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Section 1
Introduction

1. It is vitally important that the plans and proposals set out in the Minerals Core Strategy are founded on a robust and credible evidence base. Demonstrating how the evidence for the MCS was carefully considered and acted upon will be a key ‘test of soundness’ at the independent examination into the Core Strategy.

2. Consequently this report acts as part of the evidence base for the emerging spatial policy on aggregate provision and supply for Gloucestershire. Its focus is upon the future provision requirements for crushed rock to meet the regional guidelines for the South West (2001-2016).

3. The first part of the report sets out the national, regional and local policy context concerning future planning for crushed rock.

4. The second part of this report provides the spatial context for crushed rock in Gloucestershire and headlines updated information on resources, reserves, and market supply trends for the County up to 31/12/2005.

5. The third and fourth parts of the report, discusses the detailed methodology behind making appropriate provision for the supply of crushed rock in Gloucestershire. It also headlines how provision requirements might be delivered by the MCS by introducing a series of draft options for discussion.

6. The draft options look to progress the development of the MCS by providing clear and deliverable policy options for consideration at the next preparation stage – Preferred Options.

7. These options are based on an assessment of national and regional policies against local circumstances and characteristics. They also seek to embrace the views already provided by stakeholders during the earliest stage of the MCS – Issues & Options, the initial Sustainability Appraisal and Appropriate Assessment.

8. Your views on the contents of this evidence paper are encouraged, as the information provided within the paper will be central to the future preparation of the MCS.

9. However, there will still be an opportunity to formally comment on your “favoured” options at the Preferred Options stage.
10. Crushed rock aggregates are essential to built development, other construction, and the maintenance of national infrastructure such as roads, bridges and flood defences. They contribute greatly to delivering sustainable communities through growth and regeneration. However, there are significant imbalances across the country between the location of suitable crushed rock resources and the areas where they are needed. Furthermore, their occurrence often relates to valued and protected upland landscapes.

11. A sound policy framework is therefore needed to protect our valuable landscapes whilst encouraging more balanced provision for crushed rock between areas of deficit and surplus of resources. This is addressed through national and regional guidelines for aggregate provision and the translation of these policies in Regional Spatial Strategies (RSSs) and Local Development Frameworks (LDFs).

Section 2
Policy Context

12. National policy for minerals is set out in Minerals Policy Statement 1 (MPS1). However, Annex 1 to MPS1 highlights specific objectives concerning future crushed rock extraction. These objectives are as follows:

- To encourage the use, where practicable, of alternative aggregates in preference to primary aggregates;
- To make provision for the remainder of supply to be met from land-won sand and gravel and crushed rock.

13. Whilst the focus of this report is upon the latter of the two objectives, a separate technical paper entitled MCS-D, on recycled and secondary aggregates in Gloucestershire has been prepared for public debate.

14. Annex 1 to MPS1 provides the policy mechanism for making provision for land-won aggregates through published national and regional guidelines for aggregate provision in England. These guidelines intend to assist regional planning bodies (RPBs) in the preparation of RSSs and mineral planning authorities (MPAs) in the preparation of local development documents (LDDs). Their purpose is to address geographic imbalances between the supply and demand for aggregates at a national level by encouraging a mixture of sites that contribute to meeting local, regional and national demands.

15. In June 2003, the Government published the current National & Regional Guidelines for Aggregate Provision in England (2001-
2016). These guidelines require the English regions to make provision for up to 1618 million tonnes of crushed rock between 2001 and 2016 inclusive. For South West, the regional guidelines highlight a crushed rock requirement of 453 million tonnes. The full National & Regional Guidelines for Aggregate Provision in England (2001-2016) are set out in Appendix B.

16. The need for MPAs to maintain a landbank of permitted reserves is a further national policy detailed in Annex 1 to MPS1. A landbank is defined as the sum of all permitted reserves of a particular mineral type, within active and inactive sites, at a given point in time, and given area. It is a widely used mechanism for securing and maintaining steady supplies of mineral by reflecting the time taken to obtain planning permission and bring a site into full production. The landbank also works as an important indicator for when new planning permissions are likely to be needed. In this context, MPAs are required to take account of the length of the landbank in their area when making future provision for aggregates. The minimum length of the landbank for crushed rock is at least 10 years.

Regional Policy

17. Regional Planning Bodies (RPBs) are required to set out how much provision should be made for each local area in the region in order to satisfy the regional guidelines through to the end of 2016. The provision set out for each area is known as the ‘sub regional apportionment’ or ‘local apportionment’. The process for working out local apportionments must take into account technical advice from the Regional Aggregate Working Party (RAWP) and be subject to sustainability appraisal. In preparing the RSS, the RPB must apply the regional guidelines and headline the agreed local apportionments for each local area.

18. For Gloucestershire, the emerging RSS identifies a local apportionment of crushed rock equal to 39.09 million tonnes over the guideline period 2001 to 2016 inclusive. The local apportionments for crushed rock for all of the remaining areas in the South West region are set out in Appendix B.

19. During the local apportionment process the RPB recognised some potential long-term provision issues in delivering the Regional Guidelines. These issues included a shortfall in crushed rock provision from Gloucestershire and a number of shortfalls in sand & gravel provision for Gloucestershire, Wiltshire and Dorset.

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2 It is important to note that the landbank requirement as set out in Policy A2 of the adopted Minerals Local Plan is 7 years. This reflects the decision of the Inspector at the Minerals Plan inquiry. The plan’s strategy for preferred areas for extraction rather than new ‘greenfield’ sites was deemed to be a sufficiently significant factor for reducing the time needed for acquiring planning permissions and developing necessary infrastructure. The 7-year landbank approach was also in line with government guidance at the time (MPG6), which did not set out a specific landbank timeframe for crushed rock beyond “at least 7 years” as advised for sand & gravel.
20. An assessment of the regional shortfalls was commissioned by the RPB through a technical and strategic report of supply options in the South West. The conclusion to this report highlighted the potential for substituting parts of the local apportionment for certain problem areas, with other resources across the region. In terms of crushed rock in Gloucestershire a possible re-apportionment was identified for up to 8 million tonnes from the Forest of Dean resource area to comparable resources in the former Avon area (i.e. South Gloucestershire and North Somerset) and Somerset. The submission draft of the emerging RSS includes a potential reduction in local provision requirements if a possible re-apportionment of up to 8mt is feasible. To this end the RSS identifies that the MPAs in Gloucestershire and the former Avon area (and possibly Somerset) should collaborate in the preparation of LDDs to identify were the predicted local shortfall from Gloucestershire can be met elsewhere.

21. Consequently, the MCS must take into account this possible re-apportionment alongside a full and detailed consideration of the basic local apportionment set out by the regional guidelines in the RSS.

Local Policy

22. The MCS should look to make provision to meet the local apportionment of the regional guidelines as set out in the emerging RSS. However, in considering the apportionment, appropriate tests of practicality and environmental acceptability must be carried out. It is important that the regional guidelines are assessed at the local level and must not be seen as inflexible. Furthermore, the provision options borne out of the local apportionment must be subject to sustainability appraisal and appropriate assessment at the earliest possible stage.

23. Strategic and local policies concerning crushed rock extraction in Gloucestershire are currently set out in the Structure Plan 2nd Review (1999) and Minerals Local Plan (1997-2006).

24. Policy M7 of the Structure Plan states that provision should be made to maintain an appropriate contribution to local, regional and national aggregate needs, together with an appropriate landbank, based on the regional guidelines.

25. Chapter 3 of the Gloucestershire Minerals Local Plan (1997-2006) sets out specific local policy for crushed rock. It identifies an annual provision rate of 3.17 million tonnes over the plan period and supports the maintenance of at least a 7-year landbank of permitted reserves. It also highlights a 70:30 subdivision of provision between the Forest of Dean and Cotswold crushed rock resource areas.

26. To meet the future provision requirements the plan sets out five preferred areas for crushed rock extraction. These are: East of Stowe Hill/Clearwell Quarry; West of Drybrook Quarry; North and East of Stowfield Quarry; Northeast of Daglingworth

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3 In June 2005 the South West Regional Assembly (SWRA) as the Regional Planning Body (RPB) published a technical report on aggregate reserves and the potential use of secondary and recycled aggregates in the South West for the emerging RSS. Capita Symonds Ltd prepared the report for SWRA. The SW project reference for the report is SWRA/Aggregates/0894.
Quarry; West, North and East of Huntsmans Quarry. More information on preferred areas for crushed rock can be found on pages 85 – 101 of the adopted Minerals Local Plan.

**Other Spatial Considerations**

**Emerging MCS - Issues & Options Consultation**

27. The Issues & Options consultation provided stakeholders their first opportunity to pass on their views on the future of minerals planning in Gloucestershire.

28. In terms of the local apportionment and provision requirements to meet the new regional guidelines, stakeholders were presented with a series of targeted options. These sought to breakdown the complex process of determining future provision into more manageable parts for public discussion.

29. The targeted options focused on what level of provision should be made in future; how the resulting provision requirements should be looked at locally; whether undeveloped preferred areas from the existing adopted Minerals Local Plan should be considered, and finally whether a phasing strategy is necessary.

30. The level of provision favoured by stakeholders was that which took into account potential constraints on working in the county. This was followed by the option to combine the requirements of the local apportionment with potential constraints on working.

31. In terms of the way in which provision should be looked at, stakeholders opted for a sub-division of provision based on aggregate types from within the county’s key mineral resource areas. However, there was no consensus as how this sub-division should be carried out.

32. Furthermore, stakeholders did not object to the possible use of undeveloped preferred areas from the adopted Minerals Local Plan. Although support was given to the potential review of all areas before they were carried forward into the MCS. In respect of a phasing strategy, most respondents wished to see this introduced.

33. Alongside the targeted options, stakeholders were able to raise individual comments. These looked at a range of issues concerning the impact of meeting the local apportionment and the way in which it could be applied on the ground. These comments will need to be carefully interrogated and carried forward into detailed policy options for the next stage of the MCS – Preferred Options.

34. A summary consultation response report and full list of consultation responses from Issues & Options is available to view and / or download from on the County Council website.

4 The MCS Issues & Options response report and full list of consultation responses can be found via – http://www.gloucestershire.gov.uk/index.cfm?articleid=14094
The Initial Sustainability Appraisal looked at each of the targeted options set out within the Issues & Options for the MCS.

The favoured SA approach for looking at the level of provision, suggested a combination of the local apportionment; potential constraints; and a continuation of existing levels of production. This approach offered, neutral, positive or major positive effects against the 15 SA objectives over the short to medium term. However, it was deemed uncertain over the long term.

The summary comments from the SA supported the combination approach in that it would be able to – take account of emerging regional policy; provide for flexibility in the market; and consider constraints on reserves. It was also advised that an appropriate balance of combined, targeted options should ensure the most sustainable approach is adopted.

In terms of how provision should be looked at locally, the SA broadly favoured the approach adopted by the existing Minerals Local Plan. This was a subdivision of provision between the county’s key resource areas. Over the short to medium term the effects of following this approach were deemed to be positive or neutral. Although over the long term the effects were considered to be uncertain.

The SA concluded that the subdivision approach would acknowledge the different quality of crushed rock reserves across the county. This should ensure that appropriate provision is made to satisfy a range of necessary aggregate end-uses.

Undeveloped preferred areas from within the adopted Mineral Local Plan were also considered against the SA objectives. It concluded that a review of these areas would prove to be the favoured way forward. This approach would ensure that recent guidance and legislation could be taken into account, alongside a full and detailed review of each area against the SA Framework. In relation to the SA scoring of this approach, it was concluded that the use of reviewed, preferred sites would enable a better and more detailed examination of longer-term effects.

The use of phasing strategy for aggregate provision was also assessed against the SA objectives. This provided for a mix of effects. Majorly positive effects were recorded in terms of enhancing Gloucestershire’s environment – particularly through biodiversity opportunities and the wider planning of mineral site restoration schemes. However, more uncertainties were identified in several areas such as safeguarding amenity and ensuring steady and consistent supplies. The SA concluded that a phasing strategy might be overly restrictive upon the pattern of supply.

An Appropriate Assessment (AA) of protected European sites was also carried out at the Issues & Options stage of the MCS.

The purpose of AA is to screen for potential impacts upon protected European designations in and around the county so to ensure that their future protection is
integrated into the planning process at the local level. A total of 10 European sites have been recorded in and around Gloucestershire. These include – Special Conservation Areas (SACs), Special Protection Areas (SPAs), and Ramsar Sites.

44. In light of the strategic nature of the provision and supply options presented at Issues & Options, the AA was unable to highlight any likely significant effects on the 10 designated sites. However, a significant number of uncertain effects were recorded for the targeted option to review undeveloped preferred sites from the Minerals Local Plan. This was due to the unknown parameters of a review, which may or may not increase the potential impact upon designated sites.

45. The headline conclusions from the initial SA and AA process will need to be factored into the MCS framework for making provision and ensuring supply of aggregates. In this instance particularly attention should be paid to those deliverable policy options that record more positive impacts in respect of the SA objectives and, or will result in less likely significant impacts on designated European sites in and around Gloucestershire.

**Community Strategy**

46. Local Authorities have a duty to prepare Community Strategies. Gloucestershire County Council’s community strategy was adopted in 2004. It was drawn up following community involvement and aims to deliver economic, social and environmental well-being in a sustainable way.

47. The Government is keen to ensure that there is integration between Community Strategies and planning documents: planning is a tool for local authorities to use in taking forward the community strategy’s vision for their area.

48. The Gloucestershire Community Strategy 2004-2014 has a vision to:

'Make a positive difference for people who live in, work in and visit Gloucestershire.'

49. Through ensuring a steady, consistent and well managed supply of aggregate minerals, (including crushed rock), the MCS has an important spatial role to play in helping to delivery the Community Strategy. This is borne out of the need for aggregates to maintain and build upon necessary infrastructure for the county, which should demonstrate a contribution towards making a positive difference for people in and visiting Gloucestershire.

50. A revision to the Community Strategy, known as the Sustainable Community Strategy (SCS) is also underway. An initiation conference was held in March 2007 to introduce the SCS to key stakeholders. Further public consultation events are also planned for later in spring / summer 2007.

**District Local Development Frameworks**

51. District Councils in Gloucestershire will each prepare a Local Development Framework (LDF) for their area. These will contain policies and identify sites for a
range of land uses including housing, industry and employment.

52. Careful consideration will need to be given to the future siting of new non-minerals development to ensure that these do not result in the sterilisation of mineral resources such as aggregates. Furthermore the siting of sensitive land-uses near to mineral working should be avoided.

53. LDFs must take account of a range of spatial issues, which may go beyond traditional land-use planning. In terms of minerals and in particular construction aggregates, careful consideration should be given to sustainable construction, waste minimisation in new developments, and more sustainable transport infrastructure. Where appropriate, LDFs should also consider policies that identify sites for rail or water-served distribution or processing plants for primary and recycled aggregates.

54. To ensure consistency between local authorities in the two-tier planning areas, District LDFs are also required to show on their proposals maps areas of future mineral working and areas of known mineral resources, which are designated as Mineral Safeguarding Areas (MSAs).

55. Detailed information on mineral safeguarding can be found within technical paper MCS-G.

Local Transport Plan

56. The Local Transport Plan (2006-2011) includes an objective for reducing impacts of lorry movements and freight traffic, which may include aggregate distribution. It aims to improve freight efficiency and reduce environmental impacts through the development of a local route strategy, more access restrictions on certain roads, and partnership with the haulage industry. The LTP also aims to support more sustainable freight movements such as rail, sea and inland waterways through the development of existing and new infrastructure.

57. Future spatial policies for minerals and in particular aggregates, will need to carefully consider the outcomes and recommendations of the LTP, particularly where they seek to influence changes in market supply and haulage across the County and beyond.

AONB Management Plans

58. Management Plans must be prepared for all designated Areas of Outstanding Natural Beauty (AONBs). The purpose of these plans is to highlight the special qualities and importance of each designation and present an integrated vision for their future. The plans must also set out specific objectives and policies to help secure the vision and identify their delivery mechanism.

59. AONB Management Plans will be significant to the future of spatial planning in Gloucestershire as just over 50% of the entire County area is designated as an AONB. There are three designations in Gloucestershire; Cotswolds, Wye Valley and Malvern Hills. All of these AONBs have adopted Management Plans).

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5 The Cotswold AONB, Wye Valley AONB, and Malvern Hills AONB Management Plans were all adopted in 2004 and sought
60. There is also a very strong relationship between the County’s AONB designations and crushed rock working in Gloucestershire. A significant proportion of existing and future crushed rock supplies will likely occur from within AONB designations. Consequently, the MCS will need to consider the policies and proposed actions of the respective AONB Management Plans, when developing the future crushed rock strategy for the County.

Neighbouring / Nearby Mineral Planning Authorities (MPAs) and Minerals Development Plan Documents

61. The neighbouring and nearby MPAs to Gloucestershire have a responsibility to produce minerals planning documents for inclusion within their Local Development Frameworks. These documents, which may include a single Minerals Core Strategy or a joint Core Strategy with Waste, must set out the future policy for minerals development within their respective area.

62. The Government is keen to make sure that a greater degree of consistency is achieved between the policies and plans of adjoining areas. Furthermore, where opportunities exist, collaboration and joint working should be encouraged.

63. For the MCS, and in particular crushed rock resources, the relevant strategies of several neighbouring and nearby MPAs will need to be carefully considered. An understanding of wider crushed rock resources will be fundamental to the delivery of the future spatial options for Gloucestershire. This takes on even greater importance in terms of emerging regional minerals policy, which has already been highlighted between paragraphs 15 and 19. The key mineral planning authorities of interest include South Gloucestershire, North Somerset and Somerset. A brief review of their local policy context is provided under the proceeding headings.

64. Other neighbouring / nearby authorities have a resource relationship with Gloucestershire. However, currently their resources are not worked to any significant degree. These authorities include Bath & North East Somerset, Herefordshire, Warwickshire, Worcestershire and Wiltshire.

65. In Oxfordshire there are also some crushed rock operations. However, the resource relationship with this county is very much one-way, with limestone from the Cotswolds supplying parts of eastern Oxfordshire. Furthermore, there is an historical relationship between crushed rock in Gloucestershire and Monmouthshire. Although none of the quarries located in Monmouthshire are presently operational.

66. Diagram 1 of this report illustrates the spatial distribution of limestone resources across Gloucestershire and its neighbouring areas.

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6 Mineral supply from within the AONB accounts for 55% of the total working for Gloucestershire as at 31/12/2005. Mineral reserves within the AONB also totals 86% of the County’s remaining permitted reserves as at 31/12/2005. Furthermore, three preferred areas for future crushed rock extraction from within the Minerals Local Plan lie in AONB designations. There is also another area, which abuts one of the county’s AONB designations (i.e. Wye Valley AONB).
South Gloucestershire Unitary Authority

67. Local mineral policy for South Gloucestershire is contained within the authorities Adopted Minerals & Waste Local Plan (May 2002). The plan aims to make sufficient provision for up to 118 million tonnes of crushed rock between the period 1997 and 2026. It also seeks to ensure a crushed rock landbank of at least 15 years throughout the plan period by identifying three preferred areas for future mineral extraction. These areas account for a reserve potential of 37 million tonnes.

68. Currently there is an application before South Gloucestershire Council to work up to 14 million tonnes of limestone within one of the three preferred areas identified in the local plan (i.e. Wickwar Quarry). It is also worth noting that many of the resources and permitted mineral working areas in South Gloucestershire, lies close to the county border near the market town of Wotton-under-Edge (see Diagram 1).

North Somerset Unitary Authority

69. The Adopted Mineral Working in Avon Local Plan (1993) contains the local mineral policy for North Somerset. The plan was originally produced for the former county of Avon, which was disbanded in 1996. Its replacement includes the four unitary authorities of Bristol City, Bath & North East Somerset, North Somerset and South Gloucestershire.

70. The Avon MLP states that the release of land for mineral extraction should have regard to local, regional and national mineral requirements. It also advises mineral extraction will not be permitted for a period in excess of 30 years for new workings and 15 years for major extensions or other extensions to existing workings. Conditions limiting the duration of permissions will be imposed accordingly.

71. Two additional preferred areas (i.e. South of Stancombe Quarry and east of Hyatts Wood Quarry) where included in an earlier version of the Avon MLP. However, these were quashed following a high court challenge.

72. Nevertheless, since adoption of the Avon MLP, an extension has been permitted at Stancombe Quarry and a new “greenfield” site opened at Freemasons’ Farm.

Somerset County Council

73. Minerals policy in Somerset is contained within the Adopted Somerset Minerals Local (1997 – 2011). The plan aims to make provision for 225 million tonnes of crushed rock between the period 1997 – 2011. It also seeks to ensure a 15-year landbank of permitted reserves throughout the plan period. The total provision requirement for Somerset is 450 million tonnes. The plan

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7 The timeframe and provision requirements are provided under Policy 3 of the Adopted South Gloucestershire Minerals & Waste Local Plan (May 2002).


9 The timeframe and provision requirements as set out under Policy M34 of the Somerset Minerals Local Plan (1997-2011).
does not identify preferred areas for future crushed rock extraction, as sufficient permitted reserves as at 2000, were available to meet the provision requirements in full (reserves equalled 626 million tonnes). The majority of Somerset’s crushed rock resources and quarries are located in and around the Mendips.
Section 3
Crushed Rock in Gloucestershire

74. Aggregates are the most significant minerals extracted in Gloucestershire. This is in respect of production and overall landtake. In the County they predominantly fall into two distinct mineral and resource groupings; limestones used as a crushed rock and sand & gravel.

Crushed Rock Resources

75. Gloucestershire’s crushed rock resources can be divided into two specific types of limestone. These are separated over geological time and by geographical location. The older resources, known as Carboniferous limestones, occur within the Forest of Dean. And the younger resources, called Jurassic limestones are found in the Cotswolds.

76. The Carboniferous limestones have the greatest degree of flexibility as an aggregate mineral. This is because they are more durable and harder than the Jurassic limestones. Whilst both limestone types can be used in general construction, it is generally only Carboniferous limestones that can provide for high specification projects.

77. Although two distinct crushed rock resource areas have been identified within Gloucestershire, the overall distribution of these resources is not confined to the County’s administrative boundaries. For the Jurassic limestones of the Cotswolds, the resource area is much wider and covers parts of the neighbouring authorities of Bath & North East Somerset, Oxfordshire, Warwickshire, and Wiltshire. In the case of the Carboniferous limestones from the Forest of Dean, comparable resources have been worked in the adjoining Welsh authority of Monmouthshire and to the Northwest of South Gloucestershire. There are also significant crushed rock resources further a field, which may have a relationship to Gloucestershire. These are found within North Somerset and Somerset.

78. Diagram 1, illustrates the spatial distribution of Carboniferous and Jurassic limestone resources across Gloucestershire and its neighbouring areas.
Diagram 1: Crushed Rock Resources in Gloucestershire and Surrounding Areas

Carboniferous Limestone Quarries
(With potential for crushed rock working)
1. Drybrook
2. Stowfield
3. Rogers ~
4. Clearwell / Stowe Hill
5. Shakemantle ~
6. Tytherington *
7. Wickwar *
8. Chipping Sodbury *
* - These three quarries are outside of the Administrative area of Gloucestershire
~ - These sites are termed as “dormant” and will require further planning permissions before they can be worked.

Jurassic Limestone Quarries
(With potential for crushed rock working)
9. Stanleys
10. Shenberrow ~
11. Oathill
12. Hornsleasow ~
13. Three Gates ~
14. Cotswold Hill
15. Swellwold
16. Huntsmans
17. Brockhill
18. Soundborough
19. Oxleaze
20. Birdlip
21. Daglingworth
22. Shorncote
23. Veizys
Crushed Rock Supplies

79. In 2005, 1.95 million tonnes of crushed rock was supplied from Gloucestershire. The majority of this supply (73%) was sourced from the Carboniferous limestones of the Forest of Dean. The remainder originated from the Jurassic limestones located in the Cotswolds (See fig 1).

Figure 1: Crushed rock supplied from Gloucestershire during 2005 as a percentage breakdown from each resource areas.

80. The average annual supply from Gloucestershire over the five-year period 2001-2005 was calculated at 1.97 million tonnes per annum. During this period, the average breakdown of supply by resource area was 70% for the Forest of Dean and 30% for the Cotswolds (See fig 2).

Figure 2: Crushed rock supplied from Gloucestershire between 2001-2005 as a percentage breakdown from each resource area.

81. Detailed crushed rock supply and resource distribution data between 2001 and 2005 can be found in Appendix A.

Crushed Rock Infrastructure

82. During 2005, a total of 20 quarries with the potential for crushed rock working were identified across Gloucestershire (see diagram 1). Of these 12 quarries were in active production, and 13 were classed as either not in production or were only supplying other quarried products (e.g. building stone and agricultural lime) A further five un-worked and “dormant” quarries have been included on diagram 1. These quarries will require additional planning permissions for schemes of conditions of working before their reserves can be worked.
83. Most of the County’s crushed rock infrastructure and operational capacity is focused within the existing quarry sites of the Forest of Dean resource area. As of 31/12/2005 there were; three fixed processing plants, two roadstone coating plants, a concrete batching plant, a ready-mix concrete plant and several aggregate recycling facilities within this resource area.

84. In contrast, crushed rock infrastructure within the Cotswold resource area was considerably less. As of 31/12/2005, there was only; two fixed processing plants, one concrete batching plant and one aggregate recycling facility in operation. Nevertheless, some mobile crushing plants were used intermittently at several hybrid-quarries that produced small amounts of crushed rock in association with building stone.

85. It should be noted that the majority of ancillary plant used in the Cotswold resource area is of a mobile nature and is also required for building stone purposes (e.g. cutting, dressing, bagging etc.) and agricultural lime production (see Technical Paper MCS-C).

 Crushed Rock Markets

86. In 2005, 46% of crushed rock supplies were marketed within Gloucestershire. The remaining 54% was marketed between elsewhere in the South West region, the West Midlands, Wales, and the South East including London. However, due to some external processing outside of the county a proportion of the non-Gloucestershire supply may actually end up back in the county as a finished construction product. A full regional supply breakdown is set out in figure 3 and Appendix A.

87. As at 31/12/2005 the countywide reserves of crushed rock totalled 28.85 million tonnes. The majority (63%) was made up of Carboniferous limestones from the Forest of Dean. The remainder comprised of Jurassic limestones from the Cotswolds (see fig 4).
It is important to note that in 2006, the Department for Communities & Local Government (DCLG) clarified the methodology for calculating aggregate reserves. For survey data collected after 2005, reserves classified as ‘dormant’, should be removed from future reserve assessments. For Gloucestershire this amounts to a reduction of 3.75 million tonnes in the remaining reserves as of 31/12/2005.

Remaining Years of the Crushed Rock Landbank

Based on the annual provision rate to meet the local apportionment (2.44 million tonnes per annum), Gloucestershire has a remaining landbank at 31/12/2005 of 11.82 years. For the two resource areas, the landbank has been divided between 10.70 years for Carboniferous limestones from the Forest of Dean and 14.47 years for Jurassic limestones from the Cotswolds. However, the landbank would be longer if it was to be based on current production figures (1.95 million tonnes per annum). A detailed commentary on crushed rock landbanks is set out in section 4 of this report.

Information on the Strategic Crushed Rock Resources

As highlighted earlier in this section, there are comparable crushed rock resources within the neighbouring / nearby areas to Gloucestershire. A number of these resources are deemed strategic significant to Gloucestershire, as they are relatively close and easily accessible to the county’s key local markets. Consequently, survey data on these resources has been included in this report so as to provide a more strategic context to crushed rock resources.

 Crushed Rock in South Gloucestershire & North Somerset

Crushed rock supplies from South Gloucestershire originate from a belt of Carboniferous limestone, which is located within the northeast area of the authority. The resources for North Somerset lie within

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90. In August 2006, DCLG advised all MPAs that permitted reserves should only include those minerals for which a full planning consent was in existence. Where reserves were classified as ‘dormant’ under the Environment Act 1995 and in need of new conditions to be worked, they should be removed from the total reserve assessment. This was because, without new conditions, MPAs were able unable to determine how much mineral was available to be worked at each dormant site.

11 Comparable crushed rock resources exist within South Gloucestershire and North Somerset. Based on road mileage to the centre of Gloucester, the nearest of these resources lie within South Gloucestershire, approximately 22 miles away. In terms of haulage routes, crushed rock resources from both South Gloucestershire and North Somerset are also accessible along the existing motorway network, especially the M5.
a significant outcrop to the west of Bristol (See diagram 2).

92. Information on crushed rock supplies and reserves for South Gloucestershire and North Somerset is currently only available up to 2004. Furthermore, due to commercial confidentiality reasons joint figures have been published for the two authorities. However, it is anticipated that the Annual Minerals (AM) survey 2005 will provide a more up to date dataset. The final survey report is due to be published later in 2007. Therefore, this report only refers to data available for Gloucestershire.

**Crushed Rock Supplies and Reserves in South Gloucestershire & North Somerset**

93. During 2004, 4.4 million tonnes of crushed rock was supplied from both South Gloucestershire and North Somerset.

94. As of 31/12/2004, remaining reserves were calculated at 246.9 million tonnes. Based on the combined annual provision rate to meet the local apportionment for South Gloucestershire and North Somerset\(^\text{12}\) \((5.93 \text{ million tonnes per annum})\), the remaining landbank for crushed rock was 54.5 years. However, the landbank may be longer if it was based on the current annual supply outlined in the proceeding paragraph.

\(^{12}\) The annual provision rate of the local apportionment of the regional guidelines (2001-2016) for South Glos and North Somerset has been calculated jointly \((5.93 \text{ mt per annum})\). However, for the purposes of future provision requirements a 60:40 split has been applied between the authorities. For South Glos this provides an annual provision rate of 3.56 mt \((60\%)\). While for N. Somerset an annual provision rate of 2.37 mt \((40\%)\).

95. Furthermore from the correspondence received from South Gloucestershire, their remaining reserve total may be deemed to be unrealistically high. This is due to an area of old mineral permissions, which is still extant, largely dormant and / or unworked, but unlikely to come forward in the foreseeable future\(^{13}\).

\(^{13}\) To the far north of South Glos between the villages of Tortworth and Cromhall there are notable permissions for crushed rock & quartzite. However, these permissions may be sterilised by Tortworth Court, Four Pillars Hotel & HMP Leyhill.
Diagram 2: Crushed Rock Resources in South Gloucestershire, North Somerset and Somerset

North Somerset Crushed Rock Quarries
1. Durnford
2. Stancombe
3. Freemans Farm

South Gloucestershire Crushed Rock Quarries
4. Chipping Sodbury
5. Wickwar
6. Tytherington
7. Wick

Somerset Crushed Rock Quarries
8. Whatley
9. Halcombe
10. Coleman's
11. Dulcote
12. Butts Combe
13. Callow Rock
14. Gurney Slade
Section 4
Making Provision for Crushed Rock in Gloucestershire

96. Like all other mineral resources, crushed rock aggregates can only be worked where they occur. However, there are often options that can be made regarding, how much resource needs to be worked, which resources are worked, and the timing of their release. It is the responsibility of the MCS to consider these options for Gloucestershire in light of national and regional planning policies, other spatial influences, environmental constraints, sustainability, market condition and deliverability.

97. This section of the report aims to explore the processes and mechanisms for working out how much crushed rock will need to be provided for within the MCS. It introduces the local contribution or apportionment that is required to meet national and regional guidelines and the method behind maintaining an appropriate landbank of permitted reserves. It also seeks to identify how much provision will need to be made from within the key resource areas of Gloucestershire over the projected time horizons for the MCS.

98. The headline figures developed out to this section will act as a key source of background evidence for the MCS. They will also prove crucial in the development of policy options for assessment and the progression of the MCS to the next preparation stage, known as Preferred Options.

National & Regional Guidelines

99. As previously advised in Section 3, the MCS must consider the National & Regional Guidelines for Aggregate Provision in England (2001 – 2016). In doing so, it is required to make a local contribution or local apportionment of the regional guidelines set out for the South West. The local apportionment for Gloucestershire has been identified within the submission draft RSS and amounts to 39.09 million tonnes of crushed rock. The local apportionment for Gloucestershire represents 9% of the total regional guidelines for crushed rock in the South West (See fig 5)

100. To make sure that the local apportionment for Gloucestershire will be supplied in a steady and consistent manner over the guideline period (2001-2016 inclusive), an annual provision supply rate has been calculated. For Gloucestershire, the annual provision rate (also known as the ‘annual expression’ of the local apportionment) is...
2.44 million tonnes per annum of crushed rock.

Figure 5: Regional Guidelines (2001-2016) for Crushed Rock as a percentage breakdown from each sub-region / Mineral Planning Authority (MPA).

Maintaining an Appropriate Landbank

101. In addition to the national & regional guidelines, the MCS must consider making provision to maintain an appropriate landbank of permitted reserves at the end of the guideline period. As already discussed in section 3, the requirement for an appropriate crushed rock landbank is at least 10 years.

102. The formula to work out how much provision is needed to maintain an appropriate landbank is provided in the next column. It is based upon ensuring the annual provision rate of the local apportionment is sustained over a given number of years.

The Landbank Provision formula:

\[
\text{Landbank Provision} = \text{annual provision rate of the local apportionment} \times \text{length of the landbank needed in years}
\]

For Gloucestershire, maintaining an appropriate landbank for crushed rock, which is 10-years, is equal to 24.40 million tonnes (see table 1 below)

Table 1: Calculation of the Crushed Rock landbank provision for Gloucestershire over the plan period

<table>
<thead>
<tr>
<th>Annual Provision Rate of the local apportionment</th>
<th>Number of years of an appropriate landbank for sand &amp; gravel</th>
<th>Landbank Provision</th>
<th>(A x B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.44 mtpa</td>
<td>10 years</td>
<td>24.40 mt</td>
<td></td>
</tr>
</tbody>
</table>

Maximum Crushed Rock Provision for the MCS

103. The maximum amount of crushed rock provision for consideration by the MCS is based on meeting the full local apportionment of the regional guidelines and maintaining a 10-year landbank at the end of guideline period. It equals 63.49 million tonnes (See fig 6).
Figure 6: Maximum Crushed Rock Provision for consideration by the MCS.

<table>
<thead>
<tr>
<th>Crushed Rock (in million tonnes)</th>
<th>Provision to be considered by the MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total: 63.49 mt</td>
<td></td>
</tr>
<tr>
<td>24.4</td>
<td>To maintain a 10-year landbank at 2016</td>
</tr>
<tr>
<td>39.09</td>
<td>To meet the Local apportionment of the regional guidelines</td>
</tr>
</tbody>
</table>

**Years of Provision met by Supply**

104. The national & regional guidelines for crushed rock have been set between 2001 and 2016. However, the first five years of this period (2001 – 2005) have now past. During this time actual crushed rock supply from Gloucestershire has proved sufficient to meet demand and make a successful contribution to the local apportionment of regional guidelines. Consequently, the base date for provision in the MCS is 1st January 2006 as supply and reserves data is only available up to the end of 2005. Similar to the approach taken by the adopted MLP, the MCS does not make retrospective provision for the first five years of the guidelines and should concentrate on the remaining 11 years (i.e. 2006 to 2016 inclusive). As a result the provision requirement should be reduced to 26.84 million tonnes (See table 2).

**Table 2: Calculation of the remaining local apportionment (2006 - 2016)**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>Provision Req.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Provision Rate of the local apportionment (2006 - 2016)</td>
<td>Remaining years of the local apportionment</td>
<td>(A x B)</td>
</tr>
<tr>
<td>2.44 mtpa</td>
<td>11 years</td>
<td>26.84 mt</td>
</tr>
</tbody>
</table>

105. The inclusion of an appropriate 10-year landbank at 2016 increases the provision to be considered by the MCS to 51.24 million tonnes of crushed rock (see table 3).

**Table 3: Calculation of the revised provision requirements for consideration by the MCS**

<table>
<thead>
<tr>
<th>Revised Provision</th>
<th>A</th>
<th>B</th>
<th>Revised Req.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision</td>
<td>26.84 mt</td>
<td>24.40 mt</td>
<td>51.24 mt</td>
</tr>
</tbody>
</table>

**‘Local Treatment’ of the Local Apportionment**

106. The adopted MLP for Gloucestershire sets out the current crushed rock strategy for the County. It includes two separate resource areas when looking to meet the local
apportionment of the regional guidelines and landbank requirements. This ‘local treatment’ of crushed rock resources represents a 70:30 split between the Forest of Dean resource area and the Cotswolds. This approach was based upon the technical specification of the minerals from within each resource area and well-established supply trends. The 70:30 split was applied to the local apportionment and provision requirements for the last set of national and regional guidelines (1992 – 2006).

107. Although stakeholders during the Issues & Options consultation, supported the subdivision of the county’s crushed rock resources there was no overwhelming agreement to continue the 70:30 split for as adopted in the MLP. Nevertheless, evidence collected within recent annual mineral surveys, suggest that the 70:30 split remains relevant in terms of current supply trends. As a result it is deemed appropriate for the MCS to retain the 70:30 split so as to ensure a realistic and deliverable approach to meeting the provision requirements for Gloucestershire through to 2016 and beyond.

108. It is also worth noting that the emerging regional aggregate policy within the RSS recognises the ‘local treatment’ of Gloucestershire’s crushed rock resources. Within the commissioned regional supply report (see paragraph 18) a clear distinction was made between crushed rock limestone sourced from the Forest of Dean and the Cotswolds resource areas.

109. Although the 70:30 split does not affect the overall provision requirements, it does introduce a localised annual provision rate. This rate is 1.71 million tonnes per annum for the Forest of Dean resource area and 0.73 million tonnes per annum for the Cotswolds. These annual provision rates also provide for a localised requirement for each resource area. This is equal to 18.81 million tonnes for the Forest of Dean and 8.03 million tonnes for the Cotswolds (see table 4).

<table>
<thead>
<tr>
<th>Resource Area</th>
<th>Localised Annual Provision Rate</th>
<th>Remaining years of the local apportionment (2006 - 2016)</th>
<th>Localised Provision Req. (A x B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest of Dean</td>
<td>1.71mt (70% of 2.44)</td>
<td>11 years</td>
<td>18.81 mt</td>
</tr>
<tr>
<td>Cotswolds</td>
<td>0.73 mt (30% of 2.44)</td>
<td>11 years</td>
<td>8.03 mt</td>
</tr>
</tbody>
</table>

14 During the Issues & Options consultation, 52% of stakeholders to questions 4c advised that some subdivision of aggregate provision between the key mineral resource areas in Gloucestershire would be acceptable. However, only 36% of respondents to question 4d considered that the same subdivision method for the MLP would remain appropriate.

15 Data from the Annual Minerals Surveys has already been discussed in Section 3 of this Report and is provided in detail within Appendix A. Further data from the Annual Mineral Surveys can be seen in the Annual Minerals & Waste Monitoring Reports (AMRs) prepared by the County Council each year.
A similar ‘local treatment’ of the figures is necessary to maintain a 10-year landbank for each resource area. This introduces an additional provision requirement of 17.10 million tonnes for the Forest of Dean and 7.30 million tonnes for the Cotswolds (see table 5).

**Table 5: Localised requirements of a 10-year landbank for the Forest of Dean and Cotswolds resource areas**

<table>
<thead>
<tr>
<th>Resource Area</th>
<th>Localised Annual Provision Rate (A)</th>
<th>Number of years of an appropriate landbank (B)</th>
<th>Localised Provision Req. for 10-year landbank (A x B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest of Dean</td>
<td>1.71mt (70% of 2.44)</td>
<td>10 years</td>
<td>17.10 mt</td>
</tr>
<tr>
<td>Cotswolds</td>
<td>0.73 mt (30% of 2.44)</td>
<td>10 years</td>
<td>7.30 mt</td>
</tr>
</tbody>
</table>

The total provision requirement for each resource area is based upon the local treatment of both the remaining years of the local apportionment and the maintenance of a 10-year landbank at 2016. For the Forest of Dean this totals 35.91 million tonnes and for the Cotswolds totals 15.33 million tonnes (see fig 7).

**The Contribution of Existing Permitted Reserves**

As at 31/12/2005, crushed rock reserves in Gloucestershire totalled 28.85 million tonnes. For the two resource areas, this amounted to 18.29 million tonnes from the Forest of Dean and 10.56 million tonnes from the Cotswolds.

While the presence of permitted crushed rock reserves will make a significant contribution towards meeting the provision requirements, it is clear from the 2005 data that they will be insufficient to meet the full requirements. Consequently, a potential shortfall in provision will exist once all permitted reserves have been worked. This potential shortfall is equal to 17.60 million tonnes from the Forest of Dean and 4.79
million tonnes from the Cotswolds (see table 6).

Table 6: Calculation of crushed rock provision taking into account existing permitted reserves as at 31/12/2005

<table>
<thead>
<tr>
<th>Resource Area</th>
<th>A Remaining provision requirement for the resource area (Fig 7)</th>
<th>B Contribution of existing permitted reserves within the resource areas as at 31/12/2005</th>
<th>Revised Req. (A - B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest of Dean</td>
<td>35.91 mt</td>
<td>18.29 mt</td>
<td>17.62 mt</td>
</tr>
<tr>
<td>Cotswolds</td>
<td>15.33 mt</td>
<td>10.56 mt</td>
<td>4.77 mt</td>
</tr>
</tbody>
</table>

Potential Contribution of Undeveloped Preferred Areas

114. The adopted Minerals Local Plan (MLP) identified a shortfall in provision when seeking to meet the local apportionment of the previous regional & national guidelines (1992 – 2006) and maintain a 7-year landbank at the end of the guideline period.16

115. To reconcile the shortfall in provision, the MLP identified a number of site allocations for future mineral extraction defined as ‘Preferred Areas’.

116. These allocations represented extensions to existing mineral workings and were identified within both of resource areas: three in the Forest of Dean and two in the Cotswolds. Each allocation was subject to rigorous examination at various consultation stages and the public inquiry into the MLP.17

117. Under transitional arrangements,18 all of the preferred areas within the MLP remain part of the development plan for Gloucestershire until it is deemed necessary to replace them by new development plan documents. For the purposes of this study all remaining, undeveloped preferred areas have been considered as part of the provision calculations.

118. As at 31/12/2005, the potential crushed rock yield within the undeveloped preferred areas equalled 31.20 million tonnes. For the Forest of Dean resource area the potential yield totalled 14.70 million tonnes and for Cotswolds it was 16.50 million tonnes (see appendix D).

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16 Table 2 (page 35) of the adopted MLP identified a shortfall in provision equal to 14.2 million tonnes of crushed from the Forest of Dean resource area and 3.0 million tonnes from the Cotswolds resource area as of 31/12/1996.

17 The MLP underwent four formal consultation stages (i.e. consultation draft, 1st deposit and revised-deposit and proposed modifications) and a 23-day public inquiry held between September and November 2000.

18 Transitional Arrangements are found within the T&C Planning (Transitional Arrangements) (England) Regulations 2004 and are the regulatory arrangements put in place to manage the change from Development Plans to Development Frameworks. They set out how development plan policies should be saved for a period of at least three years from the enactment of the Planning Act (2004) or plan adoption, whichever is sooner. A longer ‘saving’ period may be deemed appropriate until formally replaced, where agreed by the Secretary of State.
119. Assuming all of the preferred areas are worked to their full potential, the shortfall in provision for the MCS will reduce to 2.92 million tonnes from within the Forest of Dean resource. However, for the Cotswold resource area there would be no shortfall in provision but a surplus of 11.73 million tonnes (see table 7).

Table 7: Calculation of crushed rock provision taking into account the potential contribution of undeveloped preferred areas at 31/12/2005

<table>
<thead>
<tr>
<th>Resource Area</th>
<th>A Remaining crushed rock provision requirement (Table 6)</th>
<th>B Potential Contribution of undeveloped preferred areas as at 31/12/2005</th>
<th>Revised Req. (A - B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest of Dean</td>
<td>17.62 mt</td>
<td>14.70 mt</td>
<td>2.92 mt</td>
</tr>
<tr>
<td>Cotswolds</td>
<td>4.77 mt</td>
<td>16.50 mt</td>
<td>11.73 mt surplus</td>
</tr>
</tbody>
</table>

Summary of Provision Requirements for the MCS

120. The MCS will need to carefully consider how it is going to make appropriate provision to meet the local apportionment for crushed rock of the regional guidelines between 2001 and 2016 inclusive. It will also need to endeavour to maintain a landbank of permitted reserves of at least 10 years at the end of the guideline period.

121. Based on the methodology detailed in this section, the MCS will need to devise a spatial strategy that is capable of delivering a shortfall in crushed rock provision for Gloucestershire equal to 22.39 million tonnes as of the base date 31/12/2005.

122. Taking into account the remaining reserves available in the county, the shortfall in provision can be divided between 17.62 million tonnes for the Forest of Dean resource area and 4.77 million tonnes for the Cotswolds resource area.

123. The undeveloped preferred areas from the adopted MLP represent a partial solution to delivering the identified shortfall in provision. However, even if all undeveloped preferred areas are worked to their full potential, an unresolved shortfall of 2.92 million tonnes may remain for the Forest of Dean resource area, particularly over the later stages of the MCS. Furthermore, there might also be a surplus of 11.73 million tonnes for the Cotswolds resource area.

124. Consequently, the key challenge for the MCS, is how it is going to deliver the potential unresolved shortfall in provision from within the Forest of Dean resource area. It will also need to carefully consider, how it might carry forward a surplus provision for the Cotswolds resource area.

125. The MCS must look to adopt a spatial strategy to meet both elements of the provision challenge. The options for this strategy must be broad in their outlook and not include specific local sites or preferred areas.
An Alternative View of Provision Requirements for the MCS

126. In addition to provision assessment carried out on the previous pages, sections 2 and 3 of this report refer to an alternative policy approach for meeting the local provision requirements for Gloucestershire. This relates to a fundamental review of the provision requirements for the county, based on a re-calculation of the local apportionment of the regional aggregate guidelines as set out by the SWRA in the emerging RSS.

127. The alternative approach is borne out of the regional commissioned aggregate supply report (see paragraphs 18 and 19), which has been used to support the submission draft of the RSS. It recommended the further consideration of the basic local apportionment for the South West region and the possibility of re-apportioning certain parts of the regional aggregate guidelines between a number of MPAs. For crushed rock, the report suggested that a potential re-apportionment of a shortfall of up to 8 million tonnes of provision (as at 2001) from the Forest of Dean resource area in Gloucestershire could be achieved between the neighbouring and nearby MPAs of South Gloucestershire and North Somerset (and possibly Somerset).

128. In the submission draft RSS a commentary is provided concerning the recommendations of the aggregate supply report. It advises that a potential for re-apportionment of crushed rock from the Forest of Dean resource area could be achieved through collaborative working between the relevant MPAs to achieve a potential re-apportionment of the regional aggregate guidelines. However, whilst the RSS supports this alternative approach it does not set out a deliverable policy mechanism for pursuing collaborative working between MPAs.

129. In the context of the MCS for Gloucestershire, pursuing an alternative approach to the local apportionment could have a major impact on the future provision requirements for crushed rock from the county.

130. Consequently, the next section of this report includes potential policy options for the MCS that seek to develop a workable and deliverable mechanism for achieving the alternative approach.

131. However, it is important to note that the preparation of the RSS and supporting aggregate supply report took place at a particular point in time and was founded upon data taken from 2001. For example: the local shortfall in crushed rock provision identified for the Forest of Dean resource area (i.e. up to 8 million tonnes) was based on the remaining crushed rock landbank as at 01/01/2001. Furthermore, the chosen survey methodology used in aggregate supply report did not incorporate existing policy commitments as preferred areas set out in local mineral plans across the region. For Gloucestershire, these include the potential crushed rock reserves contained within the preferred areas of the adopted MLP. Although these preferred areas have no guarantee of contributing towards meeting the potential shortfall in aggregate provision, it is now envisaged that these areas / allocations should play an integral
part of the future strategy for the MCS (see paragraphs 110 & 111 of more detailed).

132. As a result the policy options prepared in the following section recognise a revised assessment of the potential shortfall in crushed rock provision identified for Gloucestershire (see paragraph 117). This represents up to 2.92 million tonnes of crushed rock from the Forest of Dean resource area rather than up to 8 million tonnes as highlighted by the regional aggregate supply report and included in the submission draft RSS.
Section 5
Crushed Rock Options for Gloucestershire

133. This section of the report aims to introduce a series of options to stimulate early public debate. These options are founded on the assessment work carried out in section 4, for identifying future provision requirements for Gloucestershire. They have also been carefully assessed against national, regional and local policy influences (section 2) and key local characteristics (section 3) to ensure they are both realistic and deliverable through the MCS.

134. Although minerals can only be worked where it is found. There are still genuine options as to how much mineral resource should be made available for working over time and where within the wider extent of the mineral resource, future working should be focused.

135. Nevertheless, beyond the physical constraints of the geological distribution of resources (See Section 2 and Diagram 1), there are clear restrictive parameters that need to be factored in. These include – sterilisation by surface development, availability of sufficient infrastructure; accessibility to markets; and other engineering complexities (e.g. slope instability, flooding etc).

136. It is also vitally important that the community is fully involved and integrated into the development of policy options for the MCS. Without effective community engagement and consensus building, it is unlikely that any option will be successfully delivered. Consequently, stakeholders are encouraged to let us know their thoughts and ideas on the draft options that have been developed. Furthermore, to reflect the comments already received during the “issues and options” consultation and mineral forums in July 2006, these have been incorporated into the preparation process.

137. Much of the background evidence is now available to assess the merits or demerits of provision and supply options for the MCS. As a result “favoured” or “preferred” options have been headlined by this report. These will be further assessed through the preferred options stage for MCS, wherein a further Sustainability Appraisal and Appropriate Assessment will be completed.

138. It is also during the preferred options that stakeholders will have an opportunity to make formal representations on their “favoured” options for the MCS.
Draft Options Explained

139. For ease of consideration a summary of each option has been prepared. This summary will outline the potential provision requirements for the MCS; the possible mechanisms for delivering these requirements; and the strategic locations from within which shortfalls in provision may need to be identified.

140. In addition, a series of diagrams have been provided alongside the options. These look to illustrate the possible spatial context of delivery each option.

How much Provision?

141. Deciding upon how much crushed rock will need to be made available for the future is fundamental to the spatial strategy of the MCS. Section 3 and 4 of this report highlights the broad policy parameters within which future provision options should be developed. Section 4 also provides a technical assessment of the different mechanisms for determining future provision requirements.

Which Strategic locations?

142. Crushed rock can only be worked where it is found. Consequently, the strategic locations available for the future working are limited to the resource areas Gloucestershire. These are identified in section 3 of this report.

143. However, the realistic prospect of certain crushed rock resources, being worked over the plan period must not be ignored.

144. It is also important to note that the strategic locations will guide future site survey and assessment work within the mineral site allocations development plan document.

Without prejudice to the future provision requirements, all proposed location would need to be technically viable in the foreseeable future. As explained previously in this section, those resources that are sterilised by surface development, without mineral infrastructure, are inaccessibly to local markets and / or pose insurmountable engineering problems should be discounted from the study (more details on this information can be found under section 3).

OPTION 1:

Option 1 seeks to ensure that sufficient provision is made to deliver the remaining local apportionment for Gloucestershire (presently 2006 to 2016) and maintain a 10-year landbank at the end of the guideline period. It is also based on continuing the 70:30 subdivision of the provision requirement between the Forest of Dean and Cotswold crushed rock resource areas.

As of the base date: 01/01/2006, option 1 identifies a provision requirement of 51.24 million tonnes of crushed rock up to 2026. This should be divided between 35.91 million tonnes from the Forest of Dean resource area
and 15.33 million tonnes for the Cotswold resource area.

Including all permitted reserves as at 31/12/2005 and the estimated yields from undeveloped preferred areas of the MLP; option 1 identifies a shortfall in provision equal to 2.92 million tonnes from within the Forest of Dean resource area. It also identifies a surplus in provision of 11.73 million tonnes from within the Cotswold resource area.

To deliver the potential shortfall in provision, option 1 proposes additional crushed rock extraction from within the Forest of Dean resource area. This may represent:

- A lateral extension(s) to the existing crushed rock sites in the resource area; and / or
- A deepening extension(s) to the existing crushed rock quarry sites; and / or
- An increase in size for one or more of the undeveloped preferred areas of the adopted MLP; and / or
- A new green field site(s).

In the event that Option 1 is carried forward into the MCS, a detailed resource feasibility assessment would need to be carried out for crushed rock within the Forest of Dean. This assessment would need to compare each of the additional extraction options against a range of environmental and technical constraints. This would likely take place as part of the evidence gathering for the future mineral site allocations development plan document.
OPTION 1 DIAGRAM:

OPTION 1 - The potential allocation of up to 2.92 million tonnes of crushed rock from within the Forest of Dean resource area. This allocation represents the forecast shortfall in provision calculated for Gloucestershire based on the requirement to maintain a 10-year landbank at the end of the guideline period at 2016.
OPTION 2:

Option 2 looks to adopt a more strategic / sub-regional approach to meeting the future provision requirements for Gloucestershire. Its key aim is to resolve a projected shortfall in crushed rock provision for the Forest of Dean resource area by considering the potential re-apportionment of provision to comparable and less constrained resources found within South Gloucestershire, North Somerset and / or Somerset.

The initial focus for option 2 is to ensure sufficient provision is made to meet the remaining local apportionment (presently 2006 to 2016). However, it does not seek to make full provision for a 10-year landbank at the end of the plan period from within the two crushed rock resource areas of Gloucestershire. Instead, the landbank provision will be reviewed so as to reflect the remaining permitted reserves and potential reserves within undeveloped MLP preferred areas, for each resource area. Nevertheless, based on the current provision calculations set out in this report, option 2 would represent a shortfall in provision equal to 2.92 million tonnes of crushed rock from within the Forest of Dean resource area. It is this shortfall that will need to be reconciled.

Consequently, to deliver option 2 a detailed strategic / sub-regional crushed rock resource assessment will be required. This assessment should focus the projected shortfall in provision for the Forest of Dean resource area and how this can be re-apportioned to comparable and less constrained resources from within South Gloucestershire, North Somerset and / or Somerset. The assessment will need to look at environmental constraints, technical acceptability and economic viability as well as undergo a full sustainability appraisal and appropriate assessment.

All of the mineral planning authorities concerned by the assessment will need to take an active role in the re-apportionment assessment, and the South West Regional Assembly (SWRA) as the regional planning body, will need to take the strategic lead. However, it will be the responsibility of South West Regional Assembly (SWRA) as the regional planning body, to determine the strategic implications of the assessment on the remaining provision requirements for each of the affected mineral planning authorities or sub-regions.
It is also important to note that the proposed re-apportionment process may raise new issues such as inter-regional supply options with the West Midlands and/or Wales. These could have a wider impact on how the current regional guidelines are being apportioned throughout the region. Ultimately the outcomes of the assessment could instigate a full review of existing regional aggregate policies set out in the emerging RSS.

Furthermore, the outcome of option 2 might include key aspects of the other options set out in this report.

DIAGRAM FOR OPTION 2 OVER PAGE >>
OPTION 2 DIAGRAM:

OPTION 2 - The potential re-allocation of up to 2.92 million tonnes of crushed rock from within the resource areas of Forest of the Dean to:

- South Gloucestershire, North Somerset and possibly Somerset.

The re-allocation represents the forecast shortfall in provision calculated for Gloucestershire based on the requirement to maintain a 10-year landbank at the end of the guideline period at 2016.
OPTION 3:

Option 3, proposes a local re-assessment of provision requirements within Gloucestershire. This option aims to look at utilising all of existing permitted reserves and potential reserves within the undeveloped preferred areas across the county rather than focusing upon the limitations of specific resource areas.

Initially option 3 would adopt the same provision method used in Option 1, with a 70:30 subdivision of provision requirements between the Forest of Dean and Cotswold resource areas. However, where a longer-term shortfall in provision is identified, this option would propose a local re-allocation to other resources in the county.

Based on the current provision calculations set out in this report, option 3 would represent a potential re-allocation of 2.92 million tonnes of crushed rock provision from Forest of Dean to the Cotswold resource area.

However, it is noted that this option may prove to be problematic in terms of its delivery. As already highlighted in this report, the Cotswold resource area is not the same as the Forest of Dean and does not necessarily serve the same markets. This is a particular prevalent for the higher-grade aggregates such as 'road stone' used in highway repair and construction.

Nevertheless, following consultation and further resource assessment work, option 3 may prove to be a partial solution that could be used in combination with the other options presented in this report. Where technically viable, part of the potential shortfall in provision from the Forest of Dean could be re-allocated to the Cotswold resource area. The remainder of the shortfall could either be identified as new working within the Forest of Dean resource area (Option 1) or re-apportioned to a comparable resource within another MPA area or sub-region (Option 2).

DIAGRAM FOR OPTION 3 OVER PAGE >>
OPTION 3 - The potential re-allocation of up to 2.92 million tonnes of crushed rock from within the Forest of Dean resource area to:

- A) The Cotswold resource area; then
- B) Back to the Forest of Dean resource area; and / or then onto
- C) The other regional areas of South Gloucestershire, North Somerset and possibly Somerset.

The re-allocation of provision represents the forecast shortfall in provision calculated for Gloucestershire based on the requirement to maintain a 10-year landbank at the end of the guideline period at 2016.
Glossary

AGGREGATES - Sand, gravel, crushed rock and other bulk materials used by the construction industry

AREAS OF OUTSTANDING NATURAL BEAUTY (AONBs) - Are essentially a landscape designated under the National Parks & Access to the Countryside Act 1949. The primary purpose of AONBs is to conserve and enhance natural beauty.

ANNUAL EXPRESSION OF THE LOCAL APPORTIONMENT - The annualised breakdown of the local split of the regional supply guidelines for minerals demand (see local apportionment)

COMMUNITIES AND LOCAL GOVERNMENT (DCLG) - The Government department responsible for spatial planning and other local government matters

CORE STRATEGY - Sets the long-term spatial vision and strategy for the local planning authority area and provides the strategic locations for future development opportunities

CARBONIFEROUS - A division of geological time from approximately 360 to 270 million years ago.

CRUSHED ROCK - Generic term used to describe mechanically fragmented rock, which can then be used as an aggregate mineral (see aggregates)

DEVELOPMENT PLAN - Sets out the policies and proposals for development and the use of land within the local planning authority area

DEVELOPMENT FRAMEWORK - A non-statutory term for describing the folder of documents, which includes all the local planning authority's local planning documents

JURASSIC - A division of geological time from approximately 215 to 135 million years ago.

LANDBANK - The stock land with planning permissions but where development has yet to take place. The landbank can be of land for minerals, housing or any other use

LOCAL APPORTIONMENT - The local splitting of regional supply guidelines for aggregate minerals between planning authorities or sub-regions

MINERAL PLANNING STATEMENTS (MPS) - Guidance documents, which set out national policy for minerals

PROVISION REQUIREMENT - The amount of mineral (in million tonnes) that will need to be identified during the plan-making period

PREFERRED AREA - Areas identified in the development plan with a high degree of certainty for potential development / extraction (in the case of minerals)

REGIONAL AGGREGATE WORKING PARTY - A working group consisting of local authority officers, representatives of the aggregates industry and central government established to consider the supply and demand for aggregate minerals.

REGIONAL GUIDELINES - The regional breakdown of national supply for aggregate minerals. The current national guidelines are from 2001 to 2016

RESERVES - Known mineral deposits with the benefit of planning permission for extraction

RESOURCES - A potential mineral deposit where the quality and quantity of material has not been fully tested. Resources do not benefit from planning permission

SHORTFALL IN PROVISION - The amount of mineral that needs to be identified, once the entire mineral in existing working sites and potential mineral within preferred areas, has been accounted for.

SOUTH WEST REGIONAL SPATIAL STRATEGY (RSS) - The 20-year spatial strategy for the South West region

SPATIAL PLANNING - Spatial planning goes beyond traditional land use planning to bring together and integrate policies for the development and use of land with other policies and programmes which influence the nature of places and how they function
Appendix A
Gloucestershire
Aggregate information

Crushed Rock - Supply data 2001 - 2005

<table>
<thead>
<tr>
<th>Supply Year</th>
<th>For the Forest of Dean Resource Area</th>
<th>For the Cotswolds Resource Area</th>
<th>Total Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>1.44</td>
<td>0.75</td>
<td>2.19</td>
</tr>
<tr>
<td>2002</td>
<td>1.42</td>
<td>0.62</td>
<td>2.04</td>
</tr>
<tr>
<td>2003</td>
<td>1.23</td>
<td>0.52</td>
<td>1.75</td>
</tr>
<tr>
<td>2004</td>
<td>1.34</td>
<td>0.57</td>
<td>1.91</td>
</tr>
<tr>
<td>2005</td>
<td>1.43</td>
<td>0.52</td>
<td>1.95</td>
</tr>
<tr>
<td>Ave. Supply (2001-2005)</td>
<td>1.37</td>
<td>0.60</td>
<td>1.97</td>
</tr>
</tbody>
</table>

Data provided in million tonnes (mt) unless otherwise stated

Crushed Rock - Reserves Data 2001 - 2005

<table>
<thead>
<tr>
<th>Recorded Reserve Date</th>
<th>For the Forest of Dean Resource Area</th>
<th>For the Cotswolds Resource Area</th>
<th>Total Reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>31/12/2001</td>
<td>16.90</td>
<td>14.20</td>
<td>31.10</td>
</tr>
<tr>
<td>31/12/2002</td>
<td>15.33</td>
<td>13.57</td>
<td>28.90</td>
</tr>
<tr>
<td>31/12/2003</td>
<td>14.13</td>
<td>13.72</td>
<td>27.85</td>
</tr>
<tr>
<td>31/12/2004</td>
<td>13.42</td>
<td>12.80</td>
<td>26.22</td>
</tr>
<tr>
<td>31/12/2005</td>
<td>18.29</td>
<td>10.56</td>
<td>28.85</td>
</tr>
</tbody>
</table>

Data provided in million tonnes (mt) unless otherwise stated
### Crushed Rock - Markets Data 2005

#### Gloucestershire Crushed Rock Aggregate Markets (For 2005)

<table>
<thead>
<tr>
<th>Regional Destination (Including Wales)</th>
<th>Tonnage Supplied</th>
<th>As a % of Total Supply for 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloucestershire</td>
<td>0.90</td>
<td>46%</td>
</tr>
<tr>
<td>South West</td>
<td>0.52</td>
<td>27%</td>
</tr>
<tr>
<td>West Midlands</td>
<td>0.33</td>
<td>17%</td>
</tr>
<tr>
<td>Wales</td>
<td>0.14</td>
<td>7%</td>
</tr>
<tr>
<td>South East</td>
<td>0.06</td>
<td>3%</td>
</tr>
<tr>
<td>London</td>
<td>0.002</td>
<td>Less than 1%</td>
</tr>
</tbody>
</table>

**NB:** Extremely small tonnages were also supplied to the following regions: East of England, East Midlands, Yorkshire & Humber

*Data provided in million tonnes (mt) unless otherwise stated*
### National & Regional Guidelines for Aggregate Provision in England 2001 to 2016 inclusive

<table>
<thead>
<tr>
<th>Region</th>
<th>(Land-won) Sand &amp; Gravel</th>
<th>Crushed Rock</th>
<th>(Marine) Sand &amp; Gravel*</th>
<th>Alternatives*</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East</td>
<td>212</td>
<td>35</td>
<td>120</td>
<td>118</td>
</tr>
<tr>
<td>London</td>
<td>19</td>
<td>0</td>
<td>53</td>
<td>82</td>
</tr>
<tr>
<td>East of England</td>
<td>256</td>
<td>8</td>
<td>32</td>
<td>110</td>
</tr>
<tr>
<td>East Midlands</td>
<td>165</td>
<td>523</td>
<td>0</td>
<td>95</td>
</tr>
<tr>
<td>West Midlands</td>
<td>162</td>
<td>93</td>
<td>0</td>
<td>88</td>
</tr>
<tr>
<td>South West</td>
<td>106</td>
<td>453</td>
<td>9</td>
<td>121</td>
</tr>
<tr>
<td>North West</td>
<td>55</td>
<td>167</td>
<td>4</td>
<td>101</td>
</tr>
<tr>
<td>Yorkshire &amp; Humber</td>
<td>73</td>
<td>220</td>
<td>3</td>
<td>128</td>
</tr>
<tr>
<td>North East</td>
<td>20</td>
<td>119</td>
<td>9</td>
<td>76</td>
</tr>
</tbody>
</table>

*Data provided in million tonnes (mt) unless otherwise stated*

* - These totals represent assumed targets for contributing to the overall aggregate provision rather than specific guidelines

### Local Apportionment for Crushed Rock for the South West Region - to meet the National & Regional Guidelines for Aggregate Provision in England 2001 to 2016 inclusive

<table>
<thead>
<tr>
<th>Local Area / Sub-Region</th>
<th>Crushed Rock</th>
<th>As a percentage of the Regional guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avon</td>
<td>94.95</td>
<td>21%</td>
</tr>
<tr>
<td>Cornwall</td>
<td>29.04</td>
<td>6%</td>
</tr>
<tr>
<td>Devon</td>
<td>55.99</td>
<td>12%</td>
</tr>
<tr>
<td>Dorset / Wiltshire</td>
<td>7.70</td>
<td>2%</td>
</tr>
<tr>
<td>Gloucestershire</td>
<td>39.09</td>
<td>9%</td>
</tr>
<tr>
<td>Somerset</td>
<td>226.18</td>
<td>50%</td>
</tr>
</tbody>
</table>

*Data provided in million tonnes (mt) unless otherwise stated*

~ - The area of ‘Avon’ represents the old county authority. It incorporates the unitary authorities of Bristol City, North Somerset, South Gloucestershire, and Bath & North East Somerset

* - For commercial confidentiality reasons the two counties of Dorset and Wiltshire have been grouped together as one unit
Appendix C
Draft Regional Spatial Strategy for the South West - Aggregate Policies

Policy RE10 Supply of Aggregates And Other Minerals

Minerals Planning Authorities should seek to make provision for the supply of aggregates and other minerals to meet the South West’s contribution to national requirements. Minerals Planning Authorities and Local Planning Authorities will identify and collaborate in safeguarding mineral resources of economic importance from sterilisation by other forms of development. In order to promote the delivery and bulk transport of minerals by rail and/or water, existing railheads, wharfs and other handling facilities, will be safeguarded and opportunities for new ones should be identified, where appropriate.

Policy RE11 Maintaining a Landbank of Aggregates

Minerals Planning Authorities should endeavour to maintain a landbank of at least seven years during the period to 2016. The ability to meet their primary aggregate apportionment, as set out in Table M1, will be tested against environmental factors as Mineral Development Documents are brought forward.

TABLE M1 Regional Apportionment for Aggregates Demand 2001 - 2016

<table>
<thead>
<tr>
<th></th>
<th>Crushed Rock (Mt)</th>
<th>Annualised Production Rate (Mtpa)</th>
<th>Sand &amp; Gravel (Mt)</th>
<th>Annualised Production Rate (Mtpa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Former Avon</td>
<td>94.95</td>
<td>5.93</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cornwall</td>
<td>29.04</td>
<td>1.82</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Devon</td>
<td>55.99</td>
<td>3.50</td>
<td>1.36</td>
<td>2.27</td>
</tr>
<tr>
<td>Dorset</td>
<td>7.7</td>
<td>0.48</td>
<td>1.14</td>
<td>1.14</td>
</tr>
<tr>
<td>Gloucestershire</td>
<td>39.09* (31.09)</td>
<td>2.44* (1.94)</td>
<td>18.18</td>
<td>18.18</td>
</tr>
<tr>
<td>Somerset</td>
<td>226.18</td>
<td>Included with Dorset (c)</td>
<td>1.36</td>
<td>Included with Devon (c)</td>
</tr>
<tr>
<td>Wiltshire</td>
<td>Included with Dorset (c)</td>
<td>28.31</td>
<td>1.14</td>
<td>Included with Devon (c)</td>
</tr>
<tr>
<td>Total</td>
<td>452.95</td>
<td>28.31</td>
<td>6.62</td>
<td></td>
</tr>
</tbody>
</table>

(c) Confidential
* Potential reduction if proposed re-apportionment of 8 Mt is feasible

Supporting Text Policy RE11

7.3.26 The Office for the Deputy Prime Minister (ODPM) has set regional guideline figures for the South West region for aggregates for the period 2001 to 2016. These are about 106 million tonnes (Mt) of land-won sand and gravel, and about 453 Mt of crushed rock, with assumptions of 9 Mt of marine sand and gravel and 121 Mt of alternative (secondary and recycled) materials.
7.3.27 A technical and strategic assessment of aggregate supply options in the South West looked at the issue of addressing identified shortfalls in aggregate provision to 2016 in terms of permitted reserves for sand and gravel and crushed rock and, in particular, the potential for substitution from other resource areas as follows:

- A shortfall of crushed rock identified in the Forest of Dean resource area could potentially be met from significant reserves and resources in neighbouring areas, which supply similar markets. This will require that MPAs in Gloucestershire and the former Avon area (possibly including Somerset) should collaborate in the preparation of their LDDs to identify if the shortfall of eight Mt to 2016 in the sub-regional apportionment for crushed rock in Gloucestershire (relating to the Forest of Dean resource area) can be met from elsewhere.

- The technical report has also proposed various options to meet those shortfalls in the sand and gravel resource areas. Gloucestershire, Wiltshire and Dorset MPAs should work together on a collaborative basis with their adjacent MPAs in order to establish whether any shortfalls in supplies of sand and gravel from the South West can be met from existing reserves or existing development plan allocations, or other identifiable resources. The environmental capacity of those areas and the effect on supply patterns should also be taken into account.

7.3.28 Over the life of the RSS it is envisaged that the testing of the regional and local apportionment will be monitored to determine the scope of any review of national aggregates demand forecasts. The SWRAWP is best placed to assist with this process and will continue to provide essential support to the RPB by coordinating the collection, collation and analysis of minerals data.

**Policy RE12 Recycled and Secondary Aggregates**

Provision will be made for 121 Mt of secondary and recycled aggregates to be utilised over the plan period to 2016. LDDs will identify new sites, to secure an appropriate provision of minerals/aggregates recycling plants in appropriate locations, in accordance with Policy W2.
Appendix D
Undeveloped Preferred Areas for Crushed Rock from within the Adopted Minerals Local Plan (MLP) (1992-1997)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Resource Area</th>
<th>Crushed Rock Type</th>
<th>Potential Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drybrook</td>
<td>Forest of Dean</td>
<td>Carboniferous Limestone</td>
<td>4.50</td>
</tr>
<tr>
<td>Stowfield</td>
<td>Forest of Dean</td>
<td>Carboniferous Limestone</td>
<td>10.20</td>
</tr>
<tr>
<td></td>
<td><strong>Resource Area Total</strong></td>
<td></td>
<td><strong>14.70</strong></td>
</tr>
<tr>
<td>Daglingworth</td>
<td>Cotswolds</td>
<td>Jurassic Limestone</td>
<td>9.00</td>
</tr>
<tr>
<td>Huntsmans</td>
<td>Cotswolds</td>
<td>Jurassic Limestone</td>
<td>7.50</td>
</tr>
<tr>
<td></td>
<td><strong>Resource Area Total</strong></td>
<td></td>
<td><strong>16.50</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>31.20</strong></td>
</tr>
</tbody>
</table>

* A further preferred area for crushed rock was identified within this resource area in the MLP (i.e. Clearwell / Stowehill). Planning permission has been granted for extraction at this site and the resulting reserves (i.e. 8.7 mt) have been included in the landbank as at 31/12/2005. There may be potential for further resources within the preferred area to come forward at this site. However, this will be subject to how the recent permission progresses and the outcomes of site monitoring associated with the proposal.

Data provided in million tonnes (mt) unless otherwise stated.
Appendix E
Preferred Areas for Crushed Rock from within the South Gloucestershire Minerals Local Plan & *(North Somerset Area)* of the Mineral Working in Avon Local Plan

### Preferred Areas from within the South Gloucestershire Minerals Local Plan (May 2002)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Crushed Rock Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>South West of Tytherington</td>
<td>Carboniferous Limestone</td>
</tr>
<tr>
<td>North of Wickwar Quarry</td>
<td>Carboniferous Limestone</td>
</tr>
<tr>
<td>East of Chipping Sodbury Quarry</td>
<td>Carboniferous Limestone</td>
</tr>
</tbody>
</table>

**Total Potential Yield** | 37 million tonnes

### Preferred Areas from *(North Somerset Area)* of the Mineral Working in Avon Local Plan (1993)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Crushed Rock Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failand Ridge to the East of Failand</td>
<td>Carboniferous Limestone</td>
</tr>
</tbody>
</table>

*Data provided in million tonnes (mt) unless otherwise stated*