Local Aggregate Assessment 2024

The Sheffield Plan

Draft – Subject to ratification by the Yorkshire and Humber Aggregate Working Party

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1. Introduction

1.01 This Local Aggregate Assessment (LAA) for Sheffield has been produced in accordance with the requirements of the National Planning Policy Framework (NPPF). It informs the approach to minerals supply and safeguarding set out within The Sheffield Plan, which was submitted to the Secretary of State for examination in public on 06 September 2023.

1.02 An LAA is an assessment of construction aggregate supply and demand issues either prepared individually by a single Mineral Planning Authority (MPA) or prepared jointly by a collective of MPAs. Construction aggregates include crushed rock, sand and gravel or alternatives, such as secondary aggregate or recycled material. Construction aggregates are used in the construction of buildings, roads and other structures. According to the collation of the results of the 2019 Aggregate Minerals survey for England and Wales, the majority of the construction aggregate produced in England and Wales was used for either concrete manufacture (31% in 2019) or road construction (25% in 2019).

1.03 Ordinarily, the core of an LAA document would be an assessment of remaining permitted mineral reserves within the MPA's administrative area and a calculation of how many years these reserves are likely to last (the landbank of permitted reserves), taking account of any foreseeable future changes in demand. The size of aggregate mineral landbanks is used as an indicator of when the release of additional reserves may be necessary by approving new or extended minerals workings. However, Sheffield possesses no active minerals extraction sites and therefore has no landbank of aggregate mineral reserves. Due to geological and geographical constraints on large scale aggregate quarrying in Sheffield, there is no indication that this position is likely to change in the future.

1.04 Consequently, the main purpose of this LAA is instead to highlight factors which may affect the future demand for minerals in Sheffield, such as planned growth in housing delivery. The LAA also considers infrastructure issues associated with the transportation of aggregate minerals into Sheffield and the extent to which Secondary and Recycled Aggregates are produced in Sheffield.

1.05 It is hoped that this will assist in safeguarding and planning for future investment in minerals transportation, handling and aggregate recycling infrastructure. It is further hoped that the Sheffield LAA will assist those MPAs that supply construction aggregates into Sheffield to plan to meet the increased demand for minerals which will result from the planned growth of the City of Sheffield.

2. National Planning Policy Framework (NPPF)

2.01 The NPPF makes it clear that the planning system should be used to secure a steady and adequate supply of aggregates and industrial minerals, whilst also encouraging recycling. Mineral Planning Authority's (MPA's) should produce an annual Local Aggregate Assessment, either individually or jointly, to forecast future demand, 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).

2.02 An LAA would normally set out aggregate landbanks based upon a survey of minerals reserves within the relevant administrative area. Those landbanks should then be used as an indicator of the security of aggregate minerals supply, and to indicate the additional provision that needs to be made for new aggregate extraction and alternative supplies in mineral plans.

2.03 However, although Sheffield City Council (as a Unitary Authority) is technically an MPA, no primary aggregates are produced within the confines of Sheffield's administrative boundary and therefore Sheffield has no aggregate landbank. In this circumstance the scope of the LAA is limited to looking at other relevant information.

3. Primary Aggregate Resources and Reserves in Sheffield

3.01 According to Minerals Resource Maps produced by the British Geological Survey the administrative area of Sheffield City Council includes minerals resources capable of producing primary aggregates. A map showing the location and type of these mineral resources is presented at Appendix 1. The mapped resources comprise Carboniferous Sandstone (mainly occurring sporadically to the West of the City) and sand and gravel deposits (occurring along the floodplains of the River Don and the River Rother).

3.02 These mineral resources are not currently commercially worked and there are no permitted reserves of primary aggregates within Sheffield. The reason for this is likely to relate to both the quality/ value of the mineral resources present within Sheffield (with carboniferous sandstone generally being better suited to producing building stones than high specification aggregates) and also the constraints upon the extraction of minerals caused by incompatible land uses on and around those resources (with much of the mapped extent of the sand and gravel resource running through the densely built up City of Sheffield).

4. Recycled and Secondary Aggregates Produced in Sheffield

4.01 The National Planning Policy Framework (NPPF) advises planning authorities to, so far as practicable, 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, whilst aiming to source minerals supplies indigenously. LAAs should be based upon

an assessment of all supply options (including marine dredged, secondary and recycled sources).

4.02 The Minerals Products Association defines recycled and secondary aggregates (RSA) as follows:

a. ***Recycled aggregates*** *are the product of processing inert construction and demolition waste, asphalt planings and used railway ballasts into construction aggregates. Just as primary aggregates, these materials conform to European aggregate standards and national specifications, and make a key contribution to total aggregates demand. Construction activity can also require excavation work such as groundworks and tunnelling which generate softer materials including soils, sub-soils and clays which can be used for quarry restoration.*

b. ***Secondary aggregates*** *are derived from other industrial processes including: Colliery spoil - widely used for bulk fill, China clay waste - used in some areas as mortar and concreting sands, Power station ash (Fly Ash - FA) - used as a cementitious addition within Ready Mixed concrete and as an aggregate in block manufacture, Incinerator Bottom Ash (IBA) from municipal solid waste incineration. It may contain glass, ceramic, brick, concrete, grit and stone in addition to clinker. It is generally used in construction applications to replace primary aggregates in utilized as fill material/sub-base, for road construction or in block manufacture, Blast furnace slag from the iron and steel industries - used as aggregates and when ground to form GGBS as cementitious materials, Slate.*[1]

4.03 Sheffield accommodates several facilities which produce secondary aggregates - including two energy from waste facilities which produce Incinerator Bottom Ash (IBA). Portions of this IBA is reprocessed at a facility run by Blue Phoenix to produce a range of manufactured aggregate products suitable for sub-base, fill, bedding and certain concreting uses. There are also several facilities which produce recycled aggregate from other waste streams. The largest such aggregate recycling facility is the Aggregate Industries Asphalt Plant at the Tinsley Rail freight Terminal, which recycles waste aggregates to produce new coated roadstone products.

4.04 The sites which received more than 10,000 tonnes of waste for treatment in Sheffield in 2022 (other than glass waste, hazardous and industrial waste and sewerage sludge) are listed in table 1 overleaf. Although there is also a large glass recycling facility in Sheffield and two FFC Recycling UK sites which treat hazardous and industrial wastes, the glass waste site is understood to primarily produce cullet, not aggregate, from the waste glass and equally it is assumed that neither of the FCC Recycling sites produces aggregate.

4.05 It should be noted that RSA cannot be substituted for primary aggregates in all applications, particularly where higher specifications are required, such as

[1] MPA, Recycled & Secondary Aggregates, https://mineralproducts.org/Mineral-Products/Aggregates/Recycled-and-Secondary-Aggregates.aspx

in concrete manufacture and road surfacing. As such, although the above facilities contribute positively to the supply of aggregates in Sheffield, they do not remove the need for continuity of supply of primary sand and gravel and crushed rock aggregates to meet the needs of the Sheffield construction industry.

Table 1 - Waste Data Interrogator (2022) Waste Treatment Sites Sheffield

Operator Name	Total Waste Received (tonnes)
Aggregate Industries Uk Ltd, Sheffield Asphalt Plant (Tinsley) - EPR/UP3930NF	118,578
BLUE PHOENIX LIMITED - Sheffield IBA Facility EPR/FP3732WU	117,968
WASTE RECYCLING AND DESTRUCTION LIMITED - Beeley Wood Sustainable Business Park	17,639
RICHMOND RECLAMATION LIMITED - L K A B Minerals Richmond Limited	16,381

5. Sources of Supply for Primary Aggregates Consumed in Sheffield

5.01 As Sheffield is a significant consumer of construction aggregates but is not a producer, continued construction activity within Sheffield is reliant on maintaining supplies of construction aggregates quarried elsewhere. This is apart from the relatively limited quantity of recycled aggregate which is produced within Sheffield which can be utilised for lower specification uses. Aggregate is procured for specific purposes and projects within Sheffield through national and global construction aggregate supply chains which are mainly beyond the control of the Council to influence and are not documented in publicly available records. Therefore, it is not possible to have a holistic understanding of aggregate supply flows into Sheffield.

5.02 However, minerals sites are surveyed by MPAs on a regular basis for the purposes of producing annual LAAs and also for the 4-yearly National Aggregate Minerals Surveys. This survey data includes some information on sales by destination as well as reserve and sales data which is used to attempt to establish patterns of minerals flows between MPAs. Unfortunately, due to the fact that Sheffield is not a minerals producer, there is very little information available on minerals flows into Sheffield specifically. However Regional Level data is produced and relevant flow charts and diagrams from the newest available national minerals report 'The Collation of the results of the 2019 Aggregate Minerals Survey for England and Wales' is reproduced at appendices 2 to 5.

5.03 What can be gleaned from these diagrams is that (in 2019) the largest supplier of construction aggregates into Yorkshire and the Humber is the East Midlands, in relation to both crushed rock and sand & gravel. The diagrams also show that the East Midlands has the largest permitted reserves of construction aggregates of any region in England and that the East Midlands

is a net exporter of construction aggregates – with approximately 14 million tonnes more aggregate being sold than is consumed indigenously.

5.04 Finer grained data can be obtained from the LAAs of adjacent MPAs, which are likely to accommodate the majority of the quarries supplying aggregates into Sheffield, in this case Doncaster Council, Peak District National Park Authority, Derbyshire County Council and Nottinghamshire County Council (see Figure 1). A review of these LAAs has gleaned the following information:

Derbyshire & The Peak District[2]

5.05 The Derbyshire LAA acknowledges that: 'It is likely that proposed housing and economic development in the Three Cities Growth Area (an area proposed for economic growth centred on Nottingham, Leicester and Derby), particularly in the area to the south of Derby and around Nottingham, will result in an increased demand for Derbyshire's mineral resources, **as well as development in the Sheffield City Region** and the Manchester City Region Growth Areas, which are important existing markets for aggregate crushed rock from Derbyshire.'

5.06 In relation to Sand and Gravel Landbanks, the LAA confirms that: 'there are sufficient permitted reserves to maintain supply for just over seven years. This is very close to the required landbank length of at least seven years. **Additional reserves will be identified in the Minerals Local Plan to maintain supply over the Plan period to 2038**. It is expected that some of these sites will have planning permission before the Plan is adopted, ensuring that the landbank is increased and does not fall below seven years.'

5.07 In relation to Crushed Rock Landbanks, the LAA confirms that: '**…there are sufficient permitted reserves to maintain production for over 62 years, more than the government required minimum ten-year landbank.'**

Nottinghamshire[3]

5.08 The LAA acknowledges that: '**Nottinghamshire** is an important producer of sand and gravel and Sherwood Sandstone and **has a large export market, particularly to South Yorkshire and the wider East Midlands** … **Longer term, output from the Idle Valley is likely to fall** as the remaining resources are used up and this will be monitored through the LAA process. **If sand and gravel from Nottinghamshire continues to supply this market in the longer term, it would need to be sourced from the Trent Valley close to Newark**, a significantly greater distance from the markets. In this latter scenario other resources outside of Nottinghamshire may start to become increasingly viable for South Yorkshire markets, however at this stage it is difficult to predict the extent of this.'

[2] Derbyshire County Council, Derby City Council & the Peak District National Park Authority LAA 2023 (2022 data)

[3] Nottinghamshire and Nottingham Local Aggregates Assessment LAA 2023 (2022 data)

5.09 In relation to Sand and Gravel Landbanks, the LAA confirms that: '**The sand and gravel landbank** decreased slightly compared to the 2021 figure, standing at 15.2 years. This **is well above the NPPF 7-year requirement**. The Sherwood Sandstone landbank increased compared to the 2021 figure, standing at 25.74 years and remains well above the NPPF 7-year requirement.'

5.10 In relation to Crushed Rock Landbanks, the LAA confirms that: 'Whilst the County does have a permitted site to extract crushed rock (limestone), this site has been inactive since 2007 and so sales have remained at zero.'

Doncaster and Rotherham[4]

5.11 The LAA Acknowledges that: 'For South Yorkshire the current combined Local Plan annual housing requirement is 5,052 units annually. This is made up of 920 units for Doncaster, 958 units for Rotherham, 2,040 units for Sheffield and 1,134 units for Barnsley. Using the information above to estimate future supply suggests that approximately 0.9Mt of aggregate will be required annually to deliver the Local Plan housing requirements. Total annual consumption could therefore be in the region of 2.7Mt for infrastructure related projects and 0.9Mt for housing projects totalling a yearly need in the region of 3.6Mt for South Yorkshire as a whole**.**'

5.12 In relation to Sand and Gravel Landbanks, the LAA confirms that: '**The sand and gravel** reserve for Doncaster in 2022 is 7.1Mt. The **landbank based on ten year average sales is 16.4 years.** The three year average sale landbank is 12.38 years and the fixed rate local plan annual provision landbank is 16.9 years. **This is well above the seven year landbank requirement as set out in national policy**, but decreasing annually.'

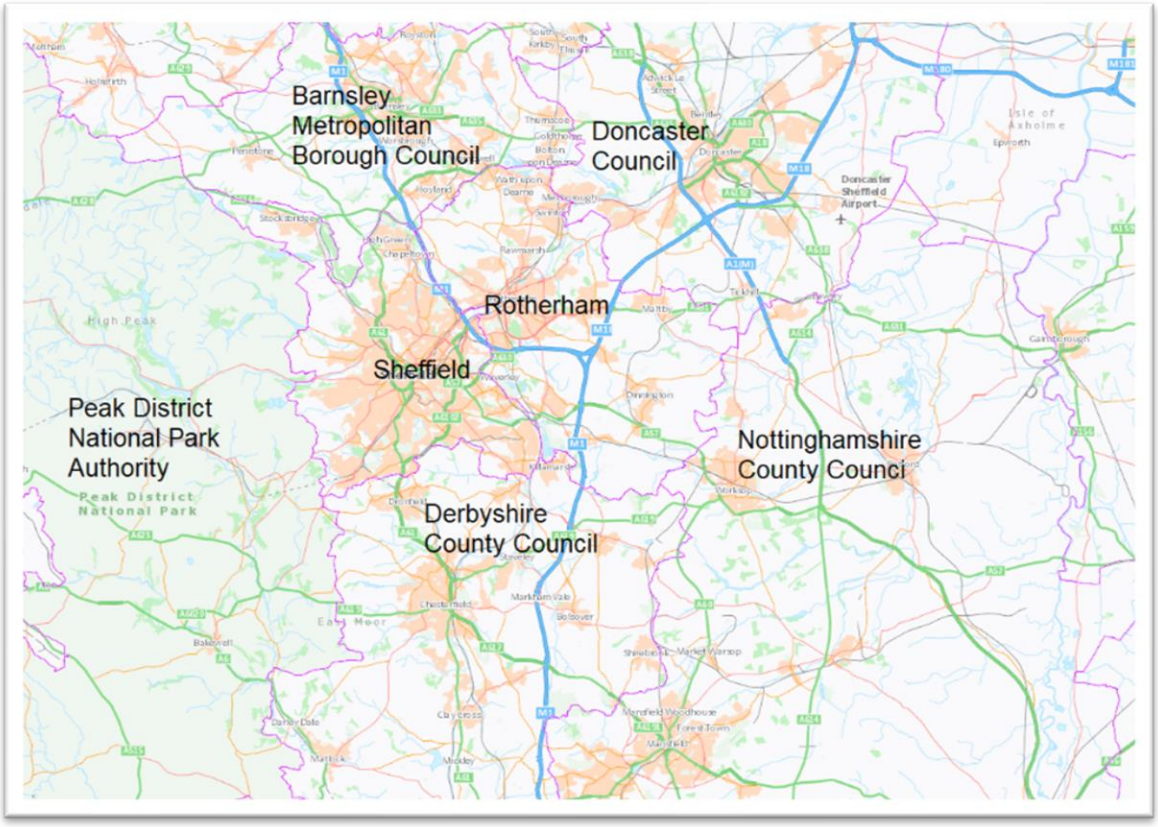
5.13 In relation to Crushed Rock Landbanks, the LAA confirms that: '**The crushed rock (limestone) reserve** (shared with Rotherham) for 2022 is 41Mt. The **landbank based on ten year average sales is 18.5 years**. The three year average landbank is 15.4 years and the fixed rate local plan annual provision landbank is 20.5 years. **This is well above the ten year landbank requirement as set out in national policy**, but decreasing annually.'

5.14 So essentially what can be seen from the LAAs of neighbouring MPAs is that, in general, the key MPAs supplying construction aggregates into South Yorkshire/ Sheffield, possess substantial landbanks of both crushed rock and sand and gravel sufficient for continuity of supply through the majority of the plan period of The Sheffield Plan. Issues are flagged with longer term aggregate supply continuity, principally in relation to land won sand and gravel supplies from Nottinghamshire, which may result in a shift in supply markets resulting in sand and gravel being transported longer distances into Sheffield and/ or alternative sources of supply needing to be found, for instance marine dredged sand and gravel.

[4] Doncaster and Rotherham Local Aggregates Assessment LAA 2023 (2022 data)

5.15 The fact that established sources of sand and gravel supplies into Sheffield from the Idle Valley are likely to deplete in the longer term places great importance on safeguarding existing aggregate rail transportation infrastructure and planning favourably for the development of new infrastructure for the transportation of aggregates via both rail and inland waterway. This will future proof Sheffield against the need to import construction aggregates from further afield, such as marine dredged sand and gravel landed at the Humber Docks. See Figures 2 and 3 for maps of the existing rail freight and inland waterway network connections relevant to Sheffield.

Figure 1 – Map Showing Surrounding MPAs



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[5] Source GeoIndex Onshore – BGS, https://mapapps2.bgs.ac.uk/geoindex/home.html

Figure 2 – Network Rail Key freight corridors & commodity types map (extract)

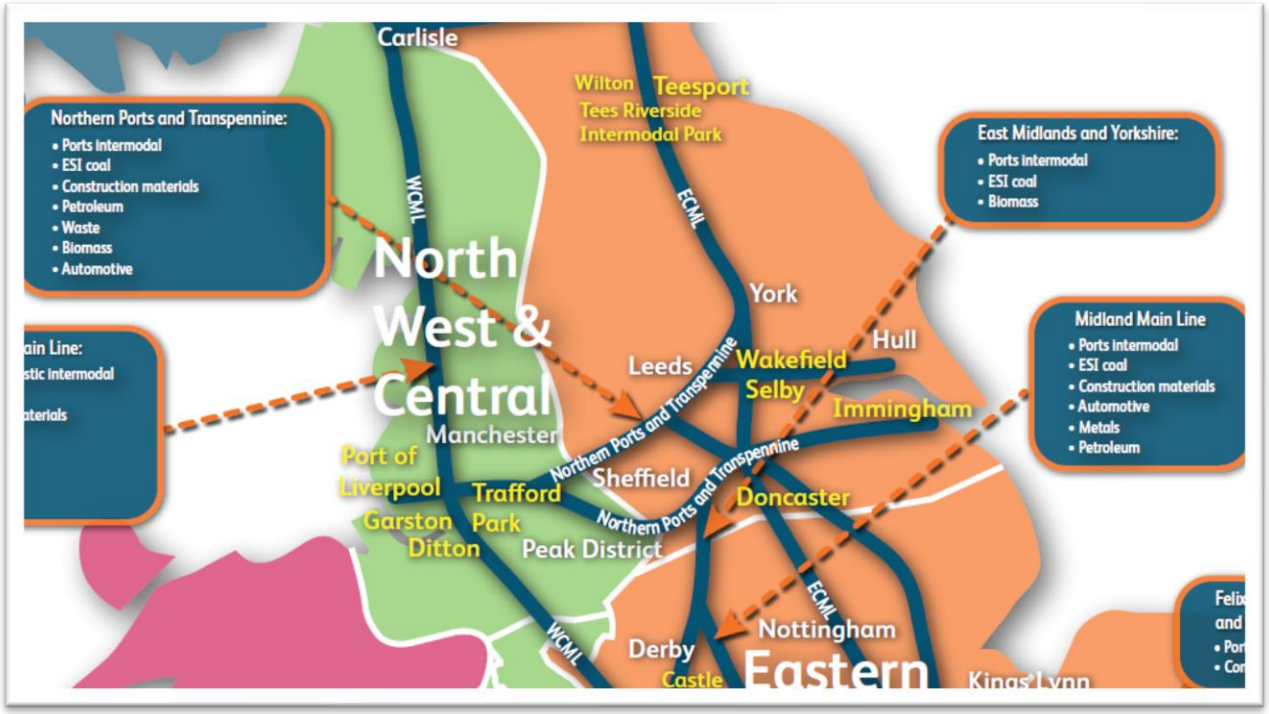

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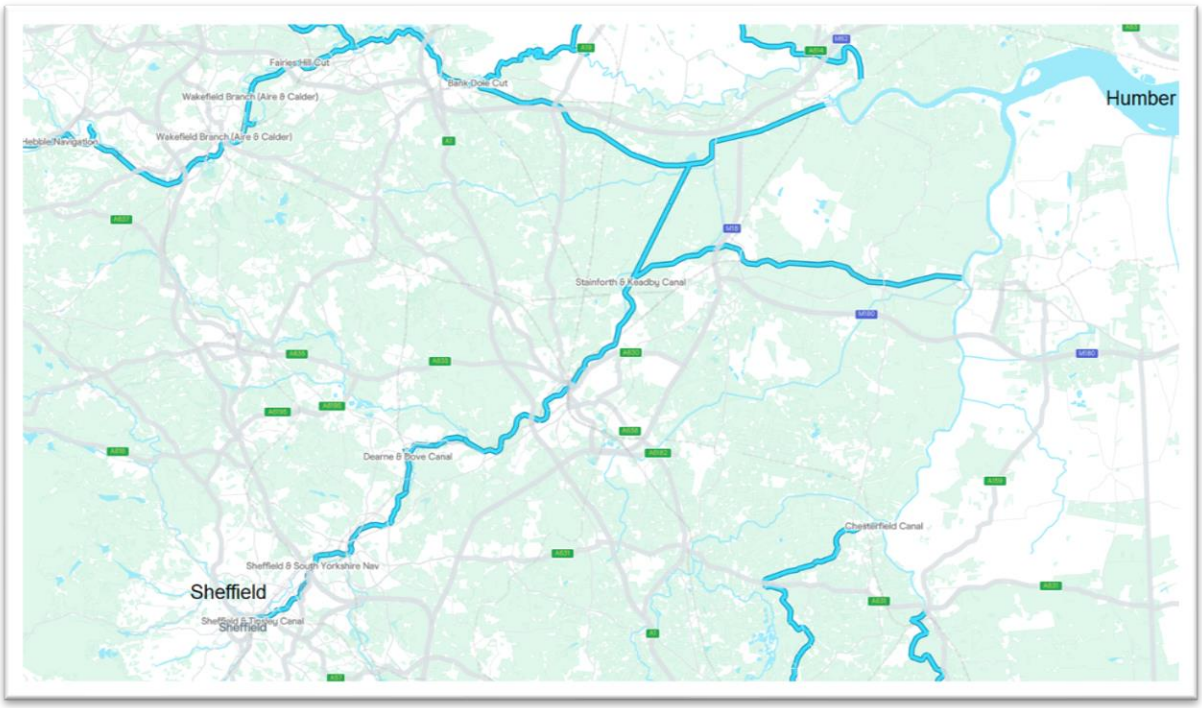
Figure 3 – Canal & River Trust Canal & River Network Map (extract)



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[6] Source Network Rail, https://www.networkrail.co.uk/wp-content/uploads/2021/03/Freight-UK-Base-Map-Rail-Freight-Commodities_Final-v1.0_PDF.pdf
[7] Source Canal & River Trust, https://canalrivertrust.org.uk/canals-and-rivers

6. The Potential Future Role of Marine Aggregates

6.01 Marine dredged sand and gravel is known to be a suitable substitute for land won material for a range of applications including concrete manufacture. The Crown Estate report that 'In 2018 marine aggregates satisfied 22% (13.7 million tonnes) of the total construction needs for sand & gravel in Great Britain.'[8]. The nearest aggregate dredging area to Sheffield is the Humber, from which approximately 3.5 million tonnes of aggregate is extracted per year, with permitted reserves of 42 million tonnes as of March 2022 (see figure 4). As established land won sand and gravel sources deplete further utilisation of marine dredged resources is one option to maintain supplies.

6.02 The Mineral Planning Authorities within the Yorkshire and Humber Region and the Crown Estate funded and commissioned a marine aggregate study in 2013 (published in 2014) to establish why so little marine sand and gravel is utilised in the Region and barriers to greater use. The study found that the cost of marine aggregate transportation from the Humber to the West and South Yorkshire markets, at the time, were not competitive with land won aggregate hauled from Nottinghamshire and North Yorkshire into the conurbation.

6.03 The study assessed that the cost gap was not very large and would narrow as land-based extraction becomes more costly to sustain. The marine aggregate study indicated that as the cost gap narrows further there will need to be investment in wharves, sidings, trains and barges to facilitate large scale transfer of aggregate westward from the Humber. Since that time some investment has taken place to improve landing facilities (for instance the 'Port of Leeds' facility in West Yorkshire) and it is understood that some limited quantities of marine dredged sand and gravel are now barged into Leeds from the Humber docs via the Aire and Calder Navigation.

6.04 There is no evidence of significant market penetration of marine dredged aggregates into South Yorkshire and Sheffield as it stands. However, this may change, as land won resources in the Idle Valley and Doncaster deplete. If marine dredged sand and gravel were to be utilised to a greater extent as a construction aggregate within Sheffield in the future, investment will be required in rail and/ or inland waterway transportation infrastructure to allow this material to be transported in the least environmentally harmful manner.

Table 2 – Crown Estate Marine Aggregates Annual Review 2022 (extract)

Region	Total current primary reserves	10-year average annual offtake*	3-year average annual offtake*	Peak annual offtake during 10-year period*	Annual permitted offtake (as March 2022)	Regional reserve life at 10-year average annual offtake
		Primary (construction aggregate)				
Humber	41.88	2.24	3.51	3.52	6.88	18.69

[8] Crown Estates, Marine Aggregates Annual Review 2023

7. How Planned Growth May Affect Demand for Aggregate in Sheffield

7.01 The Council is currently developing a new Local Plan (entitled 'The Sheffield Plan') which will set out planning policies and land use allocations to shape development within Sheffield for a plan period running to 2039. Having progressed through several stages of consultation a full draft plan has now been submitted to the Secretary of State and is under examination.

7.02 The proposed Sheffield Plan housing requirement is for 2,090 gross additional new homes per year over the plan period. Working on a 10-year time horizon this would equate to 2,090 X 10 years = 20,900 homes. The average housing completions in Sheffield between 2013/14 and 2022/23 were 1,969[9].

7.03 According to the British Geological Survey 'About 60 tonnes of aggregate are used to build an average house in the UK. If we include the associated infrastructure, this can be as high as 400 tonnes.'[10] Based upon a comparison of average gross dwelling completions vs. planned gross housing delivery targets it can be calculated that an additional 48,400 tonnes of aggregate will be required in Sheffield per year, over and above historic average demand associated with housebuilding, in order to meet the housing growth targets set out within the draft Sheffield Plan. This is presented in table 3 below.

Table 3: Potential Additional Annual Aggregate Demand in Sheffield over the Plan Period up to 2039 from Housebuilding & Associated Infrastructure

Proposed Annual Gross Housebuilding Target	2,090 dwellings
Average Gross Dwelling Completions 2013/14 to 2022/23	1,969 dwellings
Aggregate Requirement per Dwelling (including infrastructure)	400 tonnes
% Housebuilding Uplift Required to Meet Target	7%
Annual Aggregate Requirement per Year to Meet Housebuilding Target	836,000 tonnes
Additional Aggregate Required Per Year	**48,400 tonnes**

8. Infrastructure Considerations

8.01 Given Sheffield's reliance on transporting aggregates into Sheffield from other MPAs, and the possibility that the closest sources of sand and gravel supply in Doncaster and the Idle Valley will deplete in the long term, infrastructure for handling and moving aggregate is a key consideration for Sheffield. Road transportation is the predominant but least preferred method of minerals transportation given the negative effect of heavy goods vehicle haulage on air quality. The main alternatives to road transportation are rail and inland waterway.

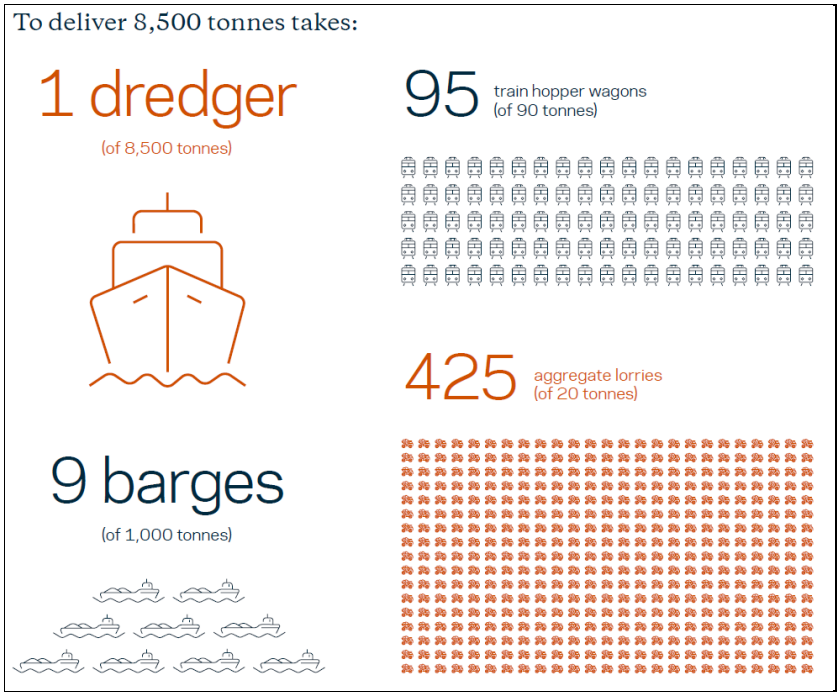
8.02 Significant greenhouse gas emissions reduction and air quality improvement benefits (as well as traffic reduction benefits) would accrue from aggregate

[9] Sheffield Housing and Economic Land Availability Assessment, December 2023

[10] BGS, 2004, 'Minerals & you', https://www2.bgs.ac.uk/mineralsuk/mineralsYou/whyDo.html

transportation modal shift away from road onto rail and barge. Carbon emissions from barges are estimated to be ten-times lower than HGV emissions (per payload tonne)[11]. The diagram below produced by the Crown Estate, illustrates the efficiency benefits of achieving modal change for aggregate transportation:

Figure 4 – Illustration of haulage capacity of different modes of transportation



8.03 In terms of available aggregate rail infrastructure in Sheffield, this primarily comprises the Europa Rail Port at Tinsley (part of Tinsley marshalling yards), which was granted planning permission in 2013 (daily rail aggregate deliveries from Leicestershire). The Rail Port occupies 5.9ha and has consent for an asphalt production facility, concrete batching plant, recycling facility and rail import depot for aggregate with an estimated total throughput capacity of some 320,000 tonnes per annum.

8.04 In addition, established rail sidings and an aggregate offloading and processing facility is located in Attercliffe. The Sheffield Asphalt Plant and Aggregates Depot on Stevenson Road is run by Cemex and takes daily aggregate loads from the Peak District.

8.05 According to industry press reporting, 'Aggregate Industries has a daily train from Bardon Hill in Leicestershire to their concrete plant in Tinsley. Building supplies specialist Cemex also has a daily train from Tunstead in the Peak District to their concrete plant in Attercliffe in Sheffield.'[12]

[11] Data from EU Inland Waterway Transport Solutions 2.0 website: https://project-iwts20.eu/
[12] Rail freight resurgence in Sheffield Published, 28-03-2023, Simon Walton, https://www.railfreight.com/railfreight/2023/03/28/rail-freight-resurgence-in-sheffield/

8.06 In relation to the potential of supplying aggregates into Sheffield by inland waterway, a number of operational and economic issues have been identified relevant to the development and use of waterway infrastructure and the use of barges for transporting aggregate. The River Don is navigable from Sheffield to Fishlake, it then joins up to a larger network of navigable waterways including the New Junction Canal, the Stainforth and Keadby Canal, the Aire and Calder Navigation, the River Trent and beyond.

8.07 Before the Sheffield and Tinsley Canal opened, barges unloaded at Tinsley Wharf. However, the length of the wharf and the area required for offloading a barge was small. resulting in disuse of the wharf. Equally there is no navigable waterway to connect with the mineral wharf on the canal at Cadeby quarry (currently inactive). Currently there is no apparent prospect of the Sheffield and Tinsley Canal itself being used for largescale commercial haulage of aggregate by barge.

8.08 Consequently, as it stands the main option for transporting construction aggregates into Sheffield is via road haulage, with additional capacity for rail transportation via Tinsley. Building upon the existing aggregate rail freight capacity and exploring options for opening up new inland waterway freight capacity should be seen as priorities to improve the sustainability of the aggregate supply chain into Sheffield.

9. Conclusion

9.01 Sheffield is an importer rather than a producer of aggregate that relies on provision from elsewhere in the Yorkshire and Humber region and East Midlands region to support the construction sector. The demand for aggregates is expected to rise by up to 7% due to the house-building increase planned for within the draft Sheffield Plan

9.02 Although relatively extensive reserves of crushed rock exist within surrounding MPAs supplying aggregates into Sheffield, sand and gravel reserves are more limited and established sources of supply will deplete in the longer term. This will mean that alternative sources of either land won or marine won sand and gravel supply will have to be found in the long term which are likely to involver longer haulage distances.

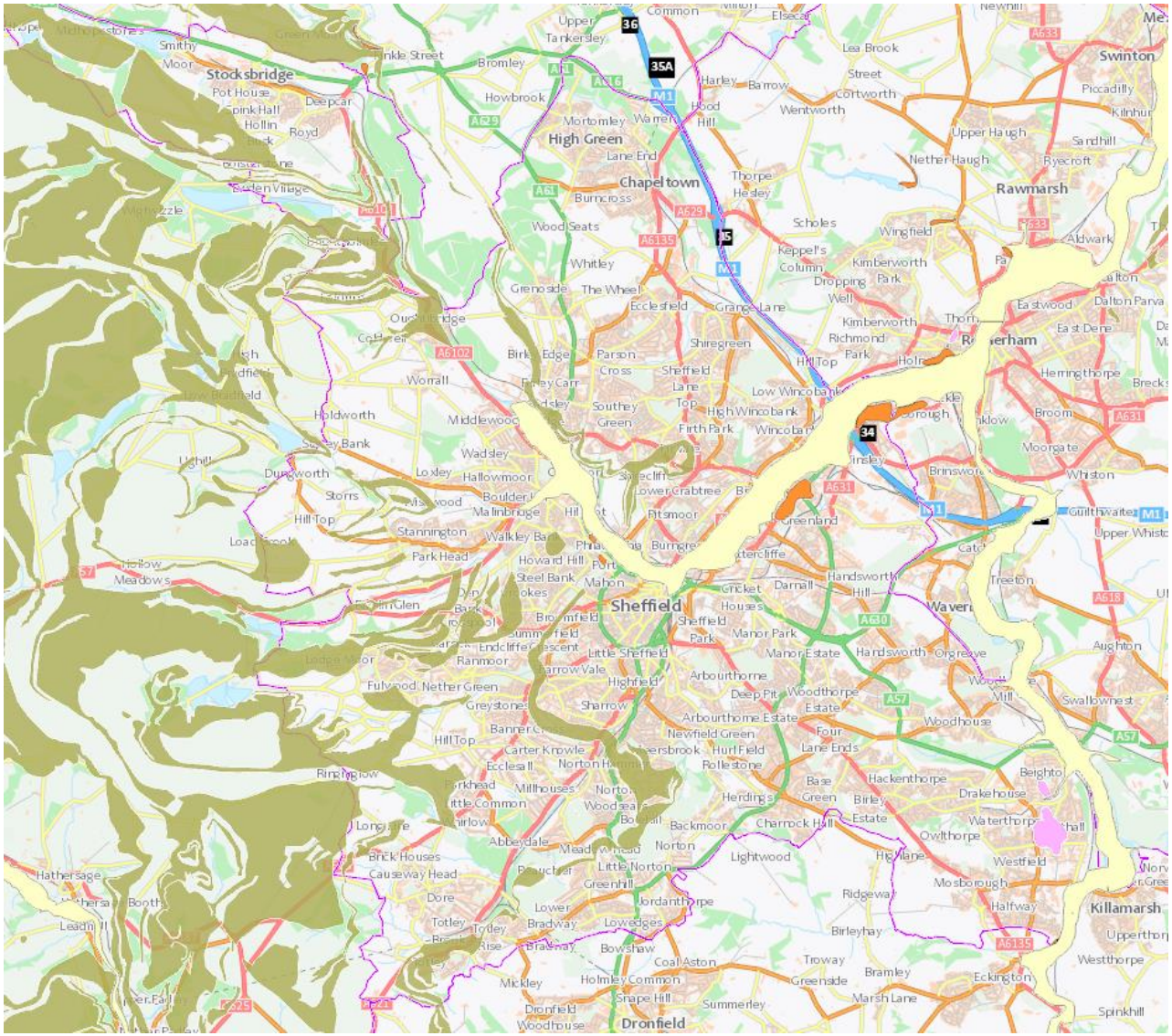
9.03 Infrastructure provision is critical for ensuring aggregate provision to meet future needs in Sheffield. Most aggregate movements are over the Strategic Road Network. A more sustainable alternative would be to make more use of the strategic rail and waterways.

9.04 The Europa Rail Link at Tinsley and the Sheffield Asphalt Plant and Aggregates Depot in Attercliffe are key rail handling facilities to import aggregate. Consideration should be given to the strategic significance of these facilities in terms of safeguarding the land from incompatible development and facilitating future investment.

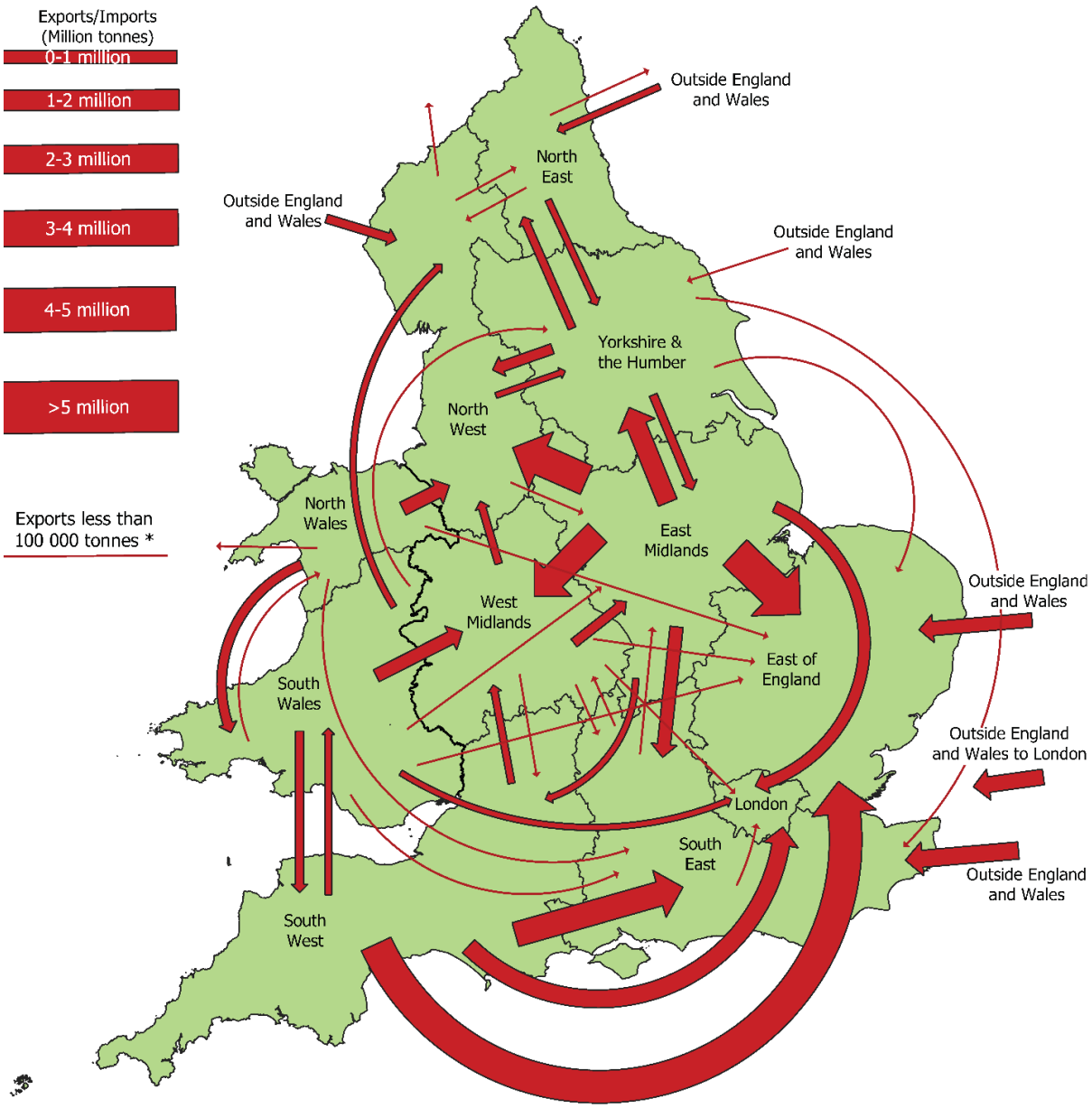
9.05 There are currently constraints upon utilising the navigable waterways which connect Sheffield to the wider waterway network in terms of both the river Don and the Sheffield and Tinsley Canal. Infrastructure investment would be needed to facilitate renewed use of waterways to transport aggregate into Sheffield. The connectivity of the River Don through South Yorkshire and navigation links via the canal with the rest of Sheffield City Region should be noted as a potential asset which could be exploited to improve the sustainability of Sheffield's aggregate supply chain.

9.06 Given that Sheffield produces no primary aggregates, the contribution it makes to meeting the demand for lower specification aggregates through PFA and Recycled Aggregate production is important. Consideration should be given to safeguarding existing PFA and aggregate recycle facilities and investment in enhancing and expanding such facilities should be encouraged, where environmentally acceptable.

Appendix 1 – Sheffield Aggregate Resources (Source GeoIndex Onshore – BGS)

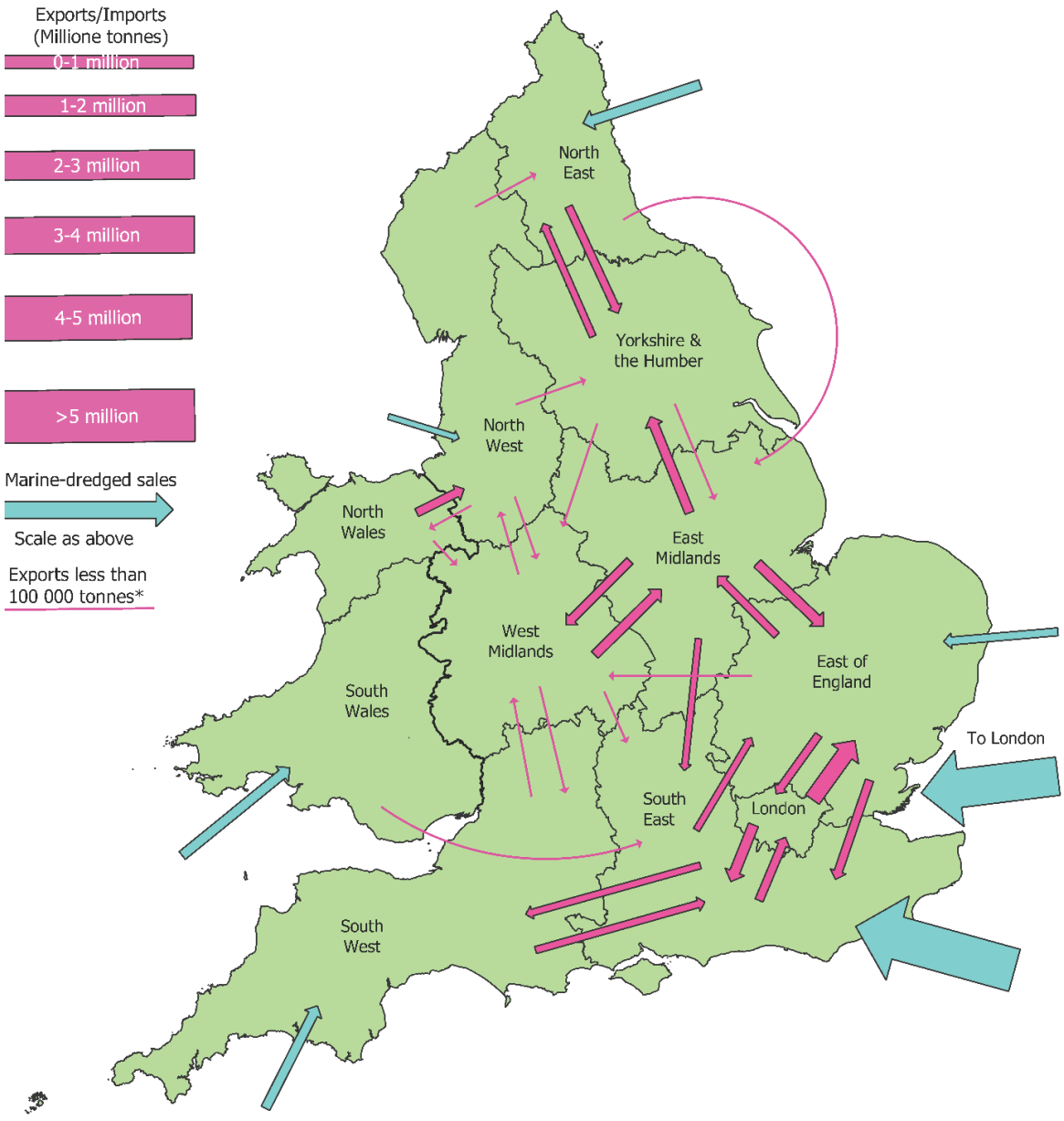


Appendix 2 – Crushed rock inter-regional flows of primary aggregates, 2019 (Source Collation of the AM2019 Survey – BGS)



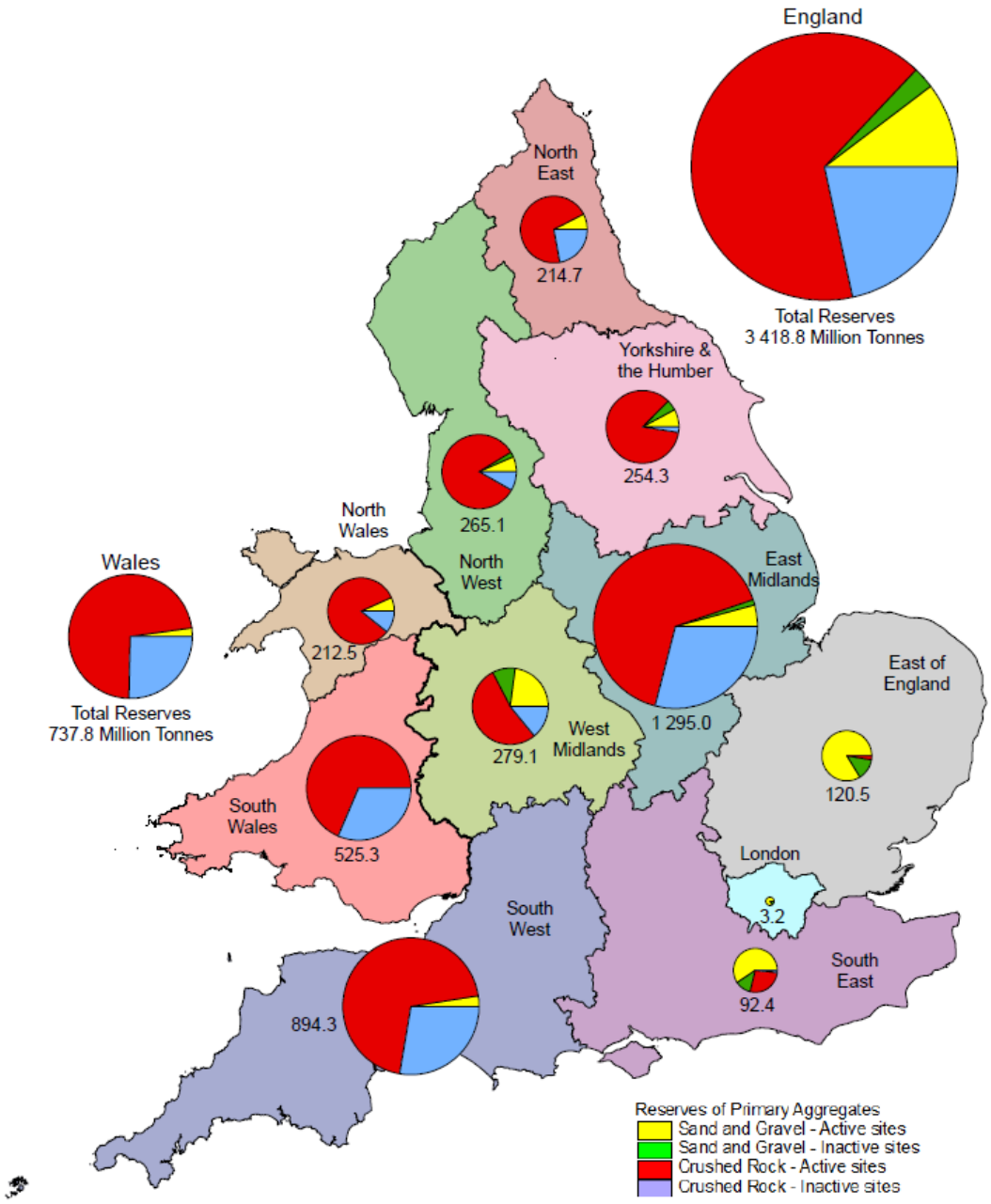
* For clarity, exports less than 25 000 tonnes are not shown.

Appendix 3 – Sand and gravel inter-regional flows of primary aggregates, 2019 (Source Collation of the AM2019 Survey – BGS)



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

Appendix 4 – Permitted reserves of primary aggregates in England and Wales, 2019 (Source Collation of the AM2019 Survey – BGS)



Appendix 5 – Sales and consumption of primary aggregates, 2019 (Source Collation of the AM2019 Survey – BGS)