AGGREGATE INDUSTRIES

Aggregate Industries UK Ltd.

Torr Quarry - Proposed Deepening

Assessment of Need & Alternatives

Final Report, 29th January 2010

Cuesta Consulting Limited

Cuesta

CONTENTS

1. Statement of Need

Summary

1.1 This section examines the following issues:

- *The need for primary aggregate to be extracted;*
- *The strategic need for aggregate extraction in the Mendips;*
- *The role of Torr Quarry in fulfilling this need and in achieving national policy objectives.*

1.2 The key findings are that:

- *Aggregates production is an essential component of the national construction industry and is needed to support economic growth;*
- *The South West region, and Somerset in particular, have strategic roles to play in meeting the national requirements for aggregate production, with much of the output being exported to growth areas in other parts of the country where insufficient resources are available;*
- *The quarries of the Mendip Hills provide more than 90% of the total crushed rock production in Somerset, and about half of the total crushed rock production in the whole of the South West Region.*
- *Torr Quarry plays a very significant role in the supply of Mendips limestone, providing around 39% of all production in Somerset and around 20% of the entire South West region's apportionment. It is therefore of vital strategic importance; and*
- *This importance is heightened by Torr's efficiency of production, its minimal impacts on the environment (compared with alternative options) and, not least, by its ability to supply aggregate by rail to a wide range of distribution depots in areas of economic growth across London and the South East.*

1.3 Torr Quarry therefore plays a vital, strategic role in helping to achieve national policy objectives for sustainable minerals extraction, transportation and the efficient use of aggregates. For these reasons, it is argued here that it is essential that the quarry is allowed to continue. In order to continue effectively, without compromising national objectives, additional permitted reserves will be required.

Introduction

1.4 An essential requirement of any application for quarrying is to demonstrate the need for the mineral to be extracted. This chapter examines the role that Torr Quarry plays in meeting national demand for aggregates and in

contributing towards achieving both national and local plan policy objectives for a sustainable pattern of minerals extraction to support economic growth.

1.5 An important aspect of this role is that Torr is a very large scale production unit which, in effect, substitutes for a larger number of much smaller quarries, the environmental impacts of which would typically be experienced across wider areas and in greater proximity to rural settlements. The scale of operation at Torr also permits a much greater scale of investment in the successful mitigation of potentially adverse environmental effects. This includes the continued operation of Torr's existing rail facilities which, in turn, allow the quarry to supply three quarters of its output by rail, rather than road.

1.6 Through its scale of operations, the quality of environmental mitigation and the continued use of its strategic rail facilities, the future of Torr Quarry is of direct relevance to the continued success of national, regional and local policy objectives for sustainable aggregates supply.

1.7 In strategic terms, it is to secure the continuation of this success that additional permitted reserves are required.

The need for primary aggregate extraction

1.8 Minerals Policy Statement 1 (MPS1) notes that minerals (including aggregates) are *"essential to the nation's prosperity and quality of life, not least in helping to create and develop sustainable communities"*. In the case of aggregates, quantification of this need is achieved, retrospectively, through four-yearly national "Aggregate Minerals" (AM) surveys, the most recent of which was AM2005. Future needs are forecast by CLG's National and Regional Guidelines for Aggregates Provision, the most recent update of which was published in June 2009.

1.9 In 2005, the most recent year for which comprehensive statistics are available, the consumption of primary aggregates in England was 161.1 million tonnes, of which the majority (151.4 million tonnes) was produced within England itself. These figures include both crushed rock and natural sand & gravel, from both land-based and marine sources, but exclude the wide range of 'alternative materials' (secondary and recycled aggregates) which now also contribute to the market. Primary aggregates are needed for use in a range of applications where alternative sources are either insufficient or inadequate, in terms of meeting technical specifications. The AM2005 survey revealed that 41% of the primary aggregates consumed within England are used in the manufacture of concrete, 22% are used in the production of asphalt and roadstone, 6% in the production of mortar, 1% as railway ballast and the remaining 30% for a variety of other construction purposes, including general fill. Additional quantities of crushed rock (not included in the figures above) are required for non-aggregate purposes, including a wide variety of industrial, agricultural and environmental applications. Industrial uses are dominated by cement production but also include both iron & steel and glass manufacture. Other applications include

the use of limestone products to reduce the acidity of agricultural land and to clean power station emissions.

1.10 Over the period 2005 to 2020, the latest CLG Guidelines suggest that the average annual rate of production of primary aggregates in England will need to be almost 173.7 million tonnes per annum[1] (mtpa). This again includes marine sand & gravel but excludes alternative materials. The figure corresponds directly to the 151.4 million tonnes noted above for 2005 and signals strongly that, notwithstanding the current economic recession, and despite the reduction in these guideline amounts compared with the previous ones, issued in 2003, **the overall domestic need for primary aggregates is likely to increase, rather than diminish, over the period between now and 2020**.

1.11 Torr Quarry produces crushed rock aggregate from the Carboniferous Limestone and, along with Whatley Quarry, is one of the two sources of this material which are closest to the main centres of demand in London and South East England, to which most of the quarry's output is supplied. Different types of crushed rock are required for different purposes. For some uses, for example road construction and high strength structural concrete, limestone may not be appropriate. For most applications however, there is a fair degree of substitutability amongst product types. An example is the way in which crushed rock products have replaced natural sand & gravel as a concreting aggregate in areas where geological and environmental constraints have significantly reduced sand & gravel extraction. This applies most obviously in the South East markets but is increasingly likely to be needed within the South West (subject to ongoing work commissioned in November 2009 by SW Councils, regarding options for sub-regional apportionment).

1.12 In a different way, the recent growth in production of secondary and recycled aggregates, caused by higher landfill costs, the effects of the landfill tax and (to a much smaller extent) the effects of the aggregates levy, has substituted for a significant amount of crushed rock production in lower grade fill products and even some road construction materials. Crushed rock (including limestone) is still needed to meet the higher specification uses, but its utilisation for these purposes is now generally more efficient than was previously the case. This has been achieved by the introduction of improved measures to maximise the output of higher quality materials and minimise waste (for example by reprocessing the 'scalpings' rejected by the main crushing and screening processes).

1.13 Because the geological deposits of various primary aggregate materials are not distributed evenly around the country, there are areas where more intensive aggregate extraction needs to take place. Sand & gravel deposits, for example, tend to be located in the lower lying, and hence more inhabited parts of the country, and are generally much closer to the markets and

[1] The Guidelines require, over the 16 year period, 2005 to 2020, a total provision of 1028 million tonnes of land based sand & gravel; 1492 million tonnes of crushed rock; and 259 million tonnes of marine sand and gravel. Total of these = 2779 million tonnes, which equates to an average of 173.7 mtpa.

intrinsically less expensive to produce and supply than crushed rock aggregates.

1.14 Yet the same locational factor of proximity to human settlement has meant that natural sand & gravel has been the first material to have to reduce extraction rates because of conflicts with other land uses. One result of this has been an increase in overall dependence upon output from those parts of the country with alternative geological resources which are situated in locations where the impacts of extraction can be better accommodated.

1.15 The frequent coincidence of suitable geological deposits with highly valued landscapes such as in National Parks or Areas of Outstanding National Beauty, (AONBs), means that those deposits which lie outside of these national designations have thus far been seen as being of greater strategic importance for national aggregates supply. The East Mendips, where Torr quarry is located, is one of the relatively few locations where readily winnable hard rock resources occur in areas without National Park or AONB status.

1.16 Such areas are typically more distant from the main centres of demand and, if they were to rely upon conventional road transportation, would incur higher transport costs and give rise to much greater carbon emissions. To compensate for this, the industry has sought, over recent decades, to increase the size of individual quarries in order to increase efficiency and to reduce unit production costs. The industry has also invested in rail transport systems at some of its largest quarries, in order to reduce transport costs and to minimise both carbon emissions and other road transport impacts.

1.17 As a direct consequence of these developments, the high demand markets and areas of major economic growth can be supplied in a more sustainable fashion, from a small number of very large production units, at a more reasonable balance between costs and environmental impact.

1.18 Torr Quarry is currently the largest example of this approach in England.

The strategic need for aggregate extraction in the Mendips

1.19 For the reasons set out above, the Mendip Hills are one of the most important sources of hard rock construction aggregates in England. Although only about 3% of the surface area of the Mendips is currently being quarried (active permissions in the Mendips account for just under 9km^2), those quarries produce almost all (more than 93%) of Somerset's total crushed rock aggregates[2]. Somerset, in turn, accounts for about half of the total crushed rock production in the whole of the South West Region.

1.20 As shown in Table 1.1, below, this is borne out in production statistics from the AM2001 and AM2005 surveys and corresponding Regional Aggregate Working Party (RAWP) reports. It is also reflected in the National and

[2] Research by Capita Symonds for the South West Regional Assembly (Thompson *et al* 2005) demonstrated that the total production of crushed limestone aggregate from Mendips quarries in 2001 amounted to 13.03Mt, (i.e. 93%) compared to a total of 13.99Mt for all crushed rock in Somerset. The proportion is higher still when allowance is made for the additional production of crushed rock aggregate from Moon's Hill Quarry (andesite rather than limestone).

Regional Guidelines for Aggregates Provision produced by the former Office of the Deputy Prime Minister (ODPM 2003) and the succeeding department of Communities and Local Government (CLG 2009); and in the South West Council's sub-regional apportionment of those figures[3].

Table 1.1: Crushed rock aggregate production and annual apportionments

	Total Crushed Rock Aggregates Production in 2001	Total Crushed Rock Aggregates Production in 2005	Annualised apportionment 2001-2016	Annualised apportionment 2005 - 2020
England	[(a)] 95.65Mt	[(c)] 83.54Mt	[(e)] 101.13Mt	[(f)] 93.25Mt
South West	[(a)] 26.52Mt	[(c)] 22.24Mt	[(e)] 28.31Mt	[(f)] 25.75Mt
Somerset	[(b)] 13.99Mt	[(d)] 11.22Mt	[(d)] 14.14Mt	[(g)] 13.42 Mt

SOURCES: [(a)] AM2001 survey; [(b)] SWRAWP 2003; [(c)] AM2005 survey; [(d)] SWRAWP 2007; [(e)] ODPM 2003; [(f)] CLG 2009 [(g)] MWP 2009

1.21 As Table 1.1 also shows, the South West region, in turn, is required by the Government's Guidelines to contribute more than a quarter of the total crushed rock aggregate supply for the whole of England.

1.22 The Mendip quarries are therefore seen to be a major component of the national aggregates supply strategy for England, and are likely to continue to be so for the foreseeable future. A key aspect of this is the ability of Torr and Whatley quarries to supply aggregates by rail, thereby minimising the carbon footprint and other impacts of transportation, by comparison with the alternative of road haulage.

The strategic importance of Torr Quarry

1.23 Since the 1970s, a number of quarries within the Mendips, including Torr, have increased substantially in size, both physically and in output, in order to meet the demand from areas where local supply sources are exhausted or more constrained. Over the same period, production has been consolidated into fewer extraction sites in order to increase efficiency and to minimise environmental impacts. Since 1970, the number of active quarries in the Mendip Hills has thus been reduced from around 20 to 9.

1.24 Encouraged by County Council policy, production has become concentrated primarily, though not exclusively, on the eastern side of the Mendips. This has been for several reasons including:

- *the reduced sensitivity of this area to groundwater impacts, compared with areas further west which are characterised by more karstic groundwater systems and by a larger number of spring-fed public water supply sources;*
- *the facilities available at Torr and Whatley to transport aggregate by rail to markets in London and the South East; and (not least)*

[3] The sub-regional apportionment shown for Somerset for the period 2005-2020 is the initial 'Scenario 1 Apportionment' figure recently calculated for South West Councils in a report by Minerals Waste & Planning (MWP 2009). Two alternative scenarios are also being investigated, so the final apportionment for Somerset might be different.

- *the avoidance of working within the west Mendips AONB.*

1.25 As a direct consequence of this strategy, and with significant investment in large scale production and rail transportation facilities, Torr and Whatley quarries have become the largest production units in Mendips, and two of the largest in the UK. Of these, Torr Quarry is currently responsible for the highest rate of production. Its strategic importance to local, regional and national supply patterns over the last 21 years is clearly demonstrated by the data in Table 1.2, below.

1.26 As can be seen from this table, at its peak in 1988, Torr was responsible for 6.6% of the total output of crushed rock in England. Since then, this proportion has averaged around 5%, but has fluctuated between 3.7% and 6%, with most of the lower percentages coinciding with the period when lower grade 'scalpings' were displaced from the market by secondary and recycled materials, following the introduction of the landfill tax in 1996.

1.27 Similar patterns are seen, for the same reason, in Torr's percentage of total crushed rock production in the South West region (which has averaged 20% over the period since 1988) and its percentage of crushed rock production in Somerset (which has averaged 39%). Since the introduction of the washing plant in 2006, which enabled much more of the scalpings to be sold as higher value products, both of these figures have increased significantly.

Table 1.2: Torr Quarry Crushed Rock Production in its Local, Regional and National Contexts, 1988 - 2008 (million tonnes per annum (mtpa))

YEAR	TORR QUARRY	SOMERSET (mainly Mendips limestone)		SW REGION		ENGLAND	
	Quarry output (i.e. sales) [1]	County crushed rock output	Torr %	Regional crushed rock output	Torr %	National crushed rock output	Torr %
1988	7.9	18.0	44%	39.1	20%	120.3	6.6%
1989	7.6	19.7	39%	37.6	20%	126.7	6.0%
1990	6.5	16.6	39%	33.1	20%	118.6	5.5%
1991	5.6	13.4	42%	28.0	20%	106.0	5.3%
1992	5.2	13.0	40%	28.6	18%	104.0	5.0%
1993	6.3	14.5	43%	29.8	21%	106.1	5.9%
1994	5.8	16.1	36%	32.1	18%	117.2	4.9%
1995	4.6	12.5	37%	27.4	17%	104.1	4.4%
1996	3.4	10.4	33%	22.9	15%	91.5	3.7%
1997	3.8	11.4	33%	22.1	17%	95.9	4.0%
1998	4.6	12.1	38%	23.1	20%	93.4	4.9%
1999	3.9	11.5	34%	23.1	17%	90.0	4.3%
2000	4.3	12.2	35%	25.3	17%	90.1	4.8%
2001	4.7	14.0	34%	26.5	18%	95.7	4.9%
2002	4.6	11.3	41%	23.0	20%	88.8	5.2%
2003	4.5	11.7	38%	22.4	20%	86.2	5.2%
2004	5.0	9.8	51%	20.6	24%	83.7	6.0%
2005	4.6	11.22	41%	22.2	21%	83.5	5.5%
2006	4.7	11.9	39%	21.5	22%	Not yet published	
2007	5.4	12.4	44%	22.6	24%	Not yet published	
2008	5.0	10.5	47%	20.3	25%	Not yet published	

Sources: Aggregate Industries, South West Regional Aggregate Working Party and British Geological Survey.

Note: From the mid 1990s until 2006 the rate of *production* at Torr (i.e. the rate of extraction) exceeded the rate of *output* from the quarry (i.e. sales). This was because the production fraction normally used in the preparation of fill products (known as 'scalpings') was no longer able to be sold because of penetration of the fill markets by secondary and recycled aggregates. During that period, the unsold scalpings were stockpiled within the quarry. The granting of planning permission for further reserves in 2000 enabled investment to be made in new washing plant and, since this became operational in 2006 the scalpings have been able to be processed into saleable products, albeit with a 15 to 20% 'wastage' factor (comprising silts and clays which are able to be used in restoration). Since that time, the rate of production from Torr has been more closely matched with the rate of output (sales), and progress has been made in reducing the stockpile of scalpings from earlier years. This has not only prevented the further accumulation of excess scalpings, it has also extended the life of the remaining permitted reserves.

1.28 The strategic importance of Torr Quarry is not, however, simply attributable to its historical share of production or its capacity for maintaining similar levels of output in the years ahead. It is equally related to the quarry's ability to contribute to national, regional and local policy objectives for the sustainable supply of aggregates.

1.29 At the **national** level, these objectives are set out in paragraph 9 of Minerals Policy Statement 1 (MPS1), published by CLG in 2006. Amongst a total of 12 headline objectives they include requirements:

- *"to secure working practices which prevent or reduce as far as possible, impacts on the environment, and human health arising from the extraction, processing, management or transportation of minerals;*
- *to protect internationally and nationally designated areas of landscape value and nature conservation importance from minerals development, other than in exceptional circumstances (as defined);*
- *to secure adequate and steady supplies of minerals needed by society and the economy within the limits set by the environment, assessed through sustainability appraisal, without irreversible damage;*
- *to promote the sustainable transport of minerals by rail, sea or inland waterways; and*
- *to protect and seek to enhance the overall quality of the environment once extraction has ceased, through high standards of restoration…"*

1.30 Taking each of these in turn, Torr Quarry provides exemplary approaches to the mitigation of environmental impacts; does not impinge upon national or international designations; provides a steady supply of essential minerals, primarily by rail; and has already demonstrated very high standards of restoration around the rim of the quarry (a process which will continue whilst the proposed further extraction takes place within the footprint of previous workings, inside the outer rim).

1.31 At the **regional** level, minerals policies are set out in the draft Regional Spatial Strategy (RSS) for the South West. Policy RE10, relating to the supply of aggregates and other minerals, confirms that:

- *"Mineral 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……" and that*
- *"…. In order to promote the delivery and bulk transport of minerals by rail and/or water, existing railheads, wharfage and other handling facilities, will be safeguarded and opportunities for new ones should be identified, where appropriate"*

1.32 Both of these statements are clearly compatible with the continued provision of aggregates by rail from Torr (and Whatley) as part of the South West's contribution to national requirements.

1.33 Policy RE11 sets out the sub-regional apportionments for aggregates provision, based on the South West Regional Aggregates Working Party (SWRAWP) recommendations originally issued in 2003. This reaffirms the figure of 14.14 mtpa as the annualised apportionment for Somerset (as noted for the period 2001-2016 in Table 1.1 above) and advises that this should continue to apply throughout the period covered by the RSS (i.e. to 2026).

1.34 In practice, this requirement is likely to be superseded by the revised sub-regional apportionment, currently being undertaken by South West Councils, of the latest national and regional guidelines for 2005 to 2020, as published by CLG in June 2009. Initial figures, for the first of three possible scenarios being investigated by SWC, suggest a reduction in Somerset's annualised apportionment from 14.14 to 13.42 mtpa (Minerals, Waste and Planning, 2009). The final figure, once consideration has been given to the second and third scenarios may be lower or higher than the scenario 1 figure. However, the heavy reliance on Somerset (and therefore the Mendips) to provide most of the region's crushed rock aggregate is unlikely to change a great deal – simply because there are no realistic alternatives within the South West for providing such large quantities, including supplies by rail into London and the South East.

1.35 The importance of the Mendips, in this respect, was demonstrated in a technical and strategic assessment carried out by Capita Symonds for the former SW Regional Assembly (Thompson *et al*, 2005)[4].

1.36 Regional policies and related studies therefore reaffirm the continued need for strategic supplies of crushed rock aggregates to be provided by the Mendips quarries and (by implication, at least) from Torr Quarry itself.

1.37 At the **local** level, Somerset County Council is the Mineral Planning Authority for the majority of the Mendip Hills, including all of its limestone quarries. Its detailed policies relating to mineral development are set out in the Somerset Minerals Local Plan 1997 – 2011 (adopted April 2004). Higher level policies, which set the strategic context for minerals development, are set out in the Somerset and Exmoor National Park Joint Structure Plan Review (adopted April 2000). Both documents are in the process of being replaced by the new Minerals Development Framework, of which the Core Strategy is currently in preparation.

1.38 In the existing Strategy for Crushed Rock Aggregates (Chapter 6 of the Minerals Local Plan), recognition is given to the importance of Somerset resources to the needs of the nation, and also to the "long standing policy of the County Council" (as articulated in Policy 25 of the Joint Structure Plan Review), for crushed rock production to be focused primarily in the East Mendip area. The supporting text to that policy notes that the reasons for continuing to concentrate aggregate extraction in the eastern Mendips relate to the 'existing commitments' in that area, the 'scope for further new extraction' and the fact that much of the area to the west is within the AONB designation. Though not explicitly stated, the 'existing commitments' referred to here seem to relate primarily to the rail infrastructure associated with Torr and Whatley quarries.

1.39 Despite this general endorsement of the strategic importance of these quarries, the more detailed observations within the Minerals Local Plan suggest that there is no justification, on need grounds, for the release of

[4] Reference to that study is made in Section 7.3.27 of the draft RSS, but the related bullet points highlighting the need for substitution and collaboration between MPAs were subsequently deleted in the Secretary of State's proposed changes.

further reserves during the Plan period and beyond. Paragraph 6.2.19 notes that the existing permitted reserves at Torr, Whatley, Moons Hill, Westdown, Battscombe and Callow Rock *"ensure that the Plan is allowing the industry to maintain an adequate and steady supply of minerals over the plan period and beyond, without the need to release further reserves other than in the circumstances set out in policy M35"*.

1.40 Those circumstances relate to situations where there is a '*demonstrable need that cannot be met from existing permitted reserves*'; or where the proposal will result in significant benefits to the environment or local communities *without significantly increasing the size of the landbank*. The Plan makes clear that, in this context, any increase greater than the most recent annual production figure for the County as a whole would be regarded as significant.

1.41 The proposed application for additional reserves at Torr Quarry falls into the first of these categories. It is argued here, on the basis of the foregoing analysis, that there is a demonstrable need to maintain the productive capacity of Torr Quarry, in recognition of its strategic importance in supporting national policy objectives for the sustainable supply of construction aggregates.

1.42 As demonstrated in the following Section on Alternatives, unless additional reserves are permitted, the output capacity from Torr is likely to be reduced during 2015 and 2016, and then reduced substantially (and permanently) after 2020, as existing reserves in the main quarry are depleted.

1.43 Allowing for the length of time which may sometimes be required for the determination of applications, and for the implementation of associated legal agreements, there is need to consider these requirements at the earliest opportunity.

Conclusion: the Need for the Proposed Development

1.44 The foregoing review has demonstrated that:

- Aggregates production is an essential component of the national construction industry and is needed to support economic growth;
- The South West region, and Somerset in particular, have strategic roles to play in meeting the national requirements for aggregate production, with much of the output being exported to growth areas in other parts of the country where insufficient resources are available;
- The quarries of the Mendip Hills provide more than 90% of the total crushed rock production in Somerset, and about half of the total crushed rock production in the whole of the South West Region.
- Torr Quarry plays a very significant role in the supply of Mendips limestone, providing around 39% of all production in Somerset and around 20% of the entire South West region's apportionment. It is therefore of vital strategic importance;

- This importance is heightened by Torr's efficiency of production, its minimal impacts on the environment (compared with alternative options) and, not least, by its ability to supply aggregate by rail to a wide range of distribution depots in areas of economic growth across London and the South East.

1.45 Torr Quarry therefore plays a vital, strategic role in helping to achieve national policy objectives for sustainable minerals extraction, transportation and the efficient use of aggregates. For these reasons, it is argued here that it is essential that the quarry is allowed to maintain output.

1.46 In order to continue effectively, and in order to justify the investment needed in continued environmental management and efficiency, Torr Quarry needs to have access to additional reserves.

1.47 Without such reserves, the quarry would have to scale down its rate of production and eventually close, leading to alternative supply scenarios with conceivably greater environmental impact overall, and to the undermining of several key areas of Government policy. As explained in detail in the following section, these effects will begin to be seen as early as 2015 unless new reserves are released before then.

2. Consideration of Alternatives

Summary

2.1 The following alternative options, available to Aggregate Industries, have been considered:

1. The closure of Torr Quarry as existing permitted reserves are exhausted (including the possibility of reduced output over a longer period);

2. The application for additional reserves.

2.2 This section reviews each of these options by considering their implications in the following terms:

- *Consequences in terms of output from, and development at, other quarries, with respect to the supply of aggregates by rail and by road to different markets;*

- *Broad environmental and sustainability implications of these consequences.*

2.3 Taking these various implications into account, this section demonstrates that the preferred option would be to secure the continued operation of Torr Quarry and its railhead facilities through a planning application for the release of further reserves.

Introduction: Options Available to Aggregate Industries

2.4 Before reaching its decision to apply for planning permission to deepen Torr Quarry, Aggregate Industries first considered the available alternative options. As the current permitted reserves at Torr are depleted, the company has concluded that it will be faced with just two options:

- ***Option 1****: to allow the closure of Torr Quarry (the 'do-nothing' option); or*

- ***Option 2****: to apply for planning permission for the extraction of additional reserves.*

2.5 Option 1 includes the commercial option for Aggregate Industries to reduce its rate of output so as to extend the life of its existing reserves. It also includes the possibility of reopening dormant or inactive sites, such as Aggregate Industries' own Cloford and Shipham Hill quarries, in order to compensate for the shortfall in output capacity which would eventually be brought about.

2.6 This section reviews each of these options, considers their implications in terms of consequential development in the Mendips and elsewhere, and provides a broad assessment of the resulting environmental issues.

Option 1: The Closure of Torr Quarry

2.7 The simplest option for Aggregate Industries to consider would be to allow Torr Quarry to close when the existing permitted reserves are exhausted. Whilst this would clearly not be in the company's interest, the environmental and wider sustainability implications of this option need to be considered.

Consequences in terms of Output and Quarry Development

2.8 If Torr were to close, the market demand which it currently serves would need to be met by increased output from other units, within the Mendips and perhaps elsewhere, including quarries within Aggregate Industries' control and those operated by other companies.

2.9 The consequences of this, in terms of changing patterns of supply, can best be assessed by giving separate consideration to the markets served by rail – primarily in south-east England, and those served by road transport – primarily within the local area.

Markets supplied by rail

2.10 Torr quarry typically supplies about three quarters of its output by rail to a network of distribution depots throughout southern and south east England. This currently (2008) amounts to around 3.75 million tonnes per annum (mtpa), but can be as high as 4.5 mtpa at times when the total output from the quarry is at the maximum level currently permitted (6 mtpa).

2.11 All of the depots served by rail from Torr are operated by Aggregate Industries, as part of a vertically integrated supply chain from supply source to end users. In the event that output from Torr Quarry were to be reduced or to cease altogether, there would be a commercial imperative for much of the shortfall in supply to these depots to be sourced instead from other AI quarries. These would principally be Bardon Hill and Croft in Leicestershire, which, at present, are both able to supply by rail to many of the depots, and Glensanda in Scotland, which is able to supply some other depots (via sea to the receiving depot in Kent and thence by rail).

2.12 Aggregate Industries has estimated, however, that various capacity restrictions (output limits, rail capacity and wharf facilities) as well as cost considerations would mean that no more than half of the shortfall would be able to be accommodated in this way. It has also advised that a shortage of permitted reserves at both Bardon Hill and Croft would greatly restrict the length of time over which this might be possible. The analysis presented here is thus a 'best case scenario', which assumes that additional reserves will be permitted at Bardon in the near future.

2.13 The remaining 50% (or more) of Torr's current rail output would therefore need to be supplied from other sources. The most likely of these would be Hanson's Whatley quarry, which is able to supply limestone aggregate by rail to all of the depots currently served by Torr. Given that Torr's rail output

varies between 3 and 4.5 mtpa, If Torr closed, Whatley would thus need to increase its rail output by 1.5 to 2.25 mtpa.

2.14 When added to the current total output from Whatley (estimated by AI to be around 3.0 mtpa) these increases would be well within Whatley's existing permitted output limit of 8 mtpa. However, in times of more typical (higher) demand, when Whatley's output would be expected to be more than 4 mtpa, such increases would bring the total close to or above the figure of 6 mtpa which is considered by Aggregate Industries to be the practical output limit of Whatley's existing plant and machinery. This would leave little if any spare capacity for the Mendips to respond to any future surges in demand for rail-supplied aggregate, e.g. for major development initiatives. The transfer of output to Whatley would also foreshorten the life of remaining reserves at that site and thereby further impact on the long term potential for continued supplies by rail from Somerset.

2.15 With regard to the South East markets, in particular, other potential sources which could theoretically help to substitute for the shortfall of supplies from Torr include:

- *Land-won sand & gravel and crushed rock extraction within the south-east;*
- *marine-dredged sand and gravel;*
- *alternative materials (secondary and recycled aggregates); and*
- *imports by sea from other countries.*

2.16 The first of these would be at odds with the recent trends of declining permitted reserves and output capacity within London and the South East (Brown & Highley 2006, Capita Symonds 2008), and also with CLG's latest (June 2009) National and Regional Guidelines for Aggregates Provision in England, which show a substantial (29%) reduction in the expectation for crushed rock production in the South East compared with the previous (2003) guidelines. This, however, relates primarily to much weaker crushed rock materials such as Kentish Ragstone, which do not in any case provide an acceptable substitute for Mendips limestone.

2.17 Marine dredged aggregates and alternative materials are already taken into account in the new guideline figures, and in both cases the assumptions made by CLG are that supplies from these sources will increase, despite the overall reduction in total requirements. The assumed increase for secondary and recycled aggregates is very minor, however. This is likely to be a reflection of the fact that the supply of these materials and the extent to which they are technically capable of substituting for primary aggregates is approaching a maximum limit.

2.18 Imports of crushed rock aggregate by sea into the South East from other countries (including AI's Glensanda quarry in Scotland) are also shown in the CLG guidelines. For the South East, the new guidelines assume that this source of supply will dramatically reduce, from 85 million tonnes over 16 years in the 2003 guidelines, to just 31 million tonnes over 16 years in the

2009 guidelines. The explanatory text which accompanied the consultation draft of the new guidelines reveals that this was largely a reflection of the actual levels of imports reported in the AM2005 survey being lower than in 2001 (rather than being an indication of either reduced availability of imports or a policy requirement to reduce them).

2.19 It is therefore reasonable to conclude that, in order to meet the expectations for supplies to South East England, as set out in the new CLG Guidelines, and to maintain the same levels of delivery by rail or sea rather than road, the closure of Torr Quarry would necessitate substantially increased output from Whatley Quarry, in the Mendips, and from Bardon Hill and Croft quarries in Leicestershire, together with imports by sea from Glensanda in Scotland. The Leicestershire quarries are already facing a shortage of reserves and may not be able to accommodate the shortfall from Somerset. The additional environmental and sustainability implications of these observations are considered separately below.

Markets supplied by road

2.20 Approximately one quarter of Torr's output is supplied by road, primarily to relatively local markets in the South West Region (Somerset, Wiltshire, Dorset, Bristol, Bath & NE Somerset, and Devon). Smaller quantities are also supplied by road into the South East (to depots which cannot be accessed by rail). The total output by road currently amounts to around 1.0 to 1.25 mtpa. The maximum permitted output by road from Torr is 3.0 mtpa, but this could only be achieved at the expense of reduced output by rail, which is unlikely to occur.

2.21 In contrast to the rail depots described above, these local markets include a mixture of internal and external customers. They include coating plants, concrete batching plants and other local supply depots operated by Aggregate Industries companies; similar depots operated by other suppliers; and direct sales to a wide range of end-users.

2.22 Given that transportation costs represent a high proportion of the delivered price of aggregates, it is reasonable to assume that any shortfall in supply to these various markets from Torr quarry is likely to be taken up by the nearest available alternative supply sources. In most, if not all cases these are likely to be other quarries within the Mendips.

2.23 In the case of internal customers, there may be a commercial preference to use other Aggregate Industries sources (i.e. Colemans Quarry in the East Mendips and Callow Rock Quarry in the West Mendips), but in other cases the choice will be wider and could therefore include any of the other active quarries in this area (Whatley, Halecombe, Gurney Slade, Battscombe and Moons Hill). The latter unit supplies andesite rather than limestone, and therefore normally commands a higher price on account of its suitability for use in specialist skid-resistant road surfacing applications (Thompson *et al* 1993, 2004), but may still be able to supply into this market – especially in times of heightened demand when the output limits from other local sources have been reached.

2.24 Table 2.1, below, lists all currently active quarries within the Mendips together with their estimated reserves, maximum permitted output levels, and current levels of output, as estimated by Aggregate Industries. It also shows their likely capacity (as assessed by AI) for increasing output in the event of Torr's closure, based on the capacity of existing processing plant and machinery as well as output limits set out in planning conditions. The table also indicates, in very general terms, the main reasons why increased output to compensate for Torr quarry may sometimes be less than the output limits specified in planning conditions.

Analysis

2.25 Table 2.1 shows that, once allowance has been made for increased output by rail from Whatley Quarry, the remaining capacity for increasing output at this and other sites within the Mendips is likely to be in the order of 3.1 mtpa. This is (just) sufficient to accommodate the maximum permissible output by road from Torr Quarry (3.0 mtpa), but leaves almost no capacity to deal with periodic surges in demand above this level. Taken together with the capacity of Whatley quarry to cover an additional 2.25 mtpa by rail, and the capacity of other quarries operated by Aggregate Industries (elsewhere in the UK) to supply material by rail and/or sea into the South East markets (subject to the replenishment of reserves in Leicestershire), this analysis shows that it would theoretically be possible for the loss of output from Torr Quarry to be absorbed, even at maximum levels of annual output. This, however, presents only a 'snapshot' of the position, and does not take account of changes in productive capacity over time. On its own, Table 2.1 is therefore misleading.

2.26 The graph shown in Figure 2.1, below, attempts to overcome this problem by linking the foregoing analysis to the changing availability, over time, of permitted reserves at each of the active quarries in the Mendips. This illustrates the likely consequences of Option 1 over the period until the end of 2031 (i.e. one year beyond the expiry date of Torr's existing planning permission). The data relating to Figure 2.1 are presented in more detail in Appendix 1.

2.27 Figure 2.1 is based on the assumption that the overall level of demand from quarries in the Mendips will recover from its current level of around 9.6 mtpa (reflecting the current economic recession), to a more typical level of around 13 mtpa by 2011, and will thereafter remain at this average level. This does not represent any kind of forecast regarding future demand; it is simply the assumption on which the following analysis has been based. As can be seen from Table 2.1, it falls in between the current, depressed output figure of 9.6 mtpa and the maximum practical output of 16.9 mtpa, as assessed by Aggregate Industries. In reality, demand will fluctuate from year to year and is likely to rise and fall over longer periods in response to economic cycles, but the assumption of 13 mtpa as an average over this period is thought to be a reasonable expectation. It is also broadly in line with the Mendips' majority share of the 'Scenario 1' annualised apportionment for Somerset over the period 2005 to 2020 (i.e. 13.42 mtpa), as assessed by the MWP 2009 report for South West Councils.

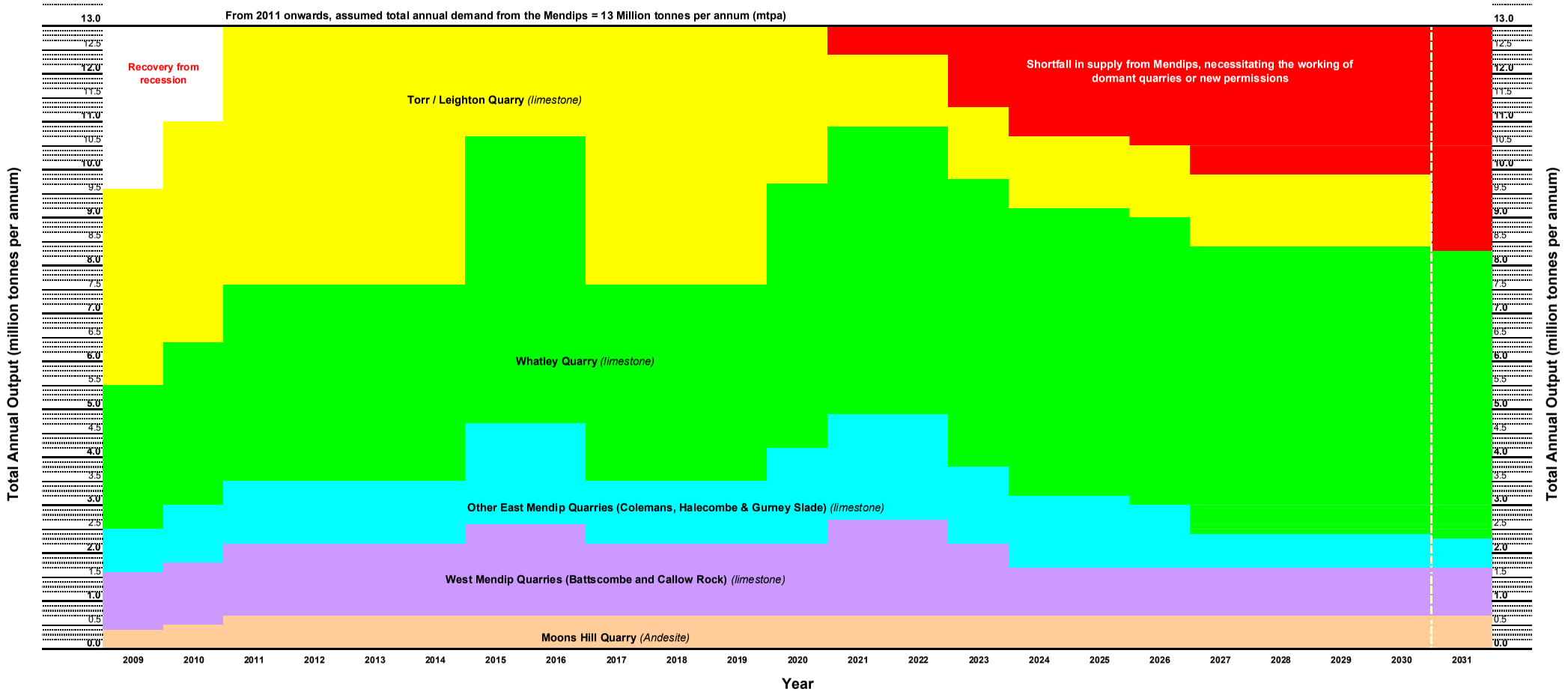
Table 2.1: Estimated reserves and output for active Quarries in the Mendips

Quarry	Estimated permitted reserves [1] million tonnes	Maximum permitted output [2] mtpa	Estimated current output [3] mtpa	Maximum practical output [4] mtpa	Main practical constraints which would limit maximum output	Estimated maximum capacity to increase output in the event of Torr's closure	
						By road (mpta)	**by rail** (mtpa)
Torr – main quarry reserves	**39.55**	**6.0** of which *no more than* 3.0 by road	**4.0** (including processed scalpings) of which 3.0 by rail and 1.0 by road	**6.0** of which *no more than* 3.0 by road	Can be worked at up to 8 mtpa using mobile primary crusher, but 10mt of these reserves are currently sterilised by the scalpings stockpile	N/A	
Torr – scalpings stockpile	**4.75**				Limited by the capacity of the washing plant, i.e. 1.0 mtpa		
Torr – Leighton reserves	**29.67**				Can only be worked by conventional operations, and thus limited to a maximum of 1.5 mtpa		
Whatley	**120**	**8.0**	**3.0**	**6.0**	Limited by existing plant and machinery	**0.75** (allowing for increased output by rail)	**2.25** (allowing for increased output by road)
Other East Mendip quarries: **Colemans**	**11**	**1.0**	**0.05**	**0.75**	Limited by existing plant & machinery	**0.70**	0
Halecombe	**13**	**1.0**	**0.55**	**0.75**		**0.20**	0
Gurney Slade	**7.5**	**1.0**	**0.35**	**0.75**		**0.40**	0
West Mendip quarries: **Callow Rock**	**13**	**1.3**	**0.65**	**1.0**	Limited by distance to market (unlikely to increase output until East Mendip Quarries are operating at full capacity)	**0.35**	
Battscombe	**30**	**1.2**	**0.50**	**1.0**		**0.50**	0
Non-limestone quarries: **Moon's Hill**	**48**	**1.0**	**0.45**	**0.65**	Limited by the higher specification of this aggregate	**0.20**	0
TOTALS (incl Torr)	**316.47**	**20.5**	**9.55**	**16.9**			
TOTALS (excl Torr)	**242.5**	**14.5**	**5.55**	**10.9**		**3.10**	**2.25**

NOTES:

1. Estimated by Aggregate Industries, as at 31/12/2008. Figures exclude overburden and waste
2. Taken from current planning conditions at each site
3. Assessed by Aggregate Industries, base year 2009
4. Assessed by Aggregate Industries, taking account of both planning and practical limitations, base year 2009

Figure 2.1: The likely consequences of Option 1 in terms of output from Mendip Quarries, 2009 to 2031



2.28 In constructing Figure 2.1, it has been assumed that output from all units will increase proportionally to the end of 2011 and will then remain steady until 2014 when the accessible reserves at Torr (those not sterilised by the scalpings stockpile, and excluding the Leighton reserves) become exhausted. At this point, the overall output from Torr is briefly maintained by an increased rate of processing scalpings (maximum output assessed at 0.8 mtpa) and by production from the Leighton extension. The latter would only be able to take place at an absolute maximum rate of 1.5 mtpa, using much smaller scale (and therefore less efficient) equipment than is used in the main quarry.

2.29 During 2015 and 2016, no production would be available from the main reserves at Torr, necessitating increased output from Whatley and other Mendip quarries.

2.30 Between 2017 and 2019, with the scalpings stockpile completely removed, and access to the underlying reserves regained, full scale production would be able to resume at Torr, albeit briefly, with a consequent reduction in output from other units.

2.31 During 2020, the main reserves at Torr would become exhausted. Thereafter, with the Leighton reserves and all other Mendip quarries being worked at maximum practical capacity, there would be a growing shortfall in output as permitted reserves are exhausted, successively at different quarries. Based on Aggregate Industries' assessments, the permitted reserves at Gurney Slade, Callow Rock, Halecombe and Colemans would be exhausted, progressively, between 2023 and 2031, whilst those remaining at Leighton would cease to be workable when the current planning permission expires in 2030.

2.32 Thereafter (beyond 2031 - not shown on Figure 2.1), with permitted reserves remaining only Whatley (only 1.4Mt) at Battscombe and Moonshill, the total output capacity would quickly be reduced to just 1.65 mtpa (a shortfall of more than 11 mtpa compared with the assumed average level of demand), none of which would be able to be transported by rail to London and the South East. In this event, the Mendips would cease to become a strategic supply source for economic growth in those areas. This would either impede development or massively increase the pressure on other supply sources.

2.33 The capacity of the Mendips to supply even local markets in the south west would also be severely diminished. Moreover, the majority of this remaining capacity would be at Moons Hill, where output is generally reserved for higher specification road surfacing applications; and the rest, at Battscombe, would be from within the AONB.

2.34 Taken together, these various consequences would be directly in conflict with current supply policies at national, regional and local levels.

2.35 In reality, the various aggregate companies would seek to avoid any shortfall in supply by applying for new planning permissions and/or by commencing production at sites which are currently inactive or dormant. Shipham Hill,

operated by Aggregate Industries, is an inactive site which would be seen as a replacement for the adjacent Callow Rock Quarry in the west Mendips AONB. Cloford, also owned by Aggregate Industries, is a currently dormant permission which would require the agreement of new conditions before reopening, but which may be seen as a partial replacement for Torr Quarry in the east. Westdown, owned by Hanson Aggregates, is also a dormant site and would be seen by Hanson as an eventual replacement for Whatley. Extensions to existing sites may also be proposed at Callow Rock and Battscombe (within the AONB), and at Gurney Slade, Moons Hill, Halecombe and Whatley.

2.36 With the exception of Whatley, however, none of these sites has rail connections. This would also be the case for any new greenfield quarries that may be proposed in the Mendips, unless Freight Facilities Grants and other forms of subsidy were able to cover a large proportion of the substantial costs involved. Whilst this might be feasible in the very long term, it is thought to be unlikely within the foreseeable future.

2.37 In terms of maintaining the ability to transport aggregates from the Mendips by rail, and to respond to future surges in demand (whether by rail or road), it is therefore clear that Option 1 has marked inadequacies.

Environmental and Sustainability Implications of Option 1

2.38 From the analysis presented above, it is likely that Option 1 would result in a progressive loss of productive capacity in the Mendips, necessitating either the granting of new permissions or the opening of inactive or dormant quarries from no later than 2021 onwards; and/or increasing pressure on other supply areas (particularly in the East Midlands, where reserves are rapidly diminishing) for the supply of aggregates into London and the South East. It would also result in a critical loss of rail capacity; thereby necessitating increased transportation of aggregates by road.

2.39 Although the early closure of Torr Quarry would achieve certain benefits, by virtue of the cessation of working and early completion of restoration works, these would need to be considered against the sterilisation of strategically important mineral resources and a number of other consequential adverse effects, both in the Mendips and elsewhere.

2.40 Assuming that the overall level of demand continued to be met, these impacts would include:

- *Greatly increased output by rail from Whatley Quarry, giving rise to much greater disturbance over many years from train movements through residential areas of Frome[5]. In addition to the increased length of trains transporting aggregate, this would include increased numbers of train movements associated with wagon and locomotive maintenance activities (which currently take place at Torr);*

[5] Note: this effect relates only to rail output from Whatley: trains to and from Torr use a different line which avoids Frome.

- *Reduction and eventual loss of rail transportation options, both at Torr and (unless extensions are permitted) at Whatley, necessitating increased transportation by road with consequential carbon impacts and/or the transfer of impacts to other supply sources in Leicestershire (where reserves are limited) and the Peak District National Park);*
- *Increased output from a number of other quarries throughout the Mendips, with consequential impacts of various kinds at those sites, including:*
  - *increased levels of extraction in the Western Mendips, within the Area of Outstanding Natural Beauty;*
  - *commencement of further extraction (and consequential disruption and impacts) at sites which are currently inactive or dormant, or at new greenfield sites;*
  - *greater overall impact on the water environment (through extraction and dewatering at sites which are in more sensitive locations and/or less capable than Torr of monitoring and mitigating these effects); and*
  - *increased levels of traffic (both lorry movements and private car journeys) on minor, rural roads.*

2.41 In addition to these environmental impacts, the loss of Torr's (and Whatley's) railhead facilities would be a waste of a substantial long term investment, including that provided from the public purse via the transport grant system. It would also remove the potential for these facilities to be used in future to transport other cargoes. This again would be a retrograde step in terms of sustainable long term planning.

2.42 If the overall level of demand could not be met (e.g. if new permissions were not forthcoming in the Mendips or if rail and/or planning restrictions prevented alternative supplies being obtained from the East Midlands), there would be very serious alternative adverse effects in terms of a shortfall of construction aggregates to support economic growth in London and the South East.

Possible Variation: Reduced output from Torr

2.43 One possibility available to Aggregate Industries, which might need to be used as a last resort in the event of a refusal of permission for further reserves, would be for the company to scale down its rate of production so that the reserves are run down more gradually between now and the expiry of the current permission in 2030. This would have the advantage of maintaining use of the railhead for a longer period of time (perhaps until further reserves are granted in future years), but would be at the expense of greatly reduced efficiency (compared with current operations) for a period of two decades. Moreover, it would still require increased production from other Mendip units, such that the reserves at most of these would still need to be replaced over a similar period of time, in order to maintain overall levels of output.

Option 2: Application for the Release of Further Reserves

2.44 The second main option available to Aggregate Industries would be to apply for planning permission for further reserves to extend the life of the quarry.

2.45 With the possibility of extending laterally being restricted on all sides by geological and/or major environmental constraints (see corresponding sections of the Environmental Statement for details), the only option remaining would be to deepen the quarry within the existing permission boundary. Clearly, even this will give rise to some environmental issues, compared with the option of allowing Torr to close, and it will extend the period of time over which these need to be considered. These issues, however, are addressed within other Chapters of the ES. In the much longer term, there may be a possibility of utilising the Torr railhead and processing facilities in connection with the exploitation of new reserves around Westdown Farm and Cloford. These possibilities are being examined as part of a long term strategy study for Defra[6], but are beyond the scope of the present analysis.

Consequences in terms of Output and Quarry Development

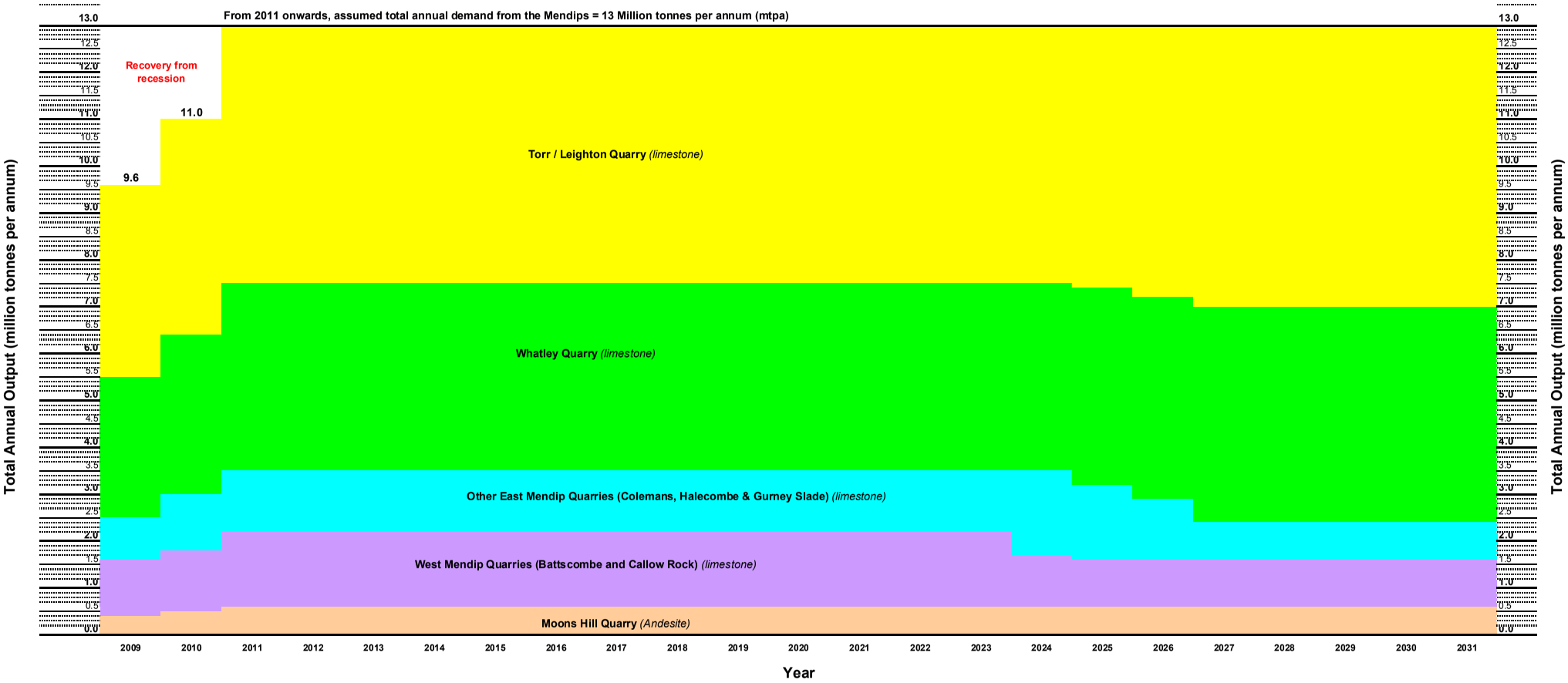
2.46 By securing almost 115 mt of additional permitted reserves, Torr Quarry would be able to maintain its 'normal' share of total output until about 2043[7]. As a consequence, although Torr Quarry and adjoining areas would be directly affected by the proposed excavation and associated works, there would be no development implications at other sites arising from or relating to the circumstances at Torr. There would also be no necessity to seek additional output from the East Midlands or elsewhere.

2.47 Moreover, by avoiding the need for other quarries in the area to step up production to compensate for reduced output from Torr, the existing permitted reserves at other sites would be able to contribute to the overall supply for longer periods. This effect would be limited at Gurney Slade and Callow Rock, but at Whatley and Colemans quarries it would extend the life of existing reserves by more than five years, compared with Option 1. These consequences are illustrated in Figure 2.2, below, and in the corresponding data, presented in Appendix 1.

[6] "An Ecosystems Approach to Long Term Mineral Planning in the Mendip Hills, Phase II" Research for Defra and MIRO by Capita Symonds, Cuesta Consulting and David Jarvis Associates

[7] As noted earlier, Torr Quarry's share of total Mendips output has averaged 39%, over the last 20 years, but has increased significantly since the new scalpings washing plant was installed in 2006. It is currently estimated by Aggregate Industries to be around 42%. Assuming a total Mendips output of 13 mtpa, this equates to an average output from Torr of some 5.45 mtpa. From the analysis presented in Appendix 1, Option 2 would result in Torr Quarry having 62.8 million tonnes of reserves remaining by the end of 2031. At the assumed average output rate of 5.45 mtpa, this equates to 11.5 years' supply, sufficient for the quarry to continue until midway through 2043.

Figure 2.2: The likely consequences of Option 2 in terms of output from Mendip Quarries, 2009 to 2031



2.48 Figure 2.2 is again based on the assumption that the overall level of demand from quarries in the Mendips will recover from its current level of around 9.6 mtpa, to a more typical level of around 13 mtpa by 2011, and will thereafter remain at this average level.

2.49 Although Callow Rock, Halecombe and Gurney Slade quarries would still close within this period, unless additional permitted reserves were to be obtained at those sites, output from all other quarries would be maintained. Figure 2.2 demonstrates that, even if new reserves at Callow, Halecombe and Gurney Slade were not able to be obtained, the total output of 13 mtpa from the Mendips as a whole could easily be maintained by slight increases in output from other units. Increased output at Battscombe would be able to compensate for some of the lost production from Callow Rock, with the remainder being picked up by Colemans and/or Torr Quarry. Similarly, these quarries would have the capacity to accommodate the lost output from Halecombe and Gurney Slade.

2.50 In reality, as with Option 1, the operators of Callow, Gurney Slade and Halecombe would be likely to seek permissions to extend these quarries, and Aggregate Industries would have the additional option of recommencing operations at Shipham Hill (currently inactive) or Cloford (currently dormant). In contrast to Option 1, however, such applications would simply enable these operators to maintain the status quo, rather than seeking to replace the rail output from Torr with output by road from a variety of other sites.

Environmental and Sustainability Implications of Option 2

2.51 From the analysis presented above, it is clear that Option 2 would be able to maintain the status quo in terms of the existing pattern of supply, including strategic rail output to southern and South East England.

2.52 As a consequence there would be no adverse implications for economic growth and no adverse environmental implications, compared with existing baseline conditions, other than those associated with Torr Quarry itself. These are addressed in other chapters of the Environmental Statement.

2.53 Although these impacts would be experienced over a longer period of time, compared with Option 1, they are generally of a minor nature and no different to existing baseline conditions. The only exceptions to this are the impacts which would relate specifically to the deepening of the quarry (particularly with respect to energy consumption and impacts on the water environment). However, as demonstrated elsewhere in the Environmental Statement, these impacts would be able to be mitigated more effectively at Torr Quarry than at other sites within the Mendips.

Conclusion: The Preferred Option

2.54 This review has examined the two main options available to Aggregate Industries with respect to the future of Torr Quarry, and the consequences that these would have in terms of output from and development at other sites.

Option 1 relates to the closure of Torr Quarry, as its existing permitted reserves are exhausted; Option 2 relates to the release of further reserves in accordance with the proposed development. The review has also briefly considered a variant of option 1, involving the scaling down of output over a longer period of time.

2.55 The analysis suggests that, on the basis of the broad environmental and wider sustainability implications which would be likely to arise, the preferred option would be to extend the life of Torr Quarry and its vital rail facilities by securing additional permitted reserves. The alternative options would give rise to increased output from much smaller sites within the Mendips, without access to rail facilities, necessitating increased transportation by road. They would also bring forward the need for further reserves at those sites and/or applications to reopen dormant sites. Furthermore, the alternatives would necessitate Whatley Quarry working at maximum capacity for many years – a high risk strategy leaving no spare capacity to cope with periodic surges in demand associated with major projects. In addition, they would place increasing pressure on rail supplies from Leicestershire where reserves are already in need of replenishment.

2.56 It is Option 2, therefore, - the release of further strategic reserves at Torr Quarry - which forms the basis for the proposed development.

Appendix 1

Details of Options 1 and 2 in terms of output from individual sites

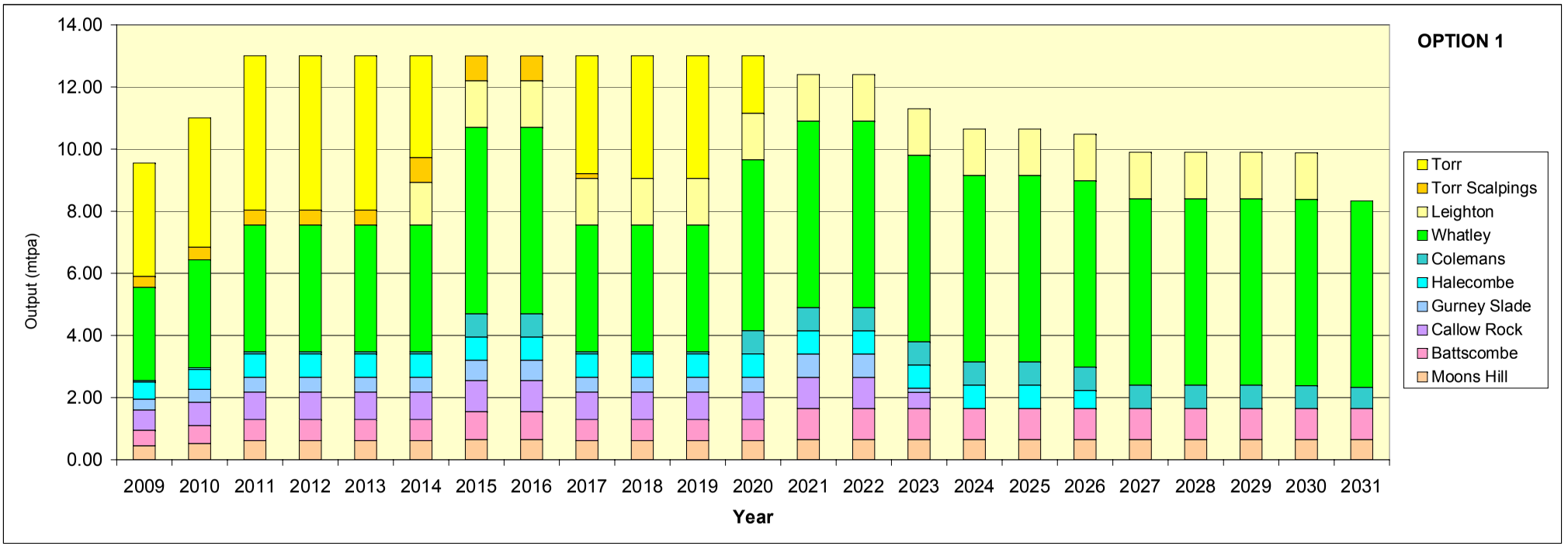
OPTION 1: No further reserves granted at Torr

Annual production from each unit in millions of tonnes per annum, assuming demand grows to 13mt by 2011 then remains at that average (bold figures represent assumed maximum output)

Accessible reserves at Torr (excl those beneath scalpings) = 26mt. Depleted by early 2014 | Remaing reserves at Torr not accessible during this period | Final reserves at Torr (=13.6mt) depleted during 2020 | Expiry of current planning permission at Torr

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total Output (mt)	Reserves available in 2009	Reserves Remaining by end of 2031
Torr	3.65	4.16	4.97	4.97	4.97	3.28	0.00	0.00	3.80	3.95	3.95	1.85	Reserves exhausted											**39.6**	39.55	0.00
Torr Scalpings	0.35	0.41	0.48	0.48	0.48	**0.80**	**0.80**	**0.80**	**0.15**	Scalpings Stockpile exhausted														**4.8**	4.75	0.00
Leighton	0.00	0.00	0.00	0.00	0.00	**1.37**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**		**25.4**	29.67	4.30
Whatley	3.00	3.47	4.08	4.08	4.08	4.08	**6.00**	**6.00**	4.08	4.08	4.08	**5.50**	**6.00**	**6.00**	**6.00**	**6.00**	**6.00**	**6.00**	**6.00**	**6.00**	**6.00**	**6.00**	**6.00**	**118.6**	120	1.44
Colemans	0.05	0.06	0.07	0.07	0.07	0.07	**0.75**	**0.75**	0.07	0.07	0.07	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.73**	**0.68**	**11.0**	11	0.00
Halecombe	0.55	0.64	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.58**	reserves exhausted					**13.0**	13	0.00
Gurney Slade	0.35	0.41	0.48	0.48	0.48	0.48	0.65	0.65	0.48	0.48	0.48	0.48	**0.75**	**0.75**	**0.13**	reserves exhausted								**7.5**	7.5	0.00
Callow Rock	0.65	0.75	0.88	0.88	0.88	0.88	**1.00**	**1.00**	0.88	0.88	0.88	0.88	**1.00**	**1.00**	**0.52**	reserves exhausted								**13.0**	13	0.00
Battscombe	0.50	0.58	0.68	0.68	0.68	0.68	0.90	0.90	0.68	0.68	0.68	0.68	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**19.3**	30	10.67
Moons Hill	0.45	0.52	0.61	0.61	0.61	0.61	**0.65**	**0.65**	0.61	0.61	0.61	0.61	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**14.3**	48	33.68
TOTAL	**9.55**	**11.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**12.40**	**12.40**	**11.30**	**10.65**	**10.65**	**10.48**	**9.90**	**9.90**	**9.90**	**9.88**	**8.33**	**266.4**	**316.5**	**50.10**
												0.00	-0.60	-0.60	-1.70	-2.35	-2.35	-2.52	-3.10	-3.10	-3.10	-3.12	-4.67	**-26.62**	shortfall compared to expected demand	

Automated Chart of the data presented above



OPTION 2: Further reserves of 115mt granted at Torr

Annual production from each unit in millions of tonnes per annum, assuming demand grows to 13mt by 2011 then remains at that average (bold figures represent assumed maximum output)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total Output (mt)	Reserves available in 2009	Reserves Remaining by end of 2031
Torr / Leighton	4.00	4.61	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.60	5.77	**6.00**	**6.00**	**6.00**	**6.00**	**6.00**	**126.2**	189	62.8
Whatley	3.00	3.46	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.21	4.32	4.64	4.64	4.64	4.64	4.64	**95.4**	120	24.6
Colemans	0.05	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.53	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**6.8**	11	4.2
Halecombe	0.55	0.63	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.55**	reserves exhausted					**13.0**	13	0.0
Gurney Slade	0.35	0.40	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.08	reserves exhausted						**7.5**	7.5	0.0
Callow Rock	0.65	0.75	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.10	reserves exhausted							**13.0**	13	0.0
Battscombe	0.50	0.58	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**17.9**	30	12.1
Moons Hill	0.45	0.52	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	**13.8**	48	34.2
TOTAL	**9.55**	**11.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**13.00**	**293.6**	**431.5**	**137.9**
																0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	shortfall compared to expected demand	

Automated Chart of the data presented above