Worcestershire Local Aggregate Assessment: Data covering the period up to 31/12/2021

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1. Executive Summary

1.1. The Local Aggregate Assessment (LAA) is an assessment of the demand for and supply of aggregates in the county. Its prime purpose is to assist Worcestershire County Council (in its role as Mineral Planning Authority) in its efforts to provide for the steady and adequate supply of local aggregates. It will inform the development and monitoring of minerals planning policy in the county and will be a material consideration in the determination of planning applications.

Substitute, secondary and recycled aggregates

1.2. There is a lack of data about the contribution that substitute, secondary and recycled materials and minerals waste make to the supply of aggregate materials in Worcestershire. This LAA assumes that the contribution of substitute, secondary and recycled materials is already accounted for prior to considering the sales figures for primary aggregates.

Sand and gravel

1.3. There are two distinct types of sand and gravel deposits in Worcestershire: the bedrock deposit solid sands of the Kidderminster Formation and Wildmoor Sandstone Formation, and the surface river terrace deposits of the rivers Severn and Avon and glacial deposits found in association with boulder clay.

1.4. Indicators of increasing demand suggest that the production guideline for primary sand and gravel should be increased significantly above the 10-year sales average shown in the LAA dashboard below.

1.5. A significant uplift is considered to be appropriate after assessing Worcestershire's ability to supply sand and gravel, as resources exist, the Minerals Local Plan (2018-2036) proposes to allocate a significant number of areas of search, and there is significant interest in bringing sites forward shown by the minerals industry in response to "calls for sites" for allocation in the emerging Mineral Site Allocations Development Plan Document, as well as a number of pre-application discussions and planning applications under consideration. However, there are some concerns in relation to continuity of supply in the near future due to the low landbank of remaining permitted reserves and the permitted timescale of some existing sites.

1.6. Following consideration of these demand and supply factors, it is proposed to deviate from the 10-year sales average by +50%.

1.7. **The annual production guideline for sand and gravel identified by this Local Aggregates Assessment is therefore 0.827 million tonnes.**

1.8. Based on this production guideline and the stock of permitted reserves of 3.42 million tonnes, **Worcestershire had a landbank of 4.14 years at 31st December 2021.**

1.9. This is well below the 7-year landbank required by national policy and indicates that there is currently a shortfall of permitted reserves in the county.

Crushed rock

1.10. The following bedrock mineral deposits are believed to be the only strata in the county that have been worked to produce crushed rock aggregates: the Precambrian "Malverns Complex" and "Warren House Formation", the Silurian "Woolhope Limestone Formation"[1], the Ordovician "Lickey Quartzite Formation"; and the Jurassic "Inferior Oolite Group".

1.11. Worcestershire has no permitted reserves, no productive capacity and no landbank for crushed rock. However, whilst the 10-year sales average for crushed rock sales is 0 tonnes and there has been no production of crushed rock in Worcestershire since 2010, it is important to recognise that there is demand for crushed rock to meet needs within Worcestershire, and there may also be an increasing need for crushed rock to be supplied from within Worcestershire as reserves are diminished elsewhere. This indicates that the annual production guideline should be increased above the 10-year average.

1.12. However, there are very significant limitations on Worcestershire's ability to supply crushed rock, both in the short and longer term. The lack of existing sites with permitted reserves and the lack of any planning applications pending decision means that there is no likelihood of supply from within Worcestershire in the immediate future. Although the Minerals Local Plan (2018-2036) provides increased certainty and policy support for crushed rock development in Worcestershire, it also recognises that there are significant constraints on Worcestershire's crushed rock resources, and when combined with the lack of planning applications, pre-application discussions, and the fact that no sites for crushed rock have been proposed in response to five "calls for sites", this means that there is no certainty that Worcestershire will be able to provide crushed rock in the longer term.

1.13. **This LAA concludes that the production guideline for crushed rock in Worcestershire is unable to be calculated, but that it is explicitly greater than 0 tonnes.**

1.14. There is no data available to indicate how much of the demand for crushed rock has been met by substitution with either secondary or

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[1] Silurian "Aymestry Limestone Formation" deposits have also been worked in the past, but these are not considered to be a significant resource under the methodology set out in the background document *Analysis of Mineral Resources in Worcestershire* (available at www.worcestershire.gov.uk/mineralsbackground)

recycled materials or by sand and gravel. It is likely that the majority of Worcestershire's demand for crushed rock over recent years has been met by imports of crushed rock from outside the county. This has been discussed in detail with the West Midlands, East Midlands, South West and South Wales Aggregate Working Parties, and Worcestershire County Council will continue to cooperate with the mineral planning authorities in these areas to understand whether Worcestershire's demand for crushed rock can continue to be accommodated.

LAA Dashboard

🡻 Indicates a decrease in comparison to the figure in the previous year's LAA.
🡹 Indicates an increase in comparison to the figure in the previous year's LAA.
- Indicates no change in comparison to the figure in the previous year's LAA.

	Sand and gravel	**Crushed rock**
Production (demand): 2021 sales	0.705 million tonnes 🡹	N/A
Production (demand): 2020 sales	0.377 million tonnes 🡻	N/A
Production (demand): 2019 sales	0.648 million tonnes 🡹	0 tonnes
Production (demand): 3-year average sales (mean)	0.577 million tonnes 🡻	0 tonnes
Production (demand): 10-year average sales (mean)	0.551 million tonnes 🡻	0 tonnes
Production (demand): 'Baseline' production guideline which informed the adopted Minerals Local Plan	0.572 million tonnes This was the production guideline as calculated in the "Worcestershire Local Aggregate Assessment (using data up to December 2017)".	0.163 million tonnes This indicative provision figure was based on the sub-regional apportionment for Worcestershire derived from the "National and regional guidelines for aggregates provision in England 2001-2016.
Production (demand): Annual Production Guideline	**0.827 million tonnes 🡻**	**Unable to be calculated, however is explicitly greater than 0 tonnes.**
Production (demand): Informatives	Production guideline based on 10-year average plus 50% due to indicators of demand, including recent levels of sales and estimated impact of HS2 on the total West Midlands supply, suggesting a significant deviation is from the 10-year average is appropriate.	Lack of production in Worcestershire means the 10-year sales average is zero tonnes. There is evidence of demand for (and consumption of) crushed rock which is being met through importation from other mineral planning authority areas, but there are significant constraints on Worcestershire's crushed rock resources. The lack of current interest from the minerals industry indicates that production of crushed rock in Worcestershire in the immediate future is highly unlikely.
Landbank (Supply): Permitted Reserves at 31st December 2021	3.42 million tonnes 🡹	0 tonnes 🡻
Landbank (Supply):	4 active sites 🡹	0 sites

	Sand and gravel	Crushed rock
Number of sites at 31st December 2021		
Landbank (Supply): Landbank at 31st December 2021 (based on annual production guideline)	**4.14 years ↑**	**0 years**
Landbank (Supply): Landbank requirement	7.00 years ✘	10.00 years ✘
Landbank (Supply): Informatives	0% of reserves are held in inactive sites. Seven applications for new mineral extraction sites were under consideration or determined in 2021. Worcestershire is a net-exporter of sand and gravel. Sufficient sand and gravel resources exist in Worcestershire and evidence of interest from minerals industry suggest a significant increase above the 10-year average can be accommodated.	Crushed rock resources exist in Worcestershire, but there are no current permitted reserves. Worcestershire County Council recognises that some contribution towards crushed rock supply may be possible from Worcestershire's resources, but the lack of current interest from the minerals industry indicates that production of crushed rock in Worcestershire in the immediate future is highly unlikely. Discussions with the West Midlands, East Midlands, South West and South Wales Aggregate Working Parties have previously concluded that Worcestershire's production guideline for crushed rock should be 0 tonnes, but with the Minerals Local Plan providing a policy framework seeking to enable a contribution towards the provision of crushed rock from Worcestershire, it is considered that the production guideline should explicitly be greater than zero tonnes, although it is not possible to calculate an exact figure. The Mineral Planning Authorities of the West Midlands, East Midlands, South West and South Wales Aggregate Working Parties have indicated that supplying Worcestershire's demand for crushed rock can be accommodated at present.

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2. Introduction

> "*It is essential that there is a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the country needs. Since minerals are a finite natural resource, and can only be worked where they are found, best use needs to be made of them to secure their long-term conservation.*"
> National Planning Policy Framework (2021), paragraph 209

2.1. The National Planning Policy Framework[2] requires Minerals Planning Authorities (MPAs) to plan for a steady and adequate supply of aggregates by:

- preparing an annual Local Aggregate Assessment (LAA) "*based on a rolling average of 10 years' sales data and other relevant local information, and an assessment of all supply options (including marine dredged, secondary and recycled sources)*",
- "*participating in the operation of an Aggregate Working Party and taking the advice of that Party into account when preparing their Local Aggregate Assessment*",
- "*taking account of any published National and Sub National Guidelines on future provision which should be used as a guideline when planning for the future demand for and supply of aggregates*",
- "*using landbanks of aggregate minerals reserves principally as an indicator of the security of aggregate minerals supply…*", and
- "*maintaining landbanks of at least 7 years for sand and gravel and at least 10 years for crushed rock*".

2.2. The LAA is an assessment of the demand for and supply of aggregates in the county. Its prime purpose is to assist Worcestershire County Council (in its role as Mineral Planning Authority) in its efforts to provide for the steady and adequate supply of local aggregates, where reasonable and practicable to do so. It will inform the development and monitoring of minerals planning policy in the county (Minerals Local Plan and Mineral Site Allocations Development Plan Document) and will be a material consideration in the determination of planning applications.

2.3. A draft of this Local Aggregates Assessment was sent to the West Midlands, East Midlands, South West and South Wales Aggregate Working Parties for consultation in November 2022, and their comments have been taken in to account in the final report (see Appendix 1: Consultation with Aggregate Working Parties).

[2] Ministry for Housing, Communities and Local Government (July 2021) *National Planning Policy Framework*, paragraph 213

Next steps

2.4. The Local Aggregate Assessment will be updated annually in consultation with the West Midlands Aggregate Working Party (WM AWP) and other AWPs as required. It will be published by the Council on our website at www.worcestershire.gov.uk/laa, and will be taken into account in Worcestershire County Council's Authority Monitoring Report (AMR) which will be published at www.worcestershire.gov.uk/amr. If you would like to be notified when new Local Aggregate Assessments and/or Authority Monitoring Report AMRs are published please contact PlanningDatabase@worcestershire.gov.uk providing your contact details[3].

[3] See http://www.worcestershire.gov.uk/info/20014/planning/1156/get_involved_in_planning

3. Substitute, secondary and recycled aggregates in Worcestershire

3.1. National policy states that, so far as practicable, planning authorities should "take account of the contribution that substitute or secondary and recycled materials and minerals waste would make to the supply of materials, before considering extraction of primary materials".[4]

Substitute materials

3.2. It may be possible to reduce the need for primary aggregates through the use of substitute materials in construction. However, the use of substitutes will vary depending on individual development proposals. Their use is likely to be more strongly influenced by sustainable design and construction policies in the City, Borough and District Councils' Local Plans rather than through minerals planning policies.

3.3. There is no data available to indicate the level of contribution made by substitute materials in Worcestershire, but if use of substitutes were to increase and lead to a reduction in demand for primary materials, this will be reflected in the level of aggregate sales recorded.

Secondary aggregates

3.4. Secondary aggregates is a term often used to describe mineral that is produced as a by-product of other mining or quarrying activities or as a by-product of an industrial process.

3.5. There was one industrial process in Worcestershire in 2021 which was known to produce material suitable for processing into secondary aggregates:

- An Energy from Waste Plant 'EnviRecover' commenced operation in 2017 at Hartlebury, near Kidderminster. This plant produces approximately 40,000 tonnes per annum of Incinerator Bottom Ash which is capable of being used as secondary aggregate, although further processing is required to enable this.

3.6. In addition, an Incinerator Bottom Ash Processing and Recovery Facility at Hill and Moor Landfill Site commenced operation in 2017. This facility is tied to the life of the Hill and Moor Landfill Site and is limited to processing 50,000 tonnes per annum of Incinerator Bottom Ash, which currently comes from EnviRecover. Incinerator Bottom Ash Aggregate (IBAA) from this facility is used under the following Environment Agency Regulatory Position Statement RPS 2475. The process of obtaining End of Waste

[4] Ministry of Housing Communities and Local Government (July 2021) *National Planning Policy Framework*, paragraph 210(b)

[5] RPS 247: Using unbound incinerator bottom ash aggregate (IBAA) in construction activities available at: https://www.gov.uk/government/publications/using-unbound-incinerator-bottom-

Criteria to use the recovered IBAA in block manufacture has also commenced. In 2022 a planning application to increase throughput of this site to 100,000 tonnes per annum was received[6] and is yet to be determined.

Recycled aggregates

3.7. Recycled aggregates arise from several sources, notably construction and demolition waste (C&D waste) such as the demolition of buildings, asphalt planings from road resurfacing, recycled glass, recycled tyres, and railway track ballast. "Recycling" aggregates involves the processing of waste materials to remove unwanted or inappropriate material such as fines, wood, plastic and metal. It will usually include crushing and screening. The recycled aggregate is then re-used, usually for a less demanding application.

3.8. The supply of recycled materials will depend on the county's capacity to process these materials. The Waste Core Strategy[7] sets targets for capacity at static plant, but due to data limitations it is not possible to monitor the role of mobile plant.

3.9. There are no reliable assessments of C&D arisings, however a guidance note has been prepared by representatives from the National Waste Technical Advisory Board Chairs and Aggregate Working Party Chairs in May 2022 outlining various options available for the collection and collation of data to estimate arisings and sales of recycled aggregates, based on discussions with representatives of the regional Waste Technical Advisory Boards and Aggregate Working Parties. The methods detailed in this note are for guidance only, and there is no set approach for making estimates about waste arisings or projecting waste growth for C&D waste set nationally.

3.10. The method used to establish projections in the Waste Core Strategy assumed that development would initially be concentrated on previously developed (brownfield) land which would generate considerable volumes of C&D waste, and that over time more new development would take place on greenfield sites resulting in the amount of C&D waste decreasing. The projected arisings of C&D waste in Worcestershire based on this approach are set out in Table 1.

Table 1. Projected Arisings of Construction and Demolition Waste (Worcestershire Waste Core Strategy)

	2010	2015	2020	2025	2030
Projected arisings of C&D waste	510,555	419,520	419,520	419,520	419,520

ash-aggregate-ibaa-in-construction-activities-rps-247/using-unbound-incinerator-bottom-ash-aggregate-ibaa-in-construction-activities-rps-247

[6] Application reference 22/000028/CM.

[7] The Waste Core Strategy for Worcestershire was adopted in November 2012. The relevant documents are available to view on www.worcestershire.gov.uk/wcs.

3.11. The Waste Core Strategy makes provision for at least 25% of the capacity to manage this waste to be met from static sites. Data is limited in this regard, however estimates suggest that static facilities in Worcestershire, including 3 which amended their planning permission between 2019-2021, received approximately 152,000 tonnes of inert waste for treatment in 2020 across 12 sites, with a further 130,000 tonnes received for transfer across 22 sites.[8] It is not currently possible to assess the proportion of this which was subsequently sold or used as recycled aggregate.

3.12. Mobile processing and re-use on site is common at construction sites across the county, although no data is available about the volume processed by mobile plant.

3.13. Worcestershire does not have any rail depot for the import or export of minerals (including secondary and recycled materials). Water transportation takes place on the River Severn, but this is limited to moving "as-dug" primary aggregates from one site in Worcestershire to processing plant at another. The wharves at these sites therefore do not currently enable imports or exports of minerals. It is therefore concluded that all imports and exports currently take place by road transport.

Potential to increase contribution from secondary and recycled materials

3.14. Despite the current lack of information on the level of use of secondary and recycled materials locally, these account for 28% of the total market nationally.[9]

3.15. We are not aware of any other potential drivers that would result in significant increases in arisings or recovery for recycled or secondary aggregate materials. We also have no evidence to indicate whether Worcestershire is likely to produce any more or any less than the national average.

3.16. The Mineral Products Association's evidence to the examination in public of the Staffordshire Minerals Local Plan in 2016 stated that:

"*secondary sources benefit from significant fiscal advantages over primary materials in the form of exemptions from the Aggregates Levy and avoidance of the Landfill Tax. As such, they will continue to be much cheaper than primary materials and thus favoured where specifications can accommodate them. Moreover, the [Mineral Products Association]'s members invariably offer a range of products including primary and secondary materials to customers so the [minerals planning authority] can*

[8] Environment Agency Waste Data Interrogator 2021, interrogated for treatment and transfer facilities for inert waste received in Worcestershire. This figure is unable to be filtered to only include C&D waste.

[9] Mineral Products Association (2021) *Profile of the UK Mineral Products Industry 2020*, page 23, https://mineralproducts.org/MPA/media/root/Publications/2021/Profile_of_the_UK_Mineral_Products_Industry_2020_Spread.pdf

have the assurance that the industry is not needlessly extracting primary materials when secondary materials will do the job just as well.

Arisings of secondary materials will continue to rise and fall with economic conditions in the same way that demand for primary materials varies. Therefore, the two types of material will parallel each other and we expect the level of use of recycled and secondaries to remain broadly at the current level of 28 - 29% of total consumption. Given this any increase in primary mineral extraction activity will not be at the expense of secondary usage." [10]

3.17. The Minerals Local Plan and Waste Core Strategy give policy encouragement to increasing the use of secondary and recycled materials. However, the lack of data makes this difficult to monitor at the local level, and the evidence above from the Minerals Products Association indicates that this Local Aggregates Assessment should not rely on any significant alterations to the proportion of supply.

3.18. On this basis, this LAA assumes that the contribution of substitute, secondary and recycled materials is already accounted for prior to considering the sales figures for primary aggregates.

[10] Mineral Products Association's written statement for day 1 of the Staffordshire Minerals Local Plan examination in public. Response to question 3 in document WS.05.

4. Primary Aggregates: Sand and Gravel Baseline

4.1. There are two distinct types of sand and gravel deposits in Worcestershire:

- Bedrock deposits: solid sands of the Kidderminster Formation and Wildmoor Sandstone Formation
- Surface deposits: river terrace deposits of the rivers Severn and Avon and glacial deposits found in association with boulder clay.

4.2. As the qualities and properties of these deposits vary, the sand and gravel resources in Worcestershire are capable of supplying the markets for various types of sands (sands for asphalt, building or mortar sands, and concrete or sharp sands).

4.3. Worcestershire's solid sands are easily crushed to produce sand, and building and mortar sands are the primary market for quarries working the Wildmoor Sandstone Formation.[11] In the Kidderminster Formation, the sand grains are coarse- to fine-grade, and pebbles and cobbles can also be found,[12] meaning that there is potential for sand and gravel working in this Formation to provide materials to the concrete market, as well as the building sand and mortar markets.

4.4. Terrace deposits are washed and separated into different sizes of sands and gravels to supply different markets, with the majority of material being sold as concreting sand (sharp sand) and concrete aggregate (gravel, and gravel/sand mixes), but with some being sold as building or mortar sands and asphalting sand.[13]

4.5. Due to the overlap in their potential uses, and to facilitate the flexibility of market supply from each deposit, the solid sands and the river terrace and glacial deposits will be considered collectively under the term "sand and gravel" in the rest of this report.[14]

Impact of the Coronavirus pandemic

4.6. The starting point for setting a production guideline for sand and gravel in the LAA is to estimate demand on the basis of a rolling average of 10 years sales data (the 10-year average) before considering other relevant local information. The 10 year sales average is designed to provide a

[11] Based on information supplied by mineral operators in response to West Midlands Aggregate Working Party's Aggregates Surveys.
[12] British Geological Survey and Department of the Environment, Transport and the Regions (1999) *Mineral Resource Information for Development Plans. Herefordshire and Worcestershire: Resources and Constraints*.
[13] Based on information supplied by mineral operators in response to West Midlands Aggregate Working Party's Aggregates Surveys.
[14] For further information about the nature, location and potential significance of the deposits see background document *Analysis of Mineral Resources in Worcestershire* at www.worcestershire.gov.uk/mineralsbackground

representative baseline indication of demand by averaging out economic peaks and troughs.

4.7. Restrictions imposed at the start of the the COVID-19 pandemic resulted in enforced shutdown of large sections of the UK economy.

4.8. Sales of sand and gravel from Worcestershire in 2020 were 0.377 million tonnes, considerably lower than the 0.596 million tonnes sold in the previous year (2019) which was unaffected by the COVID-19 pandemic. However, sales in 2021 were 0.605 million tonnes, which is comparable to pre-pandemic levels and indicates that the 2020 figures are likely to be a short-term fluctuation.

4.9. In addition, information about the level of sales elsewhere in the West Midlands region in 2020 indicated that sales remained comparable to the 10 year average of previous years' sales for the region as a whole.

4.10. It is therefore considered to be appropriate to include the 2020 sales figures in the baseline 10 year sales average in this document.

10 years sales average

4.11. The starting point for setting a production guideline for sand and gravel in the LAA is to estimate demand on the basis of a rolling average of 10 years sales data (the 10-year average) before considering other relevant local information.

4.12. Table 2 and Figure 1 show the levels of sand and gravel sales in Worcestershire over the 10 year period from 2012 to 2021. Worcestershire's data was combined with Herefordshire in 2012 and 2013 due to issues of commercial confidentiality[15]. Permission was given by the affected operator in Herefordshire to enable the data to be shown separately again from 2014.

4.13. The most recent data available is for 2021.

Table 2. Sand and gravel sales 2012 – 2021 (million tonnes)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Worcestershire	-	-	0.520*	0.538	0.399	0.455	0.596	0.648	0.377	0.705
Herefordshire & Worcestershire Combined	0.62*	0.659*	-	-	-	-	-	-	-	-

Source: West Midlands Aggregate Working Party Annual Reports and West Midlands Aggregate Working Party Annual Monitoring Survey data. Data for sales in 2012-2013 combined for Herefordshire and Worcestershire due to confidentiality requirements.
* Includes estimated sales data for some sites.

[15] Long-standing confidentially arrangements agreed between the industry and government to protect operators' commercial interests. This means that sales data will not be released or published where there are fewer than 3 operational sites in an area unless express permission is given by the operators affected. From 2012 onwards there has been fewer than 3 operational sites in Herefordshire.

4.14. In 2021[16], sales of sand and gravel in Worcestershire were 0.705 million tonnes, an increase from 0.377 million tonnes in 2020, which were likely restricted due to the coronavirus pandemic, and 0.648 million in 2019. This is the highest figure in the 10 year period[17] despite the possibility that the coronavirus pandemic may still have restricted sales, especially early in the year.

4.15. The 10-year average of sales from 2012-2021 including combined data for 2012-13 is 0.551 million tonnes. This is 22% **lower** than the 2021 sales figure.

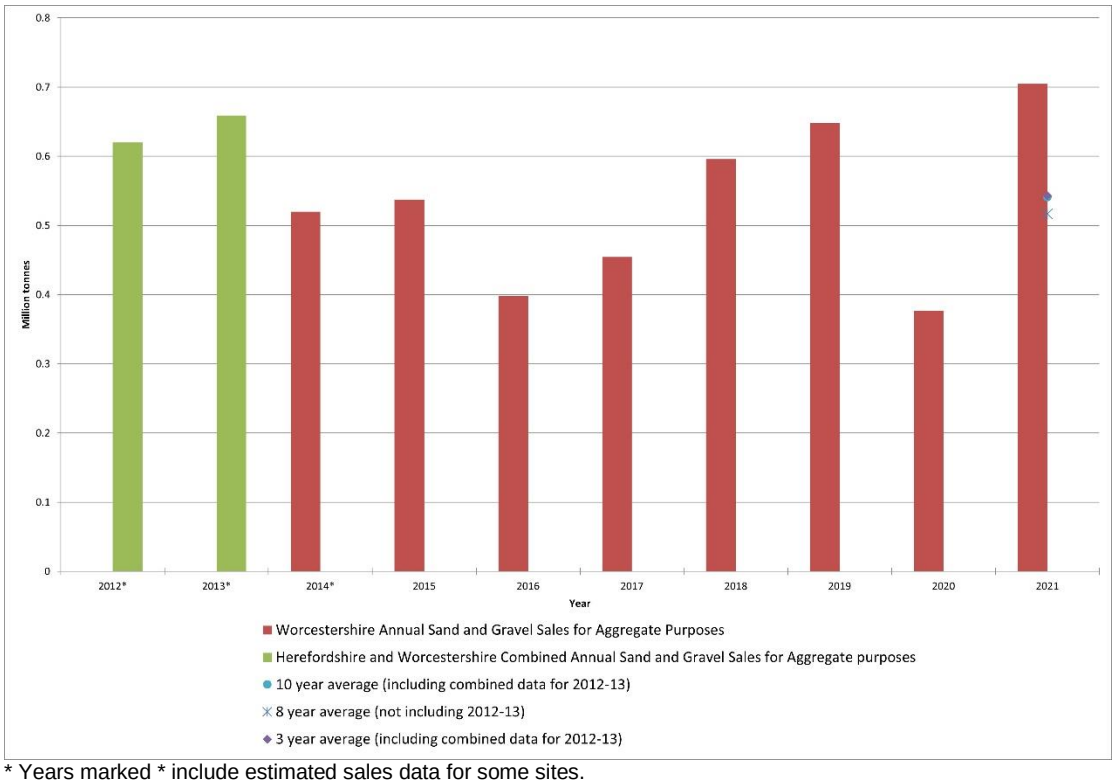
4.16. The 10-year average has a number of weaknesses that make sole reliance on it undesirable:

- sales will vary depending on both supply and demand factors in the market, and basing a production guideline on this alone could risk following historical trends rather than meeting future demand or considering the county's ability to supply;
- it incorporates combined data with Herefordshire which could skew the average;[18]
- the adopted Minerals Local Plan was beyond its expected implementation period, with a limited number of Preferred Areas and saved policies, which could have limited operator interest in bringing sites forward in Worcestershire during this time, thereby depressing the annual sales figure.

4.17. In addition, the fact that the 10-year average is below the 2021 sales figure may mean that it could under-represent current market demand. Therefore, whilst the 10-year average is considered to be the best starting point, this needs to be considered alongside other indicators of demand and supply, as set out below.

[16] The consultation draft of this LAA contained a different 2021 sales figure, this figure has been updated due to further information received from an operator. As this change has a negligible impact on the 10-year average, the findings of the LAA are believed not to be impacted by this change.
[17] Excluding 2012 and 2013 when figures were combined with Herefordshire.
[18] If we were to discount the combined data for 2012 and 2013, the average over the 8 remaining years between 2014-2021 is 0.517 million tonnes.

Figure 1. Sand and gravel annual and average sales 2012-2021



* Years marked * include estimated sales data for some sites.

5. Primary Aggregates: Crushed Rock Baseline

5.1. The bedrock geology in Worcestershire includes the following mineral deposits which are believed to be the only strata in the county that have been worked to produce crushed rock aggregates since 1947: [19]

- The Precambrian "Malverns Complex" and "Warren House Formation";
- The Silurian "Woolhope Limestone Formation"[20];
- The Ordovician "Lickey Quartzite Formation"; and
- The Jurassic "Inferior Oolite Group".

5.2. Rocks of the Malverns Complex and Warren House Formation include rocks which have previously been worked as a source of aggregate suitable for use in road construction and maintenance, as well as for building stone.[21] Woolhope Limestone is often only suitable for production of constructional fill, although there may be areas where the formation comprises relatively clean, good-quality limestones suitable for aggregate use.[22] Lickey Quartzite may be suitable for uses which require high resistance to abrasion,[23] whereas Inferior Oolite limestone is used for low-quality aggregate purposes such as constructional fill, as well as for building stone.[24, 25]

5.3. The qualities and properties of these deposits vary, although each type of deposit may be capable of supplying various markets (such as roadstone, railway ballast, concrete aggregate, or other construction aggregates). Due to the overlap in their potential uses, and to facilitate the flexibility of

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[19] For further information about the nature, location and potential significance of the deposits see background document *Analysis of Mineral Resources in Worcestershire* at www.worcestershire.gov.uk/mineralsbackground

[20] Silurian "Aymestry Limestone Formation" deposits have also been worked in the past, but these are not considered to be a significant resource under the methodology set out in the background document *Analysis of Mineral Resources in Worcestershire* (available at www.worcestershire.gov.uk/mineralsbackground)

[21] British Geological Survey and Department of the Environment, Transport and the Regions (1999) *Mineral Resource Information for Development Plans. Herefordshire and Worcestershire: Resources and Constraints*.

[22] British Geological Survey and Department of the Environment, Transport and the Regions (1999) *Mineral Resource Information for Development Plans. Herefordshire and Worcestershire: Resources and Constraints*.

[23] British Geological Survey and Department of the Environment, Transport and the Regions (1999) *Mineral Resource Information for Development Plans. Herefordshire and Worcestershire: Resources and Constraints*.

[24] British Geological Survey and Office of the Deputy Prime Minister (2006) *Mineral Resource Information in Support of National, Regional and Local Planning: Gloucestershire (comprising Gloucestershire and South Gloucestershire)*.

[25] British Geological Survey and Department of the Environment, Transport and the Regions (1999) *Mineral Resource Information for Development Plans. Herefordshire and Worcestershire: Resources and Constraints*.

market supply from each deposit, these deposits will be considered collectively under the term “crushed rock” in the rest of this report.

10 year sales average

5.4. The starting point for setting a production guideline for crushed rock in the LAA is to estimate demand on the basis of a rolling average of 10 years sales data (the 10-year average) before considering other relevant local information.

5.5. Table 3 shows the levels of crushed rock sales in Worcestershire over the last 10 years (2012-2021). Worcestershire's last crushed rock site ceased working in 2010 and has since been restored.

Table 3. Crushed rock sales 2012 – 2021 (million tonnes)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Worcestershire	0	0	0	0	0	0	0	0	0	0

Source: West Midlands Regional Aggregate Working Party Annual Reports.

5.6. In 2021, sales of crushed rock in Worcestershire were 0 tonnes.

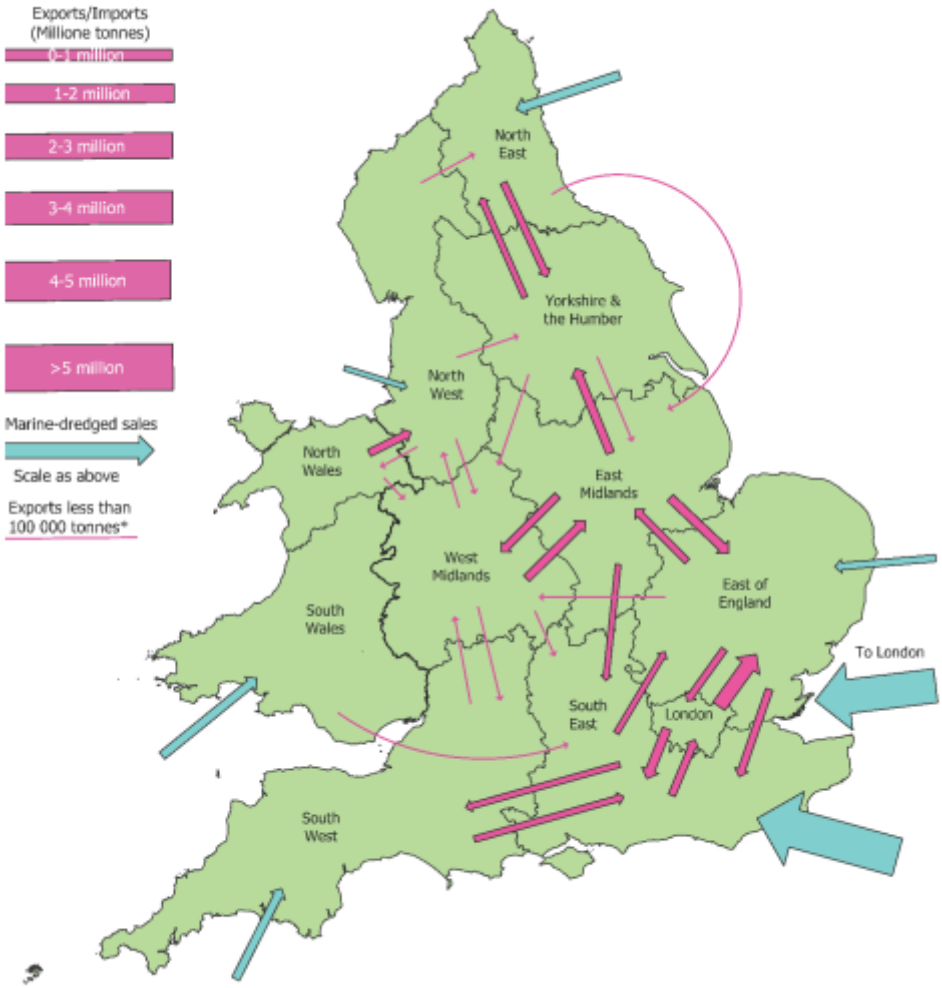
5.7. As no crushed rock sales have been recorded in any of the last 10 years, the 10-year average of sales from 2012-2021 is 0 tonnes.

5.8. The lack of sales of crushed rock in Worcestershire in recent years should not be misconstrued as a lack of demand. It should therefore be considered alongside other indicators of demand and supply, as set out below.

6. Primary Aggregates: Imports and Exports

6.1. The only source of information about the flows of imports and exports of primary aggregates is the *Aggregate minerals survey for England and Wales*. This survey is undertaken every 4 or 5 years and one aspect that it considers is the movement of material. It sets out information relating to the inter-regional flow of aggregates. The pattern of movements of sand and gravel is illustrated in Figure 2, and the pattern of movements of crushed rock is illustrated in Figure 3.

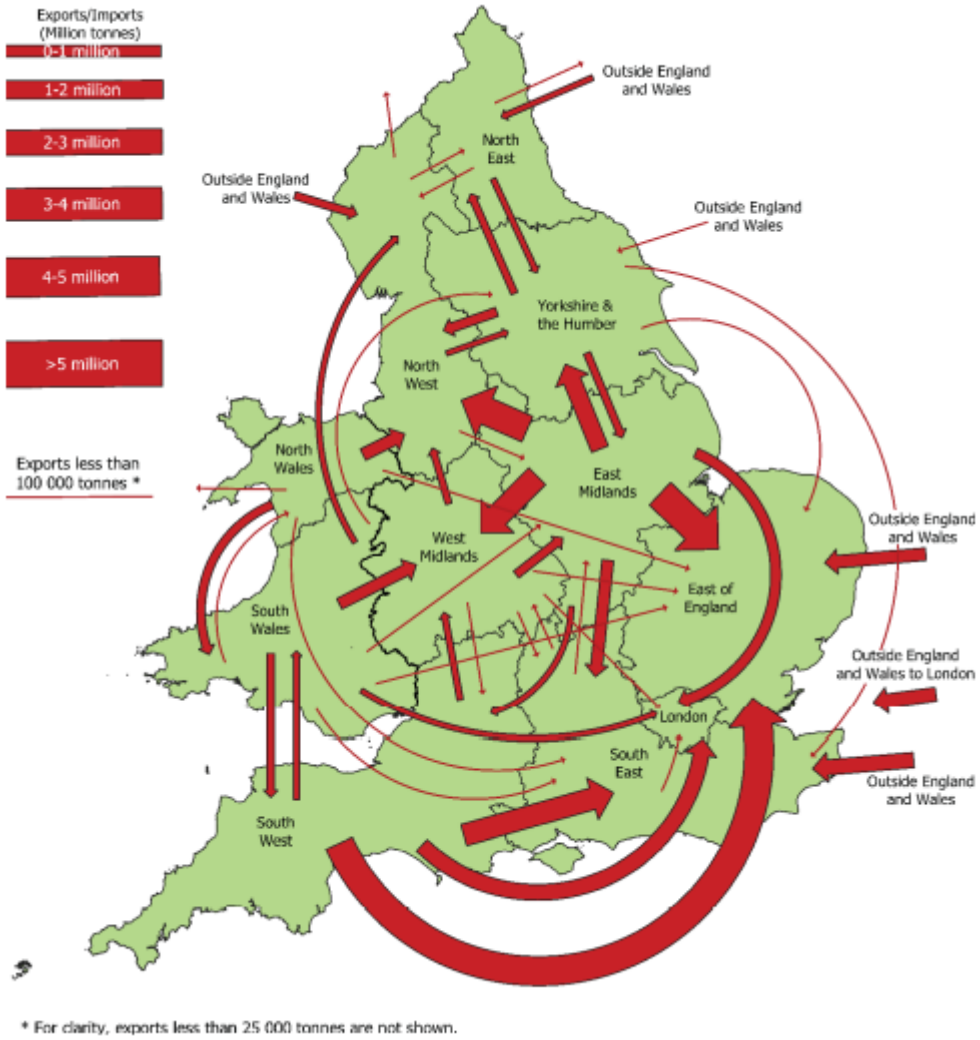
Figure 2. Sand and gravel inter-regional flows, 2019



* For clarity, exports less than 25 000 tonnes are not shown.

Source: "Collation of the results of the 2019 aggregate minerals survey for England and Wales" Ministry of Housing, Communities and Local Government (2021).

Figure 3. Crushed rock inter-regional flows, 2019



Source: "Collation of the results of the 2019 aggregate minerals survey for England and Wales" Ministry of Housing, Communities and Local Government (2021).

6.2. The data which is available for Worcestershire in the *Aggregate minerals survey for England and Wales* for 2009, 2014 and 2019 is presented in Table 4, Table 5, and Table 6. However, discussion with the authors of the document revealed that the information in the 2014 survey did not represent a complete dataset from all mineral operators,[26] and we understand from personal communications with officers at other mineral planning authorities that this may also be the case for the 2019 dataset. It is therefore considered that caution must be applied in relying on this data.

6.3. Whilst the sales figures for Worcestershire shown in Table 2 and Table 3 should therefore be considered to be more reliable, the aggregate minerals survey data is the only information available to understand the likely scale and balance of imports and exports. This allows some understanding of the

[26] Email correspondence with Mr T Bide at the British Geological Survey (7th August 2017) revealed that for 2009 responses were only received for two quarries in Worcestershire, and in 2014 for only 1 quarry.

total consumption of primary aggregates in Worcestershire (i.e. the scale of demand to supply the need within the county). Sales figures alone only show the amount produced within the county, and cannot show whether this is broadly comparable to the scale of demand within Worcestershire, whether there are net imports (which would indicate that demand in the county is higher than the amount sold), or whether there are net exports (which would indicate that Worcestershire is producing more than the amount needed to meet its own needs) and is therefore contributing to regional or national supply through the Managed Aggregate Supply System.

6.4. Subject to the caveats outlined above, the data presented in Table 4 to Table 6 below indicate that Worcestershire was a net exporter of sand and gravel in all years, and a net importer of crushed rock in all years.

6.5. Data is presented for sales of primary (land-won) sand and gravel from Worcestershire, alongside the level of imports of land-won sand and gravel, marine sand and gravel, and crushed rock into Worcestershire. As an inland county, Worcestershire does not produce marine sand and gravel. No sales data is presented for crushed rock as there were no sales recorded from Worcestershire during this period in the Aggregate Minerals Survey.[27]

Table 4. Exports: Sales of land-won sand and gravel from Worcestershire by principal destination sub-region

Year	Tonnes sold within the following destination: Worcestershire	Tonnes sold within the following destination: West Midlands	Tonnes sold within the following destination: Elsewhere	Total
2009	114,000 (52%)	59,000 (27%)	45,000 (21%)	218,000
2014	51,000 (22%)	133,000 (57%)	47,000 (21%)	231,000
2019	278,000 (44%)	269,000 (41%)	92,000 (14%)	648,000

Source: "*Collation of the results of the 2009 aggregate minerals survey for England and Wales*" Communities and Local Government (October 2011) table 9f, "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016) table 9f, and "Collation of the results of the 2019 aggregate minerals survey for England and Wales" Ministry of Housing, Communities and Local Government (2021) table 9f.

[27] No sales of crushed rock were recorded in "Collation of the results of the 2009 aggregate minerals survey for England and Wales" Communities and Local Government (October 2011) table 9f. A crushed rock site in Worcestershire was approaching the end of its working life in 2009, but it is unclear whether this table is accurate or whether some of the combined sales figure with Herefordshire for 2009 (0.2 million tonnes) reported in previous iterations of the Local Aggregate Assessment may have been attributable to Worcestershire.

Table 5. Imports of primary aggregates in to Worcestershire

Year	Tonnes of land-won sand and gravel	Tonnes of marine sand and gravel	Tonnes of crushed rock
2009	45,000	13,000	192,000
2014	146,000	2,000	540,000
2019	103,000	2,000	733,000

Source: "*Collation of the results of the 2009 aggregate minerals survey for England and Wales*" Communities and Local Government (October 2011) table 10, "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016) table 10 and "Collation of the results of the 2019 aggregate minerals survey for England and Wales" Ministry of Housing, Communities and Local Government (2021) table 10.

Table 6. Balance of primary aggregate exports and imports in Worcestershire

Year	Balance of sand and gravel imports / exports (land won and marine)	Balance of crushed rock imports / exports	Balance of all primary aggregate imports / exports
2009	Net exporter: 46,000 tonnes	Net importer: 192,000 tonnes	Net importer: 146,000 tonnes
2014	Net exporter: 32,000 tonnes	Net importer, 540,000 tonnes	Net importer: 508,000 tonnes
2019	Net exporter: 256,000 tonnes	Net importer: 733,000 tonnes	Net importer: 477,000 tonnes

Source: Based on data in "*Collation of the results of the 2009 aggregate minerals survey for England and Wales*" Communities and Local Government (October 2011), "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016) and "Collation of the results of the 2019 aggregate minerals survey for England and Wales" Ministry of Housing, Communities and Local Government (2021)

6.6. Worcestershire does not have any rail depot for the import or export of minerals. Water transportation takes place on the River Severn, but this is limited to moving "as-dug" material from one site in Worcestershire to processing plant at another. The wharves at these sites therefore do not currently enable imports or exports of minerals. It is therefore concluded that all imports and exports currently take place by road transport.

7. Primary Aggregates: Demand Indicators

Total consumption

7.1. The amount of primary aggregate consumed within Worcestershire each year would represent the demand for resources within the county.

7.2. Subject to the caveats regarding the reliability of the data outlined in Section 6 above, total consumption for the county can be calculated by combining data which is available for Worcestershire in the *Aggregate minerals survey for England and Wales* for 2009, 2014 and 2019 relating to the total amounts produced and then sold within Worcestershire, with the amounts imported into Worcestershire, as shown in Table 7 below.

Table 7. Total consumption of primary aggregates in Worcestershire

	Sales within Worcestershire (tonnes)	Combined imports of primary aggregates (tonnes)	Total consumption (tonnes)
2009	114,000	250,000	364,000
2014	51,000	688,000	739,000
2019	287,000	838,000	1,125,000

Source: Based on data in "*Collation of the results of the 2009 aggregate minerals survey for England and Wales*" Communities and Local Government (October 2011), "Collation of the results of the 2014 aggregate minerals survey for England and Wales" Communities and Local Government (March 2016) and "Collation of the results of the 2019 aggregate minerals survey for England and Wales" Ministry of Housing, Communities and Local Government (2021)

7.3. This data is not available on an annual basis, and the significant concerns about the reliability of this data mean that very little weight can be given to the apparent change in the scale of consumption from 2009-2019. However, this data does provide the best available indication of the overall scale of demand for primary aggregates within Worcestershire.

3-year sales average

7.4. As data for total consumption is not available on an annual basis and in any case would not reflect Worcestershire's contribution to the Managed Aggregate Supply System through the amounts exported, consideration must be given to trends in the amounts sold annually. An average of the last 3 years sales gives an indication of the most recent trend in demand.

7.5. For sand and gravel, the 3-year average from 2019-2021 is 0.543 million tonnes. This is almost exactly the same as the 10-year average (0.4% higher) and may therefore indicate that the 10-year average figure is representative of current levels of demand.

7.6. However, the 3-year average is 14% lower than the 2021 sales figure, and the trend across recent years[28] has been for sales to increase rather than being static at around this level. This may therefore indicate that the 3-year

[28] Excluding the impact of the Coronavirus pandemic in 2020.

average could be an under-representation of the current and potential future market demand.

7.7. For crushed rock, the 3-year average from 2019-2021 is 0 tonnes. As there were no sites in Worcestershire producing crushed rock in the last 3 years, no trends in demand can be derived from sales data over this period.

Sub regional apportionment

7.8. A further indicator to be taken into account is the sub-regional apportionment derived from the *National and regional guidelines for aggregates provision in England*.[29] These guidelines were produced to cover the period 2001-2016 and updated for the period 2005-2020 and set out the level of provision which should be made by each Region. An annual "sub-regional apportionment" was derived from the 2001-2016 Guidelines, and for Worcestershire this was 0.871 million tonnes of sand and gravel, and 0.163 million tonnes of crushed rock. No sub-regional apportionment based on the 2005-2020 Guidelines was agreed, and no further National and Sub National Guidelines have yet been published by government.

7.9. The sub-regional apportionment for sand and gravel of 0.871 million tonnes was 43% higher than the 2021 sales figure, and is 60% higher than the 10-year average. This level of production has not been achieved in Worcestershire since 2003.

7.10. For crushed rock, the level of production required to meet the sub-regional apportionment figure of 0.163 million tonnes has not been achieved in Worcestershire since 2002.

7.11. In the Inspector's Report on the partial review of the Northamptonshire Minerals and Waste Local Plan,[30] the Inspector stated “as they (*the national guidelines*) were based on production before the recession and within a different policy context, it would not be prudent to accord them very significant weight.”

7.12. However, discussion during the examination hearing sessions for Worcestershire’s Minerals Local Plan in November-December 2020 highlighted that the lack of crushed rock production and therefore sales information in recent years means that the sub-regional apportionment for crushed rock does provide some indication of the scale of potential demand.

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[29] Department for Communities and Local Government https://www.gov.uk/government/publications/national-and-regional-guidelines-for-aggregates-provision-in-england-2005-to-2020

[30] The Planning Inspectorate (August 2014) *Report on the Examination into the Northamptonshire Minerals and Waste Local Plan (Northamptonshire Minerals & Waste Development Framework Partial Review)* http://www3.northamptonshire.gov.uk/councilservices/environment-and-planning/planning/planning-policy/minerals-and-waste-planning-policy/documents/PDF%20Documents/ReportToNorthamptonshireCountyCouncilV3.pdf

7.13. This suggests that it would not be appropriate to increase the production guideline for either sand and gravel or crushed rock in this LAA above the 10-year average **solely** on the basis of the *National and regional guidelines* or the sub-regional apportionment. However, this will be considered together with other indicators in the conclusion (Section 9).

Anticipated levels of development

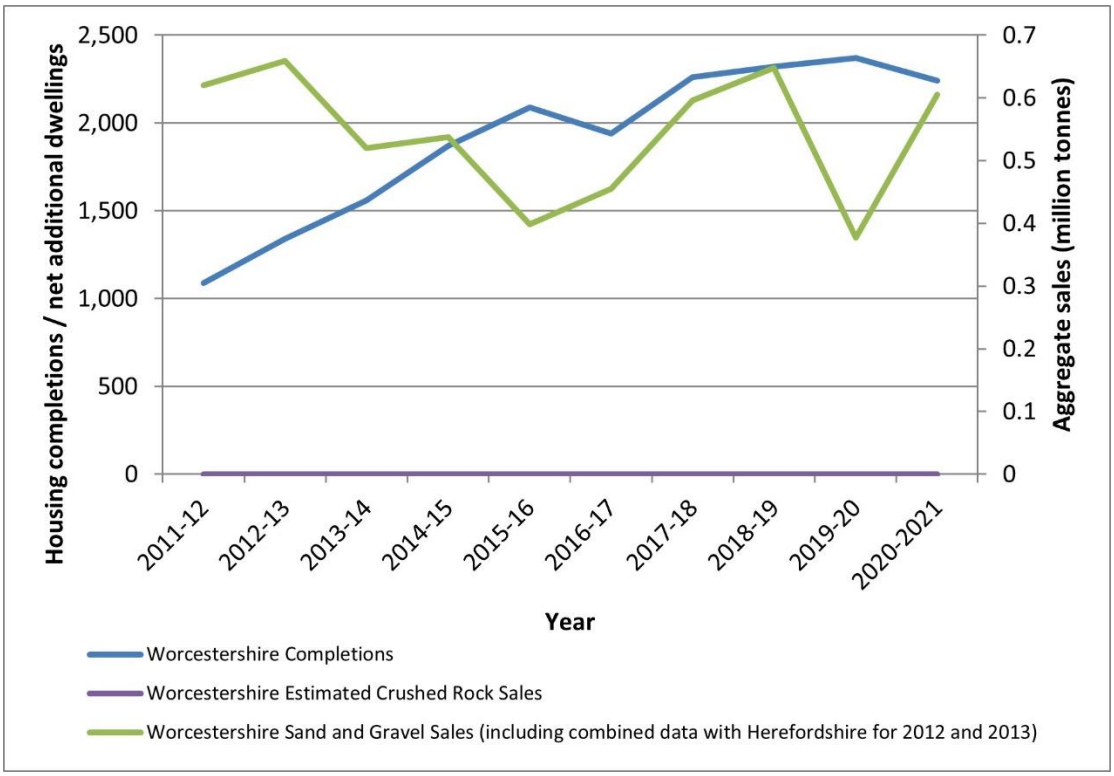
7.14. Considering levels of planned development could provide an indication of whether demand for aggregates is likely to significantly increase or decrease, warranting an adjustment in the production guidelines.

Housing development

7.15. A steady and adequate supply of aggregates is crucial to enabling the level of planned housing development to be delivered in the county. To understand whether future demand for aggregates for housing is likely to be comparable to, or significantly lower or higher than, historic levels of demand, trends in housing completions are compared below to target levels set in adopted Local Plans and as calculated using the Standard Methodology from Government released in December 2020.

7.16. Figure 4 shows aggregate sales against housing completions in the county over the last 10 years.

Figure 4. Aggregate sales versus housing completions[31]



7.17. Figure 4 shows that the level of housing completions has varied annually over the last 10 years (between 1,090 and 2,370), with an average of 1,898 completions per year,[32] and a trend in the number of completions increasing over this period. Over the next 10 years, the anticipated level of housing provision in adopted Local Plans is approximately 2,218 dwellings per year.[33] This would represent a 17% increase in comparison to the average over the last 10 years but is below the number completed in any of the three most recent years (2320 in 2018/19, 2370 in 2019/20 and 2240 in 2020/21).

7.18. A number of Local Plans are currently being reviewed. It is anticipated that these reviews will confirm the continued need for housing development in the county, plus associated infrastructure including roads and schools, with delivery being maintained at an average of 2047 houses per annum[34]. This is

[31] Housing completions data based on Department for Communities and Local Government, statistical data set "Live tables on house building: new build dwellings" table 253 (permanent dwellings started and completed, by tenure and district). https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building. Dataset incomplete for 2009-10 and 2010-11.

[32] Department for Communities and Local Government, statistical data set "Live tables on house building: new build dwellings" table 253 (permanent dwellings started and completed, by tenure and district). https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building. Dataset incomplete for 2009-10 and 2010-11.

[33] Based on figures in South Worcestershire Development Plan (2016), Wyre Forest District Local Plan (2022), Bromsgrove District Plan (2017), and Borough of Redditch Local Plan No.4 (2017).

[34] 2047 houses per annum calculated using the Standard Methodology from Government released in December 2020.

8% higher than the average number of completions seen over the last 10 years, but is 11% lower than the average number of completions seen over the last 3 years (2310 completions per year).

7.19. Figure 4 does not show a direct correlation between the number of housing completions and the level of either sand and gravel or crushed rock sales in Worcestershire in any given year. Nonetheless, it is useful to consider the likely level of aggregate required per house as an indication of the likely sufficiency of production from the county.

7.20. A typical new house uses 200 tonnes of aggregate, or up to 400 tonnes of aggregate when supporting infrastructure, such as access roads, is taken into account.[35] This does not distinguish between use of sand and gravel and crushed rock, and does not include any indication of the likely level of demand for material used in maintaining or refurbishing existing housing stock, but does enable calculations to be made of the likely scale of demand for aggregate for new housing development.

7.21. Based on average material usage per dwelling, new housing development may account for between 70.6% and 85.4% of the 10-year average amount of sand and gravel produced in Worcestershire, when supporting infrastructure is not included, or between 141.0% and 170.8% of the 10-year average amount of sand and gravel produced in Worcestershire when supporting infrastructure is also taken into account.[36]

7.22. However, despite being a net-exporter of sand and gravel, Worcestershire is a net importer of aggregate minerals once the levels of imports of crushed rock are taken into account. Housing development and associated infrastructure may have accounted for between 67.8% and 81.2% of Worcestershire's total aggregate consumption in 2019[37], and it is highly likely that Worcestershire's housebuilding is currently reliant on imports of primary materials.

7.23. The anticipated trajectory for new housing development in emerging local plans and the government's Standard Methodology both indicate that the number of dwellings required per year in future is higher than the average delivered over the last 10 years, but lower than those delivered in the last three years.

7.24. Demand for primary minerals to enable new housing development will be considered together with other indicators in the conclusion (Section 9).

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[35] The Mineral Products Association's "*Profile of the UK Mineral Products Industry - 2020 Edition*" (published in 2021) states that a "typical home" uses 12 tonnes of mortar and 200 tonnes of aggregate, https://www.mineralproducts.org/MPA/media/root/Publications/2021/Profile_of_the_UK_Mineral_Products_Industry_2021.pdf

[36] See *Appendix 3: Calculation of aggregate demand for housing development* for more information.

[37] See *Appendix 3: Calculation of aggregate demand for housing development* for more information.

Employment development

7.25. Data on employment land delivery is collated by Worcestershire's six Borough, District and City councils. However, this work is done and reviewed on different timescales across the county, and to varying levels of detail. Therefore, complete data is unable to be collated for use in identifying trends in demand. However, it is recognised that there is demand for employment developments, and therefore demand for aggregates to meet this.

7.26. A total of 752ha of land is currently allocated for employment use across Worcestershire[38]. Some employment allocations will have already been approved and implemented, this is likely largely to be covered in existing sales data. Due to the differing timescales between plan periods, the delivery of the remaining sites is likely to take place over differing timescales, and we are unable to quantify whether this demand is likely to increase or decrease.

7.27. The MPA profile of the UK mineral industry (2020) document[39] gives estimated figures of the amount of mineral products needed for different types of employment developments, this includes:

- 16,480 tonnes of concrete for a 6 storey city centre office building
- 53,000 tonnes of concrete for a community hospital
- 15,000 tonnes of concrete for a school
- 730,000 tonnes of asphalt for an example road (A14 Cambridge to Huntingdon Improvement Scheme)

7.28. This information cannot be directly applied in calculations of demand arising for employment land development, due to the wide variation in tonnages required for differing schemes, and the lack of robust data available in Worcestershire regarding delivery trajectories.

Infrastructure development

7.29. It is recognised that significant levels of infrastructure development are proposed in the Local Plans and Strategic Economic Plans in and around Worcestershire which will create some demand for aggregate minerals from within Worcestershire. However, there is a lack of data to be able to estimate the level of future demand for aggregate resources which local infrastructure developments might create, and whether this is likely to be significantly higher or lower than levels of demand over the last 10 years to facilitate understanding of the adequacy of the 10-year sales average or scale of change which may be required.

7.30. There are no Nationally Significant Infrastructure Projects planned or underway within Worcestershire.[40] However, the West Midlands Aggregate

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[38] Made up of 640ha allocated in the South Worcestershire Development Plan, 55ha in the Redditch Local Plan, 29ha in the Wyre Forest Local Plan and 28ha in the Bromsgrove District Plan.

[39] Minerals Products Association. *Profile of the UK Mineral Products Industry: 2020 Edition.* Available at https://www.mineralproducts.org/Facts-and-Figures/Profile-of-the-UK-Mineral-Products-Industry.aspx

[40] The National Infrastructure Planning website shows the "Redditch Branch Enhancement Scheme" as a Nationally Significant Infrastructure Project. This scheme was intended to create capacity along the single track to Redditch through the construction of a dynamic loop,

Working Party has long believed that the HS2 project, which will run through the West Midlands, will result in significant demand for aggregates from Mineral Planning Authority areas in the West Midlands. As aggregates tend not to very travel far from their source, this demand is likely to be met from the Mineral Planning Authority areas closest to the line's route in the first instance. However, the level and urgency of this demand is likely to put significant strain on existing supply options in these areas. Failing to make adequate provision to meet this increased demand could compromise the ability for both HS2 and other developments to be delivered.

7.31. Construction work on HS2 has begun in recent years, and evidence is beginning to appear confirming the AWP's views regarding aggregate supply and possibly shortages.

7.32. The West Midlands Aggregate Working Party has been seeking to work closely with HS2 to better understand the implications for minerals supply from the West Midlands. The latest figures supplied to the West Midlands AWP by HS2 indicate that between 2020 and 2027, HS2's demand for resources from within the West Midlands may be approximately 50% of current production levels. Therefore, in order to also continue supplying existing markets, production in the West Midlands region will require a 50% increase to meet the extra demand placed upon the region by HS2.

7.33. Hudson Contract, a payroll firm that manages the wages of more than 30,000 construction workers and supplies more than 2,500 construction companies across England and Wales, reported in April 2021 that its clients are reporting serious shortages in construction products, suggesting that this is likely to be due to materials instead supplying HS2, that the risks around availability of materials are the main threat to their growth prospects, and that the problem with the lack of building materials is most acute in the West Midlands.[41]

7.34. Whilst Worcestershire is some distance from the line of the HS2 development, and therefore unlikely to directly supply it, additional aggregate extraction in Worcestershire is likely to be needed in order help meet the demands placed upon aggregate supply chains in the West Midlands. It is difficult to quantify the extent of additional provision required from Worcestershire, but this will be considered alongside other indicators in the conclusion (Section 9).

7.35. There are no significant National Highways infrastructure projects within Worcestershire. [42]

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consisting of approximately 3km of double track and 2 connections to the original track, allowing trains to pass one another. Consent for this scheme was granted in 2013, and the project was completed in 2014.

[41] https://www.theconstructionindex.co.uk/news/view/hs2-blamed-for-materials-shortages?amp=1&s=03

[42] National Highways Delivery Plan 2020-2025, https://nationalhighways.co.uk/delivery-plan/

8. Primary Aggregates: Ability to Supply

Indigenous supply

Worcestershire's sand and gravel resources

8.1. There are two estimates of the quantity of sand and gravel resources which exist in Worcestershire.

8.2. The "Sub-Regional Apportionment of Aggregates Provision in the West Midlands Region 2005 – 2020 Consultation paper 17-02-2010" document was prepared for the West Midlands Regional Assembly by Land Use Consultants in February 2010. This used the British Geological Survey (BGS) mineral resource dataset (1:50,000) as the starting point for the distribution of resources in the region in GIS, and then applied the following factors which were considered to sterilise the resource:

- The road network – based on the Primary Road Network with a 5m buffer of the line features in GIS to approximate the footprint on the ground;
- Railways – based on railway data supplied by WMRA with a 5m buffer of the line features in GIS to approximate the footprint on the ground;
- Urban areas – based on the 2001 Census Urban Areas dataset; and
- Worked-out sites – based on information provided by mineral planning authorities (no GIS data on historical sites in Worcestershire was available at that time).

8.3. All international nature conservation and heritage designations were also removed to reflect the level of protection that international designations are afforded by the Planning system, and the Malvern Hills Conservators landholdings were also removed due to the restrictions on quarrying imposed by the Malvern Hills Acts.

8.4. A mean working thickness for each deposit type in each sub-region was derived and these were applied to the remaining areas of each mineral deposit to convert the area (ha) to a volume (mt) using a bulk density figure of 1675kg/m^3 for sand and gravel.

8.5. Worcestershire County Council (WCC) has since undertaken its own analysis of the mineral resources in the county.[43] This is also based on the BGS 1:50,000 GIS data, applying minimum size thresholds for the deposits considered (>10ha in area and >200m wide), and analysing BGS memoirs and planning histories to estimate the likely depth of each deposit. A conversion factor of 1.65t/m^3 for sand and gravel was applied following consultation responses, these are considered to be broadly comparable to the bulk density figures used in the LUC report. Some consideration was given to areas sterilised by surface development, and the calculated volume was halved in estimating the available resource volume in order to recognise that some areas are overlain by dispersed development, that information

[43] Worcestershire County Council (August 2016) *Worcestershire Minerals Local Plan Background Document: Analysis of Mineral Resources in Worcestershire*, available from the archive page at www.worcestershire.gov.uk/mineralsbackground.

about depth is limited and the quality and depth can vary across a deposit, and that constraints which will be set out in criteria-based policies have not been applied within the analysis of resources. Further work has since been completed to screen out international and national designations.[44]

8.6. A comparison between the two estimates can be seen in table 3 below.

Table 8. Comparison between LUC and WCC estimates of Worcestershire's sand and gravel resources

Document estimating resource	Area of unsterilised resource (ha)	Volume of unsterilised resource (mt)
LUC	**25,036.34**	**3,222.57**
WCC Analysis of mineral resources (April 2021)	**14,543.00**	**3,960.92**

8.7. The WCC figure for the volume of unsterilised sand and gravel resource appears to be broadly comparable to those in the LUC report. Whilst the unsterilised resource area is less in the WCC analysis, due to a greater number of international and national designations having been screened from the resources, the resource volume remains broadly similar due to the use of specific depth figures for deposits rather than reliance on an average figure applied to all deposits.

8.8. This strategic-level information suggests that there is still a significant amount of sand and gravel resource in Worcestershire which is unlikely to be affected by international and national designations. However, these strategic assessments of Worcestershire's resources have limitations in relation to consideration of the quality of the resources and the degree to which they may be affected by other planning or viability constraints. Overall, Worcestershire County Council considers that this information indicates that it should be possible for the supply of sand and gravel from Worcestershire to continue for at least the short and medium-term, and this will be considered alongside other indicators in the conclusion to this section.

Extant sites and permitted reserves (sand and gravel)

8.9. Four sand and gravel sites in Worcestershire shown in Table 9 were "active" (in production for some time during the year) during 2021. As of 31st December 2021, all four of the active sites had permitted reserves of sand and gravel for aggregate purposes.

8.10. None of the sites active as of 31st December 2021 has conditions attached to its planning permission which would restrict the productive capacity of the site.

[44] Worcestershire County Council (November 2018) *Worcestershire Minerals Local Plan Background Document: Analysis of Mineral Resources in Worcestershire*, available from the mineral resources page at www.worcestershire.gov.uk/mineralsbackground.

8.11. However, planning permission for one of the sites ends on 31st December 2026. Due to the timescales involved in getting permission for a new minerals site, and implementing said permission, this is now considered a short timescale for replenishment of this productive capacity once the permission ends on 31st December 2026.

Table 9. Sites with permitted reserves as of December 2021

Site name	Company	Location	Planning permission end date	Limits imposed on productive capacity by planning permission
Chadwich Lane Quarry	Salop Sand and Gravel	Chadwich Lane, Wildmoor, Bromsgrove	31 December 2037	None
Cinetic Quarry (also known as Wildmoor Quarry)	Wildmoor Quarry Products Ltd	Sandy Lane, Wildmoor, Bromsgrove	None stipulated (therefore 2042)	None
Clifton	Tarmac	Clifton Arles Wood, Severn Stoke	31 December 2030 (stated on planning permission 15/000006/CM which was granted 12 July 2016, consolidating the existing quarry and new extensions into one permission)	None
Ryall's Court Quarry (extraction) / Ryall House Farm Quarry (processing)	Cemex UK Materials Ltd	Ryall's Court Quarry, Ryall Court Lane, Ryall, Upton-upon-Severn Ryall House Farm, Tewkesbury Road, Ryall, Upton-upon-Severn	31st December 2026 (stated on planning permission 15/000013/CM) Proposals for decommissioning and restoration of Ryall House Farm Quarry[45] required by 31 December 2023, or within 3 months of the permanent cessation of working at Ryall's Court Quarry (stated on planning permission 15/000012/CM)	None

8.12. According to returns submitted by mineral operators in the county in response to the West Midlands Aggregate Working Party Annual Monitoring Survey, the total permitted reserves for sand and gravel in Worcestershire at 31st December 2021 was 3.42 million tonnes. This is equivalent to 6.3 years at the

[45] Planning permission 15/000012/CM granted 23 May 2016 to enable the continued temporary retention of aggregate wharf and aggregates processing plant at Ryall House Farm Quarry.

rate of the 10-year sales average, and is not sufficient to meet the requirements identified in the Minerals Local Plan (adopted July 2022).

Site allocations (sand and gravel)

8.13. During 2021, the extant Minerals Local Plan was the County of Hereford and Worcester Minerals Local Plan (1997) which allocated a number of preferred areas for sand and gravel working in Worcestershire.

8.14. A site at Strensham, which was subject to planning application 09/000085/CM, withdrawn in 2017, was the last remaining allocated site for sand and gravel extraction within Worcestershire in the adopted Minerals Local Plan, other than the extension to Aston Mill, Kemerton, which was understood to have not been worked due to the quality and quantity of the mineral deposit, and part of the wider Ryall North site, which has planning permission (Application Ref: 15/000013/CM) for the majority of the Preferred Area allocation.

8.15. Information received from the minerals industry and Mineral Products Association had long suggested that some caution should be given to the remaining Preferred Areas in the adopted 1997 Minerals Local Plan: "if allocations from that Plan are still outstanding it suggests that they are undeliverable and should not be relied on"[46].

8.16. In July 2022, a new Worcestershire Minerals Local Plan (2018-2036) was adopted which identifies that new sites and alterations or extensions to extant sites will be required to provide at least a further 11.407 million tonnes of sand and gravel in addition to the plan's baseline of permitted reserves at the end of 2017 of 3.465 million tonnes.

8.17. The Minerals Local Plan (2018-2036) contains policies to enable both new mineral development and extensions to existing sites, and it allocates 100 areas of search for sand and gravel (70 for terrace and glacial sand and gravel resources, and 30 for solid sand resources). It also commits to the development of a separate Mineral Site Allocations Development Plan Document to allocate specific sites and/or preferred areas.

8.18. Five calls for sites have been undertaken in the development of the new Minerals Local Plan and Mineral Site Allocations Development Plan Document between 2014 and 2020. The minerals industry and Mineral Products Association had previously stated that they struggled to find sand and gravel sites of sufficient size to work in Worcestershire, except as isolated satellite operations which were not long term solutions.[47] However, a number of potential sites for sand and gravel extraction have now been proposed by the minerals industry and/or landowners and these sites are under consideration as potential sites for allocation in the Mineral Site Allocations Development Plan Document (DPD).

[46] Mineral Products Association comments on Minerals Local Plan Background Documents consultation, summer 2015 (response reference D024-1899)
[47] Mineral Products Association comments on Minerals Local Plan Background Documents consultation, summer 2015 (response reference D024-1899)

Applications pending (sand and gravel)

8.19. Seven planning applications for new extraction sites were under consideration during 2021, with six of these pending determination as of 31st December 2021. These were:

- Application reference 19/000048/CM, to extract 1.5 million tonnes of sand and gravel from a new quarry at Bow Farm, Ripple. (This was approved by Worcestershire County Council's Planning and Regulatory Committee in October 2022, but is contingent on planning permission being granted for site access and processing plant within Gloucestershire which is due to be considered by Gloucestershire County Council's planning committee in December 2022).
- Application reference 19/000053/CM, to extract 3 million tonnes of sand and gravel from a new quarry at Lea Castle Farm, Kidderminster. This was refused in June 2022.
- Application reference 19/000056/CM, to extract up to 1 million tonnes of sand and gravel from a new quarry at Pinches 4, Bromsgrove.
- Application reference 20/000009/CM, to extract 475 000 tonnes of sand and gravel as an additional phase to the already permitted Ryall North Quarry, Upton-upon-Severn, immediately to the north. (This was approved in October 2022)
- Application reference 20/000042/CM, to extract 300,000 tonnes of sand from a new quarry at Wilden Lane, Stourport-on-Severn. This was refused in September 2021.
- Application reference 21/000029/CM, for the extraction of sand to enable engineering operations for stability purposes and completion of site restoration at (Western portion of the former) Sandy Lane Quarry, Wildmoor, Worcestershire. This was approved in July 2022.
- Application reference 21/000036/CM, to extract 250,000 tonnes of sand from a new quarry at Wilden Lane, Stourport on Severn.

8.20. It should also be noted that a further planning application was submitted in 2022 (reference 22/000015/CM) to extract 475,000 tonnes of sand and gravel from a new quarry at Ripple East, Ripple.

8.21. Five of these applications are for sites which have also been put forward in response to calls for sites and are being considered for potential allocation in the Mineral Site Allocations DPD.

Pre-application discussions (sand and gravel)

8.22. In 2021, pre-application discussions have been held with regard to six potential sand and gravel sites, including potential changes to existing sites. In addition, as of 1st November 2022, discussions have been held regarding 2 potential sand and gravel sites in 2022. These discussions are confidential and may not result in planning applications being brought forward[48], but they indicate that there is interest in developing further sand and gravel workings in Worcestershire.

[48] 2 of the 6 potential sites discussed in 2021 have since come forward as applications.

Worcestershire's crushed rock resources

8.23. There are two estimates of the quantity of crushed rock resources which exist in Worcestershire.

8.24. The "Sub-Regional Apportionment of Aggregates Provision in the West Midlands Region 2005 – 2020 Consultation paper 17-02-2010" document was prepared for the West Midlands Regional Assembly by Land Use Consultants in February 2010. This used the British Geological Survey (BGS) mineral resource dataset (1:50,000) as the starting point for the distribution of resources in the region in GIS, and then applied the following factors which were considered to sterilise the resource:

- The road network – based on the Primary Road Network with a 5m buffer of the line features in GIS to approximate the footprint on the ground;
- Railways – based on railway data supplied by WMRA with a 5m buffer of the line features in GIS to approximate the footprint on the ground;
- Urban areas – based on the 2001 Census Urban Areas dataset; and
- Worked-out sites – based on information provided by mineral planning authorities (no GIS data on historical sites in Worcestershire was available at that time).

8.25. All international nature conservation and heritage designations were also removed to reflect the level of protection that international designations are afforded by the Planning system, and the Malvern Hills Conservators landholdings were also removed due to the restrictions on quarrying imposed by the Malvern Hills Acts.

8.26. A mean working thickness for each deposit type in each sub-region was derived and these were applied to the remaining areas of each mineral deposit to convert the area (ha) to a volume (mt) using a bulk density figure of 2600kg/m3 for hard rock.

8.27. Worcestershire County Council (WCC) has since undertaken its own analysis of the mineral resources in the county.[49] This is also based on the BGS 1:50,000 GIS data, applying minimum size thresholds for the deposits considered (>10ha in area and >200m wide), and analysing BGS memoirs and planning histories to estimate the likely depth of each deposit. A conversion factor of 2.45t/m3 for crushed rock was applied following consultation responses, these are considered to be broadly comparable to the bulk density figures used in the LUC report. Some consideration was given to areas sterilised by surface development, and the calculated volume was halved in estimating the available resource volume in order to recognise that some areas are overlain by dispersed development, that information about depth is limited and the quality and depth can vary across a deposit, and that constraints which will be set out in criteria-based policies have not

[49] Worcestershire County Council (August 2016) *Worcestershire Minerals Local Plan Background Document: Analysis of Mineral Resources in Worcestershire*, available from the archive page at www.worcestershire.gov.uk/mineralsbackground.

been applied within the analysis of resources. Further work has since been completed to screen out international and national designations.[50]

8.28. A comparison between the two estimates can be seen in Table 9 below.

Table 10. Comparison between LUC and WCC estimates of Worcestershire's crushed rock resources.

Document estimating resource	Area of unsterilized resource (ha)	Volume of unsterilized resource (mt)
LUC	508.98	427.58
WCC Analysis of mineral resources (April 2021)	61	1.47

8.29. The difference in the figures for crushed rock is likely to be explained by differences in the screening methodology between the two assessments. The WCC Analysis of Mineral Resources screens out a number of crushed rock deposits based upon their size, before any screening based on international and national designations is undertaken.

8.30. These strategic-level assessments suggest that there is either a very small or a relatively small amount of crushed rock resource in Worcestershire which is unlikely to be affected by international or national designations. These strategic assessments also have limitations in relation to consideration of the quality of the resources and the degree to which they may be affected by other planning or viability constraints. The constraints considered in these assessments are not necessarily an absolute bar to working the crushed rock resources in Worcestershire, but they are highly likely to limit the commercial attractiveness of those resources.

Extant sites, permitted reserves and applications pending (crushed rock)

8.31. There were no sites with permitted reserves of crushed rock during in 2021, and no planning applications for working crushed rock are pending decision. This means that Worcestershire has no permitted reserves, no productive capacity and no landbank for crushed rock.

Site allocations (crushed rock)

8.32. The adopted County of Hereford and Worcester Minerals Local Plan (1997) was extant in 2021. This allocated one preferred area for hard rock working in Worcestershire at Fish Hill near Broadway. This has been worked and the site is currently in aftercare. There were therefore no remaining site

[50] Worcestershire County Council (November 2018) *Worcestershire Minerals Local Plan Background Document: Analysis of Mineral Resources in Worcestershire*, available from the mineral resources page at www.worcestershire.gov.uk/mineralsbackground.

allocations for crushed rock in Worcestershire in the 1997 Minerals Local Plan.

8.33. A new Minerals Local Plan (2018-2036) was adopted in July 2022 which highlights that planning permissions would be required for at least 4.727 million tonnes of crushed rock over the life of the plan in order to meet the scale of provision indicated by the sub-regional apportionment.

8.34. The Minerals Local Plan contains policies to enable both new mineral development and extensions to existing sites. It does not allocate any areas of search for crushed rock, but it includes criteria-based policies to enable crushed rock development on windfall sites.

8.35. The Minerals Local Plan also commits to the development of a separate Mineral Site Allocations Development Plan Document. Five calls for sites have been undertaken in the development of the new Minerals Local Plan and Mineral Site Allocations Development Plan Document between 2014 and 2020, but no sites for crushed rock have been proposed by the minerals industry or landowners.

Pre-application discussions (crushed rock)

8.36. In 2021, no pre-application discussions have been held with regard to potential crushed rock sites. This is a strong indication that there is limited interest in developing crushed rock workings in Worcestershire in the immediate future.

9. Summary of Findings

9.1. Appendix 2 (Demand and supply indicators agreed by West Midlands Aggregate Working Party) shows the indicators which have been considered throughout this LAA, and the findings are summarised in relation to each indicator in Table 11 to Table 14 before conclusions are drawn about the productions guidelines which should be set for sand and gravel and crushed rock.

Sand and gravel

9.2. Starting point: 10-year sales average for sand and gravel of 0.551 million tonnes, permitted reserves of 3.52 million tonnes.

Table 11. Demand indicators for sand and gravel

Indicator number	Demand indicator	Summary	Indication in relation to 10-year average
Demand / supply indicator (depending on movements into or out of the area)	Levels of imports and exports	Data indicates that Worcestershire was a net exporter of sand and gravel in 2009, 2014 and 2019, but with the scale varying over these years and some concerns about the reliability of the data. This indicates that Worcestershire has been able to meet its own needs for sand and gravel, and that there is ongoing demand for supply from Worcestershire as part of the Managed Aggregate Supply System, but the data does not indicate whether such demand is likely to increase or decrease in future.	No change indicated by this data.
Demand indicator 1	Gross housing completions (refer to	The anticipated trajectory for new housing development in adopted and emerging local plans	Weak indicator for increase above 10-year average.

Indicator number	Demand indicator	Summary	Indication in relation to 10-year average
	MHCLG live tables on housing supply), compared with housing targets	and the government's Standard Methodology both indicate that the number of dwellings required per year in future is 10% higher than the average number of completions seen over the last 10 years, but is 10% lower than the average number of completions seen over the last 3 years. It is estimated that housebuilding may account for a large proportion of Worcestershire's consumption of primary aggregates.	
Demand indicator 2	Employment land completions, compared with requirements	Unable to calculate trajectory for changes in material demand relating to employment land uses. However, 752ha of employment land is currently allocated in Local Plans across Worcestershire.	No change indicated by this data.
Demand indicator 3	Large scale local infrastructure requirements compared with delivery (refer to local strategic Plans and National Highways website)	Significant levels of infrastructure development are proposed in the Local Plans and Strategic Economic Plans in and around Worcestershire which will create some demand for aggregate minerals from within Worcestershire. However, there is a lack of data to be able to estimate whether this is likely to be significantly higher or lower	No change indicated by this data.

Indicator number	Demand indicator	Summary	Indication in relation to 10-year average
		than levels of demand over the last 10 years.	
Demand indicator 4	NSIPs and other major projects (refer to National Infrastructure Planning website)	No NSIPS within Worcestershire, but significant additional demand is anticipated within the West Midlands to supply HS2 development. Whilst Worcestershire is some distance from the line of the HS2 development, additional aggregate extraction in Worcestershire is likely to be needed in order help meet the demands placed upon aggregate supply chains in the West Midlands.	Strong indicator for increase significantly above 10-year average
Demand indicator 5	3-year aggregate sales average	The three-year sales figure is almost exactly the same as the 10-year average (0.4% higher), and may indicate that the 10-year average is representative of current levels of demand. However, the 3-year average is 14% lower than the 2021 sales figure, and the trend across recent years (excluding the impact of the Coronavirus pandemic in 2020) has been for sales to increase rather than being static at around this level. This may therefore indicate that the 3-year average could be an under-representation of the	No change indicated by this data.

Indicator number	Demand indicator	Summary	Indication in relation to 10-year average
		current and potential future market demand.	
Demand indicator 6	Sub-regional apportionment figures	Sub-regional apportionment of 0.871 million tonnes was 60% higher than the 10-year average, but was not intended to apply beyond 2016.	Weak indicator for increase above 10 year average.

Table 12 Supply indicators for sand and gravel

Indicator number	Supply indicator	Summary	Indication in relation to 10-year average
Supply indicator 1	Quality and/or capacity constraints of existing permitted reserves	None of Worcestershire's sites active as of 31st December 2021 has conditions attached to its planning permission which would restrict the productive capacity of the site, and there are no known quality constraints likely to impact those permitted reserves.	No change indicated by this data.
Supply indicator 2	Windfall minerals permissions / trends	Limited remaining site allocations in the 1997 MLP may have limited the number of applications for new mineral development in recent years. Despite this, planning permissions have been granted in Worcestershire for some windfall sites.	Information supports ongoing supply of sand and gravel from Worcestershire and is a positive indication of ability to supply in the medium term, but does not indicate the appropriateness of any particular

Indicator number	Supply indicator	Summary	Indication in relation to 10-year average
		The Minerals Local Plan adopted in July 2022 contains policies to enable both new mineral development and extensions to existing sites. Whilst it commits to the allocation of Specific Sites and Preferred Areas through a separate Mineral Site Allocations DPD, it also allocates 100 areas of search for sand and gravel (70 for terrace and glacial sand and gravel resources, and 30 for solid sand resources), and contains policy criteria to allow for development on windfall sites outside of site allocations under specific circumstances.	production guideline.
Supply indicator 3	Progressive exhaustion of permitted reserves over Plan period and permitted lifespans of productive sites.	No sites ceased production in 2021, but planning permission for one of Worcestershire's existing sites ends on 31st December 2026. This is now considered a short timescale for replenishment of this productive capacity. There are also a number of planning applications pending decision and a number of pre-application discussions have taken place in 2021 and so far	Information presents a positive indication of ability to supply in the medium term and therefore supports ongoing supply of sand and gravel from Worcestershire, but does not indicate the appropriateness of any particular production guideline.

Indicator number	Supply indicator	Summary	Indication in relation to 10-year average
		in 2022 regarding potential future applications, indicating that there are options available for replenishment of reserves in the short term, subject to gaining planning permission. The Minerals Local Plan adopted in July 2022 contains policies to enable both new mineral development and extensions to existing sites, and allocates 100 areas of search for sand and gravel (70 for terrace and glacial sand and gravel resources, and 30 for solid sand resources). Sites have also been put forward for potential allocation in the forthcoming Mineral Site Allocations Development Plan Document. This indicates the likelihood of options being available for replenishment of reserves in the medium term.	
Supply indicator 3	Transport constraints affecting markets for aggregates	Worcestershire does not have any rail depot for the import or export of minerals. Water transportation takes place on the River Severn, but this is currently limited to	No change indicated by this data.

Indicator number	Supply indicator	Summary	Indication in relation to 10-year average
		moving "as-dug" material from one site in Worcestershire to processing plant at another. The wharves at these sites therefore do not currently enable imports or exports of minerals. It is therefore concluded that all imports and exports currently take place by road transport. However, none of the sites in Worcestershire (as of December 2021) has conditions attached to its planning permission which would restrict the productive capacity of the site or the ability for materials to be transported to markets.	
Supply indicator 4	Limited geological reserves	Strategic-level information suggests that there is still a significant amount of sand and gravel resource in Worcestershire which is unlikely to be affected by international and national designations, but with limited consideration of quality of resources or other planning/viability constraints. Overall, considered that sand and gravel resources exist which should enable supply in	Information supports ongoing supply of sand and gravel from Worcestershire, but does not indicate the appropriateness of any particular production guideline.

Indicator number	Supply indicator	Summary	Indication in relation to 10-year average
		the short to medium term.	
Supply indicator 5	Local plan allocations	The County of Hereford and Worcester Minerals Local Plan (1997) which was extant in 2021 allocated a number of preferred areas for sand and gravel working in Worcestershire, but there was very low confidence that the limited remaining Preferred Areas were deliverable. A new Minerals Local Plan (2018-2036) was adopted in July 2022 and allocates 100 areas of search for sand and gravel, and commits to the development of a separate Mineral Site Allocations DPD to allocate specific sites and/or preferred areas. Five calls for sites have resulted in a number of potential sites being put forward, and these are under consideration in the development of the DPD.	Information supports ongoing supply of sand and gravel from Worcestershire and is a positive indication of ability to supply in the medium term, but does not indicate the appropriateness of any particular production guideline.
Supply indicator 6	Contribution from alternative aggregates	There is no data available to indicate the level of contribution made by substitute materials in Worcestershire.	No change indicated by this data.

Indicator number	Supply indicator	Summary	Indication in relation to 10-year average
		There is one industrial process in Worcestershire known to produce material suitable for processing into secondary aggregates, and a facility with planning permission to process this material. Incinerator Bottom Ash Aggregate from this facility is currently used under the Environment Agency Regulatory Position Statement RPS 247. The process of obtaining End of Waste Criteria to use the recovered IBAA in block manufacture has also commenced. Inert waste is managed at a number of facilities in Worcestershire, but it is not possible to assess the proportion which was subsequently sold or used as recycled aggregate. Secondary and recycled materials account for 28% of the total market nationally. There is no evidence to indicate whether Worcestershire is likely to produce any more or any less than the national average, but it is likely that arisings of recycled and secondary materials will rise and fall	

Indicator number	Supply indicator	Summary	Indication in relation to 10-year average
		with economic conditions, mirroring demand for primary materials. On this basis, this LAA assumes that the contribution of substitute, secondary and recycled materials is already accounted for prior to considering the sales figures for primary aggregates	

Conclusion: Sand and gravel

9.3. No demand indicators suggest that the production guideline should be lower than the 10-year average. Some indicators weakly suggest that an increase above the 10-year average may be necessary, and one indicator suggests that a significant increase above the 10-year average should be considered.

9.4. **It is therefore proposed to deviate from the 10-year sales average by +50%.**

9.5. This uplift is considered to be appropriate after assessing Worcestershire's ability to supply sand and gravel. Although there is some concern about indicators of supply in the short term, there is positive indication of Worcestershire's ability to supply sand and gravel in the medium term.

9.6. **The production guideline for sand and gravel identified by this Local Aggregates Assessment is therefore 0.827 million tonnes.**

9.7. Based on this production guideline and the stock of permitted reserves of 3.42 million tonnes, **Worcestershire had a landbank of 4.14 years at 31st December 2021.**

Crushed rock

9.8. Starting point: 10-year sales average for crushed rock of 0 tonnes, permitted reserves of 0 tonnes.

Table 13. Demand indicators for crushed rock

Indicator number	Demand indicator	Summary	Indication in relation to 10-year average
Demand / supply indicator (depending on movements into or out of the area)	Levels of imports and exports	Data indicates that Worcestershire was a net importer of crushed rock in 2009, 2014 and 2019, but with the scale varying over these years and some concerns about the reliability of the data. This indicates that Worcestershire has not been able to meet its own needs for crushed rock, and that there is ongoing demand for supply from outside Worcestershire as part of the Managed Aggregate Supply System, but this indicator does not show whether such demand is likely to increase or decrease in future.	Strong indicator for increase above 10-year average.
Demand indicator 1	Gross housing completions (refer to MHCLG live tables on housing supply), compared with housing targets	The anticipated trajectory for new housing development in emerging local plans and the government's Standard Methodology both indicate that the number of dwellings required per year in future 10% higher than the average number of completions seen over the last 10 years, but is 10% lower than the average number of completions seen over the last 3 years. It is	Strong indicator for increase above 10-year average.

Indicator number	Demand indicator	Summary	Indication in relation to 10-year average
		estimated that housebuilding may account for a large proportion of Worcestershire's consumption of primary aggregates.	
Demand indicator 2	Employment land completions, compared with requirements	Unable to calculate trajectory for changes in material demand relating to employment land uses. However, 752ha of employment land is currently allocated in Local Plans across Worcestershire.	Strong indicator for increase significantly above 10-year average
Demand indicator 3	Large scale local infrastructure requirements compared with delivery (refer to local strategic Plans and National Highways website)	Significant levels of infrastructure development are proposed in the Local Plans and Strategic Economic Plans in and around Worcestershire which will create some demand for aggregate minerals from within Worcestershire. However, there is a lack of data to be able to estimate the level of future demand for aggregate resources which local infrastructure developments might create, and whether this is likely to be significantly higher or lower than levels of demand over the last 10 years.	Strong indicator for increase significantly above 10-year average
Demand indicator 4	NSIPs and other major projects (refer to National	No NSIPS within Worcestershire, but significant additional demand is anticipated within	Strong indicator for increase significantly above 10-year average

Indicator number	Demand indicator	Summary	Indication in relation to 10-year average
	Infrastructure Planning website)	the West Midlands to supply HS2 development. Whilst Worcestershire is some distance from the line of the HS2 development, additional aggregate extraction in Worcestershire is likely to be needed in order help meet the demands placed upon aggregate supply chains in the West Midlands.	
Demand indicator 5	3-year aggregate sales average	The three-year sales average is exactly the same as the 10 year average. However, this is due to having no sites and no production, and should not be misconstrued as a lack of demand. It does not provide any indication of the scale of or trend in demand.	No change indicated by this data.
Demand indicator 6	Sub-regional apportionment figures	Sub-regional apportionment of 0.163 million tonnes. It was not intended to apply beyond 2016 but does provide some indication of a potential scale of demand.	Weak indicator for increase above 10 year average.

Table 14. Supply indicators for crushed rock

	Supply indicator	Summary	Indication in relation to 10-year average
Supply indicator 1	Quality and/ or capacity constraints of existing permitted reserves	There are no sites with permitted reserves.	Strong indication of short to medium term limitations on ability to supply crushed rock.
Supply indicator 2	Windfall minerals permissions/trends	No remaining site allocations in the 1997 MLP (which was extant in 2021) may have limited the number of applications for new mineral development, but no planning permissions have been granted in Worcestershire for windfall sites in recent years and there are no planning applications pending decision, nor have any pre-application discussions taken place in 2021 and so far in 2022 regarding potential future applications. The Minerals Local Plan adopted in July 2022 contains policies to enable both new mineral development and extensions to existing sites. It does not allocate any areas of search for crushed rock, but it includes criteria-based policies to enable crushed rock	Strong indication of medium to long term limitations on ability to supply crushed rock, as there is no known interest from the minerals industry to bring sites forward.

	Supply indicator	Summary	Indication in relation to 10-year average
		development on windfall sites.	
Supply indicator 3	Progressive exhaustion of permitted reserves over Plan period and permitted lifespans of productive sites.	Worcestershire has had no active crushed rock sites since 2010, and therefore no productive capacity. A Minerals Local Plan was adopted in 2022 which contains policies to enable both new mineral development and extensions to existing sites. It does not allocate any areas of search for crushed rock, but it includes criteria-based policies to enable crushed rock development on windfall sites, and policy support for crushed rock development within Worcestershire. No sites for crushed rock have been proposed by the minerals industry or landowners in response to five calls for sites.	Strong indication of short term limitations on ability to supply crushed rock. Weak indication of ability to supply in medium to long term (i.e. development enabled by emerging Minerals Local Plan, but with no known mineral industry intention to bring sites forward).
Supply indicator 3	Transport constraints affecting markets for aggregates	Worcestershire does not have any rail depot for the import or export of minerals. Water transportation takes place on the River Severn, but this is limited to moving "as-dug" material (sand and	No change indicated by this data.

	Supply indicator	Summary	Indication in relation to 10-year average
		gravel) from one site in Worcestershire to processing plant at another. The wharves at these sites therefore do not currently enable imports or exports of minerals. It is therefore concluded that all imports of crushed rock currently take place by road transport.	
Supply indicator 4	Limited geological reserves	Strategic-level information suggests that there is only a small amount of crushed rock resource in Worcestershire which is unlikely to be affected by international or national designations, and with limited consideration of quality of resources or other planning/viability constraints. The international and national constraints considered in the strategic assessments are not necessarily an absolute bar to working the crushed rock resources in Worcestershire, but they are highly likely to limit the commercial attractiveness of those resources.	Strong indication of limitations on ability to supply.

	Supply indicator	Summary	Indication in relation to 10-year average
Supply indicator 5	Local plan allocations	The County of Hereford and Worcester Minerals Local Plan (1997) which was extant in 2021 allocated one preferred area for crushed rock working in Worcestershire, which has been worked and is in aftercare. A new Minerals Local Plan was adopted in 2022. It does not allocate any areas of search for crushed rock, but it includes criteria-based policies to enable crushed rock development on windfall sites and contains policy support for crushed rock development within Worcestershire. Five calls for sites have been undertaken however no potential sites have been put forward for crushed rock.	Strong indication of limitations on ability to supply in the short to medium term: Minerals Local Plan provides policy support to enable crushed rock development, but the lack of site proposals by landowners and mineral operators for potential allocation as specific sites or preferred areas is a strong indication of limitations on ability to supply for the short to medium term.
Supply indicator 6	Contribution from alternative aggregates	There is no data available to indicate the level of contribution made by substitute materials in Worcestershire. There is one industrial process in Worcestershire known	No change indicated by this data.

	Supply indicator	Summary	Indication in relation to 10-year average
		to produce material suitable for processing into secondary aggregates, and a facility with planning permission to process this material. Incinerator Bottom Ash Aggregate from this facility is currently used under the Environment Agency Regulatory Position Statement RPS 247. The process of obtaining End of Waste Criteria to use the recovered IBAA in block manufacture has also commenced. Inert waste is managed at a number of facilities in Worcestershire, but it is not possible to assess the proportion which was subsequently sold or used as recycled aggregate. Secondary and recycled materials account for 28% of the total market nationally. There is no evidence to indicate whether Worcestershire is likely to produce any more or any less than the national average, but it is likely that arisings of recycled and secondary materials will rise and fall with	

	Supply indicator	Summary	Indication in relation to 10-year average
		economic conditions, mirroring demand for primary materials. On this basis, this LAA assumes that the contribution of substitute, secondary and recycled materials is already accounted for prior to considering the sales figures for primary aggregates	

Conclusion: Crushed rock

9.9. Many indicators show that there is demand for crushed rock resources, and therefore an increase above the 10-year average should be considered. However, there are also very significant limitations on the county's ability to supply crushed rock resources. The new Minerals Local Plan (2018-2036) provides policy support to enable crushed rock working, but there are significant constraints on the majority of the crushed rock resources in the county, and there has been no interest in crushed rock development expressed by the minerals industry for some time, with no sites proposed in response to "calls for sites" for potential allocation, no pre-application discussions and no planning applications pending decision.

9.10. Recognising the National Planning Policy Framework's requirement to maintain at least a 10-year landbank of permitted reserves of crushed rock, the Minerals Local Plan's recognition that Worcestershire should seek some level of provision from its indigenous crushed rock resources, and to avoid a production guideline of zero potentially being viewed as being a barrier to crushed rock development, it is considered that the production guideline for crushed rock should be increased above the 10-year average of 0 tonnes.

9.11. However, a percentage uplift cannot be applied from a starting point of 0 tonnes, and in light of the significant limitations on Worcestershire's ability to supply, at least in the short term, a specific figure for the production guideline cannot be calculated.

9.12. **This LAA therefore concludes that the production guideline for crushed rock in Worcestershire is explicitly greater than 0 tonnes.**

9.13. Based on the stock of permitted reserves of 0 tonnes, **Worcestershire had a landbank of 0 years at 31st December 2021.**

Appendix 1: Consultation with Aggregate Working Parties

A draft of this Local Aggregates Assessment was sent to the West Midlands, East Midlands, South West and South Wales Aggregate Working Parties for consultation in November 2022.

Please note, further information about sales and reserves relating to one site were submitted after the start of the consultation and therefore numbers have been adjusted based on the latest information. See footnote 16 for more information.

The following comments were received from the AWPs and their members:

Minerals Products Association

MPA comment: We believe an honest attempt has been made to assess future aggregate needs and recognises the pressure on the WM area and therefore Worcs. We support the view that indicators show increasing demand and that the production guideline for primary sand and gravel should be increased significantly above the 10-year sales average.
WCC response: Noted.

MPA comment: We note the issues over crushed rock provision but accept that Worcs. has a flexible approach in the event a site come forward.
WCC response: Noted.

Staffordshire County Council

SCC comment: As included in your previous LAA, the sand and gravel production guideline is based on the 10 year sales average plus a 50% adjustment to respond to increased demand in areas beyond Worcestershire caused by the HS2 project. In relation to the recent mineral applications considered by your Authority, is their evidence for this particular need in those applications?
WCC response: Noted. Paragraphs 7.30 to 7.35 set out the evidence and rationale for assessing the demand from HS2. As much of this demand is likely to be on other authorities, Worcestershire is not expecting to explicitly see reference to HS2 in applications, however may play a role in ensuring sufficient supply is maintained across the region through supplying demand in areas whose resources are under acute demand due to HS2.

MPA comment: I agree with the concern about the effect of HS2 demand on aggregate provision but I would be cautious at this stage in assessing the scale of that effect on local provision. For example, BBV one of the principal contractors for HS2, indicated that for two sections of the HS2 phase 1 works 14.5 Mt of aggregate would be required. Of this total, the greatest element of demand was for unbound aggregate for non-concrete aggregates that amounted to 10Mt of which 9Mt is likely to be supplied from crushed rock sites outside Staffordshire and brought to site via rail. Also I note that based on the information

provided to the WMAWP in 2021 that the greatest period of demand for the phase 1 contract was up to 2024/5 but I accept that the period of demand is likely to be extended by phase 2a works. Would you anticipate that the current adjustment to the 10 year sales average would be limited to the period of all HS2 works through the region?

WCC response: Noted. Paragraphs 7.30 to 7.35 set out the evidence and rationale for assessing the demand from HS2. The adjustment to the 10 year sales average is on the basis of a number of indicators of demand, as well as consideration of ability to supply, and not solely on the basis of HS2, as set out in Chapter 9. We will therefore continue to assess the impact of HS2 and other demand factors to inform the production guideline set in future iterations of the Local Aggregate Assessment.

South West Aggregate Working Party

Gloucestershire County Council

GCC comment: GCC M&W Policy officers note that the draft LAA concludes that the future Worcestershire LAA rate for sand and gravel should be significantly higher than would be the case if it was based upon the orthodox 10-year average of local sand and gravel sales. It is understood that an uplift figure of 50% has been put forward. This may be wholly reasonable and justified, but for reasons of transparency it would be useful to know the evidential origin of this uplift. Observing the past 10 years of sales of sand and gravel from within Worcestershire, there is no recorded annual sales figure, which has reached the proposed new LAA rate. From a strategic minerals planning perspective, GCC M&W Policy officers do not consider that the proposed LAA rate to be inherently negative by way of adversely impacting on the steady and adequate supply of aggregate minerals related to Gloucestershire. It could well indeed reduce any pressure upon existing supplies from Gloucestershire into Worcestershire. GCC M&W Policy officers broadly welcome the concept of local aggregate supply self-sufficiency as it has the potential to reduce the carbon footprint of the aggregate industry and minimise the risks of adverse impacts associated with transport of minerals from one part of the country to another

WCC response: Noted. The adjustment to the 10 year sales average is on the basis of a number of indicators of demand, as well as consideration of ability to supply, as set out in Chapter 9.

Appendix 2: Demand and supply indicators agreed by West Midlands Aggregate Working Party

Table A. Indicators to be used in LAAs (some may be dependent on availability/quality of data) as agreed by West Midlands Aggregate Working Party, October 2021

No.	Indicator	Type of information	Demand or supply indicator
1	Gross housing completions (refer to MHCLG live tables on housing supply), compared with housing targets	Set over the past 10 years, or a shorter time period. Targets from up to date local plan and/or Government's standard methodology	Demand indicator
2	Employment land completions, compared with requirements	Strategic local plan employment allocations only. Info from AMRs or Employment Land Reviews. Timeline: over local plan period to date.	Demand indicator
3	Large scale local infrastructure requirements compared with delivery (refer to local strategic Plans and National Highways website)	e.g. new roadbuilding. Check local development plans, LEPs, local transport plans etc.	Demand indicator
4	NSIPs and other major projects (refer to National Infrastructure Planning website)	Either in mineral planning authority area or nearby e.g. HS2 or Commonwealth Games Note that developers should be encouraged to provide materials audits which could be used to predict "significant future	Demand indicator

No.	Indicator	Type of information	Demand or supply indicator
		increases in demand that can be forecast with reasonable certainty" (refer to PPG)	
5	3-year aggregate sales average	Caveat: Although this indicator may give figures for most recent sales, it may include unnatural fluctuations or major anomalies (e.g. due to Covid) and therefore may not be relied upon in such instances	Demand indicator
6	Sub-regional apportionment figures	Useful for comparison and context	Demand indicator
7	Quality and/ or capacity constraints of existing permitted reserves	Compare data for the overall potential permitted capacity of sites with the level of provision made in the MLP and/ or with current 10 years sales average. Consider projection of comparison over next 10 years or over remaining period of 'time horizon' of MLP.	Supply indicator
8	Windfall minerals permissions/trends	Could high levels of windfall permissions mean that these sites should have been included in local plan allocations? Or, could this indicate that the minerals industry prefer to bring sites forward though planning applications, rather than through the local development plan process?	Supply indicator

No.	Indicator	Type of information	Demand or supply indicator
9	Progressive exhaustion of permitted reserves over Plan period and permitted lifespans of productive sites.	a) Compare sales against data on the number of operational sites and new permitted reserves (assess replenishment rates). b) Record the number of sites that have ceased production of aggregates and comment on reasons for cessation if possible. c) Record cessation dates for mineral production at permitted sites. d) Highlight sites where the MLP includes allocations for the extension of existing sites and the potential duration of continued production from allocated sites.	Supply indicator
10	Transport constraints affecting markets for aggregates	e.g. lack of rail freight opportunities Note output restrictions on permitted sites (number of lorry movements/ tonnages).	Supply indicator
11	Levels of imports and exports	Data is not always complete/reliable.	Demand/Supply indicator, depending on movements into or out of the area

No.	Indicator	Type of information	Demand or supply indicator
		Review data from AM Survey 2019 and compare with AM 2014	
12	Limited geological reserves	Generalised; not specific to particular permitted quarry operations Note LUC study for previous regional apportionment which considered the extent of aggregate resources and its constraint by international/ national designations for the environment or culture.	Supply indicator
13	Local plan allocations	See d) for 9 above.	Supply indicator
14	Contribution from alternative aggregates	Record permissions for: New / extended waste facilities with capacity for producing recycled aggregate. New/ extended facilities for producing secondary aggregate from industrial by products. Permissions for major development involving redevelopment of previously developed land involving demolition/ land clearance works.	

Note: trend based data should be used where possible, with the intention that percentage figures on how far to deviate from the 10-year average can be explained/justified.

Appendix 3: Calculation of aggregate demand for housing development

A typical new house uses between 60-200 tonnes of aggregate, or up to 400 tonnes of aggregate when supporting infrastructure, such as access roads, is taken into account.[51,52] This does not distinguish between use of sand and gravel and crushed rock, and does not include any indication of the likely level of demand for material used in maintaining or refurbishing existing housing stock, but does enable calculations to be made of the likely scale of demand for aggregate for new housing development.

Table B uses these estimates to calculate the scale of demand new housing development may account for, and presents this in comparison to both the 10-year sales average of aggregate (sand and gravel) produced in Worcestershire and the 2019 total consumption of aggregates in Worcestershire.

Table B. Calculation of aggregate demand for housing development

Housing development forecasting options	**Annual aggregate demand for housing development at 60 tonnes per house (excluding supporting infrastructure)**	**Annual aggregate demand for housing development at 200 tonnes per house (excluding supporting infrastructure)**	**Annual aggregate demand for housing development at 400 tonnes per house (including supporting infrastructure)**
Housing development at average number of completions delivered between 2012 and 2021: **1,908 dwellings per year**	0.114 million tonnes Equivalent of 20.1% of 10-year average sand and gravel sales Equivalent of 12.8% of total aggregate consumption in 2019	0.382 million tonnes Equivalent of 70.6% of 10-year average sand and gravel sales Equivalent of 42.9% of total aggregate consumption in 2019	0.763 million tonnes Equivalent of 141.0% of 10-year average sand and gravel sales Equivalent of 67.8% of total aggregate

[51] The British Geological Survey (2008) report "*The need for indigenous aggregates production in England*" states that *"Each new house built in England requires 60 tonnes of aggregates (three lorry loads). If all roads and utilities are included, the requirement can increase to as much as 400 tonnes of aggregates per house (twenty lorry loads)*", http://nora.nerc.ac.uk/id/eprint/3711/1/Aggregates_-_Final_Report_June_2008.pdf.

[52] The Mineral Products Association's "*Profile of the UK Mineral Products Industry - 2020 Edition*" (published in 2021) states that a "typical home" uses 12 tonnes of mortar and 200 tonnes of aggregate, https://www.mineralproducts.org/MPA/media/root/Publications/2021/Profile_of_the_UK_Mineral_Products_Industry_2021.pdf

Housing development forecasting options	Annual aggregate demand for housing development at 60 tonnes per house (excluding supporting infrastructure)	Annual aggregate demand for housing development at 200 tonnes per house (excluding supporting infrastructure)	Annual aggregate demand for housing development at 400 tonnes per house (including supporting infrastructure)
			consumption in 2019
Housing development at level anticipated by the December 2020 "Standard Methodology": **2,047 dwellings per year**	0.123 million tonnes Equivalent of 22.7% of 10-year average sand and gravel sales Equivalent of 11.0% of total aggregate consumption in 2019	0.410 million tonnes Equivalent of 75.8% of 10-year average sand and gravel sales Equivalent of 36.6% of total aggregate consumption in 2019	0.820 million tonnes Equivalent of 151.6% of 10-year average sand and gravel sales Equivalent of 72.8% of total aggregate consumption in 2019
Housing development at level anticipated in adopted Local Plans: **2,218 dwellings per year[53]**	0.133 million tonnes Equivalent of 24.6% of 10-year average sand and gravel sales Equivalent of 11.9% of total aggregate consumption in 2019	0.444 million tonnes Equivalent of 82.1% of 10-year average sand and gravel sales Equivalent of 39.6% of total aggregate consumption in 2019	0.887 million tonnes Equivalent of 164.0% of 10-year average sand and gravel sales Equivalent of 78.8% of total aggregate consumption in 2019
Housing development at average number of completions seen over the last 3 years (2019-2021):	0.139 million tonnes Equivalent of 25.7% of 10-year average sand and gravel sales	0.462 million tonnes Equivalent of 85.4% of 10-year average sand and gravel sales	0.924 million tonnes Equivalent of 170.8% of 10-year average

[53] Based on figures in South Worcestershire Development Plan (2016), Wyre Forest District Local Plan (2022), Bromsgrove District Plan (2017), and Borough of Redditch Local Plan No.4 (2017).

Housing development forecasting options	Annual aggregate demand for housing development at 60 tonnes per house (excluding supporting infrastructure)	Annual aggregate demand for housing development at 200 tonnes per house (excluding supporting infrastructure)	Annual aggregate demand for housing development at 400 tonnes per house (including supporting infrastructure)
2310 dwellings per year	Equivalent of 12.4% of total aggregate consumption in 2019	Equivalent of 41.1% of total aggregate consumption in 2019	sand and gravel sales Equivalent of 82.1% of total aggregate consumption in 2019

9.14. Based on the figures set out in Table 12, it is believed that the estimates of between 200 tonnes (excluding infrastructure) and 400 tonnes (including infrastructure) per house are the most likely to be representative of the demand for mineral resources placed upon Worcestershire's supply chain by housebuilding activities. Therefore, the LAA does not assess the impact of the 60 tonnes per house estimate on supply and consumption figures.