions on Condition 3: external sustainability

6.183 On the basis of paragraphs 6.169 to 6.182, we found that coordination was likely to be externally sustainable at present.

The effect of the proposed JV on coordination

Framework for our assessment

6.184 We examined the effect of the proposed JV on the likelihood and effectiveness of coordination by assessing its effect on the extent to which the three conditions for coordination set out in paragraph 6.93 were satisfied. Although we looked at the impact of the proposed JV on each of the conditions, it is not necessary that the proposed JV increases the extent to which each condition is satisfied in order to reach an SLC finding on the basis of coordinated effects. Our assessment was necessarily forward looking—we used the evidence on current behaviour in the market as a starting point and then considered how the incentives and abilities of market participants to coordinate would change as a result of the proposed JV.

6.185 In doing so, we noted that, following the proposed JV, there would be:

(a) increased concentration in UK cement production;

(b) increased consolidation in RMX production at a UK level; and

(c) a more balanced position in terms of the degree of vertical integration between the JV entity, Hanson and Cemex (compared with the present position of Lafarge in which it does not control as large a RMX business as Hanson and Cemex).[161]

6.186 The market structure in cement and RMX following the proposed JV is summarized in Tables 9 and 10.

TABLE 9 **Balance of purchases and sales of cement, and ratios of use/production, before and after the proposed JV, all majors**

	2008	*2009*	*2010*
Volumes produced (tonnes)			
Lafarge	[✂]	[✂]	[✂]
Hanson	[✂]	[✂]	[✂]
Tarmac (bulk only)	[✂]	[✂]	[✂]
Cemex	[✂]	[✂]	[✂]
Aggregate Industries*	[✂]	[✂]	[✂]
Volumes used internally (RMX and blocks) (tonnes)			
Lafarge	[✂]	[✂]	[✂]
Hanson	[✂]	[✂]	[✂]
Tarmac	[✂]	[✂]	[✂]
Cemex	[✂]	[✂]	[✂]
Aggregate Industries	[✂]	[✂]	[✂]
Ratio of use/production (%)			
Lafarge	[✂]	[✂]	[✂]
Hanson	[✂]	[✂]	[✂]
Tarmac	[✂]	[✂]	[✂]
Cemex	[✂]	[✂]	[✂]
Aggregate Industries†	[✂]	[✂]	[✂]
JV entity	[✂]	[✂]	[✂]

Source: Transaction data from Lafarge, Hanson, Tarmac, Cemex and Aggregate Industries.

*Aggregate Industries does not produce cement in Great Britain. The volumes shown in this table are the volumes it imports into Great Britain.
†For Aggregate Industries, this is the ratio of its use of cement to its imports of cement.

TABLE 10 **Market shares of bulk cement sales in Great Britain and shares of Great Britain RMX sales in 2010**

	Lafarge	*Tarmac*	*JV*	*Hanson*	*Cemex*
Cement	[30–40]	[10–20]	[40–50]	[20–30]	[20–30]
RMX	[0–10]	[10–20]	[20–30]	[10–20]	[10–20]

Source: Bulk cement market shares based on CC calculations; RMX shares at a national level based on OFT decision.

[161] Given our finding (see paragraph 6.181) that Tarmac was likely to be part of a competitive fringe, it will often be correct in our analysis of the effects of the JV on coordination to compare the position of the JV entity with that of Lafarge before the proposed JV.

6.187 We also considered the question of what would be likely to happen to the existing patterns of cross-sales among UK cement producers (as set out in Appendix P) if the proposed JV were to take place. This is because some of the possible effects of the proposed JV on coordination depend on the extent to which the JV entity maintains Tarmac's existing purchases from and Lafarge's existing sales to the remaining UK cement producers.

6.188 As shown in Table 11, at present, Lafarge is a net seller of cement and Tarmac is a net buyer of cement. Lafarge buys very little cement from the other majors [✂].

TABLE 11 **Purchases of cement by UK majors from other UK majors, 2010**

'000 tonnes

	Lafarge	*Hanson*	*Cemex*	*Tarmac*	*Total purchases from other majors*
Tarmac purchases from	[✂]	[✂]	[✂]		[✂]
Lafarge purchases from		[✂]	[✂]	[✂]	[✂]
Cemex purchases from	[✂]	[✂]		[✂]	[✂]
Hanson purchases from	[✂]		[✂]	[✂]	[✂]
Total sales to other majors	[✂]	[✂]	[✂]	[✂]	

Source: Lafarge, Hanson, Cemex and Tarmac.

6.189 The main parties told us that, following the proposed JV, the JV entity was [✂] of Tarmac's existing external purchases of cement, given Lafarge's existing excess cement capacity, the geographical spread of Lafarge's cement business and the available synergies from internalizing these purchases. In our view, this may be rational to the extent that any of these purchases were 'one-sided' (ie not carried out as part of a swap arrangement, in which neither party had to cover the other party's margin). We recognized that under the current circumstances it would be likely to be cheaper for a cement producer to self-supply if it had the capacity to do so, to avoid paying what was likely to be a considerable margin (see paragraph 6.108) to another producer.

6.190 However, we were also told by the main parties that the main reason for the current pattern of cross-sales was to [✂].

6.191 Therefore, we did not consider that the JV entity would necessarily internalize all of Tarmac's current cement purchases from [✂] and [✂] following the JV. Table 12 sets out the cross-sales position following the JV under three scenarios: *(a)* the JV entity internalizes all of Tarmac's current purchases from [✂] and [✂], *(b)* the JV entity maintains Tarmac's current [✂] volume swap arrangement with [✂] and *(c)* the JV maintains Tarmac's current [✂] volume swap arrangement with [✂] and internalizes half of current purchases from [✂] (under the assumption that some of the purchases from [✂] may still be maintained because of logistical efficiencies).

TABLE 12 **Cross-sales position after the JV, using different assumptions on internalization of Tarmac's external sales**

'000 tonnes

	JV	*[✂]*	*[✂]*	*Total purchases from other majors*
Assumption (a): the JV entity internalizes all Tarmac purchases from [✂] and [✂]				
JV purchases from		[✂]	[✂]	[✂]
[✂] purchases from	[✂]		[✂]	[✂]
[✂] purchases from	[✂]	[✂]		[✂]
Assumption (b): the JV entity maintains Tarmac's current [✂] volume swap arrangement with [✂], and internalizes Tarmac's purchases from [✂]				
JV purchases from		[✂]	[✂]	[✂]
[✂] purchases from	[✂]		[✂]	[✂]
[✂] purchases from	[✂]	[✂]		[✂]
Assumption (c): the JV entity maintains Tarmac's current [✂] volume swap arrangement with [✂] and internalizes half of Tarmac's current purchases from [✂]				
JV purchases from		[✂]	[✂]	[✂]
[✂] purchases from	[✂]		[✂]	[✂]
[✂] purchases from	[✂]	[✂]		[✂]

Source: CC analysis of transaction data from Lafarge, [✂], [✂] and Tarmac.

6.192 One part of our assessment of the effect of the proposed JV on coordination depends on the view we take on the likely extent of the JV entity's cross-sales. There is some uncertainty as to what this will be. We therefore identify in our assessment those effects that appear to enhance the scope for coordination that rely on an assumption that the JV entity will retain most of Tarmac's current external purchases of cement,

and take this uncertainty into account when considering the overall effect of the proposed JV.

Effect on Condition 1: ability to reach and monitor coordination

6.193 Following the proposed JV, we considered whether the first condition for coordination (the ability to reach and monitor coordination) would be satisfied to a greater extent.

6.194 We considered ways in which it might be easier for any group of coordinating firms to reach and monitor coordination following the proposed JV. The ability to reach a common understanding on coordination (which would be most relevant in the absence of pre-existing coordination) requires that firms come to an understanding over time and via their market interactions that they would be better off by coordinating, that they would be able to coordinate and what the system for coordination should be. If the proposed JV made it more likely that UK cement producers could reach a common understanding on the terms of coordination, or that they could do so more quickly, the proposed JV would increase the extent to which Condition 1 was satisfied.

6.195 We examined whether the proposed JV would strengthen both the ability to reach and the ability to monitor coordination because:

(a) there would be fewer cement producers; and

(b) there would be increased information available to the JV compared with Lafarge's current position.

- *Number of producers*

6.196 As a result of the proposed JV, the number of cement producers will decline from four to three and the number of major RMX suppliers will decline from five to four.

6.197 We considered that the reduction in the number of domestic cement producers was likely to make it easier to reach a common understanding on the terms of coordination (or to reach such an understanding more quickly). There are a number of ways in which this could happen. For example, any action of aggressive competition by one producer would affect the remaining two competitors more strongly (in terms of loss of cement or RMX share or customers) than the previous three competitors. Following the proposed JV, cement producers are therefore likely to reach an understanding of the benefits they can achieve from coordination more quickly. In relation to the ability to monitor coordination, UK producers will be more able to spot deviations or to target punishment with fewer alternative producers in the market. For example, fewer producers make it easier to understand whether a reduction in sales is due to a decline in the overall demand for cement or to the aggressive behaviour of a competitor.

6.198 Even with Tarmac's current low volume of external sales, Tarmac's independent existence and its incentive to continue to expand output, as a large internal user of cement, still introduces some additional uncertainty and makes it more difficult to reach a common understanding on the terms of coordination (if there was none in the past) or to strengthen the current degree of coordination (if there was already some degree of pre-existing coordination).

- *Increased market information available to the JV*

6.199 We considered that, following the proposed JV, the JV entity might have access to more information on its cement competitors than Lafarge at present. The main reason why this would be the case is that the JV entity's increased vertical integration, which would result from combining Tarmac's strong position in RMX plants with Lafarge's large cement production, would allow more information on the RMX market to flow to the JV entity than Lafarge has access to at present. This would provide the

JV entity with a better understanding (in terms of overall information and its geographic distribution) of the RMX market (as well as there being one fewer competitor in this market) and enhance its ability to spot deviations in cement purchases. RMX plants would have better local knowledge to spot deviation via better knowledge of the local market conditions for cement. For example, prior to the proposed JV, in areas where it does not have RMX plants Lafarge may find it difficult to distinguish when its sales are affected by an overall decline in demand and when they have declined because of aggressive pricing by competitors. We noted that this effect of the proposed JV was a consequence of the combination of Tarmac and Lafarge's RMX businesses and would arise even without the combination of their cement operations.

- *Conclusions on the effect of the proposed JV on Condition 1*

6.200 On the basis of paragraphs 6.193 to 6.199, we found that the proposed JV was likely to increase the ability of UK cement producers to reach and monitor coordination in the bulk cement market.

Effect on Condition 2: internal sustainability

6.201 In assessing the impact of the proposed JV on internal sustainability we examined its likely effects on:

(a) the incentives to coordinate, ie the impact on the incentives of each individual producer to deviate from coordination—in this context, we looked at the effect of changes in the number of producers, cost structures, the degree of vertical integration; and the pattern of cross-sales; and

(b) the ability of each cement producer to punish any deviation from coordination by others—in this context, we looked at the impact of the proposed JV on the effectiveness of repatriation as a punishment mechanism.

- *Fewer producers*

6.202 We noted that the reduction in the number of producers following the proposed JV would mean that members of any coordinating group would obtain a larger share of the overall profits when they coordinated rather than competing. More precisely, in the short run, the JV entity would have a larger share of profits from coordination than Lafarge would have at present. The JV entity would therefore have a stronger incentive to coordinate. In the medium term, following the proposed JV, any additional increase in cement sales in Great Britain (eg if demand recovers) would be shared by fewer producers who would have weaker incentives to deviate to capture additional sales.[162] This would contribute to making coordination more likely (or any pre-existing coordination more stable).

- *Cost similarities*

6.203 As set out in paragraph 6.113, in recent years and in terms of variable costs, Lafarge's cement plants have been among the highest cost plants in the UK while Tarmac has been the lowest-cost producer. Following the proposed JV, the level of the JV entity's variable production costs will have greater similarities to those of Hanson and Cemex than either Tarmac or Lafarge's costs have at present. This will reduce the JV entity's incentive to deviate from coordination and increase (compared with Lafarge at present) the JV entity's incentive to punish deviation from coordination. This is because:

(a) More efficient providers may gain more from deviating (if they have sufficient capacity to increase volumes by doing so), as set out in paragraph 6.179. This is because every sale they gain when they deviate will be more profitable to them than to less efficient providers.

[162] The larger the share of profits of the producer from coordination, the more it could lose from punishment and the less it could gain from deviating.

(b) Less efficient providers may find it more costly to discipline deviations by reducing prices. Because of their higher costs, the profits of less efficient providers will be more strongly affected by lower prices.

6.204 Therefore, the greater similarities in costs between the UK cement producers are likely to enhance the internal sustainability of coordination.

- *Vertical integration*

6.205 The proposed JV would not reduce the size of the independent RMX sector. However, it would change the positions of the cement producers in the industry. Lafarge is currently the least vertically integrated cement producer as it has a relatively more modest position in RMX. The JV entity would have a larger RMX business than Lafarge currently has, and this would make its vertically integrated position closer to that of Hanson and Cemex.

6.206 The increased vertical integration of the JV entity, compared with that of Lafarge currently, would increase the ability of the JV entity to punish deviations by reducing prices in the external market without fearing the full impact of its action on profits. This is because internal sales of cement by the JV entity would be larger than those of Lafarge at present, and because internal sales of cement may not be as affected by a reduction in external prices as external sales.[163]

6.207 We acknowledge that, on the basis of the same reasoning set out in the previous paragraph, the JV entity would have a stronger incentive to deviate than Lafarge

[163] This requires that lower cement prices to some independent RMX businesses do not always feed into lower prices for cement for the whole RMX market (and, hence, also reductions in the downstream price of internal sales). In order for that to happen there would need to be some product differentiation downstream. RMX is a homogeneous product. However, given that RMX markets are local, there is an element of geographical differentiation which could ensure that lower cement prices to independent RMX providers may not fully affect (via lower prices for RMX) internal cement sales. Furthermore, we consider that punishment can be targeted by reducing prices to selected customers (see paragraphs 6.155 to 6.158).

does currently as the JV entity will be less reliant on external sales (in proportion to its internal sales).

6.208 Critically, however, it is the increased similarity in the position of cement producers in terms of vertical integration into RMX that would make any coordination more stable or more likely to emerge following the proposed JV, by aligning both the incentives to coordinate and the ability to punish. Currently, Cemex and Hanson (because of their higher degree of vertical integration than Lafarge) would suffer less in a punishment phase (in which prices to independent cement customers are reduced) than Lafarge. Hence, at present, their incentives to deviate may be stronger than Lafarge's. Following the proposed JV, the incentives of the three remaining UK cement producers to deviate would be more closely aligned, thus increasing the stability of coordination (or increasing the likelihood of coordination to emerge). Each coordinating firm would have a better understanding of the abilities and incentives of each of the other coordinating firms and would be better able to take these expectations into account in its own behaviour. We noted that this effect of the proposed JV was a consequence of the combination of Tarmac and Lafarge's RMX businesses and would arise even without the combination of their cement operations.

6.209 In the discussion thus far, we have focused on the incentives to deviate and punish following the proposed JV in terms of action solely in relation to external sales of cement. However, the proposed JV will also provide the JV entity with an additional tool to punish deviations which Lafarge currently does not have: the ability to punish other UK producers by lowering the RMX prices charged by its integrated RMX business. This would allow the JV entity to increase its RMX and cement sales to the detriment of the other cement producers. Lafarge's RMX business is currently small. This means that any Lafarge attempts to punish deviation from the coordinated outcome in cement by lowering its integrated RMX business's prices for RMX would be

unlikely to be effective. As a result of the JV, because of Tarmac's contribution of RMX plants, the JV entity would be able to use its cement prices and/or its RMX prices to deviate and punish. There will also be greater similarities between the incentives of the JV entity, Cemex and Hanson to deviate and punish in relation in the cement market using their RMX prices. We noted that this was a further example of an effect of the proposed JV that was a consequence of the combination of Tarmac and Lafarge's RMX businesses and that would arise even without the combination of their cement operations.

6.210 Therefore, by increasing similarities in vertical integration and granting the JV entity increased flexibility and options in its punishment actions than Lafarge has at present, we found that the proposed JV would be likely to increase the sustainability of coordination.

- *Increased ability to signal before more costly punishing*

6.211 If the JV entity has greater cross-sales with Hanson and Cemex than Lafarge does currently (see paragraph 6.191), then it will have an enhanced ability compared with Lafarge to use repatriation as a cheap signal to deviators from the coordinated outcome to cease doing so, short of entering a more costly punishment phase. Hence the proposed JV may result in a lower risk for the cement producers of costly price wars than at present.

- *Increased effectiveness of punishment mechanisms*

6.212 The ability of the JV entity to spot and better punish deviations would increase following the proposed JV, compared with Lafarge at present.

6.213 As set out in paragraphs 6.155 to 6.158, one of the punishment mechanisms currently available in the market is to engage in targeted punishment, for example by

lowering cement prices to important customers of the other UK producers. As set out in paragraph 6.199, the merging of Lafarge's and Tarmac's RMX businesses would increase the information the JV entity has on the RMX markets compared with Lafarge at present. This increases the JV entity's ability not just to spot deviations, but to target punishment where it is most effective against competitors and less costly for the JV entity.

6.214 We also considered the effectiveness of repatriation as a punishment mechanism (rather than simply a signalling tool) following the proposed JV. If the JV entity maintains, at least in part, more extensive cross-sales with Hanson and Cemex than Lafarge does currently (see paragraph 6.191), then it will be able to punish Cemex and Hanson via repatriation whereas Lafarge and Tarmac cannot currently do so:

(a) Lafarge cannot repatriate because it does not purchase from the other producers at present [✂]; and

(b) Tarmac cannot repatriate because it cannot increase its self-supply without further expanding its capacity, which takes time and resources to do.

6.215 We noted that any increased ability of the JV entity (compared with Lafarge at present) to use repatriation of sales as either a signal or a punishment mechanism would be a consequence of the combination of Tarmac and Lafarge's RMX businesses and would arise even without the combination of their cement operations.

6.216 We noted that, following the proposed JV, if the current pattern of cross-sales did not substantially change, both Hanson and Cemex would be able to respond to repatriations by the JV entity by repatriating cement themselves, given that they would both purchase from the JV entity and have excess capacity. This suggests that repatriation following the JV may not be particularly effective as punishment but, as dis-

cussed above, could be a useful signalling mechanism before punishment takes place in the form of lower prices.

- *Conclusions on the effect of the proposed JV on Condition 2*

6.217 On the basis of paragraphs 6.202 to 6.216, we found that the proposed JV was likely to increase the internal sustainability of coordination in the bulk cement market.

Effect on Condition 3: external sustainability

6.218 Following the proposed JV, we considered that it would continue to be unlikely that any of the first three factors listed in paragraph 6.168 (namely the behaviour of the competitive fringe, entry into cement production and countervailing buyer power) would undermine coordination in the bulk cement market, for the same reasons that these factors would not currently undermine any possible existing coordination (see paragraphs 6.169 to 6.177).

6.219 As set out in paragraph 6.181, we found that it was likely that Tarmac:

(a) did not, at present, have the same incentives to coordinate as the other major UK cement producers;

(b) was likely to be part of a competitive fringe; and

(c) could not expand its sales further in the short term, given that it currently produces at, or close to, full capacity (and would therefore not be able to undermine further any possible pre-existing coordination other than by expanding its current capacity).

6.220 As explained in paragraphs 6.203, the JV entity will have stronger incentives to reduce production than Tarmac currently does[164] because it will, on average, be a less efficient cement producer than Tarmac is currently (which means it would gain

[164] The JV entity's incentives to coordinate will also be more closely aligned with those of Cemex and Hanson than Tarmac's (or Lafarge's) incentives are at present.

less from deviating by expanding output than Tarmac currently would, for the reasons set out in paragraph 6.179). The JV entity could reduce production at lower opportunity cost than Tarmac could do at present by reducing production at Lafarge's least efficient plants rather than at Tarmac's more efficient plant.

6.221 Tarmac has to date considerably expanded its capacity on two occasions in the past ten years. Tarmac may therefore have been perceived as a long-term potential threat to any possible coordination, and it is possible that other market participants would, in the interests of maximizing their own profitability, have accommodated Tarmac's increased market share rather than reduce their prices. After the proposed JV, the threat that the JV entity may expand its capacity further will be lower as it will already benefit from Lafarge's excess capacity.

6.222 The increased symmetry resulting from the proposed JV, and its 'stabilizing' impact on the market, was noted in several internal documents from the majors commenting on its impact. Lafarge, in its strategic review of cement for 2010, commented that: '[✂]'.[165]

6.223 Similar comments are noted in Lafarge's 'Cement strategic review 2009': '[✂]'.

6.224 In its UK strategic plan 2011 to 2015, Hanson comments that: [✂].

6.225 Cemex, in its UK Business Plan 2011–2015, May 2011, [✂].[166]

[165] [✂] We considered this to be consistent with our view that the proposed JV would increase the similarities between the JV entity, Cemex and Hanson in terms of the extent of their vertical integration (compared with Lafarge, Cemex and Hanson at present).
[166] [✂]

- *Conclusions on the effect of the proposed JV on Condition 3*

6.226 On the basis of paragraphs 6.218 to 6.225, we found that the proposed JV was likely to increase the external sustainability of coordination in the bulk cement market, because it would eliminate an existing market participant with a strong incentive to expand (rather than reduce) its output.

Conclusions on the effect of the proposed JV on coordination

6.227 As set out in paragraphs 6.200, 6.217 and 6.226, we found that the proposed JV was likely to result in each of the three conditions for coordination (as set out in paragraph 6.93) being satisfied to a greater extent than at present in the bulk cement market. We continued to consider that any coordination in this market would be most likely to operate in the manner set out in paragraph 6.120.

6.228 Some of the ways in which the proposed JV was likely to increase companies' abilities and incentives to coordinate in cement would arise from the combination of Tarmac and Lafarge's cement businesses. These are, in summary:

(a) making reaching a common understanding on the terms of coordination easier and/or swifter, and making monitoring of wins and losses of cement customers and production volumes easier as a result of the reduction in the number of producers;

(b) increasing the benefits of coordination, since fewer producers would each have a larger share of the overall profits from coordination;

(c) better aligning the JV entity's variable production costs with those of Hanson and Cemex, thereby aligning incentives to deviate from coordination and to punish deviation from coordination and increasing the stability of coordination; and

(d) removing Tarmac as an independent competitor with a strong incentive to produce at capacity and to expand its capacity (and sales) in the future.

6.229 Some of the ways in which the proposed JV was likely to increase companies' abilities and incentives to coordinate in cement would arise from the combination of Tarmac and Lafarge's RMX businesses. These effects would arise even if it were not proposed to combine Tarmac and Lafarge's cement businesses, and therefore these effects may have additional implications for remedies. These effects are, in summary:

(a) allowing more information on the RMX market to flow to the JV entity than Lafarge presently has access to, enhancing the ability to monitor coordination (see paragraph 6.199);

(b) creating greater similarities in the vertically integrated structure of the JV entity, Cemex and Hanson compared with Lafarge, Cemex and Hanson at present. This would also align both the incentives of the JV entity, Cemex and Hanson to coordinate and their ability to punish deviation from the coordinated outcome, making coordination more stable (see paragraphs 6.205 to 6.209); and

(c) if the JV entity maintains Tarmac's present cross-sale arrangements for the supply of Tarmac's RMX plants (see paragraph 6.191), this will give the JV entity increased ability (compared with Lafarge at present) to use repatriation of those sales either as a signal to other members of a coordinating group that it has detected deviation or as a punishment mechanism to deter deviation (although the latter is less likely) (see paragraphs 6.211 and 6.214).

6.230 As noted in the previous paragraph, these two sets of effects are largely independent. In other words, the effects in the bulk cement market from the combination of Tarmac and Lafarge's RMX businesses are largely additional to those arising from the combination of Tarmac and Lafarge's cement businesses.

6.231 Given that the three conditions for coordination were likely to be satisfied to a greater extent as a result of the proposed JV, and considering all the evidence in the round, we found that the proposed JV would make coordination in the bulk cement market

likely (if there were no pre-existing coordination), as well as increasing the effectiveness and sustainability of any pre-existing coordination. This would have the effect of making departure from any coordination less likely in future, thereby resulting in average prices being likely to be higher than would otherwise be the case. We therefore concluded that the proposed JV would be likely to result in an SLC in the supply of bulk cement.

Vertical effects

6.232 We assessed whether the proposed JV was likely to give rise to vertical effects through full or partial input foreclosure (see paragraph 6.2) of downstream non-integrated rivals. Vertical effects could arise from unilateral market power in an upstream market or coordination in an upstream market.

6.233 Given our findings on the nature of the likely competition problems as a result of the proposed JV in relation to the upstream market of primary aggregates (ie unilateral effects—see paragraph 6.27), and in relation to the upstream market of bulk cement (ie coordinated effects—see paragraph 6.231), there are two relevant vertical theories of harm:

(a) The JV entity may have an increased ability and incentive (compared with Tarmac and Lafarge before the proposed JV) to foreclose the supply of primary aggregates to its downstream RMX and asphalt competitors, with the effect of harming competition in local RMX and asphalt markets.

(b) Any coordinating group of companies in the bulk cement market may have an increased ability and incentive as a result of the proposed JV to foreclose (either partially or in full) the supply of cement to downstream RMX competitors, with the effect of harming competition in local RMX markets.

Aggregates into asphalt and/or RMX

6.234 The framework for assessing the likelihood of input foreclosure is to examine:[167]

(a) ability—whether the JV entity would have the ability to harm rivals, for example by reducing supplies of aggregates to them, increasing price or by refusing to supply them, thereby raising prices for aggregates sold externally (either generally or in certain local areas);

(b) incentive—whether the JV entity would find it profitable to do so; and

(c) effect—whether the effect of foreclosure (either full or partial) by the JV entity would be sufficient to reduce competition downstream to the extent that, in the context of the market in question, it gave rise to an SLC.

6.235 Our vertical effects analysis for aggregate supply into asphalt and/or RMX is set out in Appendix R.

6.236 Our analysis showed that aggregates were an important input into the production of asphalt and RMX. However, the JV entity appeared unlikely to have sufficient share of the external supply of aggregates (ie non-self-supplied volumes) to non-integrated asphalt and RMX producers in any local area to generate foreclosure concerns as a result of the proposed JV (using the 30 per cent market share threshold cited in the Guidelines[168] as a starting point in our analysis). The JV entity's share of supply (whether the share of external sales only was taken into account, or the share of all sales, internal and external) would be well below this threshold, whether primary aggregates were considered as a whole, or the analysis was conducted separately for crushed rock and sand and gravel. Our analysis therefore indicated that the JV entity would not have the ability to foreclose non-integrated asphalt or RMX producers. Evidence on vertical effects from the main parties' internal documents and

[167] The Guidelines, paragraph 5.6.6.
[168] The Guidelines, paragraph 5.3.5.

from submissions made by third parties was consistent with the results of our analysis.

6.237 As our analysis indicated that the JV entity would not have the ability to foreclose non-integrated asphalt or RMX producers, we did not consider its incentives to foreclose, nor the ability of downstream aggregate customers to undermine any attempts at foreclosure.

6.238 We therefore found that the proposed JV was not likely to result in an SLC as a result of vertical effects in relation to aggregate supply into asphalt and/or RMX.

Cement into RMX

6.239 We have not concluded at this point whether there are likely to be vertical effects as a result of the proposed JV in relation to cement as an input to RMX.

Countervailing factors

6.240 In accordance with the Guidelines, we considered whether the following countervailing factors would prevent or reduce an SLC that might otherwise arise as a result of the proposed JV:

(a) Efficiencies,[169] in particular whether these were rivalry-enhancing efficiencies that arose from the proposed JV and that could be expected to offset any increase in price.

(b) Expansion and entry:[170] whether these would be timely, likely and sufficient to prevent any SLC that might otherwise arise.

(c) Buyer power:[171] whether any of the JV entity's customers would have countervailing buyer power, whether any such buyer power possessed by some customers

[169] The Guidelines, section 5.7.
[170] The Guidelines, section 5.8.
[171] The Guidelines, section 5.9.

would be sufficient to protect all customers from the effects of an SLC and what the impact of the proposed JV would be on any existing countervailing buyer power.

Efficiencies

6.241 The main parties said that the proposed JV would lead to efficiencies. However, we did not receive any evidence that they would be rivalry enhancing to the extent that they might be expected to prevent or reduce the SLCs we identified as a result of the proposed JV.

Expansion

6.242 The existing overcapacity in the cement market (see paragraph 6.150) means that three of the four UK producers have the ability to expand their output, if they had the incentive to do so. However, we considered that such expansion was unlikely to offset the SLC we identified in the bulk cement market, since, following the JV, any coordinating group of firms would be likely to recognize that expansion of production would undermine the coordinated outcome.

6.243 In relation to aggregates, asphalt and RMX, there was evidence of overcapacity nationally (see Appendix S). However, whether expansion could offset any SLC that might otherwise arise at the local level as a result of the JV would depend on competitors' ability *(a)* to expand production in each local market in which an SLC might arise and *(b)* to supply these additional volumes at a price that customers would find attractive compared with the prices offered by the JV. We did not find evidence of specific expansion plans in those local aggregates, asphalt and RMX markets in which we found that the proposed JV would be likely to result in an SLC. We also did not find evidence of expansion plans in relation to rail ballast and HPL for FGD that might offset an SLC in those markets.

Entry

6.244 Appendix S contains our analysis of barriers to entry and future entry plans in the relevant markets.

Barriers to entry

6.245 As set out in Appendix S, we found that, for all the relevant markets, substantial excess capacity at a national level would act as a barrier to entry by reducing the incentives for new entry. A new entrant would perceive that its ability to make entry profitable would be reduced if existing market participants could react quickly to its entry by increasing their output.

6.246 In addition, we identified specific barriers to entry to particular relevant markets:

(a) For cement, the large capital investment required to build a new cement plant means that small-scale entry would not be feasible (ie there are significant economies of scale which would deter entry). Entry via setting up a grinding station or import terminal would require economic access to a supply of clinker (in the case of a grinding station) or cement (in the case of an import terminal), both of which would either have to be imported or come from a rival UK cement supplier. This would be likely to weaken the business case for entry via either of these routes.

(b) For both aggregates and cement, the limited availability of suitable greenfield sites, along with the difficulties and costs in obtaining planning permission, would make any entry slow and expensive.

(c) For aggregates, the supply of raw materials for the production of secondary and recycled aggregates appears likely to be sufficiently limited (because of finite resources) and confined to specific geographic locations to make entry into production of these types of aggregates on a large scale unlikely.

(d) For asphalt, the initial capital requirements to serve a limited local market, combined with current market conditions (ie both excess capacity and falls in market demand), appeared to make entry unlikely.

Future entry plans

6.247 The main parties told us that they were aware of certain plans and proposals for expansion and entry in the relevant markets. We reviewed this evidence (see Appendix S). We found that:

(a) Plans for expansion of existing cement import terminals and additional cement import terminals were unlikely to offset the SLC we identified in the bulk cement market for the reasons set out in paragraphs 6.174 and 6.246.

(b) The one proposal of which we were aware for new entry into cement production in the UK did not appear to be sufficiently certain or near term to be likely to offset the SLC we identified in the bulk cement market.

Conclusions on entry

6.248 In light of significant barriers to entry into the cement market (see paragraphs 6.245 and 6.246) and the uncertain plans for future entry (see paragraph 6.247), we found that entry into the bulk cement market was unlikely to offset the SLC we identified in that market.

6.249 For aggregates, asphalt and RMX, we did not find evidence of specific entry plans in those local aggregates, asphalt and RMX markets in which we found that the proposed JV was likely to result in an SLC, nor in the rail ballast or HPL (for FGD) markets. Taken together with barriers to entry listed in paragraphs 6.245 and 6.246, we therefore found that entry was unlikely to offset the SLCs we identified in those markets.

Buyer power

6.250 The evidence we received in relation to buyer power is assessed as part of our assessment of the unilateral effects of the proposed JV in the rail ballast market (see paragraphs 6.43 to 6.47) and as part of our assessment of coordinated effects in the bulk cement market (see paragraphs 6.176 and 6.177). We did not receive any evidence that buyer power would be sufficient to be expected to prevent or reduce the SLCs we identified as a result of the proposed JV.

7. Provisional findings

7.1 For the reasons set out in the paragraphs listed, we provisionally concluded that the proposed JV may be expected to result in an SLC in the following markets leading to prices that would be higher than might otherwise be the case:

(a) the market for the supply of bulk cement in the UK (see paragraphs 6.91 to 6.231);

(b) the 23 local markets for the supply of primary aggregates (of all grades) for construction applications listed in Appendix I (see paragraphs 6.6 to 6.27);

(c) the market for the supply of rail ballast in the UK (see paragraphs 6.28 to 6.49);

(d) the market for the supply of HPL in the UK, in relation to HPL supplied for FGD applications (see paragraphs 6.50 to 6.76);

(e) the two local markets for the supply of asphalt listed in Appendix I (see paragraphs 6.77 to 6.83); and

(f) the seven local markets for the supply of RMX listed in Appendix I (see paragraphs 6.84 to 6.90).