SD98

REGIONAL TECHNICAL STATEMENT

for the area covered by the

South Wales Regional Aggregates Working Party

October 2008

SWRAWP Regional Technical Statement

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FOREWORD

I am extremely pleased to have participated in this innovative document which sets out a new approach for the supply of aggregates in accordance with the principles of sustainable development. For all those who participated in the process I thank them wholeheartedly for their time and patience in what has been at times a demanding but also rewarding project.

Preparation of the RTS commenced in 2005 and in order to facilitate satisfactory progress the SWRAWP agreed to set up a new RTS Sub Group. This was duly formed of selected MPA Officers, representatives from industry, EA, CCW and the Chair/Secretary of SWRAWP. Several Member Forum meetings were then held at key stages to ensure elected Councillors of the 18 constituent authorities were kept involved in the process.

A series of documents were issued to inform the process as it developed. These consisted of draft and final issues; draft and final options; critical path analysis of reserves; analysis of the IMAECA environmental capacity GIS system; and MPA apportionment. All of these documents were made available on the SWRAWP website for public inspection as they were produced.

The draft RTS was the subject of a public consultation exercise commencing in November, 2007. A report of consultation responses was then produced and considered (reference to this exercise is found on page 101) by the SWRAWP in February 2008. Thereafter, the Member Forum in March, 2008, agreed to endorse the RTS subject to one of the eighteen MPA's abstaining (Torfaen).

The RTS seeks to achieve a more sustainable approach to the provision of aggregates. Instead of the traditional 'predict and provide' process of determining how much aggregate is being sold and then providing sufficient reserves to meet the demand; a more sustainable approach has been adopted. In essence, this new process determines what is happening now and whether or not based on (a) the population of the area (b) the reserves of the area (c) the environmental capacity of the area (d) the natural resources of the area, and (e) the proximity principle, existing patterns of supply need to change. It is freely acknowledged of course that any new pattern will not be achieved quickly due to the considerable legacy of permitted reserves that exist in the region. As set out in MTAN1, it is anticipated the annual production of aggregates in Wales should not exceed 23-27 mtpa at present. In order to prevent finite natural resources being sterilised by development, these have been identified for safeguarding for potential use in the future.

As to the status of the RTS, it is intended to be a strategic document produced by the RAWP's in Wales as required by MTAN1 (Annex A). Its primary aim is to provide a strategy for the provision of aggregates in the region, with allocations of future primary aggregate provision for each constituent Mineral Planning Authority area, so providing a clear steer for the emerging Local Development Plans. It will therefore have the status of a material consideration when the merits of any aggregate-related development proposals are considered in the development control process. Some authorities may, however, need to agree the level of apportionment between themselves as some may find if difficult to meet their specific apportionment requirements due to environmental constraints. In the event

some authorities choose not to implement the recommendations of the RTS in their area, powers of direction are available to the WAG to ensure a consistent sustainable approach is achieved in line with national policy.

Finally, I am optimistic the RTS will be used in a positive manner to drive a much needed sustainable approach to aggregate supply for the benefit of both the economy and the environment. I look forward to the co-operation of all stakeholders in meeting this challenge both now and in the future.

Martin Hooker
Chairman
SWRAWP

EXECUTIVE SUMMARY

The Regional Technical Statement (RTS) is a requirement of the Minerals Aggregates Technical Advice Note (MTAN1) which was issued by the Welsh Assembly Government in March 2004. MTAN1 sets an overarching objective which seeks to ensure a sustainably managed supply of aggregates (which are essential for construction), striking the best between environmental, economic and social costs. The RTS will provide a strategic basis for LDPs in the region in line with the objectives set out below.

In accordance with this objective, the RTS will therefore seek to:-

- Maximise the use of secondary and recycled materials and mineral wastes.
- Safeguard land-based minerals which may be needed in the long term.
- Acknowledge that where the principles of sustainable development can be achieved, the extension of existing aggregate quarries is likely to be appropriate.
- Where there is a need for new areas of aggregates supply, these should come from locations of low environmental constraint and take into account transport implications.
- Maintain supply of marine aggregate consistent with the requirements of the Interim Marine Aggregates Dredging Policy (IMADP).

(The terms used above are defined in the main report - see Section 3).

Consultation with stakeholders, including the public has been undertaken at a level commensurate with the status of the documents.

It has been produced by the South Wales Regional Aggregates Working Party (SWRAWP), with the assistance of the mineral planning authorities (MPAs), the quarry industry, various other bodies/agencies and the National Stone Centre.

The main purpose of the statement is to set out the strategy for the provision of the aggregates in the South Wales region for the period until 2021. As appropriate, MPAs in South Wales will then include allocations for future aggregates provision in their area, as part of the LDP process (NB. The National Park Authorities are not required to maintain such landbanks).

The RTS will be endorsed by the South Wales RAWP and each constituent MPA to inform the preparation of LDPs so that there is consistency and a sound regional strategy for sustainable mineral planning (MTAN1 paras 30 and 50). The strategic nature of the RTS means that it is not the intention to put forward specific sites. This is a matter for the MPAs via their respective LDPs, but within this regional framework. However in order to achieve transparency and robust scrutiny, where the RTS points to a general provision to meet an anticipated shortfall, this process has been the subject of strategic analysis by way of an environmental capacity assessment based on the IMAECA system[1]. At this broad level and given the detailed MPA analysis to follow, it was not considered appropriate or required that Strategic Environmental Assessment (SEA) and Health Impact Assessment (HIA) should be conducted.

It is important to note that the essentially strategic nature of this analysis means that more detailed matters which may be material as to whether Local Development Plans need to make resource allocations, should be considered during LDP preparation. Such matters may include:-

- The technical capability of one type of material to interchange for another.
- The relative environmental cost of substitution of one type of material by another
- The relative environmental effects of changing patterns of supply.
- Whether adequate production capacity can be maintained to meet the required supply.

In this respect it is also important to record that the IMAECA (environmental capacity) system has been used, subject to its limitations, to inform the strategic considerations. The IMAECA system is not intended to be used for, nor is it suitable for, the detailed identification of potential resource allocations in UDPs/LDPs or in the determination of planning applications.

In order to keep the RTS up-to-date, it will be reviewed every 5 years and monitored annually by the SWRAWP.

Key Findings and Recommendations

Secondary Aggregates

Secondary and recycled aggregate usage in South Wales has already (2005) achieved the 25% target proportion of all aggregates produced, set by MTAN1 for 2009. However, this is an all-Wales target and is therefore also dependent upon the performance in N Wales.

In tonnage terms, the main under-used secondary aggregate resource is pulverised fuel ash (p.f.a), but the application of this material is confronted by significant logistical and market issues which need to be overcome.

Usage of most other secondary and recycled aggregates and notably the recycling of construction demolition and excavation wastes (CD&EW) appears to be approaching the maximum potential in most areas. There is possibly some scope for increased CD&EW recycling in rural areas, but the quantity involved is likely to be very small. However, there are serious reservations about the reliability of CD&EW data and a considerable need for more detailed data

In the case of blast furnace slag and p.f.a there are important policy issues to be considered in optimising their use in favour of certain non-aggregates, which are considerably more efficient in terms of energy reduction, compared with their use as aggregates. There is a particular need to gain a better understanding of the issues inhibiting the greater use of p.f.a and to consider whether some of the obstacles in this respect can be overcome. Appropriate comprehensive research is required covering aspects such as transport, markets and specifications.

Marine Aggregate

Marine aggregate has the capacity to continue to make a vital contribution to supplies of sand in the region for the medium term (say 5-10 years), but important decisions will be required in the next five years concerning the implications of moving operations to deeper,

more distant waters. Marine sand currently constitutes a particularly sustainable form of aggregate supply in terms of its ability to deliver material efficiently to the centre of key urban markets in the region. Existing and potential wharves need to be safeguarded.

Primary Aggregates

Primary aggregates locally won, will continue to account for the largest tonnage of aggregates for the foreseeable future.

The distribution of resources and permitted reserves does not closely match the location of the main consuming areas. Markets and flows within the region are broadly as might be anticipated. There is a general surplus of permitted aggregate reserves (and resources) in the north and west of the region and an excess of production in those areas, when measured against population (as a proxy for demand), and a relative shortage in the more urban areas in the south and east, most acutely signalled in Swansea and Newport. There is a consistent transfer of material from the former areas, to the south east. It is acknowledged that the quality of reserves varies within the totals presented in SWRAWP Annual Reports and used here. However at the strategic level of the RTS, this is not usually a significant issue. There is a need for more specific information on the quality and distribution of aggregate resources.

There are very important environmental issues inhibiting the potential substitution of sandstone (resources of which are relatively plentiful) for limestone; these relate to the higher energy costs of production, transport and usage (especially in concrete) and higher outputs of un-saleable material.

Rock sales greatly predominate over natural land-won sand and gravel, sales of the latter being far smaller than for any other region, reflecting the high dependence upon marine sand. However, there are known untapped sand and gravel resources within the region.

Special Materials and Interregional Issues

Most exports are of high specification aggregates (HSA) to England in the form of Pennant Sandstone as well as ancient rocks (grits and igneous rocks) on the Welsh border. As South Wales is an important source of these materials at a UK level, special provision is made for this trade in MTAN1. Future supply of those materials has important environmental and transport issues. There is a need for better market survey and resource information to be able to monitor this section properly.

The region also possesses limited resources of high purity and other limestones which are of wider than regional significance, for industrial purposes. Consideration needs to be given to the extent to which special provision at a strategic level should be made for the future needs of stone for industrial (non-aggregate) uses and for HSA and whether specific landbanks can and should be established and monitored.

There appears to be little opportunity, logic or environmental advantage in promoting greater levels of imports.

Future Demand

Future demand is likely to rise relatively slowly (c1-2% pa) and in total (with N Wales) appears unlikely to breach the 27Mtpa upper level of the range anticipated by MTAN1.

Reserves, Resources and Environmental Capacity

Permitted reserves are relatively high in many MPAs but not all (notably Swansea and the former Gwent area - see Apportionment).

Dormant reserves generally account for a relatively small percentage of total reserves in the region, but are locally high in some areas.

The environmental capacity of resources in the region was examined using the IMAECA study. It should be noted that this is only intended for application at strategic level. In general it suggests that the outcrops of Carboniferous Limestone (which are in any event, not extensive), are particularly constrained whereas often, the Pennant sandstone has a greater capacity for working (but as noted elsewhere, is less versatile in use). Other sandstones and igneous rocks show a great variation in terms of environmental capacity.

Transport

There may be a possibility of increasing rail, but probably only at the risk of increasing output (and possibly even breaching the region's share of the all-Wales limit) by exporting greater quantities overall to England. Within this (and probably more acceptable in policy terms), the main opportunities for increased use of rail appear to lie with the transport of HSA's to England.

Ports proximate to possible large rock resources in environmentally acceptable locations appear to be very limited indeed. There are also a range of logistical issues connected with rail which require consideration over the next five years. However, potential siding and wharf locations should be safeguarded.

Road transport will continue to account for the bulk of traffic and usually represents the best practical means of supporting the proximity principle. In this respect there are some issues relating to improvement of local road links between quarries and primary road networks which deserve attention.

Apportionment

The apportionment of primary aggregates first required the likely demand trends on the region to be estimated (within the range anticipated by MTAN1) and the amounts expected to be met by secondary/recycled and by marine aggregates to be deducted. As noted, the level of imports was assumed to continue at a very modest level. Apportionment of primary aggregates was then carried out based on two approaches - one using traditional methods (i.e. applying past sales); the second using population as a proxy for the distribution of demand.

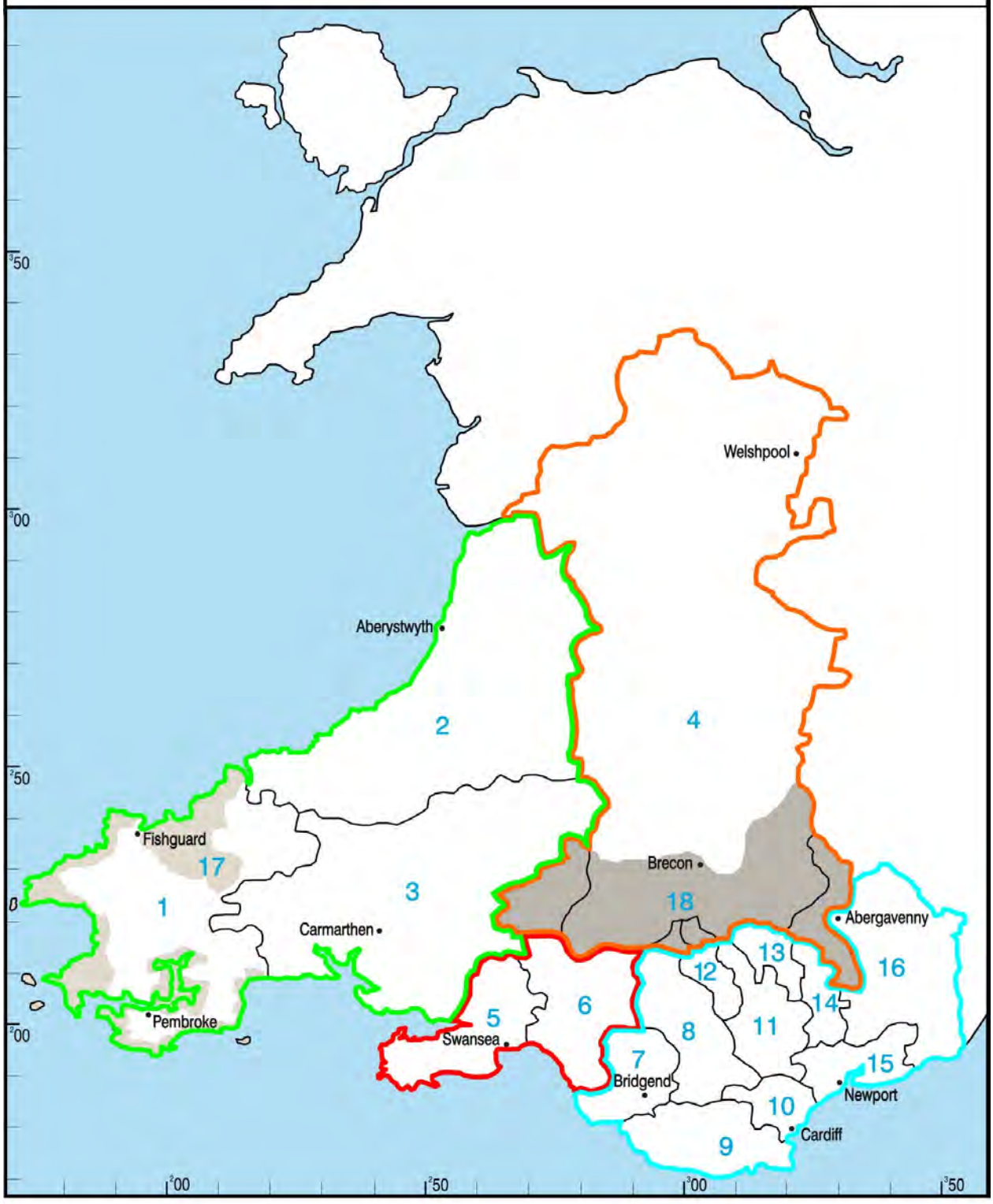
By this means it was anticipated that the need for crushed rock cumulatively would be between 163 and 175Mt over the period 2007-2021, the points on the range being dependant upon the methods used. This compares with permitted reserves of 584Mt in the region recorded for 2005 in sites then operational, with a further 131Mt at inactive sites with planning permission.

The final section of the main report analyses the situation in each of the 18 MPAs in terms of their ability to meet anticipated requirements (using the two methods noted above). In a

significant number of MPAs, the levels of permitted reserves are theoretically sufficient to maintain present levels of production for 20 years, i.e. the threshold point beyond which MTAN1 considers that the release of further reserves should not generally be made. However, MPAs are expected to take into account local circumstances. The possible implications of meeting the demand currently sourced from National Parks in the longer term, from non-park areas are reviewed and it is considered that in most instances, this would be feasible over the medium term (say 5-10 years), given some local adjustments. However the current published information base is insufficiently refined to be able to assess the situation at the appropriate level. The possible release of greater detail in statistics and liaison between all these stakeholders is required. There is also a need for further clarification of the Welsh Assembly's policy position in respect of mineral working in National Parks. Incidentally this is the first major policy guidance document in Britain to elaborate a practical shift from aggregate production in the National Parks to other areas.

Please note that for ease of reference and clear page layout all references (footnotes) are contained in Appendix 1.

Map 1: S.W.R.A.W.P. Mineral Planning Authorities



Unitary Authorities

1. Pembrokeshire
2. Ceredigion
3. Carmarthenshire
4. Powys
5. Swansea
6. Neath-Port Talbot
7. Bridgend
8. Rhondda-Cynon Taff
9. Vale of Glamorgan
10. Cardiff
11. Caerphilly
12. Merthyr Tydfil
13. Blaenau Gwent
14. Torfaen
15. Newport
16. Monmouthshire

Old County Collation Boundaries

- West Glamorgan
- Dyfed
- Powys (incl. Brecon Beacons N.P.)
- Mid & South Glamorgan And Gwent

17. Pembrokeshire Coast National Park

18. Brecon Beacons N.P.

1. INTRODUCTION

Background

1.1 The South Wales Regional Technical Statement has been prepared by the South Wales Regional Aggregates Working Party (RAWP) in accordance with the provisions of the Minerals Planning Policy (Wales) Minerals Technical Advice Note (Wales) 1: Aggregates (MTAN1) issued by the Welsh Assembly Government in March 2004.

The South Wales RAWP

The area covered by the SWRAWP includes all counties south of and including Ceredigion and Powys.

The remainder of Wales is covered by the North Wales RAWP which is preparing the counterpart document for that area.

1.2 It is the aim of the RAWP to coordinate aggregates planning across the region to provide a sound technical base of information for policy decision-makers and those involved in the planning process, including Welsh Assembly Government, MPAs, government agencies, communities and the industry. Specifically, its role is set out in MTAN1 (at Annex A) and can be summarised as:-

- Monitoring the production and distribution of primary and secondary aggregates, including exports and imports.
- Collecting details on primary aggregates reserves (including dormant sites) at regional and MPA levels.
- Monitoring the generation and usage of all alternative materials which have potential for aggregates, consider ways in which the usage might be increased to replace primary aggregates and the means by which data might be improved.
- Monitoring UDPs (Unitary Development Plan) and LDPs (Local Development Plan), and future construction development, and identifying areas where shortfalls of supply might arise.
- Assessing environmental capacity to meet demand for aggregates at MPA level.
- Assessing the likelihood of dormant sites being reactivated.

Reporting Procedure

1.3 The SWRAWP comprises mineral officers from the constituent authorities, and representatives of the Welsh Assembly Government, Environment Agency Wales (EAW), Countryside Council for Wales (CCW), the aggregates industry and the recycling industry. A list of members and their affiliations is given at Appendix 1.

1.4 In preparing the RTS, the SWRAWP has been aided by its RTS Sub-Group and in turn assisted by input from a large number of stakeholders, the co-operation of which is gratefully acknowledged. The drafting has been undertaken largely by the RAWP Secretary supported by the National Stone Centre.

In the context of the RTS, the SWRAWP advises a steering Members' Group which consists of nominees from each of the eighteen mineral planning authorities (i.e. MPA Councillors and nominated members from the National Parks), in the region.

Preliminary meetings of the Members' Group were held in January 2005, to initiate the process and consider the findings of the research report on Environmental Capacity [Appendix 2] Subsequent meetings have been held to consider documents from other stages in the RTS process.

Several meetings of the RTS Sub Group were then held during 2005-7 to consider progress on the RTS. The minutes of all these meetings are available from the RAWP Wales website.

This system ensures a close and continuing involvement of the MPAs (at officer and member level) the Assembly and other key stakeholders which have a statutory and non-statutory interest in the process. Chapter 2 sets out the relationship with higher and lower tier decision-making and policies. The UDPs and LDPs are of course subject to the full range of consultative processes and are also subject to intervention by Welsh Assembly Government using default powers (MTAN1 paras 50 and A3).

Details of the consultation procedures are set out in Section 5.

A brief review of the South Wales Region, its character and economy is given in Appendix 2.

Finally a broad statistical analysis such as that now presented is not capable of reflecting important subtleties in the market, for example the availability of large quantities of sandstone without significant environmental constraints may be of limited value to a market in need of say a sustainable source of concrete aggregate. Different types of aggregate source are not necessarily interchangeable, or, if they are used as an alternative, they may have higher intrinsic environmental costs (see Primary Aggregates - End Uses).

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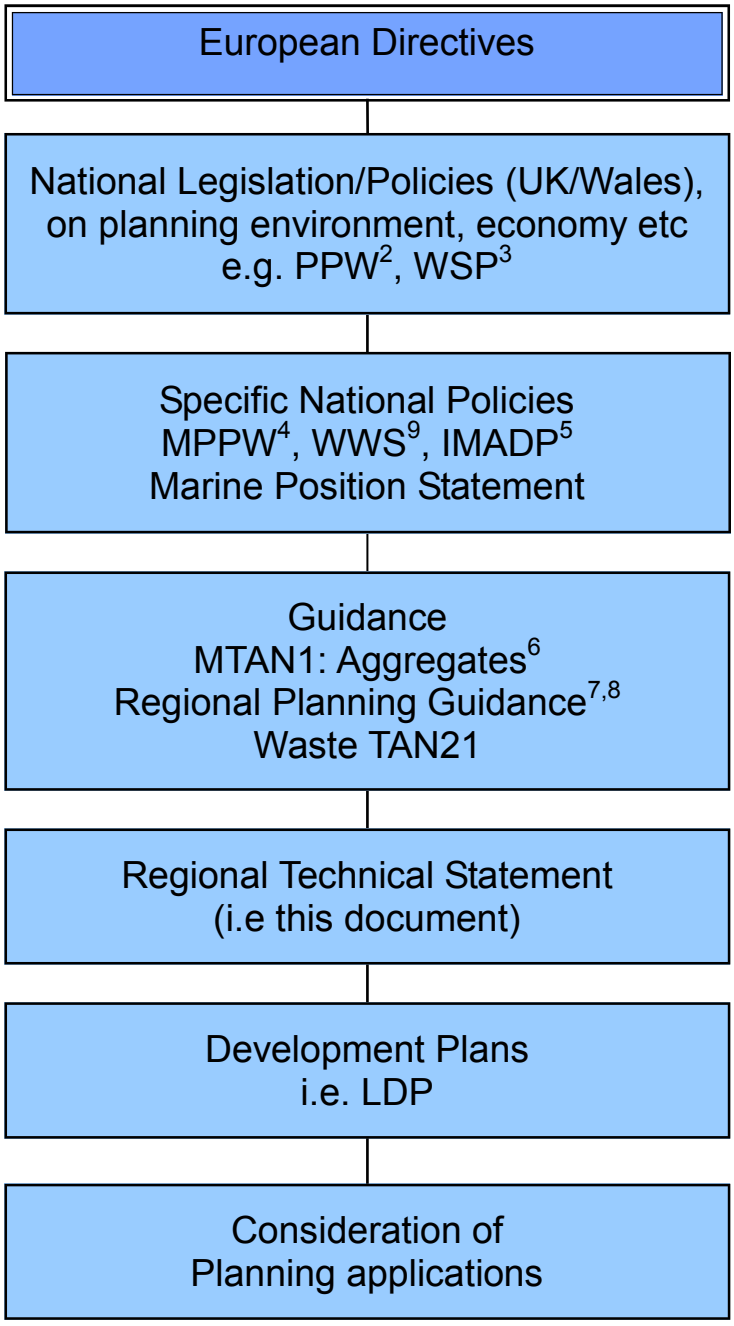
2. VISIONS, AIMS AND OVERARCHING PRINCIPLES

The planning system hierarchy is shown below:-

Table 1: Main Policy Framework



The higher level policy settings are summarised as follows:-

2.1 The concept of sustainable development is enshrined in the Government of Wales Act 1998. Planning Policy Wales (PPW) refers specifically to the Assembly's duty to ensure that in the exercise of all its functions, it has regard to the principle that there should be equality of opportunity for all people and that it promotes sustainable development. To achieve this vision, sustainable mineral planning must seek to address a number of specific aims and objectives which have been identified in the Wales Spatial Plan (WSP) as follows:-

(i) respecting distinctiveness;
(ii) valuing our environment;
(iii) building sustainable communities;
(iv) increasing and spreading prosperity;
(v) achieving sustainable accessibility; and
(vi) embracing the future.

At first sight, the relationship between quarrying and some of these objectives might appear to present considerable challenges. However there are direct linkages which are summarised in Appendix 3.

Minerals Policies

2.2 It was recognised that the special nature of minerals planning required specific policies. These are contained in Minerals Planning Policy Wales (MPPW) (2000). These relate to all mineral working and set the framework for such general matters as the system for identifying and planning future areas of working, protection of sensitive areas, measures to reduce environmental impact and in respect of post-working arrangements and efficient use of materials. Broad references are made to aggregates, the detail being reserved for MTAN1. However, conservation of resources, the production of alternatives to primary aggregates, special treatment for quarrying road surfacing materials, safeguarding of potential rail depot/wharves and recycling sites the need to identify and safeguard mineral resources (to avoid pre-emptive development which could sterilise or hinder extraction) and the significant role of marine aggregates are all referred to.

Aggregates Policies

2.3 The core objectives of the RTS are set out in MPPW - Minerals Technical Advice Note (Wales) 1: Aggregates (MTAN1) (Annex A3). These are:-

- to provide a regional assessment of the environmental capacity of each MPA area to contribute to an adequate supply of primary aggregates;
- to provide a strategy for the provision of aggregates in the region in accord with the regional assessment, with allocation of future aggregates provision for each MPA area to provide a strategic basis for future development plans;
- to assess the current and future imports/exports of aggregates;
- to assess the current and future contribution of marine aggregates;
- to advise the Assembly on the potential in each region for increasing the use of alternative materials to replace primary aggregates.

The RTS is to be monitored annually by the RAWP and subject to a thorough review and redrafting every five years.

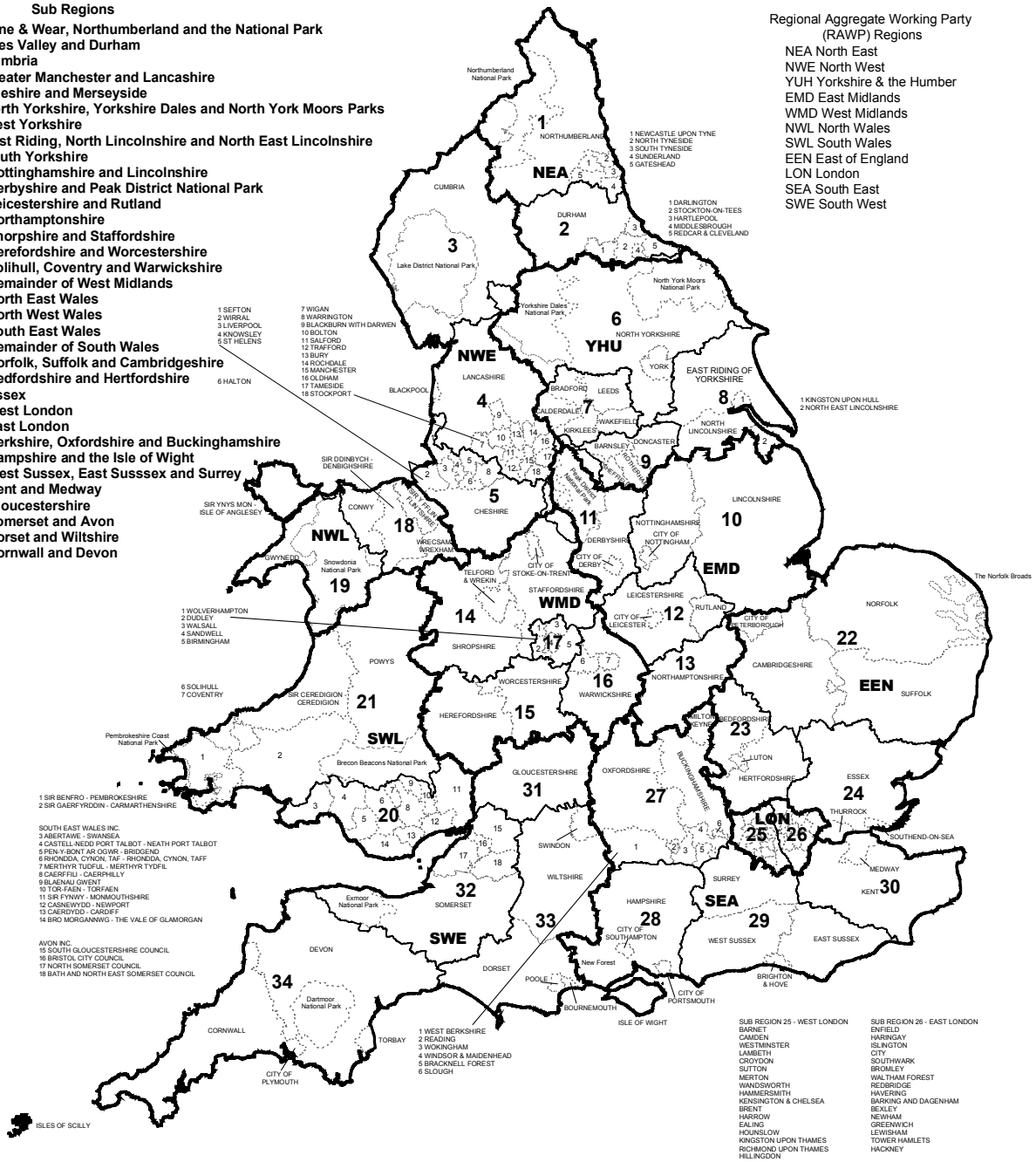
Map 2: Regional Aggregates Working Party (RAWP) Regions and Sub Regions

Sub Regions

1 Tyne & Wear, Northumberland and the National Park
2 Tees Valley and Durham
3 Cumbria
4 Greater Manchester and Lancashire
5 Cheshire and Merseyside
6 North Yorkshire, Yorkshire Dales and North York Moors Parks
7 West Yorkshire
8 East Riding, North Lincolnshire and North East Lincolnshire
9 South Yorkshire
10 Nottinghamshire and Lincolnshire
11 Derbyshire and Peak District National Park
12 Leicestershire and Rutland
13 Northamptonshire
14 Shorpshire and Staffordshire
15 Herefordshire and Worcestershire
16 Solihull, Coventry and Warwickshire
17 Remainder of West Midlands
18 North East Wales
19 North West Wales
20 South East Wales
21 Remainder of South Wales
22 Norfolk, Suffolk and Cambridgeshire
23 Bedfordshire and Hertfordshire
24 Essex
25 West London
26 East London
27 Berkshire, Oxfordshire and Buckinghamshire
28 Hampshire and the Isle of Wight
29 West Sussex, East Susssex and Surrey
30 Kent and Medway
31 Gloucestershire
32 Somerset and Avon
33 Dorset and Wiltshire
34 Cornwall and Devon

Regional Aggregate Working Party (RAWP) Regions

NEA North East
NWE North West
YUH Yorkshire & the Humber
EMD East Midlands
WMD West Midlands
NWL North Wales
SWL South Wales
EEN East of England
LON London
SEA South East
SWE South West



Local Planning Authorities in Wales, including MPAs are required to produce Local Development Plans (LDPs). Under a new system introduced by the Planning and Compulsory Purchase Act 2004, they will replace the existing Unitary Development Plans (UDPs).

A position statement[10] by the Welsh Assembly Government mainly relating to the supply of fine aggregates in the South East of Wales was issued in 2002 and Interim Marine Aggregates Dredging Policy (IMADP) was published in 2004 (These are covered in more detail in the section on Marine Aggregates and in Appendix 5).

3. KEY BACKGROUND AND ISSUES

INTRODUCTION

3.1 This section examines the significant issues presented in planning the future provision of aggregates in South Wales. Each issue is preceded by a resumé of the factual and policy background. Reference is given to supporting research and guidance forming the evidence base. Additional information is carried in the Appendices.

3.2 Fundamental to consideration of issues is an understanding of the main types of aggregate. Total consumption is made up of a range of contributing materials, each of which have particular environmental connotations or user limitations. Some of these aspects are summarised in Table 2. In most instances, there are also varying environment implications within sectors. The main commodities include:

- Primary aggregate - i.e. natural materials extracted from quarries or dredged from rivers and the sea - including rock, sand and gravel.
- Secondary materials/recycled aggregates (sometimes known collectively as 'alternative materials') - i.e. **i)** by-products of other industrial process - including, metallurgical slags, pulverised fuel ah (p.f.a) from electricity generating stations, furnace bottom ash (f.b.a), used foundry sand, and **ii)** material from the demolition of buildings and structures or recycled from roads, runways, rail ballast etc or produced from excavations related to construction (collectively known as "Construction Demolition and Excavation Waste - CD&EW), **iii)** other recycled goods e.g. glass, ceramics.
- Mineral wastes - discarded material from non-aggregate mineral working e.g. slate waste, china clay waste, colliery wastes (minewaste/minestone). (NB the issue of crushed rock fines (CRF) from aggregates quarries is discussed under primary aggregates).

3.3 Historically, providing a supply of hard rock/sand and gravel for aggregate use to cater for the demands of the construction and other industries, has been founded on a "plan, predict and provide" basis. This approach is deemed by many to be out of kilter with the principles of sustainability now enshrined not only in all aspects of mineral planning, but in respect of all government policies and actions. The Assembly considers that there are more relevant ways of determining how to meet society's vital need for construction materials without compromising the environment.

3.4 MTAN1 (2004)(para 20) assumed that the current production of aggregates in Wales was typically 23Mt per annum and that this would not increase significantly over the following five years. This was based on 2001 survey information and made an appropriate adjustments for exports, imports and all types of aggregates. Taking into account the expected economic growth in Wales, it was not anticipated that demand for aggregates would exceed 23-27 million tonnes per annum by 2010. Nonetheless, this is a broad range and later sections of the RTS give a more detailed analysis of demand as it applies to particular commodities and set in the light of more recent data. The South Wales share of this consumption was estimated to be c14 Mt pa[11].

3.5 MTAN1 states that although there should be an adequate supply of aggregates, natural resources should be conserved and the use of waste or by-products (i.e. "alternative aggregates") maximised in line with sustainable objectives. Hence, the approach is to

increase the proportionate use of alternative aggregates, so that primary (virgin) rock resources can be conserved for future generations.

3.6 Efficiency (or intensity) of use is another key objective which requires that the grade of aggregate used best fits the end-use, that wastage on site is minimised and that building design takes into account the efficient use of materials. In particular, high grade material should not be used for low specification end-uses such as fill. This for example could have implications in cases for establishing borrow pits in association with major construction schemes, or for production excessive amounts of virtually un-saleable fine materials (crushed rock fines - CRF) during the processing of certain rocks e.g. sandstone for high specification aggregates. This will ensure that valuable finite resources are not wasted in the short or longer term. Controlling this aspect of production is however, difficult and relies heavily upon a responsible approach by industry, as planning conditions cannot generally control the end-use of minerals.

3.7 It is also important to note here that a significant proportion (30-40%) of all aggregates consumed are utilised in repair and maintenance work, thus effectively sustaining the existing built environment and infrastructure. Reference has already been made to the safeguarding of resources. If there is a prospect of surface including even other mineral development, sterilising such materials, consideration should be given to prior or co-extraction (with other minerals) and may in some cases be one of the most environmentally efficient areas of securing supplies of aggregates.

3.8 In a similar vein, the use of particular aggregate materials may have important relationships for other non-aggregate materials which may in turn have very important environmental implications. These may for example be related to alternative, more energy efficient uses of such materials as blast furnace slag as a cement replacement, or may infringe on extremely limited resources e.g. high purity limestone, better suited to industrial areas. These aspects are considered further in a later Section [Industrial (Non Aggregate) Uses] and in Appendix (18 on Cement).

3.9 Generally, in the interests of promoting sustainability, the lowest acceptable quality materials with the widest availability, should be used in preference for those materials which meet more stringent specifications. Not all of aggregate materials are interchangeable for all end uses. Furthermore, whereas some end-uses can be interchanged, they may have limitations in their applicability or have additional environmental or monetary costs. The following matrix (Table 2) indicates in very general terms, the key inter-relationships and limitations. It should be noted that in some cases (particularly where marked with “?”), the use of some secondary and recycled materials may be physically possible if required by a client, but the stocks of primary material and the scheduling of production plant means that these materials are seldom used.

Aggregate	Roadstone	Concreting	Asphalt/ Building sand	Rail Ballast	Costruc-tion fill etc (f)	Armour/ Gabion Stone	Industrial use	Building stone		
Primary	**Coated**	**Dry**	**Coarse**	**Fine**						
Limestone/ dolomite (c)	√	√	√	√	-	(a)	√	√	√	√
Sandstone	√	√	(b)	(b)	-	(g)	√	√	-	√
Igneous Rock	√	√	√	√	√ (k)	√	√	√	(e)	√
Land won sand/gravel	-	-	-	√	√	-	√	-	(d)	-
Marine sand	-	-	-	√ (i)	√ (h)	-	√ (f)	-	-	-
Secondary/ Recycled										
Blast Furnace slag	√	√	-	-	-	-	√	-	√(l,m)	-
Steel Slag	√	√	-	-	-	-	√	-	-	-
Pfa	-	? (n)	-	?	?	-	√	-	√ (l)	-
Fba	-	-	?	-	-	-	√	-	-	-
CD+EW	-	-	?	-	?	-	√	-	-	-
Slate	-	-	√	-	-	-	√	?	√	√
Colliery Spoil	-	-	-	-	-	-	√	-	-	-
China clay sand	-	-	-	√(j)	-	-	-	-	-	-

Table 2: A Matrix of Aggregate Materials and Capabilities

(Footnotes on next page)

Footnotes to Table 2

a) Normally limestone and dolomite is unsuitable for rail ballast but one major quarry in S Wales produces rail ballast from an abnormally hard dolomite.
b) Whereas sandstone can be used for concrete aggregate, the main sandstone in S Wales (Pennant Sandstone) demands high volumes of cement (expensive and energy intensive) and water; it is highly abrasive and therefore costs more to process and also gives rise to more waste fines than limestone.
c) Limestone here refers to Carboniferous Limestone. Liassic (Jurassic) limestones are used in cement production but rarely if ever for aggregates and they are insufficiently resilient.
d) Natural sand has a number of industrial uses but is not employed as such to any significant extent in S Wales.
e) Igneous rock is occasionally used for industrial purposes e.g. insulation wool but this does not apply to material produced in S Wales.
f) Almost any aggregate material can and has been used for construction fill materials. However the relatively low price commanded by this end-use and the availability of a wide choice of materials, means that some of the more highly valued aggregates e.g. marine sand are not generally used for this purpose. Even in this last case, there are exceptions where large tonnages are required at coastal locations e.g. 600,000m³ of dredged materials were used in the Cardiff Bay barrage. Similar sources are normally used for beach replenishment. In such cases the specifications can actually be particularly demanding.
g) Not used in South Wales for this purpose but some older sandstones maybe suitable.
h) Particularly from the Severn Estuary and upper reaches of the Bristol Channel.
i) Particularly from the mid Bristol Channel.
j) It requires more cement and water than marine or land won sand.
k) Igneous rock fines can be blended with building sand to produce ‘sand’ suitable for asphalt.
l) Especially for cement replacement.
m) Also at some sites for fertilizer and glassmaking.
n) Small amounts are used in foam mix asphalt.

SECONDARY AND RECYCLED AGGREGATES

Key Background

3.10 Compared with primary aggregates, the secondary and recycled aggregates sector of the industry is smaller, but by comparison far more complex and fragmented. Serious research into usage and potential of all related streams of such materials began in the late 1960s and continues today. However although some materials such as slag had been used as aggregates from about 1905, despite numerous attempts (in contrast to rock, sand and gravel where annual data has been collected since 1895), the statistical evidence base for secondary and recycled aggregates is generally poor, thus making the monitoring of targets even at national (i.e. Wales) level[12,13] challenging. Below national level, the situation becomes even more problematic.

A brief resumé of the main components is given below. The main categories of secondary and recycled materials have been summarised in the previous section.

General Policy Setting

3.11 The hierarchy of supply which is perceived to optimise high environmental values places alternative aggregates (secondary and recycled materials) at the top of the list. That is to say their use should in principle be maximised and they should be utilised in preference to primary aggregates. Thus MTAN1 (para 157) sets a broad objective - to increase the proportion of aggregates production in Wales from secondary and recycled sources to at least 25% of the total aggregates supply with a 5 years (i.e. by 2009). However it goes on to imply that the main channel for achieving this level will be a significant increase in the uptake of slate waste, predominately sourced from North (West) Wales. MTAN1 (para 34) also criticised the relatively low utilisation of construction, demolition and excavation waste (CD&EW) arisings in Wales, not only compared to some other European Counties, but in contrast to levels in England (although according to QPA, the production of all aggregates derived from secondary and recycled materials in the UK is now the highest in Europe). On this basis, it (MTAN1 para 157) sets “a more realistic target” for recycling CD&EW as aggregates of at least 40% by 2005. It also points out that this is not at the level advised by the European Commission.

General Issues

3.12 Unfortunately, in South Wales, knowledge of volumes of alternatives, their arisings, stocks, locations and usage is often highly uncertain. They are also perceived by many to have significant limitations in terms of usage. Despite the lack of quantitative detail, it is inevitable that the greatest volumes of CD&EW arisings and usage are in the urban areas (and believed to be growing). Even there the levels of conversion to aggregates are believed to be lower than those in comparable settings elsewhere in Britain. It should be noted that under the European Waste Directive, materials designated as “waste” have to be treated at specific sites and by methods which comply with regulations. This process can inhibit the reuse of such materials for construction aggregates. The controlling body, the Environment Agency, working with the Waste Resource Action Programme (WRAP), has recently (August 2007) established protocols to facilitate a more straight forward means of using such works (type by type) for construction purposes.

3.13 The role of metallurgical slag as an aggregate source has always been very important in the region, although it has diminished with the closure of Llanwern Works. The future as far as aggregates supply, is uncertain. Pulverised fuel ash is produced on a large scale, but uptake is relatively low. Rail ballast and furnace bottom ash are also recycled.

Unlike North Wales, the volumes, physical characteristics and location, means that the potential for usage of slate waste (in Pembrokeshire) is relatively low.

However it may be possible to use imported secondary materials (slate from N. Wales; china clay from Cornwall - see Interregional Dependency), but location, logistics and economics are critical factors.

Table 3: Summary of Secondary and Recycled Aggregates Usage 2005 (South Wales)

	M tonnes
Construction, Demolition and Excavation Waste (CD+EW) (a)	3.000
Iron and Steel Slags (b)	0.950
Pulverised Fuel Ash/Furnace Bottom Ash (b)	0.100
Rail Ballast (c)	0.163
Clay (b)	0.017
Road Planings (e)	0.125
Slate; Colliery Limestone (f)	Nil
Pre cast Concrete (a)	0.001
Port and Harbour Dredgings (a,d)	0.070
Total Secondary and Recycled Aggregates	**4.426**

Sources:-

a) Calculations based on Faber Maunsell Survey for 2005 (adjusted to eliminate "soil")[14] - see table 4;
b) Wales Environment Trust Survey (WET);
c) Detailed data from WET: however Faber Maunsell Survey Figure is 95,000 for 2005;
d) Includes North Wales but mainly assumed to be South Wales;
e) South Wales RAWP Survey 2005, but only includes local highway authority material, and not Transport Wales;
f) Understood to be nil but not reported.

3.14 In addition, the Faber Maunsell report recorded 9.33Mt of "quarry waste" used as aggregates in Wales in 2005. However, this covers "quarry fines, scalpings" as well as "waste and other waste streams". The first two categories are already covered in the routine RAWP and AMRI surveys of Primary Aggregates (i.e. within the groups, but not exclusively, "other confliction uses inc. fill "and" undifferentiated uses. These amounted to 3.85Mt and 1.486Mt respectively in 2005).

The various types of secondary and recycled aggregates in South Wales summarised above are reviewed in turn below (more detail is given in MTAN1 and in Appendix 4). They can be divided into three broad categories: i) CD&EW, ii) other industrial materials, iii) mine and quarry wastes.

i) CONSTRUCTION, DEMOLITION AND EXCAVATION WASTES (CD&EW)

3.15 This includes crushed or other material suitable for use as aggregates, recovered from construction projects, demolition of buildings and structures, wholesale removal of roads,

aircraft runways, docks etc. It may be crushed on site (and reused on-site, or sold off-site) or taken to a depot/static site and processed for reuse.

Notwithstanding some severe limitations in the data (CD&EW waste is considered in detail in Appendix 4), and subject to the reservations noted there, the results of surveys are summarised below:-

Table 4: Arisings and usage of CD&EW as aggregates 1999-2005 (M Tonnes)

Arisings/Usage	1999	2001 (a%)	2003 (a%)	2005
Total Arisings				
N. Wales	nsa	1.56 (135)	1.46 (100)	nsa
S. Wales	nsa	3.46 (90)	4.54 (100)	nsa
Wales total	3.29	5.02 (74)	6.01 (100)	9.89
Total recycled as aggregate				nsa
N. Wales	na	0.46 (135)	0.64 (45)	1.0(c)
S, Wales	na	1.09 (90)	1.74 (43)	3.0(c)
Total Wales	na	1.55 (74)	2.38 (b)	3.97 (b)

a) Bands ± around estimate shown, at 90% confidence level shown in brackets.
b) Aggregates figures for 2003 and 2005 include soil. When this was separately recorded in 2001 it amounted to 5% of total arisings; the same proportions are applied here to 2003 and 2005.
c) Estimated rounded figures - see Appendix 4 for calculation method.
d) nsa - not separately available

One particular issue is the availability of suitable sites for recycling CD&EW wastes. These are understood to be unevenly distributed through the region but without relevant data on arisings, utilisation, capacity and location the position is unclear. This is an area which requires scrutiny by MPAs within the next 5 years. Furthermore, the processing costs for secondary aggregates, particularly to achieve a reasonable standard of product are generally higher than for primary aggregates.

ii) OTHER INDUSTRIAL MATERIALS

3.16 A number of industrial materials mainly by-product can be used instead of primary aggregates. Foremost of these are metallurgical slags but they also include material from power stations (p.f.a/f.b.a) and a wide variety of materials such as glass and ceramic waste. In some cases e.g. asphalt planings and rail ballast, it might appear more logical to group the substances under CD&EW. However, the coverage of CD&EW is already well defined in terms of survey returns, so those items are included in the industrial materials category. Data is collected by a number of agencies and in various forms. The main ones have been regularly reported but collectively in SWaRAWP surveys. These are shown on table 5 overleaf.

Table 5: Steel/blast furnace slag; p.f.a/f.b.a Totals 2000-05 (South Wales)

M tonnes	2000	2001 (b)	2002	2003	2004	2005
Used as Aggregates	0.964	0.920	0.954	0.700	0.700	1.08
Reserves at Year End (a)	12.54	5.16 (c)	16.98	27.31	26.20	25.10

Source - SWRAWP Annual Reports (except as shown below).
N.B. May include small amounts of slate waste in some years; road planings are shown separately in table T.
a) Aggregates in stockpiles and tips with planning permission for extraction except for 2001.
b) Source Symonds 2001 Survey (2003) of which slag 0.67Mt, p.f.a 0.16Mt and f.b.a 0.09Mt. In addition, spent rail ballast 0.04Mt and colliery spoil 0.03Mt.
c) Only recorded for p.f.a: colliery spoil given as 0.03Mt and rail ballast given as 0.04Mt.

Some more detailed information (collected by WET) for 2005 is shown in table 5a below.

Table 5a: Recycled and by-product materials (other than CD&EW) (2005 South Wales)

Aggregate K tonnes	Sales	Stock	Processing Capacity			
	High Value	**Low Value**	**High Value**	**Low Value**	**High Value**	**Low Value**
Iron and Steel Slags	190 (a)	760	50	300	250	630
P.f.a/f.b.a	30	70	-	12000	200	250
Rail Ballast	104	63	-	-	100	50
Glass	17	-	20	-	108	-
Total	**341**	**893**	**70**	**12300**	**568**	**930**

Source: Wales Environment Trust
a) In addition, 0.65Mt were sold for high value non-aggregate uses.

Metallurgical Slags

3.17 Port Talbot is now by far the main source of slag, but until its closure as a primary iron and steel producer in July 2001, Llanwern Works was also a major producer. Working of stockpiles still continues at the latter, but these are not being added to by new material. Blast furnace (iron) and steel slags from these works are utilised for aggregates. Processing of these in South Wales accounts for about a third of the UK annual total.

Future prospects for maintaining this level are very uncertain for a number of reasons: overall production of slag per tonne of iron/steel is generally slowly decreasing to reduce costs (including energy consumption). Stocks at former works are being depleted without further additions. The recent takeover of Corus, the main source, could bring changes to the level of primary metal production, and in turn, slag. The amount destined for aggregates

usage is also in part dependent upon the financial margins which can be generated by higher value uses. The volumes being dispatched to England could vary and at present are unknown.

Power Station Arisings

3.18 There are two forms of relevant material produced at coal fired power stations, pulverised fuel ash (p.f.a) and furnace bottom ash (f.b.a). In the region both types are only produced at Aberthaw Power Station. F.b.a is also produced at some waste incinerators but as far as is known, no aggregates are generated by this route in South Wales.

Aggregates sales data for 2005 (from WET) at 0.1Mt show a decline from 0.15Mt in 2001. They reflect a ratio of 3 low:1 high value material, or p.f.a: f.b.a. The finer (p.f.a) material is used as a fine aggregate (e.g. for concrete blocks), grout (e.g. for pumping into voids such as old mine workings) or to supplement cement. The latter embraces considerable energy savings (see Cement - Appendix 18).

These are small figures compared with the 0.36Mt generated in 2005 (or 0.4Mt in 2001) and anticipated to rise by a further 0.1Mt by 2008, or in contrast to the 12Mt stockpile. A further 5Mt on site is reported as unavailable as it encapsulates a hazardous waste tip. However a new plant was under construction in 2007 with a capacity to process 0.2Mtpa of fresh ash, 60% which will be low carbon material suitable for use in aggregates.

Further work is also needed to understand more clearly the reasons for the present limited use and to explore the opportunities for much greater applications of these considerable quantities.

Other Industrial Materials

3.19 As noted in Table 5, these include rail ballast asphalt planings and miscellaneous materials such as recycled glass, ceramics, foundry sand, rubber and plastic (see Appendix 4).

iii) MINE AND QUARRY WASTES

3.20 The waste products of certain non-aggregate mineral operations can sometimes be converted to aggregates. Those occurring in South Wales include colliery spoil (minestone) and slate. Wastes arising from aggregates production are discussed under Primary Aggregates and the possibility of using china clay sands are discussed under “Interregional Dependency”. Fine material produced alongside that of coarser aggregates, notably of sandstone for high specification aggregates is considered under primary aggregates (i.e. crushed rock fines - CRF). Sandstone has been worked effectively as a “by-product” of open cast coal mining (i.e. as a “windfall source”) particularly in the northern part of the coalfield, but there were significant issues relating to the phasing of operations, stock pilling and the need to achieve acceptable final landforms.

Quantities of colliery waste in tips in the past here were considerable. The overall potential is small for reasons given in Appendix 4 but could be locally significant. An estimate published for the main Coalfield area in 2000 suggested that only half of the 10,000t produced was used (as bulk fill)[15]. In the region permissions to rework former colliery spoil tips are located at the former British Colliery (Blaenau Gwent) and at Tower Colliery (RCT), but none are being actively exploited at the moment.

The slate industry in South Wales was very much smaller than that in the north and was concentrated in north Pembrokeshire including PCNP, and southernmost Ceredigion

The quality of the slate, if used as a secondary aggregate, is not likely to be as robust as the material in Gwynedd. In terms of a large scale source offering minimal environmental intrusion, importation by sea from the latter area probably offers a better, if still remote, prospect (see Inter-regional Dependency).

Secondary and Recycled Materials – Summary of the Main Issues

3.21 Despite the policy attractions of using a larger proportion of secondary and recycled aggregates, there are no "quick fixes". All the commodities involved present specific issues which have been aired above and can be summarised as follows:

1. **Construction Demolition and Excavation Wastes** - Although the volumes are highly significant and are generally very well placed to serve key urban markets, the sector is extremely complicated and largely unquantified certainly at detailed level. There is also little doubt that despite some practical technical and statutory constraints (which deserve further consideration), this sector has made a significant and growing contribution to the overall aggregate supply. However, in the absence of a requirement to make statutory returns of quantities and locations, it is difficult to envisage mechanisms by which data can be improved. The lack of vital data presently inhibits robust attempts at monitoring relevant MTAN1 guidelines.

   With the falling thresholds of tonnages which can be viably recycled, the possibility of improving levels of CD&EW recycling in less urban areas may be significant therefore in terms of local proportions utilised, but not in overall volumes for the region as a whole. It is likely that in urban areas the scope for increased utilisation is now limited as most available material is being recycled. There may also be some issues relating to the need to secure a suitable network of sites for processing CD&EW. In order to achieve this, a better understanding of the existing situation and trends is required.

   The scope for the recovery and re-use of construction, demolition and excavation waste is obviously concentrated in the urban areas and this needs to be taken into account when assessing the contribution which CD&E waste can make at the sub-regional level.

2. **Metallurgical Slag** - the range of sources has diminished and there are significant calls from a) higher value (and more energy efficient) end uses and b) exports to other regions. Volumes arising appear to have stabilised but there are still a number of significant uncertainties about medium-long term supply. There may be some scope for up-valuing the uses within the aggregates section.

3. **P.f.a/f.b.a** - All the high quality material is used as it is produced. Substantial quantities of p.f.a exist in stockpiles but these have limited applications and are also constrained by EA regulations (which are in the course of being modified). Perhaps the main issue relates to the extent to which p.f.a could play a larger role in the aggregates market (a largely technical issue as the material is actively marketed) and, bearing in mind the single source, are there any specific environmental considerations which need to be taken into account?

4. **Other non CD&EW materials -** These are all small by comparison and even collectively, offer few opportunities (in terms of volume) to make a major contribution. However, there is a lack of information which, although recently improved on account of the work carried out by WET, still displays some important omissions, notably the absence of any indication of the extent of asphalt planings relating to the major road network; the latter is a matter for Transport Wales to pursue in the first instance.

5. It is acknowledged that the lack of robust data at present preludes the apportionment of secondary and recycled aggregates below regional level and that steps should be taken to improve the situation before the next review.

3.22 In summary for the reasons noted earlier, there appears to be some scope for a further increase in the production of secondary and recycled aggregates, but this is likely to be very modest, unless a means of significantly increasing the uptake of p.f.a. can be established. This should be the subject of further investigation to ascertain whether there are technical or market reasons which could be overcome.

Policy Compliance - Secondary and Recycled Aggregates Usage

3.23 In 2005 in South Wales, 4.426Mt of secondary and recycled materials were used as aggregates (Table 3). A further 1.002Mt were derived from marine dredged sand and gravel landed in the region. Primary land-won aggregate production accounted for 11.29Mt (table 7). Therefore the total aggregates produced/landed/processed in the region in 2005 was 16.718Mt of which secondary and recycled aggregates contributed 26.5%. This compares with the broad objective of MTAN1 (para 157) of 25% by 2009 for the whole of Wales. Bearing in mind that MTAN1 (para 157) anticipated this level could only be reached given a significant uplift in utilisation of N. Wales slate waste (which did not contribute to the S. Wales total), the targets appear to have been met at least in South Wales well ahead of schedule.

MARINE AGGREGATES

Key Background

Further detail on marine aggregates is given in Appendix 5.

3.24 Compared with other regions of England and Wales, South Wales ranks third (after South East and London) in terms of the volume of marine sand and gravel landed. Although at 1.0-1.3Mt pa over the last 10 years, this is a relatively low tonnage (c.f. the other regions mentioned), the region is dependent to a far greater extent than any other upon marine sources for sand; here it typically represents 80-90% of the total sand consumption (and up to 95% in the south east of the region). In 2005 it was over 78% of the regional consumption.

Table 6: Landings of Marine Dredged Aggregate (South Wales) (Mt)

M tonnes	2000	2001	2002	2003	2004	2005	2006
The Crown Estate (a)	1.058	1.002	0.972	0.981	1.071	1.002	0.943
Swangrove Estate (b)	0.150	0.150	0.150	0.150	0.150	0.150	0.150
Total	1.208	1.152	1.122	1.131	1.221	1.152	1.093

Source: (a) The Crown Estate; (b) Planning Conditions

Figures previously published only relate to The Crown Estate licensed areas. In addition material dredged off Monmouthshire contributes a further estimated 0.15Mtpa based on the limit of the planning permission.

3.25 All of the marine aggregate landed in the South Wales region comprises sand and this fulfils a demand for the fine component in concrete (usually blended with crushed rock fines) and building sand, including for mortar rendering and other uses. There is a severe shortage of suitable concreting sand from land-based resources. This situation has driven the continuation of aggregate dredging activities for over 40 years and enables large volumes of material to be transported and delivered into coastal ports, very close to the point of end use in most of the main markets. This, together with the high quality and the need for only minimal processing mean that it is particularly energy efficient and an environmentally highly sustainable source of supply, especially when compared to other aggregates.

The principle deposits are in the Bristol Channel and Severn Estuary. About a third of the marine sand dredged from the region has been used to supply South West England.

Sand is also generated by port and harbour navigational dredgings, but only a very small proportion of this is suitable to replace marine aggregates for a range of logistical and technical reasons. These materials vary but are understood to account for 0.07-0.2Mt pa some of which is used for beach recharge along the South Wales coast e.g. at Burry Inlet and Briton Ferry.

Estimates of the marine aggregate resources of the Severn Estuary/Bristol Channel vary greatly but are considerable, running into billions of cubic metres. Demand is expected to grow in line with construction trends.

3.26 The Welsh Assembly Government, conscious of the significant dependence on this sector but mindful of the concerns expressed by the public and conservation interests, commissioned a number of research reports. The findings of most of the research were assessed and assimilated in 2002 by Symonds[16]. This report concluded that in terms of energy conservation, economics and technical specification for certain uses dredging was generally positive.

The report therefore advocated a gradual transfer over the next 10 years from the Nash Bank (the main source), to marine reserves further offshore and particularly to the west) and in deeper water, notwithstanding the higher economic and energy costs. As a main alternative, the report also advised that the practicality of more onshore sand and gravel working should be re-investigated and that resources identified should be safeguarded.

The existing dredging fleet and dredging regime depends on relatively shallow water and on sailing times which allow a turnaround compatible with tides and port access. The move to more distant, deposits in deeper waters would require new investment in new dredging vessels and/or technology and a different pattern of logistics. The industry indicate that there could be implications for maintaining supplies of marine sand during periods of adverse weather, if alternative licence areas in more sheltered locations are not retained. The Welsh Assembly Government is considering the case for further research into marine aggregates.

Policy Setting

3.27 Although MTAN1 is largely concerned with land-won aggregates, it necessarily refers to the vital marine contribution within the wider context. Planning authorities also have a role in safeguarding suitable land-based reception facilities for marine aggregates. The jurisdiction of MPAs may also extend into the Channel for example as just noted, the Bedwyn Sands, where the foreshore portion of a sand bank lies above the low water mark, but runs contiguously into an offshore area.

3.28 A consultative draft Marine Aggregates policy was issued in 2001 and the Assembly set out a Position Statement[17] in respect of the situation in South East Wales and with particular reference to the marine contribution was issued to the Assembly in 2002. Certain aspects of this statement still stand.

3.29 The Interim Marine Aggregate Dredging Policy (IMADP)[18] was developed following the earlier consultation on the draft policy document and was published in 2004. IMADP also applies directly to MPAs in the extended sand bank (see above - check) situation and in respect of the need to secure potential sites on shore receiving/processing facilities. IMADP supports the gradual shift of dredging operations from inshore areas to those further offshore and to those further to the west. Whilst it recognises benefits in the medium term of retaining local supplies from the Severn Estuary and inner Bristol Channel, in the longer term, a reduced proportion of sand should come from these areas. In late 2006, consultation on Draft Marine Dredging Regulations[19] and related draft procedural guidance was issued for consultation. The Regulations were made in September 2007, with associated procedural guidance. IMADP is to be reviewed at five-yearly intervals, with the first occur in 2009.

The strategy adopted in IMADP includes:-

- Steering the industry to dredging areas which are most likely to be sustainable and away from potentially vulnerable areas;
- Recognition of a continuation of marine dredging overall at current levels to support construction;
- Minimise the use of aggregates per se;
- Encourage the greater uptake of secondary and recycled materials but recognising in this context that the potential for these to replace marine sand is limited;
- Progressively over the ten years from 2004, to refocus dredging activities to off shore areas and to the west of the Bristol Channel, where they are consistent with sustainable development.

IMADP then goes on to relate to specific sedimentary environments and to assign policies to specific areas on the basis of their potential sustainability.

3.30 In terms of meeting the need for aggregates, IMADP echoes the stance in MTAN1, i.e. no significant change over the five years (from 2004) and that any increase should where possible be met from secondary and recycled aggregates, although in the short term, such an increase in demand might fall to marine dredged sources.

An upper licensed capacity threshold of 2Mt pa is set in IMADP (SP3) (c.f. the then current capacity of 2.7Mt and a production capability of 1.7Mt pa).

The Assembly seeks to maintain licensed dredging reserves at between 5 and 15 years supply, subject to suitable applications coming forward.

Subject to meeting sustainability criteria, the maximum to be contributed from Welsh waters in the Severn Estuary and Inner Bristol Channel will be 1Mt pa (equivalent to 50% the total licensed capacity in Welsh waters), reducing to 0.8Mt pa by 2015 with the migration of dredging offshore and to the west (i.e. outer Bristol Channel).

Another policy seeks to secure the use of marine dredged sand for high specification end uses.

3.31 IMADP also identifies marine sedimentary environments which are considered particularly sensitive to marine dredging and defines three moral categories, i.e. area where the Assembly:-

- Will look favourably upon proposals;
- Will adopt a precautionary approach;
- Is very willing to look favourably upon proposals.

3.32 The RAWPs and the RTS therefore have to take into account, all the appropriate aspects concerning the contribution to be made by marine sources.

3.33 A number of licence applications have been lodged and decisions are awaited: some are imminent. Although it would be presumptuous for the RTS to assume that these will all be approved, the number involved presents a range of options which, if some are confirmed, are likely to be able to maintain supplies for at least the next five years.

Marine Aggregates - Main Issues

3.34 There are considerable resources of marine sand of a good quality in the Bristol Channel/Severn Estuary, but there are also a range of policy and/or operational factors which restrict the ability to gain permissions to enable site specific deposits to be worked. In some cases there may be environmental (including European notified conservation sites) or coastal process issues to be addressed but equally there are also important economic factors to consider, notably water depth, tidal regimes, weather exposure, capital investment, running costs and distance from the principle landing points, some of which lend a strong sustainability case to the continuation of this supply. The key choice for the future is where to locate future dredging operations, with a migration to more distant, deeper waters being favoured by interim policies. Management of such changes will be a major issue over the next five years. There are also be some issues relating to the need to safeguard areas for potential landing and onshore processing facilities at points with appropriate access to the main markets e.g. at Pembroke Dock and Barry. The overall balance to be sought between marine and land-based sand supplies raises wider issues which were considered by Symonds in 2002[20].

Cornelly Quarry, Bridgend

PRIMARY AGGREGATES

Introduction

3.35 Primary aggregates are produced directly from naturally occurring materials - rocks, sand and gravel, which (usually after processing) can be used as construction aggregate. Under the definitions used in connection with the Aggregates Levy, they do not include clays or slate (see Fiscal and other Influences).

3.36 Perhaps the most significant element of the RTS is to provide a framework for the future of the primary aggregates sector and to place this within the context of the overall requirement for aggregates and one of long term sustainability.

The policies in MTAN1 on supply can be summarised as follows, they:-

- Advise an overall limit to meet aggregate requirements (as a result of demand from in and outside Wales and the region);
- Stipulate that a larger proportion of the total demand should be met from secondary and recycled sources;
- Suggest that, given acceptability in environmental terms, the marine sand contribution should continue at rates similar to those experienced in the recent past;
- Seek that all aggregates, should be used more efficiently and that high specification materials should not be used for lower speciation end uses;
- Acknowledge that primary aggregates should continue to meet the bulk of the residual demand, but that a more sustainable distribution of operational locations should be encouraged, for example with older permissions being phased out of the reserve inventory and a programme introduced for reducing the contribution made from National Parks and AONBs;
- Attempt to minimise the environmental impacts of transporting aggregate e.g. by shortening delivery journeys and where feasible (in economic and environmental terms), promoting modes other than road delivery.

3.37 Not only is South Wales well-endowed with aggregate resources, it has inherited over time, a substantial volume of permitted reserves. Reserves are often variable in terms of quality and location. It is therefore the task of the MPAs, the industry, central government and other stakeholders seek to secure the migration from the present inheritance, to a situation which demonstrates a more sustainable profile.

3.38 Whereas the main vehicle to achieve this transformation is the planning system (of controls and development plans), it is acknowledged that the legacy of commitments in some areas is so great that success will be heavily dependant upon the close cooperation and goodwill of the industry. The RAWPs and the RTS have a role in identifying such opportunities and potential solutions, and once established, bringing together the parties concerned to implement them.

3.39 The previous sections explored the contribution to be made by secondary/recycled aggregates and marine dredged sand. The key premise of the following major section is that primary aggregates will meet the residual requirement. It is also self evident that this is the sector where there is a greater direct engagement with the planning system, where the data is at its most detailed, one which probably exhibits the most poignant issues - not only in

operational terms, but in respect of transport, exports, specialist requirements and is one which is at least as susceptible as other sectors to financial and technical influences. Its environmental implications are those most readily apparent to the public.

3.40 Many of these themes are closely interrelated and a certain amount of repetition is inevitable, but attempts have been made to minimise this by adopting a sequence (see contents page) which begins by reporting the existing position in terms of production and distribution (including domestic and interregional flows), attempts to estimate consumption and future demand, acknowledges the need for provision in respect of certain special materials, considers existing landbanks and environmental capacity, then moves to a sustainable apportionment of provision for the future. The issues arising from the transport of aggregates are also assessed.

There are a few problems (e.g. of definition) surrounding establishing total sales of primary aggregates per se, and many more challenges in respect of calculating sales of secondary and recycled aggregates (see related sections of the report).

Coygen Quarry, near Laugharne, Carmarthenshire

PRODUCTION (i.e. sales)

3.41 Analysis of sales can be approached in several different ways, all of which have implications for planning: for example by rock type, end use or geographic source within the region. It is not possible to present these all in one table, but in some instances, overall long term trends are important to our understanding.

In summary, the period from 1973 has witnessed significant fluctuations in South Wales rock and sand/gravel sales until the last decade. From a high point in the mid 1990s, followed by a fall, the overall pattern has been one of remarkable stability, certainly for the last seven years or so [See Appendix 6].

Since 1973 (the date of the first RAWP Survey) with very few exceptions, South Wales has accounted for 55-65% of the Welsh output of primary aggregates output.

Sales by Primary Aggregate Mineral Type

3.42 In terms of rock type, since 1995, limestone has seen a significant decline (from c9Mt generally to 6Mt pa) but sandstone and igneous rock have both fluctuated by c±0.5Mt pa around midpoints of 3.0Mt pa and 1Mt pa respectively but with a small relative rise in sandstone sales.

In the same period, sand and gravel at a high point of 2.83Mt in 1995, has fallen back for most of the remainder of the period to 1-1.5Mt pa. The most noticeable feature here has been the major role played by marine dredging, with land won sand and gravel only accounting for between 13% and 30% of the total since 2000.

Table 7: Production of Primary Aggregates in South Wales by Mineral Type 2000-2005 (Mt)

Mineral	2000	2001	2002	2003	2004	2005	
Limestone	6.90	6.53	5.76	6.46	7.30	6.13	
Sandstone	2.42	2.64	3.14	3.71	3.20	3.49	
Igneous	0.48	0.83	0.64	0.95	1.08	1.23	
Total Crushed Rock	**9.82**	**10.00**	**9.54**	**11.12**	**11.58**	**10.85**	
Sand & Gravel	Land Won	0.16	0.34	0.19	0.19	0.40*	0.44
	Marine (a)	1.06	1.02	0.97	0.98	1.07	1.00
Total Sand and Gravel	**1.22**	**1.36**	**1.16**	**1.17**	**1.47**	**1.44**	
Total Primary Aggregates	**11.04**	**11.36**	**10.70**	**12.29**	**13.05**	**12.29**	

N Wales	9.54	8.58	7.87	7.56	7.65	6.90
All Wales	20.58	19.94	18.57	19.85	20.70	19.19

Estimate based on Crown Estate Summary of Statistics.

Location of Production

3.43 The aggregate resources will be summarised later (see Resources, Reserves, Landbanks), but within these areas, production is more concentrated and largely reflects, a) proximity to centres of demand; and b) historic patterns, many originating from the period before planning legislation was introduced in the late 1940's, indeed a number of large older sites were determined by the local availability of rail connections up to a century ago.

3.44 In broad terms, limestone production is determined by the resources of the so-called North and South Crops surrounding the South Wales Coalfield, but with the greatest

Table 8: Crushed Rock Aggregates Sales by Location of Production - South Wales (Mt)

Former County (Approx)	MPA	2001	2001	2002	2003	2004	2005
Powys	Brecon BNP	2.176	2.890	3.140	3.860	3.150	3.000
	Powys						
Dyfed	Carmarthenshire	1.628	2.030	1.390	2.230	2.770	2.660
	Ceredigion						
	Pembrokeshire						
	Pembrokeshire Coast NP						
W. Glam	Neath-Port Talbot						
	Swansea						
Mid/South Glam/Gwent	Blaenau Gwent	2.026	1.154	1.610	0.730	0.920	1.250
	Merthyr Tydfil						
	Monmouthshire						
	Newport						
	Torfaen						
	Bridgend (a)						
	Caerphilly	0.850	0.860	3.530	4.340	4.950	3.940
	Cardiff	1.290	1.090				
	Rhondda-Cynon-Taff	0.640	0.590				
	Vale of Glamorgan	1.10	1.160				
Total		**9.810**	**10.160**	**9.600**	**11.160**	**11.580**	**10.850**

Source: SWRAWP Annual Reports. RCT = Rhondda Cynon Taff a) in 2000 sales from Bridgend were 1.11Mt. NB. a more detailed breakdown of average sales for 2003-05 is given in [table X] and an alternative break-down for 2005 is given in Appendix 6

concentrations between Bridgend and Caerphilly, in East Carmarthenshire and along the Heads of the Valleys road (A465). Although sandstone producing units are much more widespread, (they can be found in almost all MPA areas except the extreme south east), the bulk of production is derived from the Pennant Sandstone of the Coalfield Valleys and, to a lesser extent from Powys. Igneous rock is won from a very small number of sites in Powys and Pembrokeshire. Almost all of the land won sand and gravel is currently drawn from Ceredigion, Pembrokeshire (inc PCNP) and Carmarthenshire, mainly from glacial deposits.

Table 9: South Wales sand and gravel sales and reserves (a) (by calendar yr Mt)

Former County (Approx)	MPA	2001	2001	2002	2003	2004	2005
Dyfed	Carmarthenshire	0.130 (10.53)	0.340 (7.55)	0.19 (10.09)	0.194 (10.12)	0.250 (9.87)	0.350 (10.86)
	Ceredigion						
	Pembrokeshire						
	Pembrokeshire Coast NP						
Powys/W/Mid/ South Glam/Gwent	Powys	0.030 (0.850)	0.000 (0.090)	0.009 (0.680)	0.002 (0.760)	0.150 (0.160)*	0.090 (0.500)
	Neath P Talbot						
	Bridgend						
Total	**Sales**	**0.160**	**0.340**	**0.199**	**0.196**	**0.400***	**0.440**
	Reserves	**11.370**	**7.640**	**10.770**	**10.880**	**10.480***	**11.360**

Source: SWRAWP Annual Reports a) Reserves for MPAs shown in brackets *Estimated figure

Table 10 (opposite) combines data for all primary aggregates for 2005.

Table 10: South Wales Primary Aggregate Sales by source 2005 (Mt)

Former County (Approx)	MPA	Rock	S/G Land	S/G Marine	Total
Powys	Brecon Beacons National Park	3.000	(b)	-	3.000 (b)
	Powys				
Dyfed	Carmarthenshire	2.660	0.350 (b)	0.107	3.547 (b)
	Ceredigion			-	
	Pembrokeshire			0.067	
	Pembs Coast NP			-	
West Glamorgan	Neath-Port Talbot		0.090	0.199	
	Swansea		-	0.074	
Mid/South Glam/Gwent	Blaenau Gwent	1.250	-	-	1.525
	Merthyr Tydfil				
	Monmouthshire			(a)	
	Newport			0.275	
	Bridgend			-	
	Torfaen	-	-	-	-
	Caerphilly	3.940	-	-	4.219
	Cardiff			0.263	
	Rhondda-Cynon-Taff			-	
	Vale of Glamorgan			0.016	
Total		**10.850**	**0.440**	**1.002**	**12.292**

Source SWRAWP Annual Report 2005.

a) Outside Crown Estate area - statistics regularly not reported but believed to be 0.150t pa.
b) Very small amount of sand and gravel from Powys shown under Dyfed (Small differences due to rounding).

Sales by End Use - Crushed Rock

3.45 Most crushed rock quarried in the region is used as aggregate. A smaller but significant amount is used for other non aggregate ("industrial") purposes (see Industrial and Other Uses section below).

Table 11: Crushed Rock end uses - South Wales (M tonnes)

Rock Type	2000	2001	2002	2002	2003	2004	2005
Coated roadstone	2.04	2.11	2.12	2.42	2.41	2.05	2.49
Uncoated roadstone	2.91	1.53	1.54	1.34	1.87	1.96	1.65
Concrete	1.50	1.95	1.97	3.08	2.83	2.74	2.16
Rail ballast	0.09	0.14	0.15	0.00	0.12	0.20	0.14
Construction fill/other (a)	3.39	4.24	4.25	2.74	3.90	3.88	4.41
Total	9.81	10.00	10.02	9.58	11.12	11.58	10.85

Source: SWRAWP Annual Reports (a) Including armourstone

3.46 Within the aggregates sector, the most significant sales are in construction fill etc (in 2005, 41%) and for road making (in 2005, 38%). The most demanding uses terms of specification are typically in road surfacing (coated stone), concrete aggregate and rail ballast, together broadly accounting for 44% of output in 2005. However the "other" portion of construction fill, may include some applications which also have to comply with tight specifications e.g. armourstone and gabion stone (75,000t in 2005) for coastal and river defences.

3.47 About half of the crushed rock coated for roadstone is transported to off-site plants for the coating process. Some of the material logged above as concrete aggregate may have been used for other purposes where clean, coarse, sized material is required.

3.48 In 2005, limestone contributed just under 50% and sandstone 45% of the roadstone requirement, the remainder being igneous rock. Limestone also accounted for 83% of the concrete (rock) aggregate and a similar general pattern is evident for earlier years for all these limestone uses, although there has been a slight, but not consistent decline in limestone overall market share.

3.49 One much discussed feature of the last decade or so has been the growing interest in the use of high specification material for road surfacing. Specific details are not available for this particular end use within the roadstone sector (see Special Aggregates section and

Appendix 10). However there is little evidence of an overall increase in production of sandstone and igneous rock for roadstone use suggesting that there has been a change of emphasis of sales within the sector, rather than an overall growth of sandstone igneous rock sales (see below).

Table 12: South Wales - Sandstone Sold for Roadstone (M tonnes)

Type	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sandstone	1.98	1.74	1.88	1.18	1.43	1.39	1.76	1.68	1.77	1.75	1.86
Igneous Rock	0.80	0.74	0.62	0.59	0.69	0.35	0.35	0.29	0.44	0.58	0.67
Total hardrock	**2.78**	**2.48**	**2.50**	**1.77**	**2.12**	**1.74**	**2.11**	**1.97**	**2.21**	**2.33**	**2.53**

Source: SWRAWP Annual Reports

Derwen Plant, Neath

DISTRIBUTION

3.50 Data on the **distribution** of sales of primary aggregates is only surveyed every four years and is often the subject of considerable estimation on the part of respondents.

Although no published systematic data is available for Wales in respect of distribution of secondary and recycled aggregates, with some exceptions (notably metallurgical slags), the distances travelled to the consumer are relatively small and it can therefore be argued that these materials are generally used within a 50km radius of source.

For the RAWP survey of primary aggregates in 2005[21], South Wales was divided into:-

a) South East Wales (SEW) (i.e. generally the former Glamorgan and Gwent areas).

b) Remainder South Wales (RSW) (i.e. former Dyfed and Powys areas) but including the whole of the Brecon Beacons National Park).

3.51 For the first time, this gives some broad hints about internal flows and ultimately, consumption (covered in a later section). Despite these shortcomings, it is evident from tables 13 and 14 that:-

a) Almost all marine sand and gravel is destined for customers within the sub-region of landing, indeed it is normally largely used within the MPA areas where it is landed.

b) The deliveries of land-won sand and gravel are less predictable and in some instances appear to be illogical e.g. from Neath-Port Talbot, 60% delivered outside the sub-region; from Pembrokeshire PCNP, all sales are reported in the National Collation to be to South East Wales; this is assumed to be an error and the tables in the RTS have been adjusted to reflect this assumption.

c) In most MPA's, most rock produced in the South East sub-region is used within this sub-region.

d) Most external sales of crushed rock from the South East region can be readily explained by long haul distribution of high PSV sandstone e.g. Neath-Port Talbot 0.292Mt; Rhondda-Cynon-Taff 0.114Mt; Caerphilly 0.176Mt, were all sent to customers outside this region. Some of the "confidential" (unquantified) deliveries to "elsewhere" are also probably in this category.

e) Some deliveries of crushed rock from the South East sub-region e.g. flows from Bridgend and Vale of Glamorgan, to the remainder of the region, are not readily explained.

f) As might be expected, sales of crushed rocks from the less populated areas of South Wales outside the South East sub-region to the latter were relatively high e.g. from the Brecon Beacons National Park, Carmarthenshire, Ceredigion and Powys.

g) The high level of sales from Powys to the West Midlands could also be anticipated e.g. two of the principal quarries producing high specification aggregates are within 2km of the Welsh-English border.

Table 13: Crushed Rock Distribution 2005 South Wales ('000 Tonnes)

Destination	SE Wales	Rmdr S Wales	W Mids	N West	N Wales	S West	Other/ Elsewhere	Total (d)
Source								
Blaenau Gwent	c (100)	- -	- -	- -	- -	- -	- -	c
Brecon Beacons National Park	469 (77)	141 (23)	- -	- -	- -	- -	1 (0)	611
Bridgend	c (25)	c (73)	- -	- -	- -	- -	c (2)	c
Caerphilly	506 (65)	96 (12)	- -	- -	- -	- -	176 (23)	777
Cardiff	874 (97)	26 (3)	- -	- -	- -	- -	- -	900
Carmarthenshire (a)	942 (78)	235 (19)	- -	- -	- -	- -	31 (3)	1213
Ceredigion	179 (84)	24 (11)	- -	- -	- -	- -	11 (5)	214
Merthyr Tydfil	c (82)	c (1)	- -	- -	- -	- -	c (17)	c
Monmouthshire	c (89)	- -	- -	- -	- -	- -	c (11)	c
North Port Talbot (a)	274 (36)	198 (26)	- -	- -	- -	- -	292 (38)	764
Pembrokeshire	76 (13)	489 (87)	- -	- -	- -	- -	- -	565
Pembs Coast NP (b)	- -	224 (100)	- -	- -	- -	- -	- -	224
Powys	567 (23)	24 (1)	1,252 (51)	110 (5)	109 (4)	- -	406 (16)	2467
Rhondda-Cynon-Taff	588 (83)	2 (0)	- -	- -	- -	- -	114 (16)	704
Vale of Glamorgan	491 (39)	752 (60)	- -	- -	- -	- -	4 (0)	1246
Total	**4,966**	**2,011**	**1,252**	**110**	**109**	**-**	**1,035**	**9,685**

Source: National Collation 2005 - table 9j.

a) "Elsewhere" includes 43,000 "unallocated";

b) Given in The National Collation table as "South Wales" i.e. SE Wales but assumed to be in error, so given here as "Remainder S. Wales";

c) Confidential;

d) i.e. tonnage (representing 100%);

NB Only figures exceeding 1Mt are available for specific export regions there is also an unresolved problem in the National Collation - the figure for SE Wales on this table is higher than that for the "derived" summary table (shown later under Demand and Self Sufficiency).

Table 14: Sand and Gravel Distribution - South Wales 2005 ('000 tonnes)

	LAND WON	MARINE			
Destinations	**SE Wales**	**Other South Wales**	**SE Wales**	**Other S Wales**	**Total**
Source					
Cardiff			265 (100)		**266**
Carmarthen-shire		2 (100)	43 (35)	80 (65)	**125**
Ceredigion	2 (1)	143 (98)			**147**
Monmouth-shire			c (100)		**c**
Neath-Port Talbot (a)	14 (b) (60)		200 (92)	16 (8)	**239**
Newport			567 (b,d) (100)		**567**
Pembroke-shire	70(100)				**70**
Pembroke-shire Coast NP	63 (100)				**63**
Swansea			66 (100)		**66**
Total	**65**	**159**	**1141**	**96**	**1542**

Source: National Collation 2005 - 9j.
Figures in brackets indicate the percentage of sales from each MPA area.
a) In addition 9000t - (40%) was delivered to "elsewhere" (i.e. beyond South Wales);
b) Given in table as South Wales but assumed to be largely S.E. Wales;
c) Confidential;
d) Includes Marine S/G for Monmouthshire; excludes c150,000t dredging from the Swangrove Estate not recorded in the survey;

[NB. Sales from Pembs/PCNP to South East Wales appear to be in error but are shown as published - this is being investigated further].

DOMESTIC CONSUMPTION (i.e. Demand from within the Region)

3.52 The term "demand" must be applied with care and must always be qualified in use. Firstly there is the element of demand arising **within** a given area, often known as "domestic consumption" (i.e. irrespective of how that demand is met). Secondly there is demand made **upon** an area; this is the sum of materials sold (or production/output) from quarries in that area (e.g. a region) both to markets (a) within that area and (b) exported to other areas. There are also wider policy issues about demand (as noted below) and about "need", which may be greater, but not necessarily be fully met. However, it is usually is assumed that need is met and so equals demand; for example, there is very little if any evidence to suggest that the lack of available aggregates has ever curbed or slowed down construction in the same way that shortages of timber, steel or bricks have done at some peak times in the past (e.g. in 1973).

Primary Aggregate Consumption: South Wales

3.53 Consumption arising within a given area is measured by deducting exports to other areas, from production, then adding in imports. Surveys of distribution, which enable these calculations to be made, have been conducted every four years, since 1973. The resultant figures are subject to unknown error which becomes most pronounced in the major exporting and importing regions. At regional level in South Wales however, these inaccuracies can be generally discounted as the interregional flows are relatively small. The survey recorded the destinations of all primary and marine aggregates, but not secondary and recycled aggregates. In most cases, the latter are assumed to have a very localised distribution. The survey results for primary aggregates are set out in Table 15 below.

Sand and Gravel

3.54 The highest recorded consumption, in 1973 coincided with a generally high level of production. Thereafter consumption has declined, but rose during the period 1989 -1997, falling abruptly to only 43% of the 1973 level is in 2001, only to rise again in 2005.

Crushed Rock

3.55 Crushed rock consumption has also fluctuated more narrowly (+34%; -18%) around the average of 10,126Mt over the period 1993-2005 having peaked in the period 1989-1993. However, like sand and gravel, consumption recorded in the last two four yearly surveys has been almost at its lowest since 1973.

All Primary Aggregates

3.56 The overall position reflects the above, with peaks in the 1989-1993 surveys and low points more recently.

Compared with the England totals, whereas the latter also illustrated peaks in 1973 and 1989 (highest), the low points differ from those of South Wales. There is therefore no all - embracing trend and South Wales does exhibit some distinct local variations.

Any general variations arising from say the increase in Landfill Tax or the Aggregates Levy, or to a lower usage of aggregates per unit of construction expenditure would apply to all regions and so cannot explain these local changes. Such general trends are discussed under "Fiscal and Other Influences".

Table 15: Consumption of Primary Aggregates within Wales ('000 tonnes)

Sand & Gravel (a)	1973	1977	1981	1985	1989	1993	1997	2001	2005
South Wales	2755	1890	1834	1689	2263	1934	1963	1198	1628
North Wales	na	1254	na	957	1450	1226	900	977	811
Total Wales	na	3144	na	2646	4083	3160	2865	2175	2439
Crushed Rock	**1973**	**1977**	**1981**	**1985**	**1989**	**1993**	**1997**	**2001**	**2005**
South Wales	10009	9629	8514	8401	12426	13619	10103	8284	8537
North Wales	na	2233	na	4092	5660	4615	2733	3663	2520
Total Wales	**na**	**11854**	**na**	**12493**	**18086**	**18234**	**12836**	**11947**	**11057**
All Primary	**1973**	**1977**	**1981**	**1985**	**1989**	**1993**	**1997**	**2001**	**2005**
South Wales	12764	11511	10348	10090	15062	15553	12066	9482	10165
North Wales	na	3487	na	5049	7110	5841	3633	4640	3331
Total Wales	**na**	**14998**	**na**	**15139**	**22172**	**21394**	**15699**	**14122**	**13496**

Source: Based on surveys by South and North Wales RAWPs and other RAWPs published/calculated in National Collation Reports.
a) Including marine NB. 1981 figures are partly estimated.

3.57 Based on the sources used for Tables 13 and 14, considerable efforts were made to calculate consumption at sub-regional or MPA levels. Reliable results could not be produced. (see also Apportionment Process - Method B).

INTERREGIONAL DEPENDENCY

Key Background

3.58 Traditionally South Wales has been a moderate exporter of crushed rock and engages in a very low level of imports. In the earliest survey for which data was separately available (1973), limestone exports predominated but since then, sandstone has increasingly dominated trade. Limestone exports have declined whereas igneous rock deliveries to other regions have generally increased in relative terms.

Further information is given in Appendix 7. This section mainly deals with primary aggregates. Inter-regional flows of secondary and recycled aggregates are not systematically surveyed but it is understood that blast furnace slag has been exported from Port Talbot to England (Symonds Report 2002) (see Secondary and Recycled Aggregates section).

Policy Setting

3.59 At various points in the past, some stakeholders have expressed concerns that the policies for aggregates production in Wales might specifically seek to restrict exports to England. However MTAN1 does not adopt this stance. It begins by noting (para 39) that the English Guidelines for Aggregates Provision (2003) envisage no change in levels of flows from Wales to England in the period to 2016 (subsequent English guidance also advises a continuation of the 2016 level thereafter). (See table A8.2]: National Guidelines Reviews). Para 40 of MTAN mainly seeks to apply environmentally sensitive transport policies (see Transport) and the proximity principle and reserves most of its concerns for the flow of aggregates from N. Wales. Furthermore it seeks a level playing field in terms of the application of environmental values on both sides of the national border (para 41), thus applying to both exports and imports. MTAN1 acknowledges (para 42) that (mainly in the case of South Wales) special consideration may need to be given to provision of some aggregates such as high PSV roadstone (HSA), which are in short supply in many parts of the UK, but that for most materials, the proximity principle should apply. In summary, provision is to be made to maintain current levels of exports.

Exports

3.60 Information from the National Collation of the 2005 surveys indicates that the largest single export flow is of sandstone 1.299Mt to the West Midlands. Sandstone was also supplied in significant quantities to the South West (0.361Mt) and South East/London (0.214 Mt). Between 0.1 and 0.2Mt of igneous rock was dispatched to each of the West Midlands, North West and North Wales.

When other “area to area” flows are examined for crushed rock as a whole, it is evident that the Powys to West Midlands (1.252Mt) was the most significant. The North West (0.11 Mt) and North Wales (0.109Mt) were other important recipients from Powys. The residual figure (0.406Mt) was undivided, but largely accounted for by the exports to South West and South West England.

The export flow from Caerphilly (0.176 Mt) was probably mainly rail ballast; those from Neath-Port Talbot (0.292Mt) and Rhondda-Cynon-Taff (0.114Mt) will have been largely accounted for by high specification aggregate (HSA) i.e. high PSV sandstone. Most of the

exports will have been supplied by a relatively small number of quarries capable of producing material to a rigorous specification (see Other Factors - Special Aggregates).

Table 16: Exports - Primary Aggregates South Wales: 1973-2005 ('000Tonnes)

Destination	1973	1977	1981	1985	1989	1993	1997	2001	2005
South East (c)	72	220	na	132	134	96	401	256 (c)	267
West Mids	660	315	na	486	812	885	402	1302	1524
South West	141	122	na	94	47	230	217	324	416
North Wales	56		-	5	5	113	89	130	116
Other	185	211	na		89	178	320	289	204
Total	**1114**	**868**	**677**	**717**	**1091**	**1503**	**1428**	**2300**	**2527**
Mineral Type (b)									
Limestone/dol	na	530	na		114	-	124	262	154
Igneous rock	na	215	na		255	345	568	572	430
sandstone	na	215	na	398	722	320	1090	1467	1941
Crushed Rock	**1114**	**868**	**677**	**717**	**1091**	**1503**	**1428**	**2300**	**2527**
Sand/Gravel			-	-	121	36	16	2	11

a) Published total is less than sum of figures above (error is inferred);
b) In addition 837Kt were undifferentiated;
c) Includes London region 2001 and 2005 (NB also in 2001 East in England/South East/London regions redefined).

Future Prospects

3.61 As the main export market from South Wales is mainly in respect of HSA materials, the future prospects are considered in that specialist section (see below).

Imports

3.62 The total import figures for South Wales are extremely small i.e. currently equivalent to that of a single small to mid-range quarry output or only accounted for 3% of regional consumption. When tracked over time, imports are presently at one of their lowest levels since the early 1970s, but have never been particularly high. Again, historically most of the imports have been of rock (especially limestone) principally from the South West and to a lesser degree, (notably in some years e.g. 2001), West Midlands.

Future Prospects

3.63 There is only limited potential, logic or necessity for increasing primary aggregates imports apart from normal, local cross border trade for example from the Forest of Dean to Monmouthshire or as return loads to avoid lorries travelling back empty.

There could be a case for considering the importation of china clay sand from Cornwall or waste slate from Gwynedd, but the logistics and economics are still uncertain and under consideration and the environmental sustainability may be not as positive as local sourcing from primary aggregates resources. A further option may be to import crushed rock by sea to areas deficient in local rock resources such as Swansea or Newport, but again, relatively local land-based sources just outside the MPA boundaries of such areas may still provide a more sustainable solution, than long distance sea imports.

New Tunnel, Taffs Wells Quarry, Cardiff

FUTURE DEMAND

(NB The various definitions of "demand" are discussed in the introductory section to Primary Aggregates).

Policy Setting

3.64 In the early years of the RAWP's, demand forecasts were produced using various statistical projections and later, employing econometric methods. These were generally applied to primary aggregates production (for which data has been conventionally more reliable), with a proportionate allocation based on past trends, to primary, marine and alternative aggregates materials respectively. More recently in both Wales and England, it has been the practice first to set either a priority or "target" figure/proportion to be met by alternative materials, then to apportion primary aggregates to meet the residual (although still larger) figure. Secondly current mechanisms have attempted to stabilise the contribution from primary aggregates in absolute terms and require any growth to be met from alternatives. This stance is set out forcefully in MTAN1 (para 17-19). In effect it signals a change from the so called "predict and provide" approach to the "plan, monitor and manage" approach.

3.65 However the new component in policies is a much greater emphasis on environmental sustainability. In summary, the new policy therefore acknowledges need but indicates that this should be more met in a sustainable manner.

In this particular context, it is important to consider a little further, both the process and nature of demand. The "Plan, Monitor and Manage" approach aims to assess the total market, determine in policy terms to what degree that market should be met and by what raw materials. Most recent attempts to follow this route, accept that there is a legitimate and necessary requirement to deliver construction development on the scale determined by a combination of the market and government land use and economic policies. MTAN1 contains a clear statement indicating that demand for construction materials should be met, which presumably means that the new policies should not be applied to a degree that they would for example impede Government policies on housing provision, transport, flood protection, national economic growth etc.

3.66 Gathering and presenting the evidence base (i.e. monitoring) for decisions has now become much more significant.

3.67 Finally "management" is now generally interpreted as the exercise of controls over the contributions made by the various elements which go towards meeting that demand and in particular, boosting the role of secondary and recycled materials. Some of these particular elements and mechanisms are discussed further under "Other Factors". They also include probably one of the least understood and measured elements, that of "efficiency of use". The inelastic nature of the general demand for aggregates is also considered at that point.

3.68 MTAN1 seeks to apply this more environmental sustainable approach. MTAN1 Para 20 therefore concluded that "the present level of total aggregates demand means consequent production i.e. the total to be met by land won, marine and secondary sources) of about 23Mt in Wales, will not increase significantly over the next five years (i.e. 2004-2009).

MTAN1 continues that even taking into account the expected economic growth in Wales, it is not anticipated that demand for aggregate will exceed 23-27Mt by 2010. It indicates that until the RTS is complete, this range should be used for planning purposes and regards this

as sufficient to meet envisaged need. This last statement implies that the RTS is required to review and test those figures in the light of information available subsequent to the publication of MTAN 1.

3.69 Furthermore MTAN1 (A3 and A4) makes it clear that the role of monitoring of production (sales) and distribution and demand is a function of the RAWPs and that the RTS is the vehicle for presentation. Another fundamental part of this process is to gain an understanding of the environmental capacity to meet this demand and to identify potential shortfall areas. These are considered later.

3.70 It has been pointed out that the levels of demand outlined in MTAN1 over the five year period concerned, did not anticipate any significant deviation from the level of consumption at the time of publication (2004). This has generally proved to be the case, but larger unscheduled projects, may subsequently arise and specific policies may need to be invoked to respond to such situations.

Assessing Future Demand

3.71 Firstly, it is clear that by "demand", MTAN 1 Para 20 means total demand for aggregates **upon** Wales and equates this to the total production of all aggregates to Wales.

Table 17: Production of Primary (c) and Secondary/Recycled Aggregates - Wales (M tonnes)

Primary Aggregates	2001	2002	2003	2004	2005	% 2005
North Wales (a)	8.6	7.9	7.6	7.7	6.9	27.38
South Wales (a)	11.4	10.7	12.3	13.1	12.3	48.80
Total Wales	**20.0**	**18.6**	**19.9**	**20.8**	**19.2**	**76.9**
Secondary/Recycled aggregates						
North Wales (a)(b)	0.8	n/a	1.3	n/a	1.6	6.30
South Wales (a)(b)	2.1	n/a	1.7	n/a	4.4	17.46
Total Wales	**2.9**	**n/a**	**3.0**	**n/a**	**6.0**	**23.81**
All Aggregates						
North Wales	9.4	n/a	8.9	n/a	8.5	33.73
South Wales	13.5	n/a	14.0	n/a	16.7	66.27
Total Wales	**22.5**	**n/a**	**22.9**	**n/a**	**25.2**	**100**

Sources:-
(a) SWa RAWP and NWa RAWP Annual Reports;
(b) Symonds Survey for 2001 (England/Wales); Smiths Gore Survey for 2003, Faber Maunsell Survey for 2005, calculations made elsewhere in this report;
(c) Includes marine sand and gravel.

The figures used in MTAN1 (derived from the 2001 surveys of primary and secondary materials) are shown in Appendix 8 which also sets out other previous estimates and the mechanics behind the estimates now used. It is important to consider if these assumptions in MTAN1 are still valid. They can be benchmarked by reference to other projections

3.72 The starting point for forecasts is based upon the latest production figures for primary, (land won and marine), secondary and recycled aggregates. These are summarised in table 17 (more detail is given in earlier sections and Appendix 6). These more recent figures show total demand rising into the range anticipated by MTAN1.

3.73 As part of the testing process, various estimates and studies were conducted or consulted.

3.74 Investigations in autumn 2006 by the QPA, with information from Experian, utility companies and the Welsh Assembly supported a modest rise in construction demand.

The annual reviews of aggregate demand in Great Britain produced by DCLG (and formerly ODPM) based upon Cambridge Econometrics' compounded economic sectoral analyses, either indicate a level or slight growth pattern for Wales as a whole.

GDP in Wales is predicted at 2.7%pa over the next five years (Experian) and construction growth over the period is expected to increase over the period 2005-2010 by 19%. A construction expenditure increase of 3-4%pa would be reasonable.

3.75 However this does not translate directly into the same percentage rise for aggregates demand. Greater efficiencies in aggregate usage (i.e. reduced 'intensity of use') are predicted, for example arising from the influence of fiscal measures (Landfill tax and the Aggregates Levy), more (but unquantified) recycling of aggregates on brownfield sites and greater use of non-aggregate dependant construction techniques. These factors all suggest a lower uptake of aggregates per £1000 of construction spend (see Appendix 9). A growth in aggregates demand in the region 1% to 2% would therefore be considered more realistic. In terms of a more managed approach to provision, it should be noted that these levels already register an inbuilt expectation of more efficient usage of aggregates than in the past, despite the fact that the consumption of aggregates per head in the UK is already one of the lowest in Europe.

SPECIAL AGGREGATES

Key Background

3.76 Exports, transport mode and meeting the demand for high specification aggregates are inextricably linked.

Certain aggregates can be regarded as "special" on account of their physical or visual characteristics - they may be of a particular colour or shape and valued on account of their decorative properties and in particular demanded for architectural or landscaping purposes. However the total volumes involved in this sector are very small and are not regularly recorded.

In some cases certain types of concreting or mortar sands may be regarded as "special" in that local sources are scarce.

3.77 Far more significant in planning terms are aggregates which are especially robust and meet the specifications for the most demanding uses. These were previously known as high PSV aggregates, although "high specification aggregates" (HSA) is now the preferred term as it embraces other characteristics as well as PSV. There are two main categories: road surfacing materials and railway ballast.

The latter is the smaller in volume and is produced at a single quarry, Machen near Caerphilly. This is a very long established rail-borne trade and involves an exceptionally resilient dolomitic limestone.

3.78 By far the largest material in this category is high specification aggregates for skid resistant road and runway surfacing. This section is very largely concerned with this last group of materials. Technical details are given in Appendix 10.

In a recent exhaustive study[22] underlines the significance of the role of the region in supplying this commodity. Of the 59 sites then actively supplying England with HSA reported in 2002, 13 were located in Wales (all except one, in South Wales) as well as potentially 9 in Scotland and 14 in Northern Ireland (although it is doubtful if any of the latter are currently supplying England). This leaves only 23 indigenous sources in England. In addition, forty inactive/dormant sites were identified in Wales. Unfortunately specific tonnages of HSA materials produced in or exported from the region (or of permitted reserves) have not been recorded. Information to this effect was sought in the 2001 survey by RAWPs but it was not possible to publish this in the National Collation Report.

3.79 A large number of different geological formations in the region meet the demands of the highest quality HSAs. Foremost of these are a number of formations within the Pennant Sandstone, particularly in the 'Lower' section (see Appendix 10). In addition, steel slag once suitably weathered although registering a PSV of 58, in performance is comparable to a quarried product with a PSV of 60. Material from Port Talbot is used for this purpose.

3.80 It should also be noted that the Pennant Sandstone often has to be removed in order to access underlying coal seams, during opencast coal operations. Such sandstones are usually backfilled but could provide a further source of HSA stone and have occasionally been used as such. These are often known as "windfall" sites. This would mean that for a given quantity of mineral (coal/sandstone) won, the ground is only disturbed once. However there are logistical, environmental and aggregate quality control issues to be overcome.

These include for example the need to manage large quantities of material appropriately and within a phased timetable to produce desirable final land profits, the need for addition processing plant and probably stockpiling long after the coal operations have been completed.

3.81 Changes in the requirements towards smaller sizes to produce thinner, more technically controlled wearing courses, over the last 7 or 8 years, have resulted in significantly increased output of crushed rocks fines, generally regarded as unsaleable waste.

Most aspects of planning for HSA provision will be covered here or in Appendix 10; others are considered under “Transport” and “Interregional Dependency”.

Policy Setting

3.82 MTAN 1 recognises that parts of Wales are almost uniquely endowed with certain types of aggregates, foremost of those being those specially suited to the demanding HSA requirements of road surfacing. Paragraph 42 of MTAN 1 advises that there may be a special case for justifying the carriage of such materials over much longer distances than that necessary for conventional and more widely available aggregates.

This policy therefore has implications for:-

- Resource management and release of reserves;
- Transport;
- Exports outside the region;
- Provides a basis for local economic development.

Policies covering these areas therefore need to be interpreted in context of the explicit recognition of this as a special case.

3.83 There is a particular need to asses the current sales and future demand in this specific sub-sector and to set this against permitted reserves in order to establish a customised landbank for those materials. At present the necessary base information does not appear to be publicly available.

Secondly, the long distance nature of the travel, particularly to distant (as opposed to even adjacent) regions suggests a relatively high potential for the use of rail if sufficient volumes to specific onward distribution points can be identified. Indeed this might be the only significant area where rail may be appropriate without jeopardising other MTAN1 policies e.g. promoting the proximity principle.

Thirdly, MTAN 1 (para 29), seeks to ensure that in respect of exports of aggregates to other regions, the best environmental and practical option for all should be taken, i.e. for both the exporting and receiving areas.

Finally, MTAN 1 (paragraph 42) indicates that “the Pennant Sandstone outcrop of South Wales has been identified as one of the main prospects for development and the UK importance of the resource should be recognised by relevant planning authorities”. This implies that, given suitable environmental safeguards, additional levels of extraction to meet this particular need, should actually be encouraged e.g. as a means of regenerating local economies.

Conclusions

3.84 There are extensive deposits of HSA materials in South Wales within broad areas which appear to have the environmental capacity to accommodate further quarrying (see Environmental capacity). Resources in England are relatively isolated and in many cases appear to be environmentally constrained. Details of the market are imperfect, but suggest the potential for some further growth in exports to England.

3.85 There is a need to monitor HSA sales specifically, to calculate future demand and assess data on resources as a basis for informed plan preparation. This should take into account the potential for greater use of rail transport. The feasibility of establishing specific HSA landbanks and safeguarding areas needs to be considered in the light of such information. Appropriate responses to potential "windfall" sites where HSA stone becomes available, should also be investigated.

3.86 Another particular issue concerns the increasing quantities of largely unsaleable crushed rock, rock fines, as a result of changes in market specification and the increased competition from CD&EW. Apart from sustainability, this is giving rise to logistical and site management problems.

All these matters require attention, particularly at a strategic level, prior to the next review and where relevant, appropriate information should be sought in future RAWP annual surveys.

Pembrokeshire Sand & Gravel Quarry

INDUSTRIAL (NON-AGGREGATE) USES

Key Background

3.87 Some materials suitable for aggregates are also used for other purposes notably limestone for cement and iron or steel flux, shaped building stone, lime production, and agriculture. The specific calls which these markets make upon permitted reserves have to be taken into consideration alongside the demand for aggregates.

Unfortunately, for confidentiality reasons, information from surveys is only available at regional level. Nevertheless almost all the activity in this sector in South Wales is confined to Bridgend and Vale of Glamorgan MPA areas and relates to the production of metallurgical flux and cement.

Table 18: Sales of Non-aggregates Rock - South Wales (M tonnes)

Type	2000		2001		2002		2003		2004		2005	
	BS	IS	BS	IS	BS	IS	BS	IS	BS	IS	BS	IS
Lime-stone/ Dolomite	0.01	1.63	0.00	1.34	0.03	0.89	0.06	1.27	0.02	1.13	0.04	1.30
Sand-stone/ Igneous rock	0.03	0.46	0.01	0.01	0.02	0.02	0.04	0.05	0.07	0.03	0.08	0.03
Total	0.04	2.09	0.01	1.35	0.05	0.90	0.12	1.23	0.09	1.16	0.12	1.33
All NA uses	2.13	1.36	0.95	1.44	1.25	1.45						

NB Some industrial stone figures may include building stone.
BS = Building Stone IS = Industrial Stone NA = Non Aggregates

3.88 Port Talbot Iron and Steelworks which is dependant upon limestone feedstock from near Bridgend, is a strategically important operation at UK level and is also vital to the local economy. The process involved means that the highest possible chemical purity of the stone is required. Resources of high purity limestones are only found in very restricted areas of Britain and within only limited parts of South Wales[23]. The works is also supplied with lime from Mendip, Somerset.

In 2001, the requirement limestone halved with the closure of Llanwern Works, but now shows signs of an increase.

3.90 The large cement works at Aberthaw on the Vale of Glamorgan coast uses a blend of Liassic limestones and harder high calcium-bearing Carboniferous Limestone from other, relatively local quarries. Although the stone quality does not have to be as pure as that for steelmaking, it does have to be as consistent as possible.

Policy Setting

3.91 MPPW (paras 80-83) sets out policies for the provision of industrial minerals. In respect of limestone include the possible need for longer term landbanks of reserves than for aggregates and for MPAs concerned to engage in dialogue with industry to this effect, particularly in respect of formulating local planning policies. The issue of safeguarding deposits is of even greater significance than in the case of aggregates.

Conclusions

3.92 Separate details of industrial uses should be collected and monitored, and projections of future requirements be made, covering a longer period than for aggregates.

3.93 Bearing in mind the paucity of high quality limestone resources, locally and nationally, and the environmental/economic necessity to use stone of the highest chemical purity, it is advised that the resources should be carefully assessed and rigorously safeguarded in LDPs. Furthermore, it is suggested that policies concerning a separate landbank for this purpose and of appropriately balancing high purity stone and aggregates won from that resource, should be considered before the next RTS review.

3.94 In respect of cement materials, it is also recommended that appropriate areas of resource be safeguarded and that the future stone requirements of this capital intensive works be assessed before the next RTS review.

RESOURCES, RESERVES, LANDBANKS and DORMANT SITES

3.95 A distinction needs to be made between "resources" (the total collection of deposits of a particular mineral) and "reserves". Reserves in this report comprise deposits with the benefit of planning permission unless otherwise qualified. The need for caution in considering reserve data and the definition of landbanks are explained later in this section.

Aggregate Resources

3.96 South Wales is fortunate in having plentiful resources of rock almost throughout the region; deposits of sand and gravel are comparatively restricted and usually more variable in nature. The resources are summarised in Appendix 12 in general order of current economic significance.

3.97 As part of the preparation of the IMAECA Report[24], the researchers examined available resource data and digitally plotted the distribution of outcrops according to twelve predetermined rock types (lithologies). Although these could be described generally as 'resource' maps, they only give a broad two dimensional explanation with no information on the thickness of deposits and only a general inference of quality/suitability. Initial attempts to score the rocks and superficial (sand/gravel) deposits (using a system which had been applied in Ireland) were abandoned in favour of a simpler, more generalised scheme. Some of the assumptions made in the Irish Study previously do not necessarily carry over well into the situation in South Wales.

Permitted Reserves and Landbanks - Status of Permitted Reserves

3.98 Data on permitted reserves have been collected and published annually by SWRAWP for well over a decade.

3.99 However it is important to reiterate most forcefully that the permitted reserves in this context comprise the sum of mainly those figures submitted by quarry operators made in annual returns to the RAWP surveys. It should therefore be remembered that companies have different ways of calculating reserves and that the figures provided may not always have been reassessed professionally for some time. Even where carried out thoroughly, the interpretation of variations in a deposits and their suitability for various end uses may differ from site to site and time to time. This is especially important when considering materials to meet the demand for high specification requirements. Furthermore, although companies are asked to complete a specific reserve figure every fourth survey year, in intermediate years they can opt to use a calculation based on the previous reserve figure, minus subsequent production. Finally, in a small minority of the sites, where no reserve figures were submitted to the MPA, it proves necessary for the MPA to calculate permitted reserves.

3.100 In summary, at a very detailed level, there is scope for ambiguity and inaccuracy in the permitted reserve figures, but at a broader level, the data serves as a very useful indicator. This is a very important factor in the context of development plan provision where for example the uncertainties are far greater than for example an assessment of land for housing provision. Ultimately, the reserves at a given site can generally only be properly known when the site has actually been worked out.

3.101 More recently (mainly since 2002), reserves have been subdivided into three categories: 'active' (i.e. permitted reserves at sites where mineral was extracted during the

survey year), 'inactive' (when there was no extraction during the survey year, but which were not defined as 'dormant') and 'dormant' (sites so defined under the 1991 and 1995 Acts effectively, where working cannot be resumed/started at such sites until a scheme of conditions is agreed). However, although there appear to be some inconsistencies in the treatment from year to year (the grouping of categories varies and this is not always self-evident), it is clear that some MPA areas are extremely well endowed with reserves in comparison with others. Data should therefore be treated in relative, rather than actual terms.

Table 19: Permitted reserves of primary aggregates 1973-2005 (South Wales) (M tonnes)

Type	1973	1977	1985	1989	1993	1997	2001	2005
Sand/Gravel	9	na	2	0	10	14	8	11 (b)
Rock (a)	656	Na	492	419	581	651	520	584
Total	665	Na	494	419	591	665	528	595

Source: Rock 1973-1997 National Collation (2005) i.e. based on RAWP reports: 2001 and 2005 from SWRAWP Annual Reports. S/G all from National Collation (2005).
a) Up to 2001 includes actual inactive and dormant; 2005 excludes dormant;
b) Given erroneously in the National Collation as 3Mt.

3.102 Table 18 indicates a relatively small but fairly volatile pattern of permitted land-based sand and gravel reserves particularly in the earlier period (NB these do not include planning permissions to dredge sand on the Swangrove Estate in the Severn Estuary).

3.103 The permitted reserves of rock showed a general decline until the 1990s. After an increase in the mid 1990s, permitted reserves have been generally maintained at these relatively high levels.

Table 19a: South Wales Rock Permitted Reserves by Calendar Year (M tonnes)

Former County (Approx)	Mineral Planning Authority	2001 (c)	2001 (c)	2002 (d)	2003 (e)	2004 (f)	2005 (g)
Powys	Brecon Beacons NP	150	168	159	170	165	155
	Powys						
Dyfed	Carmarthenshire	105	119	88	107	114	135
	Ceredigion	5	11	10	9	9	9
	Pembrokeshire	15	12	32	21	15	15
	Pembrokeshire Coast NP	12	9	10	10	9	9
W. Glam	Neath-Port Talbot (h)	0	25	2?	18	17	15
	Swansea (h)						
Mid/South Glam/Gwent	Blaenau Gwent	80	138	149	75	135	137
	Merthyr Tydfil						
	Monmouthshire						
	Newport						
	Torfaen						
	Bridgend	23					
	Caerphilly	30	30	31	27	28	33
	Cardiff	46	47	47	46	44	42
	Rhondda-Cynon-Taff	9	15	13	14	15	12
	Vale of Glam (a)	32	31	30	39	22	22
Total (b)		**520**	**593**	**570**	**613**	**575**	**584**

a) The majority of non-aggregate reserves have been excluded, but some are included;
b) Figures many not equate totals due to rounding;
c) Active, inactive and dormant;
d) Active and inactive but possibly not dormant;
e) Presumed to be active, inactive and dormant;
f) Full definition not given (understood to contain dormant RTS para 12.3);
g) Active only;
h) Calculated by subtraction using published data.

NB. see also Table 21 for more detail in 2005.

Landbanks Defined

3.104 Landbanks comprise the stock of planning permissions at all active and inactive sites within a given area. The landbank of dormant sites has to be shown separately (MTAN1 para 47). They are conventionally expressed either in tonnes or in years of life at a given (usually a recent average) production rate. MTAN1 (para 45) also confirms (by implication) that the method for calculating landbanks continues to be the tonnage of permitted reserves divided by the average of the last three years production. MTAN1 (para 45) however defines this as the "current landbank". It goes on to define the future (or "extended") landbank as including all land explicitly allocated (i.e. in UPDs/LDPs) for the working of aggregates.

Landbanks - Policy Setting

3.105 MTAN1 is particularly important and specific in establishing the framework for considering the role of primary aggregates. Paragraph 49 requires MPAs (National Parks and AONBs excepted) to maintain landbanks (i.e. a collection of permitted reserves - see below) within a given MPA (or group of MPAs) which are adequate but not excessive. For rock this should be equivalent to 10 years "production"[25] (based on an average of sales over the previous three years) and for sand and gravel, 7 year landbank. Both levels are to apply at any particular point in the duration of a development plan period. A further exception is made where, in cases where allocation cannot be made (e.g. for environmental or resource reasons) an agreed compensating provision can be made by another MPA.

3.106 Where existing landbanks exceed 20 years, plan provision is not required and MPAs are asked to consider whether extensions to existing quarries or new quarries should be permitted other than in exceptional circumstances (examples of these are given in MTAN1). In this context, it should be noted that some of the landbanks contain rock (e.g. certain types of limestone) which should be effectively 'earmarked' for industrial (non-aggregate) uses. In other instances, the nature of deposits constituting the landbank may not suit the specifications now required by the present market which may have to be met from new permissions.

3.107 Applying the MTAN1 requirements to the RTS, the rock landbanks (i.e. current and extended) should set out the means for provision covering the next 15 years (i.e. the 5 years of the RTS plan period, plus 10 years in the case of rock) at the outset, to enable provision to be rolled forward until the end of the review period (to 2021). Furthermore, the present phasing for preparing LDPs suggests that some indication of requirements for a slightly longer period may also be advisable. Data in the Apportionment section is therefore also given to 2025.

Before proceeding to the issue of future working areas and the environmental capacity of such areas to accommodate additional operations if required, it is necessary to consider existing landbanks in the region.

Landbanks – Analysis

3.108 Concerning rock, table 20 indicates that at first sight, the current landbanks in all West Wales MPAs and in Caerphilly and Cardiff exceed, in some cases by many times the reference levels set in MTAN1. In Rhondda-Cynon-Taff and the Vale of Glamorgan, they are within the policy envelope. The need to protect commercial confidentiality has necessitated the grouping of data for a significant number of MPAs (see Appendix 14).

3.109 Data on reserves of various types is published in the SWRAWP annual reports. In the 2005 report, a number of the figures for various MPAs were grouped together. As far as "active" reserves are concerned, it has proved possible to subdivide these further, following a reappraisal of confidentiality groupings. As far as "inactive" and "dormant" reserves are concerned, it was found that more detailed data had been presented in some earlier reports over the period 2000-2005 and that the totals had remained unchanged. It was therefore possible to modify Table 8 of the SWRAWP 2005 annual report, to provide more detail while, retaining the previously published totals (compare tables 20 and 21). In summary, it is clear that:-

a. In both Brecon Beacons NP and Powys, there are extensive permitted reserves;
b. Almost all the reserves in Neath/Port Talbot and Swansea lie in the former MPA;
c. Within the grouping 'Blaenau Gwent/Merthyr/Monmouthshire/Newport/Torfaen/ Bridgend', the largest concentrations of permitted reserves lie in Merthyr and Bridgend, both of which are all well above the MTAN1 recommendations. The remainder (especially Newport and Torfaen) are much smaller by comparison. However, without related published sales data, it is not possible to confirm precisely whether or not these are above, within or much lower than the MTAN1 thresholds.

3.110 Table 20 indicates the scale of current rock landbanks in years by MPAs or groups of MPAs. This indicates clearly that all the areas shown have larger rock landbanks than the minimum required (see above). Consequently, as far as these (in some instances broad) groupings are concerned, all fall into the category under which MTAN1 (para 49) advises MPAs not to make further allocations in development plans, unless there are exceptional circumstances. In detail, this may not be the case, for example, when grouped MPAs are separated out, or in respect of specific aggregate types.

3.111 MTAN1 also infers strongly that the present method of calculating landbanks needs to be reconsidered (i.e. based on apportionment derived from past production and reserves), as it reinforces the existing distribution of operations, a system based on perpetuating historic producing areas.

Table 20: South Wales Rock Landbanks(a) (expressed in years)(e)

Former County (Approx)	Mineral Planning Authority	2001 (c)	2001 (c)	2002 (c)	2003 (c)	2004 (c)	2005 (c)	2005 (d)
Powys	Brecon BNP	64	62	138	115	109	104	47
	Powys							
Dyfed	Carmarthenshire	134	214	326	215	156	124	124
	Ceredigion	19	53	46	45	41	42	42
	Pembrokeshire	128	232	132	134	47	34	35
	Pembs Coast NP	44	49	46	64	40	37	
West Glam	Neath-Port Talbot	(b)	(b)	(b)	(b)	(b)	(b)	27
	Swansea							
Mid/South Glam/Gwent	Blaenau Gwent	(b)	(b)	(b)	(b)	(b)	(b)	42
	Monmouthshire	(b)	(b)	(b)	(b)	(b)	(b)	
	Newport	(b)	(b)	(b)	(b)	(b)	(b)	
	Torfaen	(b)	(b)	(b)	(b)	(b)	(b)	
	Merthyr	(b)	(b)	(b)	(b)	(b)	(b)	73
	Caerphilly	39	36	35	33	30	36	
	Cardiff	34	33	43	50	53	51	73
	RCT	11	21	22	25	22	17	
	V. of Glamorgan	29	26	27	32	16	16	41
	Bridgend	21	(b)	(b)	(b)	(b)	(b)	

a) Based each year on reserves at year end, divided by average annual sales over the previous 3 years;
b) Not available for confidentiality reasons;
c) As published in annual reports;
d) More detailed calculations based on reappraisal of confidentiality groupings;
e) As at 31st December each year;
f) RCT - Rhondda-Cynon-Taff.

Dormant Sites

3.112 MTAN1 recognises the problems posed by very old planning permissions with inadequate conditions (if any), often relating to extensive areas, but which have not been worked for many years (or in some instances have never been worked). These are subject of the Review of Old Mineral Permissions (ROMPs) and are officially classed as "dormant" - i.e. operations cannot be resumed until a new scheme of conditions has been agreed between the owner and the MPA. MTAN1 requires all MPAs to examine critically, all dormant sites and to ascertain to what extent they are likely to be proposed for reopening. Annual returns have to be made by MPAs to the Assembly (see Appendix 15). As a second

stage, MPAs are asked to pursue serving Prohibition Orders on those sites where working is unlikely to be resumed. To date, 36 Prohibition Orders have been served in the region. All the dormant sites relate to rock, not sand and gravel.

3.113 This process has been carried out in South Wales using criteria based upon MTAN1 and refined by SWRAWP. A schedule of such sites is given in Appendix 15. In summary, of the 63 dormant sites (with estimated reserves of 128Mt), 37 sites (with 47Mt or 37% of the total) are considered to fall within the "unlikely to reactivate" category. This represents 8% of the total permitted and dormant reserve in 2003 (612Mt) [or 6% in 2005]. Cautions are expressed about the variable quality of the reserve estimates particularly apply to material at dormant sites. Another issue to consider is the type/quality of aggregate contained within the site. The majority of dormant sites are unlikely to be able to produce high quality aggregate such as high PSV (high skid resistance) sandstone.

3.114 Deleting these reserves from the landbank has a knock-on effect on the amount of the landbank across the region. The most noticeable effects would be in Carmarthenshire, Powys, BBNP, and Monmouthshire. In Carmarthenshire the amount of inactive/dormant reserves unlikely to be reactivated is calculated to be approximately 10.75Mt [double check]. With the exception of Torcoed Quarry, reserves at the currently active quarries in the county are relatively small and consideration would therefore need to be given to identifying areas of search/allocations to maintain supply in the mid to long term, to ensure a minimum 10 year landbank within each authority.

3.115 In conclusion, it would appear that:-

a) Although the inclusion of dormant reserves does distort the overall picture of 'available' reserves, at a regional level this is marginal;
b) In some recent past years, dormant reserves appear not to have been included in calculating landbanks; and
c) Where they are present, they may locally inflate the reserve figures to an unacceptable level (e.g. in Powys); or
d) If formally removed following Prohibition Orders, may effectively require 'replacement' permissions in more suitable locations (as in Carmarthenshire), if the landbank system is to be maintained. The wider impact of dormant reserves being terminated formally through the use of Prohibition Orders has to be assessed for each MPA.

Table 21: South Wales - Rock Reserves 2005 by MPA (M Tonnes)

Mineral Planning Authority	Active	Inactive	Dormant	Total
Brecon Beacons National Park	155	18.6	9.3	208.9
Powys		25.0	1.0	
Carmarthenshire	135	40.5	34.5	210.0
Ceredigion	9	1.0	-	10.0
Pembrokeshire	15	4.5	-	19.4
Pembrokeshire Coast National Park	9	2.6	0.2	11.8
Neath-Port Talbot	15	-	0.5	16.6
Swansea		1.1	-	
Blaenau Gwent	137	-	-	154.2
Merthyr Tydfil		-	-	
Monmouthshire		11.3	-	
Newport		-	-	
Torfaen		-	-	
Bridgend		5.8	0.1	
Caerphilly	33	-	17.0	50.0
Cardiff	42	12.2	0.3	54.5
Rhondda-Cynon-Taff	12	2.2	-	14.2
Vale of Glamorgan (a)	22	6.4	8.5	36.9
Total	**584**	**131.2**	**71.30**	**786.5**

Source: SWRAWP Annual Reports modified as described in detail in the text above.
a) includes some reserves for non-aggregate purposes.

ENVIRONMENTAL CAPACITY

Background

3.117 The Welsh Assembly Government considered that it was important to ensure that future aggregates supply in Wales should in future reflect the ability of resource areas to accommodate workings more closely than in the past. The Assembly therefore commissioned Arup Environmental to carry out a study into the environmental capacity of such areas. Their report, "Establishing in Methodology for Assessing Aggregates Demand and Supply" (EMAADS) was completed in 2003 and advocated a system whereby each grid square containing more than a given proportion of aggregate resource, should be assessed against twelve criteria, reflecting predefined environmental assets. It also advised the adoption of a supply based more closely upon population (as a general approximation to demand) within each MPA (see Demand).

3.118 Having established a methodology, Enviros Consulting Ltd was commissioned by Welsh Assembly Government to generate the resource base and assess the incidence of environmental indicators and to build a system by which values can be attached to each 1km grid square concerned. Their report, "Implementing the Methodology for Assessing the Environmental Capacity for Primary Aggregates" (IMAECA) was published in 2005 and is available from the Welsh Assembly Government. (see Appendix 13). The values attached to each environmental capacity indicator were fixed by Welsh Assembly Government. The report's authors consider that it will meet most of the requirements of Strategic Environmental Assessment (SEA).

Meanwhile, MTAN1 (published in 2004)(para 50) endorsed the environmental capacity approach.

3.119 The results of IMAECA are displayed in two forms; as twelve segments within each 1km grid square or secondly, as a cumulative indicator for all the environmental criteria within each grid square. The results are relative not absolute. The green values indicate comparatively high environmental capacities to accommodate quarrying, the orange designations an average ability and a red attribution, a low environmental tolerance towards quarrying.

Use and status of EMAADS/IMAECA

3.120 The creators of the methodology, the Welsh Assembly, the RTS sub group and the RAWP wish to emphasise most forcefully that the values given to any given location are only indicative (i.e. not absolute). Secondly, that EMAADS/IMAECA is a tool to be used only at a strategic level for the preparation of the RTS (i.e. not directly in Local Development Plan or in development control or planning appeal decisions). Thirdly, the results are to be taken as only one of a number of input factors (e.g. alongside current landbanks, environmental implications attached to usage different aggregate types, use of secondary materials, transport issues) in informing the future supply of aggregates in the region.

Appendix 16 presents a broad analysis of IMAECA as it applies to aggregate resources in the region and in the section on Guidance to MPAs on Apportionment.

TRANSPORT

Key Background

3.121 Mineral movements have traditionally accounted for the greatest bulk of freight transport in tonnage terms. With the demise of the deep mined coal industry in the region, aggregates now account for almost all the minerals transported (i.e. except opencast coal, petroleum products, industrial limestone for flux and cement) and with this change, the overall volumes of minerals handled by rail have declined considerably. Aggregates are high in bulk and low in relative value, even compared with other minerals, with transport typically accounting for half the delivered costs in the case of most journeys over c25km. The relatively wide distribution of aggregate resources in the region consequently means that currently, 95% of deliveries are made by road, although the remaining 5% by rail is the result of growth over the last few years. This is lower than the figure for England and Wales as a whole where rail and water account for c10% of all deliveries (this last figure is boosted by very large rail flows exported to other regions from the East Midlands and South West).

3.122 Although rail and sea transport was historically significant, by 1989 only one quarry was regularly using this mode. By 2005 two other quarries were using rail haulage, all three for rail ballast or HSA materials.

Economics and logistical factors greatly constrain choice of transport mode. There are significant implications for environmental, spatial planning and a number of non-transport policies.

Table 22: South Wales - Sales by Mode of transport (000 tonnes)

Mode	1973	1977	1981	1985	1989	1993	1997	2001	2005
Rail	296	413	na	(a)	na	na	176	238	572
Water	(b)	?	na	-	na	na	-	6	-

- = nil.
(a) no data, but rail ballast sales were 235,000 tonnes (assumed to carried by rail);
(b) small amounts from W. Glamorgan (confidential).

Policy Setting

3.123 Transport is frequently regarded as one of the most intrusive elements of the minerals production/consuming industries. Government policies seek to minimise this impact.

Mineral Policy Wales 2000 (para 42, 43) reiterates Planning Guidance (Wales) Policy (First Revision 1999) and Transport TAN (Wales) 18 (1998) in favouring rail and water modes wherever this is economically feasible. It also points to the importance of encouraging the construction of wharves and railheads and to the need for general integration/coordination of transport with land use planning to this end, including making adequate provision for on-site storage and processing at such sites. It goes on to note that where road transport is the only option, the capacity and nature of the road network is a material consideration and points out that S106 agreements/planning conditions should be applied to control or direct movements. Finally it seeks to reduce the level of road traffic, particularly in residential or congested areas.

3.124 More specifically, MTAN1 (Paras 29 and 40) in respect of land-based aggregates extraction also recognises the significance and impacts of transporting material by road and indicates two potential solutions, i.e. increasing the relative proportion of material carried by other modes or reducing the distance between source and user. Para 40 therefore seeks to apply the "Proximity Principle" to effect the latter. It also acknowledges that road transport is frequently the only option in Wales and that as a consequence, long distance road movements must be reduced.

The implications of these policies in South Wales are now considered.

Potential for Rail
(see also Appendix 17)

3.125 Conventionally, aggregates are predominately transported by road. Rail transport is theoretically more environmentally appropriate, but for many reasons is often impractical. Firstly very few quarries are suitably located with respect to railways and the same is often true of the main markets served. As significantly, even where railways run through an area, there are often logistical issues concerning the connection of extra sidings at either end of the journey (space, cost and signalling regimes may preclude this). Track specifications and alignments may not be geared to freight traffic and with growing passenger traffic, train paths may not be available. Finally, the additional cost of link movements by road, double handling (on/off loading), usually make rail only viable for large volumes of traffic over reasonably long journeys (say over 130km) or alternatively extremely large volumes over shorter journeys. If the material concerned can bear a premium (e.g. HSA stone) or where it is directed to markets where there is no local hard rock, this may be sufficient to cover such additional charges. The length of current journeys is considered under "Road Distribution".

Rail issues

3.126 The potential for rail in conventional markets within the region appears to be very limited, apart from for occasional very large projects, requiring particular types of material not locally available and where rail connections are physically and logistically feasible.

However there are likely to be possibilities for increasing rail borne exports of stone to England (and in particular of high PSV stone) and decisions will be necessary to ascertain whether this traffic is worth encouraging, in the light of other policies e.g. relating to the proximity principle and of exporting materials. In this context there may be a need to protect certain routes of former rail lines from development which could prejudice reopening for mineral traffic.

3.127 These are interim conclusions based on the application of basic principles of economics and logistics currently applying to road v. rail modes. Within the next five years, the practicalities and economies should be explored further to ascertain whether such principles apply universally to the area and in what circumstances or areas, rail might indeed be a viable alternative to road transport.

3.128 One particular area for investigation might relate to assessment of large construction projects at various points where government and local authority have opportunities to intervene.

3.129 Rail lines which previously served collieries and latterly, open-cast coal sites, are still in place in a number of the Coalfield valleys and may be suitable for carrying high PSV stone derived from Pennant Sandstone quarries in the area. They need to be safeguarded where there is potential for carrying stone.

Water - Transport

3.130 There are many coastal facilities ranging from small harbours to large ports. Examination of the main land-based aggregate resources suggests that few if any are either economically or environmentally well placed for coastal shipping (see Appendix 17). However many ports provide landing points for marine dredged sand, upon which the region is heavily dependent

3.131 Physically, the major ports (Milford Haven Waterway, Swansea, Port Talbot, Cardiff and Newport) could all import rock produced elsewhere at coastal superquarries elsewhere and this could in most cases thus be landed into the heart of urban markets. However the ready availability of stone from local quarries may make such operations unviable and such traffic would be contrary to the proximity principle.

3.132 There is also potential for importing by sea, china clay sand from Cornwall (where past improvements at Par are under consideration) and of slate waste from North Wales (where rail to part facilities are being discussed) but there are considerable uncertainties about the viability of such trade.

Road Distribution

3.133 Currently c95% of aggregates produced in S. Wales are hauled by road. Many of the reasons for this situation have already been covered or inferred in the previous discussions of rail and water transport.

3.134 In the southern half of the region, there is a well established east-west road network The road network in west and mid Wales, where the population is relatively sparse is not as well developed and has even conditioned the viability of some quarries.

3.135 General access between the main quarrying areas (and the main urban areas, is strategically good. However the links between many quarry sites themselves and the primary network are very often poor and appear to merit further attention.

Most journeys transporting aggregate are likely to be 20 km or less in the more populated south, i.e. a shorter distance in much of England.

Summary: Transport Policy Considerations/Issues

3.136 The economics, logistics and some of the planning issues governing non-road transport are described above. These suggest that, to be viable economically, they require significant volumes of transfer between fairly tightly defined points (i.e. suitable quarries and markets proximate to dispatch/reception points), and in the case of the rail, along available train paths. Also to support the capital and running costs, the scale and distances usually have to be large and markets sustained. As the total market is unelastic, this also suggests a small number of very large producing units would suffice.

3.137 In contrast, the proximity principle implies that the shortest possible distances between sources and markets should be the aim and in turn, the need for a significant number of small/medium scale operations, proximate to the main centres of consumption. The latter is the normal pattern in South Wales, with the exception of the former Gwent area where there are almost no active hard rock quarries within a relatively populous but extensive area.

3.138 Many of the problems associated with road transport are experienced over the often relatively short distance between the processing plant and the primary road network. There appears to be a particular need for a more comprehensive approach to decision-making and opportunities to be taken to improve the situation at older but active plants in this respect, in order to improve local sustainability.

Taffs Wells Quarry, Cardiff

4. APPORTIONMENT AND GUIDANCE

APPORTIONMENT PROCESS

4.1 Apportionment is the process of subdividing and assigning the likely requirement for aggregates to be met from a region, to the various resources within a region. This and the following sections draw upon all the strands of information set out in the previous sections.

Method A: Conventional Approach

4.2 The conventional method has been as follows. Demand forecasts have been produced by projection or econometric methods (see Demand) and applied to "national" consumption. Government policies have then determined the proportions of this requirement to be met nationally from primary, marine and alternative sources respectively and these materials are then set on one side (i.e. "top sliced"). The residual (large) figure for primary aggregates is then allocated to each region using some form of baseline devised from previous production, which is then multiplied by an anticipated future demand trend.

Method B: Per Capita Approach

4.3 As MTAN1 indicates, this effectively perpetuates historic supply patterns which now do not necessarily reflect the most sustainable approach to supply. It suggests that in this context, other methods need to be considered.

4.4 Two sets of sustainability policies have been brought into play in shaping this method. Firstly the proximity principle (i.e. reducing journey lengths) which aims to source material from as close as possible to the consumer. Secondly, future working should be focussed upon these areas which have the greater environmental capacity to accommodate future working. This method therefore seeks to use the distribution of population as a proxy for the distribution of demand. It generally assumes an average level of consumption per head. This level is set by reference to survey data where available. As in Method A, Method B is directly concerned with primary aggregates, alternative aggregates having been 'top sliced'.

Establishing a Base

4.5 For both approaches, the starting point, i.e. the division of Wales into North and South, has been based on the existing subdivision as reported in the 2005 Surveys (see previous sections) This can be readily justified as the two areas serve entirely different markets.

4.6 There are a number of factors which have to be overcome in order to implement either approach and some compromises are inevitable at least in the short to medium term mainly on account of the imperfect nature of the data (particularly relating to confidentiality groupings) and existing commitments in the form of permitted reserves (see Appendices 14 and 19).

4.7 It must be emphasised that a broad statistical analysis such as that now presented is not capable of reflecting important subtleties in the market, for example the availability of large quantities of sandstone without significant environmental constraints may be of limited value to a market in need if say a sustainable source of concrete aggregate. Different types of aggregate source are not necessarily interchangeable, or, if they are used as an alternative, they may have higher intrinsic environmental costs (see Primary Aggregates - End Uses and Table 2).

4.8 The anticipated growth in demand for aggregates is 1-2% pa (see Future Demand). MTAN1 policies seek to ensure that growth in requirement is met mainly if not entirely from secondary materials. As a starting point, it is therefore assumed that in the period to 2010, the contribution from secondaries will increase at 3%pa and from primary aggregates at 1% pa. Furthermore (using DCLG data for importing regions), export demand will be 1.5% pa and the imports (i.e. all primaries) will be 1%pa. These rates applied to the base 2005 figures for Wales, but making an adjustment to remove import contribution, are shown below.

Table 23: Primary and Secondary Demand (Wales 2005-2025) (M tonnes)

Year	Primary Aggregates Consumption	Secondary/ Recycled	Total Consumption	Imports	Exports	Total Demand
2005	13.5	6.0	19.5	0.5	6.4	25.4
2006	13.6	6.2	19.8	0.5	6.5	25.9
2007	13.8	6.4	20.2	0.5	6.6	26.3
2008	13.9	6.6	20.5	0.5	6.7	26.7
2009	14.0	6.8	20.8	0.5	6.8	27.1
2010	14.2	7.0	21.2	0.5	6.9	27.6
2011 - 2025	14.2	7.0	21.2	0.5	6.9	27.6

Source: tables in relevant previous sections.

Applying the same growth rates to the 2005 split for South Wales produces the following data.

Table 24: Primary and Secondary Demand (South Wales 2005-2025)

Year	Primary Aggregates Consumption (a)	Secondary/ Recycled (b)	Total Consumption (c)	Imports (d)	Exports (e)	Total Demand (f)	Primary Aggregates Demand (g)
2005	10.2	4.4	14.6	0.3	2.5	16.8	12.4
2006	10.3	4.5	14.8	0.3	2.5	17.0	12.5
2007	10.4	4.7	15.1	0.3	2.6	17.4	12.7
2008	10.5	4.8	15.3	0.3	2.6	17.6	12.8
2009	10.6	5.0	15.6	0.3	2.7	18.0	13.0
2010	10.7	5.1	15.9	0.3	2.7	18.3	13.2
2011 - 2025	10.7	5.1	15.9	0.3	2.7	18.3	13.2

a) consumption of primary aggregates using National Collation 2005 as base;
b) secondary/recycled using SWa RAWP Annual Report/ Faber Maunsell 2005 survey data and assuming all used in the region;
c) calculated from (a) + (b);
d),e) from National Collation 2005 as base;
f) calculated from (c) minus (d) plus (e);
g) calculated from (f) minus (b);

In view of the recent high levels of increase in the use of secondary and recycled aggregates and the indications of relatively little scope for further practical advancement, the rise in the secondaries contribution envisaged here appears to be rather optimistic.

4.9 When considered against policy, the levels projected from 2009 onwards marginally breach the top of the range set (MTAN1 para 20), for 2010. MTAN1 seeks a stable primary output and any growth being fully met by secondary/recycled materials. However within this total, the requirement for primary aggregates is assumed here to rise in actual (but not proportionate) terms. In the light of the reservations already expressed in respect of the ability of secondaries to be increased, it is even more doubtful whether their utilisation could be raised even further to enable primary production to be stabilised. In mitigation, the overall changes in the primary requirement are relatively small and well within any margins of error. For example if flat line figures for primary aggregates were to be adopted over the 2006 - 2016 period for example, it would mean a cumulative shortfall of 7Mt for South Wales, or 0.6Mt pa, or equivalent to only 1.2% of the permitted rock reserve.

If this growth were instead, to be added solely to the secondary/recycled contribution, the pattern would be this would represent an increase from 4.4Mt in 2005 to 5.6 in 2010, i.e. at the latter point accounting for 35% of regional consumption (or about 5.5% pa).

Table 25: Revised Secondary/Recycled Contribution (South Wales) (M tonnes)

2005	4.4
2006	4.6
2007	5.0
2008	5.2
2009	5.6
2010	5.9
2011 - 2025	5.9

Table 26: Primary Aggregate Requirement Using 2005 Base (South Wales) (M Tonnes)

Year	Crushed Rock	Sand/Gravel	Total	
		Land	**Marine**	
2005	10.9 (88%)	0.3 (2%)	1.2 (10%)	12.4
2006	11.0	0.3	1.3	12.5
2007	11.2	0.3	1.3	12.7
2008	11.3	0.3	1.3	12.8
2009	11.4	0.3	1.3	12.0
2010	11.6	0.3	1.3	13.2
2011 – 2025	11.6	0.3	1.3	13.2

4.10 If however it is acceptable to assume that a very modest increase in the actual (not proportionate) primary aggregate contribution is a realistic way forward, the requirement for the main aggregate types would be as follows based on a continuation of 2005 proportions.

METHOD A - Projection Based on Existing Consumption Patterns

4.11 The detailed methodology and calculations are given in Appendix 19. In order to overcome confidentiality issues and to provide a more representative base, averages for the period 2003-05 were used at MPA level in most instances, but where possible, 2005 figures shown for comparison (see Table 10).

4.12 Sub-regional apportionment is concerned with primary land won aggregates. However the scale of sand and gravel sales is not only very small indeed, confidentiality restrictions mean that it can only be divided into two areas grouping for the whole of the region. The addition of sand and gravel data to rock tables would compromise the level of detail with which rock can be presented. Most of the remainder of the statistics therefore concentrate on crushed rock. However, land won sand and gravel is covered in the MPA Guidelines.

The following table therefore summarises the production requirements for crushed rock to 2021 (data to 2025 is also given in Appendix 19) using both 2005 and 2003-5 averages as a base. In the period to 2010, they are also displayed as and at a constant rate and with a 1% pa growth applied.

Table 27: Method A - Summary of Cumulative Estimates 2007-2021 Crushed Rock (M Tonnes)

Mineral Planning Authority	(a)	(b)	(c)	(d)	Pptd Reserves (e)
Powys/BBNP	49.5	51.2	52.2	53.7	156
Ceredigion	3.0	3.2	3.0	3.0	9
Pembs/PCNP	10.5	10.0	10.5	10.5	24
Carms	16.5	16.4	17.7	16.5	135
Neath-PT/Swansea	7.5	8.4	9.0	9.0	15
Bridgend/ V of Glamorgan	31.5	31.3	32.8	32.9	86
RCT/Cardiff	22.5	23.1	24.0	23.9	54
Merthyr/Caerphilly	16.5	17.8	17.7	19.2	87
Blaenau/Torfaen/Newport/ Monmouth	6.0	6.6	7.4	6.0	18
Total	**163.5**	**168.0**	**174.3**	**174.7**	**584**

See Appendix 19 for details.
a) 2003-5 average MPA split applied to 2005 - constant to 2010;
b) 2003-5 average MPA split applied to 2003-5 - constant to 2010;
c) 2003-5 average MPA split applied to 2005 - 1%pa growth to 2010;
d) 2003-5 average MPA split applied to 2003-5 - 1%pa growth to 2010;
e) Active permitted reserves at end 2005 SWRAWP Annual Report.

METHOD B

4.13 The detailed methodology and calculations are given in Appendix 19. In applying Method A, data had to presented using both a 2005 and an average 2003-5 base in order to produce a more detailed breakdown at MPA level. This resulted in different base figures being set. To enable direct comparisons to be made, both bases are used here also.

Table 28: Surveyed Consumption of All Primary Aggregates by Sub-Region (South Wales 2005)

Former County	Mineral Planning Authority	Consumption (K tonnes) (a)	Adjusted Consumption (b)	Per capita Consumption (c)	Difference
Powys	Powys/Brecon Beacons NP	3556	4296	2251	+2045
Dyfed	Ceredigion				
	Pembrokeshire				
	Carmarthenshire				
W Glam	Swansea	4859	5869	7914	-2045
	Neath-Port Talbot				
Mid/ S Glam/ Gwent	Bridgend				
	Vale of Glam				
	Cardiff				
	RCT				
	Merthyr Tydfil				
	Caerphilly				
	Blaenau Gwent				
	Torfaen				
	Monmouthshire				
	Newport				
Total		**10165**	**10165**	**10165**	**0**

Source: National Collation AM2005; modified as indicated below.

a) NB in addition 1.170Mt was sold in S Wales but the division to sub-regions was not recorded (this is included in the total);

b) In the light of (a) the unknown deliveries within South Wales have been subdivided proportionally 57.5% - 42.3% (or 1,010,000t-740,000t to South East Wales and remainder South Wales respectively) and added to the declared figures;

c) For calculation - see table below.

4.14 Initially, various attempts were made to calculate existing consumption (as opposed to production) at MPA level using the data in the 2005 National Collation (which was presented at a more detailed level than in previous surveys). This did not prove to be possible (see tables 13, 14 and Domestic Consumption).

The available results from the 2005 National Collation Report are shown above, together with a redistribution of sales to unknown destinations. Imports are so small and only apply to any degree in the former Gwent area and so can be discounted at this stage.

4.15 Although neither geological resources of aggregate nor consumption is evenly distributed throughout the region, it has been suggested that a more equitable distribution of operations may be gained by allying production points more closely to consumption, and to do this by applying the average consumption per capita to population distribution. This follows the alternative approach advocated in the EMAADS Report[26].

Average consumption of primary aggregates per head in the region is 4.45t pa. Theoretical consumption base figures using this per capita rate are displayed below.

Table 29: Average Per Capita-Based Crushed Rock Consumption Estimates (S Wales) 2005

Former County	Mineral Planning Authority	Population (k) (a)	%	Consumption All Primary (kt) (b)	Consumption Crushed Rock (kt)
Powys	Powys/BBNP (d)	131.5	5.8	585	495
Dyfed	Ceredigion	78.3	3.4	348	290
	Pembrokes (c)	117.5	5.1	523	435
	Carmarthenshire	178.1	7.8	793	666
W Glam	Swansea	226.4	15.8	1007	1349
	Neath-PortTalbot	135.6		603	
Mid/S Glam/ Gwent	Bridgend	130.8	11.1	582	948
	Vale of Glam	122.9		547	
	Cardiff	319.7	24.2	1423	2066
	RCT	231.6		1031	
	Merthyr Tydfil	54.9	9.9	244	845
	Caerphilly	170.2		757	
	Blaenau Gwent	68.4	16.9	304	1443
	Torfaen	90.3		402	
	Monmouthshire	87.7		390	
	Newport	139.6		621	
Total		**2283.5**	**100**	**10160**	**8537**

a) Population in thousands from mid-year estimates for 2005 (takes into account recent boundary changes (2003/2005);
b) Based on average per capita consumption of 4.45tpc;
c) Includes Pembrokeshire Coast National Park;
d) Brecon Beacon National Park population is distributed to all the relevant authority areas otherwise listed but most of the population is resident in Powys;
Small differences in total due to rounding.

Table 30: Theoretical Surpluses and Deficits (Base Year) ('000Tonnes)

Mineral Planning Authority	Per Capita Crushed Rock Consumption 2005	Per Capita Rebased to 2003-05 Average (a)	Residual consumption (b)	Difference
Powys/Brecon Beacons NP	495	460	818	+358
Ceredigion	290	269	200	-69
Pembrokeshire CC/PCNP	435	404	670	+266
Carmarthen	666	618	1058	+440
Neath-Port Talbot/Swansea	1349	1252	375	-877
Bridgend/Vale of Glamorgan	948	880	1965	+1085
Rhondda-Cynon-Taff/Cardiff	2066	1918	1432	-486
Merthyr/Caerphilly	845	784	988	+204
Blaenau Gwent/Torfaen/ Monmouth/Newport	1443	1339	418	-921
Total	**8537**	**7924**	**7924**	**0**

a) i.e. calculated 2003 - 2005 consumption multiplied by percentage of population;
b) Calculated in table A19.12.

4.16 The table above indicates those MPA areas which are theoretically in "surplus" (shown as '+') and those in "deficit" (shown as '-'), based on a very broad brush approach which compares notional per capita consumption (see cautions in the introductory notes and Appendix 19) with that part of the output derived from within each MPA area, which was sold within the region (as previously noted, it is not possible obtain actual sales at MPA level). This is in effect a very generalised indicator of those MPA areas which are contributing more than their 'share' and those which are dependent on others. In reality, in most cases these are net figures and there inflows and outflows to almost all areas of different aggregate types (i.e. apart from those MPAs where no aggregates are produced).

To this information a constant rate and a 1%pa rate to 2010 was applied until 2025 (see Table 30). Appendix 19 also gives projects for 2025.

Table 31: Method B - Summary of Cumulative Estimates 2007-2021 Crushed Rock (M Tonnes)

Mineral Planning Authority	(a)	(b)	Pptd Reserves (c)
Powys/Brecon Beacons NP	45.0	47.7	156
Ceredigion	4.5	4.5	9
Pembrokeshire CC/PCNP	6.0	6.0	24
Carmarthenshire	10.0	10.5	135
Neath-Port Talbot/Swansea	21.0	22.3	15
Bridgend/ Vale of Glamorgan	15.0	15.0	86
Rhondda-Cynon-Taff/Cardiff	30.0	31.4	54
Merthyr Tydfil/Caerphilly	15.0	15.0	87
Blaenau/Torfaen/Newport/ Monmouth	21.0	22.3	18
Total	**168.0**	**174.3**	**584**

See Appendix 19 for details.
a) 2003-5 average per capita consumption plus exports - constant to 2010;
b) 2003-5 average per capita consumption plus exports - 1% growth to 2010;
c) Active permitted reserves at end 2005 SWRAWP Annual Report.

Torcoed Quarry, Carmarthenshire

GUIDANCE TO MPAs ON APPORTIONMENT

4.17 In this section, the various sources of aggregate supply, the permitted reserves, demand assessments, transport, Assembly policies and the findings of the environmental capacity study (IMAECA) are drawn together, to provide a regional assessment of aggregates demand and supply, and a basis for aggregates policies in LDPs.

The reader is referred to those specific sections for explanations of limitations and methodologies in arriving at the recommendations now made. In particular attention is drawn in respect of the cautions attached to the application of the IMAECA data.

In terms of the need for allocations to be made by MPAs, these all relate to primary land won aggregates, the demand to be met by secondaries/recycled materials and from marine sources having been ascertained and "removed" ("top sliced") at regional level. As far as the contribution from secondary and recycled aggregates are concerned, it is acknowledged that this may not be achieved evenly in all parts of the region (and there is any event a lack of suitable monitoring data at MPA level).

This section is intended to be strategic in nature and does not present detail relating to the importance of protecting natural and cultural assets (apart from as echoed in general terms by IMAECA). However policies which seek to restrict future aggregate operations in National Parks and AONBs are strategic in their effect. Whereas no recommendations are made for additional allocations, references are made to the need to safeguard resources are made, in order to protect them against developments which might sterilise them. Furthermore the implications of a possible cessation of aggregate working in such areas are explored (see Appendix 20).

The apportionments set out in this section do not take into account dormant sites or allocations already in UDPs or proposals in UDPs and LDPs. Existing provision in policies is worded in various forms and cannot always be readily compared across the region. Allocations in plans are termed "extended landbanks" in MTAN1.

Box 1
The guidance to MPAs that follows is based on the outputs of the Method A and Method B apportionment processes (as detailed at the beginning of Section 4). This guidance deals only with the apparent requirements for crushed rock and sand and gravel resources to be made available on the basis of total requirements compared with the current total of permitted reserves in the relevant area and therefore does not take fully into account factors that may be material to the ensuring an adequate supply of aggregates obtained from appropriately located sources. Such factors include:-

- The technical capability of one type of material to interchange for another.
- The relative environmental cost of substitution of one type of material by another.
- The relative environmental effects of changing patterns of supply.
- Whether adequate production capacity can be maintained to meet the required supply.

(Appendix 19 is relevant in this respect)

In preparing Local Development Plans, planning authorities need to take these factors into account in determining whether resource allocations are required.

1 Powys

(N.B for confidentiality reasons the apportionment for Powys is made jointly with BBNP, but as a general guide the BBNP accounts for 20-25% of the recent output).

4.18 Currently there are nine operating (and four inactive) sandstone and igneous rock quarries, some of which are very important sources nationally (i.e. at UK level) as they produce high specification aggregates and in many instances stone produced travels long distances to market. With one exception (the Dolyhir/Strinds complex where sandstones and limestones are worked together but are only recorded as the former) there are no limestone quarries or limestone resources, within Powys outside the BBNP (see BBNP). Small amounts of land won sand and gravel are imported into the area from the West Midlands and limestone is imported occasionally from North Wales. Little or no secondary aggregates are available and CD&EW are in limited supply on account of the rural nature of the area.

Resources of high specification aggregates are believed to be very extensive indeed, but in detail, vary considerably in quality and in the amount of waste which would be generated in working. Many of these resource areas are remotely located and would therefore probably be uneconomic to work, but many areas also display reasonable levels of environmental capacity to accommodate quarrying.

Based on recent shares of production, Powys and the BBNP would be expected to contribute 49.5 to 53.7Mt over the next 15 years; on a per capita basis this would equate to 45.0 to 47.7Mt. Current rock permitted reserves are therefore well in excess of the 15 year minimum requirement to meet anticipated need.

Powys is not well placed (despite its large permitted reserves) to substitute for the National Park contribution if it was called upon to make up the difference, Firstly, the production of crushed rock in the BBNP is of limestone and currently is all concentrated in the south of the National Park, serving markets beyond the Park boundary to the south. The transfer of aggregates from Powys in the north, effectively through the National Park, would not in itself be conducive to upholding the proximity and sustainability principles. Secondly, as noted, Powys only has extremely limited resources and permitted reserves of limestone.

Recommendation

On the basis of the information on permitted reserves available and in the light of MTAN1 policy (para 49), applying Method A and Method B apportionment, no resource allocation is required at present. However, preparing Local Development Plans, consideration should be given to whether the factors in Box 1 above give rise to any requirement for resource allocations.

Alternative high quality sandstone resources need to be the subject of a scoping investigation and any key areas so identified, safeguarded in the LDP. The limestone resources and reserves are inextricably bound up with hard sandstones and should similarly be safeguarded in the LDP. Deposits of sand and gravel should also be safeguarded.

Alternative rail transport modes for high psv sandstone should be investigated such as increased rail transportation via Hereford or other stations.

4.19 Appendix 20 describes the policy context of mineral working in National Parks. In particular MTAN1 para 49 indicates that no allocations for further mineral working should be made in plans for such areas. There are four permitted limestone quarries, but only two are currently active. These mainly serve adjacent areas to the south, outside the National Park. The population of the Park is very small, and the amount of development in the MPA area is hence very low. Reserves are well in excess of the 15 year minimum requirement. Although where any mineral extraction is proposed, it is subject to rigorous scrutiny and controls, the environmental capacity exercise suggested that the limestone area between the Taf and the Carmarthenshire border has generally average or in some instances, high environmental capacity to accommodate future working. This contrasts with much of the contiguous limestone outcrops to the east and west where capacity is almost always low (at least until about the A48 in the west).

Land-based sand and gravel resources are present particularly in the Usk Valley, but the quantity and quality is not known in detail and it scores low in terms of environmental capacity. However, and notwithstanding the National Park status, they must be safeguarded against prejudicial development in view of limited regional availability of the resource.

Bearing in mind any implied obligation to explore the extent to which neighbouring MPAs can accommodate a migration of the contribution presently made by quarries in the BBNP and the small amounts involved, this appears at first sight to be reasonably feasible without transferring an unacceptable burden to other MPA areas. In detail the situation is not straight forward (see related MPAs). This does not of course mean such a change could be effected rapidly in view of the extensive permitted reserves in the BBNP area. In essence, demand is very low in Powys to the north and reserves are considerable (see above). Most of the stone currently produced in BBNP however is destined for markets to the south, which are fragmented between seven or eight MPAs which themselves have varying scales of permitted reserves and environmental capacities (see below) but overall, could probably cover redistribution from the BBNP.

Recommendation

MTAN 1 (paragraph 49) indicates that plan allocations for aggregates in National Parks are inappropriate.

The possibility of a gradual transfer of production from the BBNP to other areas should be explored with other MPAs and the industry.

Land-based sand and gravel resources should be safeguarded from prejudicial development. There may be a need to make provision to meet a specific need for sand and gravel, but only where these can be worked without significant adverse environmental effects.

3 Ceredigion

4.20 Currently there are several active sandstone quarries within this large area, but no limestone quarries nor limestone resources.

Land won sand and gravel sites provide a good substitute for the lack of nearby marine reserves - Ceredigion has no operational wharves but has a number of small working harbours. The country is beyond the notional 30 km haulage limit from the Bristol Channel. Although there are some recent indications that southern Cardigan Bay could provide some marine sand and gravel, the unitary is essentially rural in nature with relatively small markets scattered over a wide area which would not support the high cost of infrastructure. There are no sources of secondary aggregate available to substitute for primary aggregates; CD&EW sources are minimal and scattered over a wide area.

Based on recent shares of production, Ceredigion would be expected to contribute 3Mt over the next 15 years; on a per capita basis this would equate to 4.5Mt. Rock reserves are therefore well in excess of the 15 year requirement on either count.

Reserves of land won sand and gravel are sufficient for more than 15 years based on recent rates of output.

Recommendation

On the basis of the information on permitted reserves available and in the light of MTAN1 policy (para 49), applying Method A and Method B apportionment, no resource allocations is required at present. However, in preparing Local Development Plans, consideration should be given to whether the factors in Box 1 above give rise to any requirement for resource allocations.

Land won sand and gravel resources need to be safeguarded in the LDP.

(For confidentiality reasons Pembrokeshire and PCNP apportionments are grouped together).

4.21 Currently there are two active limestone quarries; one active igneous quarry; two active sandstone quarries; one active slate quarry; active sand and gravel quarries. In the 2005 (base year) survey there were two active sand and gravel quarries (by 2006, this had reduced to a single operational site).

The geology and the environmental capacity of the county are extremely varied making generalisation difficult, but resources in most areas apart from the hinterland and east, tend to have lower capacity (i.e. are sensitive). This is by far the most diverse area in terms of types of aggregate produced in South Wales.

The majority of the area is also within 30km of active sand wharves at Pembroke Dock.

Based on recent shares of production Pembrokeshire and PCNP would be expected to contribute 10.5Mt over the next 15 years; on a per capita basis this would equate to 6.0Mt.

If Pembrokeshire was to be called upon to support rock demand currently met by PCNP, overall permitted reserves are still well in excess of a 15 year requirement, but the varied mix of materials contained in that overall reserve is far from evenly balanced and may necessitate some extra provision.

Reserves of land won sand and gravel are sufficient for more than 15 years based on recent rates of output but only just adequate if Pembrokeshire were to be called upon to supply the demand currently sourced from PCNP

Although slate waste has been recycled recently, this has been on a small scale and resources are understood to be limited. Sources of CD&EW are likely to be concentrated in the southern half of the county.

Recommendation

On the basis of the information on permitted reserves available and in the light of MTAN1 policy (para 49), applying in terms of the current balance of contributions, no resource allocation is required at present. However, the MPA should explore with PCNPA and the industry the possibility of taking on output currently met by PCNP. In this circumstance, there may be shortfalls of some materials in the longer term. This should be investigated further in detail. Consideration should also be given to whether the factors in Box 1 above give rise to any requirement for resource allocations.

Consideration should be given to opportunities to work slate waste, where these arise in within environmentally acceptable terms.

Existing and potential wharves should be identified for protection in the LDP to safeguard sand and gravel supply routes into the area. Land won sand and gravel resources need to be protected in the LDP.

(For confidentiality reasons the apportionment for Pembrokeshire and the PCNP has been presented jointly).

4.22 Appendix 20 describes the policy context for mineral working in National Parks. In particular MTAN1 para 49 indicates that no allocations for further mineral working should be made in plans for such areas. The varied geology and coastal terrain with high environmental designations and environmental designations have given rise to significant areas with low environmental capacity (i.e. sensitive).

Currently two active igneous quarries and one limestone quarry exist. Two land won sand and gravel sites are also active. Additional limestone resources are present in the south. These need to be safeguarded.

Based on recent shares of production, PCNP contributed about a third of the total combined with Pembrokeshire, i.e. equivalent to 3.0Mt over 15 years. The population of the Park (only 22,500 people) is very small indeed and on a strictly per capita basis, this would hardly be sufficient to justify even a single aggregates quarry, if that approach were to be adopted. Based solely upon population this would equate to 17% or 1Mt over the 15 year period. Current rock reserves are well in excess of these figures.

There are no known alternative supplies of secondary aggregates readily available.

Overall production is still relatively modest but the area does also account for about 40% of the region's land-based sand and gravel reserves.

Reserves of land won sand and gravel in the PCNP are sufficient for more than 15 years based on recent rates of output.

Notwithstanding this situation, the area of Pembrokeshire outside the National Park holds permitted reserves and resources which could be numerically be sufficient to be deployed to cater for needs of rock for over 15 years and only just sufficient to meet the requirement for sand and gravel currently met from quarries in the PCNP area for such a period.

Recommendation

MTAN 1 (paragraph 49) indicates that plan allocations for aggregates in National Parks are inappropriate.

The MPA should explore with Pembrokeshire CC, other MPAs, and the industry, the possibility of taking on output currently met from reserves within the PCNP. In this circumstance, there may be shortfalls of some types of materials in the medium term in such contributing areas, for example if the mix of reserves does not match market demand. This should be investigated further in detail.

Alternative limestone resources need to be safeguarded in the LDP and subject to detailed investigation.

4.23 Four active limestone quarries operate, some of which are in areas where the environmental capacity is low to moderate (i.e. sensitive). Alternative limestones resources are evident which are in less sensitive areas and these need to be safeguarded in the mid to long term. Very small amounts of sand and gravel are also produced.

There are no known alternative supplies of secondary aggregates. As far as CD&EW is concerned, this is most likely to arise in the south east of the county, coincident with areas of former industrial and anticipated development.

Based on recent shares of production, Carmarthenshire would be expected to contribute 16.5Mt over the next 15 years; on a per capita basis this would equate to 10.5Mt. Current reserves are considerably in excess of the amount needed to satisfy the 15 year minimum period.

If called upon to supplement the limestone production currently being met from the west of the BBNP, the county would be able to accommodate this.

Recommendation

On the basis of the information on permitted reserves available and in the light of MTAN1 policy (para 49), and applying Method A and Method B apportionment, no resource allocation is required at present. However, in preparing Local Development Plans, consideration should be given to whether the factors in Box 1 above give rise to any requirement for resource allocations.

Existing and potential wharves should be identified for protection in the LDP to safeguard marine sand and gravel supply route into the area.

The possibility of taking on some of the aggregates requirement currently met from BBNP or PCNP should be investigated with the MPAs concerned and the industry.

Alternative limestone/sandstone resources need to be safeguarded.

Land won sand and gravel resources need to be safeguarded in the LDP.

(NB. For confidentiality reasons apportionment is made jointly with Neath and Port Talbot).

4.24 There are no active limestone or sandstone quarries. The only existing permitted limestone quarry has very limited reserves and is located within the Gower AONB. The AONB area encompasses virtually the whole of the Carboniferous Limestone outcrop and MTAN 1 (para 49) precludes additional provision in such areas (see also Appendix 20). Those parts of the limestone beyond the AONB are largely within the built up area. Outside the AONB, large urban areas occupy much of the southern part of the MPA area, so that the only other significant rock resource physically available is the Pennant Sandstone. Within these areas, the rock outcrops with greatest environmental capacity lie to the north of the M4, especially on Mynydd y Gwair. Those should be safeguarded.

The MPA area currently relies heavily upon quarries in Neath Port Talbot and Carmarthenshire which are in relatively close proximity (i.e. 13 miles/21 kilometres to the east or 6 miles/9 kilometres to the west). These operate in areas where the environmental capacity is usually moderate to high. As these are also accessed largely by the M4/A48, the existing supply pattern is considered to be reasonably sustainable.

The sand and gravel resources of the Lower Tawe Valley and scattered outcrops in the area bordering the M4 deserve further investigation, but are believed to be relatively thin and poor quality. However, working would in part have to compete with marine sand which may be a more sustainable option.

Suitable alternative resources, including secondary aggregate from Port Talbot steelworks are available; again these are outside the MPA. Although not quantified, it is likely that a significant proportion of the CD and E waste recycled as aggregates in the region is processed within this MPA area, thus also supplementing the shortfall of primary aggregates here.

Based solely on recent shares of production Swansea would not be expected to contribute any primary aggregates, but on a per capita basis, the expected figure for Swansea/Neath-Port Talbot would be 21-22.3Mt over the next 15 years. If this were subdivided proportionate to the population of the two MPA areas, this would represent a requirement from Swansea of 62.5% of the above i.e. 13.1-13.9Mt over the same period. This substantial amount could continue to be contributed by adjacent MPA areas within sustainable travel distances, but other supply options should be investigated.

Recommendation

The MPA should examine critically, the potential for facilitating the production of primary aggregates sustainably within the area and where appropriate make LDP allocations Carboniferous / Limestone and sandstone resources need to be safeguarded in the LDP and be subject to detailed investigation to ascertain their sustainability for the end-uses demanded by the aggregate market (see “Cement”).
Every effort should be made to promote and facilitate the maximum use of CD&EW as an effective and sustainable substitute for primary aggregates imported from other MPA areas. Landbased sand and gravel resources need to be investigated and where appropriate, safeguarded in the LDP. Existing and potential wharves should be identified for protection in the LDP to safeguard marine sand and gravel supply route into the area.

(NB. For confidentiality reasons, apportionment is made jointly with Swansea but the great bulk of the share is anticipated to be derived from Neath-Port Talbot for the foreseeable future).

4.25 Currently two sandstone (high psv) quarries are active. Permitted reserves are just over the minimum 15 year landbank (see below), but in view of the important (i.e. UK level) need for such high specification aggregates, it would seem prudent to safeguard appropriate additional areas. Some of this material is exported to market by rail via Briton Ferry sidings, a few miles from the quarry.

In view of the proximity of the large settlement areas in Swansea and the lack of current consented reserves in that area, quarries in Neath - Port Talbot (like Carmarthenshire in the west), are likely to continue to be called upon to supply markets in the Swansea area and (as described under "Swansea") in general terms, this is considered to be as sustainable a solution as any other, but needs to be kept under review.

Almost the whole of the Carboniferous sandstone (apart from the area west of the Tawe Valley) has a relatively high environmental capacity to host additional workings.

Opencast anthracite mines also generate some sandstone as part of coal extraction, but these are acknowledged as temporary 'windfalls' and not permanent supply sources. Nonetheless, proposals for coal extraction which require the extraction of marketable aggregates should utilise this source of aggregates to maximise the potential use of finite resources, thus obviating the need for broader surface areas to be disturbed by mineral working. However, there are particular issues associated with this practice; these include the need to secure appropriate restoration landforms within a specified and usually short timetable, and to identify suitable areas and management strategies for stockpiling and the distribution of the stone.

Carboniferous Limestone is imported (probably in large but unquantified volumes) mainly from Bridgend to satisfy the need for coarse concrete aggregates. In the absence of limestone in NPT, this is logical and reasonably sustainable, particularly when primary routes are used. Ideally local sourcing may be more sustainable in some parts of the MPA.

There are considerable secondary aggregate resources (mainly blast/steel furnace slag and CD&EW) in the area, but the majority are fully utilised, either as aggregates but more particularly for more energy-efficient non-aggregate uses (Appendix 18 - Cement). Some secondary aggregate is taken by sea to Newport for processing. One of the largest CD&EW facilities in the region is based at Neath.

Sand and gravel deposits in the Vale of Neath and Margam have a high environmental capacity but are not currently being exploited in the former area, presumably on account of the quality and the competing availability of marine sand.

Three sand wharves are present at Briton Ferry which provides convenient access to all of Neath and the surrounding MPA area.

Based on recent shares of production, the Neath-Port Talbot and Swansea MPAs area as a whole would be expected to contribute 7.5-9Mt over the next 15 years. On a per capita basis this becomes 21-22.3Mt. However as NPT accounts for only 37.5% of the population

8 Neath-Port Talbot (continued)

of these two areas, the proportionate share would be 7.9-8.4Mt. NPT would be able to meet this apportionment and that based upon existing shares, from permitted reserves, but not the higher figure for the two MPAs combined using a per capita basis.

Recommendation

On the basis of the information on permitted reserves available and in light of MTAN1 policy (para 49), and applying Method A and Method B apportionment, no resource allocation required at present but the situation should be kept under close review (see Swansea) and particularly in respect of sandstone for high specification aggregate purposes. In preparing LDPs, consideration should be given to whether the factors in Box 1 give rise to any requirement for resource allocations.

Existing and potential wharves should be identified for protection in the LDP to safeguard the marine sand and gravel and other potential mineral flows into the area.

Existing and potential rail connections and sidings should be identified for protection in the LDP to enable stone to be re-hauled where possible. Additional high quality sandstone resources need to be identified and where appropriate safeguarded swlectively in the LDP. Land won sand and gravel resources need to be identified and where appropriate, safeguarded in the LDP.

9 Bridgend

(NB. For confidentiality reasons, apportionment is made jointly with the Vale of Glamorgan).

4.26 Currently there are two active limestone sites which supply in excess of 1.5Mt. Reserves are well in excess of the 15 year limit. Additional Carboniferous Limestone resources exist in very small areas, where the environmental capacity is generally low to moderate.

That limestone required for high purity end uses (e.g. iron/steel making flux), now quarried here could not easily be substituted. This is won from the same reserves as that permitted for use as aggregates and on account of its rarity and importance to the steel industry, this should be acknowledged by means of a separate provision alongside the aggregates apportionment. A proviso needs to be attached providing for the use of this landbank for aggregates if no longer required for industrial purposes. However, there is insufficient data at present to enable a separate apportionment to be calculated and it will be necessary to ascertain with the industry and others what the long term prospects are likely to be.

Additional resources of both limestone and sandstone should also be safeguarded in the LDP.

There are no secondary aggregate sources of any significance to substitute for existing aggregate supply although slag is undoubtedly delivered from Neath-Port Talbot. CD&EW is generated and recycled at a number of points in the area.

In the Valleys portion of the MPA area, there are extensive areas of Pennant Sandstone

which display overall, a moderate environmental capacity for quarrying and in places may be suitable for HSAs.

No land won sand/gravel is produced; however the Symonds Report (2000)[1] indicated the presence of several land-based deposits, each of which could have estimated yields of over 5 Mt, although there are no marine wharves (or potential), marine sand drawn from other areas is the main fine aggregate used here.

Over the next 15 years, based on existing supplies, Bridgend and the Vale of Glamorgan areas would be required to contribute jointly, 31.1-32.9Mt. On a per capita basis, the figure would be 15Mt. In population terms, the two areas are very similar. However, the bulk of reserves are in the Bridgend and the greatest production is in the Vale of Glamorgan. On a per capita basis, both have adequate reserves, but on the basis of existing shares, Bridgend is well provided for, but the Vale of Glamorgan is close to the limit.

Recommendation

On the basis of the information on permitted reserves available and in the light of MTAN1 policy (para 49), and applying Method A and Method B apportionment, no resource allocation is required at present. However, in preparing Local Development Plans, consideration should be given to whether the factors in Box 1 above give rise to any requirement for resource allocations.

Limestone and sandstone resources need to be safeguarded selectively in the LDP.

Special provision needs to be considered and developed over the review period in respect of protection of the higher quality portions of both these materials, in terms of specific apportionment/landbanks and safeguarded areas.

Land won sand and gravel resources need to be safeguarded in the LDP.

Vale of Glamorgan 10

(NB. For confidentiality reasons, apportionment is made jointly with the Bridgend).

4.27 Several active limestone quarries (serving both aggregate and non-aggregate end users) operate. Some are concentrated areas which are in areas of low environmental capacity (i.e. sensitive), but the less constrained areas (particularly along the A48), are more extensive than in Bridgend indeed they account for most wide ranging areas for limestone resource in the region (outside BBNP).

Additional resources need to be safeguarded and investigated further.

As in the case of Bridgend, a significant part of the output is destined for non-aggregate purposes, but in this instance to support Aberthaw cement works. The long term nature of

the capital investment here and the scale of this usage need to be taken into account separately alongside the need for aggregates, but with the proviso that if cement ceased to be a consumer, this material could become available for aggregates. The Liassic (Jurassic) Limestone is also used for cement making, but is not suitable for aggregates.

As in the case of Bridgend, discussions need to take place to ascertain the extent of the reserves which need to be "assigned" to non-aggregate uses.

Marine sand was landed at Barry Docks until 2005. No land based sand/gravel is produced, however the Symonds Report (2000)[27] indicated the presence of several land-based deposits, each of which could have estimated yields of over 5Mt.

A very large source of secondary aggregate exists (12Mt of p.f.a, with a more limited amount of f.b.a) which could substitute for low value aggregate but p.f.a is mainly used for non-aggregate uses (see Cement). This probably represents the greatest opportunity for the increased use of secondaries, but is dependent upon the development of suitable technologies and marketing.

There is likely to be a modest level of CD&EW generated or utilised but this could increase significantly if large MOD facilities were ever released.

Over the next 15 years based on existing supplies, the Vale of Glamorgan and the Bridgend areas would be required to contribute jointly, 31.1-32.9Mt. On a per capita basis the figure would be 15Mt. In population terms the two areas are very similar. However, the bulk of reserves are in the Bridgend and the greatest production is in the Vale of Glamorgan. On a per capita basis, both have adequate reserves, but on the basis of existing shares Bridgend is well provided for, but the Vale of Glamorgan is close to the limit.

Recommendation

Landbanks, for limestone should be monitored particularly carefully and the possibility of allocating additional reserves to cover any impending shortfall should be kept under review. In preparing Local Development Plans, consideration should be given to whether the factors in Box 1 above give rise to any requirement for resource allocations.

Existing and potential wharves should be identified for protection in the LDP to ensure marine sand and gravel supply routes into the area continue. Additional limestone resources, particularly but not exclusively those in areas of high environmental capacity (low sensitivity), should be safeguarded for possible future use.

Further investigation of the potential use of the Aberthaw p.f.a stockpiles should be undertaken and in addition, the possibility of establishing a wharf, so that any future major projects such as alternative energy projects, may benefit.

Land won sand and gravel resources need to be identified and where appropriate, safeguarded in the LDP.

(NB. For confidentiality reasons, apportionment for this area is paired with the Cardiff.)

4.28 Currently only one limestone quarry and one sandstone (high psv) quarry are operational. Considerable quantities of colliery shale exist at Tower Colliery, Hirwaun, which is still active but is likely to close within the next few years. Shale could potentially be used for low quality fill if there were large contracts nearby (such as the A465 improvements), but it would not meet normal aggregate specifications.

The resources of the Pennant Sandstone (which is generally suited to high specification aggregate uses) are especially extensive, covering most of the southern two thirds of the MPA area. The environmental capacity of the area as a whole is very variable, exhibiting all three levels of capacity over broad zones.

There is also a possibility of production of high specification aggregate sandstone as a "windfall" associated with open cast coal operations (see comments made under Neath-Port Talbot in this respect these also apply here).

No significant amounts of secondary aggregates are present but reasonable volumes of CD&EW are likely to be widely available throughout most of the urbanised parts of the MPA.

Based on recent shares of production, RTC and Cardiff combined would be expected to contribute 22.5-23.9Mt over the next 15 years. On a per capita basis, this would equate to 30-31.4Mt. Taking these two areas jointly, there are sufficient resources to meet this requirement, but although the production is almost equally divided, the permitted reserves are far more concentrated in Cardiff than RCT. The latter would just be able to meet its proportionate on the basis of existing projections, but not that based on the per capita approach (RCT accounts for 42% of the joint population). On this latter basis, if called to do so, unless RCT sandstone can be substituted for BBNP limestone supplies, it is also difficult to envisage how RCT could take over some of the contribution currently made by BBNP, (RCT's limestone reserves and resources are all in the far south of that MPA i.e. a significant distance from the BBNP boundary).

Recommendation

Early consideration should be given to the need to allocate additional reserves likely to be required in the later part of the 15 year landbank period. In preparing LDPs, consideration should be given to whether the factors in Box 1 give rise to any requirement for resource allocations.

Alternative limestone and high quality sandstone resources need to be safeguarded. There are no wharves to protect but opportunities for co-using rail facilities (primarily established for opencast coal), for aggregates should be considered as they arise.

Tower colliery railhead should also be identified for protection in the LDP to safeguard possible future aggregate transportation.

The possibility of this area being one of those which shares in taking on the production presently derived from the BBNP should be considered, but the scope appears marginal. Land won sand and gravel resources need to be safeguarded in the LDP

(NB. For confidentiality reasons, apportionment for this area is paired with the Rhondda-Cynon-Taff).

4.29 One active limestone quarry exists with two inactive quarries. Existing quarries are located in sensitive areas and are located within 4km of each other, giving an impression of relatively concentrated quarrying in a semi-rural area. Additional resources in areas which are not highly sensitive, are very limited.

Some secondary aggregates are available, but most are currently fully utilised with relatively small stockpiles, which need to be weathered before use. The amount of CD&EW was arising and utilised is likely to represent a considerable proportion of the regional total.

There are three active marine sand wharves in close proximity to a large concentrated market area. Cardiff, as a large port, also has the capacity to accommodate hard rock/ secondary aggregate imports if appropriate in the future.

Based on recent shares of production, Cardiff and RTC combined would be expected to contribute 22.5-23.9Mt over the next 15 years. On a per capita basis, this would equate to 30-31.4Mt. Taking these two areas jointly, there are sufficient resources to meet this requirement, but although the production is almost equally divided, the permitted reserves are far more concentrated in Cardiff than RCT. The latter would only just be able to meet its proportionate share at the end of the 15 year period.

Recommendation

On the basis of the information on permitted reserves available and in the light of MTAN1 policy (para 49), and applying Method A and Method B apportionment, no resource allocation is required at present. However, in preparing Local Development Plans, consideration should be given to whether the factors in Box 1 above give rise to any requirement for resource allocations.

Existing and potential wharves should be identified for protection in the LDP to safeguard marine sand and gravel/hard rock/secondary aggregate existing and potential flows into the area.

Additional rock, sand and gravel resources should be investigated and safeguarded for possible future use in the LDP.

(NB. For confidentiality reasons, apportionment is grouped with the Caerphilly).

4.30 Currently one sandstone (high psv) quarry and (until recently), one limestone quarry have been operational. The northern boundary with the BBNP is defined in places by the edge of limestone quarries, leaving very little of the potentially workable limestone resource outside the BBNP. All the additional resources of limestone here, i.e. just north of the A465 corridor, have low environmental capacity to accommodate further quarrying.

The Pennant Sandstone, which may be suitable for high specification aggregates, outcrops over much of the higher land in the southern half of the MPA area, where it exhibits variable environmental capacity.

No significant amounts of secondary aggregate are present but volumes of CD&EW are likely to be widely available in the main valley areas.

Based on recent shares of production, Merthyr and Caerphilly jointly would be expected to contribute 16.5-19.2Mt over the next 15 years. On a per capita basis, this would equate to 15Mt. Permitted reserves in both areas are each sufficient to meet these levels.

In the case of Merthyr, a portion of this is located at a limestone quarry which straddles the border with the BBNP. It would appear likely that if production were to be resumed there, this could in part cover a shortfall, should production elsewhere in the BBNP cease.

Recommendation

On the basis of the information on permitted reserves available and in the light of MTAN1 policy (para 49), and applying Method A and Method B apportionment, no resource allocation is required at present. However, in preparing Local Development Plans, consideration should be given to whether the factors in Box 1 above give rise to any requirement for resource allocations.

Areas of high psv sandstone resources and any remaining areas of limestone outside the BBNP need to be subject to further investigation and be safeguarded selectively in the LDP.

The probability of substituting production here for that currently being sourced from BBNP, should be considered.

The possibility of using rail transport for high psv sandstone should be investigated, such as the railhead at Cwmbargoed (Ffos y Frân opencast site) and associated line.

Additional high quality sandstone resources need to be safeguarded in the LDP and be subject to detailed investigation.

14 Caerphilly

(NB. For confidentiality reasons, apportionment is grouped with Merthyr Tydfil.)

4.31 Currently two active sandstone and one active limestone quarries are operational. The recent extension approval at Machen Quarry has increased the permitted reserves in the MPA. The Carboniferous Limestone of the South Crop here exhibits one of the most extensive (but still relatively limited) areas bearing medium environmental capacity to accept further working. As the MPA area does not extend to include North Crop of the limestone, it is not well placed to substitute for any shortfall arising in BBNP.

Within the MPA area, almost the whole of the MPA area north of Caerphilly town, is underlain by Pennant Sandstone, likely to be suited to high specification aggregate. The north western margin and parts of the south display low environmental capacity, otherwise the levels are average.

Substantial quantities of colliery shale exist above Bedwas, Machen, and Llanbradach, but these are generally remote from transport links, moreover, efforts to obtain planning permission for the removal of tips in Machen in the past have been refused.

A rail link exists at Machen Quarry which is in use to transport aggregates, particularly rail ballast and HSA. Cwm Bargoed rail link in the adjacent area of Merthyr (qv) may also be able to serve this MPA area. The majority of the area is within 30 km of the Cardiff / Newport wharves.

Based on recent shares of production, Caerphilly and Merthyr would be expected to contribute 16.5-19.2Mt over the next 15 years. On a per capita basis this would equate to 15Mt. Permitted reserves in both areas are each sufficient to meet these levels.

Recommendation

On the basis of the information on permitted reserves available and in the light of MTAN1 policy (para 49), and applying Method A and Method B apportionment, no resource allocation is required at present. However, in preparing Local Development Plans, consideration should be given to whether the factors in Box 1 above give rise to any requirement for resource allocations.

Alternative high quality sandstone reserves need to be safeguarded selectively in the LDP and be subject to further investigations for potential future use, as should the Carboniferous Limestone in the south.

Machen Quarry railhead should be defined for protection in the LDP to safeguard existing and possible future extension of its use for aggregate transportation.

Land won sand and gravel resources need to be identified and safeguarded in the LDP.

Former "Gwent" Area: General Statement

4.32 The situation in the remaining four MPAs: Blaenau Gwent, Torfaen, Newport and Monmouthshire, is particularly complicated as far as apportionment is concerned.

Firstly, despite the geographic size and the scale of population (386,000 people or 17% of the region), within those four authority areas, average production is only 0.44Mt i.e. only equivalent to a medium scale rock quarry and the shared reserve amounts to 18.4Mt. [N.B This figure is understood to include dormant reserves].

Resources of limestone and sandstone are present to a lesser or greater degree and of varying quality and accessibility within all these authority areas.

The area currently partially relies upon importing aggregate supplies from Caerphilly to the west (c0.25 MPA area) and from Gloucestershire to the east, (c0.15Mt pa). Almost all of this is limestone. However, the recent closure of limestone operations in Monmouthshire might suggest that the supply situation in the area is not as acute as the available statistical information implies. The small size of some of the authority areas may explain the lack of operational quarries. Consultation with Gloucestershire MPA has indicated that the continuity of supply from the Forest of Dean area in the longer term may not be sustainable as the majority of limestone quarries in that area lie within the Wye Valley AONB.

Marine sand is also an important player (0.43Mt in 2005).

The presence of two ports (Newport and Chepstow) may offer potential for sea borne imports to supplement local land won materials. This has been the case in the past with imports of Scottish granite being landed at Newport.

On the basis of recent shares of production, the combined area would be expected to contribute to 6Mt of rock over the next 15 years. On a per capita basis however, this would equate to 21-22.3Mt. Permitted reserves taken as a whole would be sufficient to meet the former, but not the per capita requirement. Individually, only Monmouthshire (22% population) would be capable of meeting it's per capita-based share.

15 Blaenau Gwent

(NB. For confidentiality reasons Blaenau Gwent, Torfaen, Newport and Monmouthshire are grouped together for apportionment purposes.)

4.33 Currently one limestone quarry is active. The present site is in close proximity to, but outside the BBNP boundary. Despite a recent extension, reserves are well below the recommended 15 year minimum landbank. The operators are currently investigating an extension to the quarry.

Other limestone resources are present, but are extremely limited beyond the existing permitted areas and are sensitive from an environmental capacity point of view.

Carboniferous sandstone resources occupy much of the MPA area, more than half of which has environmentally low capacity. Both limestone and sandstone resources require more detailed investigation.

Some secondary aggregate sources may be available for limited substitution (colliery shale), but the sources are not significant and the quality is poor compared with quarried rock. CD&EW is available in the area and a new site has recently commenced recycling.

Although the MPA is not on the coast, the greater part of the area is within 30km of the marine wharves in Newport.

On the basis of existing or per capita-based requirements, additional reserves of about 3Mt would need to be provided for. In terms of its existing share, Blaenau Gwent could not continue to meet even this and therefore could not additionally absorb some of the BBNP, if called to do so from existing permitted reserves.

Recommendation

In order to meet a proportionate share of demand, the MPA should assess the potential to make a resource allocation of at least 3Mt in the LDP. Where feasible, this should be of limestone.

Additional Carboniferous Limestone resources need to be examined and safeguarded.

Alternative Carboniferous sandstone resources should be investigated and selectively safeguarded for possible future use.

(NB. For confidentiality reasons Blaenau Gwent, Torfaen, Newport and Monmouthshire are grouped together for apportionment purposes.)

4.34 There are no active sites or reserves of aggregate minerals. Unworked resources of Carboniferous sandstone exist in areas of high and medium environmental capacity. A narrow outcrop of Carboniferous Limestone runs along the eastern flank; this has a generally low environmental capacity and may be physically difficult to work, not withstanding any planning constraints.

Some secondary aggregate sources (foundry sand/colliery shale) may be available for substitution, but the sources are not significant in tonnage or quality terms. Regeneration schemes in this area are likely to produce CD&EW, which has potential use as aggregate.

Although the MPA area is not on the coast, it is within 30km of the marine wharves in Newport.

There has been no aggregate produced for several years so an "existing share" cannot be stated. On the basis of a per capita approach, Torfaen would be expected to produce 25% of the joint total equating to 5.25-5.6Mt over the next 15 years.

Recommendation

In order to meet a proportionate share of demand, the MPA should assess the potential to make a resource allocation in the LDP of 5-6Mt.

Limestone/sandstone resources should be investigated and safeguarded for possible future use.

17 Newport

(NB. For confidentiality reasons Blaenau Gwent, Torfaen, Newport and Monmouthshire are grouped together for apportionment purposes).

4.35 There are no active quarries, but one limestone quarry has recently been active. Resources beyond these areas are very limited indeed and mainly have low environmental capacity.

Reserves are significantly below the 15 year minimum landbank.

The area is also supplied by three marine sand and gravel wharves.

Small stockpiles of secondary aggregates (blast furnace and steel slag estimated at 0.5Mt) were recorded (by WET) at the former Llanwern steelworks, most of which was used as low end-use specification fill but at the recent rate of processing are likely to have been exhausted by 2007. These previously contributed a significant volume to local aggregate needs. If still available steel slag is in general, however, capable of being used as a higher grade aggregate and could possibly substitute some of the current shortfall in aggregate reserves. It is understood that some slag is imported from Port Talbot by sea but processed at Llanwern.

A rail sidings site is utilised to process spent rail ballast for use as aggregate. This should be safeguarded for potential wider use in the future. There is also likely to be a reasonably high level of CD&EW recycled as aggregates in this predominately urban area.

As there is currently no active working and rock reserves are extremely modest, it is not possible to set out a projection based on existing shares. In terms of per capita, the MPA area would be expected to account for 38.4% of the combined area or 8-8.5Mt over the 15 year period.

Recommendation

The MPA should examine the feasibility of making allocations which go an appreciable way towards meeting the estimated 8-8.5Mt of demand for aggregates arising within its area.

The secondary aggregate stockpiles should be monitored and where available used to replace the shortfall in primary aggregate reserves.

Existing and prospective wharves should be identified for protection in the LDP to safeguard the marine sand and gravel and possibly other minerals flow into the area.

The rail sidings at Mon Bank should be safeguarded to maintain existing and potential use for the transportation of aggregates by rail.

The feasibility of sea borne rock imports should be explored.

Land won sand and gravel resources and possibly small areas of limestone which may be workable, need to be safeguarded in the LDP.

(NB. For confidentiality reasons Blaenau Gwent, Torfaen, Newport and Monmouthshire are grouped together for apportionment purposes).

4.36 There are two recently active limestone quarries. Additional limestone resources exist in the southern part of the MPA, but in general, the area is sensitive in terms of environmental capacity. Furthermore some parts of the limestone resource lie within the Wye Valley AONB and contain at least one dormant site. MTAN1 (paragraph 49) indicates that no allocations should be made in respect of such areas (see also Appendix 20). A number of different pre-Carboniferous sandstones exist in the MPA area but most are not suitable for aggregates.

There are extensive potential resources of river valley sand and gravel deposits along the Usk, but the quality and quantity is unknown in detail. Almost all of this material has low environmental capacity.

Marine sand is landed at Chepstow. The majority of the area is within 30km of marine wharves here and in Newport. Limestone and land won sand and gravel is also imported from England.

There are no significant sources of secondary aggregates in the area.

Based either on the existing situation or a per capita approach reserves exceed a 15 year requirement. However, in the medium term future, Monmouthshire is likely to continue to be called upon to support demand arising within adjacent authorities.

Recommendation

On the basis of the information on permitted reserves available and in the light of MTAN1 policy (para 49), and applying Method A and Method B apportionment, no resource allocation is required at present. However, in preparing Local Development Plans, consideration should be given to whether the factors in Box 1 above give rise to any requirement for resource allocations.

Existing and potential wharves should be identified for protection in the LDP to safeguard marine sand supplies to the area.

Additional resources of limestone should be investigated and safeguarded for possible future use in the LDP.

Land based sand and gravel resources need to be safeguarded in the LDP.

5. PUBLIC CONSULTATION

The draft RTS was subjected to wide public consultation during the period 23 November 2007 to 31st January 2008. Press releases were circulated, fliers were produced and distributed locally via the MPAs, and the draft report was placed on the SWaRAWP website.

Thirty eight representations were received from MPAs, government agencies, community councils, industry (including trade federations and consultants), environmental bodies, utility organisations and other bodies. Their comments were collated, RAWP officers recommended responses and revisions were considered and agreed by the RAWP on 27th February 2008.

Of the concerns raised, there was a particular focus on marine aggregates, national parks and the apportionment to some of the smaller MPAs.

Where the comments were not adopted specifically, many were considered to be already covered adequately at some point in the RTS. In most other instances however, the observations were gauged to be outside the remit of the RTS for one or more of the following reasons:-

a) They were site or locally specific (the RTS is a strategic document) and were more appropriate for consideration in LDP formulation or at planning application stage.

b) They were matters for the Welsh Assembly to consider as they were contrary to the Assembly's current guidance, e.g. as set out in MTAN1, and which formed the required basis for the preparation of the RTS.

c) They related to non-land-use planning matters, in many cases to marine issues which are the subject of a specific control regime.

APPENDIX 1

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24. Implementing the Methodology for Assessing the Environmental Capacity for Primary Aggregates (IMAECA) Enviros (2005). see also Appendix 14
25. NB the terms 'production' and 'sales' have been traditionally used interchangeably - all the surveys conducted over the last c10 years have technically concerned sales, but the same data are still frequently referred to as 'production' or 'output'.

26. 2003 'Establishing in Methodology for Assessing Aggregates Demand and Supply' Arup Environmental
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31. Smiths Gore (2003) Survey.
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APPENDIX 2

LISTS OF MEMBERS

South Wales RAWP RTS Sub-Group

Represented by:-

Martin Hooker (Chair)		Bridgend County Borough Council
Steve Bool (Tech. Sec)		Bridgend County Borough Council
Peter Huxtable	Tony Gilman	British Aggregates Association
P. Mears	Mrs R Amundson	Caerphilly County Borough
Roger Barrett-Evans	Mrs C A Williams	Pembrokeshire County Council
R. Thomas	Mr M Lucas	Vale Of Glamorgan Council
Geoff White	Mr Neville Morgan	Neath Port Talbot County Borough Council
Sue Martin		Welsh Assembly Government
Carolyn Warburton		Welsh Assembly Government
Mark Russell		British Marine Aggregate Producers Assoc.
Karen Maddock-Jones		Countryside Council For Wales
Richard Millard		Quarry Productions Association
Malcolm Lawer		Tarmac-Western (QPA)
Ian Thomas		National Stone Centre
Anthony Wilkes		Environment Agency

South Wales RAWP Members

Martin Hooker (Chair)		Formerly of Bridgend C. B. Council
Steve Bool (Tech. Sec.)		Bridgend County Borough Council
Steve Smith	Lynda Healy	Blaenau Gwent County Borough Council
Chris Morgan		Brecon Beacons National Park Authority
P. Mears	Mrs R Amundson	Caerphilly County Borough Council
Julian Steadman	Mr Stuart Williams	Cardiff City Council
Bryan Thomas	G Dorrington	Ceredigion County Council
E.W. Bowen	Mr Hugh Towns	Carmarthenshire County Council
Norman Davies		Merthyr Tydfil County Borough Council
George Ashworth	Mr M Davies	Monmouthshire County Council
S. Wild	Lindsay Christian	Newport City Council
Roger Barrett-Evans	Mrs C A Williams	Pembrokeshire County Council
Ifor Jones	Mrs Julie Kirk	Pembrokeshire National Park
G. Davey	Mr S Packer	Powys County Council
Mrs S Davies	Mr O Jones	Rhondda Cynon Taff C. B. Council
Bryan Graham	Ms R Henderson	Swansea City And County Council
Andrew Fretter	Mr Adrian Wilcock	Torfaen County Borough Council
R. Quick	Mr M Lucas	Vale Of Glamorgan Council
Geoff White	Mr Neville Morgan	Neath Port Talbot County Borough Council
Sue Martin		W.A.G/Planning Services

South Wales RAWP Members (continued)

Carolyn Warburton		W.A.G/Planning Services
Ken Hobden		Quarry Products Association
David Highley		British Geological Survey
Jason Golder		The Crown Estate
Basil Hollington		W.A.G./Food And Farming
Mark Frampton		Hanson Aggregates (QPA)
Ian Fox		National Ash
J. Cuddy		Cuddy Demolition and Dismantling
Malcolm Lawer		Tarmac Western (QPA)
Anthony Wilkes		Environment Agency
Kevin Seaman		United Marine Dredging
Karen Maddock-Jones		Countryside Council for Wales
Peter Huxtable		British Aggregates Association
Graham Bishop		Welsh Environment Trust
Mark Russell		British Marine Aggregate Producers Assoc.
Anthony Wilkes		Environment Agency Wales
Ian Thomas		National Stone Centre
Peter Bide	D Cameron	British Geological Survey
Wayne Towell		Cemex

South Wales RTS Members Forum

Cllr D.J. Owens	Blaenau Gwent County Borough Council
Cllr Peter Seaman	Brecon Beacons National Park Authority
Cllr Bob Burns	Bridgend County Borough Council
Cllr E.K. Griffiths	Caerphilly County Borough Council
Cllr Simon Wakefield	Cardiff City Council
Cllr Anthony W Jones	Carmarthenshire County Council
Cllr Hag Harris	Ceredigion County Council
Cllr D.D. Games	Merthyr Tydfil County Borough Council
Cllr E. Saxon	Monmouthshire County Council
Cllr D Lewis	Neath Port Talbot County Borough Council
Cllr Erryl Heath	Newport City Council
Cllr Huw George	Pembrokeshire County Hall
Cllr Rosemary Hayes	Pembrokeshire National Park
Cllr W.T. Jones	Powys County Council
Cllr Robert Bevan	Rhondda Cynon Taff C.B. Council
Cllr Alan Robinson	City And County Of Swansea
Cllr G. Caron	Torfaen County Borough Council
Cllr C J Williams	Vale of Glamorgan Council

APPENDIX 3

SOUTH WALES REGION: ITS CHARACTER AND ECONOMY

The area forming the South Wales region extends as far north as a line drawn north eastwards from the Dyfi on the Mid Wales coast and covers approximately 70% of the total land area of Wales.

Its current population is approximately 2,113,000 persons, which is predicted to rise to 2,410,000 by 2020. This equates to a 12% increase. The largest percentage recent increase has been in Ceredigion, Powys, Cardiff and Monmouthshire and the largest decrease in Neath, Rhondda Cynon Taff, Merthyr Tydfil and Blaenau Gwent.

Economic activity, which relies heavily on physical infrastructure including roads, buildings, structures etc, is set to increase from the current levels according to a number of reports. Econometric studies[28] which contain detailed macroeconomic and industrial forecasts to the year 2015 for England and Wales, indicate that the strongest performances are expected in Wales and other Central areas, based on a sharp improvement in consumer services and manufacturing, combined with continuing strong growth in construction. This trend has inevitable consequences for the demand for aggregates or other materials which may substitute for aggregates.

Within South Wales, there is a diverse and extremely broad range of landscapes, coastal, and urban settings. A number of reasonably distinct areas can be defined:-

South East Wales consists of a low coastal belt and the main north-south trending Valleys area of the Coalfield. It is a dynamic and modern industrial/service area with an extremely broad range of economic activity, but also has a large inherited area of semi-urban deprivation, which grew in the wake of colliery and steel works closures. The Wye Valley AONB straddles the Wales/England Border.

The **Swansea Bay** area contains historical population centres, dating from the Industrial Revolution and extreme disparity between very deprived and prosperous areas. Manufacturing and service development is important and the area has a strong transport link with South East Wales. The area includes the Gower AONB.

South West Wales (Carmarthenshire/Pembrokeshire/west Ceredigion) is dominated in the south by a network of small, largely tourism-dependant towns with industry concentrated around Milford Haven and relatively challenging agriculture in the remainder. Protected areas include the Pembrokeshire Coast National Park.

The **north and east** of the region i.e. north of the Heads of the valleys road (Powys and east Ceredigion) comprises sparsely populated, extensive moors upland including the Brecon Beacons National Park, with narrow, farmed valleys, serviced by small market towns. It also supports several large water supply facilities.

APPENDIX 4

WALES SPATIAL PLAN OBJECTIVES

To achieve the vision of sustainable development, mineral planning must seek to address a number of specific aims and objectives which have been identified in the Wales Spatial Plan (WSP) as follows:-

(i) respecting distinctiveness;
(ii) valuing our environment;
(iii) building sustainable communities;
(iv) increasing and spreading prosperity;
(v) achieving sustainable accessibility and;
(vi) embracing the future.

At first sight, the relationship between quarrying and some of the objectives in the Wales Spatial Plan might appear to present considerable challenges. However there are direct linkages which can be summarised as follows.

Distinctiveness - this is embodied in the sense of place and in turn, local pride. One of the contributing factors, particularly strong in many parts of the region, is the use of vernacular building materials and particularly stone. The same material often equally forms the foundations of our landscape. Although the RTS is concerned with the aggregates sector, some quarries produce both building stone and aggregates, thus contributing to this distinctiveness.

Valuing Environment - in places such as those just noted, a supply of relevant materials, either simply shaped or subject to appropriate processing, will be required to conserve and enhance the related built environment. Conversely there is always a need for the quarrying industry to continue improving environmental and operational standards and in some cases, where there is earlier dereliction, it can be used as a tool for enhancing local environments, by planned reshaping of damaged landscapes, or by the provision of leisure space or may offer important opportunities for bio/geo conservation. However in some instances, the value placed on a particular environment may be such as to limit, or preclude quarrying altogether, particularly where less environmentally intrusive options are available. This choice is usually available in the core of aggregates.

Sustainable Communities - the quarrying industry, the manufacture of some of the related "downstream" products and their distribution, provide vital and longstanding sources of employment, (alongside agriculture and tourism) in certain rural areas.

Increasing Prosperity - the quarrying industry produces essential raw materials to underpin the construction industry, which is fundamental to development and prosperity.

Sustainable Accessibility - minerals can only be extracted where they occur. South Wales is blessed with a wide variety of good quality aggregates. Transport (and hence energy) costs represent a significant proportion of the delivered costs of aggregates. In most areas of the region it is therefore feasible to sustain the proximity principle in respect of aggregate supplies. MTAN1 (para 29) promotes the greater use of water or rail transport on environmental grounds. MTAN1 (para 29) also indicates that self sufficiency within regions

should be sought. These policies therefore need to be applied in an informed context as the situation in South Wales is complicated and could actually result in larger quantities being extracted in the region and transported longer distances for export to other regions. This in itself raises inherent questions about sustainability. Indirectly, the use of aggregates by providing materials for transport infrastructure will support improvement to such networks.

The future - the maintenance of adequate future supplies within a sustainable context is the prime aim of this document.

APPENDIX 5

SECONDARY AND RECYCLED AGGREGATES

The various types of secondary and recycled aggregates in South Wales summarised in Section 3 are reviewed in turn below (more detail is given in MTAN1. They are divided into three broad categories:-

i) CD&EW; ii) other industrial materials; iii) mine and quarry wastes.

i) Construction, Demolition and Excavation Wastes (CD&EW)

This includes crushed or other material suitable for use as aggregates, recovered from construction projects, demolition of buildings and structures, wholesale removal of roads, aircraft runways, docks etc. It may be crushed on site (and reused on site or sold offsite) or taken to a depot/static site and processed for reuse.

All the statistics referred to in this section have a significant "health warning" attached for the following reasons:-

- The nature of the industry is extremely varied and in many cases highly transient, naturally responding directly to the sites where demolition is taking place.
- The legislative control of the industry is split between local authorities and the Environment Agency[29].
- The categories of site are complicated (with potential for survey duplication or under representation) so that it is difficult to ensure a true population of aggregates processing sites is being surveyed[1].
- The locations where businesses are based and data is accounted for, are often distant from the processing activity on the ground.
- It is becoming more economic to use/hire smaller crusher and screening plants, and for smaller tonnages to be recovered over shorter campaign periods, resulting in increasingly transient operations.
- Significant quantities are reused on site, particularly on larger schemes (to obviate transport costs, Landfill Tax and, more recently the Aggregates Levy on primary aggregates), very little of which is measured. However, Environmental Agency Wales are seeking to gauge levels of reuse onsite in their current survey. This could amount to a considerable proportion of the total volumes recycled and is usually by far the most sustainable activity in this sector.
- Unlike primary aggregates, there are only limited statutory reporting procedures and no centrally held data system of all throughputs by location of activity or usage.

As a result of all the above and as ODPM/CLG and Welsh Assembly Government CD&EW surveys are not statutorily required, nor have they been traditional or regular, the level of response is generally very low (effectively 15% of all sites in 2005) and the confidence limits set around central estimates so broad as to render them questionable. They are therefore perhaps best used in a qualitative rather than a quantitative way. However the underlying trend demonstrated by the latest figures is significant and reinforces the results of earlier surveys. It is also understood that the Environment Agency C&D survey for Wales nearing completion at the time of writing, has received a 70% response.

Surveys of England and Wales were carried out for the government in 1999 and 2001[30]. The former was ostensibly for "inhouse" use only, largely on account of the uncertainty of the results. Particular cautions were attached to the results at anything below the level of totals for England and Wales, i.e. at "regional" level. Bearing in mind that the total amounts and scale of the industry in Wales as whole are less than that for any English region except possibly the North East, this makes data for Wales particularly suspect, and that for North or South Wales even more questionable. Totally separate surveys were conducted for England and Wales in respect of 2003[31] and 2005[32]. The results are summarised below in table A4.1.

The treatment of the low levels of returns received for the 2003 survey was questioned during the 2005 survey which may result in the need for reappraisal. A survey was carried out by WET for 2005 of sales from static crusher plants only, which indicated 0.513Mt of secondary aggregate.

Notwithstanding these limitations the results of the national surveys are shown below.

Table A4.1: Arisings and Usage of CD&EW as Aggregates 1999-2005 (M Tonnes)

Arisings/Usage	1999	2001 (a%)	2003 (a%)	2005
Total Arisings				
North Wales	nsa	1.56 (135)	1.46 (100)	nsa
South Wales	nsa	3.46 (90)	4.54 (100)	nsa
Wales	3.29	5.02 (74)	6.01 (100)	9.89
Total recycled as aggregate				nsa
North Wales	na	0.46 (135)	0.64 (45)	nsa
South Wales	na	1.09 (90)	1.74 (43)	nsa
Wales	na	1.55 (74)	2.38 (b)	3.97 (b)

a) Bands ± around estimate shown, at 90% confidence level shown in brackets;
b) Aggregates figures for 2003 and 2005 include soil. When this was separately recorded in 2001 it amounted to 5% of total arisings; the same proportions are applied here to 2003 and 2005.
nsa - not separately available.

In order to corroborate earlier data, separate attempts were made to calculate 2005 figures by using data from the National Federation of Demolition Contactors Survey grouped for Wales and Midlands, in conjunction with data from the 2005 Survey for England. However the two sets of data proved contradictory in certain aspects and so could not be used.

More than 94% of CD&EW is currently regarded by WET as “low value” aggregate (i.e. only suitable for uses requiring less demanding specifications), but a substantial proportion could be upgraded to “high value” given the availability of suitable equipment, some of which is currently being installed. As with other waste and by-product materials, CD&EW has to meet the requirements of the WRAP Protocol or it may be considered by the Environment Agency as waste and have to be treated accordingly.

A separate survey is being conducted for 2005 by the Environment Agency Wales covering various other categories of CD&EW processing points in Wales and is expected to report in autumn 2007. This will cover some 350 construction companies e.g. to ascertain the amounts being generated, and used for aggregates on and offsite.

The 2001 and 2003 surveys separated the results into North and South Wales. The 1999 and 2005 studies did not as the level of returns was regarded as insufficient to be able to produce data at this degree of detail. Bearing in mind the strong cautionary notes attached to the usage of this data, it is regarded as inadvisable to rely upon further subdivision, but this is absolutely necessary for planning purposes. A pragmatic approach is therefore adopted below. Firstly, the average of the proportions apparently from the 2001 and 2003 surveys are applied. These are then compared with a breakdown using the relative populations as a weighting tool, most of the arisings and potential for usage being understood to be closely related to population.

Table A4.2: Weighting CD&EW Aggregates 2005

Region	2001%	2003%	Average %	Applied to 2005 Mt	Million people	Population%	Applied 2005 Mt
South Wales	70	73	71.5	2.84	2.285	77	3.06
North Wales	30	27	28.5	1.13	0.673	23	0.91
Wales	100	100	-	3.97	2.958	100	3.97

From the above and bearing in mind the need for caution, the application of rounded figures of 3Mt for of CD&EW usage for aggregates in South Wales and 1Mt for North Wales respectively, would appear to be a reasonable way forward.

If, as government policy seeks, new construction becomes more concentrated upon brownfield sites than in the past, CD&E waste recycling could increase accordingly, at least in short to medium term until the stock of such sites dries up.

It is axiomatic that if overall aggregates demand remains reasonably stable, the level of contribution from secondary and recycled aggregates could be maintained and indeed some elements (CD&EW) may actually rise in parallel with an increase in construction on brownfield sites.

However, if there were to be a significant and rapid increase in demand for aggregates, it is unclear to what degree an uplift of secondary and recycled aggregates could keep pace. In contrast, the primary sector is likely to be able to respond rapidly and fully.

MTAN1 para 157 also sets a target to recycle at least 40% of C&D waste (construction and demolition) arisings by 2005 (NB C&D waste now includes excavation waste).

The Faber Maunsell survey for 2005 recorded 9.89 Mt of total arisings for Wales as a whole, of which 4.46Mt (i.e. 45%) was used as recycled aggregates, i.e. the same proportion as in the 2003 survey. However both the 2003 and 2005 data incorporated on undisclosed proportion of recycled soil. Soil was only separately identified in the 2001 survey which then amounted to 5% of all arisings. It would therefore appear that the target was met in 2003 and the position was maintained in 2005.

ii Other Industrial Materials

A number of industrial materials mainly by product can be used instead of primary aggregates. Foremost of these are metallurgical slags but they also include material from power stations (p.f.a/f.b.a) and a wide variety of materials such as glass and ceramic waste. In some cases e.g. asphalt planings and rail ballast, it might appear more logical to group the substances under CD&EW. However, the coverage of CD&EW is already well defined in terms of survey returns, so those items are included in the industrial materials category. Data is collected by a number of agencies and in various forms. The main ones have been regularly reported but collectively in SWaRAWP surveys. These are shown on table A4.3 below.

Table A4.3: Steel/Blast Furnace Slag; p.f.a/f.b.a (Totals 2000-05)

M tonnes	2000	2001 (b)	2002	2003	2004	2005
Used as aggregates	0.964	0.920	0.954	0.700	0.700	1.08
Reserves at year end (a)	12.54	5.16 (c)	16.98	27.31	26.20	25.10

Source - SWRAWP Annual Reports (except as shown below)
N.B. May include small amounts of slate waste in some years; road planings are shown separately in table T.
a) Aggregates in stockpiles and tips with planning permission for extraction except for 2001;
b) Source Symonds 2001 Survey (2003) - of which slag 0.67Mt, p.f.a 0.16Mt and f.b.a 0.09Mt. In addition, spent rail ballast 0.04 and colliery spoil 0.03Mt;
c) Only recorded for p.f.a: colliery spoil given as 0.03Mt and rail ballast given as 0.04Mt.

Some more detailed information for 2005 is shown in table A4.4 below.

Table A4.4: Recycled and By-Product Materials (other than CD&EW) (2005)

Aggregate K tonnes	Sales	Stock	Processing Capacity			
	High Value	**Low Value**	**High Value**	**Low Value**	**High Value**	**Low Value**
Iron and Steel Slags	190 (a)	760	50	300	250	630
P.f.a/f.b.a	30	70	-	12000	200	250
Rail Ballast	104	63	-	-	100	50
Glass	17	-	20	-	108	-
Total	**341**	**893**	**70**	**12300**	**568**	**930**

Source: Wales Environment Trust
a) In addition, 0.65 Mt were sold for high value non-aggregate uses.

The main characteristics of each sub-sector are described below.

Metallurgical Slags

Port Talbot is now by far the main source of slag, but until its closure as a primary iron and steel producer in July 2001, Llanwern Works was also a major producer. Working of stockpiles still continues at the latter, but these are not being added to by new material. Blast furnace (iron) and steel slags from these works are utilised for aggregates. Processing of these in South Wales accounts for about a third of the UK annual total.

After a dip following the Llanwern closure and unplanned temporary closure of one of the Port Talbot furnaces (also in 2001), output was expected to increase at Port Talbot. However a substantial proportion of output is processed (quenched - rapidly cooled) for ground granulated blast furnace slag (GGBS) to be used as a substitute for Portland cement. This is a high priced and more energy efficient use of this by-product than for aggregates. Sales of GGBS have risen significantly in recent years and are particularly significant in this region. A small amount is used also as “basic slag”, an agricultural fertiliser. These two uses make significant inroads into the volume of total arisings available for aggregates. The choice of use is dependent on commercial decision making and the composition of the slag. Material destined for aggregates is allowed to cool naturally and then crushed. Small amounts of slag from old tips are reworked in Blaenau Gwent.

Steel slag has to be allowed to weather for six months (to leach out adverse soluble material) before use. It can then be used to produce a reasonably high skid resistant road surfacing material but, as it is relatively dense and uses more bitumen, it may be less cost effective than some other materials. In addition to the works noted above, it was produced until recently from electric arc furnaces at Cardiff. It has been suggested that a very large proportion (c90%)[33] of the steel slag processed in Wales, is exported to England. If this is the case then the previous assumption i.e. that all slag sales were to destinations in Wales may therefore have distorted earlier aggregates consumption figures for Wales. Distribution data is not systematically collected.

There are no discrete consistent slag figures (data in SWRAWP Annual Report is grouped for confidentiality reasons), but data from WET for 2005 has been recast and presented in summary form as Table A4.4. At 0.95Mt, despite works closures, this is only a small decrease from the 2001 level (0.99Mt) (Symonds Survey 2001).

Blast furnace slag is currently considered as a “waste” under recent EU Guidance relating to by-products. The Environment Agency is currently looking at the UK position.

Slag stocks at active and former iron/steel works, are understood to equate to about six months aggregate supply at the end of 2005, but stocks are being partially replenished by new slag make. In addition there are believed to be further large stocks which may be earmarked for other purposes.

Future prospects for maintaining this level are very uncertain for a number of reasons: overall production of slag per tonne of iron/steel is generally slowly decreasing to reduce costs (including energy consumption). Stocks at former works are being depleted without further additions. The recent takeover of Corus, the main source, could bring changes to the level of primary metal production, and in turn, slag. The amount destined for aggregates usage is also in part dependent upon the financial margins which can be generated by higher value uses. The volumes being dispatched to England could vary and at present are unknown.

Power Station Arisings

There are two forms of relevant material produced at coal fired power stations - pulverised fuel ash (p.f.a) and furnace bottom ash (f.b.a). In the region both types are only produced at Aberthaw Power Station. F.b.a is also produced at some waste incinerators but as far as is known, no aggregates are generated by this route in South Wales.

Aggregates sales data for 2005 (from WET) at 0.1Mt show a decline from 0.15Mt in 2001. They reflect a ratio of 3 low: 1 high value material, or p.f.a: f.b.a. The finer (p.f.a) material is used as a fine aggregate (e.g. for concrete blocks), grout (e.g. for pumping into voids such as old mine workings) or to supplement cement.

These are small figures compared with the 0.36Mt generated in 2005 (or 0.4Mt in 2001) and anticipated to rise by a further 0.1Mt by 2008, or in contrast to the 12Mt stockpile. A further 5Mt on site is reported as unavailable as it encapsulates a hazardous waste tip.

New plant is expected to increase usage of p.f.a for cement supplement materials to 0.11Mt by 2008.

In contrast, the much smaller arisings of f.b.a are fully utilised as aggregate to make concrete blocks. Market arrangements concentrate sales in South Wales.

The Environment Agency classes p.f.a as a “waste” which means that it can currently only be supplied to sites which have waste exemption licences or waste management licences. Changes in the “Quality Protocol” now in hand, are likely to remove this barrier and enable sales to increase. The Environmental Agency is working with the Waste Resources Action Program (WRAP) and industry to develop a protocol for the use of p.f.a. If the specified criteria can be met, then it is likely that the material will no longer be considered a waste and therefore not subject to regulation by the Environment Agency. It is important to note that

the aggregates produced would still be required for use in a genuine construction activity, as stated in the WRP Protocol. Further work is also needed to understand more clearly the reasons for the present limited use and to explore the opportunities for much greater applications of these considerable quantities.

Rail Ballast

Although rail ballast and road planings (i.e. road surfaces planed off before renewal) are forms of construction waste (CD&EW), usually their use is considered separately.

One plant in the region processes used rail ballast into aggregate at a rate of c0.15Mt pa.

Asphalt Planings

Information on road planings has been collected for a number of years by SWRAWP from local highway authorities only. However those should be regarded as minimum as they do not include planings arising from work on the motorway and trunk road network which are administered by Transport Wales. The latter are likely to be substantial.

Table A4.5: Arisings and Usage of Road Surface Planings (South Wales 2000-05)

K Tonnes	2000	2001	2002	2003	2004	2005
Arisings	60	28	128	36	83	50
Recycled	55	25	124	32	76	47
a)	13	8	13	8	12	6
b) %	81	50	81	50	80	40

a) Number of local highways authorities responding (out of 16);
b) Percentage of local authority responses.

It is not known how representative the responses were of the whole of South Wales. Mathematically grossing up the 2005 figures based on the number of responses received would give a total of 125,000t which would not appear to be unreasonable in the light of returns for earlier years. Bearing in mind that the roads administered by Transport Wales tend to include the larger recycling schemes, the actual figure could be twice this level.

Most recycled planings are currently used for low grade tasks such as verges, cycle tracks footpaths and farm roads. Occasionally major resurfacing schemes have involved significant quantities over a short period.

Miscellaneous Materials

Stocks of glass are located at two sites and small amounts are crushed to produce sand at one location. It is understood that small volume tonnages of foundry sand has also been used as aggregate but that recent statistics are not available[34]. Amounts are projected to increase significantly to 0.1Mt pa. In some areas ceramics including reject bricks are crushed, but not in South Wales. Trials are also being conducted elsewhere into the use of rubber and plastic.

iii) Mine and Quarry Wastes

The waste products of certain non-aggregate mineral operations can sometimes be converted to aggregates. Those occurring in South Wales include colliery spoil (minestone) and slate. Wastes arising from aggregates production are discussed under Primary Aggregates and the possibility of using china clay sands are discussed under "Interregional Dependency". Fine material produced alongside that of coarser aggregates, notably of sandstone for high specification aggregates is considered under primary aggregates (i.e. crushed rock fines - CRF). Sandstone has been worked effectively as a "by-product" of open cast coal mining (i.e. as a "windfall source") particularly in the northern part of the coalfield, but there were significant issues relating to the phasing of operations, stockpiling and the need to achieve acceptable final landforms.

Colliery Spoil/Minestone

A 5 A

Quantities of colliery waste in tips in the past here were considerable - either unburnt ("black shale") often with a high carbon and pyrite/sulphur content) or red (burnt) shale. In may cases the latter was preferred as being a more chemically stable construction fill. Following the Aberfan Disaster (1966), a long government programme of tip removal or landscaping under the Derelict Land Reclamation Scheme (and successors) took place. This "loss" of tips as sources of aggregates was accelerated by the major colliery closure programme of the 1980s - 90s so that now, few tips are considered available for processing as aggregates. Apart from local (social and planning) and fiscal objections to reworking former tips, EU and UK government regulations may deter prospective recyclers in this respect. The overall potential is small for those reasons but could be locally significant. An estimate published for the main Coalfield area in 2000 suggested that only half of the 10,000t produced was used (as bulk fill)[35].

In the region permissions to rework former colliery spoil tips are located at the former British Colliery (Blaenau Gwent) and at Tower Colliery (RCT), but none are being actively exploited at the moment.

Slate

The slate industry in South Wales was very much smaller than that in the north and was concentrated in north Pembrokeshire including PCNP, and southernmost Ceredigion. Tips of reject slate are on a very much smaller scale and are located remote from major development, are not rail-linked and in most cases, are some distance from harbours. In some cases there may also be strong environmental and cultural reasons why such tips should not be reworked. Small amounts have been crushed from time to time for local needs in recent years at the locations in Pembrokeshire (Clogau and Cefn, Cilgerran).

The quality of the slate, if used as a secondary aggregate, is not likely to be as robust as the material in Gwynedd. In terms of a large scale source offering minimal environmental intrusion, importation by sea from the latter area probably offers a better, if still remote, prospect (see Inter-regional Dependency).

APPENDIX 6

MARINE AGGREGATES

Introduction

The principle source of natural fine aggregate in the region over the last 40 years has been marine sand deposits in the Bristol Channel and Severn Estuary. Compared with other regions of England and Wales, South Wales ranks third (after South East and London) in terms of the volume of marine sand and gravel landed. Although at 1.0-1.3Mt pa over the last 10 years, this is a relatively low tonnage (c.f. the other regions mentioned), the region is dependent to a far greater extent than any other upon marine sources for sand; here it typically represents 80-90% of the total sand consumption (and up to 95% in the south east of the region). In 2005 it was over 78% of the regional consumption.

Uses and Markets

All of the marine aggregate landed in the South Wales region comprises sand and this fulfils a demand for the fine component in concrete (with crushed rock used as the coarse element) and for (finer) building sand for mortars and plastering. Building sand probably accounts for over half the annual total dredged.

The quality of marine dredged sand is usually highly regarded for concrete, necessitating minimal processing, which in turn results in the generation of virtually no waste product. Importantly, when used in concrete, marine sand requires less cement (which is expensive and particularly energy-intensive to produce) per cubic metre than crushed rock fines and so is therefore more energy efficient.

There is a severe shortage of suitable concreting sand from land-based resources, proximate to the main markets. This situation has driven the continuation of aggregate dredging activities, which allow large volumes of what is a low value, bulk material to be transported and delivered into coastal ports, close to the point of end use in most of the main markets (90% is delivered to customers within 20km). This in turn significantly reduces the distance over which the material has to be transported by road.

About a third of the material dredged has been used to supply South West England. The bulk of the Welsh landings take place at Pembroke Dock, Swansea, Briton Ferry, Port Talbot, Barry, Cardiff and Newport.

Resources

Estimates of the marine aggregate resources of the Severn Estuary/Bristol Channel vary considerably. The characteristics of the sand also vary from area to area, meaning that the various resources are not necessarily interchangeable to meet market requirements.

Sand is available in offshore deposits (water depths of 25-40 metres), where the potential for coastal issues is significantly reduced by the distance offshore and the water depth involved. However, whereas community concerns about coastal issues may be reduced by moving further offshore into deeper water, the more stable physical environment in that location may still raise issues which will have to be addressed, such as nature conservation features and fisheries.

Production and Reserves

Figures previously published in SWRAWP Reports only relate to landings from areas licensed by The Crown Estate. They do not include material dredged off Monmouthshire and landed at Newport and Chepstow as these fall outside the area controlled by The Crown Estate. These dredgings are derived from Bedwyn Sands/Charston/Dunn Sands and part of the Middle Ground, are controlled by the Swangrove Estate. They contribute a further estimated 0.15Mt pa based on the limit of the planning permission.

Table A5.1: Landings of Marine Dredged Aggregate (South Wales) (M Tonnes)

M tonnes	2000	2001	2002	2003	2004	2005	2006
The Crown Estate (a)	1.058	1.002	0.972	0.981	1.071	1.002	0.943
Swangrove Estate (b)	0.150	0.150	0.150	0.150	0.150	0.150	0.150
Total	1.208	1.152	1.122	1.131	1.221	1.152	1.093

Source: (a) The Crown Estate; (b) Planning Conditions

Currently, 5 companies are involved in marine aggregate operations in the Bristol Channel: British Dredging Ltd (CEMEX UK Marine Ltd), Hanson Aggregates Marine Ltd, Llanelli Sand Dredging Ltd, Severn Sands Ltd and United Marine Dredging Ltd. At any one time there can be up to five marine aggregate dredgers operating in the region.

Not only does the control regime for marine aggregates differ from that of land won sand and gravel, so does the general approach to defining reserves.

The maximum amount that may be taken from production licence areas in any one year (i.e. the 'offtake') is controlled by the dredging permission and/or the dredging licence. The potential annual capacity of the production licences in the region can be derived by adding together, the maximum permitted annual offtakes. In 2006, the maximum permitted offtake from Crown Estate licences in the Bristol Channel as a whole was 2,616,000 tonnes, of which 1,545,275 tonnes was actually removed. Of this, 942,896 tonnes was landed at seven Welsh ports. The balance of production was landed at facilities in South West England.

These figures suggest that there is currently licensed capacity to support further marine sand supply, should the market demand in the region rise. However, the maximum permitted offtake does not reflect the sand reserve remaining within production licence areas, and in some cases the remaining reserve will be unable to sustain production levels close to the maximum permitted offtake. While modern dredging permissions will be directly related to the construction sand reserve available within a licence area, the licensed offtake from older areas in the Bristol Channel will not. Therefore older licence areas may contain large volumes of inferior quality resources (particularly gravelly sands) which are unsuitable for construction sand purposes, but which may be suitable for alternative end uses such as construction fill or beach recharge.

Crown Estate reserve figures for marine sand in the region produced in 2006 show that permitted reserves run to 10.39 million tonnes - i.e. sufficient for 6.5 years production at the

current rates of 1.6 million tonnes/year or only 3.89 years at the maximum permitted off take. In addition to The Crown Estate, levels of production controlled by planning permissions in the Severn Estuary were 150,000t pa.

Significant volumes of sand are also generated by port and harbour dredgings e.g. at Burry Port and Baglan, which vary but account for 0.07-0.2Mt pa[36]. As these contain a high proportion of silt, some of the material is used for beach recharge along the South Wales coast. Data on volumes of beach recharge material in general were sought but could not be obtained. Usage is on a "campaign" basis and can vary considerably, dependent upon available budgets.

Licenses and permissions

Production licences are located throughout the Bristol Channel, split between the upper Estuary (Denny Shoal, Middle Ground, Bedwyn/Charston/Dun Sands), the middle Estuary (Holm Sand, Culver and Nash Bank) and the Outer Bristol Channel (Helwick Bank and Nobel Banks). The majority of these licences are issued by The Crown Estate, however, the Bedwyn/Charston/Dun Sands lie on the Duke of Beaufort's Estate - as such the permitted offtake and landings are not reflected in the standard Crown statistics.

Licences are issued by the landowner, based on commercial terms agreed with the operator, however production operations will not be permitted until the operator is also in possession of a dredging permission - in effect the environmental consent. Applications are subjected to the 'Government View' procedure, which, after consideration of detailed environmental studies (including a comprehensive EIA), if approved, constitutes a permission.

The distribution of production licence areas allows a range of markets to be supplied via the major ports in the region - ranging from Newport in the East to Pembroke Dock in the West, and encompassing the majority of recognised ports in between. The various licence areas also allow different grades (grain sizes) of sand quality to be supplied, and the proximity of licence area to port means that for the most part cargoes will be dredged around low water and delivered to port at high water, making the operation very efficient and minimising fuel usage.

Research and Response

The Welsh Assembly Government, conscious of the significant dependence on this sector but mindful of the concerns expressed by the public and conservation interests, commissioned a number of research reports. This included the Bristol Channel Marine Aggregates Study (August 2000)[37] which suggested that, although potential marine resources were widely distributed, most lay at depths inaccessible to the current dredging fleet and at greater distances from ports. Such a change would require significant new investment and adjustments to the economics on which the industry currently operates. The findings of most of the research were assessed and assimilated in 2002 by Symonds[38].

The production of dredged materials in terms of energy conservation, economics and technical specification for certain uses, was generally positive. In this last respect, crushed rock fines and secondary/recycled alternatives exhibited some disadvantages in terms of sustainability, but in many respects, marine sand was considered as sustainable as natural landwon sand. However resources of the latter are not plentiful near key market areas.

The report therefore advocated a gradual transfer over the next 10 years from the Nash Bank (the main source), to marine reserves further offshore and particularly to the west) and in deeper water, notwithstanding the higher economic and energy costs. As a main alternative, the report also advised that the practicality of more onshore sand and gravel working should be re-investigated and that resources identified should be safeguarded.

Finally, where suitable (sand) applications can be found for secondary aggregates without giving rise to greater environmental impacts overall, import of these materials by rail or sea should be encouraged.

Future Perspective

Predicted need for marine sand and gravel up to 2020 was the subject of a report in 2004[39] which anticipated a relatively steady contribution at existing levels i.e.1.1Mt to about 1.35Mt in 2020. A gradual growth in construction demand for sand is also predicted by the industry. Demand for aggregates within the wider context is covered in the relevant section of the RTS.

There are significant volumes of fine marine aggregate resources suitable for use as construction aggregate available throughout the Bristol Channel region, in contrast to the much more limited land-based sand and gravel deposits.

The main traditional sources of marine sand supply in the Bristol Channel are either reaching natural exhaustion (e.g. Holm Sand) or are close to licence expiry (Nash Bank in 2010). However, key areas of replacement reserve have been identified by the industry in both the more sheltered, Severn Estuary and mid-Bristol Channel regions, and in the outer Bristol Channel, and applications for new permissions to release substantial replacement reserves are being considered by both the Assembly Government and the Marine and Fisheries Agency (M&FA).

The Assembly Government have a policy preference for more extraction operations to move offshore into the deeper water of the Outer Bristol Channel. However, there is also an acknowledgement of the strong operational and economic drivers for the industry to maintain production licences throughout the region. This will ensure production is less weather dependant and allow dredging to take place close to the main markets in the upper Estuary, thus minimising steaming times and hence reducing CO_2 emissions associated with supply.

The industry advise that the current fleet of dredgers operating in the region were specifically designed for dredging relatively shallow water in order to supply tidally restricted wharves. The existing dredgers are therefore not suited to more exposed operations in deeper water further away from the markets being supplied - particularly as their cargo capacities are relatively small. Consequently, in response to IMADP 2004 some of the operators have proposed a phased approach to moving further offshore over a 10 year period to allow operational feasibility studies to be undertaken.

Under current market conditions, and subject to appropriate replacement permissions being released by the Assembly Government and M&FA, marine sand will continue to fulfil an important part of the overall supply portfolio of construction aggregates to South Wales for the foreseeable future.

The potential for marine resources to support larger scale changes to market demand, such as that created by a tidal power renewable energy project or a large scale coast protection schemes, certainly exists in the region. However, given the maximum permitted offtake from existing production licence areas, coupled with the current reserve base, it is likely that significant additional demands for marine sand (or gravel) (say >1Mt pa) would require further marine reserves to be permitted. This additional capacity could either be achieved by increasing the permitted offtake from existing licensed areas or by permitting new areas - subject to the award of appropriate dredging permissions.

APPENDIX 7

PRIMARY AGGREGATES

Definitions

As previously noted, “sales” from quarries i.e. primary aggregates are recorded annually (but are often loosely termed as “production”), whereas “production” strictly includes all materials sold, stock-piled and discarded as waste from quarries. In general, stockpiles and waste can be discounted, but there are some special issues, which have arisen in this respect last few years as a result of the Aggregates levy/Landfill Tax and the demand for High Specification Aggregates (HSA). These are discussed further under related later sections, under “crushed rock fines” (CRF). The terms sales, production and output are used in this document interchangeably to denote sales, unless otherwise qualified.

However secondary and recycled aggregates when surveyed and reported are conventionally labelled as “Arisings” (i.e. tonnages arising from a particular process e.g. iron/steel production, demolition of buildings, planing of road surfaces) and are distinguished from materials “sold” or “used” as aggregates.

In contrast, “consumption”, is the amount of aggregates used **within** any given area and can be defined as: tonnages sold, minus exports to other areas, plus imports from other areas (see Domestic Consumption).

There are a few problems (e.g. of definition) surrounding establishing total sales of primary aggregates per se, and many more challenges in respect of calculating sales of secondary and recycled aggregates (see related sections of the report).

(see Production [i.e. Sales] Table A6.1 overleaf).

Production (i.e. Sales)

Table A6.1: Historic Sales Trends of Primary Aggregates (Wales by Region) (M tonnes)

Sand/ Gravel	1973	1977	1981	1985	1989	1993	1994	1995	1996	1997	1998	1999	2000
South Wales	2.4	1.8	1.8	1.5	2.5	1.8	1.6	2.8	1.9	2.0	1.5	1.5	1.2
North Wales	2.5	1.9	2.2	1.6	1.9	1.7	1.7	1.7	1.7	1.4	1.5	1.7	1.5
Wales	4.9	3.6	4.0	3.1	4.4	3.5	3.3	4.5	3.6	3.4	3.0	3.2	2.7

Crushed Rock	1973	1977	1981	1985	1989	1993	1994	1995	1996	1997	1998	1999	2000
South Wales	10.2	10.3	9.2	9.5	13.1	14.7	15.6	14.9	13.9	12.9	12.3	12.5	9.8
North Wales	6.2	4.1	6.8	7.0	11.4	8.0	8.7	8.5	7.0	7.5	8.0	8.0	8.0
Wales	16.4	14.4	16.0	16.5	24.5	22.8	24.3	23.4	20.9	20.5	20.3	20.5	17.8

Primary Aggregate	1973	1977	1981	1985	1989	1993	1994	1995	1996	1997	1998	1999	2000
South Wales	12.6	12.1	11.0	11.1	15.7	16.6	17.3	17.7	15.8	14.9	13.8	14.0	11.0
North Wales	8.7	6.0	9	8.5	13.3	9.8	10.4	10.2	8.7	8.9	9.5	9.7	9.5
Wales	21.4	18.1	20	19.6	29.0	26.3	27.7	27.9	24.5	23.8	23.3	23.7	20.5

Source: RAWP and National Collation reports (except some data for 1981, 1994 based on BGS UK Mineral Statistics).

APPENDIX 8

CONSUMPTION AND INTER-REGIONAL FLOWS

Domestic Consumption

Various attempts to have been made to gauge the demand arising within various parts of the region, the latest and most comprehensive being the 2005 AM survey as reported in the National Collation Report 2005[40]. However the results are not easy to follow at sub-regional level and three important factors must be borne in mind:

a) A considerable amount of estimation on the part of the respondents is usually is involved in producing the data.

b) There is significant scope for distortion in for example aggregates being processed to say concrete products or coated stone locally and then ultimately used well outside the initially consigned area.

c) Imports to sub-areas of the region (i.e. mainly from Gloucestershire to "Gwent") may be too small to register separately in the published tables (although local geography and production points may provide useful circumstantial evidence).

Table A7.1: Primary Aggregate Consumption within South Wales by Sub Region (2005) ('000 Tonnes)

Region	Crushed Rock	S/G Land Won	S/G Marine	S/G Total	Total Aggregate
South East Wales	4,173	27	659	686	4859
Remainder of South Wales	3,165	229	162	391	3556
Unknown but in South Wales	1,199	135	417	552	1750
Total South Wales	**8,537**	**390**	**1238**	**1628**	**10165**

Source: National Collation Report 2005

Inter-regional Flows (see Table A7.2 overleaf)

2001	Dom-estic sales	Total Exports	South West	South East	London	East England	East Mid-lands	West Mid-lands	North West	Other England	North Wales	Other
S/G												
Land Won	88	1									1	
Marine	915	1	0									
Total S/G	1003	2	0								1	
Limestone	5934	262	49	23		0		157			0	33
Igneous Rock	268	572	6	9	1	9	8	295	115		129	
Sandstone	1475	1476	268	172	52	53	36	851	22	13	0	
Total Rock	7658	2303	324	204	52	62	44	1303	137	13	130	33
Total Aggregates	**8661**	**2304**	**324**	**204**	**52**	**62**	**44**	**1303**	**137**	**13**	**130**	**33**
2005												
S/G												
Land Won	293	11										
Marine	1236	0	0					9			2	
Total S/G	1530	11	0					**9**			**2**	
Limestone	5982	154	25	48				81			0	
Igneous Rock	808	430	30	3	1	24	12	145	106	1	108	
Sandstone	1586	1941	361	88	126	40	11	1299	4	5	7	
Total Rock	8376	2527	416	140	127	64	23	1524	111	6	116	
Total Aggregates	**9906**	**2538**	**416**	**140**	**127**	**64**	**23**	**1533**	**111**	**6**	**118**	

Table A7.2: Exports from South Wales by Aggregate Mineral Type (2001, 2005) ('000 tonnes)

Totals may not sum due to rounding.
Source: National Collation Reports, 2001, 2005

Relationship with North Wales

The boundary area between North and South Wales is relatively sparsely populated and one in which there have been very few significant construction projects in recent years, perhaps the largest being wind-farms and the relatively modest Welshpool by-pass. Even when larger projects have taken place e.g. the reservoir and hydroelectric schemes of the 1950's - 1970's, those were mainly serviced by aggregates from borrow pits dug specifically for the purpose. Flows across the North/South Wales boundary are therefore relatively small, usually equating to less than the output of a small to medium sized quarry and in 2005 were much less than in the previous AM survey in 2001.

The situation could change if major urban or transport developments were put in hand e.g. wholesale improvements to North-South links such as the A470, but these are not programmed proposals. The extensive availability of aggregate resources in this zone means that this is likely to raise few significant new issues.

Exports

Export tonnages from 1973 onwards are given in Table 16. NB in 1981 and 1985, full details are not available.

West Midlands

The analysis of exports in the past in the main text indicates that the main flows are from Powys to the West Midlands. This has been a pattern for well over a century. Although there is no further detail on destinations within the West Midlands, it is logical to assume that the bulk of those deliveries will have been to the main West Midlands conurbation and that much of the northern part of that region will have been adequately serviced by the very large permitted reserves in Shropshire and Staffordshire. The south of that region has relatively small rock reserves, hard rock quarrying having almost ceased in Worcestershire and Herefordshire, and is declining in the main urban areas. In historical terms, it has also fallen in Warwickshire (the latter being replaced by imports from Leicestershire). The West Midlands housing strategy over the period 2007-21 aims to concentrate growth in the main urban areas, rather than the "shire counties", but on an annual level is similar or below present completions. Apart from the regeneration of the Black County, there appear to be few very large scale developments proposed in the west of the region. Over the previous decade most of the road construction has been focused in areas away from that served by Wales. DCLG[41] predicts (2006) a very modest increase in the West Midlands aggregates consumption with the 2016 demand figure only 3-4% above that for 2005. It is therefore assumed that exports to the West Midlands will continue.

Exports to Other Regions

The second largest export flow (0.416Mt in 2005) was to the South West most of which (0.361Mt) was sandstone. The figures are insufficiently detailed to permit this flow to be dissected further. However it is likely from the location of rock production in that region and its export of (0.153Mt) of limestone to South Wales that the bulk of this was probably high PSV stone destined for the Northern and Eastern parts of the South West. There are for example roadstone quarries producing high PSV stone in Devon, Cornwall, and Somerset and at one point in South Gloucestershire. It is also evident that the bulk of the other deliveries were of sandstone, i.e. to the South East, London.

Imports

Imports in 2005 only accounted for 3% of regional consumption, this being the lowest level of dependency on other regions in percentage terms, of any region in England and Wales. This comprised 98,000t of sand and gravel and 259,000t of crushed rock (almost entirely limestone/dolomite).

Although there is little survey information at sub-regional level, most of the imports are understood to have been traditionally provided by Gloucestershire and in particular the Forest of Dean delivering limestone into the former county of Gwent area. Material from the West Midlands in earlier years was probably from Shropshire (Oswestry area) into Powys.

It is understood that in c2001, 40,000t of granite was imported to Newport by sea from Glensanda, Scotland to supply a concrete blockmaking plant[42]. This was not confirmed in the 2001 National Collation and was not evident in the 1997 and 2005 surveys.

Table A7.3: Imports to Wales (1973-2005) ('000 tonnes)

Sand and Gravel	1973	1977	1981	1985	1989	1993	1997	2001	2005
South Wales	342	96	na	160	233	152	114	195	98
North Wales	56	54	na	13	132	-	92	135	83
Wales	398	150	na	173	365	152	206	330	181

Crushed Rock									
South Wales	941	183	na	112	380	381	309	626	161
North Wales	11	135	na	5	325	113	136	279	199
Wales	952	318	na	117	705	494	445	905	360

Total Primary									
South Wales	1303	279	na	272	613	533	423	821	259
North Wales	97	189	na	18	457	113	228	414	282
Wales	1400	468	na	290	1070	646	651	1235	541

Difference in totals includes undifferentiated. NB Glensanda material noted in text not included here.

APPENDIX 9

ASSESSMENT OF FUTURE DEMAND

Up until the early 1990s, joint guidelines were produced for England and Wales which contained forecasts of demand. In 1995, in the absence of Government guidelines for Wales, the two Welsh RAWPs published guidelines for South and North Wales respectively for primary aggregates.

Table A8.1: Forecasts of Demand - South and North Wales RAWP Guidelines (M tonnes)

Expressed as Average Annual Figures	Crushed Rock	Sand and Gravel	Total Aggs Wales averages		
	SW	**NW**	**SW**	**NW**	
1992 - 1996 Landwon	12.4	8.8	0.2	1.6	23.0
1997 - 2001 Landwon	14.2	10.8	0.2	2	27.2
2002 - 2006 Landwon	15.2	12.8	0.4	2.4	30.8
Marine Dredged (1992-2006)	-	-	2.3	-	2.3
Total Demand (1992-2006)	**13.8**	**10.8**	**2.6**	**2.0**	**29.2**

Source: Adapted from 5 yearly block figures shown in MTAN par 25.
The 5-year periods do not add up to the total shown in the table.

It should be noted that in this context "demand" means demand made **upon** Wales or effectively "production" (or sales) of primary aggregates. In the period 1992 - 1996 these proved to be significant underestimates in South Wales but closer to the actual figures in North Wales. Both sets of data were closer to the actual levels experienced than the econometric forecasts produced in the Mineral Planning Guidance 6 (MPG 6) in England (MTAN 1 para 25,26).

Although the Department of Communities and Local Government (previously ODPM) does not have jurisdiction over aggregates policy in Wales, it still publishes forecasts of all aggregates (primary and secondary) demand for Great Britain which show separate figures for Wales. These are based upon projections of construction output for each of a large number of construction sectors (produced by Cambridge Econometrics). These projections are then applied to a base figure derived from "National Collation" consumption data[43]. Calculations are made for each year up to 2011; beyond that, they are held at the 2011 level. It should be noted that they refer to **consumption** in each area, not production/sales.

Table A8.2: Projected Consumption (M tonnes)

Year	2004 Review (a)	2005 Review (b)	2006 Review (c)			
	England	Wales	England	Wales	Eng-land	Wales
2005	254	20	246	19	239	18
2006	256	20	247	19	242	18
2007	260	20	247	19	245	18
2008	266	20	249	19	247	18
2009	273	21	252	19	248	18
2010	280	21	257	19	250	18
2011	286	22	262	19	254	18
2012	286	22	262	19	254	18
2013	286	22	262	19	254	18
2014	286	22	262	19	254	18
2015	286	22	262	19	254	18
2016	286	22	262	19	254	18

a) National and Regional Guidelines for Aggregates Provision in England 2001 - 2016: First Monitoring Report Oct 2004 (data April 2004);
b) National and Regional Guidelines for Aggregates Provision in England 2001- 2016: Second Monitoring Report Nov 2005 (data June 2005);
c) National and Regional Guidelines for Aggregates Provision in England 2001 - 2016: Third Monitoring Report Sept 2006 (data June 2006).

[Draft (as yet unpublished) figures for demand arising in Wales in the same series suggest a reversion to levels closer to those generally envisaged in the 2004 Review, but it is not known at this stage whether these indicate an actual increase, a reinterpretation of earlier base data or changes in methodology; those figures are still under discussion].

The 2004-2006 review figures illustrate a number of factors. Firstly a stable demand within Wales contrasting with a gradual rise in England. Secondly they have been progressively reduced in the three review rounds shown. However the latter is mainly considered to be the result of revisions of past data, rather than to any real changes in demand overall these show a very gradual rise to 2010 then stable figures thereafter. The same reports go on to indicate expected ratios of primary and alternative aggregates for England and Great Britain (but there is no separate analysis in this respect for Wales). Forecasts are also given for the English regions (but not for N/S Wales) which could be used to inform the likely demand for exports to such areas.

In September 2006, the Quarry Products Association, responding to a request from the North and South Wales RAWPs, prepared an analysis of demand and consumption estimates for primary and secondary aggregates in Wales for use in the RTS process. In summary, this is based on interpretations of economic indicators and sector by sector reviews sourced from a range of agencies such as Welsh Water, Welsh Assembly Government and Experian. The main trends are as follows:

General Economy: for Wales - particular focus along the M4 (Cardiff 20% of Wales GDP); financial services less significant than England. Exports strong, Wales' GDP is lower than England and Assembly aims to catch up to 90% by 2010;
5yr GDP growth of 2.7% predicted (i.e. lower than Assembly aspirations).

Construction Output: After a stable period in the 1990s, strong growth was experienced from 2001-04.
Key Drivers
Private housing and **commercial sector** (together 56%)
Maintenance/repair at a high (36%) but stable level;
Other public sector - a small fall followed by growth 2007-10;
Infrastructure - growth 2006-07 then mild decline post 2008;
Industrial - volatile but includes some major commercial projects along M4;
Repair/Maintenance - consistent long term growth.

Since this analysis was prepared, there has been a growing acknowledgment of the national need to increase the housing stock and a greater awareness of the requirement to improve river and coastal flood defences (one recent statement in indicated that at least half of the latter required attention). However it is not yet clear how and to what degree, these changes will relate to South Wales.

However lack of appropriate data on volume splits makes direct application of these trends to aggregates demand, but overall, they do tend to support the likelihood of modest growth.

QPA therefore adopted the following approach a) in the light of AM2005 consumption data not being available at the time, the AM2001 ratios of consumption/exports were retained and applied to the published Annual Minerals Raised Inquiry (AMRI) data, b) it was then assumed that exports would follow the DCLG forecast for England and that c) the trend of aggregates "intensity of use" (i.e. tonnes of aggregates consumed per unit of construction output usually measured in terms of expenditure in £s) would continue to decline and finally, d) an assumption of positive economic and construction growth over 2005-10. As there are considered to be too many uncertainties beyond this, 2010 levels were adopted thereafter.

It was further assumed that secondary/recycled materials would take up a higher proportion of the growth (4% pa) and primary (at 1% pa), a lower percentage. This produced the forecasts set out in table A8.2.

Table A8.3: QPA's Estimated Trend in Aggregates Demand for Wales 2004-2010 (M tonnes)

Year	Primary Aggregates Consumption	Recycled/ Secondary Materials	Total Consumption	Exports	Total Demand
2004	14.0	3.9	17.9	5.7	23.6
2005	14.1	4.1	18.2	6.1	24.3
2006	14.3	4.2	18.5	6.1	24.6
2007	14.4	4.4	18.8	6.2	25.0
2008	14.6	4.5	19.1	6.2	25.3
2009	14.7	4.6	19.3	6.2	25.5
2010	14.9	4.8	19.7	6.2	25.9
2011-6 (pa)	14.9	4.8	19.7	6.2	25.9
2005 Actual	13.5	6.0	19.5	6.4	25.9(a)

NB 2004 and 2005 figures were projections at the time. These calculations take no account of imports (which are in any case minimal), but assume that domestic consumption plus exports equals total production (i.e. "demand").
a) of which imports were 0.54Mt giving actual demand of 25.36Mt)

This suggests a rate similar to the DCLG - derived June 2005 forecast (see above), (which was downgraded in June 2006). Neither of these forecasts had the advantage of the AM2005 survey data or the Faber Maunsell Report for 2005.

A9A

At an earlier stage in the RTS process, attempts were made to examine the factors influencing demand in the region for each of a number of sectors mainly in qualitative terms. Although there are now out-of-date they are broadly collaborated by the more recent analysis just described.

It was noted that population in the region was expected to increase from 2.1 million in 2001 [?], by 12% to 2.4M in 2020. Recent trends have seen the largest population rises in Ceredigion, Powys, Cardiff and Monmouthshire, accompanied by the largest decreases in Neath-Port Talbot, Rhondda-Cynon-Taff, Merthyr Tydfil and Blaenau Gwent.

The earlier Cambridge Econometric forecasts for Great Britain envisaged the strongest growth areas to 2015 being Wales and the Midlands. It was understood that this was based upon a sharp improvement in the consumer services and manufacturing sectors, combined with high construction growth.

As a number of the forecasts relate to Wales as a whole, it is briefly worth reviewing the relative share contributed by South Wales to the whole country. Tables X and Y, indicate the levels in tonnage terms. This is shown as percentages in table Q.

Table A8.4: Contributions to Primary Aggregate sales by percentage (1973-2005)

Year	1973	1977	1981	1985	1989	1993	1997	2000	2001	2002	2003	2004	2005
South Wales	59	67	55	57	54	63	62	54	57	58	62	63	64
North Wales	41	33	45	43	46	37	38	46	43	42	38	37	36

The average percentage for South Wales in the period 2000 - 2005 is 59.7%, say 60%.

In terms of the spatial distribution of demand, the M4 corridor is the main focus, with the city areas of Cardiff, Swansea and Newport by far the largest consumers in Wales. This is likely to continue to be the case.

There are no major highway schemes now planned for the north of the region. Those further south in central Powys are well placed for relatively local quarries. Possibly apart from exports, especially from quarries near the border, no major construction projects are anticipated in the northern part of the region.

APPENDIX 10

FISCAL AND OTHER INFLUENCES

In this particular context, it is important to examine briefly "demand" a little further. Firstly, unlike most consumer goods, the requirement for aggregates as a whole is generally inelastic - i.e. aggregates are normally only produced to meet a specific market demand which is not particularly price-sensitive (i.e. lowering the price doesn't normally increase demand). However, within the overall aggregates sector, when materials such as secondary aggregates (or amount of the Aggregates Levy and Landfill Tax) were able to enter the market with a price edge over primary aggregates, they were able to capture a larger proportion of the market from primaries than previously.

There is little direct evidence that these fiscal measures have played a significant role in reducing the overall demand for aggregate, but there may have been some marginal responses e.g. more efficient use on construction sites to avoid Landfill Tax charges. Other factors such as changes in architectural fashions, construction technology, land prices forcing more compact development etc, are likely to have played a bigger role, but none have been quantified on a large scale.

A detailed government sponsored report[44] indicated that for at least 15 years up until 1995 the amount of aggregates consumed per unit of construction i.e. "intensity of use" (usually expressed in tonnes/£1000 spent) had grown. Even at that stage and continuing to day, the UK consumption of aggregates in per capita terms is one of the lowest in Europe.

Since that report however, the intensity of use has fallen. The reasons for this have not been assessed in detail, but are likely to be due to a combination of the following:-

1. Landfill tax - causing much more material to be recycled on site (note that recycled aggregates used off-site would not contribute to this effect);
2. Brownfield sites - Government policy favours the development of such sites, there is greater potential for recycling and often some existing usable infrastructure at brownfield sites;
3. Aggregates Levy - raises costs, causing consumers to specify and use in more controlled manner;
4. Less wastage on site - more pre-bagged and controlled usage resulting from increasingly space/time constrained projects;
5. Denser building - current standards generally seek a greater density of residential building (including medium rise buildings and denser low rise packing per ha). These patterns require less infrastructure per unit completed;
6. Construction techniques - a movement to greater use of steel, portal frame and glass/ metal/plastic sheet infill in industrial/retail/commercial sector. Moves in housing towards drylining (i.e. timber stud and plasterboard) interior walls has reduced the demand for concrete blocks and the thickness specification for concrete foundation slabs. More recently, the move to factory-prefabricated units for offices and homes (of wood/composite materials), will further these trends;
7. In terms of roads, there has been a greater emphasis on repair and maintenance and for new or replacement build using road structures requiring less volume, but higher performance materials;
8. Property refurbishment (rather than new build) has also increased considerably on all fronts.

Contrary potential trends might include:-

1. The much greater volume of residential building than that has occurred over the last 20 years;
2. Higher investment in sea and river flood defences with the prospect of climate change;
3. The requirement for higher thermal efficiencies in buildings is likely to demand more insulation materials;
4. Technological changes based on environmental choices which could result in more, low energy-costing materials e.g. locally won aggregates being substituted for higher energy consuming materials such as steel, glass and hydrocarbon-based materials e.g. plastics.

From the limited information available and the complexity of the systems, it is far from clear whether these two general trends will cancel each other out or which will predominate. Some, such as the availability of brownfield sites are likely to have effect over a limited duration (as the supply of such sites will diminish over time), and the extent of other impacts such as efficient use of materials on site (driven by costs) may already be having their maximum effect. On balance, a stable or very small rise in the aggregates market (despite a far greater increase in the rate of construction spend) might represent a cautious, but realistic assessment.

Probably the two most significant and recognisable effects were the recent fiscal changes. These are now summarised.

The **Aggregates Levy** was introduced in April 2002, with the prime objective of encouraging the use of other materials to substitute for virgin primary aggregate. A charge of £1.60 was levied on each tonne of primary aggregate extracted by the industry but certain mineral wastes including shale and slate were excluded. In 2007 this was increased to £1.95/tonne, i.e. a level broadly in line with inflation during the intervening period. This levy was set as a strong financial measure to influence the market.

A 10 A

The Quarry Products Association (QPA) in their report entitled “QPA Assessment of the Impacts of the Aggregates Levy” issued in September 2003, raised a number of fundamental questions as to the merits of the levy. These centre on the increase of unsold quarry waste which at some sites has sterilised reserves; unauthorised activity notably in Ireland; the general decline in crushed rock sales which may have masked the alleged benefits of the levy; the general increase in the use of construction and demolition waste and secondary aggregates prior to the introduction of the levy which is chiefly attributed to the introduction of the Landfill Tax and lack of environmental targets or outcomes.

There is no doubt the full effects of the Levy may take some time to become apparent and will be difficult to disentangle from the effect of the Landfill Tax (see below), but the early trends appear to demonstrate that it has reinforced to some degree, an increase in the use of recycled aggregates. Further research is probably required to analyse the claims and counterclaims regarding the benefits of the levy and it would be unwise to make any final judgement at the moment.

The **European Landfill Directive** was issued in 2002 and the UK Government responded by introducing a charge of £2/tonne for the disposal of inactive/inert waste, (this is increasing to £2.50 in April 2008) and a standard rate of £24/tonne for other mixed wastes to

landfill (increasing to £27/tonne in April 2008). In South Wales, the reaction of the waste skip industry was to start to recycle and segregate inert and other waste for which hitherto, landfill was considered as the only economic disposal option. Over the last 5 years there has been a marked change in the number of inert waste recycling sites and [MRFs] screens and crushers are now commonplace on brownfield re-development sites. Indeed most of this type of construction and demolition waste never leaves the sites involved and is employed for low end uses such as sub-base for roads/footpaths or general foundation fill for embankments; in such cases it may not be quantified.

There is no doubt that the Directive has initiated a sea-change in the disposal of a variety of waste materials including those that can substitute for low end use aggregates. This trend is likely to continue and to rise, particularly if the landfill charges increase as expected in line with other EU countries. There is also still a considerable difficulty in quantifying the volumes of construction, demolition and excavation waste (CD&EW) actually generated or reused.

APPENDIX 11

SPECIAL AGGREGATES

Analysis

For road surfacing stone, skid resistance is measured in terms of the polished stone value (PSV) i.e. its ability to resist becoming polished; the aggregate abrasion value (AAV) is also significant (this measures durability in terms of the ease with which it wears away). Conventionally for such uses, PSVs have to be at or above 58 and AAVs 16 or less.

The location of the most accessible deposits suited to producing HSA's, i.e. concentrated mainly in the lofty hills overlooking the Coalfield Valleys, is in an area where the economy is not as buoyant as in the main urban coastal areas of the region. Quarrying could generate additional employment although the numbers are likely to be limited as the export market concerned requires dry stone (which is coated remotely in the receiving area) which will necessitate relatively little, largely automated processing, unlike say the making of concrete products. Some more jobs are likely to arise from transport, but those again will be particularly limited (and not necessarily local) if rail is to become the main distribution mode.

In a recent exhaustive study[45] of the 59 sites actively supplying England with HSA reported that in 2002, 13 were located in Wales (all except one, in South Wales) as well as potentially 9 in Scotland and 14 in Northern Ireland (although it is doubtful if any of the latter are currently supplying England). This leaves only 23 indigenous sources in England. In addition, forty inactive/dormant sites were identified in Wales.

Table A10.1: HSA Active Quarries in Wales in 2002

Quarry Name	Typical PSV	AAV
Cribarth	71	10
Cwm Nant Lleici	70	9
Bryn	75	n.a
Builth Wells	61	5.6
Craig Yr Hesg	70	9
Criggion	62	4.6
Gelligaer	69	9.3
Hafod Fach	68	8
Gilfach	71	8.6
Bwlch Fos	69	8
Dolyhir	66	4.7
Gore	65	4
Minfordd*	62	4.4

Source: Capita Symonds (2004)
* North Wales; all other sites are in South Wales.

The report estimates that demand in England increased by 130% from 2.63 million tonnes in 1992, to 6.126 million tonnes in 2002. Of this, the growth in supply from imports from outside England increased by over 150% (i.e. from 0.915 to 2.331 million tonnes) in the same period. Whereas road surfacing have become thinner (i.e. using less aggregates overall per square metre covered) the amount of HSA has increased both as a proportion of all road aggregates used and in actual terms. Future trends are unclear and there are contradictory influences and a lack of firm data in some instances, but the general expectation is for a moderate increase over the next decade.

Unfortunately the report only cites total imports to England from other parts of the UK and does not subdivide those by country. Significantly higher delivered costs suggest that only very small tonnages will have been sourced from Northern Ireland. The presence of the major English sources of HSA in the North of England suggests that imports from Scotland will also be relatively small. The conclusion is that Wales was the main contributor and that this also now accounts for most of hard rock exports from Wales.

Cross reference to the narrative on Exports [see xyz] indicates that for South Wales, there were flows of 1.941 Million tonnes of sandstone and 0.43 million tonnes of igneous rock in 2005 (total 2.371 million tonnes) (No comparative flow information is available for 2002). The Capita Symonds report accords a classification to the various categories of aggregate quality, based on a scale of 1-6 (1 being the most stringent specification based on PSV/ AAV). These were applied to aggregate resources assigned to 91 relevant geological formations in the UK (although the quality is not uniform throughout each sequence). The values are based upon those known at active quarries within each resource. Those in Wales falling within the two top-most groups are as follows.

Table A10.2: High Specification Aggregate Resources (South Wales)

Category 1	General Location
Denbigh/Penstrowed Grit (Fm)	N-W Powys
Old Red Sandstone Milford Haven GP	Pembs
Old Red Sandstone Senni Beds	Brecon Beacons
Pennant (L) Brithdir Beds	Main Coalfield
Pennant (L) Rhondda Beds	Main Coalfield
Pennant (U) Grovesend Beds	Main Coalfield
Pennant (L) Hughes Beds	Main Coalfield
Pennant (L) Swansea Beds	Main Coalfield
Scrach (Fm)	South Powys
Category 2	**General Location**
Aberytwyth Grit (Fm)	Ceredigion
Cwmystwyth Grits	Ceredigion
Gray Sandstone	Pembs
Pennant (L) Llynfi Beds	Main Coalfield
Talerddig (Fm)	Powys
Treffgarne Volcanic	Pembs

Source: Capita Symonds (2004)
Fm = Formation; U = Upper; L = Lower

In addition there are a number of formations in the region which fall into categories 3-5 and which are within the definition of HSA's given earlier. These mainly are in Pembrokeshire (especially volcanic rocks) and Powys (greywackes).

Furthermore, steel slag once suitably weathered although registering a PSV of 58, in performance is comparable to a quarried product with a PSV of 60. Material from Port Talbot is used for this purpose.

It should also be noted that the Pennant Sandstone often has to be removed in order to access underlying coal seams, during opencast coal operations. Such sandstones are usually backfilled but could provide a further source of HSA stone and have occasionally been used as such. These are often known as "windfall" sites. This would mean that for a given quantity of mineral (coal/sandstone) won, the ground is only disturbed once. However there are logistical, environmental and aggregate quality control issues to be overcome. These include for example the need to manage large quantities of material appropriately and within a phased timetable to produce desirable final land profits, the need for addition processing plant and probably stockpiling long after the coal operations have been completed.

Although specific data on production and the distribution of HSAs from South Wales has not been collected, it is highly probable that most all the exports of sandstone and igneous rock to regions other than the West Midlands is likely to comprise HSA. The evidence for this assumption is based upon the location of all aggregate resources in the receiving areas and the growth pattern in this trade over the last decade or so. It is recognised that the flows from mid Wales (mainly Powys) to the West Midlands represent a mix of meeting local needs for all hard aggregates as well as supplies of HSAs. These are considered in more detail under "Exports".

The need to apply parity to environmental standards in both the exporting and receiving areas has already been referred to (Policy Setting). In respect of HSAs, potential alternative resources in England their locations can be summarised as follows:

West Midlands:	Shropshire Hills (mainly in AONB) Malvern and Abberley Hills (AONB) Rowley Regis (heavily urbanised area) Nuneaton (urban fringe) Shrewsbury and Telford areas (parts in AONB - also isolated locally prominent hills)
South East:	Wickwar, Gloucestershire (urban fringe) Barnstaple area (very rural area) Central Cornwall (just outside AONB)

The Environmental Capacity of relevant resources in Wales is discussed in that section of this report. There also appear to be possibilities for channelling greater quantities onto rail, but the opportunities for significant growth in employment appear to be slender.

Whereas there may be little firm indication of growth in sales of HSA, there has been a marked change in product sizes. 7 or 8 years ago the primary product was 20 mm used as

PCC in hot rolled asphalt, with 14mm and 10mm being used in surface dressing. Now with the increased use of thin wearing courses, 20m is rarely produced and 14, 10 & 6mm are the main product, used in the thin, stone mastic asphalt type wearing courses. The result is that production of quarry dust has increased from about 35 to 45%. Dust has little market so is mainly stockpiled. This is not only questionable in sustainability terms, it has the effect that more land take is necessary for similar sales volumes and land stockpiles may sterilise workable reserves or in general, increase logistical operational problems.

Conclusions

There are extensive deposits of HSA materials in South Wales within broad areas which appear to have the environmental capacity to accommodate further quarrying (see Environmental capacity). Resources in England are relatively isolated and in many cases appear to be environmentally constrained. Details of the market are imperfect, but suggest the potential for some further growth in exports to England.

There is a need to monitor HSA sales specifically, to calculate future demand and assess data on resources as a basis for informed plan preparation. This should take into account the potential for greater use of rail transport. The feasibility of establishing specific HSA landbanks and safeguarding areas needs to be considered in the light of such information. Appropriate responses to potential “windfall” sites where HSA stone becomes available, should also be investigated.

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APPENDIX 12

INDUSTRIAL AND OTHER USES

Metallurgical Fluxes

Limestone or dolomite is required as a flux in iron and steel making. Port Talbot works which is dependant upon this feedstock is a strategically important operation at UK level and is also vital to the local economy. The process involved means that the higher the chemical purity of the stone used, the lower the overall energy costs and the smaller the amount of slag produced (i.e. the less impurity, the more efficient the process). High purity limestones and dolomites can only found in very restricted areas of Britain and within only limited parts of South Wales[46], notably in the Carboniferous Limestone in the north eastern part of the outcrop (e.g. Blaenau Gwent and BBNP) and in the south, on either side of the River Ogmore and on Gower. Steelmaking requires high quality lime (i.e. burnt limestone); although this was traditionally produced locally, for much of the period in which modern steel making methods have been employed, this has been imported - initially from Derbyshire, but since 1974 from Mendips, Somerset. The resultant slag, used for aggregates and other specialist purposes derived, from iron and steel making, in effect recycles their initial input, whether originating as local stone or imported lime (see Secondary Aggregates).

In 2001, the requirement for high purity limestone virtually halved with the closure of primary metal production at Llanwern and coincident with temporary inactivity of a major furnace at Port Talbot. The consequential slag make also fell. In subsequent years, the demand at Port Talbot has risen and, despite the uncertainties following the change of ownership, there are signs that iron and steel making, and hence the limestone flux requirement, is set to rise.

Bearing in mind the paucity of high quality limestone resources, locally and nationally, and the environmental/economic necessity to use stone of the highest chemical purity, it is advised that the resources should be carefully assessed and rigorously safeguarded in LDPs. Furthermore, it is suggested that policies concerning a separate landbank for this purpose and of appropriately balancing high purity stone and aggregates won from that resource, should be considered.

Cement

The manufacture of cement requires sources of limestone, shale or clay and fuel, plus various more minor ingredients. The large works at Aberthaw on the Vale of Glamorgan coast represents the last of a number in the area, which were dependent upon relatively soft Liassic Limestones. These exhibited almost fortuitously, the required mix of muddy limestones enveloped with shale. With modern sophisticated controls, this mix is not totally appropriate, so that lime bearing shales and thin limestones are blended with the harder high calcium-bearing Carboniferous Limestone from other, relatively local quarries.

Although the stone quality does not have to be as pure as that for iron and steel making, it does have to be as consistent as possible. It is therefore recommended that appropriate areas of resource be safeguarded and that the future stone requirements of this capital intensive works be assessed.

Building stone and other non-aggregate requirements

Building stone (including slate) is a small but very specific market, usually demanding stone of a particular appearance and physical make-up. The growing awareness of the need for authentic building conservation and for blending new work with the vernacular means that the demand, although still comparatively, small is likely to grow. In some cases, aggregates quarries may provide a source but, it other cases, micro-fissuring resulting from blasting may render the stone unsuitable for building work. Conversely, the waste arising from building stone (particularly slate), may provide a source of secondary aggregates (see Secondary and Recycled Aggregates). Although in terms of scale and market, the relationship is perhaps marginal, (certainly at strategic level), MPAs will need to be mindful of the need to take this requirement into account in the future decisions on aggregates provision. Further brief guidance is given in MPPW (paras 71-75) and more information is contained in the "Symonds Report"[47].

Small amounts of ground limestone are also used in farming as a soil conditioner.

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APPENDIX 13

AGGREGATE RESOURCES

More details of resources in the region are available in various reports of the British Geological Survey, the IMAECA Report [48] and a number of other commissioned research reports, notably on high PSV sandstones and an sand/gravel (see footnotes to p15 of IMAECA report).

As part of the preparation of the IMAECA study, the researchers examined available resource data such as that just noted and digitally plotted the distribution of outcrops according to twelve predetermined rock types (lithologies). Although these could be described generally as 'resource' maps, they only give a broad two dimensional explanation with no information on the thickness of deposits and only a general inference of quality/ suitability. Initial attempts to score the rocks and superficial (sand/gravel) deposits (using a system which had been applied in Ireland) were abandoned in favour of a simpler, more generalised scheme. Some of the assumptions made previously in Ireland do not necessarily carry over well into the situation in South Wales. A description of the process involved is given in the section on Environmental Capacity in the main report and Appendix 13.

The summary below is broadly in order of economic significance (but do not reflect environmental considerations or designations).

Carboniferous Limestone

This usually comprises a series of relatively hard limestones which may vary from muddy to extremely chemically pure ("high purity") stone. The latter also has strategically important applications for industrial (non-aggregate) end uses, notably in this region, iron and steel working. They occur as an encircling rim around the South Wales Coalfield (known as the "North and South Crops"), extending westward across the Gower then below Carmarthen Bay into south Pembrokeshire. They also outcrop widely in the Vale of Glamorgan and in South Monmouthshire/Newport.

Pennant Sandstone

This is the main, often massively bedded sandstone dominating the Upper Coal Measures and outcropping widely across the main South Wales Coalfield. Although used traditionally as a building stone, it generally only supplied local aggregate needs until relatively recently, when its use as a road surfacing material (due to their high skid resistant qualities - i.e. high "PSV"-or high specification aggregate (HSA)) became widely acknowledged. It is sometimes known as grit or gritstone. It probably accounts for about half the regional sandstone output.

Igneous Rock

The outcrops of igneous rock are far smaller, being confined mainly to Pembrokeshire (in and outside the National Park) and Powys.Although the Pembrokeshire surface occurrences are more extensive, (located largely in the north), those in Powys are quarried on a much larger scale, particularly at Builth Wells and along the Welsh-English border. Most of the material from Powys is destined for road surfacing in England, again on account of its good surface wearing qualities.

Other Sandstones

A number of Ordovician and Silurian sandstones, usually described as greywackes (i.e. sandstones interleaved with finer grained and often shaley rocks) are exploited with Powys, accounting for about half the regional output from such sources. Resources of this type are extensive, covering about a third of the region (i.e. to the north of the Coalfields), but quality is largely unknown in detail. Devonian (also known as Old Red) sandstones are also found in this area, but south of the Twyi Valley. They are often considered too friable for aggregate use.

Other Limestones

Small amounts of Silurian Limestone are worked for aggregate around Old Radnor, Powys and occur around Usk.Jurassic (Liassic) Limestones underlie much of the Vale of Glamorgan, but are generally too soft for use as aggregates.

Sand and Gravel (land based Resources)

The knowledge of sand and gravel resources was not as well established as that for rock. As a result, the Assembly commissioned a special study[49]. The picture in South East Wales became clearer, revealing potentially extensive deposits in the Usk Valley of Monmouthshire, Brecon Beacons and Powys. Other possible (mainly glacial) sources were located in the Vale of Glamorgan and between the lower Llwchr, Tawe and Neath Valleys and between Port Talbot and Cardiff.

Sub alluvial gravels are likely to be present in most of the other large river valleys (Tywi, Teifi, Severn and Aeron), but the quality may well be indifferent.

Currently, the main source is of glacial gravels in south west Ceredigion and north Pembrokeshire.

APPENDIX 14

IMAECA EXECUTIVE SUMMARY

(Extract from the report - Implementing the Methodology for Assessing the Environmental Capacity for Primary Aggregates)

'*Minerals Technical Advice Note 1: Aggregates (2004) proposes a different approach to the provision of aggregates in Wales through a careful assessment of the supply of aggregates based on a study of the environmental capacity of resource areas. Research commissioned by the Welsh Assembly Government, titled "Establishing a Methodology for Assessing Aggregates Demand and Supply" (EMAADS) completed in 2003, examined different ways of providing for aggregates and developed a new methodology, which is based on environmental capacity, for assessing the suitability of different areas of Wales to supply primary aggregates.*

Enviros Consulting Limited was commissioned by the Welsh Assembly Government to implement the 2003 methodology. The objective of the work was to ensure that the future primary aggregates supply is obtained from the most acceptable locations taking into account the availability of different types of geological resources for aggregates and the environmental capacity of areas in Wales to supply those aggregates.

The study was completed in February 2005. All available geological information on potential primary aggregates was collated and digitised. The EMAADS methodology was applied utilising a Geographical Information System (GIS) and a software tool was developed to enable the user to query geological and environmental information across the whole of Wales.

The software tool provides automatic 'scoring' of environmental capacity for 1Km squares across Wales. Twelve national environmental indicators are used to determine whether a square turns green, orange or red (lowest environmental capacity). The colouring is an indication of the capacity of the area within the square to accommodate aggregate extraction. This provides opportunities for nationally consistent and sustainable strategic decisions on aggregates provision. These decisions are to be made by the Regional Aggregates Working Parties (RAWPs) in Wales when they prepare the Regional Technical Statements. RAWPs will need to take into account environmental capacity as indicated by this tool, national policy, and a balance between need and resource availability.

The Welsh Assembly Government is able to change settings within the tool. The settings include threshold levels for each indicator, the weight to be applied to each indicator and the bands applied to total scores for each square. Changing the settings has the potential effect of changing the colour of individual squares.

The tool is to be delivered to the RAWPs with the setting fixed by the Welsh Assembly Government and the tool is designed to be used only by the RAWPs to support the development of Regional Technical Statements and should not be used directly in Local Development Plans, development control decisions or planning appeal decisions.

In preparing the geological resource database it was necessary to introduce an aggregate classification scheme. The tool identifies 11 classes of aggregate type to take into account the primary aggregate resources currently worked and other geological resources with the

potential to be worked for primary aggregates. In addition an extensive bibliography of the aggregate resource was assembled to assist the work of the RAWPs.

Copyright for the environmental capacity tool is held by the Welsh Assembly Government and one copy has been prepared for each of the RAWPs in Wales.

Enviros Consulting Limited was assisted by the University of Liverpool and Environment Systems, Aberystwyth'.

APPENDIX 15

CONFIDENTIALITY GROUPINGS

In the past, concerns about confidentiality of data provided by individual companies have resulted in some very broad groupings of reserve and production data. The data from published reports is set out in table D. However it has recently possible to reassess the way in which data for whole MPAs is grouped and as a result to develop a much more explicit set of data. By this means, most of the earlier assumptions have been reinforced, but have also been refined to provide more detailed landbank figures, particularly on a more rational basis for the former Glamorgan and Gwent areas. However a degree of grouping of MPA's is inevitable. The rationale for the present groupings is:-

a. To provide as much detailed data as possible;
b. To respect the confidentiality undertakings which form an integral part of these voluntary surveys;
c. Where possible to benefit from explicit relaxations agreed with companies; their co-operation in this respect is most welcome.

In terms of geographical implications, this new grouping has permitted:-

a. West and Mid Wales to be presented at a 'County' level;
b. An overall approximation to the former West and South Glamorgan and Gwent to be retained;
c. "Mid Glamorgan" to be subdivided into two zones based upon naturally interrelated valley areas (RCT/Cardiff and Merthyr Tydfil/Caerphilly);
d. In the case of the two National Parks, unfortunately it has proved necessary to group these with their main related county areas.

This represents a major breakthrough and becomes of prime importance when the matter of apportioning future aggregate provision to MPAs is brought into play. However, in those instances where data grouping is still necessary, the apportionment analysis (qv) attempts where possible to provide additional information and guidance tailored to the individual areas concerned.

APPENDIX 16

REVIEW OF DORMANT AGGREGATE SITES: SOUTH WALES 2006

Table A15.1 (overleaf) List of SWRAWP sites (dormant/inactive for longer than 10 years) which are considered likely or unlikely to reactivate.
(Revised 4.8.06)

Table A15.1: List of SWRAWP Sites (dormant/inactive for 10 or more years)

SITE	RESERVES (Mt)	LIKELY	UNLIKELY
Blaenau Gwent	0	0	0
Brecon Beacons NP	0	0	0
Brownhill		✓	
Penwyllt		✓	
Cefn Cadian		✓	
Blaen Onneu		✓	
Llanfair		✓	
Carreg Dwfn			✓
Cwar Glas, Llangadog			✓
River Amman, Rhosamman			✓
Caerhowell			✓
Dan-y-Darren			✓
Hafod Farm, Brynmawr			✓
Daren Hillside, Pantyrhiw			✓
Daren Felen Crossing			✓
Garig y Gaer			✓
Bridgend			
Stormy Down		✓	
Caerphilly			
Ochwr Chwith (Pontymister)			✓
Cefn Onn			✓
Cwm Leshon		✓	
Cardiff			
Cefn Garw			✓
Blaengwynlais		✓	
Carmarthenshire			
Capel		✓	
Castle		✓	
Cerrigynwyn		✓	
Cross Hands		✓	
Cynhordy		✓	
Garn		✓	
Hengoed		✓	
Limestone Hill		✓	

Table A15.1: List of SWRAWP Sites (dormant/inactive for 10 or more years) (continued)

SITE	RESERVES (Mt)	LIKELY	UNLIKELY
Carmarthenshire (continued)			
Llwynyfran		✓	
Maesdulais		✓	
Pwllymarch		✓	
Ty'r Garn		✓	
Capel Graig			✓
Nantyrhyddod			✓
Penybanc			✓
Penyfoel			✓
Pleasant View			✓
Ceredigion			
Troedrhiwffenyd			✓
Aberleri			✓
Pant			✓
Merthyr Tydfil			
Morlais Castle			✓
Monmouthshire			
Ifon		✓	
Neath	0	0	0
Newport	0	0	0
Pembrokeshire Coast NP			
Penberry			✓
Pembrokeshire CC			
Gilfach Slate		✓	
Treffgarne			✓
Powys CC			
Garreg/Lloyds			✓
Penycraig/Penyparc			✓
Rhayadr		✓	
Rhondda-Cynon-Taff			
Hendy		✓	
Swansea			
Barland			✓

Table A15.1: List of SWRAWP Sites (dormant/inactive for 10 or more years) (continued)

SITE	RESERVES (Mt)	LIKELY	UNLIKELY
Torfaen			
Cwmynscoy			✓
Vale of Glamorgan			
Argoed Isha		✓	
Cnap Twt			✓
Ruthin		✓	
St Andrews		✓	
Southerndown Road			✓
Beaupe			✓
Cosmeston			✓
Cross Common			✓
Downswood			✓
Lavernock			✓
Ely Brickworks (part in Cardiff)			✓

APPENDIX 17

IMAECA APPLIED TO AGGREGATE RESOURCES

The section below reviews the results of IMAECA for each of the main aggregate resources. Later this information is brought together with demand and reserve data to inform the Apportionment requirement and where appropriate, the need for allocations, by each MPA. However the IMAECA information is intended as a general steer only to future areas worthy of future consideration.

It should be noted that the twelve aggregate resource categories have been rationalised so that all the Pre-Carboniferous Sandstones have been grouped together as has the various types of sand/gravel.

As noted earlier green indicates a relatively high capacity to accommodate quarrying, orange an average ability and red a poor environmental tolerance towards quarrying.

Pre Carboniferous Sandstones

These have considerable outcrops in Ceredigion, Powys, Pembrokeshire (including the National Park) and the Brecon Beacons National Park. This wide ranging distribution and the extremely small recent levels of production mean that it is not proposed to describe the environmental capacity in as much geographic detail as for other resources. Mynydd Preseli, West and South Pembrokeshire, The Towy and Teifi Valleys, much of Pumlumon and the higher ground of Mynydd Epynt and then eastwards across the Black Mountains to the Herefordshire border, all tends to be assigned red. The lower slopes in this last eastern region usually register as orange. The lower farmland of North Carmarthenshire, parts of the Teifi Valley and the inland platform of the Aberystwyth Grits in Ceredigion, have been scored green. This is also the case with most of the hill country and valleys in Powys beyond the area already described, including a very large tract between Llandrindod and Lake Vrynwy. In the Monmouthshire area, the valleys around the main Old Red Sandstone outcrop appear as red, but elsewhere this deposit is given as green or orange.

Igneous Rocks

The outcrops are generally scattered and are often very isolated. Those in North Powys e.g. in the Berwyns and along the English border west of Oswestry, display mixed values.

Y Breiddin is highly constrained, whereas the Corndon–Minsterley, and the Llandrindod-Builth Wells inliers are more varied in their capacity. The Old Radnor inlier appears to have less environmental capacity but the outcrops are extremely limited.

In the larger Pembrokeshire igneous rock area, the Northern flank of Mynydd Preseli across to Strumble Head is very largely in the red zone as is virtually all of the St David's peninsular. However inland around Haycastle and just to the north of Milford Haven, values of environmental capacity are slightly more accommodating.

Carboniferous Limestone and Dolomite

In southern Pembrokeshire, the limestone is almost entirely in the red zone with the exception of Caldy and a few small inland areas which are orange.

The main very narrow “North Crop” through Carmarthenshire, displays less constraint west of the A48, but a high level to the east. More orange and some green values are to be found in southern Breconshire, entirely within the National Park. The remainder of the North Crop and the eastern edge of the Coalfield, both in and outside the National Park, are almost entirely in the red zone, as are most of the deposits in south Monmouthshire. On the “South Crop”, the Gower is similarly constrained, with only two green squares (the Mumbles!) and only a few orange values. To the south east, in the Vale of Glamorgan, the environmental capacity also registers very low, particularly in the main operational areas. Only occasional orange and even fewer green values are to be found and these are mainly to the west of the Ogmore along the A48 and also following the outcrop south of Caerphilly.

Carboniferous Sandstone

This comprises very largely Pennant Sandstone. The outcrop of the Millstone Grit is usually too narrow to register as a separate formation in terms of environmental capacity. Significant parts of the western outcrops of the Pennant register green. These lie mainly in the area west of the Llwchwr although the valley itself and nearby coast is scored orange or red. Immediately north of the M4, the extensive Mynydd Gwair area is scored green in the south, but orange and red beyond the Swansea boundary. East of the Tawe, green zoning prevails more or less as far as a line from Margam to Maesteg and Hirwaun. To the east of here, to the position is more constrained, with orange predominating and very little green, apart from limited areas around Mountain Ash and Llantrisant. A zone between the Taf and Rhymney Valleys in particularly heavily constrained. Narrow outcrops in southern Pembrokeshire exhibit more varied values as do some detached outcrops north of the Main Coalfield along the southern edge of the Brecon Beacons National Park. As exception is the area around the head of the Vale of Neath which is in the red zone deposits. Similarly belts north of Newport and immediately to the west of the Wye Valley area highly constrained.

Part Carboniferous Limestone and Sandstone

These are considered to be generally too soft to be used for aggregates, although the Jurassic (Liassic) limestones of the Vale of Glamorgan are employed in cement production.

Sand and Gravel

Sand and gravel deposits in the region are largely concentrated along the larger valleys, but elsewhere, are heavy scattered occurrences are of glacial material. In Ceredigion, outcrops surrounding Aberystwyth and the River Aeron normally score green, but the high reaches of the valleys, register red. In contrast, the Teifi valley is more constrained and the Towy valley above Carmarthen is almost entirely in the red zone. Outcrops to the west of Carmarthen and into central Pembrokeshire display green in the east and red in the west. The glacial outliers near Cardigan and west of Fishguard are fairly constrained as is much of the Llwchwr valley. Immediately to the east, scores are mainly orange and in the Tawe and Neath valleys, mainly green. In most of the Coalfield Valleys, orange and red values are fairly evenly displayed. Red predominates on the Caldicot levels and markedly along most of the course of the Usk, apart from the head waters. The Lower Wye and Mid Wye valleys as far as the A470, are in the red zone. Upstream from here, almost all the scores in the sand and gravel valley deposits of Powys are green, notably in the broad Vrynwy, Tanat and to a lesser extent, Severn valleys.

APPENDIX 18

TRANSPORT

Past Use of Rail

Historically, before World War II many quarries in the region were rail-linked by private sidings. With the growing flexibility offered by road transport, then during the 1960s, the "Beeching Cuts" to rail routes, followed by the switch from mixed goods trains to train-load traffic, rail carriage of stone generally declined in the region in the 1980s. Traditionally in the area it was mainly confined to regular deliveries fluxing stone for steel works and rail ballast. In the 1960s, the building of the Port Talbot breakwater specifically required very large quantities of large limestone blocks many of which were brought in by rail from as far away as the Peak District. In other regions, it has been possible to require rail to be used for particular large contracts e.g. parts of the M3, Manchester Airport runway extension and Heathrow Terminal 5 and even some more modest projects where rail is alongside e.g. Chesterfield inner ring road. All necessitated large volumes over short periods to specific locations where additional rail links were feasible.

All major construction projects in the region during the last 30 years or so (e.g. Second Severn Crossing, M4/A48/A40 improvements, Usk Reservoir, Cardiff Bay Barrage, developments along Milford Haven, have largely taken place within c8km (5 miles) and often much less, of aggregate sources.

Rail forwardings from South Wales were not always recorded in AM surveys. In the 1970s, the use of rail was confined to limestone and dolomite from three sites, one of which was a regional source of rail ballast (in the mid 1970s railway ballast deliveries trebled). In the 1985 survey rail forwarding's were not recorded, but two limestone quarries were still rail-served and rail ballast sales from S. Wales' quarries were 235,000t.

By 1989 only one quarry (limestone) was using rail and so rail ballast figures were not disclosed. More recently, in the 1990s a proportion (amount unknown) of sandstone for use as high PSV stone has been transferred by rail for the bulk of its journey to market. In 2005 although only one quarry (Machen, Caerphilly) was directly rail connected stone was being transferred by road from quarries to railheads e.g. from Strinds/Dolyhir Quarry to Hereford Station and from Cwm Nant Leici Quarry to Briton Ferry Sidings.

Water – Transport

At many points on the South Wales Coast, reasonably hard rocks suitable for aggregate, outcrop at or within 1-2km of the shoreline. These may be summarised as:-

1. The Aberystwyth Grits (greywackes) along Cardigan Bay;

2. Igneous rocks from Fishguard Bay to Newgale, Pembrokeshire;

3. Carboniferous limestone:
   a) At many points south of a line from Milford Haven to Tenby,
   b) Pendine, Carmarthenshire,
   c) The Gower,

d) Porthcawl to Ogmore,
e) Fronting Caldicot Levels to Chepstow.

4. Pennant Sandstone:
a) Around the Loughor (Llwchwr) Estuary,
b) Swansea-Port Talbot.

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Historically some of these have been exploited at coastal quarries e.g. from very small ports such as Porthgain (Pembs), many points in S. Pembrokeshire and along the Wye Valley. They were also used in the construction of massive marine structures (each using over 1Mt) at Fishguard, Port Talbot and Cardiff Bay.

It is understood that significant amounts (unquantified) of metallurgical slag have been transferred in recent years by water from Port Talbot steelworks to Llanwern works, Newport for processing. It is also believed that deliveries of granite from Glensanda (Scotland) have been landed at Newport Docks, but no details on recent shipping were available at the time of writing.

However many of these maritime resources are located in protected areas e.g. Pembrokeshire Coast National Park and Gower/ Wye Valley AONBs. None were identified as having potential in the superquarries study of the UK (Arup Economics and Planning: Coastal Superquarries and Aggregate Supply c1995). In many instances secure port facilities on the required scale and depth would probably be difficult to create except in the Milford Haven Waterway. Although there are a number of navigable waterways in the region, none have capacity for high volumes of freight.

Physically, the major ports (Milford Haven Waterway, Swansea, Port Talbot, Cardiff and Newport) could all import rock quarried at coastal superquarries elsewhere and this could in most cases thus be landed into the heart of urban markets. However the ready availability of stone from local quarries may make such operations unviable and such traffic would be contrary to the Proximity Principle. There is also potential for importing by sea, china clay sand from Cornwall (where past improvements at Par are under consideration) and of slate waste from North Wales (where rail to part facilities are being discussed) but there are considerable uncertainties about the viability of such trade.

Road Distribution

Currently c95% of aggregates produced in S. Wales are hauled by road. Many of the reasons for this situation have already been covered or inferred in the previous discussions of rail and water transport.

In the southern half of the region, there is a well established east-west road network (M4/ A48; A40, A465), although some of these routes are of variable quality. In the South Wales Coalfield, a natural pattern of north-south routes along the valleys, again varies in standard. The road network in west and mid Wales, where the population is relatively sparse is not as well developed and has even conditioned the viability of some quarries.

General access between the main quarrying areas (east Carmarthenshire and the Vale of Glamorgan) and the main urban areas, is strategically good. However the links between many quarry sites themselves and the primary network are very often poor and frequently involve transit along narrow country roads or through residential areas.This may be the case

even where major routes are virtually alongside the quarry (and ironically the quarry may have even provided the raw materials for such roads). However, there are also some good examples where good direct links to the primary network have now been built-in subsequently e.g. from the Cornelly group of quarries to the M4, and the recent access road to Taffs Well quarry have greatly alleviated local traffic problems.

A small number of important PSV stone quarries along the border are to close to well established west to east routes entering England.

In South Wales, although there do not appear to have been any specific studies of journey lengths, the distribution of operating quarries (and of inactive sites with reserves), suggests that in the area south of the Brecon Beacons National Park and south of a line from Llandeilo westwards, south of the A40, most journeys transporting aggregate are 20km or less. In the Cardiff area for example most delivery journeys are under 12km. These distances are generally less than the average maxima for England and Wales as a whole i.e. typically 30-40km. However north of this line, journey lengths are often considerably greater, particularly in Powys north of the A40. Whereas suitable resources are reasonably plentiful here, there are only a handful of active quarries and this directly reflects the very small and scattered population. In that extensive area, there are only two railway routes, both restricted to passenger traffic.

It has also been pointed out that although lorries are now larger than in the past, they are quieter and involve fewer journeys per 1,000 tonnes carried.

APPENDIX 19

CEMENT

Although the prime concern of the RTS is with aggregates, there are some very important linkages with cement, many of which have significant environmental implications.

Firstly, the production of cement takes place at Aberthaw works and requires limestone and shale/clay. These materials are drawn from Carboniferous and Liassic limestones (see Industrial and Other Uses and Appendix 11). The former of these is also suitable for use as aggregates; the latter is not substitutable.

Secondly, two by-product materials often used as secondary aggregates can also be used for other, more energy efficient purposes. Blast furnace slag when processed (quenched by water immediately after emerging from the furnace and ground to a powder) can produce a substitute for Portland cement and in some cases, as a fertilizer or for glassmaking. This material known as ground granulated blast furnace slag (GGBS) can be substituted for up to 90% of amount used but more regularly; it is used on a 50:50 basis. On the Second Severn Crossing it comprised 70% of the cement requirement. GGBS only demands 20% of the energy required to make Portland cement[50] (see also Secondary and Recycled Aggregates and Appendix 4).

P.f.a can also be produced as a cement supplement. In both cases the energy saving for such uses is considerably greater than that when these materials are used for aggregates in place of primary aggregates. Therefore, care needs to be exercised in promoting the use, particularly of blast furnace slag, for aggregates, as against its more environmentally sustainable applications.

It is therefore suggested that the Welsh Assembly Government should review this element of MTAN1 policy and provide specific related advice.

Thirdly, in making concrete (produced by mixing coarse and fine aggregates, cement and water), the type of aggregate used has a significant influence on the amount of the all-important cement needed. As previously noted, the cost (financial and in energy/ environmental terms) of cement usage is significantly greater per tonne than that for aggregate.

The relative cement requirements are set out in table 18.1 overleaf.

Table A18.1: Relative Cement Requirements

Low Cement Requirement ⇑ ⇓ **High Cement Requirement**	Marine or fluvial sand/gravel
	Glacial sand/gravel
	Crushed Carboniferous limestone
	Crushed igneous rock
	Crushed pre-Carboniferous sandstone
	Crushed Pennant sandstone/crushed slate
	China clay sand

APPENDIX 20

APPORTIONMENT PROCESS (Method and Calculations)

Information Base - Limitations

There are a number of factors which have to be overcome in order to implement either approach and some compromises are inevitable at least in the short to medium term mainly on account of the imperfect nature of the data and existing commitments in the form of permitted reserves.

Firstly the level of consumption in any given area is not known precisely (see Domestic Consumption). Consumption survey data, even from the more sophisticated 2005 survey, is insufficiently specific to be able to identity uptake down to MPA level and in any event, MPA boundaries do not in any way reflect the margins of market areas.

Furthermore, if the experience of other interregional flows is applied, large exporting areas tend to have higher than normal, and importing regions, lower than normal consumption rates respectably. Survey-derived consumption data is also to be used with great caution at sub-regional level let alone MPA level. It had been hoped to be able to use the MPA based distribution data from the National Collation (table 9j) to calculate even at an indicative level, the notional consumption within each MPA as a starting point. Despite considerable efforts, this proved impossible as there were irregularities in the data (e.g. they included some non-aggregate deliveries), significant volumes had not been declared in the table for confidentiality reasons and it was not possible to correlate or recalibrate the remaining data with the survey data even at sub-regional level.

Although it is likely that population is a general indicator of consumption, actual levels of usage are likely to be higher per capita in most city areas i.e. where building levels are usually more intensive, than in predominantly rural areas. This is in general, the direct reverse of the apparent survey bias just noted. The population density and general distribution is also far from evenly spread in the region even between MPAs.

Another major factor is that in the region, there is a considerable legacy of permitted rock reserves (and a comparatively small percentage of this is classed as “dormant and unlikely to be reactivated”). This means that unless owners are prepared to relinquish such permitted reserves without compensation, they will remain “live” (for the RTS period at least) and therefore these “traditional” areas will be available to supply the market for very many years to come.

The further consideration is that geological resources are not uniformly distributed either geographically or in proportion to population. The most graphic illustration of this is the dearth of land-based sand and gravel in South Wales, say in contrast with South East England where these materials predominate, although that area is almost totally devoid of workable rock resources.

Yet another element concerns the environmental capacity measures. These may suggest that some areas which are close to markets may be less able to accommodate quarrying than those more distant, so that there could be a need to make difficult decisions about trading off environmental capacity against the proximity principle.

Finally a broad statistical analysis such as that now presented is not capable of reflecting important subtleties in the market, for example the availability of large quantities of sandstone without significant environmental constraints may be of limited value to a market in need if say a sustainable source of concrete aggregate. Different types of aggregate source are not necessarily interchangeable, or, if they are used as an alternative, they may have higher intrinsic environmental costs (see Primary Aggregates - End Uses).

METHOD A - Projection Based on Existing Consumption Patterns

The first step is to establish a base level of production at MPA level. Unfortunately there are confidentiality issues in using the 2005 information at MPA level. Furthermore, using data for a specific year as a base may be unrepresentative. To overcome both these aspects, it is proposed to use the average of the period 2003-05 as a base in most instances. However, where possible, 2005 figures are given for comparison (see Table 10).

A 20 A

Table A19.1: Annual Average Crushed Rock and Marine Production by MPAs (2003-05)

Mineral Planning Authority	Crushed Rock	M. Tonnes Marine		
	Average Production 2003 - 05	**% of Total South Wales**	**Average Production 2003 - 05**	**% of Total South Wales**
Powys/BBNP	3.41	30.45	-	
Ceredigion	0.21	1.88	-	
Pembs/PCNP	0.67	5.98	0.05	4
Carmarthenshire	1.09	9.73	0.10	8
Neath/Swansea	0.56	5.0	0.32	27
Bridgend/Vale of Glamorgan	2.09	18.66	0.02	1
RCT/Cardiff	1.54	13.75	0.28	24
Merthyr/Caerphilly	1.19	10.63	-	-
Blaenau Gwent / Torfaen/Newport/ Monmouth (a)	0.44	3.92	0.41	36
Total	**11.2**	**100.00**	**1.17**	**100**

a) includes Crown Estate and Swangrove Estate (estimated) landings.

Sub-regional apportionment is concerned with primary land won aggregates. However the scale of sand gravel sales is not only very small indeed, confidentiality restrictions mean that it can only be divided into two areas grouping for the whole of the region. The addition of sand and gravel data to rock would compromise the level of detail with which rock can be presented. Most of the remainder of the statistics therefore concentrate on crushed rock. However, land won sand and gravel is covered in the MPA Guidelines.

Table A19.2: Annual Average Land won Sand and Gravel Production by MPAs (2003-05)

Mineral Planning Authority	Land Won Sand/Gravel Mt	2003 - 05 %
Carms/Ceredigion/Pembs/CNP	0.026	76
Neath-Port Talbot/Powys/Bridgend	0.008	24
Total	**0.034**	**100%**

The following tables therefore show the production requirements for crushed rock to 2021 and 2025 using both 2005 and 2003-5 averages as a base. In the period to 2010, they are also displayed as and at a constant rate and with a 1%pa growth applied.

Table A19.3: Crushed rock production using 2003-05 average MPA split applied to 2005 base (constant throughout) (M Tonnes)

Mineral Planning Authority	%	2005	Cum. 06-10	Cum. 11-15	Cum. 16-20	Cum. 21-25	Cum.(a) 07-21
Powys/Brecon Beacons NP	30	3.3	16.5	16.5	16.5	16.5	49.5
Ceredigion	2	0.2	1.0	1.0	1.0	1.0	3.0
Pembrokeshire CC/PCNP	6	0.7	3.5	3.5	3.5	3.5	10.5
Carmarthenshire	10	1.1	5.5	5.5	5.5	5.5	16.5
Neath-Port Talbot/Swansea	5	0.5	2.5	2.5	2.5	2.5	7.5
Bridgend/ Vale of Glamorgan	19	2.1	10.5	10.5	10.5	10.5	31.5
Rhondda-Cynon-Taff/Cardiff	14	1.5	7.5	7.5	7.5	7.5	22.5
Merthyr Tydfil/Caerphilly	10	1.1	5.5	5.5	5.5	5.5	16.5
Blaenau/Torfaen/Newport/ Monmouth	4	0.4	2.0	2.0	2.0	2.0	6.0
Total	**100**	**10.9**	**54.5**	**54.5**	**54.5**	**54.5**	**163.5**

a) i.e. 15 years.

Table: A19.4: Crushed rock production using 2003-05 average MPA split applied to 2003-05 average as base (constant throughout) (M Tonnes)

Mineral Planning Authority	%	2005	Cum. 06-10	Cum. 11-15	Cum. 16-20	Cum. 21-25	Cum. (a) 07-21
Powys/Brecon Beacons NP	30	3.41	17.1	17.1	17.1	17.1	51.2
Ceredigion	2	0.21	1.1	1.1	1.1	1.1	3.2
Pembrokeshire/PCNP	6	0.67	3.4	3.4	3.4	3.4	10.0
Carmarthenshire	10	1.09	5.5	5.5	5.5	5.5	16.4
Neath-Port Talbot/Swansea	5	0.56	2.8	2.8	2.8	2.8	8.4
Bridgend/ Vale of Glamorgan	19	2.09	10.4	10.4	10.4	10.4	31.3
Rhondda-Cynon-Taff/Cardiff	14	1.54	7.7	7.7	7.7	7.7	23.1
Merthyr Tydfil/Caerphilly	10	1.19	6.0	6.0	6.0	6.0	17.8
Blaenau/Torfaen/Newport/ Monmouth	4	0.44	2.2	2.2	2.2	2.2	6.6
Total	**100**	**11.20**	**56.0**	**56.0**	**56.0**	**56.0**	**168.0**

a) i.e. 15 years NB. 5 year and 15 year cumulative figures may not always equate due to rounding.

Table A19.5: Crushed rock production using 2003-05 average MPA split applied to 2005 base year - 1% growth to 2010 (base calculation) (M Tonnes)

Mineral Planning Authority	BASE %	2005	2006	2007	2008	2009	2010
Powys/Brecon Beacons NP	30	3.3	3.3	3.4	3.4	3.4	3.5
Ceredigion	2	0.2	0.2	0.2	0.2	0.2	0.2
Pembrokeshire/PCNP	6	0.7	0.7	0.7	0.7	0.7	0.7
Carmarthenshire	10	1.1	1.1	1.1	1.1	1.1	1.2
Neath-Port T/Swansea	5	0.5	0.6	0.6	0.6	0.6	0.6
Bridgend/ Vale of Glamorgan	19	2.1	2.1	2.1	2.1	2.2	2.2
Rhondda CT/Cardiff	14	1.5	1.5	1.6	1.6	1.6	1.6
Merthyr/Caerphilly	10	1.1	1.1	1.1	1.1	1.1	1.2
Blaenau/Torfaen/ Newport/Monmouth	4	0.4	0.4	0.4	0.5	0.5	0.5
Total	**100**	**10.9**	**11.0**	**11.2**	**11.7**	**11.4**	**11.7**

Table A19.6: Crushed rock production using 2003-05 average MPA split applied to 2005 base year (1% growth to 2010) (M Tonnes)

Mineral Planning Authority	%	2005 (a)	2011-25 (b)	Cum. 06-10	Cum. 11-15	Cum. 16-20	Cum. 21-25	Cum(c) 07-21
Powys/Brecon BNP	30	3.3	3.5	17.00	17.5	17.5	17.5	52.2
Ceredigion	2	0.2	0.2	1.0	1.0	1.0	1.0	3.0
Pembrokeshire/PCNP	6	0.7	0.7	3.5	3.5	3.5	3.5	10.5
Carmarthenshire	10	1.1	1.2	5.6	6.0	6.0	6.0	17.7
Neath-PT/Swansea	5	0.5	0.6	3.0	3.0	3.0	3.0	9.0
Bridgend/ Vale of Glamorgan	19	2.1	2.2	10.7	11.0	11.0	11.0	32.8
Rhondda CT/Cardiff	14	1.5	1.6	7.9	8.0	8.0	8.0	24.0
Merthyr/Caerphilly	10	1.1	1.2	5.6	6.0	6.0	6.0	17.7
Blaenau/Torfaen/ Newport/Monmouth	4	0.4	0.5	2.3	2.5	2.5	2.5	7.4
Total	**100**	**10.9**	**11.7**	**56.6**	**58.5**	**58.5**	**58.5**	**174.3**

a) i.e. annual figures. b) projections for 2005-2010 are shown in table [above). c) i.e. 15 years.

Table A19.7: Crushed rock production using 2003-05 average MPA split applied to 2003-05 average as base (1% growth to 2010) (M Tonnes)

Mineral Planning Authority	Base %	2005	2006	2007	2008	2009	2010	Cum. 06-10
Powys/Brecon BNP	30	3.4	3.4	3.5	3.5	3.5	3.6	17.5
Ceredigion	2	0.2	0.2	0.2	0.2	0.2	0.2	1.0
Pembs/PCNP	6	0.7	0.7	0.7	0.7	0.7	0.7	3.5
Carmarthenshire	10	1.1	1.1	1.1	1.1	1.1	1.1	5.5
Neath-PT/Swansea	5	0.6	0.6	0.6	0.6	0.6	0.6	3.0
Bridgend/ Vale of Glamorgan	19	2.1	2.1	2.1	2.2	2.2	2.2	10.8
RCT/Cardiff	14	1.5	1.5	1.5	1.6	1.6	1.6	7.8
Merthyr/ Caerphilly	10	1.2	1.2	1.2	1.2	1.2	1.3	6.1
Blaenau/Torfaen/ Newport/Monmouth	4	0.4	0.4	0.4	0.4	0.4	0.4	2.0
Total	**100**	**11.2**	**11.2**	**11.3**	**11.5**	**11.5**	**11.7**	**57.2**

Table A19.8: Crushed rock production using 2003-05 average MPA split applied to 2003-05 average as a base (1% growth to 2010) (M Tonnes)

Mineral Planning Authority	Base %	2005	Cum(a) 06-10	Cum. 11-15	Cum. 16-20	Cum. 21-25	Cum. (b) 07-21
Powys/Brecon NP	30	3.4	17.5	18.0	18.0	18.0	53.7
Ceredigion	2	0.2	1.0	1.0	1.0	1.0	3.0
Pembrokeshire/PCNP	6	0.7	3.5	3.5	3.5	3.5	10.5
Carmarthenshire	10	1.1	5.5	5.5	5.5	5.5	16.5
Neath-PT/Swansea	5	0.6	3.0	3.0	3.0	3.0	9.0
Bridgend/ V of Glamorgan	19	2.1	10.8	11.0	11.0	11.0	32.9
RCT/Cardiff	14	1.5	7.8	8.0	8.0	8.0	23.9
Merthyr/Caerphilly	10	1.2	6.1	6.5	6.5	6.5	19.2
Blaenau/Torfaen/Newport/ Monmouth	4	0.4	2.0	2.0	2.0	2.0	6.0
Total	**100**	**11.2**	**57.2**	**58.5**	**58.5**	**58.5**	**174.7**

(a) see table [above]. (b) i.e. 15 years.

Table A19.9: Method A - Summary of Cumulative Estimates 2007-2021 Crushed Rock (M Tonnes)

Mineral Planning Authority	(a)	(b)	(c)	(d)	Pptd Reserves (e)
Powys/BreconBNP	49.5	51.2	52.2	53.7	156
Ceredigion	3.0	3.2	3.0	3.0	9
Pembrokeshire/PCNP	10.5	10.0	10.5	10.5	24
Carmarthenshire	16.5	16.4	17.7	16.5	135
Neath-PT/Swansea	7.5	8.4	9.0	9.0	15
Bridgend/ V of Glamorgan	31.5	31.3	32.8	32.9	86
RCT/Cardiff	22.5	23.1	24.0	23.9	54
Merthyr/Caerphilly	16.5	17.8	17.7	19.2	87
Blaenau/Torfaen/Newport/ Monmouth	6.0	6.6	7.4	6.0	18
Total	**163.5**	**168.0**	**174.3**	**174.7**	**584**

See Appendix 19 for details. a) 2003-5 average MPA split applied to 2005 - constant to 2010;
b) 2003-05 average MPA split applied to 2003-05 - constant to 2010; c) 2003-5 average MPA split applied to 2005 - 1%pa growth to 2010; d) 2003-5 average MPA split applied to 2003-05 - 1%pa growth to 2010;
e) Active permitted reserves at end 2005 SWRAWP Annual Report.

METHOD B

In applying Method A, data had to presented using both a 2005 and an average 2003-5 base in order to produce a more detailed breakdown at MPA level. This resulted in different base figures being set. To enable direct comparisons to be made, both bases are used here also.

Initially, attempts were made to calculate existing consumption (as opposed to production) at MPA level using the data in the 2005 National Collation (which was presented at a more detailed level than in previous surveys). This did not prove to be possible (see tables 13, 14 and Domestic Consumption).

The available results from the 2005 National Collation Report are shown below, together with a redistribution of sales to unknown destinations. Imports are so small and only apply to any degree in the former Gwent area and so can be discarded at this stage.

Table A19.10: Surveyed Consumption of All Primary Aggregates (South Wales 2005)

Former County	Mineral Planning Authority	Consumption (kt) (a)	Adjusted Consumption (b)	Per capita Consumption (c)	Difference
Powys	Powys /BBNP	3556	4296	2251	+2045
Dyfed	Ceredigion				
	Pembrokeshire				
	Carmarthenshire				
W Glam	Swansea	4859	5869	7914	-2045
	Neath-PTalbot				
Mid/S Glam/ Gwent	Bridgend				
	V. of Glam				
	Cardiff				
	RTC				
	MerthyrTydfil				
	Caerphilly				
	Blaenau Gwent				
	Torfaen				
	Monmouthshire				
	Newport				
Total		**10165**	**10165**	**10165**	**0**

a) NB in addition 1.175Mt was sold in S Wales but the division to sub-regions was not recorded (this is included in the total); b) In the light of (a) the unknown deliveries within South Wales have been subdivided proportionally 57.5%-42.3% (or 1,010,000t-740,000t to South East Wales and remainder South Wales respectively) and added to the declared figures; c) For calculation - see table below.

Although neither geological resources of aggregate nor consumption is evenly distributed throughout the region, it has been suggested that a more equitable distribution of operations may be gained by allying production points more closely to consumption, and to do this by applying the average consumption per capita to population distribution [ref to EMAADS Report].

Average consumption of primary aggregates per head in the region is 4.45tpa. Theoretical consumption base figures using this per capita rate is displayed below.

Table A19.11: Average per capita-based crushed rock consumption estimates (S. Wales 2005)

Former County	Mineral Planning Authority	Population (k) (a)	%	Consumption All Primary (kt) (b)	Consumption Crushed Rock (kt)
Powys	Powys/BBNP (f)	131.5	5.8	585	495
Dyfed	Ceredigion	78.3	3.4	348	290
	Pembrokes (e)	117.5	5.1	523	435
	Carmarthensh	178.1	7.8	793	666
W Glam	Swansea	226.4	15.8	1007	1349
	Neath-PTalbot	135.6		603	
Mid/S Glam/ Gwent	Bridgend	130.8	11.1	582	948
	Vale of Glam	122.9		547	
	Cardiff	319.7	24.2	1423	2066
	RTC	231.6		1031	
	MerthyrTydfil	54.9	9.9	244	845
	Caerphilly	170.2		757	
	Blaenau Gwent	68.4	16.9	304	1443
	Torfaen	90.3		402	
	Monmouthshire	87.7		390	
	Newport	139.6		621	
Total		**2283.5**	**100**	**10160**	**8537**

a) Population in thousands from mid-year estimates for 2005 (takes into account recent boundary changes (2003/2005);
b) Based on average per capita consumption of 4.45tpc;
c) As above by former counties;
d) Sub-regional consumption based on the AM 2005 National Collation (provisional);
e) Includes Pembrokeshire Coast National Park;
f) Brecon Beacon National Park population is distributed to all the relevant authority areas otherwise listed but most of the population is resident in Powys.
Small differences in total due to rounding.

It was planned to compare this with the production information a) for 2005, and, in order to gain a broader base b) using the average for 2003-05. However, as already noted it only proved possible to present the actual production data at a reasonable level of discretion for crushed rock. The theoretical per capita data was therefore rebased for rock consumption only, in order to obtain a closer match to regional consumption, data on the percentage of exports (from table 9J of AM 2005 - which in this respect is reasonably represented) was applied to production and exports were then "removed". This produces an indicative figure of the amount of rock consumed in South Wales which was generated within South Wales and is termed here "residual consumption". For completeness and comparison, imports are added in the final column.

This later permits the per capita estimates of MPA area to be compared with reasonable estimates of contribution made by each MPA area to South Wales regional consumption.

Table A19.12: Crushed rock estimated consumption–based on SWRAWP surveys S Wales

Mineral Planning Authority	Rock Production 2003-05 Av kt	% Exported 2005 (b)	Export '000 tonnes	Residual Consumption in South Wales kt (d)	Rock Imports kt (c)
Powys/BBNP	3410	76	2592	818	-
Ceredigion	210	5	10	200	-
Pemb/PCNP	670	-	-	670	-
Carmarthenshire	1090	3	32	1058	-
Neath-PT/Swansea	560	33	185	375	-
Bridgend/V of Glam	2090	6 (a)	125	1965	-
RCT/Cardiff	1540	7	108	1432	-
Merthyr/Caerphilly	1190	17	202	988	-
Blaenau Gw/Torfaen Newport/Monmouth	440	5	22	418	161
Total	**11200**	**-**	**3276**	**7924**	**8085**

a) Combined percentage but actual unknown in one case;
b) From table 9J of National Collation 2005;
c) Assumed that all rock imports are to the former Gwent areas;
d) i.e. sales from MPAs into South Wales.

The per capita estimates are now compared with the consumption data calculated above from National Collation and SWaRAWP statistics.

Table A19.13: Theoretical Surpluses and Deficits (Base Year) ('000Tonnes)

Mineral Planning Authority	Per Capita Crushed Rock Consumption 2005	Per Capita Rebased to 2003-05 Average (a)	Residual consumption (b)	Difference
Powys/BBNP	495	460	818	+358
Ceredigion	290	269	200	-69
Pembrokeshire CC/PCNP	435	404	670	+266
Carmarthenshire	666	618	1058	+440
Neath-PT/Swansea	1349	1252	375	-877
Bridgend/Vale of Glamorgan	948	880	1965	+1085
Rhondda-Cynon-Taff/Cardiff	2066	1918	1432	-486
Merthyr Tydfil/Caerphilly	845	784	988	+204
Blaenau Gwent/Torfaen/ Monmouth/Newport	1443	1339	418	-921
Total	**8537**	**7924**	**7924**	**0**

a) i.e. calculated 2003-2005 consumption multiplied by percentage of population;
b) Calculated in table A19.12

The table above indicates those MPA areas which are theoretically in "surplus" (shown as +) and those in "deficit" (shown as -), based on a very broad brush approach which compares notional per capita consumption (see cautions in the introductory notes and Appendix 19) with that part of the output derived from within each MPA area, which was sold within the region (as previously noted, it is not possible obtain actual sales at MPA level). This is in effect a very generalised indicator of those MPA areas which are contributing more than their 'share' and those which are dependent on others. In reality, in most cases these are net figures and there inflows and outflows to almost all areas of different aggregate types (ie apart from the current non-producers).

Table A19.14: 2003-05 Per capita x population S Wales consumption plus exports (base calculation)

Mineral Planning Authority	P Capita Consumption x population (a)	Exports	2003-5 Average	Rounded Base (b)
Powys/Brecon Beacons NP	0.460	2.592	3.052	3.0
Ceredigion	0.269	0.010	0.279	0.3
Pembrokeshire CC/PCNP	0.404	-	0.404	0.4
Carmarthenshire	0.618	0.032	0.650	0.7
Neath-Port Talbot/Swansea	1.252	0.185	1.437	1.4
Bridgend/Vale of Glamorgan	0.880	0.125	1.005	1.0
Rhondda-Cynon-Taff/Cardiff	1.918	0.108	2.026	2.0
Merthyr/Caerphilly	0.784	0.202	0.986	1.0
Blaenau/Torfaen/Newport/ Monmouth	1.334	0.022	1.361	1.4
Total	**7.924**	**3.276**	**11.200**	**11.2**

a) From preceding table;
b) In order to retain the 11.2Mt total as a base, the rounding of some of the MPA figures has been slightly adjusted.

Table: A19.15: Based on 2003-05 totals and per capita plus exports base-constant throughout

Mineral Planning Authority	2005	Cum. 06-10	Cum. 11-15	Cum. 16-20	Cum. 21-25	Cum. 07-21
Powys/Brecon Beacons NP	3.0	15.0	15.0	15.0	15.0	45.0
Ceredigion	0.3	1.5	1.5	1.5	1.5	4.5
Pembrokeshire CC/PCNP	0.4	2.0	2.0	2.0	2.0	6.0
Carmarthenshire	0.7	3.5	3.5	3.5	3.5	10.5
Neath-Port Talbot/Swansea	1.4	7.0	7.0	7.0	7.0	21.0
Bridgend/Vale of Glamorgan	1.0	5.0	5.0	5.0	5.0	15.0
Rhondda-Cynon-Taff/Cardiff	2.0	10.0	10.0	10.0	10.0	30.0
Merthyr Tydfil/Caerphilly	1.0	5.0	5.0	5.0	5.0	15.0
Blaenau/Torfaen/Newport/ Monmouth	1.4	7.0	7.0	7.0	7.0	21.0
Total	**11.2**	**56.0**	**56.0**	**56.0**	**56.0**	**168.0**

Table A19.16: Based on 2003-05 totals and per capita base plus exports - 1% growth to 2010 (Mt)

Mineral Planning Authority	2005	2006	2007	2008	2009	2010	Cum. 06-10	Cum. 11-15	Cum. 16-20	Cum 21-25	Cum. 07-21
Powys/BBNP	3.0	3.0	3.1	3.1	3.1	3.2	16.0	16.0	16.0	16.0	47.7
Ceredigion	0.3	0.3	0.3	0.3	0.3	0.3	1.5	1.5	1.5	1.5	4.5
Pembs/PCNP	0.4	0.4	0.4	0.4	0.4	0.4	2.0	2.0	2.0	2.0	6.0
Carmarthenshire	0.7	0.7	0.7	0.7	0.7	0.7	3.5	3.5	3.5	3.5	10.5
Neath-Port Talbot/ Swansea	1.4	1.4	1.4	1.4	1.5	1.5	7.2	7.5	7.5	7.5	22.3
Bridgend/Vale of Glamorgan	1.0	1.0	1.0	1.0	1.0	1.0	5.0	5.0	5.0	5.0	15.0
RCT/Cardiff	2.0	2.0	2.0	2.1	2.1	2.1	10.3	10.5	10.5	10.5	31.4
Merthyr/Caerphilly	1.0	1.0	1.0	1.0	1.0	1.0	5.0	5.0	5.0	5.0	15.0
Blaenau/Torfaen/ Newport/ Monmouth	1.4	1.4	1.4	1.4	1.5	1.5	7.2	7.5	7.5	7.5	22.3
Total	**11.2**	**11.2**	**11.3**	**11.4**	**11.6**	**11.7**	**57.2**	**57.2**	**57.2**	**57.2**	**174.7**

N.B Regional totals are summed from columns; actual totals are 0.1Mt higher by direct calculation.

Table A19.17: Method B - Summary of Cumulative Estimates 2007-2021 Crushed Rock (Mt)

Mineral Planning Authority	(a)	(b)	Pptd Reserves (c)
Powys/Brecon Beacons NP	45.0	47.7	156
Ceredigion	4.5	4.5	9
Pembrokeshire CC/PCNP	6.0	6.0	24
Carmarthenshire	10.0	10.5	135
Neath-Port Talbot/Swansea	21.0	22.3	15
Bridgend/ Vale of Glamorgan	15.0	15.0	86
Rhondda-Cynon-Taff/Cardiff	30.0	31.4	54
Merthyr Tydfil/Caerphilly	15.0	15.0	87
Blaenau/Torfaen/Newport/ Monmouth	21.0	22.3	18
Total	**168.0**	**174.3**	**584**

See Appendix 19 for details.
a) 2003-05 average per capita consumption plus exports - constant to 2010;
b) 2003-05 average per capita consumption plus exports - 1% growth to 2010;
c) Active permitted reserves at end 2005 SWRAWP Annual Report.

APPENDIX 21

POLICY SETTING FOR AGGREGATES PROVISION IN NATIONAL PARKS AND AONBS

MPPW (2000 para m21.22) states that mineral working in National Parks and AONBs should only take place in exceptional circumstances and indicates a set of related criteria. Similarly paras 23-24 refer to protection given to European protected sites. Referring specifically to aggregates, MTAN1 (paras 51-53) indicates clearly that plan allocations or approval of proposed working in National Parks and AONBs should only take place where no alternative environmentally acceptable sites are available and where other exceptional circumstances prevail. MTAN1 goes on to require that the RTS process should discuss and record the agreement of other areas (ie other MPAs) in taking on board the contribution which National Parks ands AONBs are unable to make. Paragraphs 54-69 refer to the need to give particular protection to other natural and cultural assets, most of which although no less significant, are affected through National Parks or AONBS. Those last two categories however, have a regionally strategic significance.

PPW (2002) states that special considerations apply to major development proposals within National Parks and AONBs, and that major developments should not take place except in exceptional circumstances (para 5.5.6). In March 2007, the Welsh Assembly Government produced a policy statement for National Parks and National Park Authorities in Wales. It identifies two key issues for mineral working (i) old permissions and (ii) safeguarding mineral resources (page 12).

Response

At the moment the BBNP and PCNP have significant permitted rock reserves easily able to cater for future production at recently experienced rates. The same is the not necessarily the case in respect of sand and gravel in PCNP [detailed checking is required] and certainly not for BBNP. Concerning the Gower and Wye Valley AONBs, those again need some detailed examination.

Whereas neither sets of policies above state categorically that aggregates should not be worked in such areas, nor do they insist that current operations should be closed or planning permissions relinquished (except by implication, in the case of dormant sites via Prohibition Notices), it is clear that where feasible, there is a general underlying desire to reduce the level of production in these designated areas .Furthermore, it is also clear that where possible, there should be no new provision (i.e. allocations in plans) in National Parks and AONBs".

There is probably therefore an implied obligation (coupled with applying the proximity principle) that the RTS should at least explore the extent to which other MPAs closer to the main market areas, are able to meet the demand currently met from National Parks and AONBs.

The later section on Guidance to MPAs considers the sustainability of these protected areas in terms of the permitted reserves but will also examine the feasibility of the share presently being contributed by such areas, being covered by neighbouring authorities.

Whereas this could take many years to effect, with the cooperation of MPAs and industry over the next five years a much more rapid outcome may be achievable.

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