

Joint Minerals Local Plan

Assessment of Need for Aggregates:

Local Aggregate Assessment

April 2016



Working in Partnership



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Executive Summary

The National Planning Policy Framework (NPPF) requires Mineral Planning Authorities (MPA) to prepare an annual Local Aggregates Assessment (LAA) 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 for 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 further evidence gathering in 2015 to identify 'other relevant local information' that may influence the 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 headline facts and figures are set out below:

Land won Sand and Gravel:

- Sales data available indicates sales have fallen from 703,000 in 2005 to 238,577 in 2014 (66%) plateauing since 2009;
- The ten year average sales figure of all land won sand and gravel is currently 385,027 tonnes;
- The average split between soft sand and sharp sand and gravel over the past 10 years is 95:5;
- Average sales of soft sand over the last 10 years is 365,062 tonnes;
- Average sales of sharp sand and gravel over the last 10 years is 19,965 tonnes;
- The total permitted reserve of land-won sand and gravel is 3,909,400 tonnes, 3,009,400 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, there is no requirement to plan for additional land won supplies over the Plan period;
- For soft sand, if supplies are maintained at the level of the current 10 year average of sales then an additional 3.56-4.61mt would be needed over the Plan period;
- Extraction of soft sand in West Sussex is highly constrained as the majority of the resource is within the South Downs National Park.

Marine Won Sand and Gravel

- Marine dredged landings and sales in West Sussex have increased steadily over the last 10 years with a marked increase since 2011;
- The 10 year average sales of marine dredged aggregate is 1,097,950 tonnes and 10 year average landings is 919,354 tonnes;

- The demand forecast based on landings data shows that demand could be as high as 1,411,963 tonnes, 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 78% in 2005 to 96% in 2014.

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 135,819 tonnes;
- The demand for sand and gravel being imported by rail to West Sussex railheads is estimated to be as high at 178,769 tonnes per annum.

Crushed Rock

- All sales of crushed rock are of mineral imported via railheads and wharves.
- Sales of crushed rock from railheads have been steadily increasing over the 10 years with a marked increase since 2009;
- Sales of crushed rock from railheads has fluctuated over the last 10 years and peaked in 2013 at 814,401 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 likely demand for crushed rock being landed at West Sussex wharves may be as high at 134,135 tonnes per annum;
- The demand for crushed rock being imported by rail to West Sussex railheads is estimated to be as high at 681,215 tonnes per annum.

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 568,000 tonnes in 2014¹;
- The average sales of recycled aggregate over the last 10 years is 539,000 tonnes;
- A total of 596,940tpa 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 11,031 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

¹ The way that recycled aggregate recycling has been recorded has varied over the 10 year period. Further information can be found in Table 17.

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 and crushed rock to meet demand.

Soft sand resources are heavily constrained by being situated in the South Downs National Park but existing reserves are sufficient to supply soft sand at levels equivalent to the 10 year average sales, and taking account of relevant local information, for 7.1 years. Beyond this period, further supplies from West Sussex are dependent on an assessment of 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.

1. Introduction

1.1. The Managed Aggregate Supply System

- 1.1.1. Aggregates are used for the construction of homes, commercial development and infrastructure. It is therefore important that nationally there is an adequate and steady supply to contribute to 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) for over 35 years.
- 1.1.2. The MASS system was developed due to the geographical imbalance of aggregates and the need for Mineral Planning Authorities (MPAs) to make a contribution to the national need for aggregates as well as local supply. The MASS system has been reformed to deliver more decentralised power to MPAs following a more 'localist' approach. MPAs are now required to prepare a Local Aggregate Assessments (LAA) to assess the demand and supply of aggregates on an annual basis. LAA 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 National Planning Policy Framework (NPPF) and National Planning Practice Guidance (NPPG). Paragraph 62 of the NPPG states that LAA should cover:
- 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;
 - 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.

1.3. West Sussex Minerals Local Plan

- 1.3.1. The 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 government minerals planning policies (included in the NPPF), the establishment of the South Downs National Park Authority (in 2011) and other material changes in relation to the demand and supply of minerals in West Sussex.
- 1.3.2. 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.
- 1.3.3. This LAA is required to inform the preparation of the Plan by setting out a forecast of the unconstrained need for aggregates over the Plan period and indicating what other local issues are likely to influence the future ability of West Sussex to meet the future need. It will form part of the evidence base to support the Plan and will be included within the Annual Monitoring Report (AMR) to ensure that it is kept under review. Consultation on the draft JMLP will take place in Spring 2016. The LAA will be updated on an annual basis.
- 1.3.4. The findings of the LAA will be considered alongside other evidence as the JMLP is developed, in order to determine (through the Plan process) whether the need identified within the LAA can or cannot be met. Whilst the LAA ‘flags up’ potential constraints, the Plan making process will fully explore the constraints around individual sites and the level of mineral ‘need’ that can be met.
- 1.3.5. This LAA will incorporate 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 Joint Minerals Local Plan. This information has been used to underpin a number of scenarios which consider differing aggregate demand uses, including anticipated levels of construction of homes and the maintenance and construction of roads.
- 1.3.6. Data and evidence on roads and homes provide a sound baseline from which to assess possible future demand scenarios. 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.

1.4. National and Regional Context

- 1.4.1. As well as preparing LAA, MPAs, including National Park Authorities, should plan for a steady and adequate supply of aggregates by participating in, and taking the advice of, the Aggregate Working Party (AWP). MPAs should also take account of the published National and Sub-National Guidelines on future provision of aggregates which should be used as a guideline when planning for the future demand for and supply of aggregates. As part of the sand and gravel resources are situated within the South Downs National Park, regard also needs to had to national policy on major development in National Parks (paragraph 116 of the NPPF). This requires a stringent assessment of major developments within these protected landscapes.
- 1.4.2. As part of 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.
- 1.4.3. The data used in this LAA is from the Aggregate Minerals Survey which was carried for the year 2014. The survey is one of a series that has been undertaken on a four-yearly basis providing up-to-date information on sales, reserves and transportation of minerals.

1.5. Consultation Arrangements

- 1.5.1. In accordance with the NPPF and NPPG, this LAA was subject to consideration and scrutiny by SEEAWP on 10 November 2015 and was agreed. It was also sent to a number of other consultees including: the South West England Aggregate Working Party (SWEAWP); counties that receive or provide aggregates to West Sussex; the Coast to Capital Local Economic Partnership; the Crown Estate; the Marine Managament Organisation; the Local Nature Partnership and Natural England.
- 1.5.2. The consultation took place during December 2015 and January 2016 and comments received have been used to amend the LAA where appropriate.

2. Aggregates in West Sussex

- 2.0.1. West Sussex has the capability of supplying aggregates from a number of sources including:
- Extracting soft sand and sand and gravel from the land (land-won);
 - Recycled and secondary aggregate;
 - Imported aggregate (e.g. crushed rock and sand and gravel); and
 - Sand and gravel dredged from the sea bed (marine-won)
- 2.0.2. When planning for a steady and adequate supply of minerals, Mineral Planning Authorities have to consider all supply options (as set out above) when considering total aggregate supply and demand.
- 2.0.3. This LAA considers each supply option separately including the economic and environmental opportunities and constraints that might influence the situation. It then brings this together to consider the total aggregate supply picture and the balance between supply and demand.

2.1. Land-won sand and gravel (soft sand and sharp sand gravel)

Geology and landscape

- 2.1.1. In broad terms, the county has a sequence of broad geological zones from the south to the north-east of the County; see **Map A1 in Appendix A**.
- 2.1.2. Sand is won from the Sandgate Formation and the Folkestone Formation 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 sands or is used in the production of concrete. Gravel, of varying quality, and some sharp sand, is found to the south of the Downs in the south-east of the County.
- 2.1.3. Coarser, silty 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. Gravel resources are clustered around Chichester and south of the Downs 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. Minerals can only be worked where they occur and their extraction can potentially cause conflict through loss or changes to valued landscapes. The SDNP covers almost half the Folkestone Beds, and part of the gravel resource north of Chichester. The Chichester Harbour AONB designation includes a partial amount of

unconsolidated gravel. The extent of these landscape designations is shown in **Map A1, Appendix A.**

- 2.1.5. Much of the soft sand outside the SDNP has been worked or is currently being worked. The majority of remaining land-won soft sand resources therefore 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 and in the Storrington area, it was also noted that a lot of land is owned by the National Trust. This evidence is being re-examined, and new evidence sought as part of the development of the Joint Minerals Local Plan in order to fully explore the alternatives to soft sand from within the SDNP, having regard to the technical data and the protection from major development that the SDNP has under national planning policy.
- 2.1.6. With regard to 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.
- 2.1.7. A Soft and Silica Sand Study has been commissioned that will assess the geology of the Folkestone Formation. It will provide details of whether the Folkestone Formation contains silica sand, which can be used for a range of industrial applications and is regarded as strategic importance in national policy.

Uses of land-won sand and gravel

- 2.1.8. 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)

- 2.1.9. Looking at past sales figures for land-won sand and gravel provides an indication of the contribution that this source of supply has made to the overall supply picture in West Sussex.
- 2.1.10. The ten years of land-won sales data is presented in Table 1 and Figure 1. This shows that sales have fallen from 703,000 tonnes to 238,577 tonnes (66%) over the ten year period since 2005 and have plateaued since 2009. The average sales figure over the 10 year period for both sand and gravel is 385,027 tonnes and the

average for the past three years has been much lower (266,423 tonnes). It is not possible to provide sales figures for individual mineral types but the average split between the two aggregate types over the last 10 years is 95% soft sand and 5% sharp sand and gravel. This equates to 365,062 tonnes of soft sand and 19,965 tonnes for sharp sand and gravel (10 year averages).

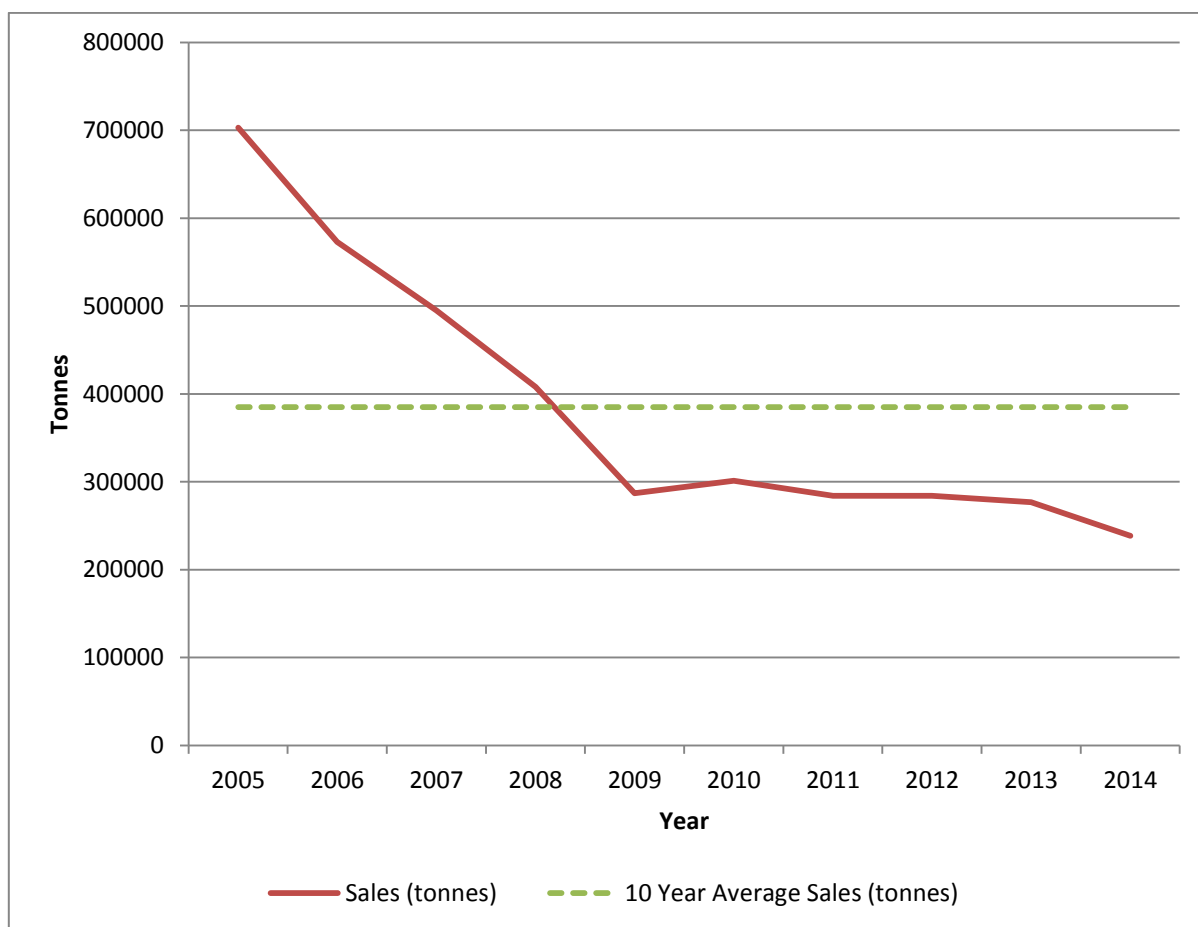
- 2.1.11. The general pattern of decline in sales could be attributed to an increase in the supply of alternatives (secondary/recycled and marine dredged sand and gravel) replacing the need for primary aggregates and/or a reduction in development levels due to the economic downturn. Gross dwelling completions 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 the last three years there has been an increase in housing completions, with a total of 3,564 being completed in 2014/15.

Table 1: Sales of Land Won Sand and Gravel in West Sussex 2005 – 2014

Year	Sales (tonnes)*
2005	703,000
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
3 Year Average	266,423
10 Year Average	385,027 (365,062 tonnes soft sand, 19,965 tonnes sharp sand and gravel²)
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.	

² 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 2005 - 2014



2.1.12. The fall in land-won aggregate sales is replicated in neighbouring authorities, with Hampshire and Surrey also showing a downward trend in sales (Table 2 and Figure 2). Sales for the South East region as a whole fell by 48% (10,405,000 tonnes to 5,399,000 tonnes) between 2004 and 2013, which covers the period before and during the economic downturn³. 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 and economic growth may not be clear cut. With regard to East Sussex, due to the number of 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.

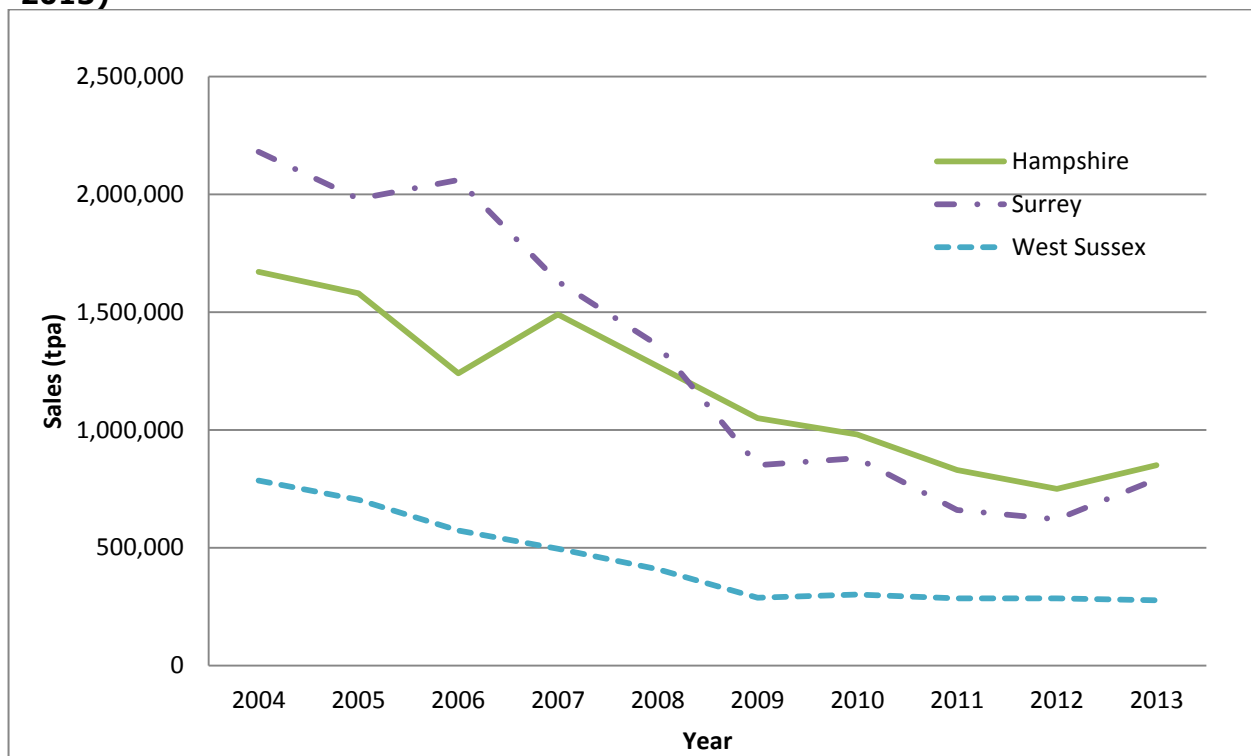
Table 2: Sales of Land-Won Sand and Gravel in Adjoining Authorities (2004 – 2013)

Year	Hampshire	Surrey
2004	1,670,000	2,180,000
2005	1,580,000	1,980,000
2006	1,240,000	2,060,000

³ SEEAWP (2013) South East Aggregates Monitoring Report 2013.

2007	1,490,000	1,630,000
2008	1,270,000	1,360,000
2009	1,050,000	850,000
2010	980,000	880,000
2011	830,000	660,000
2012	750,000	620,000
2013	850,000	790,000
Ten Year Average	1,171,000	1,301,000
Three year Average	810,000	690,000
Figures for 2014 have not been included because the AM2014 survey data has not been published yet.		

Figure 2: Sales of Land-Won Sand and Gravel in Adjoining Authorities (2004 – 2013)



Other Relevant Local Information

- 2.1.13. 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. Scenarios were developed taking into account two growth factors (Housing = 15.9%, Construction of roads = 15.3%).

Appendix B explains how these factors have been developed and applied in more detail. This includes assumptions regarding the level of use of different aggregates in these uses.

- 2.1.14. Sharp sand and gravel are considered separately from soft sand as they are used for different purposes. Paragraph 145 of the NPPF 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.*"
- 2.1.15. Further other relevant local information includes the fact that soft sand resources are constrained by the allocation of the South Downs National Park. This is further considered in paragraph 2.1.31 below.

Sharp Sand and Gravel

- 2.1.16. Based on the 10 year average split of sales (95% soft sand and 5% sharp sand and gravel), the estimated demand based only on 10 years sales data for sharp sand and gravel is 19,965 tonnes. National policy states that a three year average should also be considered in order to show any trend. The three year average for sharp sand and gravel sales in West Sussex is zero but it is anticipated that this will not be the case in the next monitoring year if the permission at Kingsham gravel site is implemented.
- 2.1.17. The scenarios set out in table 3 below were based on the following assumptions using the data presented in Appendix B.
- *Assumption 1: Housing is projected to grow by 15.9% in West Sussex*
 - *Assumption 2: Spending on road maintenance/improvements is expected to increase by 15.3% 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*

Table 3: Sharp sand and gravel demand forecast scenarios 2015 – 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	19,965		
Additional demand for housing	n/a	2,889	3,174
Additional demand for roads	n/a	1,008	3,055
Total Annual	19,965	23,862	26,194

requirement			
Total requirement over Plan period (2015 – 2033)	359,370	429,508	471,490
Current reserves	900,000 ⁴		
Shortfall (+ve) /surplus (-ve)	-540,633	-470,492	-428,510

- 2.1.18. Based on the calculated maximum annual demand (demand forecast scenario 3), a requirement of 471,490 tonnes of sharp sand and gravel would need to be met until 2033. The landbank for sharp sand and gravel, based on the current reserves against demand forecast scenario 3, is 34 years (calculated by dividing the reserve figure of 900,000 tonnes by the annual demand figure of 26,194) therefore there is **no requirement to plan for additional land won sharp sand and gravel supplies.**

Soft Sand

- 2.1.19. Based on the 10 year average split of sales (95% soft sand and 5% sharp sand and gravel), the estimated demand based only on 10 years sales data for soft sand is 365,062 tonnes. The three year average for soft sand sales in West Sussex is 266,423 tonnes.
- 2.1.20. The following key assumptions have been used when forecasting what the future demand for land-won soft sand and may be in West Sussex based on the following data presented in Appendix B:
- Assumption 1: Housing is projected to grow by 15.9% in West Sussex
 - Assumption 2: Up to 91% of sand and gravel may be used in homes
- 2.1.21. 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 365,062 tonnes, which are set out in Table 4 below:

Table 4: Soft sand demand forecasts 2015 - 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	365,062		
Additional demand for housing	n/a	52,821	58,045

⁴ Current reserves at Kingsham Quarry

Total Annual requirement	365,062	417,883	423,107
Total requirement over Plan period (2015 – 2033)	6,571,116	7,521,892	7,615,925
Current reserves	3,009,400		
Shortfall (+ve) /surplus (-ve)	3,561,716	4,512,492	4,606,525

- 2.1.22. Table 4, shows that the scenarios would mean additional supplies of between 3.56-4.61mt of soft sand are needed over the Plan period (2015 – 2033). The landbank, based on the current reserves against the 10 year average, is 8.2 years (calculated by dividing the reserve figure of 3,009,400 tonnes by the ten year average of 365,062). The landbank based on the highest expected annual demand (demand forecast option 3) is 7.1 years (3,009,400 divided by 423,107).
- 2.1.23. At present, there are five permitted soft sand sites in the Plan Area, as set out in Table 4. These sites have a total reserve of 3,009,400 tonnes. There is a potential reserve of 2,920,800 tonnes at the Dunford Rough site in the 2003 Minerals Local Plan (table 4). However, this site is no longer deemed to be viable for extraction due to restrictive covenants and access difficulties which mean that initial indications are that there will be a need to plan for further soft sand extraction through allocations in the Plan.
- 2.1.24. The Authorities feel that the heavily constrained options for meeting soft sand demand through the Plan period should be considered as '*other relevant local information*'. Consideration of future supply from within the South Downs National Park through the JMLP process will include 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

- 2.1.25. West Sussex imports and exports aggregates from/to surrounding MPAs, as well as from further afield, and it is important to understand the current and potential future cross-boundary issues between West Sussex and other neighbouring and more distant mineral planning authorities.
- 2.1.26. 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. The data presented below comes from the last national survey (2009)⁵ and from data obtained from the British Geological Survey (BGS). Data for 2014 has recently been collated by BGS but will not be available to MPAs until 2016. Due to

⁵ South East Aggregates Working Party (February 2011). South East Annual Monitoring Report 2009.

confidentiality restrictions, import data figures were provided by BGS as a percentage range of total supply to provide an indication of the relative importance of each supplying Mineral Planning Authority. Table 5 shows that in 2009, West Sussex consumed approximately 78% of total sand and gravel (land won and marine) sales within the county, the rest was exported. A total of 53,141 tonnes of sand and gravel was imported into West Sussex, approximately 10% of the total it consumed.

Table 5: Origin/Destination of Sand and Gravel Consumed/Produced in W. Sussex

Origin/Destination	Imports (tonnes)	Exports (tonnes)
South East Region		
Berkshire	See note	229
Buckinghamshire	See note	0
East Sussex and Brighton and Hove	-	492,867
Hampshire and Isle of Wight	7,725 – 15,451 (Approx. 90-95% from marine sand and gravel)	64,091
Oxfordshire	See note	0
Kent and Medway	18,541 – 30,901 (Approx. 90-95% from marine sources)	25,427
Surrey	3,090 – 7,725	10,812
Sub Total	44,809	593,426 (Approx. 90% from marine sources)
Consumed in West Sussex	-	533,509
Outside South East Region		
Devon	See note	0
Dorset	See note	13,619
Essex	See note	0
Gloucestershire	See note	0
Somerset	See note	8,098
London	See note (All from marine sources)	10,206
Wiltshire	See note	756
Sub Total	8,332	32,679 (Approx. 76% from marine sources)

Overall Total imports/exports (excluding West Sussex consumption)	53,141	626,105 (Approx. 86% from marine sources)
Source: Data obtained from the British Geological Survey and was based on the 2009 Aggregate Minerals Survey. The information for West Sussex Sand and Gravel contained an error which has been rectified here, thus the total exports figure (and consumed in West Sussex figures) are higher than that from the 2009 AMS.		
<i>Note: For imports to W. Sussex, ranges are provided due to confidentiality restrictions. For outside the SE Region, a sub-total is provided. The total provided in the "subtotal" row shows what was imported to W. Sussex.</i>		

- 2.1.27. 626,105 tonnes was exported to other authorities, predominantly to adjoining neighbours (East Sussex and Brighton and Hove, Hampshire and Surrey). East Sussex and Brighton and Hove received the greatest proportion (79% of total exports from West Sussex).

Current supply of land-won sand and gravel

- 2.1.28. The current supply of land-won aggregate in West Sussex comprises 7 sites, all of which were operating before the designation of the South Downs National Park which now forms part of the plan area. These are presented in Table 6 below and shown in **Map A2, Appendix A**. In 2014, the total permitted reserve of land won sand and gravel in West Sussex was 3,909,400 tonnes.

Table 6: Permitted Sand and Gravel Quarries in West Sussex (2014)

Soft Sand			
Location	Site	Operator	Status
SDNP	West Heath Quarry, West Harting, Petersfield	CEMEX UK Operations	Active - Winning and working of sand.
West Sussex	Rock Common Sandpit, Washington, Pulborough	Dudman Group Ltd.	Active - Sand extraction. Concrete batching plant. Aggregates recycling.
West Sussex	Sandgate Park Quarry, Water Lane, Sullington, Storrington	CEMEX UK Operations	Active - Winning and working of sand.
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 – Holds permitted reserves.

Sharp Sand and Gravel			
West Sussex	Land at Kingsham, South of Chichester, Chichester, West Sussex, PO19 8XH	Dudman Group Ltd.	Unimplemented permission for gravel extraction.

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

Potential Supply from Allocated Sites

- 2.1.29. Table 7 sets out the allocated sites in the Minerals Local Plan, 2003, (MLP) that have not come forward to date. Although the Lavant sites were refused at planning committee in March 2009, they remain allocated in the MLP (2003) and are therefore shown in the table below. The Authorities are aware that the landowner has sold the land but retained the mineral rights and an application for a non-mineral use has been submitted. These sites are therefore thought to be undeliverable, but are being reassessed as part of the JMLP.
- 2.1.30. 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. However, there is no certainty that the remaining sites would come forward and they would need to be re-assessed as part of the preparation of the JMLP. These sites are also sharp sand and gravel sites and the LAA has identified that there isn't a need for this mineral. The existing allocations in the MLP (2003) would not therefore meet the identified demand in West Sussex.

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 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.

Potential constraints to future land-won supply

- 2.1.31. Minerals can only be worked where they are found. The site selection process being undertaken for the JMLP is highlighting issues associated with already limited options for viable and deliverable land-won sand and gravel resources. This may limit further land-won extraction in the future. The issues include:
- Environmental and landscape designations
 - Water resources; and
 - Communities and amenity
- 2.1.32. 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.
- 2.1.33. The Authorities feel that the heavily constrained options for meeting soft sand demand through the Plan period should be considered as '*other relevant local information*'. Consideration of future supply from within the South Downs National Park through the JMLP process will include an assessment of 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.
- 2.1.34. This assessment will include looking at the alternative sources of supply from outside designated areas and will require a positive dialogue with adjoining and more distant authorities to establish potential alternative supplies. It will also include assessing the potential resource outside the SDNP but still within West Sussex, although as has been previously mentioned, the industry has raised concerns about the viability of this resource.
- 2.1.35. Similarly, 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.
- 2.1.36. As an illustration, the proposed aggregate sites on the long-list (see Minerals Sites Study V2, 2015) are subject to the following constraints (**Appendix A, Mapa A1 and A3** shows the constraints).

Table 8: Constraints affecting potential sites in West Sussex

Constraint	Number of sites (out of 21 total sites)
National Park	11
Local Wildlife Site/Site of Importance for Nature Conservation	2
Site of Special Scientific Interest	1

- 2.1.37. 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.
- 2.1.38. 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'. However there is no evidence of this being possible during the Plan period for the JMLP.
- 2.1.39. 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 2033⁶. 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.

⁶ Surrey Local Aggregate Assessment (2014)

- Hampshire had permitted reserves of 13.1mt sand and gravel combined⁷ (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 Sussex⁸.
- 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:

Past to Current Demand

- Sales of land won sand and gravel have fallen 66% from 703,000 tonnes in 2005 to **238,577 tonnes** in 2014;
- Average sales of land won sand and gravel over the last 10 years is **385,027 tonnes**;
- Average sales of soft sand over the last 10 years is **365,062 tonnes**;
- Average sales of sharp sand and gravel over the last 10 years are **19,965 tonnes**.

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, an additional **3.56-4.61mt** are needed over the Plan period which will not be met by existing allocations, therefore new sources of supply will need to be found.

Imports and Exports

- West Sussex consumed 88% of total sand and gravel (land won and marine) sales within the county;
- 626,105 tonnes of sand and gravel produced in the County (both landed at wharves, and land-won) was exported to other counties and a significant proportion to East Sussex, Brighton and Hove (79%).

Supply

- In 2014, the total permitted reserve of land-won sand and gravel was **3,909,400 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

⁷ Hampshire Local Aggregate Assessment (2014)

⁸ East Sussex, South Downs and Brighton & Hove Local Aggregate Assessment (2014)

Marine Won Sand and Gravel

- 2.2.1. West Sussex receives a steady supply of marine dredged sand and gravel to its wharves and this is a major source of primary aggregate and also a principal alternative source to land-won aggregate. 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-dredged materials.
- 2.2.2. West Sussex has two ports with wharves, Littlehampton and Shoreham. Although marine-dredged landings were received at Littlehampton in the past, these 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 dredgers⁹. This leaves Shoreham as the only port for marine-dredged imports in the County.
- 2.2.3. 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. Work began on preparing the South Marine Plan in April 2013 and a consultation on the vision and objectives took place in July 2014. 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 expects to release a consultation draft of the marine plans for formal representations in winter 2015 to 2016.
- 2.2.4. Mineral rights for sand and gravel are owned by the Crown Estate. 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 14 licences allowing the extraction of 7.8 million tonnes per year, however, over the last 10 years, just under half of the permitted tonnages have been taken and there is currently permitted capacity to supply an additional 4.8 million tonnes per year. If approved, four further dredging applications in this area could also deliver permits for an extra 1.9 million tonnes per year (Crown Estate, 2015)¹⁰. Current estimates suggest that there are 21 years of primary aggregates production permitted.

⁹ Land and Mineral Management (2008). West Sussex Wharves and Railheads Study.

¹⁰ Crown Estate (2015). Marine Aggregates Capability and Portfolio 2015.

Use of marine-won aggregate

- 2.2.5. Marine-won aggregates from the South Marine Plan areas are used for building houses, transport infrastructure, replenishing beaches and improving coastal defences, as well as being exported to neighbouring European countries¹¹. As marine and land won aggregates are geologically similar, they can be easily substituted for one another in many uses.
- 2.2.6. 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 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 source¹².
- 2.2.7. 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 license areas. This indicates that there are some areas of 'fine sand' within the South marine plan onshore and offshore areas, but that the currently licenced 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 programme¹³.

Past to current demand for marine-won aggregate

- 2.2.8. Marine dredged landings to West Sussex over the last 10 years have increased steadily over the last 10 years with a marked increase since 2011 (Table 9), although nationally extraction has fallen in recent years reflecting the drop in economic output and the construction industry¹⁴. Marine dredged landings 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. The term 'landings' is used to describe the volume of aggregates that are delivered and stored at a wharf, whereas 'sales' indicates the volume of aggregates that are removed from the wharf in any one year.
- 2.2.9. Sales of marine-dredged sand and gravel have broadly followed landings¹⁵, until recent years when sales have been significantly higher (Table 9, Figure 3). Discussions with operators has revealed that some of the small wharf operators at

¹¹ Crown Estate (2015). Marine Aggregates Capability and Portfolio 2015.

¹² British Marine Aggregate Producers Association

¹³ British Geological Survey (2013) The Mineral Resources of the English Channel and Thames Estuary

¹⁴ Crown Estate (2014). Marine Aggregates Capability and Portfolio 2014

¹⁵ Landings data from the Crown Estate.

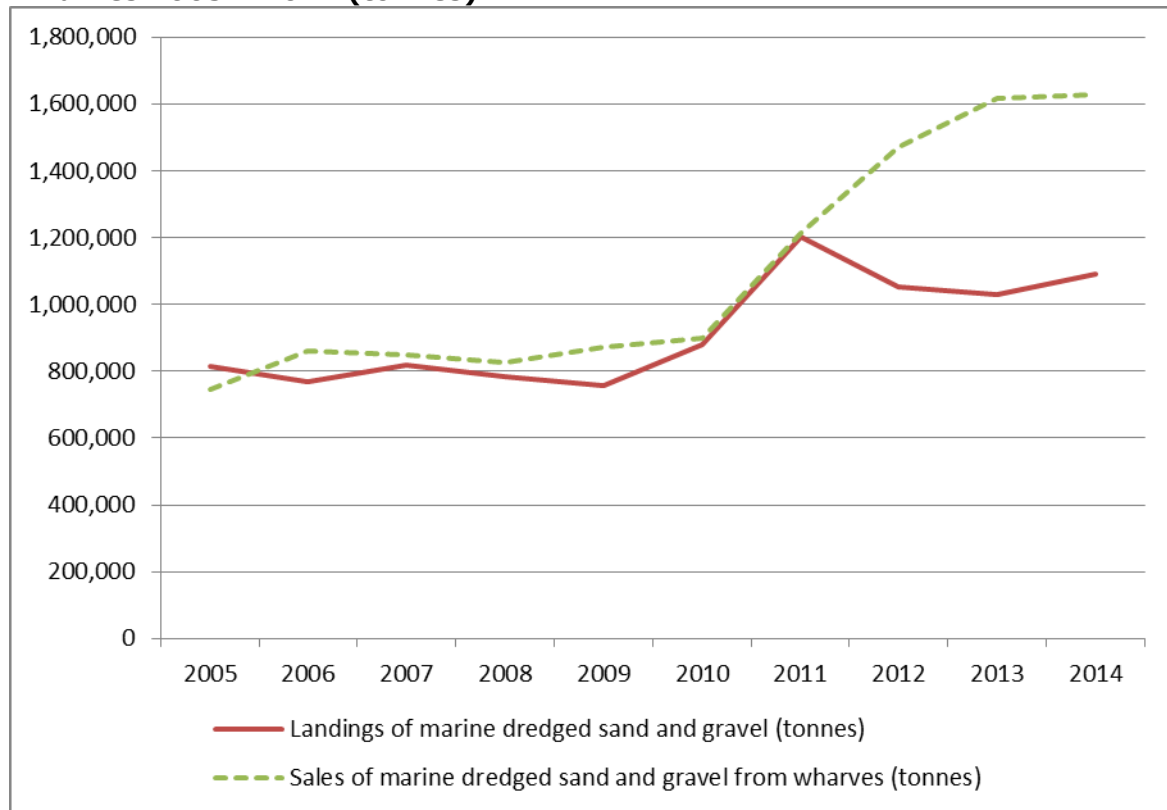
Shoreham are currently buying marine dredged aggregate from the larger operators, therefore there is an element of double counting taking place. The difference between the two figures, from 2012 onwards, reflects the changing market conditions which can lead to an increase or decrease in stock piles maintained at the wharves and has an important bearing on the capacity required.

Table 9: Landings and sales of sand and gravel at West Sussex Wharves 2005-2014 (tonnes)

Year	Landings of marine dredged sand and gravel (tonnes)	Sales of marine dredged sand and gravel from wharves (tonnes)
2005	815,439	745,620
2006	768,196	860,000
2007	817,207	849,348
2008	784,688	826,252
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
3 year average	1,057,407	1,570,903
10 year average	919,354	1,097,950

- 2.2.10. 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. 1,090,138 tonnes of marine dredged aggregates were landed at Shoreham Harbour in 2014 (Table 9).

Figure 3: Landings and sales of marine won sand and gravel at West Sussex Wharves 2005 – 2014 (tonnes)



Other Relevant Local Information

- 2.2.11. For the purposes of forecasting future demand landings data (using Crown Estate Data) have been presented. Using landings data removes the element of double counting, hence is likely to be a more accurate picture of future demand. A large amount of marine dredged sand and gravel is sold in 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 has been used because it is higher.
- 2.2.12. The following assumptions have been when forecasting the likely future demand for marine dredged sand and gravel may be in West Sussex. These demand forecasts build on the 10-year average of landings (919,354) tonnes, which are set out in Table 10 below:
- Assumption 1: Housing is projected to grow by 15.9% in West Sussex
 - Assumption 2: Spending on road maintenance/improvements is expected to increase by 15.3% 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

Table 10: Demand forecast scenarios for marine dredged sand and gravel based on landings 2015 – 2033 (tonnes)

	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	919,354		
Additional demand for housing	n/a	133,021	146,177
Additional demand for roads	n/a	46,418	140,661
Total Annual requirement	919,354	1,098,794	1,206,193

- 2.2.13. The demand forecast based on landings data shows that demand could be as high as 1,206,193 tonnes. If this is compared to the estimated capacity at wharves in West Sussex, there would be a surplus of 1,007,807, tonnes. Some of this capacity would be used to land crushed rock and annual capacity requirements for wharves are discussed later in this report once total demand for crushed rock is set out.

Imports and exports

- 2.2.14. The East Sussex Brighton and Hove LAA (2014) states that 70% of the total sand and gravel consumed in East Sussex and Brighton and Hove was supplied from West Sussex reflecting their reliance on imports of marine dredged sand and gravel landings to Shoreham Harbour. Imports and exports of marine-won sand and gravel occur between West Sussex and Hampshire.
- 2.2.15. 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 goes beyond the county boundary.¹⁶

Current supply of marine-won sand and gravel

- 2.2.16. The wharves in West Sussex are primarily land marine-dredged sand and gravel; however, they also land some small amounts of crushed rock. The Authorities recently commissioned a new Wharves and Railheads Study¹⁷. The study provides an estimate of the potential maximum capacity that can be landed at wharves and railheads within West Sussex. The study concludes that existing operational

¹⁶ West Sussex County Council (2009). Background paper 4: Transportation of Minerals and Waste, Version 2.

¹⁷ LUC (February 2014) West Sussex Wharves and Railheads Study.

wharves within West Sussex could have the maximum import capacity to land 1,885,000 tonnes of aggregate imports (marine dredged aggregates and land-won aggregates by sea). The capacity of these wharves was not reviewed in the updated study and this estimate has now been revised to 2,274,000 tonnes following discussions with the Shoreham Port Authority and Operators. If this is compared with the maximum sales of all aggregates from West Sussex wharves between 2005 and 2014 (1,626,551 tonnes), there would be a minimum surplus capacity of 647,449 tonnes. Although the wharves within Shoreham Harbour have reduced in number since the previous Wharves and Railheads Study in 2008, they still have additional capacity to handle more aggregate.

Marine 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' with capacity to supply an additional 4.8 million tonnes per year.

Past to Current Demand for Marine Sand and Gravel:

- Marine dredged landings and sales in West Sussex have increased steadily over the last 10 years with a marked increase since 2011;
- The 10 year average sales of marine dredged sales is 1,097,950 tonnes and 919,354 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 1,206,193 tonnes per annum.

Imports and Exports

- Marine dredged 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:

- Marine dredged landings to West Sussex has been relatively stable until a marked increase in 2011;
- 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 sales of all aggregates from West Sussex wharves between 2005 and 2014 (1,626,551 tonnes), there would be a minimum surplus capacity of 647,449 tonnes;
- Marine dredged landings ceased in Littlehampton in 2005, although crushed rock continues to serve the coated roadstone plant.

2.3. Sand and gravel imported by rail

2.3.1. A small amount of sand and gravel is imported into West Sussex by rail which would be either marine sand and gravel or land-won from outside West Sussex. 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. The vast majority of materials are delivered to fairly local destinations within a 20 mile radius due to the haulage costs.

Past to current demand for marine-won aggregate

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. The 10 year average sales of sand and gravel from railheads is 136,257 tonnes.

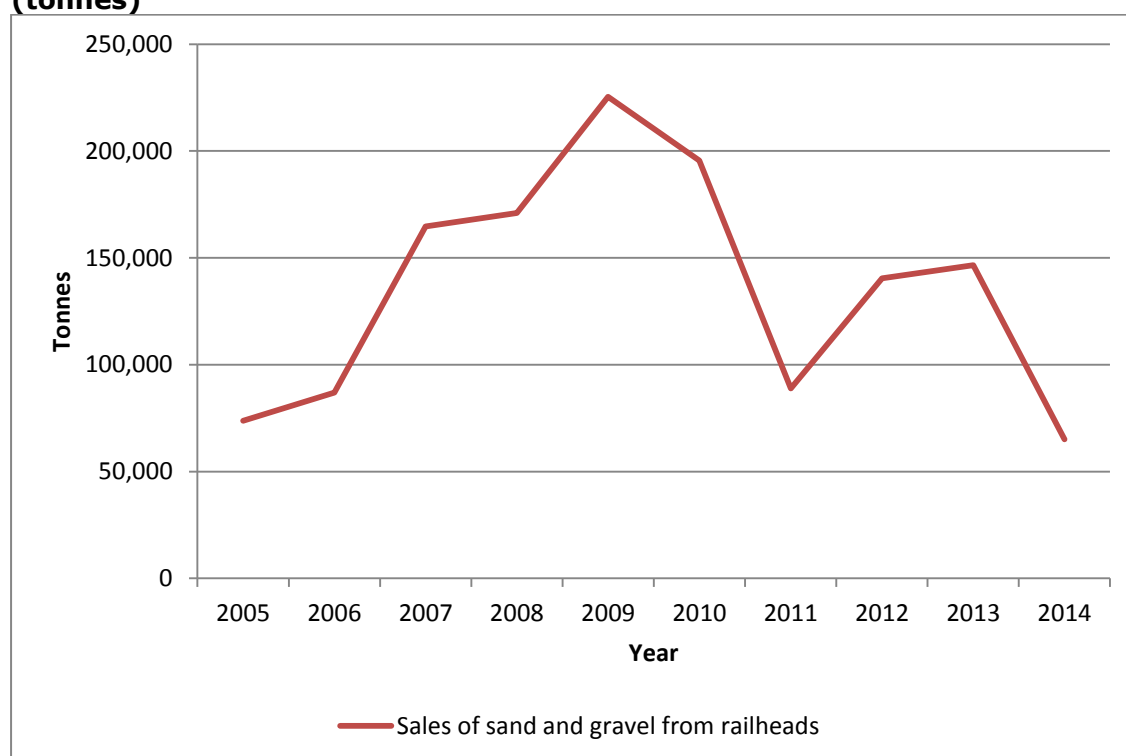
Table 11: Imports of sand and gravel to West Sussex Railheads 2005 – 2014 (tonnes)

Year	Sales of sand and gravel from railheads
2005	73,800
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	69,383*
Total	1,362,572
3 Year Average	118,811

10 year Average**136,257**

*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 and therefore are recorded in table 7 .

Figure 4: Imports of sand and gravel to West Sussex Railheads 2005 – 2014 (tonnes)

**Other Relevant Local Information**

2.3.3. Two demand forecasts have been created based on a number of assumptions. These demand forecasts build on the 10-year average of sales (136,257) and are set out in Table 12 below:

- Assumption 1: Housing is projected to grow by 15.9% in West Sussex
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 15.3% 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

Table 12: Demand forecasts for rail imported sand and gravel 2015 - 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	136,257		
Additional demand for housing	n/a	19,715	21,665
Additional demand for roads	n/a	6,880	20,847
Total Annual requirement	136,257	162,852	178,769

- 2.3.4. Table 12 indicates that the likely demand for sand and gravel being imported by rail to West Sussex railheads may be as high at 178,769 tonnes per annum.

Current supply of rail imported sand and gravel

- 2.3.5. 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).
- 2.3.6. The West Sussex Wharves and Railheads Study (2014) states that they could have a total maximum capacity of 1,380,000 tonnes¹⁸. All but one of the railheads could probably improve throughput if more train pathways were available. The Sussex Route Utilisation Strategy (RUS)¹⁹ states that the movement of aggregates is likely to continue in the medium to long term with demand closely linked to the level of house building and other major construction projects. The Southern Regional Planning Assessment²⁰ 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.

Rail Imported Sand and Gravel Summary:

Past to Current Demand for Marine Sand and Gravel:

- A small amount of sand and gravel is imported into West Sussex by rail. At its peak, this was 225,303 tonnes in 2009;
- Most of the sand and gravel would be used locally due to high haulage

¹⁸ Based on Scenario R1 in the West Sussex Wharves and Railheads Study (2014) which safeguards all five railheads.

¹⁹ Network Rail (2010). Sussex: Route Utilisation Strategy.

²⁰ Department for Transport (2007). Southern Regional Planning Assessment for the Railway.

- costs;
- The 10 year average sales of sand and gravel from railheads is 136,257 tonnes.

Other Relevant Local Information:

- The likely demand for sand and gravel being imported by rail to West Sussex railheads may be as high at 178,769 tonnes per annum.

Railhead Capacity:

- West Sussex railheads have a potential capacity of 1,380,000 tonnes;

2.4. Hard (crushed) rock

- 2.4.1. West Sussex does not have any natural hard rock resources and therefore relies on imports of hard rock such as limestone and granite in order to meet demand for this type of aggregate.

Uses of crushed rock

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

Past and current demand for crushed rock

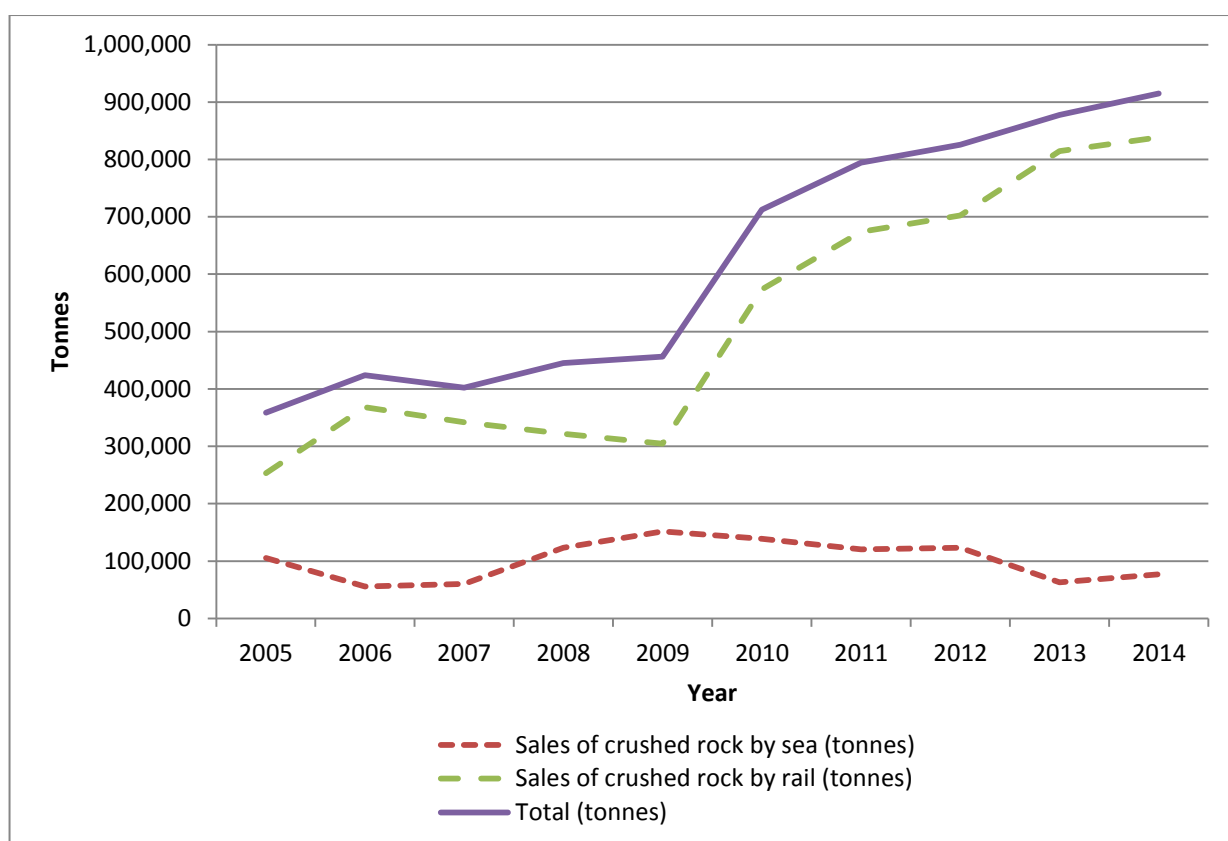
- 2.4.3. Sales of crushed rock from wharves have been more variable over the ten year period (13) with a sudden drop experienced in 2013. The 10 year average sales of crushed rock from wharves is 101,836 tonnes.
- 2.4.4. Crushed rock sales from railheads have been steadily increasing since 2009 (table 13 and figure 5). The 10 year average sales of crushed rock from railheads is 518,618 tonnes but it the average has been substantially more in the last 3 years (783,043 tonnes).

Table 13: Sales of Crushed Rock at West Sussex Wharves and Railheads 2005-2014 (tonnes)

Year	Crushed Rock Aggregate sales from wharves (tonnes)	Sales of Crushed Rock from Railheads (tonnes)
2005	105,429	253,380
2006	55,786	367,972

2007	59,999	341,953
2008	123,109	322,008
2009	151,556	304,481
2010	138,927	573,222
2011	120,428	674,140
2012	123,457	702,396
2013	63,000	814,401
2014	76,670	832,333
3 Year Average	87,709	783,043
10 Year Average	101,836	518,618

Figure 5: Sales of Crushed Rock at West Sussex Wharves and Railheads 2005-2014 (tonnes)



Other Relevant Local Information

- 2.4.5. Based on a number of assumptions, four demand forecast scenarios have been created. These demand forecasts build on the 10-year average of sales (101,836), which are set out in Table 14 below. This shows that the likely demand for crushed

rock being landed at West Sussex wharves may be as high at 134,135 tonnes per annum.

- Assumption 1: Housing is projected to grow by 15.9% in West Sussex
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 15.3% 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)

Table 14: Demand forecast scenarios for marine landed crushed rock 2015 - 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	101,836				
Additional demand for housing	n/a	5,667	16,192	5,667	16,192
Additional demand for roads	n/a	12,153	15,581	12,680	16,107
Total Annual requirement	101,836	119,656	133,609	120,183	134,135

2.4.6. Using the assumptions set out below, two demand forecasts have been created for rail imports of crushed rock. These demand forecasts build on the 10-year average of sales (519,219 tonnes), which are set out in Table 15 below. Table 15 indicates that the likely demand for crushed rock being imported by rail to West Sussex railheads may be as high at 681,215 tonnes per annum.

- Assumption 1: Housing is projected to grow by 15.9% in West Sussex
- Assumption 2: Spending on road maintenance/improvements is expected to increase by 15.3% 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

Table 15: Demand forecasts for rail imported crushed rock 2015 - 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	519,219		
Additional demand for housing	n/a	28,895	82,556
Additional demand for roads	n/a	61,964	79,440
Total Annual requirement	519,219	610,077	681,215

Imports and exports of crushed rock

- 2.4.7. West Sussex relies predominantly on imports from outside the county to its wharves and railheads for its supply of crushed rock as Table 16 shows. Imports are predominantly from Somerset (60-65%) to railheads in West Sussex. Some of the crushed rock that is imported into West Sussex is exported by road to neighbouring counties (Table 16). However, according to the Annual Monitoring Survey, in 2009, West Sussex produced an amount of crushed rock (chalk and sandstone) which was used for aggregate from a small number of building stone quarries. A small quantity of crushed rock (0.01mt) imported to Hampshire by rail is exported into West Sussex and Surrey by road. Landings of marine dredged sand and gravel at Littlehampton Harbour ceased in 2005 but crushed rock imports continue to service the adjacent coated roadstone plant. Following a period of steady imports between 2008 and 2012, crushed rock imports dropped in 2013.

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

Origin/Destination	Imports (tonnes)	Exports (tonnes)
South East Region		
East Sussex Brighton and Hove		483
Hampshire and Isle of Wight		1,849
Kent and Medway		211
Surrey		6,735
Unknown but somewhere in the south east		49,280
Outside South East Region		
Somerset	291,000 – 315,250 (60-65% of total consumed – 485,000)	

Outside England and Wales	72,750 – 97,000 (15-20%)	
Derbyshire	24,250 – 48,500 (5-10%)	
North Somerset	4,850 – 24,250 (1-5%)	
Leicestershire	4,850 – 24,250 (1-5%)	
Yorkshire Dales National Park	4,850 – 24,250 (1-5%)	
Northumberland	<4,850 (<1%)	
Shropshire	<4,850 (<1%)	
Dorset	<4,850 (<1%)	
Powys	<4,850 (<1%)	
Total	367,000 (taken from total imports of crushed rock in AMS 2009)	58,558
Source: Data obtained from the British Geological Survey and was based on the 2009 Aggregate Monitoring Survey.		

Current supply of crushed rock

- 2.4.8. 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.

<p>Crushed Rock Summary:</p> <p>Past to Current Demand for Crushed Rock:</p> <ul style="list-style-type: none"> • West Sussex produced a small amount of crushed rock (chalk and sandstone) which was used for aggregate from a small number of building stone quarries (2009 Regional Aggregates Monitoring Survey); • Sales of crushed rock from railheads have been steadily increasing over the 10 years with a marked increase since 2009; the three year average is 783,043 tonnes; • Sales of crushed rock from railheads has fluctuated over the last 10 years and peaked in 2014 at 832,333 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. <p>Other Relevant Local Information:</p> <ul style="list-style-type: none"> • The likely demand for crushed rock being landed at West Sussex wharves may be as high at 134,135 tonnes per annum; • The likely demand for crushed rock being imported by rail to West Sussex
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railheads may be as high at 681,215 tonnes per annum.

Capacity for Importing Crushed Rock:

- West Sussex railheads have a potential capacity of 1,380,000 tonnes, indicating that there is spare capacity for further imports.

2.5. Secondary/Recycled Aggregates

- 2.5.1. The LAA is required to provide an assessment of the contribution secondary and recycled aggregates make to the supply of aggregates in the area. The definition of secondary and recycled aggregates is provided below:

Secondary Aggregates: These usually 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 pulverised fuel ash (PFA) which can be used as fill material or used to make breeze blocks and metallurgical slags which can be crushed to produce aggregate. Natural secondary aggregates from mineral extraction 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) which are generated after processing (crushing and screening) as well as material recovered from surface dressing of highways (road planings).

Use of secondary and recycled aggregates

- 2.5.2. Recycled and secondary aggregates have a growing use in applications such as base layers for new developments and road construction, helping to reduce the demand for primary aggregates. Higher quality recycled aggregates can also be used in the production of concrete and other construction materials.

Past and current demand for recycled and secondary aggregate

- 2.5.3. The recorded sales figures for recycled and secondary aggregate production in West Sussex are set out in Table 17 below. This shows that sales of recycled aggregates have been relatively stable since 2005, peaking in 2010 at 630,000 tonnes, with an

apparent decline since that peak. However, it should be noted that the recording of recycled aggregate sales data has changed over the last ten years. Prior to 2014, estimates had been provided through the waste forecast reports using a methodology to estimate likely sales. In 2014, the data started to be collected as part of the annual monitoring surveys, however, not all operators returned estimates, and therefore this figure is likely to be higher. The increase corresponds to the fall in primary aggregate sales which started to decline in 2004 (table 1 and figure 1). Figures for recycled aggregates in Surrey and Hampshire show that there has been a general increase in sales of recycled aggregates over the 10 year period.

Table 17: Sales of Recycled Aggregates in West Sussex 2005 – 2014

Year	Sales (tonnes)
2005	525,000
2006	519,000
2007	519,000
2008	622,000
2009	629,000
2010	630,000
2011	446,000 ⁽¹⁾
2012	446,000 ⁽²⁾
2013	526,000 ⁽³⁾
2014	568,000 ⁽⁴⁾
Total	5,430,000
3 Year Average	513,000
10 Year Average	543,000

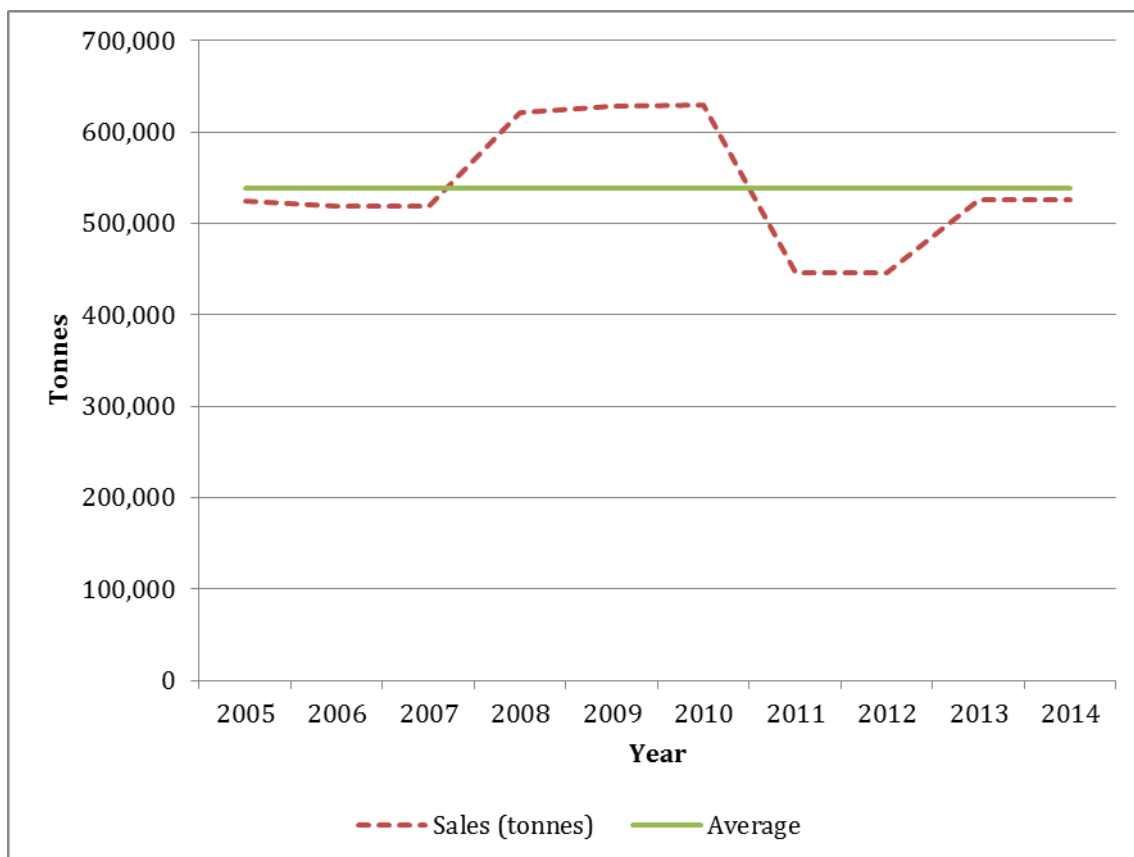
1) This figure was estimated as part of the work with the Waste Forecast Report (2012) for the Waste Local Plan. It provided a further breakdown of C&D waste to recycling and other management.

(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 is an estimate from 'Review and Refresh of C&I and C&D Waste and CDEW Arisings and Projections in West Sussex' (BPP Consulting, 2015). This figure is different from last year's LAA because BPP Consulting's Paper (published after the LAA) provided a better estimate.

(4) Figure is an estimate from '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 2005-2014



Imports and exports of recycled and secondary aggregates

- 2.5.4. The Hampshire County Council LAA (2014) states that small volumes of recycled aggregate are being imported to Hampshire from West Sussex.

Current capacity for recycled and secondary aggregates

- 2.5.5. In 2014 there were 14 sites within West Sussex that process waste to create recycled aggregates (Tables 18 and 19). A map of these sites is given in **Map A2, Appendix A**. These tables show that in 2014, the 14 sites provided a total capacity of 596,940tpa (355,065tpa + 241,875tpa) for recycling aggregates which would have been available for use as an alternative to primary aggregates. However, the actual figure for aggregate recycling in the County is likely to be significantly higher than this due to the use of mobile recycling facilities. This capacity is provided by either dedicated aggregate recycling sites (Table 18), or at transfer stations (Table 19).

Table 3: Permitted C&D Waste Recycling Sites

Authority	Site Name	Temporary/ Permanent	Estimated Capacity (tonnes per annum)
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 (Britaina Crest Recycling)	Permanent	50,000
WSCC	Hurstpierpoint Wastewater Treatment Works	Temporary (until 2022)	16,065
SDNP	Newtimber Chalk Works	Temporary	25,000
WSCC	Portfield Quarry, Chichester (TJ Waste)	Temporary	100,000
SDNP	Shoreham Cement Works, Dudman Aggregates Ltd	Temporary	50,000
WSCC	Woodhorn Farm, Tangmere*	Permanent	4,000
	Total		355,065

Table 4: Transfer Stations with Aggregate Recycling Capacity

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	60,000*
	Total	322,500

	Estimated total recycling capacity at sites	241,875*
	<p>* Based on operator estimates (August 2015).</p> <p>**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 CD&E recycling rates are between 70 and 80%.</p>	

2.5.6. The difference between the 10 year average of sales (539,000 tonnes) and estimated capacity (596,940tpa) shows that there is a **surplus capacity for aggregate recycling in the county**. Demand scenarios have not been applied to this source of aggregate supply because the future availability of recycled aggregates is likely to be inextricably linked to construction activity and the use of mobile processing facilities at redevelopment sites means that supply can often respond to demand relatively quickly. Aggregate recycling sites within West Sussex are safeguarded through the Waste Local Plan (2014) to ensure continuity of supply.

Secondary Aggregates

2.5.7. In West Sussex, the by-products from chalk and sandstone have been used as secondary aggregates. Other sources of secondary aggregate include bottom ash from waste 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 will 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 for Incinerator Bottom Ash Aggregates (IBAA) Purposes. In 2014, this amounted to 11,031 tonnes.

2.5.8. An estimate of the likely capacity for secondary aggregates has been calculated and is presented in Table 20 below. It presents the current capacity that exists within the County (11,000 tpa at the Lancing Energy from Waste facility) and two further scenarios that include the permitted site at Ford and a theoretical capacity which may arise from sites that come forward to meet the requirements in the adopted Waste Local Plan (2014). Table 20 shows that there could be an estimated 56,000 tpa of secondary aggregates capacity in the County if further energy from waste plants are permitted in West Sussex over the life of the Waste Local Plan (until 2031).

Table 20: Secondary Aggregate Capacity Scenarios

Secondary Aggregate Recycling Capacity	Capacity Scenario 1 (Current Situation – Lancing Energy from Waste Plant) Figures in tonnes	Capacity Scenario 2 (Energy from Waste Plant + Ford Site) Figures in tonnes	Capacity Scenario 3 (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
<p>(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).</p> <p>(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).</p>			

Recycled and Secondary Aggregates Summary:

- Sales of recycled aggregates were relatively stable, peaking at 630,000 tonnes in 2010. Sales have risen in recent years and were **568,000 tonnes** in 2014;
- The average sales of recycled aggregate over the last 10 years is **539,000 tonnes**;
- There is one site in West Sussex producing **11,031 tonnes** of bottom ash that is used as a secondary aggregate;
- A total of **596,940tpa** of capacity for recycled aggregates is likely to be available within the County (2015 estimate) which means that there is a **surplus of capacity within the county**;
- There could be between **11,000tpa and 56,000tpa** of secondary aggregates capacity in the County.

3. Balance Between Demand and Supply

- 3.0.1 The supply of aggregates in West Sussex is currently maintained by a number of different sources – as detailed in the above sections. This ensures that reliance is not placed on any one source.
- 3.0.2 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 considers how aggregate might be used locally over the plan period 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.
- 3.0.3 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 been compensating for reduced land-won sharp sand and gravel extraction and this trend is likely to continue due to development constraints associated with terrestrial resources.
- 3.0.4 There are sufficient reserves of sharp sand and gravel to meet forecasted demand for this aggregate type and therefore no requirement for find additional sites (quarries, wharves or railheads) in the JMLP.
- 3.0.5 Soft sand has particular uses which are related to its particular qualities and so can only be supplied from land-won sources. As shown in table 21, the demand for soft sand (based on average 10 year sales and other local relevant information) could be as high as 7,615,925 tonnes and current permitted reserves are 3,009,400.
- 3.0.5. 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 is heavily constrained due to the majority of the resource being located within the South Downs National Park. Permitting extraction of further resources is subject to it passing the ‘exceptional circumstances’ test and being shown to be in the public interest.
- 3.0.6. Preparation of the JMLP has considered the balance between the supply options for the future, and taken account of evidence about the alternatives to land-won soft sand supply from within the SDNP including an improved understanding of the other environmental constraints that may restrict land-won supply. The evidence on need within this document, combined with evidence from other mineral planning authorities (Duty to Co-operate feedback and LAAs) on the wider need and the

potential for alternative sources of supply of soft sand will inform the consideration of exceptional circumstances and public interest.

Table21: Total demand for all sources of aggregate over the JMLP period (2015 - 2033)

	Ten year average sales/landings (2005-2014) (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	19,965	359,370	26,194	471,492	900,000 (Permitted Reserves)	-428,508
Soft Sand	365,062	6,571,116	423,107	7,615,926	3,009,400 (Permitted Reserves)	+4,606,526
Marine Dredged Sand and Gravel	919,354 (landings)	16,548,372	1,206,193	21,711,474	Total annual operational capacity – 2,274,000	annual capacity surplus – 933,672
Crushed Rock (landed at wharves)	101,836 (sales)	1,833,050	134,135	2,414,430		
Crushed Rock (rail imported)	519,219	9,345,934	681,215	12,261,870	Total annual capacity – 1,380,000	annual capacity surplus – 520,016
Sand and Gravel (rail imported)	135,819	2,444,742	178,769	3,217,842		
Secondary and Recycled Aggregate	543,000	9,774,000	-	-	10,744,920 (596,940 x 18)	-1,042,920

Table 22: Total demand for wharves and railheads (2015-2033)

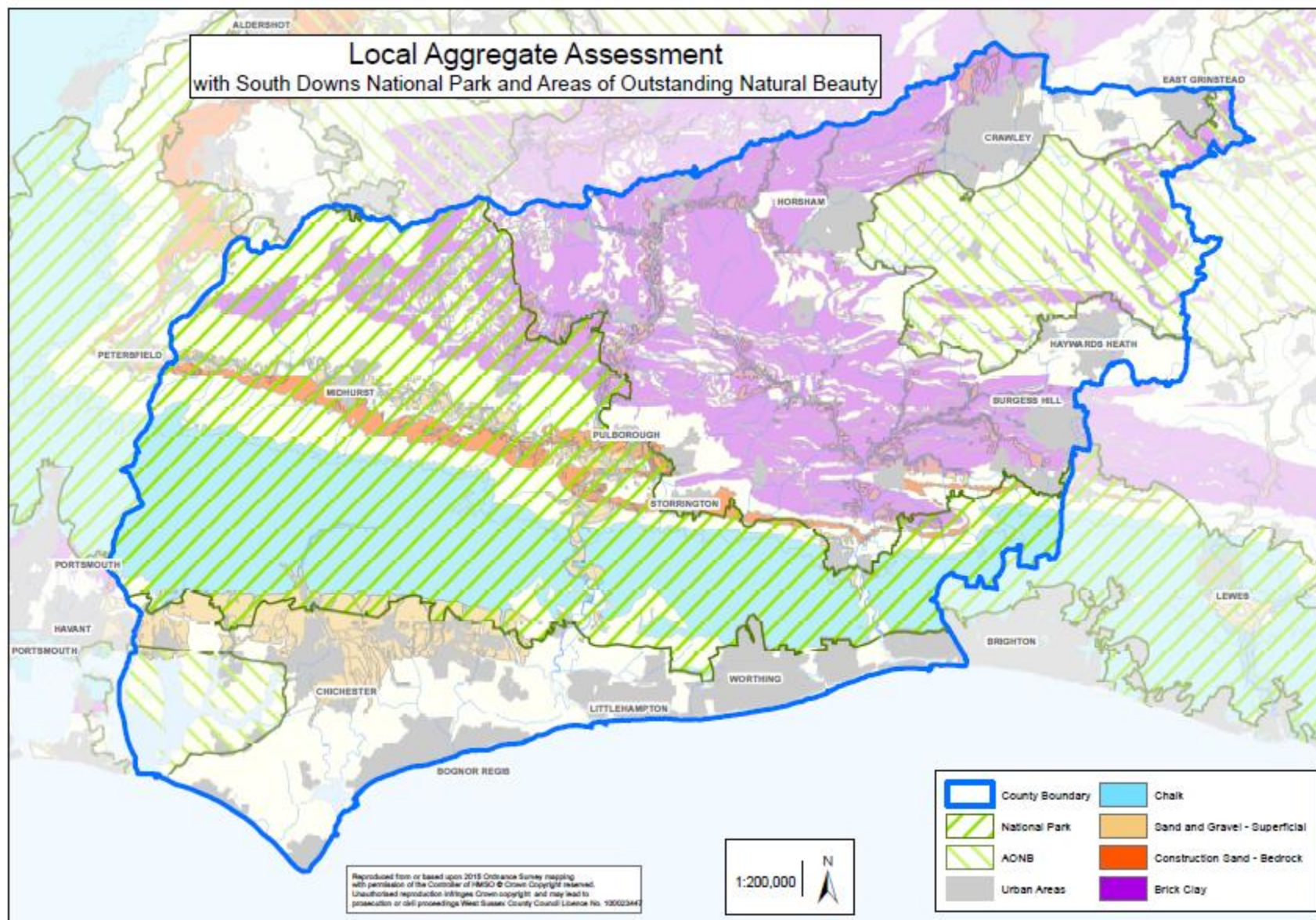
	Ten year average sales/landings (2005-2014) (tonnes)	Annual requirement taking account other relevant local information	Total Estimated Supply (tonnes) or capacity	Capacity implications (against highest demand)
Marine Dredged Sand and Gravel	919,354 (landings)	1,206,193	-	-
Crushed Rock (landed at wharves)	101,836 (sales)	134,135	-	-
Wharves total	1,021,190	1,340,328	2,274,000	Surplus 933,672
Crushed Rock (rail imported)	519,219	681,215	-	-
Sand and Gravel (rail imported)	135,819	178,769	-	-
Railheads Total	655,038	859,984	1,380,000	Surplus 520,016

Proposed Monitoring Arrangements

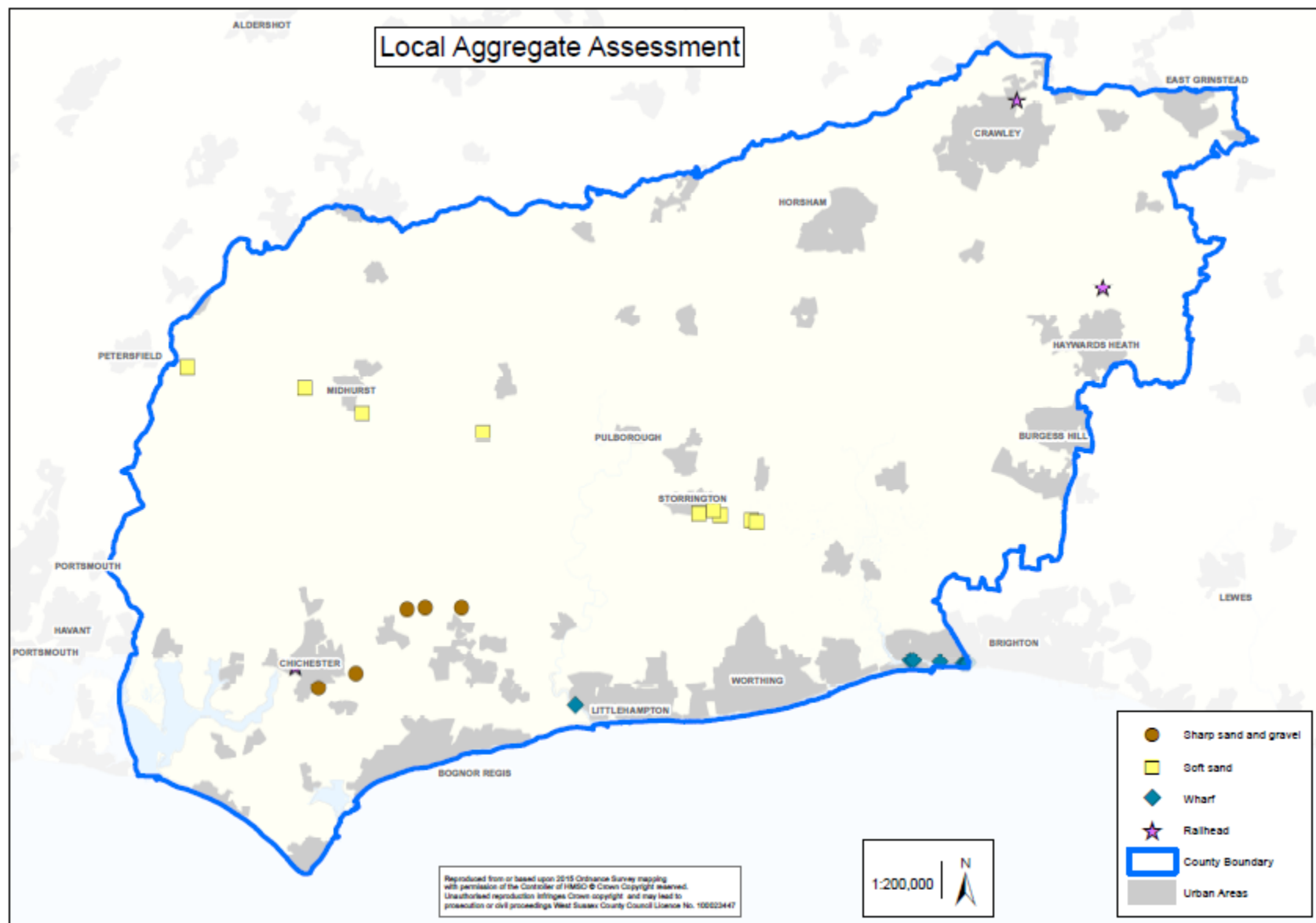
- 3.0.7. Provision for the land-won and other elements of this LAA will be made in the JMLP which is to be prepared jointly with the South Downs National Park Authority. The LAA will form a key piece of the evidence that will underpin the JMLP and provide evidence of the demand for aggregates for West Sussex. The LAA will be updated on an annual basis as part of the Annual Monitoring Report.

Appendix A: Maps

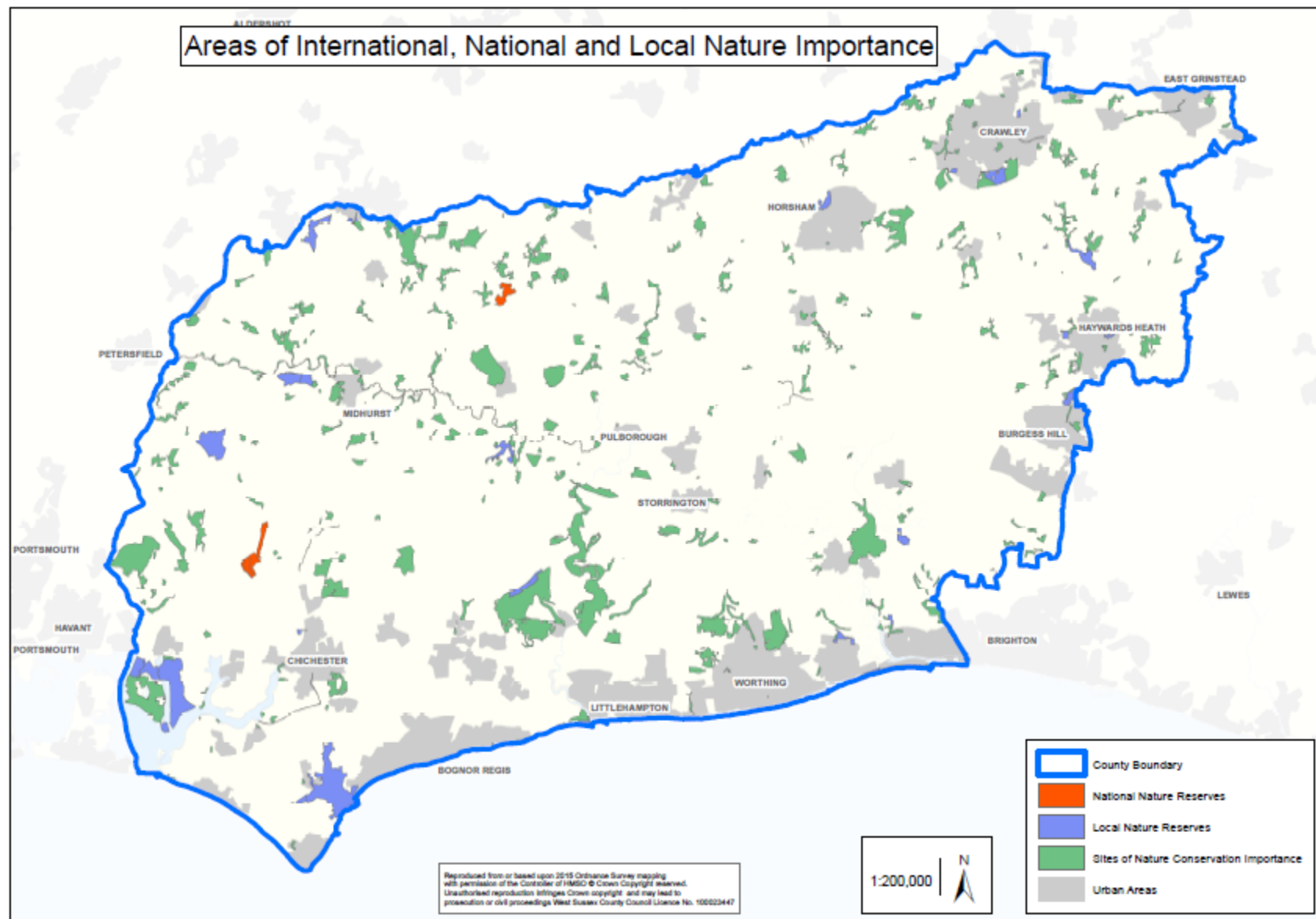
Map A1: Geological Zones, SDNP and AONB in West Sussex



Map A2: Location of Mineral Sites in West Sussex



Map A3: Nature Constraints in West Sussex



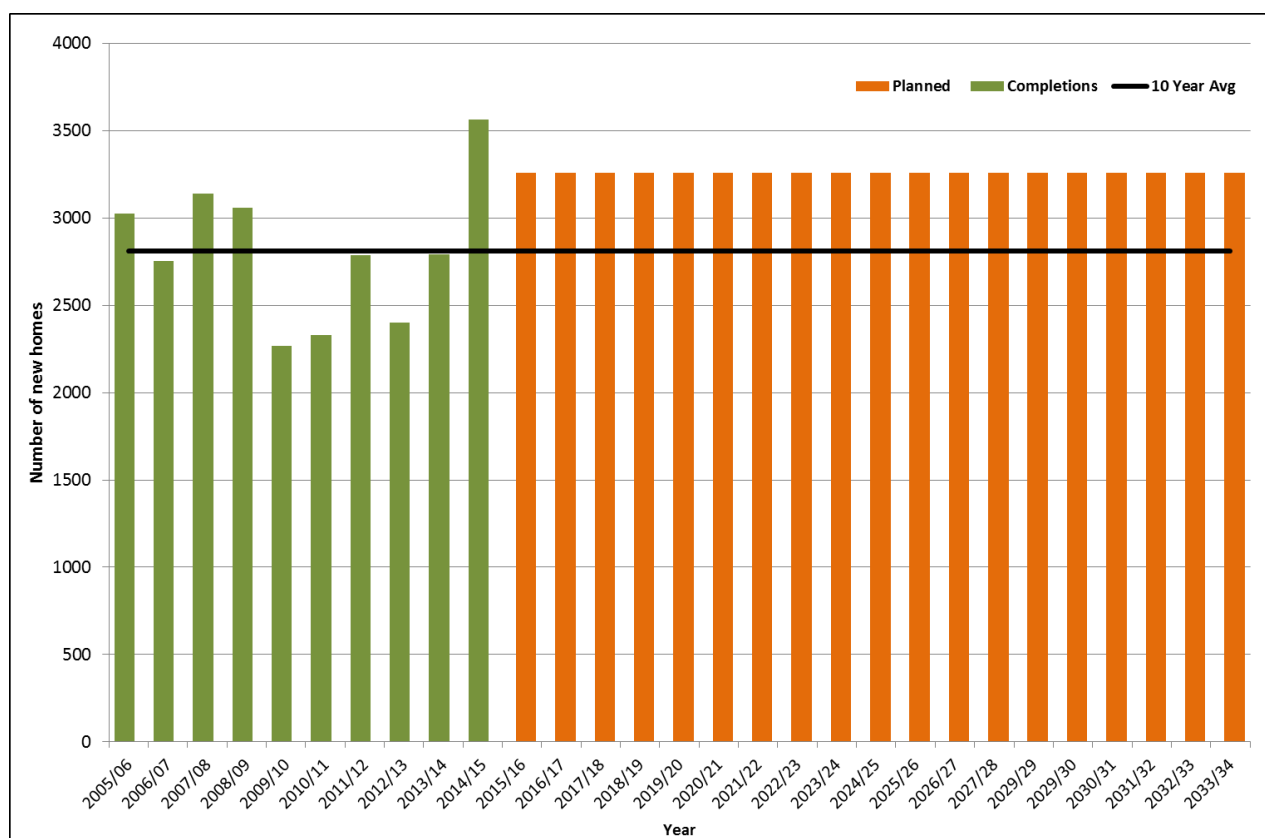
Appendix B: Supply and Demand Background Information

In order to take account of '*other relevant local information*' evidence has been gathered on housing and highways as set out below. Based on this information a number of assumptions have been made when forecasting what the future demand for land-won sharp sand and gravel may be in West Sussex.

Projected Housing Completions

Housing completion data indicates that an average of 2,811 dwellings have been built annually in West Sussex over the ten year period of 2005-2015. Meanwhile, planned housing, based on existing or emerging local plans of local planning authorities within West Sussex, suggests that 3,257 dwellings will be built per annum up until 2033. This represents an increase of 15.9% when compared to the 10 year average.

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



As aggregates are transported across administrative boundaries, future housing development in neighbouring areas²¹ may influence the demand for aggregate and so needs to be considered. Table B1, below, sets out planned housing in West Sussex and all neighbouring areas, as well as the percentage increase when compared to previous completions.

²¹ Hampshire, Surrey, Brighton & Hove, and East Sussex.

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

	Average completions per annum (2005/06 – 2014/15)	Average planned housing per annum (2015 – 2033)	Percentage Change
Brighton & Hove	499	608	21.9%
East Sussex	1,360	1,487	9.3%
Hampshire	5,624	6,172	7.0%
Surrey	3,063	2,977	-2.8%
West Sussex	2,811	3,257	15.9%
Average for West Sussex, East Sussex, Brighton & Hove, Surrey and Hampshire	2,672	2,870	10.3%
Average for West Sussex, East Sussex, and Brighton & Hove	4,672	5,352	14.6%

The assumption being made is that if housing is to increase by 15.9% (in West Sussex) then the demand for aggregates needed to build housing will increase by 15.9%. This has been used in the demand scenarios, set out within the LAA, against the 10 year average of sales (or landings in the case of wharves). Table B1 shows that the highest percentage change will be seen in West Sussex (compared to averages for neighbouring areas combined), and thus 15.9% has been used as the main assumption with regards to housing increases when assessing demand increases that may be seen.

Planned Highway Improvement

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).

To obtain an indication of the level of non-trunk road construction and maintenance, West Sussex revenue & highways & transport capital expenditure for the previous 10 years has been collated. This shows an annual average, spend of £44.6M during the period 2004/05 – 2013/14 (see Figure B2).

Figure B2: West Sussex Highways revenue works and highways and transport capital expenditure (2004/05 – 2013/14)



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 (July 2014). 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	3,400	20,857
2016/17	3,734	12,581	5,980	22,295
2017/18	3,743	12,200	11,350	27,284
2018/19	3,734	11,043	7,670	22,447
2019/20	3,734	11,043	5,420	20,197
2020/21	3,734	11,043	5,420	20,197

* 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)

Evidence from the Local Growth Funding, which is expected in West Sussex, suggests an average increase of £6.5M per annum²². 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 £22.2M per annum. This is an increase of £6.8M during the period 2016-2021 when compared to 2011-2015. **This equates to an increase of 15.3%²³ when compared to previous spending.**

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
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)

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

²² The average between 2015/16 and 2020/21 from Coast to Capital Growth Funding

²³ £6.8M equates to 15.3% of the 10 year average spending on highways construction and maintenance (£44.6M).

first five years of the Joint Minerals Local Plan's Plan period, when compared to the ten year average spend (£21.5M).

For the purposes of establishing possible future demand scenarios that may result from an increase in highways maintenance and construction, a growth factor has been applied to crushed rock sales. 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% (see marine landed crushed rock demand scenarios 4 and 5, table 14).

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 required will be dependent on future Government budget allocations, which have not yet been announced. The following schemes are proposed in West Sussex;

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

As these kinds of improvement works have been undertaken in the past, it is considered reasonable to assume that aggregate demand for trunk road improvements in future will be a case of 'business as usual'.

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 on roads is to increase by 15.3% (in West Sussex), then the demand for aggregates will increase by 15.3%. This has been used in the demand scenarios, set out within the LAA, against the 10 year average of sales of CR. A further two demand scenarios for marine landed crushed rock have been prepared to account for demand from East Sussex and Brighton & Hove.

As aggregates have a number of end uses, and this work is focussing on housing and highways related demand, evidence has been obtained from the CLG/BGS (June 2013) *Mineral Planning Factsheet: Construction Aggregates*. This 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.

The housing, highways, and aggregate use data summarised above has been used to calculate future demand, providing an account of *other relevant local information*. How this is applied for each aggregate type is set out in each relevant section in this paper.

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