Joint West Sussex Minerals Local Plan

Assessment of Need for Aggregates:

Local Aggregate Assessment

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west sussex county council

Working in Partnership

South Downs National Park Authority

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Contents

Executive Summary

The National Planning Policy Framework (NPPF) requires Mineral Planning Authorities (MPAs) to prepare an annual Local Aggregates Assessment (LAA)[1] which is an evidence base document that sets out the potential demand, and assessment of potential supply, of aggregates within their area. This joint LAA has been prepared by West Sussex County Council (WSCC) and the South Downs National Park Authority (SDNPA) and provides evidence to support the Joint West Sussex Minerals Local Plan, which is currently being prepared.

Chapter 1: Introduction

This chapter explains the background to the Managed Aggregate Supply System (MASS) and the requirement for Mineral Planning Authorities to undertake LAA. It explains how the LAA is informing the preparation of the West Sussex Minerals Local Plan which is being prepared jointly by WSCC and the SDNPA and the consultation arrangements for the LAA. This LAA incorporates the findings from the latest round of evidence gathering in 2016. This evidence includes that which shows how 'other relevant local information' influences the estimated demand and supply of aggregates through the life of the Minerals Local Plan (to 2033).

Chapter 2: Aggregates in West Sussex

This chapter sets out the past to current demand for, and supply of, aggregates in West Sussex from each different source in turn; the key findings are set out below:

<u>Land won Sand and Gravel:</u>

- Sales data available for all land-won sand and gravel indicates sales have fallen from 703,000 tonnes per annum (tpa) in 2006 to 244,594tpa in 2015, (66%) plateauing (between around 250,000tpa and 300,000tpa) since 2009;
- The ten year average annual sales figure of all land won sand and gravel is currently 339,186tpa (a decrease of just under 50ktpa in the last 12 months);
- The three year average annual sales figure of all land won sand and gravel is currently even less at 253,288 tpa;
- The average split between soft sand and sharp sand and gravel over the past 10 years is 97:3;
- Average annual sales of soft sand over the last 10 years is 329,394 tpa;
- Average annual sales of soft sand over the last 3 years is 253,288 tpa;
- Average annual sales of sharp sand and gravel over the last 10 years is 9,793 tpa;
- The total permitted reserve of land-won sand and gravel is 3,960,500 tonnes: 3,060,500 tonnes of this is soft sand and 900,000 tonnes is sharp sand and gravel;
- For sharp sand and gravel, based on the calculated maximum annual demand for land won material and existing reserves, there is no requirement to plan for additional land won supplies over the Plan period (to 2033);
- For soft sand, if supplies are maintained at the level of the current 10 year average of annual sales then current reserves would last for 9.3 years and an additional 2.54mt would be needed (based on a 7 year theoretical landbank) over the Plan period; if

[1] See para 145 first indent

additional growth (due to housing growth assumptions is accounted for, then current reserves would last for 8.2 years and an additional 3.32mt would be needed;

- For soft sand, if supplies were to be maintained at the level of the current 3 year average of annual sales, then current reserves would last for 12 years and an additional 1.25mt would be needed over the Plan period (equivalent to 83,300tpa over 15 years).
- Extraction of soft sand in West Sussex is highly constrained as the entire resource is within the South Downs National Park.

Marine Won Sand and Gravel

- Marine won sand and gravel landings and sales in West Sussex have increased steadily over the last 10 years with a marked increase since 2011;
- The 10 year average of annual sales of marine dredged aggregate increased again in 2015/16 and is 1,187,302 tpa and 10 year average of annual landings also increased to 955,141 tpa;
- The three year average annual sales of marine-won aggregate is 1.63mtpa
- The three year average landings of marine-won aggregare is 1.10mtpa
- The demand forecast for the emerging Plan period (to 2033), based on landings data, shows that demand could be as high as 1,234,997 tpa, which will need to be met from wharves;
- Marine won sand and gravel is the majority source of sand and gravel in West Sussex. The contribution marine sand and gravel made to aggregate supply has increased from 57% in 2006 to 84% in 2016;
- There are six minerals wharves in West Sussex.

Rail Imported Sand and Gravel

- A small amount of sand and gravel is imported into West Sussex by rail. At its peak, this was 225,503 tonnes in 2009;
- The 10 year average sales of sand and gravel from railheads is 132,393 tpa;
- The three year average annual sales of sand and gravel from railheads is 83,708tpa:
- The demand forecast for the emerging Plan period (to 2033), for sand and gravel being imported by rail to West Sussex railheads is estimated to be as high at 171,184 tpa:
- There are five railheads importing aggregate to West Sussex.

Crushed Rock

- All sales of crushed rock are imported via railheads and wharves;
- In the last 10 years the maximum annual sales of crushed rock from wharves in West Sussex was 151,556 tonnes and the minimum was 55,786 tonnes;
- Its possible that demand for crushed rock being landed at West Sussex wharves could be as high at 127,137 tpa;
- Annual sales of crushed rock from railheads peaked at 814,401 tonnes in 2013;
- The demand for crushed rock being imported by rail to West Sussex railheads is estimated to be as high at 689,852 tpa.

Secondary and Recycled Aggregates

- Sales of recycled aggregates were relatively stable, peaking at 630,000 tonnes in 2010.
- Sales have risen in recent years and were 526,000 tonnes in 2014[2] but have fallen to 393,000 tonnes in 2015;
- The average annual sales of recycled aggregate over the last 10 years is 488,000 tonnes;
- A total of 853,000tpa of capacity for recycled aggregates is likely to be available within the County (2015 estimate) which means that there is currently capacity available to allow a modest increase in supply;
- There is one site in West Sussex producing 11,000 tonnes of bottom ash that is used as a secondary aggregate;
- The supply of secondary aggregate (in the form of bottom ash) in the County could increase to 56,000tpa over the Plan period (to 2033).

Chapter 3: Balance between Demand and Supply

This chapter summarises the supply of aggregates from the different sources and allows for comparison of the different supply options based on relevant local information. It concludes that:

- Existing permitted reserves of land won sharp sand and gravel exceed a forecasted demand value which is based on 10 year average sales and local relevant information for the plan period.
- Safeguarded wharves, railheads and recycled aggregate sites will continue to be the majority sources of supplies for sharp sand and gravel.
- Safeguarded wharves, railheads and recycled aggregate sites will continue to be the majority sources of supplies for crushed rock.
- Soft sand resources are heavily constrained by being situated in the South Downs National Park (or its setting) but existing reserves (including a proposed allocation) are sufficient to supply soft sand at levels equivalent to the 10 year average sales for 9.3 years, and, taking account of relevant local information, for 8.2 years.

[2] The way that recycled aggregate recycling has been recorded has varied over the 10 year period. Further information can be found in Table 17.

1. Introduction

1.1. The Managed Aggregate Supply System

1.1.1. Aggregates are used for the construction of homes, commercial development and infrastructure (such as roads). It is therefore important that nationally there is an adequate and steady supply to ensure economic development and quality of life. The Managed Aggregate Supply System (MASS) has been the mechanism to ensure there has been an adequate supply of aggregates (sand, gravel and crushed rock) in England for over 35 years.

1.1.2. Minerals can only be worked where they occur and their extraction can potentially cause conflict through loss or changes to valued landscapes. The MASS system was developed due to the geographical imbalance of aggregates and ensure Mineral Planning Authorities (MPAs) make an appropriate contribution to the national need for aggregates as well as local supply. As part of the MASS system, each MPA is required to prepare a Local Aggregate Assessment (LAA) which assesses the demand and supply of aggregates in its area on an annual basis. LAAs can be prepared jointly by more than one authority.

1.2. What is a Local Aggregate Assessment

1.2.1. The requirement for MPAs to prepare a LAA is set out in the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG). Paragraph 62 of the PPG states that LAA should cover the following:

- *"A forecast of the demand for aggregates based on both the rolling average 10-year sales data and other relevant local information;*
- *An analysis of all aggregate supply options, as indicated by landbanks, mineral plan allocations and capacity data e.g. marine licences for marine aggregate extraction, recycled aggregates and the potential throughput from wharves. This analysis should be informed by planning information, the aggregate industry and other bodies such as local enterprise partnerships; and*
- *An assessment of the balance between demand and supply, and the economic and environmental opportunities and constraints that might influence the situation. It should conclude if there is a shortage or surplus of supply and, if the former, how this is being addressed."*

1.2.2 PPG, Paragraph 64, states that the LAA "*must also consider other relevant local information in addition to the 10 year rolling supply*", and this information may include "*levels of planned construction and house building*", as well as considering average sales over the last three years to identify general trend of demand.

1.3.1. This LAA incorporates the findings from further evidence gathering that has considered 'other relevant local information' that may influence the demand of aggregates through the life of the JMLP (to 2033). This information, including anticipated levels of construction of homes and the maintenance and construction of roads, has been used to underpin a number of differing aggregate demand scenarios.

1.3.2. While there are many end users of aggregates, many of these can be related to housing growth which are partially driven by population change. Therefore, housing trends are considered to provide a useful indicator for trends in demand for other users of aggregates. Data and evidence on the future construction of homes therefore provide a sound baseline from which to assess possible future demand scenarios. Furthermore, information on planned highways works (maintenance and improvement) have also been considered as they consume aggregates (genereally crushed rock).

1.4. West Sussex Minerals Local Plan

1.4.1. The current West Sussex Minerals Local Plan was adopted in 2003. The Minerals Local Plan is now significantly out of date, and any evidence that it was based on is even more out of date. A new Plan is therefore required to take account of new evidence such as changes in relation to the demand and supply of minerals in West Sussex as well as government minerals planning policies (included in the NPPF), the establishment of the South Downs National Park Authority in 2011.

1.4.2. West Sussex County Council (WSCC) and the South Downs National Park Authority (SDNPA) have agreed to jointly prepare a Joint Minerals Local Plan (JMLP) – 'the Plan', which will cover the period to 2033. This will include: a vision; strategic objectives; a suite of strategic policies; strategic sites and development management policies.

1.4.3. This LAA informs the preparation of the Plan by setting out a forecast for the need for aggregates over the Plan period and indicating what other local issues are likely to influence the ability of needs for aggregates to be met from minerals resources and facilities in West Sussex. The LAA forms an important part of the evidence base to support the Plan and will be updated annually. Last year's LAA informed the content of a draft JMLP that was consulted on between April and June 2016.

1.4.4. The findings of this LAA are used to inform the content of the Proposed Submission Draft JMLP that is due for publication in January 2017. Whilst the LAA 'flags up' opportunities and constraints affecting the supply of aggregate, the plan making process fully explores the constraints around individual sites and therefore concludes, and sets out, the most suitable way for aggregates to be supplied in future.

1.5. National and Regional Context

National and Regional Guidelines for Aggregates Provision

1.5.1. LAAs, are used by MPAs, including National Park Authorities, to help them plan for a steady and adequate supply of aggregates. In doing so MPAs participate in, and take the advice of a Aggregate Working Party (AWP), a technical advisory group of MPAs and relevant organisations that has the following role;

- to consider, scrutinese and provide advice on the LAAs of MPAs;
- to provide an assessment of the overall demand and supply for the AWP area, incuding whether the area is making a full contribution towards meeting national and local aggregare needs;
- to obtain, collect and report in data on minerals activity in their area, including annual data collected by the MPAs on sales, permissions and reserves of aggregates (including recycled and secondary sources).

1.5.2. West Sussex and the South Downs National Park Authority fall within the South East England Aggregate Working Party (SEEAWP) area.

1.5.3. As part of the Managed Aggregate Supply System (MASS), the amount of land-won aggregates to be provided by each region was set out in the "National and Regional Guidelines for Aggregates Provision in England 2005-2020" (June 2009). MPAs may decide, collectively, to plan for more or less than set out in the Guidelines based on their LAA but this must be supported by robust evidence and be properly justified, having regard to the local and national need.

1.5.4. The data used in this LAA includes that from the National Aggregate Minerals Survey, which was carried out for the year 2015.

Policy on National Parks

1.5.5. In West Sussex a significant proportion of the sand and gravel resources are situated within or in the setting of the South Downs National Park, and so national policy on development in National Parks (paragraphs 115 and 116 of the NPPF) needs to be taken into account.

1.6. Consultation Arrangements

1.6.1. In accordance with the NPPF and PPG, this LAA is subject to consideration and scrutiny by the South West England Aggregate Working Party (SEEAWP). Other bodies invited to comment on its contents include the following: Counties that receive or provide aggregates to West Sussex; the Coast to Capital Local Economic Partnership; the Crown Estate; the Marine Management Organisation; the Local Nature Partnership and Natural England.

2. Aggregates in West Sussex

2.0.1. When planning for a steady and adequate supply of minerals, Mineral Planning Authorities have to consider all supply options. West Sussex currently supplies aggregates from a number of sources including:

- Soft sand and sharp sand and gravel extracted at quarries in West Sussex;
- Recycled and secondary aggregate production;
- Imported aggregate (e.g. crushed rock and sand and gravel), by road, rail and sea; and
- Sand and gravel dredged from the sea bed (marine-won)

2.0.2. Each supply option is considered separately below including the economic and environmental opportunities and constraints that might influence the situation. This information is then used to consider the total aggregate supply picture and the balance between supply and demand.

Geology and landscape

2.1.1. In broad terms, the county has a sequence of broad geological bands which run across the County from the west to east; see **Map A1 in Appendix A.**

2.1.2. **Soft Sand** is won from the Sandgate Formation and the Folkestone Formation (also known as the Folkestone Beds) which is worked in a number of locations in West Sussex. The variable grain size and low clay content mean that little or no processing is required to produce high quality construction and mortar sands.

2.1.3. Coarser, **sharp sand and gravels** lie over the chalk to the north of a line approximating to the route of the A27 and have been exploited in dry workings. Overlying the clay to the south, cleaner, better-sorted gravels have been exploited through wet working as evidenced by lakes around the eastern and southern fringes of Chichester. Sand and gravel resources are clustered around Chichester, and south of the SDNP from the Funtington area in the west to Slindon in the east. The sharp sand and gravel deposits are primarily used to make concrete, concrete products or cement.

2.1.4. The SDNP covers almost half the Folkestone Formation in West Sussex, and part of the sharp sand and gravel resource north of Chichester. The Chichester Harbour AONB designation includes a small area which contains potential sharp sand and gravel. The extent of these landscape designations is shown in **Map A1, Appendix A.**

2.1.5. There are no indigenous sources of crushed rock in West Sussex, therefore, this aggregate is imported into West Sussex by rail or sea.

2.1.6. Much of the soft sand outside the SDNP has been worked or is currently being worked. The majority of the remaining land-won soft sand resources lie within the SDNP. Stakeholder engagement carried out in 2008/09 provided some information about the quality of sand and gravel resources outside the National Park. One operator advised that after some limited investigation (drilling boreholes etc.) of unconsolidated sand deposits, anything east of Steyning was found to be finer and 'dirtier' deposits which may make extraction uneconomic on any significant scale. There has also been no significant interest in any areas outside of the SDNP, including through a "Call for sites" process in 2014.

2.1.7. With regard to sharp sand gravel deposits, operators commented that it becomes much thinner to the south east and therefore uneconomic to work. At the western end, it was felt that any deposit south of the A27 would also be uneconomic.

2.1.8. A study was undertaken to assess the geology of the Folkestone Formation. It concludes that the Folkestone Formation contains silica sand, which can be used for a range of industrial applications. The Silica Sand Study (2016) can be found online at www.westsussex.gov.uk/mwdf.

Uses of land-won sand and gravel

2.1.9. Soft sand from the Sandgate Formation and the Folkestone Formation is worked in a number of locations in West Sussex. The variable grain size and low clay content mean that little or no processing is required to produce high quality building sands for plaster and mortar. Gravel of varying quality and some sharp sand is used for concrete products but it is not as easy to use as building sand because the mortars are less workable.

Past to current demand for land-won sand and gravel (sales)

2.1.10. Looking at past sales figures for land-won sand and gravel provides an indication of the contribution that the land-won source of supply has made to the overall supply of aggregates in West Sussex.

2.1.11. Annual land-won sales data over the past ten years is presented in Table 1 and Figure 1. This shows that sales have fallen from 573,000 tonnes to as low as 244,594 tonnes over the ten year period since 2006, and have plateaued between around 250,000 and 300,000tpa since 2009. The average annual sales figure over the 10 year period for sand and gravel is 339,186 tonnes and the average for the past three years has been much lower (253,288 tonnes).

2.1.12. It is not possible to provide sales figures for individual mineral types but the average split between the two land-won aggregate types in West Sussex over the last 10 years is 97% soft sand and 3% sharp sand and gravel. This equates to

329,394 tonnes of soft sand and 9,793 tonnes for sharp sand and gravel (10 year annual averages).

2.1.13. The general pattern of decline in sales can be attributed to a number of factors including:

- An increase in the supply of alternatives (secondary/recycled and marine dredged sand and gravel) replacing the need for primary aggregates;
- a reduction in development levels due to the economic downturn in the period after 2008;
- heavily constrained supply options for remaining, unextracted, areas.

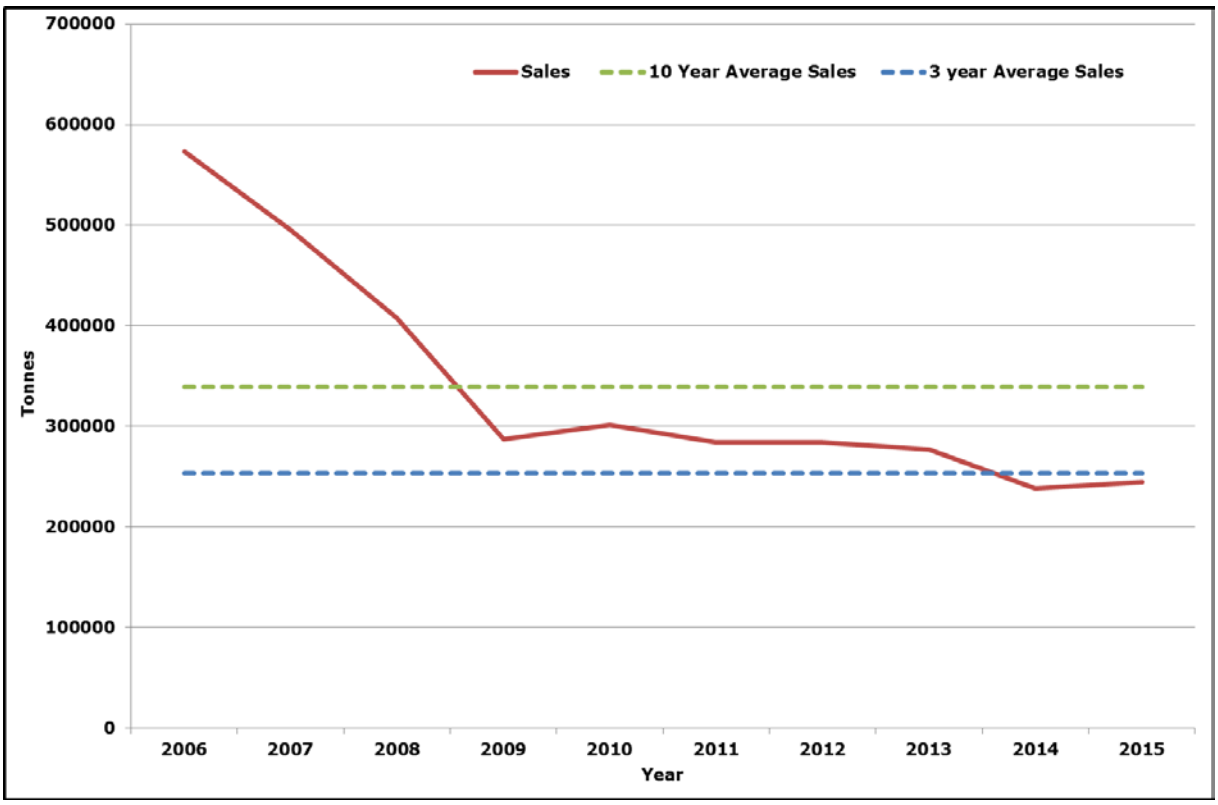
2.1.14. As aggregates are used in the building of homes, it is worth considering data on housing completions when attempting to explain trends in aggregate sales. Gross dwelling completions within West Sussex fell from 3,140 in 2007/08 down to 2,400 in 2012/13 (a 24% reduction) and there was a 32% drop in sand and gravel sales over the same period. However it should be noted that sand and gravel sales were falling before the drop in gross housing completions began in 2008/09. In addition, in the last four years, while there has been an increase in housing completions (4,769 in 2015/16, the highest level seen in the last 15 years), sales of land-won sand and gravel have not increased.

Table 1: Sales of Land Won Sand and Gravel in West Sussex 2006 – 2015

Year	Sales (tonnes)*
2006	573,000
2007	495,000
2008	408,000
2009	287,000
2010	301,000
2011	284,000
2012	284,000
2013	276,692
2014	238,577
2015	244,594
3 Year Average	**253,288**
10 Year Average	**339,186 (329,394 tonnes soft sand, 9,793 tonnes sharp sand and gravel[3])**
Sales data is based on estimates using operator returns, supplemented, where necessary, by estimates based on past rates and information from site visits. The figures for soft sand and sharp sand and gravel have been amalgamated due to reasons of confidentiality.	

[3] Figures may not add up to 95% and 5% exactly due to rounding.

Figure 1: Sales of Land-Won Sand and Gravel in West Sussex 2006 - 2015



2.1.15. The fall in land-won aggregate sales has been replicated in neighbouring authorities, with Hampshire and Surrey also showing a downward trend in sales up until 2012, however there have been increases since. Sales for the South East region as a whole fell by 45%, down from 9.7mt to 5.3mt between 2005 and 2015, which covers the period before and during the economic downturn[4]. Despite the increasing levels of economic growth recorded between 2004 and 2007, sales in the South East fell 18% during the same period. This indicates that the link between sales of aggregates and economic growth is not clear cut. With regard to East Sussex, due to the very small number of sand and gravel sites, there are zero returns for over half of the 10 year period and the rest of the figures are confidential, therefore no figures are reported.

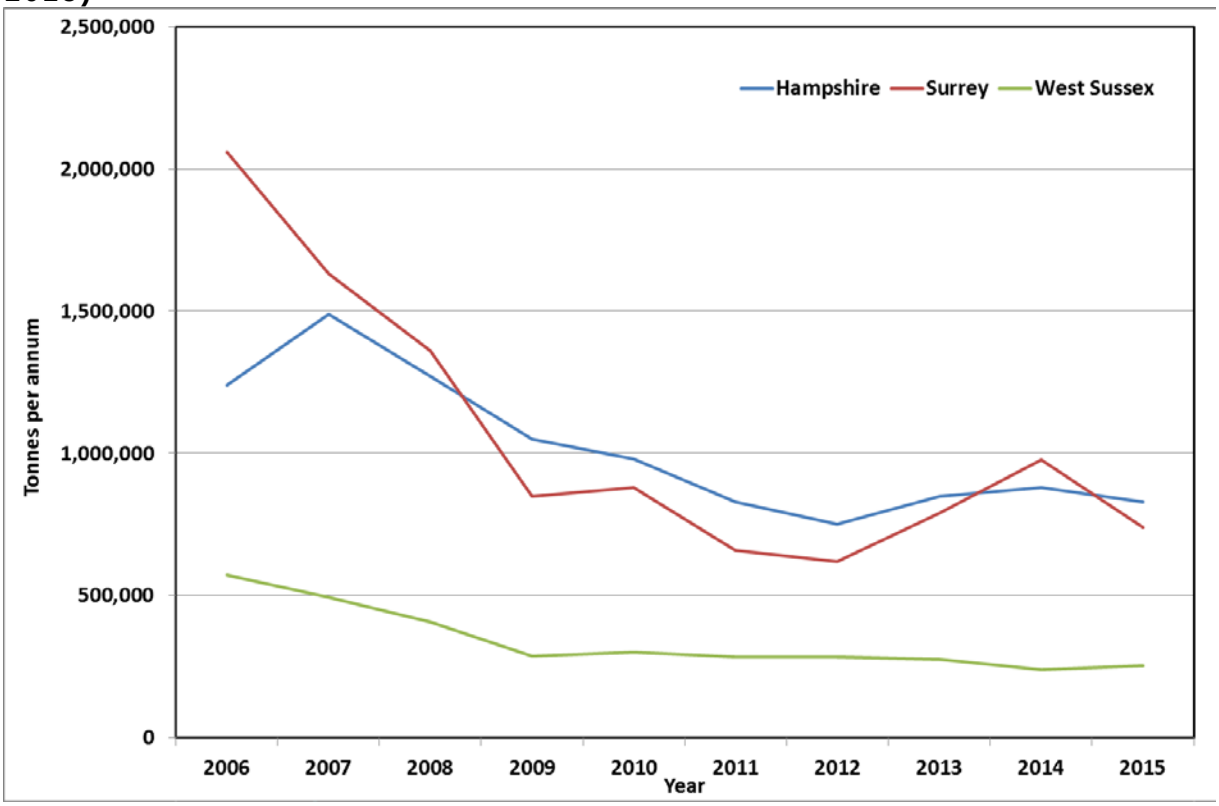
Table 2: Sales of Land-Won Sand and Gravel in Adjoining Authorities (2006 – 2015)

Year	Hampshire	Surrey
2006	1,240,000	2,060,000
2007	1,490,000	1,630,000
2008	1,270,000	1,360,000
2009	1,050,000	850,000

[4] SEEAWP (2013) South East Aggregates Monitoring Report 2013.

2010	980,000	880,000
2011	830,000	660,000
2012	750,000	620,000
2013	850,000	790,000
2014	880,000	978,000
2015	830,000	740,000
Ten Year Average (2006 – 15)	1,020,000	1,050,000
Three year Average (2013 – 15)	850,000	836,000

Figure 2: Sales of Land-Won Sand and Gravel in Adjoining Authorities (2006 – 2015)



Other Relevant Local Information Affecting Aggregate Supply and Demand

2.1.16. The Authorities have carried out an assessment of the likely demand for aggregates over the plan period based on anticipated levels of construction of homes and the maintenance and construction of roads. No other major infrastrucure projects are anticipated in or near West Sussex that might influence the demand for aggregate. Scenarios were therefore developed taking into account two growth factors (Housing = 14%, Construction of roads = 14.6%). Appendix B explains how these

factors have been derived. This includes assumptions regarding the level of different aggregate supply related to these uses.

2.1.17. Sharp sand and gravel, soft sand and crushed rock are considered separately as they are used for different purposes. This is consistent with paragraph 145 of the NPPF which states that *"Minerals planning authorities should plan for a steady and adequate supply of aggregates by……calculating and maintaining separate landbanks for any aggregate materials of a specific type or quality which have a distinct and separate market."*

2.1.18. Further other relevant local information includes the fact that soft sand resources are heavily constrained by the South Downs National Park designation. This is further considered in paragraph 2.1.31 below.

Sharp Sand and Gravel

2.1.19. Based on the 10 year average split of sales (97% soft sand and 3% sharp sand and gravel), the estimated demand based only on 10 years annual sales data for sharp sand and gravel is 9,793 tonnes. Planning Practice Guidance states that a three year average annual sales should also be factored into consideration of a sales trend. The three year average annual sales figure for sharp sand and gravel in West Sussex is zero but it is anticipated that this will not be the case in the next monitoring year as the permission at Kingsham gravel site, south of Chichester, has now been implemented.

2.1.20. Existing reserves are provided by a single existing permission at Kingsham gravel site which has an estimated remaining yield of 900,000 tonnes.

2.1.21. Forecast demand scenarios have been established below based on the following assumptions using the data presented in Appendix B.

- *Assumption 1: Housing is projected to grow by 14% in West Sussex*
- *Assumption 2: Spending on road maintenance/improvements is expected to increase by 15.8% in West Sussex*
- *Assumption 3: Up to 91% of sand and gravel may be used in homes*
- *Assumption 4: Up to 33% of sand and gravel may be used on road maintenance/improvements*

2.1.22. The annual demand values associated with each of these scenarios is set out in Table 3 below. The table also shows the extent of any predicted shortfall having regard to the existing reserves.

Table 3: Sharp sand and gravel demand scenarios 2016 – 2033 (tonnes)

	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10 yr. avg. only)	1, 2, 3, and 4	1 and 2
10 year average	9,793		
Additional demand for housing	n/a	1,248	1,371
Additional demand for roads	n/a	511	1,547
Total Annual requirement	9,793	11,551	12,711
Total requirement over Plan period (2016 – 2033)	166,476	196,365	216,086
Current reserves	900,000[5]		
Shortfall (+ve) /surplus (-ve)	-733,524	-703,635	-683,914

2.1.23. The calculated maximum average annual demand (demand forecast scenario 3) is 12,593 tonnes, which suggests that a total of 216,088 tonnes of land won sharp sand and gravel would need to be supplied to 2033. The minimum calculated landbank for sharp sand and gravel, based on the current reserves against demand forecast scenario 3, is 71 years (calculated by dividing the reserve figure of 900,000 tonnes by the annual demand figure of 12,593) therefore there is **no requirement to plan for additional land won sharp sand and gravel reserves.**

Soft Sand

2.1.24. Based on the 10 year average split of sales (97% soft sand and 3% sharp sand and gravel), the estimated demand based only on 10 years annual sales data for soft sand is 329,394 tonnes. The three year average for annual soft sand sales in West Sussex is 253,288 tonnes – this is the same as the three year average for annual total sand and gravel sales as there have been no sales of sharp sand and gravel in the past 3 years.

2.1.25. Existing reserves are provided by several sites (see table 6) and currently amount to 3,060,500 tonnes.

2.1.26. Forecast demand scenarios for land-won soft sand have been established using the following key assumptions based on data presented in Appendix B:

- Assumption 1: Housing is projected to grow by 14% in West Sussex

[5] Current reserves at Kingsham Quarry

- Assumption 2: Up to 91% of sand and gravel may be used in homes

2.1.27. As road maintenance or improvement works do not involve the use of soft sand, these activities have been excluded from calculations of demand forecasts for soft sand. These demand forecasts build on the 10-year average of 329,394 tonnes, which are set out in Table 4 below.

2.1.28. The annual demand values associated with each of these scenarios is set out in Table 4 below. The table also shows the extent of any predicted shortfall having regard to the existing reserves.

Table 4: Soft sand demand forecasts 2016 - 2033 (tonnes)

	Demand Forecast Scenarios 1	Demand Forecast Scenarios 2	Demand Forecast Scenarios 3
Assumptions applied	None (10 yr. avg. only)	1 and 2	1
10 year average	329,394		
Additional demand for housing	n/a	41,965	46,115
Total Annual requirement	329,394	371,358	375,509
Total requirement over Plan period (2015 – 2033)	5,599,691	6,313,092	6,383,648
Current reserves	3,060,500		
Shortfall	2,539,191	3,252,592	3,323,148

2.1.29. Table 4 suggests that additional supplies of between 2.54-3.32mt of soft sand are needed over the Plan period (2015 – 2033). The maximum landbank, based on the current reserves against the 10 year average, is 9.3 years (calculated by dividing the reserve figure of 3,060,500 tonnes by the ten year average of 329,394). The landbank based on the highest forecast annual demand (demand forecast option 3) is 8.2 years (3,060,500 divided by 375,509).

2.1.30. National planning duidance (PPG, para 064) states that MPA's should also consider average annual sales over the previous three years, to identify the general trend of demand. Based on the 3-year average of soft sand sales (253,288 tonnes), and current reserves, the landbank is currently 12.1 years. The requirement over the plan period would theoretically be 4,305,890 tonnes (3-year average x 17), and therefore the shortfall would be 1,245,390 tonnes.

2.1.31. At present, there are six permitted soft sand sites in the Plan Area, as set out in Table 6. These sites have a total reserve of 3,060,500 tonnes. There is a potential reserve of 2,920,800 tonnes at the Dunford Rough site in the 2003 Minerals Local

Plan (table 6). However, this site is no longer deemed to be viable for extraction due to restrictive covenants and access difficulties.

2.1.32. **In light of the estimated shortfalls in soft sand supplies it is considered appropriate to consider the possibility of allocating additional soft sand reserves in the emerging Joint Minerals Local Plan.**

2.1.33. However, consideration of meeting the estimated shortfall has to take account of the heavily constrained nature of the resource. Indeed this constitutes '*other relevant local information'* that has to be taken into account in supply and demand considerations.

2.1.34. In accordance with national policy[6], consideration of future supply from within the South Downs National Park through the JMLP process includes an assessment whether there are 'exceptional circumstances' and a 'public interest' that would justify the allocation of new or extended sand quarries within the South Downs National Park.

Imports and exports of land-won sand and gravel

2.1.35. West Sussex imports and exports land–won aggregates from/to surrounding MPAs, as well as further afield, and it is important to understand the current and potential future issues affecting cross-boundary movements of land–won sand and gravel between West Sussex and other neighbouring and more distant mineral planning authorities.

2.1.36. A national four-yearly aggregate minerals survey is conducted by the DCLG and the British Geological Survey (BGS) which includes analysis of the movements (imports and exports) of aggregates for each MPA in England and Wales. A survey was not undertaken in 2013, and instead took place in 2014[7]. The data presented below comes from the latest national survey (2014) and from data obtained from the British Geological Survey (BGS).

2.1.37. Due to confidentiality restrictions, import and export data figures were provided by BGS as a percentage range of total supply to each Mineral Planning Authority, to provide an indication of the relative importance of each supplying Mineral Planning Authority. Table 5 shows that in 2014 upto 55,000 tonnes of sand and gravel was imported into West Sussex, whilst upto 275,600 tonnes of sand and gravel was exported from West Sussex. Therefore, for land-won sand and gravel, West Sussex is a net-exporter. Table 5 also shows that aggregate may be transported considerable distances to and from West Sussex.

[6] NPPF Para 116
[7] https://www.gov.uk/government/publications/aggregate-minerals-survey-for-england-and-wales-2014

Table 5: Origin/Destination of Land won Sand and Gravel Imported/Exported to/from West Sussex, 2014.

Origin/Destination	Imports to West Sussex (tonnes)	Exports from West Sussex (tonnes)
South East Region		
Berkshire	upto 1,000	Upto 12,000
Buckinghamshire & Milton Keynes	0	7,900 – 79,000
East Sussex and Brighton and Hove	0	2,600 – 29,000
Hampshire and Isle of Wight	1,000 – 10,000	Upto 17,600
Oxfordshire	upto 1,000	0
Kent and Medway	upto 1,000	0
Surrey	10,000 – 20,000	7,600 – 84,000
Sub Total	**11,000 – 33,000**	**18,100 – 221,600**
Outside South East Region		
Cambridgeshire	upto 1,000	0
Dorset	upto 1,000	0
Essex	30,000 – 40,000	0
Wilshire and Swindon	0	Upto 5,400
Unknown, in the S.West	unknown	24,300 – 48,600
Sub Total	**30,000 – 42,000**	**24,300 – 54,000**
Overall Total imports/exports (excluding West Sussex consumption)*	**41,000 – 55,000**	**42,400 – 275,600**

Source: Data obtained from the British Geological Survey and was based on the 2014 Aggregate Minerals Survey.

Note: Ranges are provided due to confidentiality restrictions.

** there is also some (between 15,400 – 154,000 tonnes) of land won sand and gravel that was consumed in the South East, however the final destination for its consumption is recorded as "unknown". It is presumed that some of this would have been consumed in West Sussex, whilst some consumed in other areas around the S.East.*

Current supply of land-won sand and gravel

2.1.38. Land-won sand and gravel is currently supplied from seven sites in West Sussex, six of which were operating before the designation of the South Downs National Park, which now forms part of the plan area and covers a substantial part of the sand and gravel mineral resource. These sites are presented in Table 6 below and shown in **Map A2, Appendix A**. The total permitted reserve of land won sand and gravel in West Sussex was 3,960,500 tonnes.

Table 6: Permitted Sand and Gravel Quarries in West Sussex (2016)

Soft Sand			
Location	**Site**	**Operator**	**Status**
SDNP	West Heath Quarry, West Harting, Petersfield	CEMEX UK Operations	Active – Sand extraction
SDNP	Heath End Quarry, Station Road, Heath End, Petworth[8]	Dudman Group Ltd.	Active – Sand extraction.
West Sussex	Rock Common Sandpit, Washington, Pulborough	Dudman Group Ltd.	Active - Sand extraction. Concrete batching and aggregates recycling also takes place.
West Sussex	Sandgate Park Quarry, Water Lane, Sullington, Storrington	CEMEX UK Operations	Active – Sand extraction.
West Sussex	Washington Sand Pit, Hampers Lane, Sullington	Britaniacrest Recycling Ltd.	Inactive - Permission granted for mineral extraction until December 2015.
West Sussex	Chantry Sand Pit, Chantry Lane, Storrington	Dudman Group Ltd.	Inactive
Sharp Sand and Gravel			
West Sussex	Land at Kingsham, South of Chichester, Chichester, West Sussex	Dudman Group Ltd.	Implemented permission for gravel extraction.

[8] Contiinued extraction permitted on appeal – 6 September 2016.

NB: In accordance with the PPG, mineral sites that are subject to a stalled review of their planning conditions have not been included in the assessment of existing reserves.

Potential Supply from Allocated Sites

2.1.39. Table 7 below sets out the allocated sites in the Minerals Local Plan, 2003 (MLP), that have not been developed to date. All of these sites are sharp sand and gravel sites.

Table 7: Allocations in the Minerals Local Plan (2003)

Authority	Allocation (resource)	Potential yield (tonnes) set out in 2003 MLP	Updated yield in 2014 (tonnes)
SDNP	Dunford Rough (sand)	2,920,800	0*
WSCC	Woodmancote (gravel)	449,700	449,700
WSCC	Westhampnett (gravel)	388,800	0**
WSCC	Slades Field (gravel)	851,400	851,400
WSCC	Lavant (gravel)	2,400,000	0***
Total		**7,010,700**	**1,301,100**

* This site is now deemed undeliverable due to restrictive covenants and access difficulties.

** The landowner has stated that the site will no longer be available for extraction.

*** Following the refusal of planning permission for mineral extraction in 2009, the landowner has sold the land, but retained the mineral rights. A planning application for a non-minerals use has been submitted.

2.1.40. Although there are existing allocations within the Minerals Local Plan (2003) with a potential reserve of 7,010,700 tonnes, the Lavant sites, Westhampnett and Dunford Rough are unlikely to come forward due to issues of deliverability. If these sites were removed, the potential yield from remaining allocated sites would be 1,301,100 tonnes. The remaining sites have been re-assessed as part of the preparation of the JMLP. These sites are sharp sand and gravel sites and the LAA has identified that there isn't an additional need for sites supplying this type of aggregate .

Potential constraints to future land-won supply

2.1.41. Minerals can only be worked where they are found. The site selection process undertaken for the JMLP has identified particular issues associated with the identification of viable and deliverable land-won sand and gravel resources. These issues which are likely to limit further land-won extraction in the future, include:

- Environmental and landscape designations

- Water resources; and
- Communities and amenity

2.1.42. West Sussex has a number of environmental and landscape designations, including the South Downs National Park which is afforded the highest level of protection. These designations can restrict, and may continue to restrict, opportunities for future minerals development, particularly in regard to land-won extraction. Consideration of future supply from within the South Downs National Park will be through the JMLP process.

2.1.43. In accordance with the PPG, it is important that the effects of environmental constraints are taken into account, as '*other relevant local information',* when considering options for meeting aggregate demand through the Plan period. This is especially pertinent to consideration of the future supply of soft sand as the majority of the resource in West Sussex is located within the South Downs National Park. Detailed site assessment ework, undertaken as part of the JMLP process, has considered whether there are 'exceptional circumstances' and a 'public interest' that would justify the allocation of new or extended sand quarries within the South Downs National Park.

2.1.44. This assessment has involved examination of the presence of alternative sources of supply from outside designated areas and included dialogue with adjoining and more distant authorities to establish potential alternative supplies. It has also included an assessment of the potential resource outside the SDNP but still within West Sussex.

2.1.45. Floodplains, Source Protection Zones (SPZs), secondary and principal aquifers, groundwater depth, geology and smaller abstractions are also constraints which need to be taken into consideration when identifying suitable sites for mineral extraction. The site selection process for the JMLP will take all of these issues into account.

2.1.46. Minerals development should not have a significant impact on communities if they are designed, managed and located appropriately. However, concerns may still be raised about the potential impacts of noise and dust, as well as associated lorry movements, particularly at the planning application stage. Such issues need to be addressed to ensure that minerals development does not significantly impact the amenity of local communities. The site selection process for the JMLP will also take the impact on communities into account, and the Plan will also contain policies to make sure that the impact on communities and amenity is prevented, minimised or mitigated to an acceptable level.

2.1.47. Soft sand has specific applications for which concreting and other aggregate materials are unsuitable, and is most commonly used in mortar. The South Downs Soft Sand Study (2012) states that the Crown Estate 'believe that there is potential for marine sources to provide viable 'soft' sand as an alternative to land based

quarrying'. There are sources of marine-won aggregate being used, as a replacement, or through blending, to create mortar. In 2014, in England and Wales, 1.05mt of marine-won aggregate was used in mortar. Of this, 72,000 tonnes was sold in the South East.

2.1.48. A summary of the comments received from other authorities in the South East as part of the Duty to Cooperate is provided below. These discussions help to develop a picture about the possibility of bringing soft sand into West Sussex by other means.

- Surrey County Council has concerns about the longer term supply of sharp sand and gravel post 2030. The two planning permissions granted by Surrey County Council in 2014 means that Surrey has surplus soft sand reserves available to meet their requirements in the plan-period and until at least 2033[9]. The Surrey Minerals Plan Core Strategy DPD includes a presumption against new workings of soft sand within the AONB which covers around 25% of the county
- Kent County Council has a 22.21 year landbank for sand and gravel but they are gathering additional information on whether some soft sand reserves should be classified as silica sand. The current work on the Mineral Sites Plan has highlighted the potential for several further soft sand sites which total 16.422mt which generally lie outside the AONB designations.
- Hampshire had permitted reserves of 13.1mt sand and gravel combined[10] (December 2013).
- East Sussex County Council has a 31 year landbank (based on the adopted WMP figure) which is sufficient to meet its needs over the plan period. Around 70% of total sand and gravel consumed in East Sussex and Brighton and Hove was imported from West Sussex[11].
- As some soft sand from West Sussex travels to London markets, the City of London Corporation raised concerns about making sure there are sufficient minerals supplied to meet future demand.

Land–Won Sand and Gravel Summary:

<u>Past to Current Demand</u>

- Sales of land won sand and gravel fell from 573,000 tonnes in 2006 to 244,594 tonnes in 2015. Sales slightly increased in 2015 from the previous year,;
- Average sales of land won sand and gravel over the last 10 years is **339,186 tonnes;**
- Average sales of soft sand over the last 10 years is **329,394 tonnes;**
- Average sales of sharp sand and gravel over the last 10 years are **9,793 tonnes.**

[9] Surrey Local Aggregate Assessment (2014)
[10] Hampshire Local Aggregate Assessment (2014)
[11] East Sussex, South Downs and Brighton & Hove Local Aggregate Assessment (2014)

Other Relevant Local Information

- For sharp sand and gravel, based on the calculated maximum annual demand (demand forecast scenario 3), there is no requirement to plan for additional land won supplies;
- For soft sand, when applying a rolling ten-year average, an additional **2.54 – 3.23mt** are needed over the Plan period which will not be met by existing allocations, therefore new sources of supply will need to be found. For soft sand, when applying the 3-year average, an additional 1.25mt would be needed over the plan period.

Imports and Exports (of land-won and marine-won sand and gravel)

- in 2014 upto 0.23mt of sand and gravel was imported into West Sussex,
- In 2014, upto 1.82mt of sand and gravel was exported from West Sussex
- As such, West Sussex is a **net exporter** of sand and gravel

Supply

- In 2015, the total permitted reserve of land-won sand and gravel was **3,960,500 tonnes**;
- The potential yield from allocated sites in the 2003 MLP is **1,301,100 tonnes**;
- Many of the sites being considered through the JMLP are constrained by environmental and landscape designations, including the South Downs National Park which is afforded the highest level of protection.

Marine Won Sand and Gravel

2.2.1. A steady and significant supply of marine won sand and gravel is landed at wharves in West Sussex. This is a major source of primary aggregate and also a principal alternative source to land-won aggregate. Marine won sand and gravel landed in the S.East of England is primarily used as a replacement for sharp sand and gravel, and is not a substitute for soft/building sand.

2.2.2. Although marine won aggregates was landed at Littlehampton in the past, this activity ceased in 2004 when the aggregate processing plant was removed. The full potential of Railway Wharf, Littlehampton would only be realised if the operator re-established a marine aggregate processing plant, and if navigation/silting problems on the River Arun were resolved to allow continued access for small

dredgers[12]. The wharf at Littlehampton is currently used to import, by sea, crushed rock, for use in the adjacent Coated Roadstone Plant. This leaves Shoreham as the only port used for landing marine won sand and gravel in the County.

2.2.3. NPPF requires local planning authorities to safeguard: existing, planned and potential rail heads, rail links to quarries, wharfage and associated storage, handling and processing facilities for the bulk transport by rail, sea or inland waterways of minerals, including recycled, secondary and marine-won materials.

2.2.4. National marine policy is contained within the Marine Policy Statement (MPS) which sets out a framework for preparing marine plans and taking decisions affecting the marine environment. The South Marine Plan areas are the second busiest in England for marine aggregate extraction, with a total area that is licensed for aggregate extraction of 155.47 square km. The Marine Management Organisation began work on preparing the South Marine Plan in April 2013 and a consultation on the vision and objectives took place in July 2014. A call for issues with supporting evidence consultation took place in July 2016, and further consultations are expected in the near future.

2.2.5. Mineral rights for marine won sand and gravel are owned by the Crown Estate, whom issue licences for dredging activitiy. Marine-won sand and gravel landed in West Sussex is dredged from the channel in the 'South Coast' region which is the second largest dredging region in terms of permitted tonnages. There are currently 14 licences allowing the extraction of 7.8 million tonnes per year. Current estimates suggest that there are permitted reserves sufficient to provide a 21 year supply at the ten year average rate of extraction. If approved, four further dredging licence applications in this area could also deliver licences for an extra 1.9 million tonnes per year, allowing the extraction of 9.7 million tonnes per year (Crown Estate, 2015).[13]

Use of marine-won aggregate

2.2.6. Marine-won aggregates from the South Marine Plan areas are predominantly of a similar nature of sharp sand and gravel. They are used for producing concrete, transport infrastructure, replenishing beaches and improving coastal defences, as well as being exported to neighbouring European countries[14]. As marine and land won aggregates are geologically similar, they can be easily substituted for one another in many uses.

2.2.7. A publication on marine sands in mortars and screeds from the British Marine Aggregate Producers Association (BMAPA) states that the main difference between the majority of land-based sands and marine sands are the presence of chloride and shell. The publication states that there is occasionally resistance by specifiers

[12] Land and Mineral Management (2008). West Sussex Wharves and Railheads Study.
[13] Crown Estate (2015). Marine Aggregates Capability and Portfolio 2015.
[14] Crown Estate (2015). Marine Aggregates Capability and Portfolio 2015.

and purchasers to resist the use of marine won sands due to their potential to include low levels of chlorides but concludes that marine sands show no aesthetic problems associated with sand source[15].

2.2.8. The Marine Sand and Gravel Resources map produced by BGS and the Crown Estate shows the current and potential marine sand and gravel resources, as well as current licensed areas. This indicates that there are some areas of 'fine sand' within the South marine plan onshore and offshore areas, but that the currently licensed areas are in areas of coarse sand and coarse aggregate. The accompanying report states that the map delineates areas within which potentially workable minerals may occur but that this takes no account of planning constraints that may limit their working and that the economic potential of individual sites can only be proved by a detailed evaluation programme[16].

2.2.9. Research undertaken by the Authorities suggests that mortar manufacturers in the south east may be using marine won sand in their mortar products in place of land won soft sand. The use of marine won sand in mortar is common place in other parts of England.

Pattern of previous landings and sales and current demand for marine-won aggregate

2.2.10. Landings of marine-won aggregate at wharves in West Sussex have increased steadily over the last 10 years with a particularly marked increase observed since 2011 (Table 9), this is contrary to the national picture that shows landings have fallen in recent years reflecting the drop in economic output and the construction industry after 2008

2.2.11. Landings of marine-won aggregate at wharves in West Sussex make a significant contribution to overall aggregate supplies in West Sussex and neighbouring authorities (particularly East Sussex and Brighton and Hove).

Table 9: Landings and sales of marine-won sand and gravel at West Sussex Wharves 2006-2015 (tonnes)

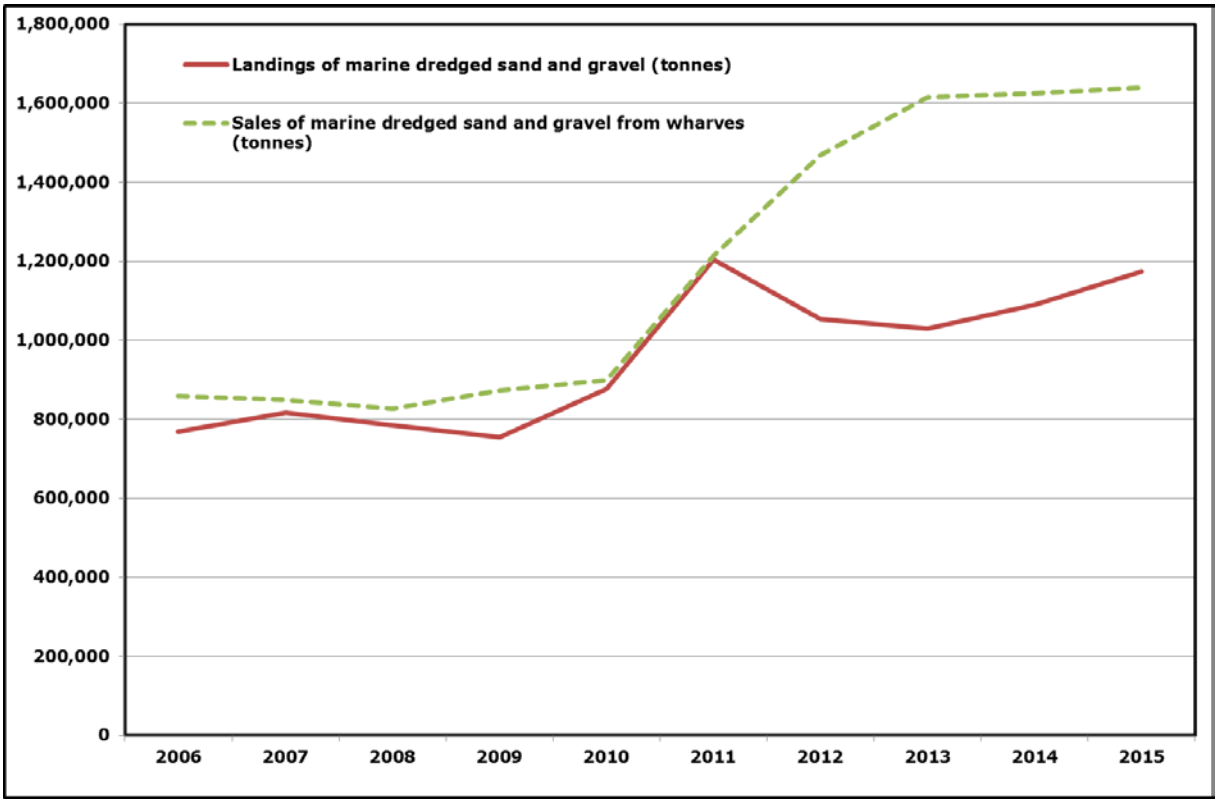
Year	Landings of marine-won sand and gravel (tonnes)	Sales of marine-won sand and gravel from wharves (tonnes)
2006	768,196	860,000
2007	817,207	849,348
2008	784,688	826,252

[15] British Marine Aggregate Producers Association
[16] British Geological Survey (2013) The Mineral Resources of the English Channel and Thames Estuary

2009	755,018	872,267
2010	877,799	899,944
2011	1,203,574	1,213,356
2012	1,052,976	1,470,023
2013	1,029,108	1,616,136
2014	1,090,138	1,626,551
2015	1,173,304	1,639,146
3 year average	**1,097,517**	**1,627,278**
10 year average	**955,141**	**1,187,302**

2.2.12. It is worth noting that the importation of marine won aggregate to Littlehampton ceased in 2004, as a result of the restrictions on shipping flexibility around spring tides, which meant that insufficient aggregate could be imported on the tides available. Therefore figures included in Table 9, from 2005 onwards, reflect imports of marine won sand and gravel to Shoreham only. 1,173,304 tonnes of marine-won aggregates were landed at Shoreham Harbour in 2015 (Table 9).

Figure 3: Landings and sales of marine won sand and gravel at West Sussex Wharves 2006 – 2015 (tonnes)



Future Demand for Marine-won Sand and Gravel

2.2.13. Forecasts of future demand for marine-win aggregate are based on landings data (provided by the Crown Estate) as this removes the element of double counting, whereby some operators of wharves are buying aggregate from other wharf operators, and reporting their sales. Landings data therefore provides a more accurate picture of future demand.

2.2.14. Different scenarios on future demand have been derived based on different mixes of the following assumptions:

- Assumption 1: Housing is projected to grow by 14% in West Sussex
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 14.3% in West Sussex
- Assumption 3: Up to 91% of sand and gravel may be used in homes
- Assumption 4: Up to 33% of sand and gravel may be used on road maintenance/improvements

Other Relevant local Information

2.2.15. A large amount of marine-won sand and gravel is exported to Brighton & Hove and East Sussex, where housing growth is predicted to grow by 10.1%. However, for the purposes of forecasting demand, the projected growth of housing figure for West Sussex (14%) has been used because it is higher, thus ensuring that the emerging JMLP is sufficiently flexible. These forecasts build on the 10-year average of annual landings (955,141 tonnes) and are set out below in Table 10;

Table 10: Demand forecast scenarios for marine-won sand and gravel based on landings 2016 – 2033 (tonnes per annum)

	Demand Forecast Scenario 1(B)	Demand Forecast Scenario 2(B)	Demand Forecast Scenario 3(B)
Assumptions applied	None (10 yr. avg. only)	1, 2, 3, and 4	1 and 2
10 year average	955,141		
Additional demand for housing	n/a	121,685	133,720
Additional demand for roads	n/a	49,801	150,912
Total Annual requirement	955,141	1,126,627	1,239,773

2.2.16. The demand forecast based on landings data shows that demand could be as high as 1,239,773 tonnes per annum. If this is compared to the estimated capacity at wharves in West Sussex, there would be an additional 1,034,227, tonnes of capacity available. Some of this capacity would be used to land crushed rock, and total annual capacity requirements for wharves are discussed later in this report.

Imports and exports

2.2.17. The East Sussex Brighton and Hove LAA (2014) states that 70% of the total sand and gravel consumed in East Sussex and Brighton & Hove was supplied from wharves at Shoreham Harbour in West Sussex which means development in these areas is heavily dependent on landings of marine-won sand and gravel at these wharves. Imports and exports of marine-won sand and gravel also occur between West Sussex and Hampshire.

2.2.18. Discussions with operators during 2008/09 revealed that aggregates delivered to wharves and railheads in West Sussex generally travel a distance of between 25-50 miles suggesting that their market area extends beyond the county boundary.[17]

Current supply of marine-won sand and gravel

2.2.19. The mineral wharves in West Sussex are primarily used for landing marine-won sand and gravel; however, they also land a modest proportion of crushed rock. In 2013, the Authorities commissioned a Wharves and Railheads Study[18] that provides an estimate of the potential maximum quantity of aggregate that can be landed at wharves and railheads within West Sussex. The study concluded that operational wharves within West Sussex could have a maximum total import capacity to land 1,885,000 tpa of aggregate (marine–won aggregates and land-won aggregates transported by sea). The wharves within Shoreham Harbour have reduced in number since this estimate was derived, however, following discussions with the Shoreham Port Authority and wharf operators, this estimate has since been revised upwards to 2,274,000 tpa.

2.2.20. If it is assumed that the maximum capacity requirement in future equates to the maximum landings of marine-won sand and gravel from West Sussex wharves between 2006 and 2015 (1,639,146 tonnes), then there will be a minimum surplus capacity of 634,854 tonnes.

[17] West Sussex County Council (2009). Background paper 4: Transportation of Minerals and Waste, Version 2.
[18] LUC (February 2014) West Sussex Wharves and Railheads Study.

Marine-won Sand and Gravel Summary:

- The South Marine Plan areas are the second busiest in England for marine aggregate extraction;
- 7.8 mt of material is permitted for extraction per annum from licences within the 'South Coast Region'.

Pattern of previous landings and sales and current demand for marine-won aggregate.

- Landings and sales on marine-won sand and gravel in West Sussex have increased steadily over the last 10 years with a marked increase since 2011;
- The 10 year average of annual marine-won sales is 1,187,302 tonnes and 955,141 tonnes of landings;
- For the purposes of assessing demand, landings data has been used because this eliminates an element of double counting that has been identified.

Other Relevant Local Information:

- The demand forecast based on landings data shows that demand could be as high as 1,239,773 tonnes per annum.

Imports and Exports

- Marine-won aggregates make a significant contribution to aggregate supply in West Sussex and neighbouring authorities (particularly East Sussex and Brighton and Hove) due to declining supplies from land-won sources in the area.

Wharf Capacity:

- Following discussions with operators and the Shoreham Port Authority, the potential capacity at wharves in West Sussex is estimated to be 2,274,000 tonnes per annum;
- Based on maximum landings of marine-won sand and gravel from West Sussex wharves between 2006 and 2015 (1,203,574 tonnes), there would be a theortical minimum surplus capacity of 1,070,426 tonnes;
- Marine-won landings ceased in Littlehampton in 2005, although crushed rock landed at the wharf continues to serve the adjacent coated roadstone plant.

2.3. Sand and gravel imported by rail

2.3.1. A relatively small amount of sand and gravel is imported into West Sussex by rail which could be either from marine-won or land-won sources (sharp sand and gravel, or soft sand). Evidence from stakeholder engagement in 2008/09 showed that most of the sand and gravel that came into one of the Crawley depots was bagged for builder's merchants or collected from the depot by building contractors. Due to haulage costs, the vast majority of materials are delivered to fairly local destinations within a 20 mile radius due to the haulage costs.

Pattern of previous sales and current demand for sand and gravel imported by rail

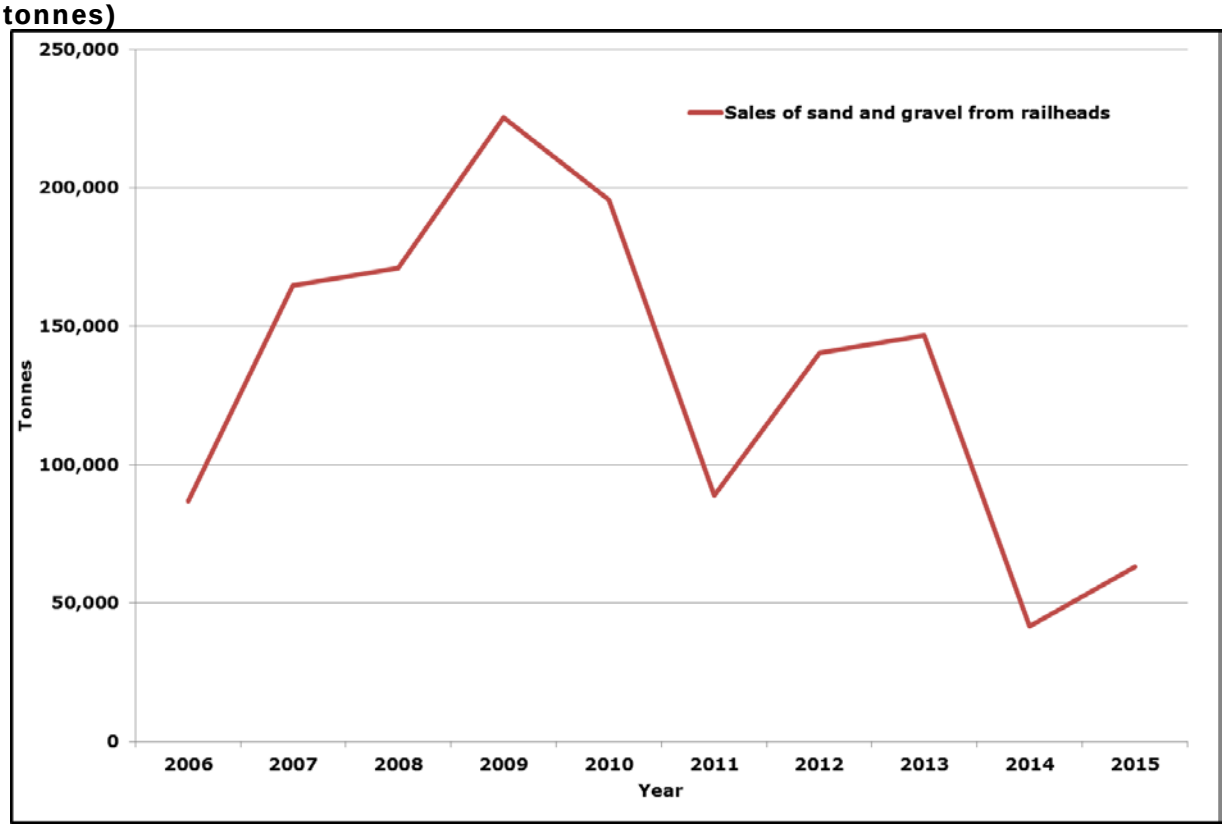
2.3.2. Table 11 and figure 4 shows that sales of sand and gravel from railheads within West Sussex have fluctuated over the last 10 year period, peaking at 225,303 in 2009 and generally declining thereafter. The 10 year average annual sales of sand and gravel from railheads is 136,257 tonnes and the 3 year average is 83,708 tonnes.

Table 11: Imports of sand and gravel to West Sussex Railheads 2006 – 2015 (tonnes)

Year	Sales of sand and gravel from railheads
2006	86,985
2007	164,635
2008	170,971
2009	225,303
2010	195,599
2011	88,845
2012	140,466
2013	146,585
2014	41,521*
2015	63,019
Total	**1,323,929**
3 Year Average	**83,708**
10 year Average	**132,393**

*The fall in imports of sand and gravel in 2014 can be attributed to the fact that one railhead became inactive during 2014 and therefore reported nil returns. The imports to Chichester rail sidings were also previously reported as being sand and gravel but information provided the operator shows that imports they are crushed rock

Figure 4: Imports of sand and gravel to West Sussex Railheads 2006 – 2015 (tonnes)



Future Demand for Sand and Gravel Imported by Rail

2.3.3. Two demand forecasts have been created taking account of the 1—year average of sales (132,393) and other relevant local information set out in the following assumptions

- Assumption 1: Housing is projected to grow by 14% in West Sussex
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 14.6% in West Sussex
- Assumption 3: Up to 35% of crushed rock may be used in homes
- Assumption 4: Up to 78% of crushed rock may be used on road maintenance/improvements

2.3.4. The demand forecast scenarios are set out in Table 12 below:

Table 12: Demand forecasts for rail imported sand and gravel 2016 – 2033 (tonnes per annum).

	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10 yr. avg. only)	1, 2, 3, and 4	1 and 2
10 year average	132,393		
Additional demand for housing	n/a	16,867	18,535
Additional demand for roads	n/a	6,903	20,918
Total Annual requirement	132,393	156,163	171,846

2.3.5. Table 12 indicates that the likely future demand for sand and gravel being imported by rail to West Sussex railheads may be as high at 171,846 tonnes per annum.

Current supply of rail imported sand and gravel

2.3.6. There are five operational railheads in West Sussex, one in Chichester, one in Ardingly and three in Crawley all of which are safeguarded in the existing Mineral Local Plan (2003) and the emerging Joint Minerals Local Plan

2.3.7. The West Sussex Wharves and Railheads Study (2014) states that the a total maximum capacity of 1,380,000 tonnes[19]. All but one of the railheads could probably improve throughput if more train pathways were available. The Sussex Route Utilisation Strategy (RUS)[20] envisages a likely continuation of the movement of aggregates by rail in the medium to long term with demand for rail transported aggregate closely linked to the level of house building and other major construction projects. The Southern Regional Planning Assessment for the Railway[21] suggests that in the Sussex RUS area there will largely be sufficient capacity on the railway network to accommodate predicted levels of growth but suggests that additional capacity at terminals will be required.

[19] Based on Scenario R1 in the West Sussex Wharves and Railheads Study (2014) which safeguards all five railheads.
[20] Network Rail (2010). Sussex: Route Utilisation Strategy.
[21] Department for Transport (2007). Southern Regional Planning Assessment for the Railway.

Rail Imported Sand and Gravel Summary:

Pattern of Previous and Current Demand for Rail Imported Sand and Gravel:

- A relatively small amount (63,019 tonnes) of sand and gravel was imported into West Sussex by rail in 2015. Rail imports peaked at 225,303 tonnes in 2009;
- Most of the sand and gravel imports would be used locally due to high haulage costs;
- The 10 year average sales of sand and gravel from railheads is 132,393 tonnes.

Future Demand:

- The likely demand for sand and gravel being imported by rail to West Sussex railheads to 2033 may be as high at 171,846 tonnes per annum.

Railhead Capacity:

- West Sussex has five railheads with a potential total capacity of 1,380,000 tonnes;
- There is a sufficient capacity to allow for an increase in rail imports of sand and gravel, however this is addressed further in this report as crushed rock is also imported by rail

2.4. Crushed rock

2.4.1. Crushed rock is generaly used for roadstone and rail ballast. West Sussex does not have any natural hard rock resources and relies on rail and sea imports of hard rock, such as limestone and granite, in order to meet local demand for this material.

2.4.2. There are three sites within West Sussex where crushed rock is used to make coated roadstone. These are strategically located close to rail and wharf infrastructure: Ardingly Rail Depot, EWS Goods Yard in Crawley and Littlehampton Wharf, Littlehampton.

Pattern of previous and current demand for crushed rock

2.4.3. Sales of crushed rock from wharves have been more variable over the ten year period than those from wharves (Table 13) with a sudden drop experienced in 2013. The 10 year average annual sales of crushed rock from wharves is 97,935 tonnes.

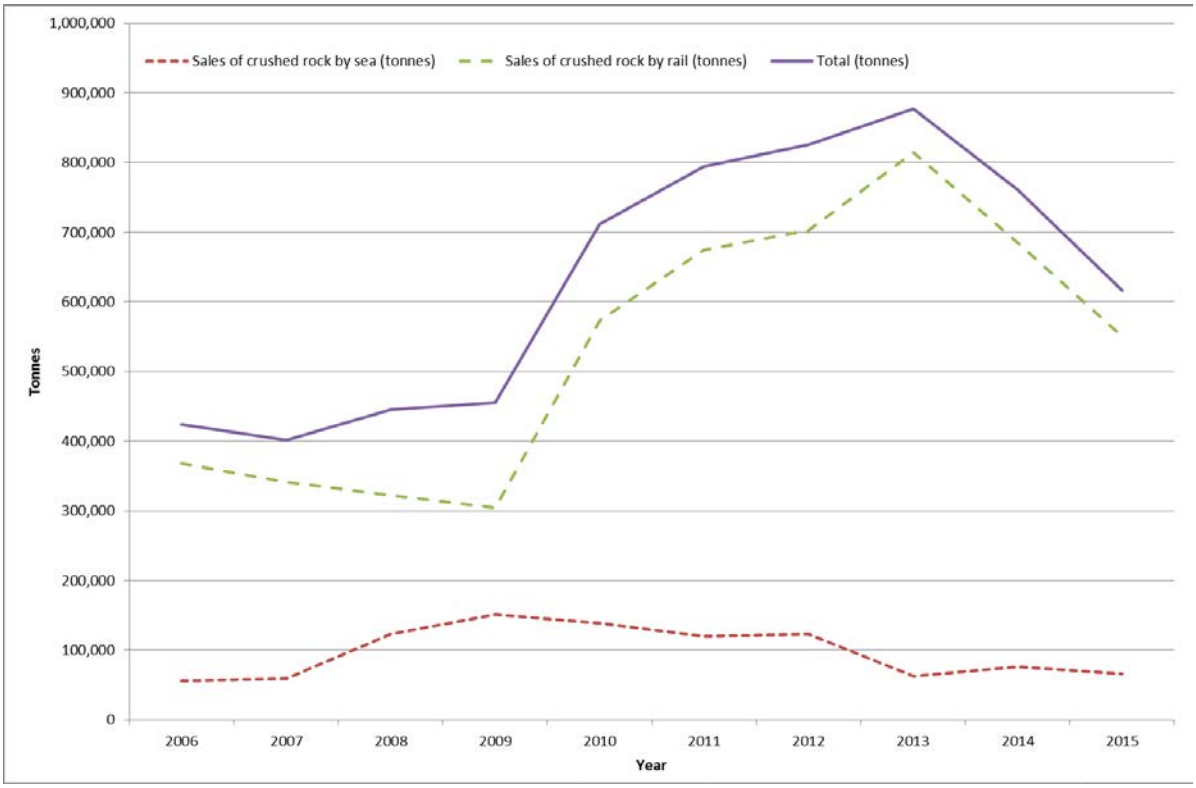
2.4.4. Crushed rock sales from railheads have been steadily increasing since 2009 (table 13 and figure 5). The 10 year average sales of crushed rock from railheads is

533,528 tonnes but the three year annual sales is substantially greater at 683,069 tonnes.

Table 13: Sales of Crushed Rock at West Sussex Wharves and Railheads 2006-2015 (tonnes)

Year	Crushed Rock Aggregate sales from wharves (tonnes)	Sales of Crushed Rock from Railheads (tonnes)	Total
2006	55,786	367,972	423,658
2007	59,999	341,953	401,952
2008	123,109	322,008	445,117
2009	151,556	304,481	456,037
2010	138,927	573,222	712,149
2011	120,428	674,140	794,568
2012	123,457	702,396	825,853
2013	63,000	814,401	877,401
2014	76,670	684,271	760,941
2015	66,422	550,536	616,958
3 Year Average	**68,697**	**683,069**	**751,767**
10 Year Average	**97,935**	**533,528**	**631,463**

Figure 5: Sales of Crushed Rock at West Sussex Wharves and Railheads 2006-2015 (tonnes)



Future Demand for Crushed Rock Imports from Wharves

2.4.5. Four demand forecast scenarios have been created which takr account of the 10-year average of sales (97,935), and other relevant local information:

- Assumption 1: Housing is projected to grow by 14% in West Sussex
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 14.6% in West Sussex
- Assumption 3: Up to 35% of crushed rock may be used in homes
- Assumption 4: Up to 78% of crushed rock may be used on road maintenance/improvements
- Assumption 5: Spending on road construction/maintenance in Brighton & Hove and East Sussex is projected to increase by 51.7% (applied to 1% of total sales to account for exports in previous years)

2.4.6. The calculations of demand are set out in Table 14 below, which shos that the likely demand for crushed rock being landed at West Susses wharves may be as high as 127,626 tonnes per annum. The capacity of wharves in West Sussex is 2,274,000 tonnes per annum, therefore these is sufficient cacpcity to accommodate further demand for imports, however this is addressed further in this report wharves are also used for landing marine-won sand and gravel.

Table 14: Demand forecast scenarios for marine landed crushed rock 2016 - 2033.

	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3	Demand Forecast Scenario 4	Demand Forecast Scenario 5
Assumptions applied	None (10 yr. avg. only)	1-4	1 and 2	1-5	1, 2 and 5
10 year average	97,935				
Additional demand for housing	n/a	4,799	13,711	4,799	13,711
Additional demand for roads	n/a	12,070	15,474	12,576	15,980
Total Annual requirement	97,935	114,804	127,120	115,310	127,626

Future Demand for Crushed Rock Imports to Railheads

2.4.7. Two demand forecasts have been created for rail imports of crushed rock, taking account of he 10-year average of sales (533,528 tonnes) and other relevant local information set out in the following assumptions:

- Assumption 1: Housing is projected to grow by 14% in West Sussex
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 15.8% in West Sussex
- Assumption 3: Up to 35% of crushed rock may be used in homes
- Assumption 4: Up to 78% of crushed rock may be used on road maintenance/improvements

2.4.8. Table 15 shows the calacuations of demand and this indicates that the likely demand for crushed rock importer to West Sussex railheads may be as high at 692,519 tonnes per annum. The capacity of railheads in West Sussex is 1,380,000 tonnes per annum. As railheads are used to import both crushed rock and sand and gravel, total capacity is discussed later in this report.

Table 15: Demand forecasts for rail imported crushed rock 2016 - 2033.

	Demand Forecast Scenario 1	Demand Forecast Scenario 2	Demand Forecast Scenario 3
Assumptions applied	None (10 yr. avg. only)	1, 2, 3, and 4	1 and 2
10 year average	533,528		
Additional demand for housing	n/a	26,143	74,694
Additional demand for roads	n/a	65,752	84,297
Total Annual requirement	533,528	625,423	692,519

Imports and exports of crushed rock

2.4.9. The sources of crushed rock being imported into West Sussex are set out in Table 16, and are based on Aggregate Minerals Survey (2014) data provided by BGS. This is in the form of percentage ranges, due to confidentiality restrictions. The data shows that that Somerset (70-80%%) is the main source of crushed rock being imported into West Sussex. Crushed rock is imported by sea to Littlehampton Port to service the adjacent coated roadstone plant. Total imports of crushed rock into West Sussex steadily rose between 2007 and 2013, after which there has been a decline from 877,401 tonnes, down to 616,958 tonnes in 2015.

Table 16: Origin / Destination of Crushed Rock Landed in West Sussex (2014)

Origin / Destination	Imports to West Sussex (tonnes)
Outside England and Wales	76,100 – 152,200 (10-20%)
Cornwall Council	7,610 – 76,100 (1-10%)
Devon County Council	Upto 7,610 (<1%)
Dorset County Council	Upto 7,610 (<1%)
Gloucestershire County Council	Upto 7,610 (<1%)
North Somerset Council	Upto 7,610 (<1%)
Somerset County Council	532,700 - 608,800 (15-20%)
South Gloucestershire Council	Upto 7,610 (<1%)
Leicestershire County Council	7,610 – 76,100

	(1-10%)
Shropshire Council	Upto 7,610 (<1%)
Northumberland National Park	Upto 7,610 (<1%)
Powys	Upto 7,610 (<1%)
Total	**761,000**

Current supply of crushed rock

2.4.10. As set out earlier the wharves have a potential capacity to land 2,274,000 tonnes of aggregate imports. With regard to railheads, the West Sussex Wharves and Railheads Study (2014) states that they could have a total maximum capacity of 1,380,000 tonnes. As railheads are also used for importing sand and gravel, the total capacity requirements are considered later in this document.

Crushed Rock Summary:

Pattern of Previous and Current Demand for Crushed Rock:

- The vast majority of crushed rock used in West Sussex is imported via railheads, with some imports via wharves;
- Sales of crushed rock from railheads have been steadily increasing over the 10 years with a marked increase since 2009 and peaking in 2014 at 814,401 tonnes; the ten year annual sales average is currently 533,528 tonnes and the three year average is 683,069 tonnes;
- Sales of crushed rock from wharves in West Sussex have remained between 55,786 tonnes and 151,556 tonnes over the last 10 years; the ten year annual sales average is currently 97,935 tonnes and the three year average is 68,697 tonnes;

Future Demand:

- The likely demand for crushed rock being landed at West Sussex wharves may be as high at 127,626 tonnes per annum;
- The likely demand for crushed rock being imported by rail to West Sussex railheads may be as high at 692,519 tonnes per annum.

Capacity for Importing Crushed Rock:

- West Sussex railheads have a potential capacity of 1,380,000 tonnes, indicating that there is sufficient capacity to meet future demand for imports of crushed rock.
- West Sussex wharves also have capacity to land future demand for imports of crushed rock.

2.5. Secondary / Recycled Aggregates

2.5.1. Aggregates sourced from waste materials can be used to substitute primary aggerates in a range of applications such as base layers for new developments and road construction. Higher quality recycled aggregates can also be used in the production of concrete for use in non-load bearing applications. Secondary and recycled aggregates can therefore reduce the demand for primary aggregates and so this LAA provides an assessment of the contribution that these materials may make to the overall supply of aggregates in the area.

2.5.2. Sources of secondary and recycled aggregates are provided below

Secondary Aggregates:

These come from by-products of industrial or mineral extraction processes and may be used either in raw condition or require processing. Secondary Aggregates can be further sub-divided into manufactured and natural, depending on their source. Examples of manufactured secondary aggregates from industrial by-products are Incinerator Bottom Ash (IBA) which can be crushed to produce aggregate. Naturally occurring secondary aggregates generally come from mineral extraction and include china clay sand and slate aggregate. (Source: WRAP www.wrap.org.uk).

Recycled Aggregates:

These usually comprise material derived from construction and demolition wastes, such as builders' rubble, bricks and tiles, excavation waste (such as stone and rock). These materials generally require processing (crushing and screening) but also include material recovered from surface dressing of highways (road planings).

2.5.3. While these materials come from distinct and discrete sources they are generally counted together being from non-primary sources.

Pattern of previous and current demand for recycled and secondary aggregate

Recycled aggregate

2.5.4. The recorded sales figures between 2006 and 2015 for recycled aggregates in West Sussex are set out in Table 17 below. This shows that sales of recycled aggregates have been relatively stable with a peak in 2010 (630,000 tonnes) and an apparent decline since.

Table 17: Sales of Recycled Aggregates in West Sussex 2006 – 2015

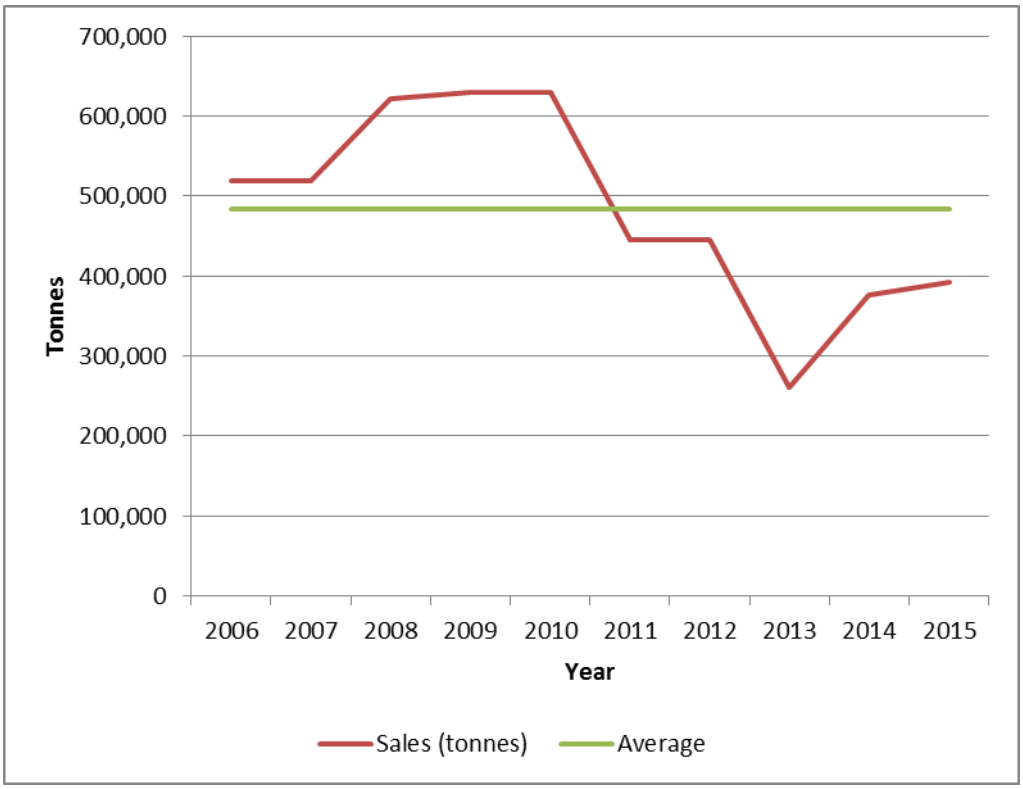
Year	Sales (tonnes)
2006	519,000
2007	519,000
2008	622,000
2009	629,000
2010	630,000
2011	446,000(1)
2012	446,000(2)
2013	261,000(3)
2014	377,000(3)
2015	393,000(3)
3 Year Average (2013 – 2015)	**344,000**
10 Year Average (2006 – 2015)	**488,000**

1)This figure was estimated as part of the work with the Waste Forecast Report (2012) for the Waste Local Plan. It provided a further breakdown of C&D waste to recycling and other management.

(2) Due to the lack of information from 2012 data, this is a rolled forward estimate on 2011. All the sites at the time were active and thus it is expected that recycling continued at similar levels to the previous year.

(3) Figure was derived using a revised methodology prepared as part of the 'Review and Refresh of C&I and C&D Waste and CDEW Arisings and Projections in West Sussex' (BPP Consulting, 2016).

Figure 6: Sales of Recycled Aggregates in West Sussex 2006-2015



Current capacity for production of recycled aggregates

2.5.2 Recycled aggregate can be produced on the site at which demolition waste is produced using a mobile crusher and supplied directly, at an intermediate temporary site using a mobile crusher or at a static site usually a mineral working or a waste management site. In 2015 there were estimated to be 19 static sites within West Sussex that have permission to produce recycled aggregates - capacity is provided by either dedicated CDEW recycling sites (Table 18), or at transfer stations (Table 19). These tables show that in 2015, the 19 sites provided a total capacity of 853tpa for recycled aggregate production. It is important to note that since the assessment of capacity relates to consented static sites only the actual overall capacity for aggregate recycling in the County is likely to be significantly higher than that indicated above due to the contribution mobile and temporary production capacity might make.

Table18: Permitted C&D Waste Recycling Sites

Authority	Site Name	Temporary / Permanent	Estimated Capacity (tonnes per annum)
WSCC	Brookhurst Wood Landfill site**		17,500
WSCC	Crawley Goods Yard, Gatwick Road, Crawley (Day Group)	Permanent	75,000
WSCC	Eastlands, Lewes Road, Scaynes Hill	Permanent	5,000
WSCC	EWS Goods Yard, Crawley	Permanent	30,000

WSCC	Hampers Lane (Britaniacrest Recycling)	Permanent	50,000
WSCC	Hurstpierpoint Wastewater Treatment Works	Temporary (until 2022)	16,000
SDNP	Newtimber Chalk Works	Temporary	25,000
WSCC	Portfield Quarry, Chichester (TJ Waste)*	Temporary	200,000
WSCC	Rowley Farm, Lowfield Heath, Crawley***		30,000
SDNP	Upper Beeding Cement Works, Dudman Aggregates Ltd	Temporary	50,000
SDNP	Valdoe Quarry (former), Lavant	Temporary (until Dec 2016)	75,000
WSCC	r/o Wyevale Garden Centre, Copthorne Road, Crawley***		30,000
	Total		**603,500**

*The operator has provided a revised estimate of the capacity of this site which has increased from the previous year.

** Planning permission was granted at Brookhurst Wood landfill site (Ref: WSCC/00314/14/NH) for the recycling of 25,000 tpa of street cleaning residues into a recycled aggregate . 70% of the input is estimated to be converted into aggregate giving a production capacity of approximately 17,500tpa..

***Additional site not recorded in previous years.

Table 19: Transfer Stations at which aggregate production is expressly consented

Authority	Site Name (all permanent sites)	Estimate C&D Recycling Capacity (tonnes per annum)
WSCC	Arun Waste Services Ltd. Hobbs Barn	20,000*
WSCC	Bognor Road Distribution Centre	17,500
WSCC	Ford Waste Management Facility, South Coast Skips Ltd	100,000*
WSCC	Cox Skips, Burleigh Oaks Farm	35,000*
WSCC	Sussex Waste Recycling (Rabbit Skips)	75,000*
WSCC	Elbridge Farm, Chichester Road, Bersted	15,000*
WSCC	Former Brickworks, Langhurstwood Road	70,000*

	Total	**332,500**
	Estimated total recycling capacity at sites	**249,375****
	* Based on operator estimates (August 2015). **Based on 75% of the total capacity at CD&E sites which is an average of the estimated recycling rate achieved at each site. Stakeholder engagement carried out during 2008/09 also revealed that overall CD&E recycling rates are between 70 and 80%.	

2.5.3 Comparison between the difference of the 10 year average of sales (488ktpa) and estimated capacity (853ktpa) shows that **capacity for producing recycled aggregate in the county appears to be underutilised.** Demand scenarios have not been applied to this source of aggregate supply because the future availability of recycled aggregates may be constrained by availability of feedstock which is reliant on construction and demolition activity. In addition, the use of mobile processing facilities at development sites means that supply may respond to demand relatively quickly without express consent being required. Aggregate recycling sites within West Sussex are safeguarded through the Waste Local Plan (2014) to ensure continuity of supply.

Secondary Aggregates

2.5.4 In West Sussex, the by-products from chalk and sandstone have been used as secondary aggregates. Other sources of secondary aggregate extraction include bottom ash from thermal treatment facilities at the following sites:

- Planning permission has been granted for a waste treatment facility at Ford which includes a 140,000tpa gasification plant generating energy from waste (Ref: WSCC/096/13/F). The gasification process is estimated to produce 21,000 tonnes of residue ash each year which is to be transported off-site for recycling or concrete product manufacture;
- The bottom ash from the 50,000 tpa Energy from Waste plant at Lancing is processed into Incinerator Bottom Ash Aggregates (IBAA). In 2014, this amounted to 11,031 tonnes;

2.5.5 An estimate of the likely capacity for production of secondary aggregates has been calculated and is presented in Table 20 below. It presents the current capacity that exists within the County and two further scenarios that include the permitted site at Ford and a theoretical capacity which may arise if further thermal treatment plants are developed to meet the waste recovery requirements in the adopted Waste Local Plan (2014). Table 20 shows that there could be capacity for producing an estimated 56,000 tpa of secondary aggregates in the County.

Table 20: Secondary Aggregate Capacity Scenarios

Secondary	Capacity Scenario 1	Capacity Scenario 2	Capacity Scenario 3

Aggregate Recycling Capacity	(Current Situation – Lancing Energy from Waste Plant) Figures in tonnes	(Energy from Waste Plant + Ford Site) Figures in tonnes	(Lancing Energy from Waste Plant + Ford Site + remaining capacity in WLP[1]) Figures in tonnes
Lancing Energy from Waste	11,000	11,000	11,000
Ford Energy from Waste	-	21,000	21,000
Remaining sites in WLP	-	-	24,000[2]
Total	**11,000**	**32,000**	**56,000**

(1) To meet the shortfall of non-inert recovery capacity of 270,000 as set out in Policy W1 of the Waste Local Plan 2014. The remaining capacity is calculated to be 130,000 tpa (270,000 – 140,000 = 130,000 tpa).

(2) An estimate of the amount of bottom ash that could be generated from the remaining WLP sites has been calculated using a conversion factor of 5.5. This is an average of the conversion factors of the Lancing and Ford Sites (4.5 and 6.6 respectively).

Recycled and Secondary Aggregates Summary:

- Sales of recycled aggregates peaked at 630,000 tonnes in 2010. Data indicates that supply may have risen in more recent years and were **393,000 tonnes** in 2015;
- The 10year average production of recycled aggregate is **484,000 tonnes;**
- There is one site in West Sussex producing **11,000 tonnes** of bottom ash used as a secondary aggregate;
- A total of **853,000tpa** of capacity for recycled aggregates production is likely to be available within the County (2016 estimate) which indicates that **capacity within the county is underutilised;**
- There could be between **11,000tpa and 56,000tpa** of additional secondary aggregates production capacity in the County.

3. Balance Between Demand and Supply

3.0.1 As previously stated, to be consistent with the NPPF the starting point for estimating future demand is information on sales over the previous 10 years and 'other relevant local information' (such as future demand for housing and other infrastructure). The authorities have considered 'other relevant local information' to calculate a figure for aggregate demand that factors in likely local changes in use of aggregate over the emerging Joint Minerals Local Plan (JMLP) period (to 2033) and a summary of the resulting forecasted demand is shown in Table 21. Table 21 also presents the total estimated likely available supplies for aggregates and the net supply requirements.

3.0.5. West Sussex, and neighbouring authorities, are heavily reliant on imports to its wharves and railheads for crushed rock and marine sand and gravel. Indeed, imports of marine won sand and gravel to the county appear to have compensated for reduced land-won sharp sand and gravel extraction. There is sufficient capacity in wharves and railheads to meet future demands for the importation of crushed rock and sand and gravel (see table 22).

3.0.2 There are sufficient reserves of sharp sand and gravel to meet forecasted demand for this aggregate type and therefore no requirement for additional faciliites to be planned for through the JMLP (quarries, wharves or railheads).

3.0.3 Soft sand has particular uses which are related to its particular qualities and so this is considered separately from sharp sand and gravel. Historically the demand for soft sand in West Sussex has largely been met from land-won sources though data suggests that marine won sand may also provide a source of supply (AM14). As shown in Table 21, the demand for soft sand over the emerging JMLP period (based on average 10 year annual sales and other local relevant information) could be as high as 6,383,648 tonnes and current permitted reserves are 3,060,500. **Therefore, the emerging JMLP will need to consider how to address a shortfall of upto 3,232,148 tonnes of soft sand to 2033.**

3.0.6. As explained above, the Dunford Rough site in the MLP (2003) is no longer deemed to be viable for soft sand extraction. Exploitation of further land won soft sand has to address the more restrictive stance taken towards major development set out in the NPPF given the majority of the remaining resource in West Sussex being located within the South Downs National Park and therefore any extraction proposals can only proceed if 'exceptional circumstances' exist and they are in the public interest.

3.0.7. There is significant capacity for increasing levels of recycled and secondary aggregate production, with the ten year annual average of production currently 533,000 tonnes, whilst the capacity is 805,000 tonnes per annum.

Table 21: Total demand for all sources of aggregate over the JMLP period (2016 - 2033)

	Ten year average sales/landings (2006-2015) (tonnes)	Total Requirement to 2033 based on ten year average sales/landings (tonnes)	Annual requirement taking account other relevant local information	Total Requirement to 2033 (inc. relevant local information) (tonnes)	Total Estimated Supply (tonnes) or capacity	Net Additional Requirement (tonnes) (-ve values = surplus)
Sharp Sand and Gravel	9,793	166,476	**12,711**	**216,086**	900,000 (Permitted Reserves)	-683,914
Soft Sand	329,394	5,599,691	**375,509**	**6,383,648**	3,060,500 (Permitted Reserves)	+3,323,148
Marine-won Sand and Gravel	955,141 (landings)	16,237,394	**1,239,773**	**21,076,137**	Total annual operational capacity – 2,008,000	annual capacity surplus – 640,601
Crushed Rock (landed at wharves)	97,935 (sales)	1,664,902	**127,626**	**1,880,374**		
Crushed Rock (rail imported)	533,528	9,603,504	**692,519**	**11,772,829**	Total annual capacity – 1,380,000	annual capacity surplus – 515,635
Sand and Gravel (rail imported)	132,393	2,383,072	**171,846**	**2,921,382**		
Secondary and Recycled Aggregate	484,000	8,228,000	**-**	**-**	13,685,000 (805,000 x 17)	-

Table 22: Total demand for wharves and railheads (2016-2033)

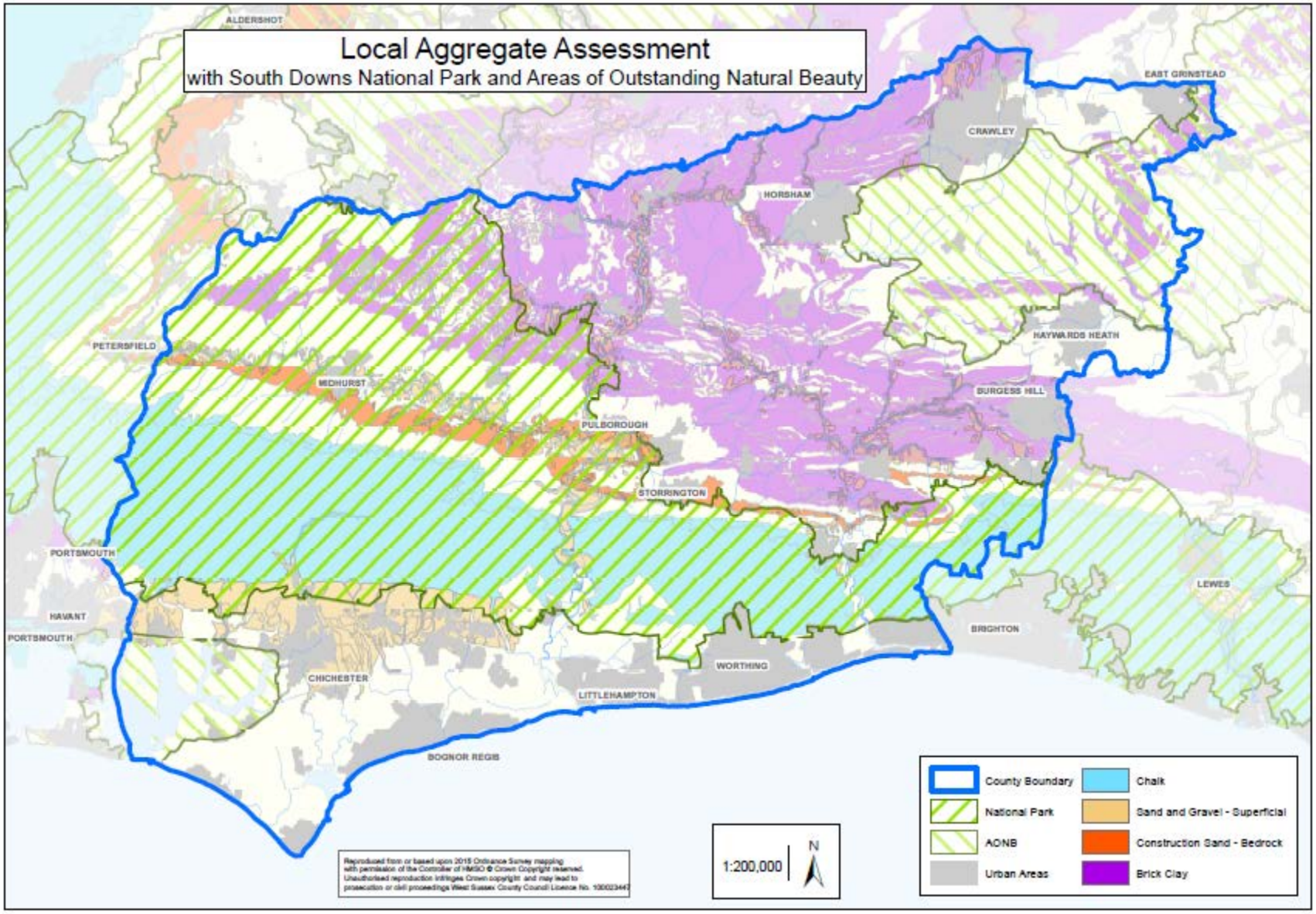
	Ten year average sales/landings (2006-2015) (tonnes)	Annual requirement taking account other relevant local information	Total Estimated Supply (tonnes) or capacity	Capacity implications (against highest demand)
Marine-won Sand and Gravel	955,141 (landings)	1,239,773	-	-
Crushed Rock (landed at wharves)	97,935 (sales)	127,626	-	-
Wharves total	**1,053,076**	**1,367,399**	**2,008,000**	**Surplus 640,601**
Crushed Rock (rail imported)	533,528	692,519	-	-
Sand and Gravel (rail imported)	132,393	171,846	-	-
Railheads Total	**665,921**	**864,365**	**1,380,000**	**Surplus 515,635**

Proposed Monitoring Arrangements

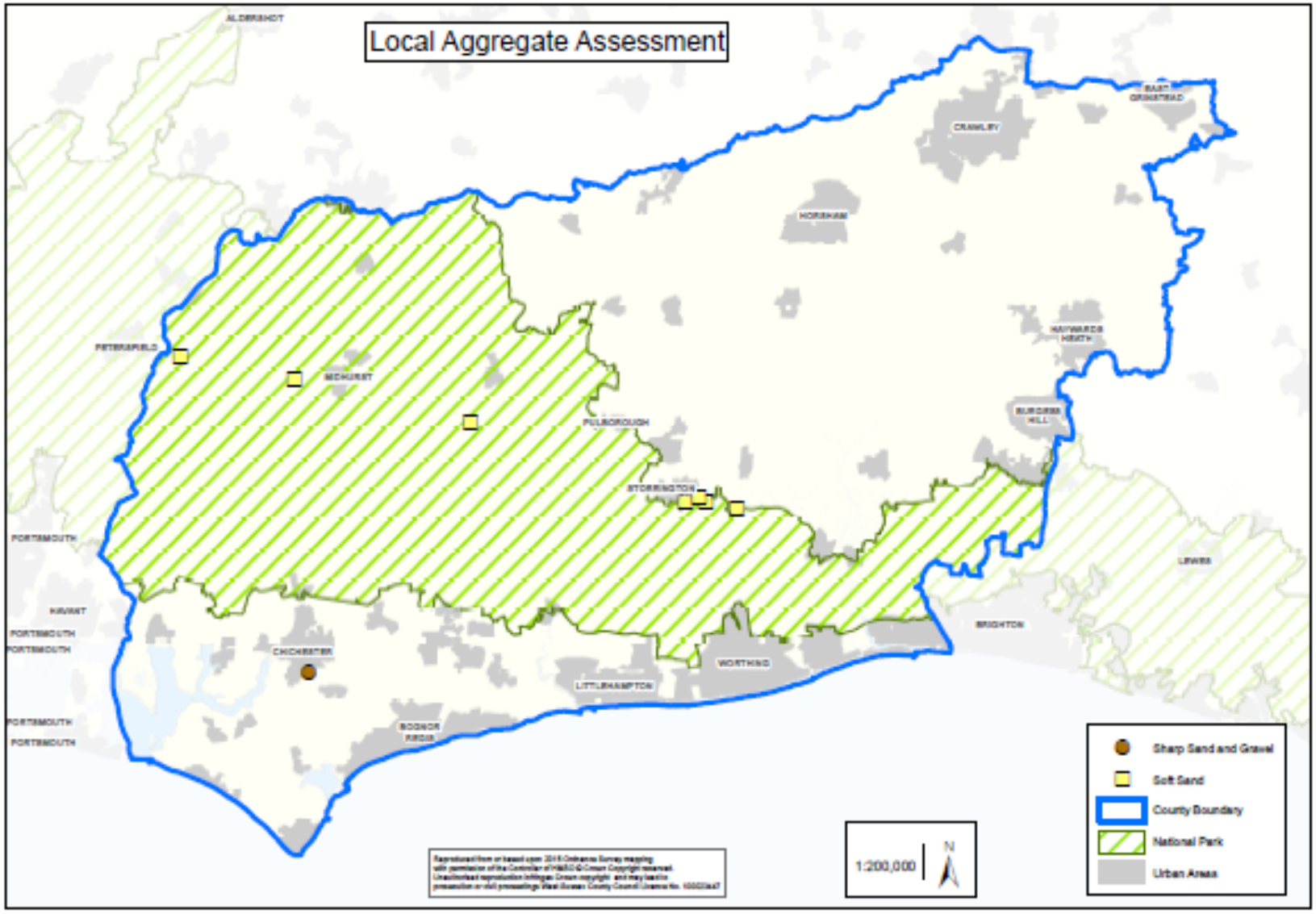
3.0.8. Provision to meet demand for aggregate, as set out in this LAA is considered in the emerging JMLP which is being prepared jointly with the South Downs National Park Authority. The LAA will be updated on an annual basis as part of the Annual Monitoring Report.

Appendix A: Maps

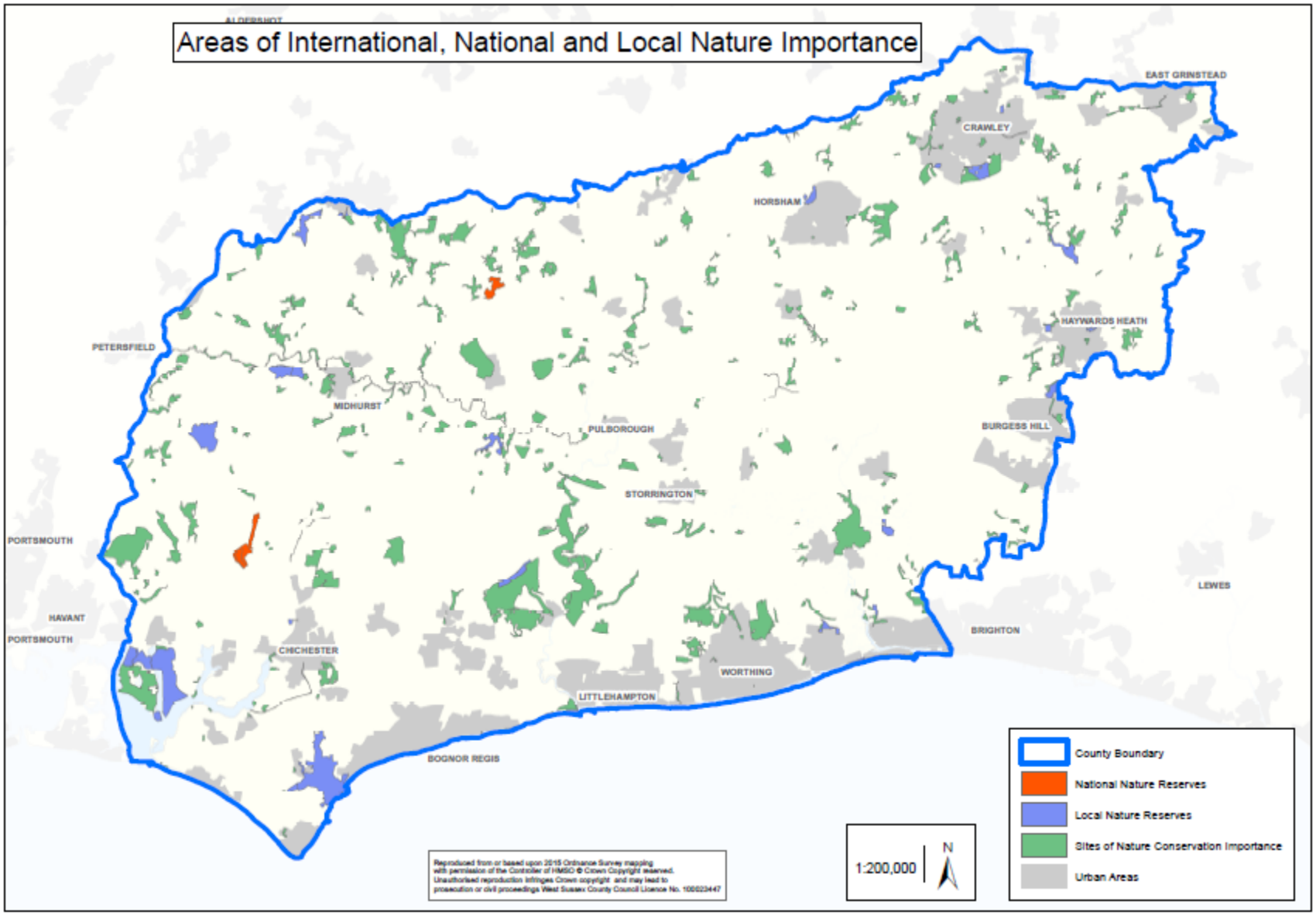
Map A1: Geological Zones, SDNP and AONB in West Sussex



Map A2: Location of Aggregate Sites in West Sussex



Map A3: Nature Constraints in West Sussex



Appendix B: Affect of Housing and Road Construction on Aggregate Supply and Demand

B1. The CLG/BGS (June 2013) *Mineral Planning Factsheet: Construction Aggregates* sets out an overview of aggregate supply in the UK, and its main purpose is to inform the land use planning process. Table 1 of the factsheet sets out the principal uses of primary aggregates in Great Britain, based on sales in 2011. This has been used to calculate the amounts of sand and gravel (including soft sand) and crushed rock that may be used in both housing and highways maintenance/improvements. The data indicates that;

- 91% of total sand and gravel (including soft sand) sold may be used in the construction of homes
- 35% of total crushed rock sold may be used in the construction of homes
- 33% of total sand and gravel (including soft sand) may be used in the construction and maintenance of roads.
- 78% of total crushed rock sold may be used in the construction and maintenance of roads.

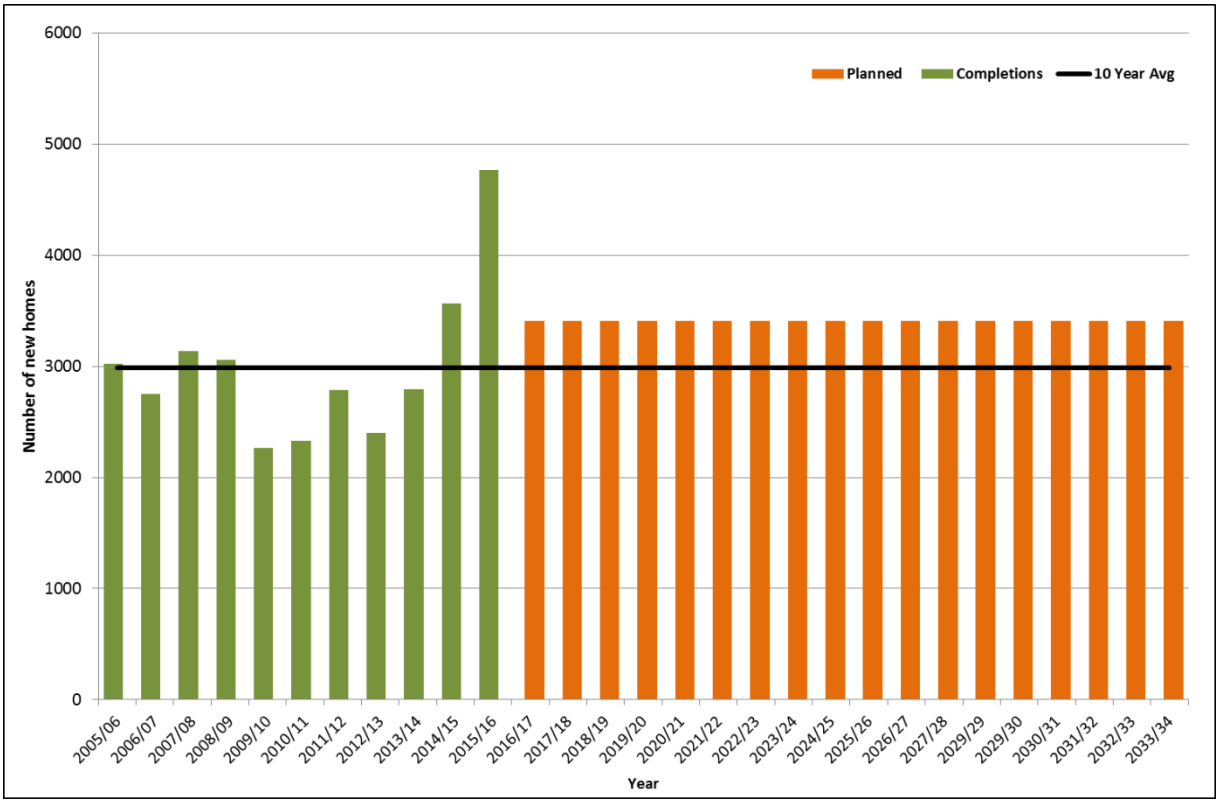
B2. In light of this, when assessing the future demand for aggregate it is considered reasonable to assume that changes to the construction and maintanence of housing and roads will have an important effect.

B3. The LAA sets out how this has been factored in to various demand scenarios for different aggregate types and this appendix shows how the relevant percentage factors applied have been derived.

Housing

B4. Housing completion data indicates that an average of 2,986 dwellings have been built annually in West Sussex over the ten year period of 2006/07 – 2015/16. Meanwhile, planned housing, based on an analysis of existing or emerging local plans of local planning authorities within West Sussex, suggests that 3,405 dwellings will be built per annum up until 2033. This represents an increase of 14% when compared to the 10 year average.

Figure B1: Planned and completed housing in West Sussex (2005/06 - 2033/34)



B5. As aggregates are transported across administrative boundaries, future housing development in neighbouring areas[22] may also influence the demand for aggregate and so needs to be considered. Table B1, below, therefore sets out planned housing in West Sussex as well as all neighbouring areas, and shows the percentage change when compared to actual housing completions. The data presented below for West Sussex is for the period 2006/07 – 15/16, unlike for neighbouring areas, where data is yet to be published.

Table B1: Planned housing growth in West Sussex and Neighbouring Areas.

	Average completions per annum (2005/06 – 2014/15)	Average planned housing per annum (2016 – 2033)	Percentage Change
Brighton & Hove	499	660	32.3%
East Sussex	1,360	1,487	9.3%
Hampshire	5,622	6,020	7.1%
Surrey	3,035	2,977	-1.9%
West Sussex (2006/07 – 15/16)	2,986	3,405	14%
Average for West Sussex, East Sussex, Brighton & Hove, Surrey and Hampshire	**13,501**	**14,549**	**7.76%**

[22] Hampshire, Surrey, Brighton & Hove, and East Sussex.

B6. If the number of housing completions are to increase then it might be reasonable to assume that the demand for aggregates needed to build this housing will also increase. Table B1 shows that a 14% increase in housing completions will occur in West Sussex. This is considerably higher than that of all neighbouring authorities combmined, therefore14% has been factored into the demand scenarios, set out within this LAA, against the 10 year average of sales of for aggregates (where relevant).

Planned Highway Improvement (Crushed Rock)

B7. Evidence has been gathered on planned highway improvement and maintenance works, which require aggregate (generally crushed rock) use. Trunk roads are managed by Highways England, and non-trunk roads are managed by the Highways Authority (WSCC).

Non-trunk Roads

B8. An indication of the level of non-trunk road construction and maintenance for the previous 10 years in West Sussex is provided by an analysis of the highways & transport revenue & capital expenditure. This shows an annual average spend of £45.3M during the period 2006/07 – 2015/16 (see Figure B2).

Figure B2: West Sussex highways and transport capital and revenue expenditure (2006/07 – 2015/16)

B9. There is limited information available on anticipated long term highways spending, with the only information readily available relating to grants from the Local Growth Fund for the

period 2015-2021. This relates to those schemes which are named and committed, as set out in the Coast to Capital Growth Deal. West Sussex local transport funding is set out below in table B2

Table B2: West Sussex Local Transport Funding

Year	Funding Source			Total (£m)
	Construction (£m)*	Maintenance (£m)**	Local Growth Funding (£m)***	
2011/12	4,292	10,519	n/a	14,811
2012/13	4,578	10,447	n/a	15,025
2013/14	4,578	10,610	n/a	15,188
2014/15	6,348	10,043	n/a	16,481
2015/16	3,734	13,723	2,065	19,522
2016/17	3,734	12,581	2,335	18,650
2017/18	3,743	12,200	4,210	20,144
2018/19	3,734	11,043	5,461	20,238
2019/20	3,734	11,043	3,657	18,434
2020/21	3,734	11,043	23,288	38,065

** DfT - Integrated Transport Block Capital Grant (March 2014). Indicative figures for the period 2015/16 – 2020/21*

*** DfT - Highways maintenance funding allocations: 2015/16 to 2020/21 (Dec 2014)*

**** Named and committed schemes, as set out in the Coast to Capital Growth Deal*

B10. Evidence from the Local Growth Funding, which is expected in West Sussex, suggests an average increase of £7.1M per annum[23]. Between 2011 and 2015, the average local transport spending per annum was £15.4M, whilst the average spending between 2016 and 2021 is expected to be £22.5M per annum. This is a total increase of £7.1M during the period 2016-2021 when compared to 2011-2015. **This equates to an increase of 15.8%[24] when compared to previous spending levels.**

B11. Due to the fact that East Sussex and Brighton & Hove rely on crushed rock landed at wharves at Shoreham to meet demands for aggregates in highways works, an assessment of spending was considered for those areas also (Table B3).

Table B3: East Sussex and Brighton & Hove Local Transport Funding.

Year	Funding Source			Total (£m)
	Construction (£m)*	Maintenance (£m)**	Local Growth Funding (£m)***	
2011/12	12,664	6,324	n/a	18,988

[23] The average between 2015/16 and 2020/21 from Coast to Capital Growth Funding

[24] £7.1M equates to 15.8% of the 10 year average spending on highways construction and maintenance (£45.3M).

2012/13	12,233	6,971	n/a	19,204
2013/14	11,318	6,744	n/a	18,062
2014/15	12,221	8,034	n/a	20,255
2015/16	5,978	12,254	13,500	32,732
2016/17	5,978	12,150	19,000	37,128
2017/18	5,978	11,783	20,000	37,761
2018/19	5,978	10,665	8,000	24,643
2019/20	5,978	10,665	8,000	24,643
2020/21	5,978	10,665	8,000	24,643

** DfT - Integrated Transport Block Capital Grant (March 2014). Indicative figures for the period 2018/19 – 2020/21*

*** DfT - Highways maintenance funding allocations: 2015/16 to 2020/21 (Dec 2014)*

**** Named and committed schemes, as set out in the Coast to Capital Growth Deal (July 2014)*

B12. The local growth funding for East Sussex and Brighton & Hove is estimated to be on average £12.75M per annum during the period 2015-2021. When compared to previous spending, it is calculated that the increase in Local Growth Funding equates to **51.7%** during at least the first five years of the Joint Minerals Local Plan's Plan period, when compared to the ten year average spend (£21.5M).

B13. For the purposes of establishing possible future aggregate demand scenarios that may result from an increase in highways maintenance and construction, a growth factor has been applied to crushed rock sales as crushed rock is the type of aggregate used in this activity. In 2009, 199,000 tonnes of crushed rock was sold in East Sussex and Brighton & Hove of which, 1%, was imported from West Sussex. Although imports of crushed rock at East Sussex have begun at Newhaven Depot, importation of crushed rock from West Sussex is expected to continue. To take account of the exports of crushed rock to East Sussex, the proportion of crushed rock coming from West Sussex (1%) has been forecast to grow by 51.7% (i.e. to 1.52%) (see marine landed crushed rock demand scenarios 4 and 5, table 14).

Trunk Roads

B14. The average annual spend on the improvement and maintenance of trunk roads in West Sussex is difficult to ascertain due to the short term and commercial nature of the contracts between Highways England and the Area contractors. Highways England has confirmed that there will be a requirement for surfacing materials, and hence aggregates, over the lifetime of the new contract. The amount of aggregate required for trunk road improvement schemes will be dependent on future Government budget allocations, which have not yet been announced. The following trunk road improvement schemes are proposed in West Sussex;

- A27 Chichester improvement
- A27 Worthing to Lancing improvements
- A27 Arundel bypass.

B14. As these kinds of improvement works have been undertaken in the past and are therefore reflected in data on past demand, it is considered reasonable to assume that

aggregate demand for trunk road maintenance and improvements in future will not increase future demand.

Future demand for aggregates use in roads

B15. For the purposes of forecasting future demand for aggregates use in roads, the assumption being made is that, if spending on the construction and maintenance of roads is to increase by 15.8% (in West Sussex), the demand for aggregates will also increase by 15.8%. This factor has therefore been used in the demand scenarios, set out within this LAA, against the 10 year average of sales of Crushed Rock. A further two demand scenarios for marine landed crushed rock have been prepared to account for demand from East Sussex and Brighton & Hove.

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