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Consultation Document

Towards Zero Waste One Wales: One Planet

Draft Construction and Demolition Sector Plan



Date of issue: 8 November 2011

Action required: Responses by 31 January 2012

Overview

We want your views on this plan. This plan covers all waste produced during construction, civil engineering and demolition projects. Its aims are to prevent and reduce waste and increase recycling from businesses in this sector. It will do this through

- influencing behaviour change,
- encouraging better ways of working
- Developing partnerships with the third sector
- Legislative controls

The aims shall be addressed throughout the lifecycle of a construction product, from design of products / buildings to demolition, recovery and disposal.

This plan supports 'Towards Zero Waste', the overarching waste strategy document for Wales. It does this by detailing outcomes, policies and delivery actions relevant for these sectors.

These proposals seek to deliver sustainable outcomes. They contribute to the delivery of our commitments and targets.

We want your views on the consultation document and recommend that it is read in conjunction with the Sustainability Appraisal (incorporating the Strategic Environmental Assessment).

Other relevant documents which should be considered include:

- the Health Impact Assessment (HIA);
- Habitats Regulation Assessment (HRA); and
- the evidence base.

How to respond

You may respond in a variety of ways – by sending your written response to the address below or by email to the email address provided.

Further information and related documents

Large print, Braille and alternate language versions of this document are available on request.

Contact details

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Data protection

How the views and information you give us will be used.

Any response you send us will be seen in full by Welsh Government staff dealing with the issues which this consultation is about. It may also be seen by other Welsh Government staff to help them plan future consultations.

The Welsh Government intends to publish a summary of the responses to this document. We may also publish responses in full. Normally, the name and address (or part of the address) of the person or organisation who sent the response are published with the response. This helps to show that the consultation was carried out properly. If you do not want your name or address published, please tell us this in writing when you send your response. We will then blank them out.

Names or addresses we blank out might still get published later, though we do not think this would happen very often. The Freedom of Information Act 2000 and the Environmental Information Regulations 2004 allow the public to ask to see information held by many public bodies, including the Welsh Government. This includes information which has not been published. However, the law also allows us to withhold information in some circumstances. If anyone asks to see information we have withheld, we will have to decide whether to release it or not. If someone has asked for their name and address not to be published, that is an important fact we would take into account. However, there might sometimes be important reasons why we would have to reveal someone's name and address, even though they have asked for them not to be published. We would get in touch with the person and ask their views before we finally decided to reveal the information.

Ministerial Foreword

Towards Zero Waste, the overarching waste strategy document for Wales, sets out the Welsh Government's high level policies and targets for the management of waste in Wales. Sector plans are the key delivery documents that identify specific objectives and actions for each sector in order to make the necessary contribution towards the delivery of Towards Zero Waste.

The policies and targets in Towards Zero Waste reflect the importance of changing our wasteful ways urgently. It fulfils our commitment to sustainable development and well-being which is at the heart of everything the Welsh Government does. Our Sustainable Development Scheme, 'One Wales: One Planet' shows clearly that our current levels of consumption are unsustainable. We have an obligation - to ourselves, to our children and to our fellow citizens - to ensure that, proportionally, we use the resources of only One Planet - our "fair share". The planet on which we live, and the natural resources and economy that provide us with wealth, all depend on us using resources more wisely. This is an important issue of social justice - both for citizens in Wales and for citizens in the developing and emerging economies of the world.

This sector plan covers the waste generated by the construction and demolition sector. It contains a number of proposals for discussion about how we manage and treat our waste to achieve more sustainable and affordable outcomes. It focuses on the key role that the construction and demolition sector plays through working with their clients, customers, suppliers, trades people and the wider communities to achieve the twin goals of 'One Planet living' and zero waste.

Waste from the construction and demolition sector accounts for 14% of the ecological footprint for waste within Wales, making it the third highest impact sector. A survey of waste from the sector carried out in 2005-06, showed that, while reuse and recycling are prevalent in the sector, landfill is still the primary management option for a number of waste streams. Some sub-sectors within the construction industry are already achieving high recovery rates. For example, civil engineering firms, particularly on major works, can recover in excess of 90 per cent of the waste generated. However, some parts of the sector still face significant challenges; for example, small general building companies are often reliant on the efficiency of waste management organisations to recover the resources and typically 30-40 per cent of the material currently still goes to landfill.

The construction industry must reduce the amount of waste produced and must reuse and recycle more of that which is produced. A major challenge will be with the thousands of small builders who often have limited options for management of the waste generated during construction projects. With the help of the Welsh Government and the support bodies it funds to provide help and guidance to businesses, we believe the waste prevention and recycling targets set out in this plan are achievable.

The construction sector is an important sector to the Welsh economy, contributing 30% of GDP. It has the potential to be a powerful agent for change and, with particular regard to sustainable development, the sector has an extremely influential role in transforming the behaviour of those with whom it works to shape the built environment of Wales. With this document, the Welsh Government is proposing to work with the sector to drive change in a consistent direction to meet overarching sustainable development goals.

Constructing Excellence in Wales (CEW) has played a key role in the development of this sector plan. In particular, it provided valuable contact with a variety of stakeholders which helped to identify the direction which the sector would like take to meet the targets set in Towards Zero Waste. I wish to thank CEW and all those stakeholders who contributed, and emphasise that the Welsh Government will continue to work closely with CEW and other business support organisations such as Ecodesign Centre and WRAP Cymru to ensure that the sector is supported to complete the actions proposed in this draft sector plan.

A handwritten signature in black ink, reading "John Griffiths". The signature is written in a cursive style with a large initial 'J'.

John Griffiths AM
Minister for Environment and Sustainable Development

Summary

What are the main issues?

The Construction and Demolition Sector Plan seeks to address issues in four key areas:

i) Waste prevention:

- Reducing the waste arisings directly produced by the sectors covered in the plan; and
- Utilising ecodesign approaches throughout the construction and demolition sector's processes.

ii) Preparation for reuse:

- Use of demolition plans to ensure resources such as bricks, blocks, window and doorframes etc are preserved, where practicable, for reuse; and
- Provision of infrastructure to encourage partnerships for reuse between construction & demolition contractors and the third sector.

iii) Recycling:

- Encourage better segregation of waste to enable higher recycling rates and improved quality of recyclate; and
- Encourage use of recycled materials and products as replacements for virgin materials, where viable.

iv) Treatment and disposal:

- Deliver sustainable treatment and disposal of residual construction and demolition waste in a cost effective way and work towards the targets set in Towards Zero Waste, including those that limit energy from waste and seek to reduce landfill to zero.

Reason for this consultation

The purpose of this Consultation is to seek the views of interested parties on the draft Construction and Demolition Sector Plan which covers wastes generated by construction and demolition companies in Wales. The draft plan supports 'Towards Zero Waste', the overarching waste strategy document for Wales, by detailing outcomes, policies and delivery actions for this sector. It forms part of the suite of documents that overall comprise the waste management plan for Wales in accordance with the plan making requirements enshrined in UK and EU legislation.

Outline of the Proposals

The proposals contained in this document seek to deliver the sustainable development outcomes identified in the Sustainable Development Scheme 'One Wales: One Planet' and in Towards Zero Waste. They contribute to the delivery of the Welsh Government's commitments (including targets) set under relevant EU Directives in a way that meets and delivers key overarching policies and strategies on sustainable development and climate change, as well as those set by other Welsh Government functions.

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Consultation questions

Consultation Question 1: Do you agree with the findings and conclusions of the Sustainability Appraisal? If no, please explain why.

Consultation Question 2: Do you consider that a producer responsibility measure would be appropriate for the construction industry? If yes, would you prefer to see a legislative or non-legislative approach?

Consultation Question 3: Do you agree that a voluntary agreement would be appropriate and deliverable? If no, please state why. If yes, do you feel that it would be beneficial to have separate agreements for each of the sub-sectors?

Consultation Question 4: Do you consider that the best method for monitoring the resource efficiency of the sector would be to measure the total material used per standardised unit? If no, please suggest an alternative.

Consultation Question 5: Do you agree with the proposed waste prevention target?

Consultation Question 6: Do you consider that setting 5 yearly milestones is a fair way of monitoring progress against the overall Towards Zero Waste target? If no, please explain why.

Consultation Question 7: Do you consider these actions to be sufficient to meet the waste prevention targets? If not, what other measures would you propose?

Consultation Question 8: “At least 10% of the total value of materials and products used in all new buildings promoted or supported by the Welsh Government or Welsh Government Sponsored Bodies (WGSBs) should be recycled and reused content.” Should this target be increased? If so, what would be an appropriate target?

Consultation Question 9: Do you consider these actions to be sufficient to meet the recycling targets? If not, what other measures would you propose?

Consultation Question 10: We have asked a number of specific questions. If you would like to comment on any specific actions, or raise any issues which you feel we have not fully addressed, please use the space provided.

1 Setting the Scene

1.1 The role of 'Towards Zero Waste' and the Sector Plan

Towards Zero Waste – the overarching waste strategy document for Wales – is a long term high level strategic framework which describes the social, economic and environmental outcomes that resources efficiency and waste management will achieve and contribute towards a sustainable future. It also details our high level principles, policies and targets.

Sector plans are implementation plans that will form part of the suite of documents that comprise the overall waste management plan for Wales as required under EU, UK and Wales legislation. When completed, they will describe the role of the sector, the Welsh Government and other in delivering the outcomes, targets and policies in Towards Zero Waste.

The sector plans will be web based 'living documents' and there will be linkages between them, where the actions of one sector will affect and/or support those of another. They will be evidence based and link to best practice case studies as far as possible.

1.2 Scope of the Sector Plan

The draft Construction and Demolition (C&D) Sector Plan covers construction and demolition companies of all sizes from sole operators to large organisations operating and working on construction and demolition activities in Wales and which fall under one or more of the following four sub-sectors:

- Construction companies;
- Demolition companies;
- Civil engineering companies; and
- General building companies.

The draft Sector Plan covers waste materials which are directly generated by a C&D business conducting construction or demolition activities in Wales, no matter what the source of the waste. It will include all types of construction development and each phase within these developments (demolition, site clearance, sub-structure, super-structure, and fittings). The Sector Plan also covers wastes generated through the activities of renovation and maintenance of existing building structures.

'Towards Zero Waste' sets out targets for reducing waste arisings and identifies priority materials for each sector whose reduction would have the most significant impact on Wales' ecological footprint. For the Construction and Demolition Sector, these waste materials are:

- Wood;

- Plastic;
- Metal;
- Insulation and gypsum; and
- Hazardous waste.

In addition to these priority materials, the C&D sector currently uses a wide range of materials and products which, at end of life, would be considered 'legacy' wastes. Legacy wastes are defined as materials or products that it is not feasible to recycle either now or in the foreseeable future due to their hazardous nature, composite make-up, the costs of treatment for recycling or the way their use leads to contamination at end of life. They therefore cannot feasibly be returned into the chain of utility via reuse or high quality recycling. At present, the only options are energy recovery or disposal, and this is likely to continue to be the case if that material continues to be made and used in the same way. In order for waste not to become legacy waste, the original product needs to be redesigned so that it can be reused or recycled. In the meantime, where feasible, energy recovery should be employed to avoid these materials or products being sent for disposal.

The only exception would be when a life cycle assessment shows that the use of a material or product provides demonstrably greater environmental benefits that outweigh the environmental impacts of their recovery as energy or their disposal. In such cases, they will not be classified as 'legacy wastes'.

The draft Sector Plan does not extend to construction waste materials generated by householders arising from work carried out by traders, which is collected by Welsh Local Authorities – this is specifically dealt with under the Municipal Sector Plan¹. The draft Sector Plan also does not extend to construction waste materials generated by the commercial and industrial organisations arising from work carried out by traders but disposed of by the commercial and industrial organisation directly. This will be covered in the Industrial and Commercial Sector Plan.

1.3 Who the Sector Plan is aimed at

This draft Sector Plan is aimed at construction companies, demolition companies, civil engineering organisations and general building operators of all sizes from sole-trader to large scale companies operating and working across Wales. It will identify actions for the whole sector, but seek to highlight those for specific sub-sectors for ease of reference. It identifies what the Welsh Government will do to facilitate change and to support the sector.

In addition, the C&D sector has a number of other stakeholders who can influence the life cycle of a construction project. Therefore, the Sector Plan will also be of relevance to architects & designers, planning and building control professionals, manufacturers, retailers & suppliers of building materials, the waste management industry and anyone who commissions construction projects (whether privately or public sector).

¹Welsh Government, Draft Municipal Sector Plan, Part 1, June 2010, page 9

Responsibility for delivery is identified for each sub-sector involved in this plan, with the Welsh Government driving and overseeing its delivery in partnership with the delivery bodies.

1.4 Status of the Plan

The draft C&D Sector Plan provides a record of the proposed objectives, targets and actions for the construction and demolition sector and associated stakeholders. When finalised following consultation, it will form part of the suite of documents that together comprise the statutory waste management plan for Wales as required by UK and EU legislation.

1.5 Key Drivers

The key drivers for the more sustainable management of waste covered in this draft Sector Plan include:

- The Welsh Government's goal that sustainable development should drive everything we do in Wales.
- Ensuring that the more sustainable management of waste helps contribute to the reduction of greenhouse gas emissions globally.
- The Welsh Government's stated goal to achieve One Planet living within the lifetime of a generation.
- The need to become more resource self sufficient, in order to ensure resilience for our economy in terms of the security of supply of affordable material resources.
- The increasing costs of landfill, including the effect of the £8 per tonne per year increase in Landfill Tax (rising from £56 per tonne in 2011/12 to £80 per tonne for 2014/15).
- The desire of many customers for contractors & suppliers to help them have less of an impact on the planet.
- The revised EU Waste Framework Directive requirement for action to be focussed higher up the waste hierarchy, with far greater attention paid to waste prevention (including reuse), preparing for reuse and recycling.

1.6 Outcomes and Milestones

This section describes the objectives, outcomes and milestones that we are seeking to achieve in our overarching strategy document 'Towards Zero Waste' and through the sector plans. Building a sustainable future is fundamental to our approach. This means we will consider the environmental, social and economic implications of our actions. Each is considered in turn below.

Outcomes

A sustainable environment

Towards Zero Waste shows how we will reduce the impact of waste in Wales to within our environmental limits by focussing on reducing the ecological footprint of

waste to 'One Planet' levels by 2050. This approach will reduce the impact of climate change from waste activities, achieve sustainable consumption and production, sustain our economy and manage and conserve the planet's resources. To do this we need to:

- Focus on waste prevention, and more sustainable ways of consuming and producing.
- Focus on very high levels of recycling of the waste that is produced, and make sure that it is the right type of recycling (i.e. closed loop).

A prosperous society

Towards Zero Waste shows how our actions on resource efficiency and waste management will support the development of a prosperous society that:

- Provides more 'green' jobs within the waste and resource management industry across a range of skill levels in Wales and increase the number of high skilled, high value green jobs.
- Is resilient against future competing demands including rising costs and security of supply of global material resources, saving money and maintaining or increasing profit through more efficient resource management.

A fair and just society

The Sector Plans will implement the targets, actions and policies in Towards Zero Waste in a manner in which citizens can, through actions on waste prevention, reuse and recycling:

- Achieve their full human potential.
- Enrich their communities.
- Contribute towards the wellbeing of Wales.
- Improve their local environment.
- Actively improve the quality of their life.

There will be equality of opportunity for all citizens of Wales to contribute to waste prevention, reuse and recycling irrespective of where they live, their health and ability, mobility or personal circumstances.

Milestones

To implement our outcomes, Towards Zero Waste sets out the following two key milestones.

2025 Towards Zero Waste

By 2025, there will be a significant reduction in waste (27%), and we will manage any waste that is produced in a way that makes the most of our valuable

resources. This means maximising recycling and minimising the amount of residual waste produced and achieving as close to zero landfill as possible.

This is an intermediate step on the way to our 2050 target of achieving zero waste and 'living within our environmental limits'². This is needed because reducing the impact of waste in Wales to 'One Planet' levels will require big changes in the way that products and services are designed, and the actions that consumers and businesses take.

Towards Zero Waste will require:

- **Waste prevention** – Waste arisings need to be reduced by around 1.5 percent (of the 2007 baseline) each year across all sectors in order to achieve the One Planet goal for 2050. Reuse of unwanted items will be encouraged. As far as possible, items that are discarded as waste are 'prepared for reuse' and are able to be a resource and reused by others. Minimising hazardous waste and reducing packaging waste will be key actions for this sector plan.
- **A strong economy in resource management** – This means that recyclates will be collected and managed with supply to Welsh manufacturing in mind. There will be strong markets for recyclates in place in the local economy and the benefits of recycling will remain, as far as possible, within the local community. To achieve this we will need:
 - High levels of clean recyclates to drive the market. This means that all sectors in Wales will be recycling at least 70% of their waste.
 - Waste collection systems will enable high levels of high quality recycling to be achieved, so that the recyclate can feed as far as possible into reprocessing facilities in Wales (retaining the economic value of recyclate within Wales).
 - There will be a focus on serving local recyclate markets that are 'closed loop' recycling systems to achieve the best environmental benefits.
- **Residual waste will be minimised** – Substantially less residual waste will be produced than at present, and it will be phased out of landfill sites to high efficiency energy from waste plants.
- **Landfill will be eliminated as far as possible** – To reduce Wales' greenhouse gas emissions and make the most of our valuable resources we need to divert waste from landfill, and manage the emissions from existing landfill sites.
- **Legacy wastes will be tackled** – Alternative ways of treating these will be found, and efforts will be made to ensure that products are redesigned so that they do not become problematic legacy wastes in the future.

2050 – Achieving zero waste

² Environmental Limits – 'Our Vision of a Sustainable Wales is one where Wales: lives within its environmental limits, using only its fair share of the earth's resources so that our ecological footprint is reduced to the global average availability of resources, and we are resilient to the impacts of climate change' (Source: One Wales: One Planet: A new sustainable development scheme for Wales).

By 2050, we will have reduced the impact of waste in Wales to within our environmental limits. Residual waste will have been eliminated and any waste that is produced will be recycled. This means that the ecological footprint of waste in Wales will be at One Planet levels. It will be achieved by continuing and enhancing our current efforts on:

- **Achieving One Planet levels of waste – ‘Living within our environmental limits’** – Greater efforts will be made to challenge waste at all stages of its production. All products will use as little material as possible, with the majority of its sources from recycle, with as few virgin resources used as possible. Resources will be highly valued to a level that none will be wasted.
- **Aiming to phase out residual waste and achieve ‘zero waste’ through ensuring that all waste is reused or recycled** – Any waste that is produced, will be reused, recycled, composted (for green waste) or anaerobically digested (for food waste). All products and packaging will be designed for disassembly and reuse or recycling, and the collection services and facilities to recycle all of the material will be in place. All recycling operations will be ‘closed loop’, or employ ‘upcycling’. As far as possible, recycle will be used directly in Welsh manufacturing processes. This means there will be far less need for residual waste treatment facilities such as energy from waste plants with the number and/or capacity required progressively reducing from 2025 to 2050.

In addition to these key milestones, Towards Zero Waste sets out 4 sector specific milestones / targets for the construction and demolition sector:

- **2015** – The amount of C&D waste disposed of to landfill will be reduced by 50%.
- **2020** – The amount of C&D waste being prepared for reuse and recycled will have increased to a minimum of 90% by weight for all non-hazardous construction and demolition waste, excluding naturally occurring material defined in category 170504 in the list of wastes.
- **2025** – There will be a significant reduction in the generation of C&D waste (23%) thereby reducing the impact of the ecological footprint of C&D waste.
- **2050** – We will have further reduced the ecological footprint of waste due to a further reduction in the amount of C&D waste generated (61%) and will be at One Wales: One Planet levels.

1.7 Approach

The approach followed in this document is to consider the situation with regard to the different stakeholders and their role in delivering appropriate actions in relation to:

- The prevention of waste arising from the C&D sector throughout the life cycle of a construction and the different construction phases (design; site clearance; sub-structure; super-structure; fittings; renovations and demolition);
- Increasing the preparation for reuse and recycling opportunities for C&D wastes by the sector and stakeholders throughout the life cycle of a construction and the different construction phases;
- Increasing, where relevant and appropriate other recovery methods for waste arising from the C&D sector throughout the life cycle of a construction and the different construction phases;
- Reducing the quantities of waste disposed to landfill by the C&D sector;
- Reducing the quantities of future hazardous and legacy wastes generated by the C&D sector throughout the life cycle of a construction and the different construction phases.

The draft Sector Plans outlines the actions that will be developed through further engagement with the relevant stakeholders and delivery bodies.

A Sustainability Appraisal (including a Strategic Environmental Assessment) has been published to accompany this draft Sector Plan.

<p>Consultation Question 1: Do you agree with the findings and conclusions of the Sustainability Appraisal? If 'no', please explain your reasons.</p>
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1.8 Links to other Sector Plans

A number of other Sector Plans are being developed by the Welsh Government to implement Towards Zero Waste. Each of the sector plans will be supportive of one another to maximise the opportunity for the common goals of Towards Zero Waste to be met.

Collections, Infrastructure and Markets Sector Plan

The draft Collections, Infrastructure and Markets Sector Plan was published for consultation on 10th March 2011. It seeks to create the conditions for a sustainable approach to resource management by ensuring that services are set up in Wales to guarantee the collection of a high volume of clean, source segregated recyclate that can then be delivered to reprocessors based in Wales as far as possible, and that closed loop end markets are developed for the recyclates. The draft plan seeks to retain the economic value of the recyclate within the Welsh economy, as far as possible.

The draft plan identifies where improvements in recyclate collection are required and where opportunities to develop infrastructure exist. The draft plan aims to facilitate developments in infrastructure by demonstrating need for such investments. It will also help to identify the skills and qualifications required to support the changing nature of the waste management infrastructure.

Industrial and Commercial Sector Plan

The Industrial and Commercial Sector Plan is in the process of development and will focus specifically on:

- commercial waste arising from any premises which are used wholly or mainly for trade, business, sport recreation or entertainment (excluding household and industrial);
- industrial waste arising from any factory and from any premises occupied by an industry (excluding mines and quarries);
- products (and associated packaging) produced or sold from the industrial and commercial sector that eventually become waste – in accordance with the principle of extended producer responsibility. This includes products used in construction.

The Plan scope is likely to cover:

- waste prevention – including of wastes produced by the sector, and in relation to producer responsibilities in respect of products produced by the sector (with a focus on eco-design);
- preparation for reuse;
- source segregation and separate collection of key recyclate streams, including paper, card, metal, glass and plastic;
- eco-design of products and packaging produced and/or sold by the sector in order to increase reuse and recyclability, and increase the recycled content; and

- sustainable management of residual waste.

Public Sector Plan

The Public Sector Plan is in development and will establish how the Public Sector in Wales will manage resources efficiently, develop sustainable procurement activities and prevent waste production arising from provision of services in relation to healthcare, education, local government, justice administration and emergency response in Wales. It will set out a challenging action plan which will aid the public sector to provide leadership to all other sectors and become a driver of change.

There are strong links between the C&D Sector Plan and the Public Sector Plan as the public sector is a major construction client in Wales. Local government procures some 40% of the construction industry's outputs³. Value Wales estimated that in Wales, public construction procurement accounts for approximately 20% of overall annual Welsh public sector procurement spend (Value Wales, 2009). Therefore, any proposed actions relating to driving change through procurement of services and materials will be developed further via the Public Sector Plan.

1.9 Evolution of this Sector Plan

At an early stage in the consideration of this draft Sector Plan, nine task and finish groups were identified that represent all of the key stakeholders within the sector. The nine groups were: Construction (incorporating demolition); Civil Engineering; General Building; Design (incorporating architects); Waste Management; Planning/Building Control; Clients (incorporating both public and private); Procurement and Product Manufacturers (incorporating builder's merchants. The task and finish groups discussed the approach and the content of the Sector Plan.

An initial meeting was held with a broad spectrum of stakeholders from the nine task and finish groups to discuss prioritised and general areas of concern for the sector in relation to waste generation and management. At the meeting the representatives also proposed potential solutions to a number of the identified problems. At a follow up meeting, the findings and outcomes from the initial meeting were presented to the representatives and their opinions were recorded and fed into the development of the Sector Plan.

The feedback from stakeholders has been fed into the development of this Sector Plan.

³ WRAP – http://www.wrap.org.uk/construction/how_do_i_reduce_waste/sectors/index.html

2 Current Situation

2.1 Introduction

This section describes the types and quantities of waste produced by the Construction and Demolition sector, and the management of those wastes. The data is taken from the Wales Construction and Demolition Waste Arising Survey 2005-06, conducted by Environment Agency Wales on behalf of the Welsh Government.

The priority wastes, as determined by the ecological footprint of the wastes and their management, are discussed. The data is taken from an analysis carried out by Arup on behalf of the Welsh Government⁴.

A brief description of the construction sector, its contribution to the economy in Wales and the activity within the sector since 2005 is provided for context.

2.2 The construction and demolition sector in Wales

When the C&D waste survey was carried out (in 2006), the construction and demolition sector in Wales had a turnover of £7,156 million⁵ and employed around 110,000⁶ people, including those self-employed. 80,650 employees worked in 39,335 businesses of which 38,580 (98%) were micro-businesses employing fewer than 10 employees; the remainder were primarily self employed builders. A significant proportion of construction employees (>60%) were low-skilled labourers⁷.

The Index of Construction for Wales⁸ is a quarterly report produced by the Statistics for Wales team, within the Welsh Government. It shows the short-term movements in the economic output of the construction industry within Wales, which accounts for approximately 7% of the Welsh economy. Figure 1 shows the Index of Construction for Wales and for the UK from Quarter 1 2005 to Quarter 1 2011.

Construction output in Wales fell more steeply during 2008 than the UK average and has remained significantly below the UK average since that time.

⁴ Ecological Footprint Impact of the Welsh Waste Strategy. Study Report. 2009

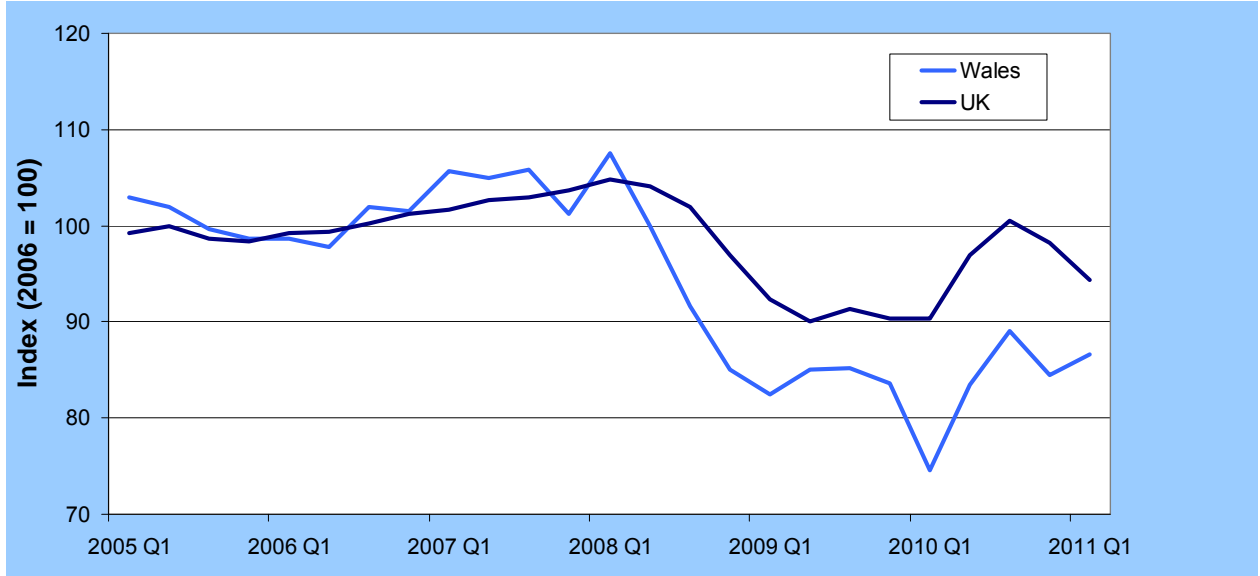
⁵ StatsWales report on Business Structure Statistics, available from StatsWales website.

⁶ ONS. Workforce jobs by industry (SIC 2007) - seasonally adjusted.

⁷ LEK Consulting. Construction in the UK Economy: The Benefits of Investment. London: UK Contractors Group, 2009.

⁸ Statistics for Wales. Index of production for Wales and Index of Constructon for Wales Quarter 1, 2011.

Figure 1 – Index of construction for Wales and the UK



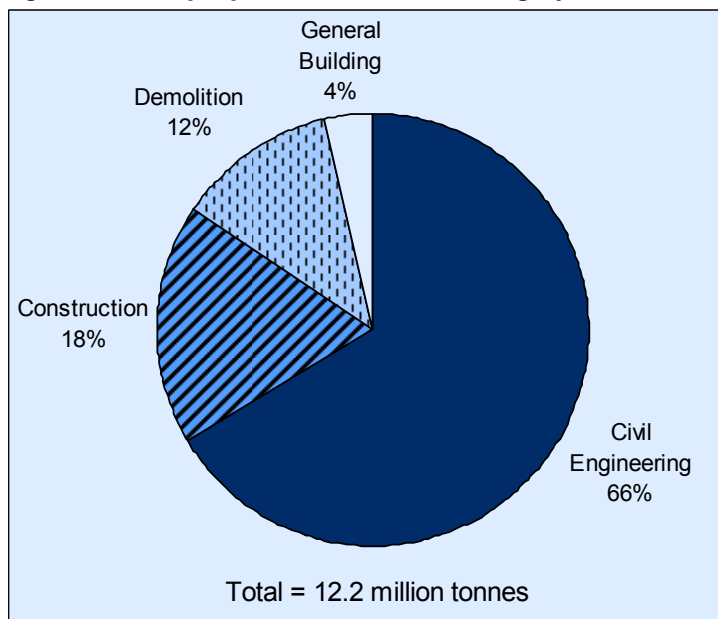
Source: Statistics for Wales

2.3 Construction and Demolition waste

2.3.1 Quantity and type of waste produced in 2005-06

The total amount of C&D waste arising in Wales in 2005-06 was estimated to be 12.2 million tonnes. Figure 2 shows that, of the 12.2 million tonnes produced by the C&D sector, the majority arose from the Civil Engineering sector (8.0 million tonnes). The remaining sub-sectors contribute as follows: Construction (2.2 million tonnes), Demolition (1.4 million tonnes) and General Builders (431,000 tonnes) sectors.

Figure 2 – The proportion of waste arising by sub-sector (2005-06)

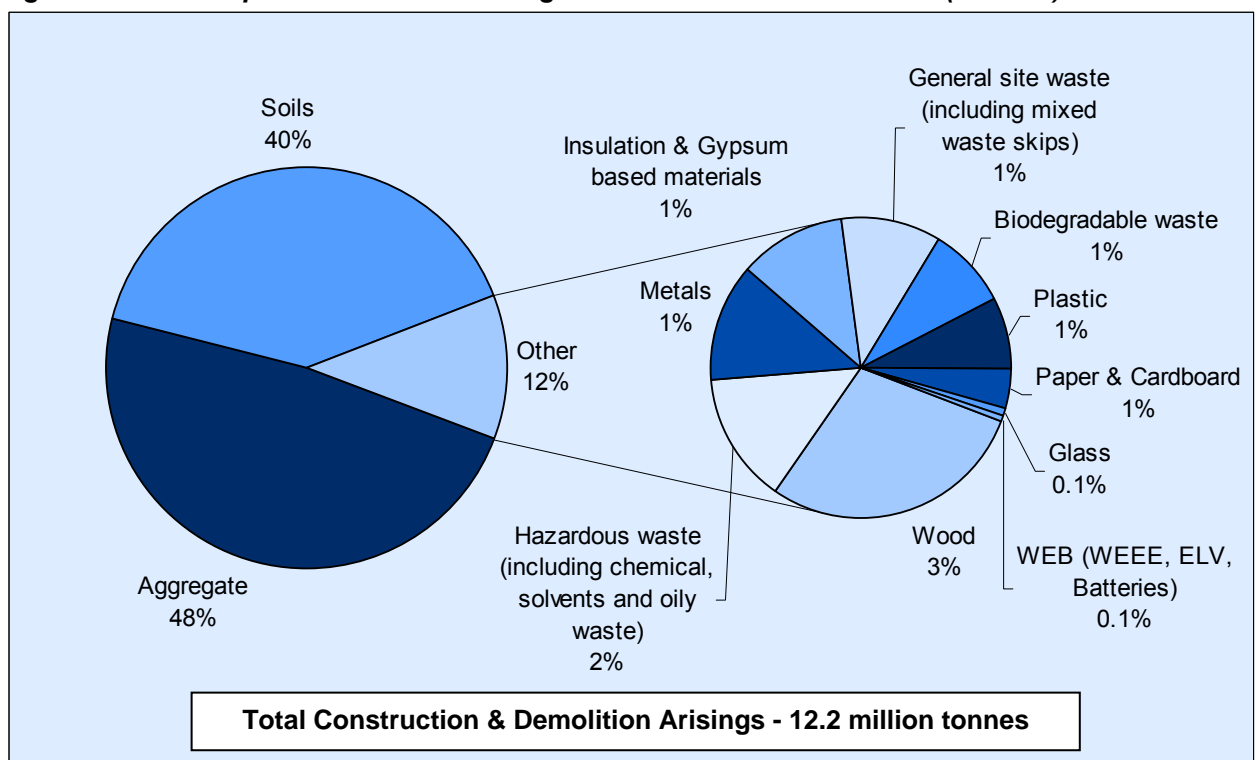


Source data: Environment Agency Wales

The survey analysed the results by company size. Companies with 50-99 and 100-249 employees produced the most waste (40% and 33% of the total respectively). Companies with 250+ employees produced only 1% of the sector's waste. Despite the great number of micro-businesses, they accounted for only 15% of the total quantity of waste arising.

The composition of waste arising from the C&D sector is shown in Figure 3. Aggregates⁹ (5.856 million tonnes), such as concrete and bricks, and soils (4.897 million tonnes) account for 88% of waste arising from the sector. The remaining 12% consists of a mixture of plastic, wood, glass, metals, hazardous waste, insulation and gypsum, paper and cardboard, waste electrical and electronic equipment, end of life vehicles and batteries, biodegradable and general site waste.

Figure 3 – The composition of waste arising from the C&D sector in Wales (2005-06)



Source: Environment Agency Wales

Table 1 shows the quantities of different waste types produced by the sub-sectors within construction and demolition. It breaks the figures down into waste collected as separate and mixed streams. Of the 10.7 million tonnes of aggregates and soils generated during 2005-06, the majority originated from the Civil Engineering sector (72%).

⁹ The survey defined the term aggregate as follows: Materials used in construction. Usually composed of two types: 1) primary aggregate sources such as sand, gravel, crushed stone, slag, or 2) waste produced by the C&D sector that are recycled or reused. These are termed secondary aggregates, i.e. crushed concrete. Waste Group comprises of concrete (EWC 17 01 01), bricks (EWC 17 01 02), tiles & ceramics (EWC 17 01 03), mixtures of the above (EWC 17 01 07) and bituminous mixtures (EWC 17 03 02).

Wood was the next largest waste stream, accounting for approximately 405,800¹⁰ tonnes. The majority of wood arises from the Construction sector (75%).

Almost 200,000 tonnes of hazardous waste was generated from site clearance, contaminated land remediation and refurbishment activities in the C&D sector. The Civil Engineering sector generated 81% of hazardous waste. The most common hazardous waste types were asbestos and contaminated soil.

Metals (178,000 tonnes), insulation and gypsum (167,700 tonnes) and general site waste (153,900 tonnes) also arose in significant quantities. Other wastes generated by the sector are as follows: biodegradable waste (118,900 tonnes), plastic (110,500 tonnes), paper and cardboard (61,193 tonnes), WEEE, ELV, and batteries (8,700 tonnes) and glass (9,400 tonnes).

2.3.2 Level of segregation of waste at the site of production

The act of segregation, where different types of waste are kept separate, reduces cross-contamination and facilitates preparation for reuse and closed loop recycling.

72% of all waste arising from construction and demolition is kept separate at the site where it is produced, but there is significant variation between sub-sectors and materials.

The demolition and civil engineering sub-sectors segregate 76% of their waste. Construction companies segregate 64%, while general builders segregate 34% of their waste.

94% of hazardous waste produced was kept separate from non-hazardous waste. This is due to good practice in dealing with waste of this type, minimising further contamination of materials and complying with legal requirements set by the Landfill (England and Wales) Regulations 2002 and the Hazardous Waste (Wales) Regulations 2005, which ban the mixing of hazardous and non-hazardous waste.

77% of all aggregates and soils are segregated. There is significant room for improvement in the management of other wastes; only 54% of wood and 57% of metals and glass were source segregated. Other materials that are predominantly mixed with other wastes, but which are potentially recyclable if segregated are: - biodegradable waste, plastic, insulation and gypsum based materials and paper and cardboard.

¹⁰ The quantities provided here are rounded to the nearest 100 tonnes.

Table 1 - C&D waste arising by sub-sector and waste type split by separate and mixed factions (000's tonnes) (2005-06)

Source	Waste group	Aggregate (excluding soils)	Soils	Insulation & Gypsum based materials	Hazardous waste (including chemical, solvents and oily waste)	WEB (WEEE, ELV, Batteries)	Glass	Plastic	Paper & Card	Wood	General site waste (including mixed waste skips)	Metals	Biodegradable waste	Total
Separate	Demolition	796	238	0	1	0	0	0	0	3	0	71	0	1,110
	Construction	649	545	3	10	1	0	0	0	205	0	9	0	1,421
	Civil Engineering	2,932	2,976	0	162	1	0	0	1	13	0	20	0	6,105
	General Building	121	2	0	15	0	5	1	0	1	0	1	0	147
	Sub total	4,498	3,762	3	187	2	5	1	1	221	0	101	0	8,782
	<i>% separated</i>	<i>77%</i>	<i>77%</i>	<i>2%</i>	<i>94%</i>	<i>23%</i>	<i>57%</i>	<i>1%</i>	<i>2%</i>	<i>54%</i>	<i>0%</i>	<i>57%</i>	<i>0%</i>	<i>72%</i>
Mixed	Demolition	240	72	5	5	0	0	0	0	13	2	7	0	343
	Construction	196	165	88	7	3	2	54	28	100	68	42	47	799
	Civil Engineering	885	898	18	1	1	0	17	10	30	18	10	72	1,959
	General Building	37	1	54	0	3	2	39	22	42	66	18	0	284
	Subtotal	1,358	1,136	165	13	7	4	110	60	185	154	77	119	3,385
	<i>% mixed</i>	<i>23%</i>	<i>23%</i>	<i>98%</i>	<i>6%</i>	<i>77%</i>	<i>43%</i>	<i>99%</i>	<i>98%</i>	<i>46%</i>	<i>100%</i>	<i>43%</i>	<i>100%</i>	<i>28%</i>
Total	Demolition	1,037	310	5	6	0	0	0	0	15	2	78	0	1,453
	Construction	844	710	90	16	3	2	54	28	305	68	51	47	2,219
	Civil Engineering	3,817	3,875	19	163	2	0	17	10	43	18	30	72	8,064
	General Building	158	3	54	15	3	7	40	22	43	66	19	0	431
	Grand Total	5,856	4,897	168	200	9	9	111	61	406	154	178	119	12,167
	<i>% of Total</i>	<i>48</i>	<i>40</i>	<i>1</i>	<i>2</i>	<i>0.1</i>	<i>0.1</i>	<i>1</i>	<i>0.5</i>	<i>3</i>	<i>1</i>	<i>2</i>	<i>1</i>	<i>100</i>

Source data: Environment Agency Wales

2.3.3 Management of waste from the construction and demolition sector

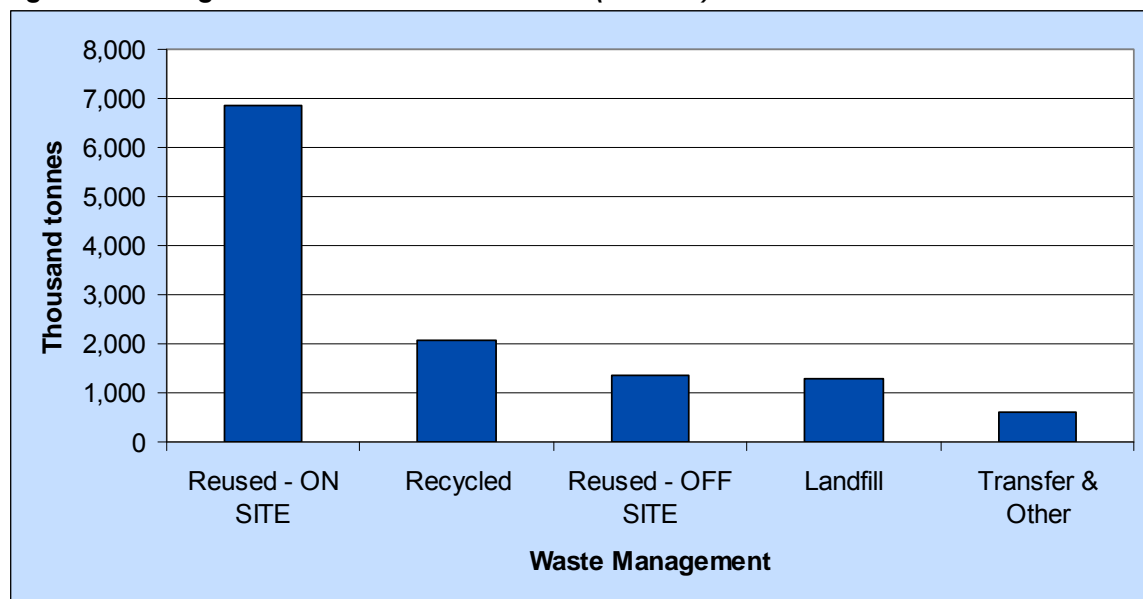
Figure 4 illustrates how the 12.2 million tonnes of waste produced by the sector was managed in 2005-06.

The terminology for waste management methods described in this section reflects those that the survey team used in 2005-06. It is not possible to directly transpose the results onto the management categories of the new waste hierarchy, laid down in the revised Waste Framework Directive, but a description of the types of activities included in each management method are provided for clarity where this information is available.

Over 6.8 million tonnes of C&D waste, representing 56% of the total C&D waste arising, was reused on site where the works were being undertaken.

Recycling is the second most used waste management option representing 17% of the total C&D waste arising, followed by reuse off site (11%) and landfill (11%). Around 544,000 tonnes of C&D waste went to a waste transfer station, representing 5% of the overall total¹¹. A small proportion of C&D waste arising was incinerated (0.002%), treated (0.2%) and other (0.3%) which consists of composting and management at exempt sites where known.

Figure 4 - Management of C&D waste in Wales (2005-06)



Source data: Environment Agency Wales

Note: "Transfer & Other" includes transfer station, treatment plant and don't know

For wastes that were taken off site for management, recycling was the dominant method of waste management. 39% of the 5.3 million tonnes managed off site was recycled, 26% was reused off site and 24% was landfilled.

¹¹ Transfer was only recorded as the fate where it was not possible to identify the final destination. Where further evidence of the final destination of the waste, such as landfill, could be obtained through the use of waste transfer notes or company invoices, then the waste was recorded against that end fate. This served to minimise double-counting as much as possible.

The Waste Framework Directive contains a target for recycling and other recovery:

“by 2020, the preparing for re-use, recycling and other material recovery, including backfilling operations using waste to substitute other materials, of non-hazardous construction and demolition waste excluding naturally occurring material defined in category 17 05 04 in the list of waste shall be increased to a minimum of 70 % by weight”.

Defra is leading discussions with the European Commission on how the UK will monitor progress against this target, which includes clarifying the method of measurement and the range of waste management activities that are included in the target. It is not possible to measure our performance until this work has been completed; the result will be published in the final version of this sector plan.

Table 2 - C&D waste arising by sub-sector and waste management method (000's tonnes)

Sub-sector	Disposal/Recovery option								
	Landfill	Recycling	Reuse - ON SITE	Reuse - OFF SITE	Incineration	Treatment	Transfer	Other	TOTAL
Demolition	115	269	841	168	0	0	54	5	1,453
Construction	356	527	984	209	0	8	130	6	2,219
Civil Engineering	662	1,180	4,914	961	0	5	314	28	8,064
General Building	140	95	115	28	0	7	45	1	431
TOTAL	1,272	2,071	6,854	1,366	0	20	544	39	12,167

The demolition sub-sector reused or recycled 88% of their waste in 2005-06; they reused 58% on site and 18.5% off site, and recycled 11.6%. Only 8% of demolition waste was landfilled.

The civil engineering sub-sector reused or recycled 87% of their waste in 2005; they reused 61% of their waste on site and a further 12% off site, and recycled 15%. Only 8% of civil engineering waste was landfilled.

The construction sub-sector also recorded a high reuse and recycling rate of 77%; this was achieved by reusing 44% of the waste on site and a further 9% off site, and recycling 24%. They landfilled 16% of their waste.

The general building sub-sector recorded the lowest reuse and recycling rate of 55%. They reused almost 27% of the waste on site and a further 6.5% off site, and recycled 22% of their waste. This sub-sector landfilled 32% of their waste, the highest rate of landfilling of all sub-sectors.

Table 3 shows the breakdown of C&D waste arisings by type of waste and waste management method. As previously highlighted, the largest waste streams for this sector are aggregates and soils, with a combined total of 10.7 million tonnes arising in 2005-06. Over 6.6 million tonnes (62%) of this is reused on site, making this the dominant waste management method for aggregates and soils in Wales.

Over 1.3 million tonnes were also reused off-site and a further 1.5 million tonnes went to recycling facilities.

Landfill was the most significant waste management method for insulation and gypsum based materials; over 106,000 tonnes went to landfill in 2005. A further 23,000 tonnes were recycled and 31,000 tonnes went to waste transfer stations. The landfilling of gypsum and other high sulphate-bearing wastes with biodegradable waste has been prohibited in England and Wales since July 2005. Some landfills have a separate cell to deposit gypsum with non-biodegradable waste such as asbestos or stable non-reactive hazardous waste.

Of the 200,000 tonnes of hazardous C&D waste arising in Wales, approximately 170,000 tonnes (85%) of contaminated soil and slag wastes were remediated and the waste was subsequently reused on site. A further 12,000 tonnes (12%) of hazardous waste mostly went to landfills in England and one in Wales. Around 4,000 tonnes went to treatment facilities in Wales and England.

Over 3,000 tonnes of WEB (WEEE, ELV and Batteries) waste went to landfill and a further 2,000 tonnes of WEB waste went to waste treatment facilities.

Table 3 - C&D waste arising by type and waste management method (000's tonnes)

Waste	Disposal/Recovery option								TOTAL
	Landfill	Recycling	Reuse - ON SITE	Reuse - OFF SITE	Incineration	Treatment	Transfer	Other	
Aggregate	675	363	3,968	634	0	0.1	180	35	5,856
Soils	110	1,158	2,704	700	0	0	222	4	4,897
Insulation & Gypsum based materials	106	23	2	6	0	0	31	0	168
Hazardous site waste (including chemical, solvents and oily waste)	25	1	170	1	0	4	1	0	200
WEB (WEEE, ELV, Batteries)	3	1	0.1	0.2	0.1	2	1	0	9
Glass	4	3	0.3	0.4	0	0	1	0	9
Plastic	68	15	1	4	0	0	22	0	111
Paper and Cardboard	37	9	1	2	0	0	12	0	61
Wood	89	285	2	6	0.4	0	23	0	406
General site waste	89	15	1	5	0	14	29	0	154
Metals	20	152	1	1	0	0	5	0	178
Biodegradable waste	47	45	4	6	0	0	17	0	119
GRAND TOTAL	1,272	2,071	6,854	1,366	0.5	20	544	39	12,167

Approximately 61% of plastic and paper & cardboard produced went to landfill. In addition 39% of biodegradable waste such as green waste and 44% of glass was sent to landfill. Conversely, 18% of plastic, 20% of paper & cardboard and 33% of glass was reused/recycled. 46% of biodegradable waste was reused or sent to recycling and composting facilities.

285,000 tonnes of wood was recycled. This represents around 70% of the overall wood arising in Wales from C&D activities. An additional 22% of wood, 89,000 tonnes, went to landfill. A further 23,000 tonnes went to waste transfer stations and 8,000 tonnes was reused.

Approximately 152,000 tonnes of metals were recycled, representing 85% of the total metal arising in the C&D waste stream. A further 20,000 tonnes were landfilled (11%), 5,000 tonnes were sent to waste transfer stations (3%) and 2,000 tonnes were reused (1%).

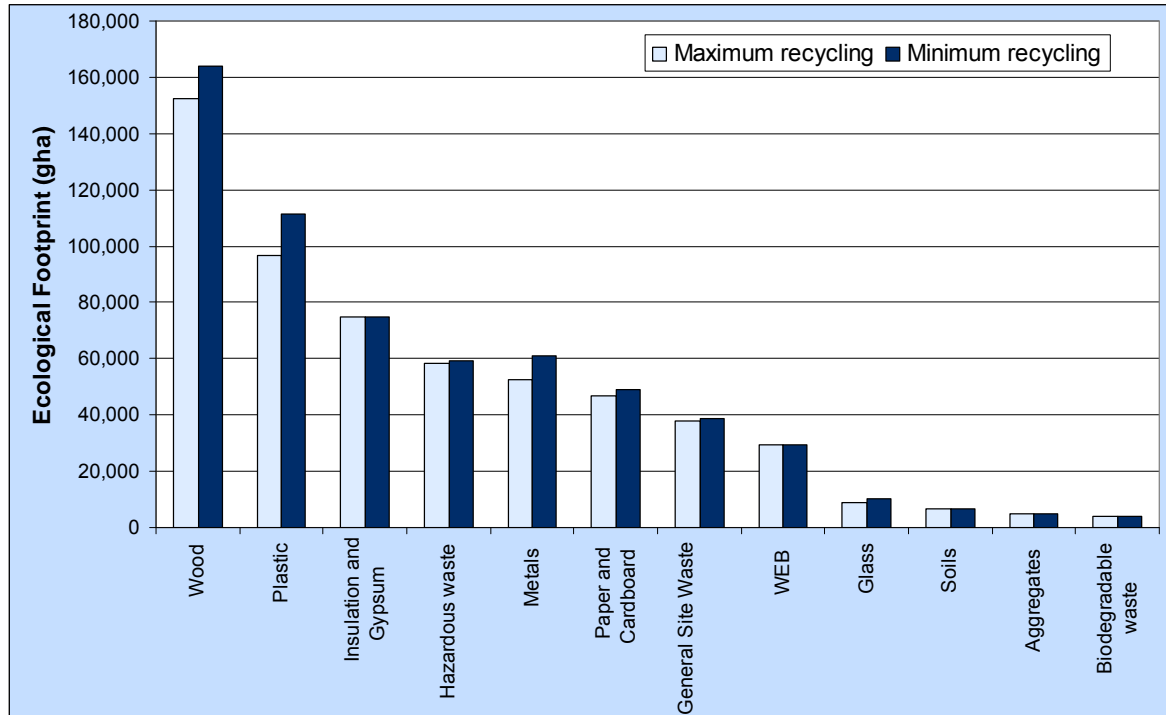
Over 89,000 tonnes of general site waste went to landfill, representing 58% of the total general site waste arising in the C&D waste stream. General site waste is composed of waste arising from company activity in their office and some site clearance. Examples of such waste are canteen waste, gas cylinders, and office furniture. A further 29,000 tonnes of general site waste was transferred and 14,000 tonnes went to waste treatment facilities. Only 14% of general site waste was sent for reuse or recycling (21,000 tonnes).

2.4 Priority materials for the construction & demolition sector

The Welsh Government uses the Ecological Footprint as an indicator of the environmental impact of waste; it is an accepted methodology used to highlight the impacts of consumption in the context of the planet's ecological limits. The Ecological Footprint methodology calculates the land area needed to feed, provide resources and produce energy for people together with the area needed to absorb the pollution and waste generated as a result of their consumption activities. The Ecological Footprint of waste, measures the embodied footprint impacts of materials in the waste stream, and the impact of the management of the wastes.

In practice, the priority materials for construction and demolition were determined by applying the embodied footprint per tonne of each waste type and the management impacts of different management methods to the arisings and management data from the survey. Figure 5 shows the ecological footprint of C&D waste types.

Figure 5 - Ecological Footprint of C&D waste in Wales 2005-06



Source data: ARUP

Note: WEB = WEEE, ELV and Batteries

The total ecological footprint for C&D waste using 2005-06 data was between 595,000 global hectares (gha) and 631,000 global hectares (gha) dependant on the recycling processes in place¹² for C&D waste in Wales.

Over 75% of the ecological footprint of C&D waste is attributable to five material groups: **wood** (26.6%), **plastic** (17.5%), **insulation and gypsum products** (12.5%), **hazardous waste** (10%) and **metals** (9.5%). These are the **priority materials for the C&D sector**.

2.4.1 Wood

Wood waste has the largest total ecological impact of all C&D waste (26.6%), but represents only 3.7% of the total waste arising. The ecological footprint per tonne of wood is high due to the requirement of direct land area to grow trees. Materials falling in this category can be identified as wood that was either used or destined to be used in the construction process (EWC 17 02 01) and wooden packaging (EWC 15 01 03).

The **Construction** sub-sector is responsible for generating **75% of wood waste**, with the general building and civil engineering sub-sectors responsible for 10.6% each. Demolition works generate less than 4% of wood waste.

¹² The Ecological impact was modelled twice. The first calculation determined the impact on the waste Ecological Footprint using factors representing the maximum Ecological Footprint reduction possible through employing the most effective recycling processes, referred to as maximum recycling. A second calculation examined the effects from the least efficient or effective recycling processes, referred to as the minimum recycling.

Wood is a popular material in construction, particularly in housing. The Environment Agency Wales survey identified the **super-structure**¹³ and **fittings**¹⁴ stages of a construction project as the stages that generate the greatest quantities of wood waste. Common sources of wood waste include pallets, crates, beams, window and door frames, doors, floor boards, shuttering, fencing and panels such as chipboard¹⁵.

376,000 tonnes (72%) of wood was recycled or reused, and 80,000 tonnes (22%) was landfilled. A further 23,000 tonnes went to waste transfer stations – its final destination is unknown.

2.4.2 Plastic

Plastic waste has a high ecological footprint, 17.5% of the total, but represents only 1% of the total waste arising. The ecological impact of plastic waste is complex. The impact is high because of the large proportion of plastic waste that is landfilled (61.5%), and the inefficient recycling of plastic.

54,000 tonnes of plastic waste is generated by the **construction** sub-sector, representing 49% of all waste arising. The **general builder** sub-sector is responsible for 39,000 tonnes (36%). The civil engineering sub-sector produced around 15% of arisings. The demolition sub-sector produces a negligible quantity of plastic waste.

Packaging materials such as wrap and bindings account for **25% of plastic waste** generated by the C&D sector. The remainder is waste from building materials and products such as pipework, window frames, wall and floor covering and interior fittings.

The use of plastic as a construction material is likely to increase as plastic replaces other materials due to its durability, weight benefits (implications of H&S Regulations), low maintenance, and resistance to rot. As the construction sector is concerned with using long-lasting products and materials, it is estimated that the average working life of all plastic applications in construction is 35 years. However, depending on the specific application, this has a wide variation of between five (such as wallpaper) and 80 years (such as pipes)¹⁶.

The European Plastics Converters reported¹⁷ in 2007 that, with the exception of insulation and board applications, PVC is by far the most-used plastic in all application areas in building and construction.

Plastic waste has a poor reuse and recycling rate of 18.9%. There are multiple factors that influence this rate, most notably the variety of plastic polymer types. Other influencing factors include the generation of the largest volume of plastic waste at a single phase of construction activity, namely **fitting out** in a relatively short period of time and the fact that 99% of plastic is put into mixed waste skips

¹³ The super-structure phase involves work above ground level on the entire structure (excludes substructure) such as walls, floors and roof.

¹⁴ The fittings phase is usually where a site is near completion of works or maintenance of an existing structure. It involves decorating, painting, installation of kitchens, hanging of doors etc.

¹⁵ http://www.wrap.org.uk/construction/construction_materials/wood/sources_of_waste.html

¹⁶ http://www.wrap.org.uk/construction/construction_materials/plastic/index.html

on site. However, uncontaminated plastics can be readily recycled and contaminated plastics can be suitable for recycling after additional processing¹⁷.

2.4.3 Insulation and gypsum based products

Insulation and gypsum account for 12.5% of the ecological footprint of C&D waste. In 2005, 168,000 tonnes of gypsum and insulation waste was generated from construction and demolition activities, which is only 1.4% of all Construction and Demolition waste. Its contribution to the ecological footprint is driven by its high impact per tonne.

90,000 tonnes of insulation and gypsum waste is generated by the **construction** sub-sector, representing 54% of all arising of this material. The **general builder** sub-sector is responsible for 32% or 54,000 tonnes. The civil engineering sub-sector produced around 11% of arisings and the demolition sub-sector less than 3%. It is produced primarily during the **super-structure** and **fittings** stages in construction.

There are many different types of insulation supplied in range of different forms, each with distinct material differences. Examples are foam (rolls/blown/rigid board), fibreglass, polystyrene, resin, sheep's wool, spray foam, polyurethane, and fibreboard. The influence of the carbon reduction agenda is increasing the frequency of use of insulation, and consequently the quantities used in construction are increasing. The amount of insulation waste generated varies according to the type of insulation and the type of installation; for example rigid insulation is estimated to produce 10 - 15% waste, flexible 8% and blown 5%¹⁸.

Gypsum based products are primarily plasterboard and wet plaster, and also cement (which is 5% gypsum). Between 23% and 38% of the plasterboard produced by the sector is new plasterboard. The majority of this (90%) comes from off-cuts, and the remainder comes from damage during storage or handling and over ordering. Plasterboard wastage of 10% to 35% is often generated on site during installation. The remaining 62% - 77% of plasterboard is produced during demolition and refurbishment and will often be contaminated, for instance with paper liner¹⁹.

63% of insulation and gypsum was disposed of to landfill in 2005-06. 14% was recycled and a further 5% reused. The remaining 18% was managed primarily by removal to a waste transfer station where the end destination is not known.

There are no sustainable waste management options available for some insulation materials currently in use; this will have an impact on the attainment of future recycling targets unless novel recycling technologies are developed. Many of the buildings being fitted with this type of insulation have life spans of between 15 and 100 years.

¹⁷ European Plastics Converters. The European Market for Plastic Building Products (2007)

¹⁸ http://www.wrap.org.uk/construction/construction_materials/insulation/index.html

¹⁹

http://www.wrap.org.uk/construction/construction_materials/plasterboard_gypsum/common_sources_of.html

Uncontaminated plasterboard waste such as off-cuts from installation can be returned to the manufacturers and recycled into new products via take back schemes. There are also a number of independent plasterboard recyclers that convert plasterboard into a range of gypsum products.

2.4.4 Hazardous waste

Hazardous waste (excluding the elements of WEEE, ELV and Batteries that are hazardous) accounts for 10% of the ecological footprint of C&D waste. In 2005-06, approximately 200,000 tonnes of hazardous waste was generated by the Construction and Demolition Sector.

Contaminated soil generated by the **civil engineering** sub-sector accounts for 81% of this waste. Asbestos is also a significant hazardous waste from this sector; around 21,000 tonnes of asbestos were generated in Wales in 2005-06.

Approximately 85% of the hazardous waste generated is managed through on-site remediation. Remediation techniques have become the most cost-effective and efficient method of dealing with this type of waste with the “co-disposal” ban on the mixing of hazardous and non-hazardous waste in landfills came into force in July 2005.

2.4.5 Waste metals

Metals (including the following European Waste Catalogue (EWC) codes, 15 01 04 metallic packaging, 17 04 01 copper, bronze and brass, 17 04 02 aluminium, 17 04 03 lead, 17 04 05 iron and steel, 17 04 07 mixed metals, 17 04 11 cables, and 20 01 40 metals) are responsible for 9.5% of the Ecological Footprint of C&D waste.

In 2005-06, 178,000 tonnes of metal waste was generated from C&D activities in Wales. In excess of 86% of this was recovered for recycling. The majority of metal waste is generated by the **demolition** (44%) and construction (28%) sub sectors, and is primarily made up of iron/steel and mixed metal.

2.5 Summary of waste arisings

This section provides an overview of the waste arising from each of the four sectors. The C&D sector is a large consumer of natural resources, and over 1 million tonnes of C&D waste was disposed to landfill in 2005-06 without any form of reuse or recovery. More efficient use of materials at the beginning of their life, and a more sustainable approach to waste management, would reduce the environmental impact of the sector by limiting the depletion of finite natural resources and reducing dependence on landfill.

Table 4 - Summary of waste arisings and their management within the C&D subsectors

Indicator		Demolition	Construction	Civil Engineering	General Building	C&D Total
Waste generation and level of segregation	Total Waste produced (tonnes)	1,452,886	2,219,296	8,063,986	431,049	12,167,216
	% of overall C&D arisings	12%	18%	66%	4%	100%
	Company size producing most waste (%)	100-249 employees (65%)	100-249 employees (54%)	50-99 employees (58%)	< 10 employees (60%)	50-249 employees (73%)
	Segregated (tonnes)	1,109,599	1,420,515	6,104,971	147,018	8,782,103
	Segregated (%)	76%	64%	76%	34%	72%
Waste management	Reuse on site (%)	58%	44%	61%	27%	56%
	Reuse off site (%)	12%	9%	12%	7%	11%
	Recycling rate (%)	19%	24%	15%	22%	17%
	Landfill (%)	8%	16%	8%	33%	11%
	Other (%)	4%	7%	4%	12%	5%

2.6 Fly-tipping of construction and demolition waste

Fly-tipping data is recorded by the Environment Agency and local authorities on Flycapture²⁰ and is made publicly available through the Welsh Government's annual statistical release. The following data is based on the 2010-11 statistical release.

In 2010-11 there were a total of 41,750 incidents of fly-tipping reported in Wales, costing £2.29 million for clean up alone. 2,861 incidents involved the illegal tipping of construction demolition and excavation wastes, and a further 180 incidents involved the tipping of asbestos. Construction and Demolition waste is the second most commonly fly-tipped waste (after household waste).

Table 5 - Flycapture data since 2006/07

Waste Component	2006-07	2007-08	2008-09	2009-10	2010-11
Other household	17,128	21,375	19,768	18,270	17,666
Black bags - household	18,621	20,740	16,267	13,052	9,312
Construction/demolition/excavation	3,394	3,885	3,120	2,652	2,861
Other commercial waste	2,105	2,238	2,998	2,702	1,647
Green	2,462	2,901	2,939	2,374	1,943
Other (unidentified)	1,921	2,229	2,446	1,896	1,764
White goods	2,564	2,868	2,216	1,809	1,622
Tyres	1,360	1,641	1,622	1,366	1,141
Other electrical	1,057	1,496	1,561	1,740	1,336
Black bags - commercial	2,332	941	985	1,157	1,427
Vehicle parts	1,046	815	588	470	513
Animal carcass	281	333	302	213	100
Chemical drums, oil, fuel	205	268	239	210	170
Asbestos	236	168	188	172	180
Clinical	122	97	110	96	68
TOTAL	54,834	61,995	55,349	48,179	41,750

The trend in total fly-tipping incidents shows a 36.5% reduction since the peak in 2007-08, and a 25% fall in the costs associated with clean-up. The fly-tipping of construction, demolition and excavation waste showed a marked improvement between 2007-08 and 2009-10, but during 2010-11 209 more incidents were recorded compared to the previous 12 months. It also accounted for a greater percentage of incidents (6.9% of the total number) than in any of the previous years.

There are relatively few asbestos incidents recorded every year, accounting for between 0.3% and 0.4% of the total number of fly-tipping incidents in Wales. Asbestos is a hazardous waste²¹ and a danger to human health – asbestos fibres can cause lung disease and cancer of the lung.

²⁰ Flycapture is a web-based, fly-tipping database for England and Wales which helps local authorities and the Environment Agency tackle fly-tipping. It is one of a number of measures to combat fly-tipping, which have been introduced to meet the requirements of the Anti-Social Behaviour Act 2003.

²¹ Asbestos waste is classed as hazardous waste if it contains >0.1% asbestos.

3 Actions

3.1 Introduction

This section covers existing and proposed new actions in respect of changing behaviour within the sector to consider waste minimisation and prevention at all stages of construction; instil the principles of eco-design; promotion of preparation for reuse and reuse opportunities; encouraging better segregation of waste to facilitate higher recycling rates. Actions are organised in accordance with the relevant parts of the waste hierarchy and requirements to deliver Towards Zero Waste. The first section details the overarching objectives and actions which are common to all elements of the waste hierarchy, and which derive from the revised Waste Framework Directive and Towards Zero Waste.

The proposed actions in this plan have been developed based upon the analysis of the current situation (Section 2). Consideration has been made of where specific gaps need to be filled and market failures addressed in order to meet future targets and the sustainable development policies and outcomes laid down in Towards Zero Waste.

Each of the key action areas are subdivided into:

- Challenges and Benefits
- Specific objectives
- Targets
- Actions
- The need for additional evidence
- Indicators and review
- Summary of actions

3.2 Overarching Objectives & Actions

3.2.1 Overarching Objectives

Key specific objectives that this sector plan needs to achieve are described under each main action section. However, there are objectives arising from the revised Waste Framework Directive and from Towards Zero Waste that are generic across all key action areas, and these are listed as follows:

1. To ensure that the products (including buildings and other infrastructure built by the construction sector) generated by the sector(s) use fewer resources (reducing especially those that are non-renewable), are more durable and/or have an extended life, are more reusable and/or refurbishable / upgradeable and that opportunities are taken to deploy the products more efficiently through leasing and/or “collaborative consumption”. Products should also

generate less waste at end of life, be more recyclable, and have a higher recycled content. The producer should take more extended responsibility for the product's management at end of life, including in respect of the costs of end of life management. Producers will also be expected to play in promoting behavioural change to customers/consumers.

2. To explore and implement the use of sectoral agreements, consumer/producer panels and/or sectoral negotiations in order that the relevant businesses or sectors set their own resource efficiency plans or objectives for the supply the production site, and in respect of product waste (to include waste prevention, increasing reuse and recycling, and increasing recycled content where feasible).
3. To ensure that the management of waste is guided by the waste hierarchy as a priority order (unless a life cycle assessment guides otherwise) as follows:
 - prevention;
 - preparing for re-use;
 - recycling (encompassing composting and anaerobic digestion);
 - other recovery, e.g. energy recovery; and
 - disposal.
4. To ensure that waste management is carried out without endangering human health, without harming the environment and, in particular:
 - without risk to water, air, soil, plants or animals;
 - without causing a nuisance through noise or odours; and
 - without adversely affecting the countryside or places of special interest, including in respect of conservation status.
5. To make an overall net positive impact in Wales on areas of special conservation status, taken as a whole and biodiversity in general through the more sustainable management of waste leading to reductions in greenhouse gas emissions that will help contribute to reducing the scale of climate change and its associated impact on native flora and fauna.
6. To meet obligations for Wales under EU and UK waste legislation, including the Habitat Regulations, especially in relation to the impact of waste facilities on areas of special conservation status.
7. To generate more 'green' jobs within the waste and resource management industry across a range of skill levels in Wales and to increase the number of high skilled, high value green jobs.
8. To enable business in Wales to become more competitive in the world market through more efficient resource management ensuring that they are more resilient against future competing demands including, rising costs and security of supply of global material resources, thus saving money and maintaining or increasing profit.
9. To ensure that public and corporate procurement includes the integration of environmental and resource efficiency criteria in calls for tenders and contracts (in line with the Handbook on environmental public procurement published by the Commission on 29 October 2004).

10. To ensure the initiation and promotion of research and development into resource efficiency, including achieving cleaner and less wasteful products and technologies, and the dissemination and use of the results of such research and development.
11. To ensure that the management of waste will change in a way that contribute towards a more fair and just society through enabling all citizens of Wales to contribute to waste prevention, reuse and recycling irrespective of where they live, their health and ability, mobility or personal circumstances in order to:
 - Achieve their full human potential;
 - Enrich their communities;
 - Contribute towards the wellbeing of Wales;
 - Improve their local environment; and
 - Actively improve the quality of their life.
12. To deliver integrated and consistent behaviour change campaigns to secure resource efficiency at both the production and consumption stages, including campaigns that are specifically aimed at, and adapted to, small sized enterprises, including working through established business networks.
13. To ensure all collection and management infrastructure for waste is capable of adapting to, and is resilient, in respect of the impacts of climate change, including the need to maintain business continuity during extreme weather and avoid public nuisance during routine operations. This will also need to include the need to take into account any areas of 'managed realignment' along the Welsh coastline when siting new waste facilities.
14. To obtain more reliable, accurate and up-to-date data in relation to waste generation and waste management methods in order to monitor trends, progress in meeting targets and to help formulate better strategic plans.

3.2.2 Overarching Actions

The overarching actions described below add to existing measures already in place to deliver many of the overarching objectives, including the protection afforded by the planning and environmental permitting regimes. Most of the actions cover resource efficiency as a whole, and include most, or all, elements of the waste hierarchy.

Article 15 of the revised EU Waste Framework Directive requires that waste producers or other holders of waste ensure that the waste is treated in accordance with Article 4 (the waste hierarchy) and Article 13 (without harming human health or the environment).

Article 4 lays down that the following waste hierarchy shall apply as a priority order in waste prevention and management legislation and policy:

- (a) prevention;
- (b) preparing for reuse;
- (c) recycling;
- (d) other recovery, e.g. energy recovery; and
- (e) disposal.

Actions at a global and EU level

a) Welsh Government influencing global and EU initiatives

Greening the construction supply chains is a key resource efficiency action. However, supply chains for the construction industry are not restricted to the UK and therefore action is needed at both the European and global level. The European Union has applied a lifecycle approach of the economic activity, from the exploitation of the raw materials to the recycling of buildings or civil engineering works. The Welsh Government will strive to influence EU policy to ensure policies and actions at this level helps Wales meet the waste reduction targets and the ultimate goal of achieving One Planet levels of waste by 2050.

Examples of relevant EU initiatives already underway include:

- **Construction Products Regulation (CPR)** To replace the existing Construction Products Directive, the objective of the CPR is to ensure that reliable information is presented in relation to the performance of construction products. This is achieved by providing, mainly in standards, a common technical language, to be used not only by manufacturers, but also by public authorities when defining their requirements on construction works, directly or indirectly influencing the demands placed on the products to be used in them. Specific mention is made of the sustainability of construction products, through a new 'basic works requirement' (the essential criteria for works upon which standards for the products used are based) which means that where Member States choose to legislate for environmental performance of products, this can be shown as part of the declaration associated with CE marking and expressed in harmonised terms across the EU. The Construction Products Regulation (CPR) has been adopted by the European Commission and UK Government; the main provisions will come into force in July 2013. These include:
 - Ensuring that all construction products marketed will bear the CE mark in order to guarantee that everything that is sold in the EU has undergone appropriate quality control with simplified procedures for micro-enterprises
 - Improved market surveillance through granting easier access to manufacturers certification information
 - Introducing a minimum level of harmonization of assessment criteria which in turn would ensure that CE markings will have the same significance in all the EU Member States.
- **Lead Market Initiative²²**: Sustainable construction is one of the six markets in the Lead Market Initiative. The initiative looks at the interaction and combined effects of the rational use of natural resources (energy, water and materials). In relation to residential housing the initiative looks at the increasing role of the passive house concept. One of the challenges of the initiative is the introduction of life-cycle and cost-benefit assessments to facilitate the public procurement of sustainable construction. Through the development of a road

²² http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/sustainable-construction/index_en.htm

map it is expected to raise awareness and acceptance about the need to transform the way the customer decides and the supply chain operates. The initiative also details the development of potential European standards that allow taking into account sustainability aspects in construction design (EU, 2007). As of September 2009, the following actions were being progressed:

- Screening of national building regulations; - further work identified and tenders due to be called for in 2009/2010.
- Recasting of the Energy Performances of Building Directive – new Renewable Energy Directive came into force in June 2009.
- Guidance and pilot schemes on award criterion and Life Cycle Costing (LCC) – due to be completed October 2009
- Establish a network between public authorities in charge of procuring sustainable construction – networks due to start activities in September 2009
- Framework, assessment method and benchmarks for the assessment of sustainability performances
- Widening the scope of European codes for construction design (Eurocodes 2nd generation)
- Construction Products Regulation and sustainability requirements – was expected to be adopted in 2009/10
- Small to Medium sized Enterprises (SMEs) guide on collaborative working schemes in construction projects – completed March 2009
- Alternative warranty / label schemes related to construction insurance – feasibility study was due to be completed March 2010
- EU-wide strategy to facilitate the up-grading of skills and competencies in the construction sector – completed March 2009

This will work in conjunction with the policies outline by the Welsh Government.

Regulation and Enforcement

Legislation is one of several interventions that are available to the Welsh Government to encourage a more sustainable approach to waste and resource management along the construction supply chain. At present there are two pieces of legislation in process, which will assist in delivering our objectives:

b) Transposition of the revised Waste Framework Directive (2008/98/EC)

The EU Waste Framework Directive lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste, and by reducing the overall impacts of and improving the efficiency of, resource use. Revisions of the Waste Framework Directive (2008/98/EC) were adopted in December 2008 and have been transposed in Wales via the Waste (England and Wales) Regulations 2011.

The Directive includes requirements for member states to:

- Apply the waste hierarchy in waste management legislation and policy;
- Take measures, as appropriate, to promote the re-use of products and preparing for re-use activities, notably by encouraging the establishment and support of re-use and repair networks, the use of economic

instruments, procurement criteria, quantitative objectives or other measures;

- Establish waste management plans;
- Establish Waste Prevention Programmes describing existing prevention measure, evaluating the usefulness of other measures and determine benchmarks for measurement of adopted prevention measures;
- Promote the high quality recycling of waste materials as part of the overall aim to make the EU a 'recycling society';
- Ensure that separate collection is set up for at least the following – paper, metal, plastic and glass by 2015 (for **all** waste producing sectors);
- Ensure that the preparation for reuse, recycling and other material recovery of non-hazardous construction and demolition waste is increased to a minimum of 70% by weight by 2020.

This sector plan will form part of the Welsh Government's compliance with the requirements of the Directive in respect of waste management and waste prevention plans.

Actor: Welsh Government

c) Consideration of waste hierarchy guidance in respect of construction and demolition waste

The "duty of care" Code of Practice is a statutory document which explains how all holders, producers, carriers, importers, brokers, dealers and processors of waste can meet the legal duty set out in Environmental Act 1990, section 34 to manage that waste correctly to enable its safe recovery or disposal without harming the environment. All waste holders will still have to have regard to their statutory duty of care, in addition to the waste hierarchy. The Code of Practice will be revised to refer to the waste hierarchy guidance, which will remain a separate document because of its different scope and level of details.

The Welsh Government intends to publish waste hierarchy guidance for producers and holders of waste, based on the hierarchies proposed in the draft Collections, Infrastructure and Markets Sector Plan. It will put particular emphasis on the importance of waste prevention. A revised 'duty of care' Code of Practice is to be produced to reflect the new requirement on the transfer note.

All producers of waste within the Construction and Demolition sector will be encouraged to take note of this guidance and in particular the advice on what, in relation to individual waste streams, are the circumstances in which the Welsh Government considers that departures from the Article 4(1) waste hierarchy may be justified by life-cycle thinking etc.

Actors: Welsh Government, Construction and demolition companies

d) Legislation to introduce Site Waste Management Plans (SWMPs)

The purpose of the SWMPs is to help companies in the C&D sector to think and plan to prevent, minimise and recycle the waste being produced and divert waste

away from landfill. They are an important tool, which provides a framework that encourages resource efficiency and waste reduction, recycling and re-use both on-site and off-site. The Welsh Government is scoping the consultation proposals for SWMP regulations and aim to issue a consultation by early 2012.

Through conducting a SWMP, companies can begin to assess the true cost of waste generation. In particular, the introduction of the Landfill tax escalator and the increasing capacity of the waste management industry to recover waste have made it more cost effective to divert waste from going to landfill.

The preparation of SWMPs will help the C&D sector achieve a more sustainable approach to waste management by:

- Designing out waste at the design stage, making it easier for companies to work to specification. In turn this will also reduce the potential of waste on-site;
- Improving waste management practices and making it easier to process waste and reduce at source, thus avoiding the high costs of waste disposal;
- Measuring the amount of waste produced (and benchmarking);
- Ensuring compliance with existing waste management legislation, reinforcing the Duty of Care;
- Recycling and re-use of materials, reducing primary demand for primary materials and increasing take-up of secondary / recycled C&D materials;
- Ensuring building materials are managed more efficiently, and
- Ensuring that waste is disposed of legally.

Actor: Implementation of Regulations – Welsh Government; Development of SWMPs – Construction & Demolition companies meeting the thresholds outlined in the Regulations

e) Legislation to introduce a charging scheme for SWMPs (Waste (Wales) Measure 2010 – section 12(2)(e))

The Waste Measure (Wales) 2010 allows the Welsh Government to introduce a fees and charging scheme in relation to SWMPs. Introducing a fees and charging scheme could help to make SWMPs effective by ensuring that the relevant enforcement authority has appropriate resources to monitor and enforce the plans.

A fees and charging scheme, if introduced, would accord with the ‘polluter pays’ principle in other pieces of environmental legislation as well as with other regulatory functions undertaken by various enforcement authorities, such as the operation of planning and building regulations by each local authority.

The Welsh Government will consult about fees and charges when it consults on SWMP regulations.

Actors: Welsh Government

f) Consideration of extended producer responsibility

Article 8 of the revised Waste Framework Directive (rWFD) enables Member States to introduce extended producer responsibility. It allows Member States to take legislative or non legislative measures to ensure that any person who professionally develops, manufactures, processes, treats, sells or imports products has extended producer responsibility. Measures can include the design of products in order to reduce their environmental impacts and the generation of waste in the course of production and subsequent use of products and in order to ensure that the recovery and disposal of products that have waste take place in accordance with the waste hierarchy (Article 4) with regards to waste management.

The Welsh Government will explore to see whether it would be practical or desirable to introduce extended producer responsibility legislation with the outcome of delivering a life cycle approach to building development, which would result in more recycling.

A major issue for the sector is the unpredictability of future waste quantities from demolition activities. In future years the sector will have to deal with the demolition of existing building stock and also future building stock. To assist in meeting the targets set in Towards Zero Waste and to comply with our obligations under the revised EU Waste Framework Directive, it is necessary to consider potential options to reduce the future environmental and human impacts from the demolition of buildings not yet developed.

At present there is no direct producer responsibility for the construction industry, however an End-of-Life Directive has been mooted (NHBC Foundation, 2007). In light of this, the Welsh Government, working with the UK Government and the other Devolved Administrations in the UK, will explore whether an End-of-Life Building Directive is a viable proposition to be advocated to the EU. An End-of-Life Directive may require developers of building to taken into consideration the life span of all materials. The industry would have to design houses and use products that can ultimately be re-used, recycled and recovered at the end of their life. Design for deconstruction and disassembly of products would be central components of any future End-of-Life Directive.

Actors: Welsh Government

Consultation question 2: Do you consider that a producer responsibility measure would be appropriate for the construction industry? If so, would you prefer a legislative or non-legislative approach?

Procurement

g) Greening public procurement

The public sector is the largest construction client in Wales (approximately 40% of all spend on construction projects in the UK is by the public sector) and as such has a major role to play in influencing contractors and driving sustainability up the supply chain.

The Welsh Government has established Value Wales as a body, specifically to support public sector organisations in making the Welsh pound go further. Value Wales acts as a catalyst for change, providing leadership, strategic direction, procurement training and best practice guidance to help organisations achieve real and sustainable improvements. Value Wales promotes collaboration in the purchasing of supplies and in the delivery of services. In relation to sustainable procurement within construction projects, Value Wales are exploring a range of initiatives:

- A Construction Procurement Strategy is currently being developed, in response to the recommendations of the 2010 in Constructing Excellence in Wales 'No Turning Back' report which pointed to limited progress in adopting more efficient integrated procurement and supply chain arrangement aimed at delivering continuous improvement. The strategy will promote a standard approach to maximise the benefits delivered through investment in construction projects by simplifying procurement and removing unnecessary and costly practices. It will ensure that current and future policies such as BREEAM, 2011 Zero Carbon aspiration and the 3% Carbon Dioxide reduction requirement are incorporated into the procurement process. It recognises the need to support the Sustainable Development Scheme and integrate appropriately with Towards Zero Waste.
- Also currently in development is a Construction Supplier Qualification Information Database (SQulD) to standardise the pre-qualification process that will reduce waste, time and expense and help remove the barriers faced by Welsh SMEs in winning business. The SQulD question set helps clients ensure that prospective contractors meet the requirements of the Green Compass scheme and WRAP's 'Halving Waste to Landfill' criteria.
- A Sustainable Building Portal has been proposed which will provide advice on waste prevention within public sector construction projects. This could include signposting to appropriate standards which construction contractors can work towards; guidance on reducing impacts on the environment and human health through the use of non-hazardous materials, and improved opportunities to minimise waste generation and increase opportunities to reuse materials.
- Public sector organisations are encouraged to operate sustainable procurement policies and practices to drive the development of markets for environmental products and services, which in turn can assist in waste prevention through their contracts with construction companies. To aid this, Value Wales have developed a Sustainable Procurement Assessment Framework (SPAF) which looks at a number of Sustainable Procurement priorities, such as reduced resource consumption, sound environmental management, community development and regeneration, equalities, and supplier development. For these to be delivered, it is essential that all public sector organisations first have a sound procurement function which manages people, suppliers, and IT effectively. Once this has been established, sustainable development priorities can be integrated into all procurement activities. As part of the

overall sustainable approach, the SPAF addresses a number of waste related issues including:

- Identifying opportunities to ensure that reuse of materials is increased;
- Ensuring waste materials not suitable for reuse are sent for recycling;
- Encouraging procurement of materials with a high recycled content and which meet all building regulation specifications to help to drive a market for materials and products which have been recycled;
- Encouraging the use of Green Compass waste management companies.

The Welsh Government will explore further opportunities to develop the Construction Procurement Strategy, Construction SQuID and investigate further the need for the proposed Sustainable Building Portal. In addition, the Welsh Government will continue to promote the use of the Sustainable Procurement Assessment Framework by all public sector organisations and provide support for development of sustainable procurement policies where needed.

Actors: Public Sector, Welsh Government, Business Support organisations

h) Review construction related procurement guidance for private sector

The Welsh Government wishes to promote best practice from the public sector to assist private clients with the inclusion of green procurement clauses in their contracts. Private clients can assist in meeting the targets through material specifications in the design contract, this can include the requirement to reuse, where practicable, any materials that may be available on site, the requirement to utilise materials with recycled content and a requirement to prepare for reuse suitable materials and other materials to be sent for recycling.

Constructing Excellence in Wales will be asked to carry out a review of the range of guidance and tools currently available to aid businesses in this and the visibility of these resources. The results of this review will determine the need for additional resources and who may be best placed to develop them.

Actors: Constructing Excellence in Wales

Behaviour change

i) Sustainable Development Charter

The voluntary Sustainable Development Charter, launched in May 2009 by the Welsh Government, commits participating organisations, working in Wales, to embed sustainable decision making into their processes. It has already gained over 90 signatories from Welsh businesses, public sector organisations and the Third Sector. To date 15 organisations from within the C&D Sector community have signed up and the Welsh Government strongly encourages all businesses in sectors covered by this plan to sign up to the Charter.

Actors: Welsh Government, Construction and Demolition companies

j) Voluntary Agreement

There are already voluntary agreements in place, which are relevant to the C&D sector. The Home Improvement Sector Commitment, an agreement facilitated by WRAP with the UK home improvement sector, aims to reduce the environmental impact of home improvement products through optimising packaging and reducing waste. It is an arrangement based on similar principles to those of the successful Courtauld Commitment, which relates to grocery retail packaging and food waste. Also run by WRAP, in England (and formerly in Wales) is the Halving Waste to Landfill commitment which aims to halve the amount of construction, demolition and excavation waste being sent to landfill by 2012.

The Welsh Government wishes to explore with the C&D sector in Wales the potential to establish a voluntary agreement. The focus of this agreement would be for the sector to meet the waste prevention and recycling targets set in Towards Zero Waste, resulting in an ecological footprint reduction of 75% by 2049/50. In particular, the voluntary agreement could be used to encourage C&D companies to focus on reducing their reliance on products and materials with a high ecological footprint.

The Welsh Government will ask Constructing Excellence in Wales to explore with the sector how a voluntary agreement could be taken forward in Wales.

Actors: Construction, Civil Engineering, Demolition and General Building Companies, Public Sector, Designers/Architects, Manufacturers, Suppliers/Retailers, Business Support organisations

Consultation Question 3: Do you agree that a voluntary agreement would be appropriate and deliverable? If no, please state why. If yes, do you feel that it would be beneficial to have separate agreements for each of the sub-sectors?

k) Sustainability clauses for Welsh Government funded grants

Towards Zero Waste states that all Welsh Government grants should require recipients to take active steps to meet waste reduction and recycling targets. This will be done through the development of a set of standard conditions which will also promote the use of relevant standards and protocols, some of which are referred to elsewhere in this sector plan (e.g. Demolition Protocol, BREEAM).

Actors: Welsh Government

Ecodesign

l) Ecodesign within construction projects

Ecodesign is a strategic design management process that considers the full life-cycle impacts of packaging, products, processes and services (e.g. energy, materials, manufacturing, distribution, packaging, use and end-of life treatment). As a process, ecodesign can help provide practical and creative solutions to complex problems, especially with respect to sustainability. Some of the key principles of ecodesign include; full life cycles (cradle to cradle); focus activities on areas of greatest impact; all sustainability issues taken into consideration (inc.

social impacts); no shift of environmental pressure between stages of life cycle (systems perspective, legacy waste etc.); and, creation of higher overall quality and value.

There are 5 recognised ecodesign approaches, of which the following four could be applied to construction materials and projects to assist with waste prevention:

- **Life Cycle Thinking** - considering the full life cycle impacts of a product, packaging or service. This includes material extraction, manufacture, distribution, retail, use and end-of-life. Completing a Life Cycle Assessment (LCA) can make a comparison between different design options allowing the least damaging option to be selected.
- **Design for Disassembly** – considering the easy separation of different types of material from a product once its useful life has come to an end, to allow for effective recycling.
- **Reduce** the negative impact of a product on the environment, for example by removing hazardous chemicals or materials, without compromising the design.
- **Re-Design** the product or product system, for example by re-designing the product to take advantage of more sustainable materials and cleaner production methods.

Ideally Ecodesign would become a thread that runs through the design, planning and development of all construction activities. It can ensure construction is not undertaken in isolation, but that a holistic, life cycle perspective with superior resource management is applied. Welsh Government will continue to fund Ecodesign Centre Wales to provide support to the construction sectors.

Actors: Welsh Government, Ecodesign Centre Wales

m) Design for Deconstruction (D4D)

The design stage is the point at which sustainability objectives become embedded within the specifications for a development project. This is one of the most important phases in determining a successful sustainable outcome. By considering the sustainability issues around natural resource use, human health, and community concerns at the design stage, designers can create buildings that are cleaner, healthier for occupants and the environment, and deplete fewer resources – both during construction and throughout their life.

It is vital at the design stage that consideration is given to commercial factors during both construction and operation phases. Operating costs invariably outweigh construction costs and will therefore heavily influence design schematics of materials and systems. Designing in balance between capital and operational expenditure can have effects further downstream on product selection to meet the required specification, replacement lifecycles and planned maintenance regimes. Therefore, design must pay attention to the tensions between capital expenditure and revenue throughout the building lifecycle.

D4D requires architects and engineers to select materials that have a high capacity for reuse in subsequent projects and materials that are recyclable and reprocessed into new products. It is also a tool for reducing the building industry's ecological footprint by factoring the life cycle of different materials incorporated into the

design. At the end of a building's life, recover for reuse or recycling of waste materials should not require high amounts of energy. Consequently, D4D can reduce the energy consumption and CO₂ emissions. D4D also has economic benefits as it reduces the costs of disposing to landfill and may also involve a financial return from the materials suitable for reuse and recycling²³

Through the Ecodesign Centre, Welsh Government will encourage designers/architects to design for the end-of-life of the building. This will ensure that the materials used in the construction of the development contain a high percentage of recycled content (helping to create a market for recycled materials and products) and that throughout the life of the building the materials can be either reused or recycled.

Constructing Excellence in Wales will work to raise awareness of the importance of designing for end of life and recommend that all designers/architects and construction companies utilise existing systems to assist in meeting these objectives. These systems include: BREEAM, CEEQUAL, D4D, SCRIPT, LEED and LEAN.

Actors: Ecodesign Centre, Constructing Excellence in Wales

n) Greening the Welsh Housing Quality Standard Refurbishment

The National Housing Strategy for Wales' Better Homes for People in Wales states that houses should be brought up to 'good quality' by 2012. The strategy was particularly aimed at Local Authorities and social housing providers, who are obliged to assess their housing stock against the Standard.

The refurbishment process will result in significant quantities of waste associated with the removal of the old products. Consideration should be given to opportunities for reuse and recycling of items being removed from houses such as carpets, kitchen units and bathrooms.

The Welsh Government wishes to work with the Local Authorities and social housing providers to ensure that consideration is given to the life cycle implications of the products and materials they are using as part of the upgrade, in particular the amount and types of waste that the products they are using to upgrade may generate in future housing upgrades. Relevant departments within the Welsh Government will work together to ensure that future revisions of the Standard include specifications for use of sustainable practices, materials and products for all refurbishments.

Actors: Welsh Government, local authorities, housing associations

Education and guidance

o) Support for construction and demolition businesses

Following the publication of "Economic Renewal: a new direction" by the Welsh Government, direct support for business in Wales has changed. The Department for Business, Enterprise, Technology and Science is focusing on 9 key business

²³ <http://www.design4deconstruction.org>

sectors which are, or have the potential to be, key to the economy of Wales, including the construction sector.

All sectors will have access to information, advice and support through the Welsh Government Business Information gateway (www.business.gov.uk). In addition, the Welsh Government are currently funding Constructing Excellence in Wales to provide packages of work to raise awareness of waste issues within the C&D sector and research a variety of technology and infrastructure options to aid the sector in meeting Towards Zero Waste targets.

Welsh Government will work with delivery partners to achieve improved awareness through the coordination of guidance documents and awareness raising sessions.

Actors: Welsh Government, Constructing Excellence in Wales

3.2.3 Need for additional evidence

The Welsh Government will explore ways to build on its existing evidence base, drawing, as appropriate, on studies carried out elsewhere and commissioning, as necessary, and with others as appropriate, new research. Throughout this section, areas for research have been identified, in summary these are:

- Explore to see whether it would be practical or desirable to introduce extended producer responsibility legislation with the outcome of delivering a life cycle approach to building development.

3.2.4 Overarching indicators and review of progress

3.2.4.1 Monitoring and measuring

The following indicators are proposed (Table 6). Welsh Government will be liaising with delivery bodies and relevant stakeholders with regards to their reporting tools already in place or being developed.

Table 6 - Indicators and monitoring for overarching actions

What will we monitor	How will we monitor	Who will monitor it
Ecological Footprint of Construction & Demolition Waste	We will evaluate the ecological footprint of C&D waste in Wales periodically (at least every five years)	Welsh Government
Eco-Design	We will monitor the following: Number of eco-design funded projects; Number of design courses with sustainability as a central component	Welsh Government
Resource Efficiency of the sector (possibly measured in terms of total material used per standardised unit)	We will consider methods of monitoring and measuring the resource efficiency of the sector.	TBC

Consultation Question 4: Do you consider that the best method for monitoring the resource efficiency of the sector would be to measure the total material used per standardised unit? If no, please suggest an alternative.

3.2.4.2 Review

This section recognises that there are a number of actions which will help to meet both waste prevention and recycling targets, as well as helping to increase reuse within the sector. Consequently, the Welsh Government will carry out an ongoing review of how each of these actions can work alongside more specific areas of work, to meet the targets set out under the waste prevention and recycling sections.

3.2.5 Summary of overarching actions

Action	By Whom	By When	Method
Transposition of the revised Waste Framework Directive (2008/98/EC)	Defra, Welsh Government	Complete	
Consideration of waste hierarchy guidance in respect of construction and demolition waste	Welsh Government, Construction and demolition companies	Short term	Waste Hierarchy guidance to be published following review of responses to CIM Sector Plan consultation.
Legislation to introduce Site Waste Management Plans (SWMPs)	Implementation – Welsh Government; Development of SWMPs – C&D companies meeting the thresholds outlined in the Regulations	Short term	Welsh Government is currently producing SWMP Regulations which will be consulted on in 2012
Legislation to introduce a charging scheme for SWMPs (Waste (Wales) Measure 2010 – section 12(2)(e))	Welsh Government	Short term	Welsh Government has developed a Waste Measure, which will permit a levy to be charged on SWMP
Consideration of extended producer responsibility	Welsh Government	Long term	
Greening public procurement	Welsh Government, Value Wales, Public sector organisations	Medium term	
Review construction related procurement guidance for private sector	Constructing Excellence in Wales	Short term	
Sustainable Development Charter	Welsh Government, Construction and Demolition companies	Ongoing	Existing awareness campaign through Sustainable Development team within Welsh Government
Voluntary Agreement	Construction Excellence in Wales, Construction & Demolition companies, Civil Engineers, Public Sector, Designers / Architects,	Medium term	Campaign Communication Awareness Raising Guidance

Action	By Whom	By When	Method
	Manufacturers, Suppliers / Retailers.		Best Practice Sharing
Sustainability clauses for Welsh Government funded grants	Welsh Government		Liaising with relevant Welsh Government departments
Ecodesign within construction projects	Welsh Government, Ecodesign Centre	Ongoing	
Design for Deconstruction (D4D)	Ecodesign Centre, Constructing Excellence in Wales	Ongoing	
Greening the Welsh Housing Quality Standard Refurbishment	Welsh Government, Local Authorities, housing associations	Short term	

3.3 Waste Prevention (including reuse)

3.3.1 What is “prevention”?

What is “prevention”?

The revised **Waste Framework Directive** states in Article 4 that the following waste hierarchy shall be applied as a priority order in waste prevention and management legislation and policy:

- **Prevention**
- *Preparing for reuse*
- *Recycling*
- *Other recovery – e.g. energy recovery, and*
- *Disposal*

The revised **Waste Framework Directive** defines waste prevention as:

‘Measures taken before a substance, material or product has become waste, that reduce the quantities of waste, including through the re-use of products or the extension of lifespan of products the adverse impacts of generated waste on the environment and human health or the content of harmful substances in materials and products’. (Article 3.12)

The **Organisation for Economic Co-operation and Development (OECD)**

breaks down waste prevention into three components:

- **Strict avoidance** involves the complete prevention of waste generation by virtual elimination of hazardous substances, or by reducing material or energy intensity in production, consumption and distribution.
- **Reduction at source** involves minimising the use of hazardous substances and/or minimising material or energy consumption.
- **Product reuse** involves the multiple use of a product in its original form, for its original or alternative purpose, with or without reconditioning. This includes refurbishment and repair. Reuse is important, and is part of the waste hierarchy, but it also provides social and economic benefits to Welsh communities, such as opportunities for jobs and increasing skills (OECD, 2000, Strategic Waste Prevention, OECD Reference Manual).

Article 29 of the Directive also requires that Member States shall establish, in accordance with Articles 1 and 4, waste prevention programmes not later than 12th December 2013.

3.3.2 The benefits of waste prevention

Waste prevention is the primary means of improving resource efficiency, through the saving and optimisation of materials. Waste prevention reduces the loss of resources and stops the environmental impacts associated with waste management from occurring.

A significant proportion of the environmental impact of construction arises from the use of resources (energy, water and materials). Using materials more efficiently at each stage in construction can assist in delivering more sustainable outcomes. Waste prevention also assists in meeting other environmental outcomes including reducing extraction of aggregates, energy use and the quantity of waste sent to

landfill. Waste prevention can also save money through a reduction in collections, recycling and disposal of waste.

A sector specific example of cost savings through waste prevention is highlighted in research undertaken by Envirowise. This stated that the average cost of the waste in a construction site skip is between £1,300 and £1,500.²⁴ In the research, Envirowise assessed the contents of the average skip and their associated value, which was being lost (Table 6).

Table 7 - Contents of Average Construction Skip plus associated values

Materials	Estimated financial value
Pallets x 3	£12.00
Timber from work	£48.00
Assorted timber	£60.00
Doors	£50.00
Door frames	£75.00
Metal railings	£60.00
Wash hand basin	£200.00
Cavity closer	£40.00
Plastic pipe	£74.28.
Clay pipes 2m	£118.00
Quilt insulation	£8.04
Cavity insulation	£28.90
Rope	£35.00
Plastic fence mesh	£40.00
Brick x 15	£2.25
Paving slabs	£6.00
Roof tiles x 30	£27.00
Packaging	£30.00
Carpet	£22.00
Bags of cement x 2	£8.00
Skip hire	£160.00
Labour	£40.36
Vat 17.5%	£200.52
Grand total	£1346.35

Source: WRAP

Through reducing our consumption of resources, waste prevention also significantly reduces global greenhouse gas emissions. Raw material extraction and product manufacture for this sector often occurs in other parts of the world, and all use energy and generate greenhouse gases.

A report by the UK Department for Business, Innovation and Skills (BIS) Low Carbon Construction Innovation & Growth Team²⁵ found that 10-15% of the materials sent to a building site end up as waste. The report stated that the carbon emitted in the materials extraction, manufacture and transport to site is also wasted, to which is then added the carbon emitted in transporting the materials away again and disposing of them.

²⁴ Available via WRAP website – True Cost of a Construction Skip
<http://envirowise.wrap.org.uk/uk/Sectors/Construction/Sector-Services/True-Cost-of-Waste.341603.html>

²⁵ Low Carbon Construction Innovation & Growth team – Final Report (November 2010)
<http://www.bis.gov.uk/assets/biscore/business-sectors/docs/110-1266-low-carbon-construction-igt-final-report.pdf>

The BIS Report *Estimating the Amount of CO₂ Emissions that the Construction Industry can Influence* found that the manufacture of construction products and materials accounts for the largest amount of CO₂ emissions within the process of construction (BIS 2010), as shown in Table 7. In addition, BRE has estimated that reducing waste by 10 tonnes saves around 5 tonnes of CO₂ equivalent (BRE, 2006)²⁶.

Table 8: Amount of CO₂ emissions which the construction industry has the ability to influence, 2008

Sub-Sector	MtCO ₂	% of total
Design	1.3	0.5%
Manufacture	45.2	15%
Distribution	2.8	1%
Operations on-site	2.6	1%
In Use	246.4	83%
Refurb/Demolition	1.3	0.4%
Total	298.4	100%

(Source: BIS report *“Estimating the Amount of CO₂ Emissions that the Construction Industry can influence”* (2010))

Waste prevention activities can also increase skills, employment and social justice. A change in training within the sector to address resource efficiency as an intrinsic element of the construction process will reduce waste arisings and can increase workforce employability. In addition, there may be opportunities for third sector organisations to participate in and develop repair networks to prevent usable products becoming waste (for example doors, windows and radiators).

Action on preventing waste should, where feasible, focus on materials which will result in a faster reduction in our ecological footprint. For C&D waste, these are: wood, plastic, metal, insulation & gypsum, and hazardous waste. A reduction in these waste materials will also assist in reducing our carbon emissions. The BIS report identified for a number of construction materials, their level of carbon emissions (Table 9).

Table 9: Construction Material and their associated carbon emission levels

Material	Mt CO ₂
Wood and wood products	1.9
Paints, varnishes, printing ink etc	0.2
Rubber products	0.8
Plastic products	3
Glass and glass products	1.4
Structural clay products, Cement, lime and plaster	11.6
Articles of concrete, stone etc	1.2
Metal products	2.2
Iron and steel, Non-ferrous metals, Metal castings (Assumed 28% of this category)	7.1
Embedded emissions in imported construction products 2004.	15.8
Total	45.2

(Source: BIS report *“Estimating the Amount of CO₂ Emissions that the Construction Industry can influence”* (2010))

²³ Developing a strategic approach to construction waste – BRE, 2006

3.3.3 The challenges of waste prevention

There are 4 distinct sub-sectors within the C&D sector – construction, demolition, civil engineering and general builders – all of which face their own challenges when looking to prevent waste.

Construction and Demolition sub-sectors

The construction of a new building can often require at least partial clearance and demolition of existing structures, which unavoidably generates waste.

Civil Engineering

Within this sub-sector, the waste arisings are mainly soils and aggregates, most of which are separated out for recycling / reuse. However, a significant amount of this material is still landfilled so there may be further scope for reclamation of materials. There is also scope to increase onsite reuse, although this should not be done at the cost of reclamation of quality materials such as undamaged tiles, bricks, window & door frames etc.

General Builders

This sub-sector produce the lowest waste arisings of the sector, but are also the most difficult to access for education and awareness raising purposes. Possibly one of the key reasons for waste arisings in this sub-sector is through over-ordering and limitations on segregation at source.

3.3.4 Specific objectives

In order to meet the key milestones and key social, economic and environmental outcomes identified in Towards Zero Waste, the following waste prevention objectives are proposed:

- To give priority to waste prevention, and on more sustainable ways of consuming and producing.
- To achieve the annual reduction target of –1.4 per cent through concerted, collective action by the private sector, the public sector, clients, suppliers, business support, social enterprise and the Welsh Government and other relevant stakeholders.
- To ensure that manufacturers, wholesalers, retailers, other businesses (including the construction sector) and the public sector minimise resource use and waste through supply chain initiatives, to reduce, and eliminate where possible waste at all stages of production, distribution, sales and consumption and ultimately disposal, with the ultimate aim of a fair and equitable “One Planet” use of resources.
- To ensure that procurement systems do not result in unnecessary waste.
- To give priority at the design state to ensure that products (including buildings and other constructed infrastructure) are designed to reduce waste through material optimisation (efficiency in terms of quantities and types of materials used, including extending product life and the design of new

business models, (e.g. product leasing and/or take back), and through designing for reuse, refurbishment and/or upgrading.

- To ensure that manufacturers, wholesalers, retailers, other businesses (including construction companies) and the public sector influence the behaviours of their staff, visitors and customers to help ensure that they are fully engaged in less wasteful behaviour with customers assisted to help them making the right purchasing decisions to avoid waste.
- To improve take back or exchange opportunities for unwanted and unused materials by manufacturers, construction companies, retailers, service providers and other businesses.
- To ensure that manufacturers and construction companies adopt lean production models, including maximising the reuse of materials onsite, thereby helping to reduce the environmental impacts associated with transportation of materials and the impacts from waste management activities.
- To ensure that the opportunities to achieve waste prevention are maximised under the prevention requirements in permits under the Waste Framework Directive and the Integrated Pollution Prevention and Control Directive 96/61/EC (IPPC).
- To apply a focus on reducing the consumption and wastage of the key priority materials wood, plastic, metal, insulation & gypsum and hazardous waste.
- To reduce the use of hazardous materials in products (including in buildings) in order to reduce the production of hazardous waste on site and at end of life.

3.3.5 Targets

The Arup Ecological Footprint report²⁷ concluded that a 70% recycling rate alone would only result in a 14% reduction in the C&D waste footprint. In order to meet the 2050 One Planet goal there would need to be an emphasis on waste prevention as a primary means of reducing the ecological footprint of C&D waste in Wales. Waste prevention is therefore the best way of reducing the ecological footprint of waste in Wales.

With this in mind, Towards Zero Waste proposes waste prevention targets of 1.4% year on year reduction of waste arisings for C&D waste to 2050. Because activity within the construction and demolition industry is affected by economic change, and also because many of the waste prevention actions take effect in the medium to long term, we propose to monitor our waste prevention actions using 5 year milestones in arisings and composition.

As previously discussed, a set of priority materials have been identified within this sector (wood, plastic, metal, insulation & gypsum, and hazardous waste). The ecological footprint of waste can be reduced more quickly if the focus is on preventing arisings of these materials, where it is feasible to do so.

The proposed waste prevention target is set out as follows:

²⁷ Ecological Footprint impact of the Welsh Waste Strategy, Study Report – Arup, January 2009

Construction and Demolition Waste	
Waste Prevention Target	Waste prevention is the best way of reducing the ecological footprint of waste in Wales. To achieve one Wales: one planet levels by 2050, we need to reduce our waste arisings across all sectors by around 1.5% (of the 2005 baseline) each year.

Consultation Question 5: Do you agree with the proposed waste prevention target?

Using the data from 2005/06 C&D waste arisings survey as a baseline, the assumption is that total arisings for 2011-12 would be approximately 5,028,725 tonnes (not including materials reused on site). Therefore, based on a 1.4% decrease in waste arisings each year, the following 5-yearly milestones are proposed:

Monitoring period	Tonnes arising	% reduction of baseline
2012/13 – 2016/17	4,650,219	7.5
2016/17 – 2020/21	4,347,414	13.5
2020/21 – 2024/25	4,044,609	19.6
2024/25 – 2028/29	3,741,804	25.6
2028/29 – 2032/33	3,438,999	31.6
2032/33 – 2036/37	3,136,194	37.6
2036/37 – 2040/41	2,833,389	43.7
2040/41 – 2044/45	2,530,584	49.7
2044/45 – 2049/50	2,152,078	57.3

Consultation Question 6 – Do you consider that setting 5 yearly milestones is a fair way of monitoring progress against the proposed waste prevention target? If no, please explain why.

3.3.6 Actions

Actions have been grouped under those occurring at a global / European, UK and Wales level:

Actions at a global and EU level

EU Action Plan on Waste Prevention: The plan covers three sectors – food, hazardous waste and construction and demolition. The plan evaluates the measures for prevention construction and demolition waste and highlights the importance of focussing on metal waste. The plan was open for consultation until July 2011 (EU, 2011). Some of the key measures include:

- Additional reporting requirements on C&D waste generation and composition;
- Limit input of hazardous substances' concentrations in primary and secondary construction materials;
- Vocational training on ecodesign principles
- Information requirements on resource efficiency and hazardous materials used in buildings;
- Disseminate best practices in building construction, support knowledge transfer networks, introduce sector specific prevention guidelines and handbooks; and
- Applying waste preventive design principles including easy maintenance and longevity of the building.

European PVC Industry Initiative²⁸ On 22 June 2011, the European Polyvinyl chloride (PVC) industry launched VinylPlus – a new voluntary commitment to enhance the sustainable production and use of PVC by 2020. The VinylPlus initiative represents an expanded scope and level of ambition over prior efforts. Targets are derived from The Natural Step System Conditions for sustainability. VinylPlus builds on the achievements and results of Vinyl 2010, the first Voluntary Commitment of the European PVC industry.

Wales specific actions

Eco-design

With respect to the construction and demolition sector, the following specific ecodesign-related actions will be considered:

a) Sustainable Construction products

As stated in section 1.2, this sector has the potential to produce a significant amount of legacy waste. As a route to preventing materials becoming legacy waste, the Welsh Government seeks to explore the potential to develop systems to provide information on the components of materials and products used in the construction sector to assist with phasing out of hazardous substances in construction.

Initial work on the production of a system consisting of two lists of materials characterised in relation to their environmental performance has been undertaken

²⁸ <http://www.vinylplus.eu/>

by the Ecodesign Centre²⁹To build on this the Welsh Government has asked Constructing Excellence in Wales to explore existing systems, in particular the BASTA system³⁰ developed in Sweden, with the potential for the development of a similar system for application in Wales.

Actors: Welsh Government, Constructing Excellence in Wales, Ecodesign Centre

b) Design solutions for construction products

Modern Methods of Construction (MMC) or off-site construction offer significant potential to minimise construction waste compared to traditional on-site construction. Several studies have found corresponding evidence that suggests modular homes can reduce waste by 70 to 90%, through better material management. Houses can be made using on average 10% less material tonnage (WRAP, 2007³¹; BRE, 2009³²; Barrett and Wiedmann, 2004³³). The scenario assumptions made are:

- Quick Win scenario - 2% of the construction market is met by modular building design by 2020.
- Best Practice scenario - 5% of the construction market is met by modular building design by 2050.
- Beyond Best Practice scenario - 10% of the construction market is met by modular building design by 2050

The Welsh Government is funding the Ecodesign Centre to work with construction product manufacturers to identify ecodesign solutions to address issues of production inefficiencies, generation of legacy waste and recyclability. This will include, amongst other things, focussing on the promotion and development of MMC as well as simpler solutions such as the use of standardised sizes for materials to help reduce the amount of off-cuts produced on site.

Actors: Welsh Government, Ecodesign Centre, Manufacturers, Suppliers/Retailers

c) Encourage use of value engineering for large construction projects

The civil engineering sector is already achieving much in reduction of waste arisings. During the C&D sector plan stakeholder engagement sessions it was agreed that there were some useful best practices which could be shared with the other C&D sectors.

²⁹ Preliminary discussion document on construction materials for the construction sector plan, April 2010 Ecodesign Centre

³⁰ http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=2360&docType=pdf

³¹ WRAP (2007) Current Practices and Future Potential in Modern Methods of Construction, http://www.wrap.org.uk/downloads/Modern_Methods_of_Construction-Summary.eb890a56.3663.pdf

³² BRE (2009) BeAware Supply Chain Resource Efficiency Sector Report, Modern Methods of Construction, http://www.bre.co.uk/filelibrary/pdf/rpts/BeAware_MMC_Sector_Report_02Mar09.pdf.

³³ Barrett, J. and Wiedmann, T. (2004) A comparative carbon footprint analysis of on-site construction and an off-site manufactured house, SEI and ISAUK research report 07-04

An example of this is 'value engineering', a technique commonly used on civil engineering projects. Value engineering is the formal application of a value methodology to a project in order to improve its value.

The value methodology is a systematic process used by a multidisciplinary team to improve the value of a project through the analysis of its functions. Value is defined as a fair return or equivalent in goods, services, or money for something exchanged. Value is commonly represented by the relationship:

Value \approx Function/Resources

where **function** is measured by the performance requirements of the customer and **resources** are measured in materials, labour, price, time, etc. required to accomplish that function. A value methodology focuses on improving value by identifying alternate ways to reliably accomplish a function that meets the performance expectations of the customer.

Value methodologies can be applied during any stage of a project's development cycle, although the greatest benefit and resource savings are typically achieved early in development during the conceptual stages. At this point, the basic information of the project is established, but major design and development resources have not yet been committed. The reason this is the best time to apply a value methodology is because the manner in which the basic function of the project is performed has not been established, and alternative ways may be identified and considered.

All construction projects could benefit from applying the principles of Value Engineering and learning from civil engineering. By identifying improvements for various project phases: concept development, preliminary design, final design, procurement and construction significant quantities of waste could be prevented. The Welsh Government will fund Constructing Excellence in Wales to apply the learning from the civil engineer sector to the construction sector by raising awareness of this methodology and encourage its use along with other relevant tools available.

Actors: Welsh Government, Client, Designer / Architect, Constructing Excellence in Wales, Construction & Demolition companies

Case Study: Value Engineering – Church Village By-Pass

In accordance with the procurement strategy agreed with the Welsh Government, a value engineering exercise was carried out by a Client / Contractor / Designer integrated team. This exercise was undertaken to ensure that the project delivered a scheme which provided best value while meeting the stated primary objective of significantly reducing traffic flows along the existing A473 road corridor.

Value engineering was applied right from the start to ensure that materials were reused and recycled wherever possible. As a result, over 99% of the 750,000m³ of excavated material was reused. More than 70% of the 150,000m³ of imported construction materials came from recycled products, including blast furnace slag, recycled concrete and recycled plastic. Overall, it is estimated that the volume of earthworks excavation required was reduced by 300,000m³.

The use of precast bridges, culverts, and complete precast manholes helped to minimise

waste on site and ensure a safer working environment. Safety was a top priority throughout; for example, edge protection was used on site vehicles to prevent falls from height when working on the back of delivery vans. Satellite-guided bulldozers and excavators removed the requirement for setting out and the need for banksmen to control plant.

Wildlife habitats were protected where possible. For instance, two new great crested newt ponds and three dormice bridges were created, a large area of habitat suitable for marsh fritillary butterflies was purchased, and 400 reptiles were moved to safer areas. Otter passes were provided at all river culverts, along with badger, otter and great crested newt fencing along the length of the scheme.

To keep local people informed of progress, a full-time community relations manager was appointed. Information was disseminated in various ways, including through a dedicated website, visitors centre, newsletters, advanced works information notices and the local press. Nearly 3,000 schoolchildren were given talks, educational site visits were arranged, and a number of school projects connected to the works were organised. More than 60 local projects were also supported.

The Church Village team was committed to delivering wider economic regeneration benefits to the community. Over 70 entry-level jobs for long-term unemployed and three jobs for long-term prolific offenders were created, and two new business start-ups were supported. Ninety per cent of contracts were awarded to local companies and 90% of all material orders were sourced from local suppliers.

The team also established a Church Village Bypass Business Club and developed a Small and Medium Enterprise-friendly charter in line with the Welsh Government's Opening Doors strategy, providing expert support and advice to help smaller companies improve their procedures, processes and skills in order to grow their business and develop into new markets.

d) Designing out waste

Designing out waste at the earliest possible stage in a construction project can help deliver more sustainable, efficient projects, with cost savings from reduced material usage and waste creation³⁴. Designing out waste, which is based on the efficient use of materials can reduce the quantity of materials used in the first instance, lowers the material purchasing costs, minimises waste and eliminates the need for subsequent handling and disposal cost.

The work undertaken by WRAP has led to the development of five key principles that design teams can use during the design process to reduce waste:

- Design for reuse and recovery;
- Design for off-site construction;
- Design for materials optimisation;
- Design for waste efficient procurement; and
- Design for deconstruction and flexibility.

The Welsh Government, via Constructing Excellence in Wales, will seek to increase awareness about 'designing out waste' amongst clients, designers and architects and encourage them to utilise these principles at the commencement of a construction project. The Welsh Government will work with business support

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http://www.wrap.org.uk/construction/tools_and_guidance/designing_out_waste/dow_introduction.html

organisations like Constructing Excellence in Wales and WRAP Cymru to achieve this objective.

Actors: Client, Designer/Architect, Construction Excellence in Wales, WRAP Cymru Welsh Government

Case Study: Newport High School, Newport

The client team focused on delivering quality and minimising waste at the very start of the procurement process.

A collaborative approach and sound planning produced excellent waste management results at the school. Reducing waste from the outset of the scheme was a primary target and it was agreed to involve the entire supply chain in conjunction with the main contractor. The goal was to go beyond normal compliance, but to be realistic as well.

The first step was the use of a Site Waste Management Plan (SWMP) as a tool to monitor waste production, then target the construction elements with recyclable value, and finally review the SWMP on monthly intervals to achieve a Waste versus Resources Action Plan as per WRAP's Best Practice guidance. There was commitment across the whole project, and on-site recycling processes such as reusing the piling mat as fill below ground floor slab and then crushing demolition material for reuse delivered immediate benefits. There was consistent reuse of surplus materials such as stockpiling topsoil; insulation off-cuts reused by masonry contractor to avoid cold-bridging and bricklayer's waste crushed on site and reused for community projects.

Of the 24,607 cubic metres of waste created, 24,000 cubic metres was reused and only 67.8 cubic metres sent to landfill.

e) Minimising 'wastage' factor

It is estimated that, on average, between 5 and 15% of materials ordered for a construction project will be 'wasted' due to damage retained during transport or incorrect storage etc. Therefore, over-ordering is common within the sector which regularly leads to excess but usable materials being disposed of as waste on completion of a project.

Welsh Government will ask Constructing Excellence in Wales to investigate the viability of introducing an 80:20% ordering scheme in Wales (see case study in box below), in order to minimise wastage through over-ordering. A similar scheme is currently operational in South East England and the results from this could be used to assess the potential benefits of such a scheme in Wales.

Actors: Welsh Government, Constructing Excellence in Wales.

Case Study: ZeroWise ERDF Construction a three year initiative in the South East of England managed by Remade South East

Support is being given to develop an 80: 20 ordering system for the supply of new sustainably produced construction materials to site. Construction companies are given the opportunity to minimise waste generated through over- ordering, by calling off products required in smaller batches with 80% of the material being delivered to site and 20% held back and delivered to site if needed. If the additional materials are not needed, the supply will be withheld to prevent these materials from becoming waste.

Behaviour Change

f) Education and guidance

Increasing awareness about waste prevention within the sector is a fundamental step in assisting to meet the waste prevention targets. Constructing Excellence in Wales is improving awareness through the development of a number guidance documents, including but not limited to:

- ‘By Products Definition’ and the impact for Civil Engineering and Construction in relation to the reuse of soils and aggregate;
- Working with Construction Skills Certification Scheme (CSCS) to amend the environment card to ensure the “waste” reflects the waste hierarchy – this exists to meet industry needs and is managed by CSCS Limited whose Directors all come from the Construction Industry. The scheme was set up to improve quality and reduce accidents.
- Guidance for Manufacturers to ensure their product is handled appropriately to reduce the risk of damage/waste

Constructing Excellence in Wales will also signpost construction companies to the guidance on waste prevention which is already available through a variety of trade and research bodies.

Actor: Constructing Excellence in Wales

Reuse of surplus materials

The revised Waste Framework Directive defines “reuse” as any operation by which products or components that are not waste are used again for the same purpose for which they were conceived. Reuse is considered as waste prevention under the waste hierarchy, examples include the donation of items to a charity and the re-sale of items. It is distinguished from preparing for reuse which involves , for example checking, cleaning or repairing operations of items that have been discarded and collected as waste.

Research undertaken on behalf of Defra indicates that in excess of 13% of the contents of a skip is material which has not been used. By working to develop activities which can prevent unused surplus materials entering the waste stream, such as product return schemes with builders’ merchants, significant savings can be made.

The reasons why unused materials enter the waste stream are complex and range from simple over-ordering activity & changes within the design during construction to standardised pack sizing, product returns and obsolete stock items. The following actions have been identified to aid the sector increase reuse of materials:

g) Welsh Government directed support for SME's to reuse surplus materials

In Wales 99.5% of C&D companies have less than 50 employees (Statistics Wales, 2006). They are each responsible for generating relatively small quantities of waste made up of materials identified as a priority for this sector plan. The Welsh Government, through Constructing Excellence in Wales, has funded the development of an internet platform to enable the construction industry, in particular SMEs, to make their surplus materials suitable for reuse visible to potential users. Originally launched as Builderscrap and rebranded as Recipro Wales³⁵ the site was launched in Wales at the FMB Conference in Swansea 13th November 2010. It enables builders to upload the details of any surplus construction materials and advertise to others within the industry for reuse. The concept has been extensively trialled and developed over a three year period. Through Constructing Excellence in Wales, the Welsh Government will continue to provide, develop and raise awareness of this mechanism to facilitate the construction industry, and in particular SMEs, to reuse its surplus materials.

Actors: Constructing Excellence in Wales

h) Infrastructure to support the reuse of surplus materials for community benefit

The issue of surplus construction materials in the waste stream is not isolated to the SME. Major contractors on large construction projects also report the occurrence of surplus materials within their own waste streams. Whilst the Recipro platform can be equally applied to larger construction companies, consultation identified concerns the potential for the collection of materials to give rise to site access issues at larger projects. There is the potential for the Recipro concept to be developed around the idea of a surplus centre where larger construction companies and builder's merchants can donate their surplus materials for reuse.

The Welsh Government has tasked Constructing Excellence in Wales working with Cylch to determine the feasibility of establishing a surplus centre to receive donated surplus construction materials and redistribute them to community projects and schemes for reuse. The scope of the feasibility includes exploring the potential for training opportunities that could be developed from the reuse of the materials.

Actors: Welsh Government, Constructing Excellence in Wales, Cylch

i) Moving the use of demolition wastes up the waste hierarchy

Following demolition it is often the case that good quality bricks and blocks are crushed and used for new developments as lower quality sub-base, often on the re-development site. This activity is covered under Environmental Permitting (England and Wales) Regulations 2010 as an exemption - U1 – Use of waste in

³⁵ www.recipro-wales.com

construction - that allows the use of suitable wastes for small scale construction instead of using virgin raw materials e.g. using crushed bricks, concrete, rocks and aggregate to create a noise bund around a new development and then using soil to landscape it to enable grass to grow. This is a recycling operation because the bricks and blocks have been crushed, and they have been turned into a different product.

The Welsh Government would like to see options higher up the waste hierarchy to be used where practicable - e.g. bricks and concrete blocks re-used as bricks and blocks, rather than being used in a lower value recycling operation (i.e. crushed and then used as sub-base or fill) . The production of bricks and concrete blocks uses a lot of energy, and if they are crushed and used to replace low embedded energy fill rather than being reused as building materials, then this is not a good carbon reduction outcome. The Environment Agency and Constructing Excellence in Wales will be asked to work together to investigate how extensive the activity of crushing and using as infill is, and how to encourage options higher up the waste hierarchy.

Actors: Environment Agency Wales, Constructing Excellence in Wales

j) Increase awareness about using reused products

Construction companies need to be encouraged not only to ensure that the unwanted materials are reused, but they also need to be encouraged to purchase or accept items provided for reuse by others. An awareness campaign will be initiated to encourage companies to value existing items more and for clients to be encouraged to use materials have been used before, in the same way that antique wood beams are valued. This will form part of the Waste Awareness Wales campaign on reuse.

Actors: Welsh Government, Waste Awareness Wales, Business Support organisations

<p>Consultation Question 7: Do you consider these actions to be sufficient to meet the waste prevention targets? If not, what other measures would you suggest?</p>
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3.3.7 The need for additional evidence

The Welsh Government will explore ways to build on its existing evidence base, drawing, as appropriate on studies carried out elsewhere and commissioning, as necessary, and with others as appropriate, new research. Throughout this section, a number of areas for research have been identified, in summary these are:

1. To develop guidance for planning authorities on maximum waste generation per project, we need to:
 - Determine average levels of waste generated by different types and size of development projects (taking into consideration location);
 - Determine average levels of waste generated per cubic metre;
 - Identify appropriate thresholds are set at reasonable levels.
2. Research to quantify the amount of waste produced through over-ordering, which could be reduced if an 80:20% order scheme was introduced in Wales.
3. Scope for reuse of bricks / blocks on demolition sites

3.3.8 Waste prevention indicators and review of progress

3.3.8.1 Monitoring and measuring

The following indicators are proposed (Table 10). Welsh Government will be liaising with delivery bodies and relevant stakeholders with regards to their reporting tools already in place or being developed.

Table 10 - Indicators and monitoring for waste prevention

What we will monitor	How we will monitor	Who will monitor it
Quantity of C&D waste produced in Wales	<p>We will continue at present to support C&D Waste Surveys to record the quantity of waste generated by the sector.</p> <p>We will utilise the data required to be sent to the EU for Eurostats on C&D waste.</p> <p>We will use data supplied via Site Waste Management Plans to assist in monitoring the quantity of waste produced by C&D companies.</p> <p>We will endeavour to introduce a new reporting system, which will allow construction companies to record waste and which will feed into the duty of care obligation.</p>	<p>In the near future quantities will be measured via Surveys conducted by Environment Agency Wales;</p> <p>Regulator of SWMPs via Site Waste Management Plans.</p> <p>Development of the Electronic Duty of Care pilot scheme as a means of capturing waste data. Possible development of this scheme with the existing BREE Smart Waste tool or the WRAP Net Waste tool as a new mechanism for capturing waste data.</p>
Extent of reuse on site	<p>We will continue at present to support C&D Waste Surveys, which will include collecting data on waste reused on site.</p> <p>We will use data supplied via Site Waste Management Plans to assist in monitoring the quantity of waste reused on site.</p> <p>Investigate alternative methods of monitoring materials reused on site (both crushed and whole materials)</p>	<p>Surveys – Environment Agency Wales</p> <p>Building Control/Planning via Site Waste Management Plans.</p> <p>Development of the Electronic Duty of Care pilot scheme as a means of capturing waste data. Possible development of this scheme with the existing BREE Smart Waste tool or the WRAP Net Waste tool as a new mechanism for capturing waste</p>

		data.
Quantity of legacy wastes produced	We will continue at present to conduct C&D Waste Surveys, which will include collecting data on the types and quantities of legacy waste generated.	Surveys – Environment Agency Wales
Extent and effectiveness of waste prevention awareness campaigns	We will monitor the following: 1. SWMP; 2. Number of eco-design funded projects;	Constructing Excellence in Wales WRAP Cymru
Skills	Measure of up-skilling relating to the number of products designed to reduce waste	Welsh Government
Quantity of reuse	We will monitor the number of companies/transactions utilising the Recipro platform	Constructing Excellence in Wales
Access to jobs and employability	We will commission research on indicators to monitor and measure accessibility to jobs and employability in respect of recycling and preparation for reuse.	Welsh Government

3.3.8.2 Review

It is accepted that waste prevention will become an increasing priority as higher proportion of waste is driven up the hierarchy. Consequently, the Welsh Government will carry out an ongoing review of how much waste can be reduced and what guidance is required to assist with the greater reduction of waste.

3.3.9 Summary of waste prevention actions

Action	By Whom	By When	Method/Existing Resource
Working with UK and Europe	Welsh Government	Short to medium term: From 2010 to 2020	Welsh Government will provide input into evolving actions on SCP at the UK and EU level and will also contribute to the European Commission's review of the Thematic Strategies on the Prevention and Reuse of Waste and on the Sustainable Use of Natural Resources.
Sustainable Construction Product	Ecodesign Centre Wales / Constructing Excellence Wales	Longer term	Research and development. Provisional work has already been carried out. Has been included in EDC and Constructing Excellence in Wales grant memorandums for 2011/12 which will be reviewed in early 2012.
Design Solutions for construction products	Ecodesign Centre Wales	Short term	Has been included in EDC's grant memorandum for 2011/12 which will be reviewed in early 2012.
Encourage use of value engineering for large construction projects	Welsh Government, Client, Designer / Architect, Constructing Excellence in Wales, Construction and Demolition companies	Medium term	Campaign Communication Awareness Raising Guidance Best Practice Sharing
Designing out waste: incorporating waste minimisation principles into building design and throughout the supply chain	Designer Architect Client Manufacturer	Short term (in existence)	Designing out waste: a design team guide for buildings (WRAP) Designing out Waste Tool for Civil Engineering (WRAP) http://www.wrap.org.uk/construction/tools_and_guidance/designing_out_waste/

Action	By Whom	By When	Method/Existing Resource
			The Green Guide to Specification (BRE) http://www.bre.co.uk/greenguide/podpage.jsp?id=2126
Minimising wastage factor	Welsh Government, Constructing Excellence in Wales	Medium term	Guidelines on Wastage Factor Clause in public sector procurement contracts Application of an 80:20 ordering system with suppliers.
Waste awareness, communications and educational campaigns	Welsh Government Constructing Excellence in Wales WRAP	Short to Medium term	Guidance Documents Awareness Campaigns
Welsh Government directed support for SMEs to reuse surplus materials	Constructing Excellence in Wales	Short term	Recipro website was launched in Wales in November 2010. Active promotion of scheme to be carried out during 2011/12 by Constructing Excellence in Wales
Infrastructure to support the reuse of surplus materials for community benefit	Welsh Government, Constructing Excellence in Wales, Cylch	Short to medium term	
Moving the use of demolition wastes up the waste hierarchy	Environment Agency Wales, Constructing Excellence in Wales	Short term	
Increase awareness about using reused products	Constructing Excellence in Wales	Short term	

3.4 Preparation for Reuse

The waste hierarchy also includes 'Preparing for Reuse' and ranks it above recycling but below prevention (see box below). Increasing the preparation for reuse of items discarded as waste helps meet environmental outcomes, increases opportunities for enhancing social wellbeing through involvement in reuse activities and reduces the costs to businesses of waste management.

3.4.1 What is preparation for reuse?

What is “preparing for reuse”?

The revised **Waste Framework Directive** states in Article 4 that the following waste hierarchy shall be applied as a priority order in waste prevention and management legislation and policy:

Prevention

Preparing for reuse

Recycling

Other recovery – e.g. energy recovery, and

Disposal

“Preparing for reuse” means checking, cleaning or repairing recovery operations, by which products or components of products that have been collected as waste are prepared so that they can be reused without any other pre-processing. It is distinguished from reuse, which means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived. Reuse is therefore counted as waste prevention under the waste hierarchy. For example, a donation of an item to a charity is “reuse”; if the same item had been put out for collection as waste, and was then subsequently reused – this is known as “preparing for reuse”.

Within the construction and demolition sector preparing for reuse is more commonly termed reclamation or salvage. This can be further divided into sectors defined by their nature, volume and unit price³⁶:

- Architectural and Ornamental Antiques – Items can range from door furniture to an entire church but are characterised by their age and uniqueness which commands higher prices.
- Reclaimed Building Materials – These are materials released by careful extraction which are to be reused in their original purpose. Items include bricks, paving, timber and steel and tend to be of specific dimensions that are standard across the construction sector.
- Demolition Materials – These are materials released into the supply chain by professional contractors but with minimal regard to reuse and are characterised by the large volumes released and comparatively low unit price.

³⁶ BioRegional ReClaimed (2006) Reclaimed Building Materials in the Development of the Thames Gateway

3.4.2 The challenges of preparation for reuse

Preparing for reuse is not a new concept; however, increased recycling of materials has had an adverse affect on the rate of reuse³⁷. Materials that were previously extracted and sold for reuse are often skipped and downgraded, for example steel is chopped, shredded, cubed and exported to be melted down; bricks are crushed to create a recycled aggregate and timber chipped for a range of products such as particle board or animal bedding.

The cost of preparing an item for reuse may exceed the value which can be achieved for a second hand item, this is especially true for high volume items such as bricks.

There are further issues around the monitoring and measuring of items that are re-used. These are centred on the lack of clarity when determining the point at which an item is considered to have qualified as being prepared for reuse.

3.4.3 The benefits of preparation for reuse

Preparation for reuse has many benefits, including:

- Replacing the need for virgin materials.
- Reducing the energy demand for manufacturing new products
- Retaining the embodied energy of the material (the energy required to abstract, process, manufacture and deliver it).
- Saving irreplaceable historic materials and craft skills from bygone eras³⁸.

The Building Research Establishment (BRE) life cycle analysis of construction materials using environmental profiling technique (Ecopoints) identified environmental impact of reclaimed as opposed to new materials. For steel, factoring that new steel is made with 60% recycled content it still has 25 times the environmental impact of reclaimed and reused steel³⁹. The use of reclaimed timber is estimated as having a 79% lower environmental impact compared to the use of new.

³⁷ BigREc Survey (2007) A survey of the UK reclamation and salvage trade [CRW & AEA]

³⁸ Bioregional Reclaimed (2007) Reclamation Led Approach to Demolition

³⁹ Building Research Establishment (BRE) Construction Materials report toolkit for carbon neutral developments

3.4.4 Specific objectives

In order to meet the key milestones and key social, environmental and economic outcomes identified in Towards Zero Waste, the following preparing for reuse objectives are proposed:

- To provide preparation for reuse services in a way that promotes sustainable development and offers the opportunity for lower overall whole system costs.
- To ensure that as far as possible all of the waste that cannot be prevented is prepared for reuse as a priority.
- To achieve the waste preparation for reuse required in EU Directives (Packaging, WEEE, ELV, Batteries and Waste Framework Directive) and in Towards Zero Waste.
- To take measures, as appropriate, to promote the reuse of products and preparing for reuse activities, notably by encouraging the establishment and support of reuse and repair networks, together with the use of economic instruments, procurement criteria, quantitative objectives or other measures (including alternative business models).
- To develop waste collection systems which protect waste products or materials in a way that maximises their potential for preparation for reuse by social enterprises and other companies. This should include enhancing opportunities for architectural salvage / reclamation, including for items of cultural heritage.
- To ensure that preparation for reuse affords opportunities for job creation and training and offers extended opportunities for the third sector to be involved in the waste management infrastructure;
- To ensure a focus on the reuse of packaging waste, including making packaging more reusable.

3.4.5 Targets

Separate targets for preparation for reuse have not been established because of a lack of data available on the potential for reuse in the construction and demolition sector. Therefore, preparation for reuse has been included in the targets established for recycling in Towards Zero Waste.

3.4.6 Actions

The Collection, Infrastructure and Markets Sector Plan identified the need to increase the extent of “preparing for reuse” activity in Wales. For the construction & demolition sector, the following actions are proposed:

a) Encouraging a reclamation led approach

The reclamation or salvage of construction materials forms an integral part of the demolition process; however, to date, approaches to demolition have favoured recycling and landfill rather than reclamation and material reuse. Dismantling for reuse is more time consuming and can be more expensive than new or reproduction items. However, substitution of locally sourced reclaimed materials in construction work can radically reduce the lifecycle impact of that particular item⁴⁰.

There is requirement that, in Wales, all new housing must be built to the Code for Sustainable Homes minimum Code level 3 and new non domestic buildings funded by the Welsh Government and Welsh Government Sponsored Bodies must be built to the Building Research Establishment Environmental Assessment Method (BREEAM) Excellent standard or equivalent. Within these standards, points can be gained for using reclaimed materials where the provenance of the item can be demonstrated. This will help to increase the use of reclaimed items and raise awareness of genuine reclamation over reproduction.

Through giving consideration to the deconstruction and demolition of a building at the design and building stages, techniques and materials can be employed which would enable the easier extraction and reuse in the longer term. This can be considered as part of Design 4 Deconstruction (D4D) principles considered in the waste prevention actions, to provide a complete life cycle approach to the waste produced during construction. Constructing Excellence in Wales will work with construction companies to promote the consideration of the deconstruction and demolition of a building at the design and building stages, including the techniques and materials that can be employed which would enable the easier extraction and reuse in the longer term.

Actors: Constructing Excellence in Wales, WGPBs, Clients

b) Encouraging the implementation of the Demolition Protocol

The Institution of Civil Engineers Demolition Protocol⁴¹ has been developed to provide an overarching framework which enables the waste hierarchy to inform approaches for managing buildings and structures at the end of their lives. First launched in 2003 and revised in 2008, there is more emphasis on the need to assess the reuse of buildings, structures, elements and products prior to demolition and recycling activities, recognising the carbon benefits in doing so. The 2008 Protocol also provides an integrated approach to the development of Site Waste Management Plans, with indicative targets described and approaches which deliver major benefits to clients.

The Welsh Government will, via Constructing Excellence in Wales, seek to raise awareness of this protocol within the construction and demolition sector, as well as with potential clients. The Welsh Government will seek to ensure that tenders from within the public sector for demolition work include the protocol and Constructing Excellence in Wales will encourage their member contractors to specify in bids to future clients, that they work to the protocol.

⁴⁰ Waste strategy for England 2007 annex C3: Construction, demolition and excavation waste, DEFRA

⁴¹ http://www.ice.org.uk/knowledge/specialist_waste_board.asp

Actors: Welsh Government, demolition companies, public sector organisations

c) Preparation of pre-refurbishment survey

The National Housing Strategy for Wales' Better Homes for People in Wales states that houses should be brought up to 'good quality' by 2012. The strategy was particularly aimed at Local Authorities and social housing providers, who are obliged to assess their housing stock against the Standard.

A cost study carried out for Welsh Government in 2005, the study estimated that over the 30 year planned period (based on 160,000 dwellings):

700,000 windows would need to be replaced;
200,000 doors ;
200,000 boilers;
250,000 kitchens; and
200,000 bathrooms

(Welsh Government, 2005)

The refurbishment process will result in significant quantities of waste associated with the removal of the old products. In addition, there will also be off-cuts and installation waste associated with the new products being fitted. The study estimated an average of 1.8 million tonnes of waste arising from the refurbishment work over the planned period. It also highlighted the cost of waste disposal per local authority area, for example in Cardiff it was estimated this cost would be approximately £4.5 million, in Wrexham £2.5 million, in Swansea £3.8 million and in Gwynedd £1.5 million (Welsh Government, 2005).

Best practice identifies that to achieve the greatest levels of reuse local authorities and housing associations be encouraged to undertake a pre-refurbishment survey on all properties before work commencement (Constructing Excellence in Wales commissioned BRE to develop Managing waste from Welsh Housing Quality Standard Refurbishment Report and guidance). The ICE Demolition Protocol details a checklist that can be applied equally to demolition and refurbishment projects for the purposes of undertaking a pre-refurbishment survey. The Welsh Government will seek to raise awareness of this protocol within the local authorities and housing associations, in conjunction with the Managing waste from WHQS Refurbishment Report. Tenders for WHQS work should include the preparation of a pre-refurbishment survey as a condition and contractors should be encouraged to work to maximise the levels of materials that can be removed for reuse.

Case Study: Cartrefi Conwy – Maes Y Dre Project

Cartrefi Conwy is a registered social landlord, established in September 2008 as the first LSVT in North Wales. They have invested £30m for refurbishments to bring homes up to the Welsh Housing Quality Standard by 2012.

The Maes y Dre project involves structural refurbishment of 30 properties in Abergele, Conwy. These properties were identified as having poor environmental performance and limited life expectancy if untreated. The project focuses on refurbishment rather than new build construction, allowing tenants to stay in their local community in sustainable properties for the future. The structural alteration works include floor slab renewal, replacement of wall ties, new kitchens, bathrooms, windows and doors and internal and external re-decoration.

Through working with a local social enterprise (Crest Cooperative) all salvageable and recyclable materials were removed from the properties prior to the refurbishment work being undertaken. The materials and products removed were prepared for reuse and sold to members of the public and local businesses at affordable prices. This raised income and support for Crest's other social enterprise activities related to providing training and employment opportunities to the long term unemployed and helps raise public awareness about the benefits of salvaging and recycling over disposal.

In addition, Welsh Government propose the development of benchmarks for resource efficiency and waste minimisation for WHQS works based on the indicated waste levels ascertained in the WAG 2005 study. Constructing Excellence in Wales will work with the Housing Information Group to disseminate these established benchmarks to the relevant local authorities and housing associations. It is proposed that this information be included in the reporting requirement to the Housing Information Group, Welsh Government as part of the monitoring requirement of progress against the Welsh Housing Quality Standard. Local authorities and housing associations should work with contractors to encourage monitoring of waste arisings during ongoing programmes to measure against the benchmarks.

Actors: Welsh Government, Constructing Excellence in Wales, Local Authorities, Housing Associations,

d) Further develop the role of the Third Sector in preparing for reuse

Article 11 of the revised Waste Framework Directive requires member states to “promote the reuse of products and repairing for reuse activities, notably by encouraging the establishment and support of reuse and repair networks”. Between 2008 and 2011, the Welsh Government provided £3million in capacity building support to social enterprises in Wales. The Welsh Government would like to see the established network expanded to cater for a wider range of items and consulted on the most appropriate methods for doing this within the development of the Municipal Sector Plan – Part 1.

By promoting these activities it can help Wales meet its sustainable development objectives, including factors that stretch beyond the activity itself, such as combating social exclusion and promoting the regeneration of our most deprived

communities. The Welsh Government will continue discussions with the social enterprise sector and with local government to further explore how the establishment of more extensive reuse and repair networks can be encouraged and supported.

Actors: Social enterprise sector, Welsh Government, Cylch, Local Authorities

3.4.7 Preparation for reuse indicators and review of progress

3.4.7.1 Monitoring and measuring

The following indicators are proposed in Table 11. The Welsh Government will be liaising with delivery bodies and relevant stakeholders with regards to their reporting tools which may already be in place or being developed.

Table 11 – Indicators and monitoring for preparation for reuse

What we will monitor	How we will monitor	Who will monitor it
	Waiting on EU guidance on measurement of preparing for reuse	Welsh Government
C&D waste prepared for reuse	We will continue to measure the extent of the reuse of items through in the short term C&D waste surveys and in the middle to long term the development of new reporting systems	Environment Agency Wales Welsh Government

3.4.7.2 Review

It is accepted that preparation for reuse will become an increasing priority as a higher proportion of waste is driven up the hierarchy. Consequently, the Welsh Government will carry out an ongoing review of how much waste can be made available for preparation for reuse and what guidance is required to assist with this process.

3.4.8 Summary of preparation for reuse actions

Action	By Whom	By When	Method/Existing Resource
Reclamation led approach	Welsh Government, WGSPBs, clients	Short term	Policy
Implementation of Demolition Protocol	Welsh Government, demolition contractors, public sector	Short term	Guidance
Pre-refurbishment survey	Welsh Government, Local authorities, Housing Associations	Short term	Guidance
Role of third sector in preparing for reuse	Welsh Government, Cylch, Local Authorities	Medium term	Tbc

3.5 Recycling

3.5.1 What counts as recycling?

The revised **Waste Framework Directive** states in Article 4 that the following waste hierarchy shall be applied as a priority order in waste prevention and management legislation and policy

- *Prevention*
- *Preparing for reuse*
- **Recycling**
- *Other recovery – e.g. energy recovery, and*
- *Disposal*

The revised **Waste Framework Directive** defines recycling in Article 3(17) as being: *Any recovery operation by which waste materials are reprocessed into **products, materials or substances** whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.*

Thus in order to be classified as recycled, a waste must cease to be waste, and instead be a product, material or substance. Under Article 6 of the revised Waste Framework Directive, certain specified wastes shall cease to be waste when they have undergone a recycling or other recovery operation and complies with specific criteria to be developed by the European Commission. So called “end-of-waste criteria” are currently being developed for 5 waste streams: ferrous, aluminium and copper scrap metal, paper and glass. A further criteria is proposed for biowaste.

Article 11 of the revised Waste Framework Directive sets targets:

By 2020, the preparing for reuse, recycling and other recovery of non hazardous construction and demolition wastes (excluding soil and stones) shall be increased to a minimum of 70% by weight.

The European Commission is in the process of producing guidance on how the targets should be measured and reported. However, it must be noted that the UK, as a member state, may report slightly differently to the EU in respect of what the UK counts as recycling against the Article 11 revised Waste Framework Directive targets.

3.5.2 The challenges of recycling

The Environment Agency’s survey on waste arising from the C&D sector asked participant companies what they considered to be the barriers to recycling.

Table 12 - Main obstacles/issues arising – recycling C&D waste

Comment	No. of respondents
No comment/no issues	67
Time and cost constraints of recycling	51
Problems with segregation	43
Difficulty finding recycling company/facilities (including exempt, hazardous) especially in rural areas	37
Changing mindset/educating employees	16
Lack of support and information from government - poor/inconsistent/vague advice	13
Regulations too strict/confusing, resulting in recycled materials not meeting specifications	13
No incentives	6
Building/client specification dictates what can be re-used	6
Local CA site don't allow trade access	3
Skip company problem	2

The responses indicate that the main barriers to recycling are time and cost constraints, problems with segregation, and difficulties in finding facilities especially in rural areas. It is recognised that source segregation is a particular issue for general builders, where lack of space at smaller construction project means it may only be possible to have a single skip for waste, which can limit recycling capability.

3.5.3 The benefits of recycling

By reusing or recycling waste materials, less waste is disposed to landfill and this can have cost benefits for companies – with landfill tax due to increase by £8 per tonne a year until 2014/15, the financial savings made by diverting waste from landfill through recycling, could be significant.

Recycling helps conserve limited resources; it also helps protect the environment by reducing the amount of waste disposed to landfill. For many construction materials, one of the main benefits of recycling is that it avoids the production of virgin materials, for example plastics⁴².

Article 11 of the revised Waste Framework Directive states that, by 2020, preparation for reuse; recycling and other recovery of non-hazardous construction and demolition wastes (excluding soils and stones) shall be increased to a minimum of 70% by weight. Meeting this target will result in a 7 to 21%

⁴² Environmental Benefits of Recycling , 2010 Update, WRAP, 2010

(averaging 14%) reduction in the ecological footprint, dependant on the recycling process used. Recycling can have very significant impacts on the ecological footprint of some waste types, including the following two priority wastes:

- Metals – The ecological footprint of aluminium can be reduced by between 79% and 85% through recycling, depending on the amount of cleaning and preparation required. Ferrous metal can also achieve a footprint reduction of between 36% (for recycling in an electric arc furnace) and 52% (for use in a blast furnace).
- Plastic – Closed loop recycling will reduce the ecological footprint of dense plastic by 60% and plastic film by 47%. However, the ecological footprint can be increased by 27% (plastic film) or 28% (dense plastic) through open-loop recycling, for example, the use of plastic to replace other materials such as steel and wood.

Recycling can also have life cycle benefits in relation to the reduction of carbon emissions. In an international review of the environmental benefits of recycling⁴³, the majority of the LCA studies assessed indicated that recycling steel, for example, results in greenhouse gas savings of approximately 1.5 tonnes CO₂-equivalents per tonne of material recycled, in comparison with disposing the same quantity of material to landfill. This increases to 10 tonnes CO₂-equivalents when aluminium is recycled.

Closed loop recycling is the preferred method for C&D waste as this involves the recycled materials being used continuously for the same purpose. An example of this is the Swansea Quadrant Interchange Case Study:

Case Study: Swansea Quadrant Interchange

The Swansea Quadrant bus station was constructed over 30 years ago and was considered to be in urgent need of redevelopment to provide a modern bus interchange and a hub for Swansea and its outlying districts as well as providing facilities for national coach operators.

Willmott Dixon and Dawnus joined forces at the tender stage to create a sustainable waste minimisation and recycling plan that included Derwen – a local waste handler and one of the Green Compass Pathfinder organisations. The result was the smooth and well managed removal of excavated waste from the site, delivery to the waste handler and the return delivery of a high value recycled aggregate. By processing and reusing materials excavated from site and coordinating deliveries of aggregate more than 700 lorry movements were saved which minimised the carbon footprint of the site and also reduced traffic and disruption to Swansea City Centre motorists and pedestrians. In total over 18,000 tonnes of excavated material was diverted from landfill and close to 10000 tonnes of virgin aggregate was saved.

⁴³ Environmental Benefits of Recycling: An international review of life cycle comparisons for key materials in the UK recycling sector – WRAP, 2007

3.5.4 Specific objectives for recycling

- To provide recycling services in a way that promotes sustainable development and offers the opportunity for lower overall whole system costs.
- To ensure that as far as possible all of the waste that cannot be prevented or prepared for reuse is either recycled, composted or anaerobically digested.
- To achieve the waste recycling targets set in EU Directives (Packaging, WEEE, ELV, Batteries and Waste Framework Directive) and in Towards Zero Waste.
- To ensure that all products (including buildings) only contain materials that can be recycled and are designed to be easily disassembled.
- To ensure high quality recycling and, ensure the setting up of separate collections of waste to meet the necessary quality standards for the relevant recycling sectors (with a high priority to closed loop recycling or 'upcycling'), and to ensure that separate collection is set up for at least the following: paper⁴⁴, metal, plastic and glass (as required by Article 11 of the Waste Framework Directive). To also encourage the setting up of separate collection systems to include food, wood and card in Wales.
- To ensure the collection and delivery to reprocessors / end users of high quality recyclate meeting relevant end-of-waste criteria (or Quality Protocols) and that the recyclate is used in closed loop applications that maximise the reduction in ecological footprint and carbon footprint, with as much use as possible in Welsh manufacturing operations.
- To ensure the source segregation of recyclable wastes by all businesses in Wales, with a focus on food, paper, card, wood, metal, plastic, glass, textiles, WEEE and batteries.
- To ensure that adequate space for the storage of separate recyclate materials is provided in new buildings, and during the construction phase (for construction wastes).
- To encourage businesses to recycle their wastes on site, where feasible.
- To ensure that all waste management companies operating in Wales obtain Green Compass status and provide more accurate reports to customers on the management of their wastes, especially in relation to levels of recycling.
- To ensure a focus on the recycling of packaging waste (where preparation for reuse is not feasible), including making packaging more recyclable and increasing recycled content.

⁴⁴ Paper does not include card for the purposes of the directive

3.5.5 Targets for recycling

Specific targets for the construction and demolition sector have been set out in Towards Zero Waste as follows:

Construction and Demolition Waste	2015/16	2019/20
Recycling		Increased to a minimum of 90% by weight.

Targets in the revised Waste Framework Directive

The Waste Framework Directive sets a target that by 2020, preparation for reuse, recycling and other material recovery, including backfilling operations using waste to substitute other materials, of non-hazardous construction and demolition waste excluding naturally occurring material defined in category 17 05 04 in the list of waste shall be increased to a minimum of 70% by weight.

In order to achieve the overall targets in Towards Zero Waste, the more easily recyclable materials need to be recycled at a higher rate. These indicative recycling rates for the priority materials in the scope of this plan are shown in table 10.

Table 13 - Material specific indicative recycling rates

Waste type	Current baseline* (%)	2015/16 target rate (%)	Tonnage increase	2019/20 target rate (%)	Tonnage increase	2024/25 target rate (%)	Tonnage increase
Wood	72			90	66,750		
Plastic	18.9			90	79,900		
Insulation & Gypsum	18.4			90	120,000		
Hazardous waste	0.5	-	-	-	-	-	-
Metals	86	90		95			
Aggregates				98			

*Recycling rate to include preparation for re-use and recycling

Targets in EC Directive on Packaging and Packaging Waste (94/62/EC amended)

The EC Directive on Packaging and Packaging Waste set minimum recovery targets (60%) and recycling targets (55%) for packaging waste, to be met by 31 December 2008. The Directive also established material specific recycling targets for glass (60%), paper and board (60%), metals (50%), plastics (22.5%) and wood (15%). Post 2008, Member States must continue to meet these minimum targets.

The UK has chosen to set higher targets via the Producer Responsibility Obligations (Packaging Waste) (Amendment) Regulations 2010.

Table 14 - UK packaging recycling targets for specific materials

Material	2010	2011	2012
Glass	81%	81%	81%
Aluminium	40%	40%	40%
Steel	69%	71%	71%
Paper/board	69.5%	69.5%	69.5%
Plastic	29%	32%	32%
Wood	22%	22%	22%

3.5.6 Actions

Actions to deliver the recycling objectives are as follows:

Actions at a global and EU level

a) Welsh Government influencing global and EU initiatives

C&D waste has been identified as a priority waste stream by the European Union. There is a high potential for recycling and reuse of C&D Waste, since some of its components have a high resource value. In particular, there is a reuse market for aggregates derived from roads, drainage and other construction projects. The Welsh Government will strive to influence wider policy to ensure actions and policies at these levels helps Wales to meet its targets and ultimate goal of achieving One Planet levels of waste by 2050.

Actors: Welsh Government

Actions at a UK level

Welsh Government working with UK Government and other stakeholders at a UK level.

b) Consultation on increasing recycling targets under Producer Responsibility Obligations (Packaging Waste) Regulations

In the UK, the Producer Responsibility Obligations (Packaging Waste) Regulations implement this Directive through a system of producer responsibility (an extension

of the polluter-pays principle). The Directive is transposed into a series of UK targets for businesses handling packaging which reflect the UK packaging market and waste arisings; certain businesses are obligated depending on turnover (£2m) and quantity of obligated packaging handled per annum (50 tonnes).

The UK is currently meeting its obligations. The Welsh Government, DEFRA and the Scottish Government intend to consult on increased recycling targets on packaging producers from 2013 to 2017. The scale of the increases will be dependant on the results of Impact Assessment, which will consider issues such as affordability for business and government. Consideration for establishing a sub-target for glass into re-melt applications will also be consulted upon.

Actors: Welsh Government, UK Government

c) Encouraging use of alternative substitutes for aggregates

The current PRN system can encourage the use of recyclate into less environmentally beneficial end markets. This is especially the case for glass, where using glass recyclate as a secondary aggregate can actually increase the carbon and ecological footprints. The Welsh Government will support proposed changes to the UK Packaging Regulations which would update the PRN system to take into account the sustainability of the end market for recyclate. The proposed changes, if implemented, would incentivise the closed looped recycling of glass (e.g. via re-melt) over open loop applications such as its use as a secondary aggregate. As a result of this, we will work through Constructing Excellence in Wales to encourage the use of alternative, lower carbon embodied secondary materials as substitute for aggregates.

Actors: Welsh Government

d) Environment Agency's Cement Sector Plan

The Cement Sector Plan is a joint agreement between the Environment Agency and the Cement Industry. First produced in 2005, and revised in 2008, it sets out the key environmental objectives for the industry, with Performance Indicators set until 2015, covering both statutory and non-statutory activity.

The Cement Sector Plan is intended, in particular, to:

- define the environmental objectives to be achieved across the sector;
- contribute to sustainable development;
- identify opportunities for the cement sector to work with other sectors on a co-ordinated basis, on issues such as the recovery/ reuse of wastes, to achieve wider benefits;
- help to identify best practicable environmental options

All British Cement Association member companies are signatories or supporters of the Cement Sustainability Initiative (CSI) 'Agenda for Action', which was developed by worldwide cement producers in conjunction with the World Business Council for Sustainable Development (WBCSD).

The Cement Sector Group within the Environment Agency has prepared a 5 Year Intervention Plan. The Welsh Government will ask the Environment Agency to explore the potential for the cement sector plan to act as a mechanism to increase the use of recyclable materials (as aggregates) and other wastes (as fuel) within cement process.

Actors: Welsh Government, Environment Agency

e) Waste Protocols Project

The Waste Protocols Project is a joint Environment Agency and WRAP (Waste & Resources Action Programme) initiative which involves working with industry to provide regulatory clarity for recyclers and end users on the point waste ceases to be waste. The initiative removes layers of unnecessary regulation, easing the burden on businesses while significantly benefiting the environment. It:

- Bolsters business by reducing costs associated with regulation;
- Simplifies legislation and regulatory compliance obligations;
- Increases demand for recyclates; and
- Reduces volumes to landfill

Since the project began in 2005, final quality protocols have been established for these waste materials:

- Aggregates from inert waste
- Biodegradable waste (source-segregated) for compost
- Biodegradable waste (source segregated) for anaerobic digestate
- Cooking oil and rendered animal fat
- Glass – flat
- Lubricating oil
- Plasterboard
- Plastics (non-packaging)
- Pulverised fuel ash and furnace bottom ash (bound and grout)
- Tyres – tyre-derived rubber material

Draft quality protocols have been published for these waste materials:

- Poultry litter ash

The following materials are currently being review or are in UK public consultation:

- Biodegradable waste (source-segregated) for compost
- Aggregates from inert waste (public consultation complete);
- Wood

Quality protocols for the following waste materials are currently being considered by the project:

- Glass – CRT
- Incinerator bottom ash
- Paper sludge ash
- Pulverised fuel ash and furnace bottom ash (unbound)
- Steel slag
- Tyres – tyre bales

The following materials have been assessed but end-of-waste criteria could not be established:

- Marine-dredged materials
- Soil – contaminated
- Soil – uncontaminated

Blast furnace slag was assessed and subsequently successfully proven to be a by-product rather than a waste, when new guidance was issued from Europe. The Welsh Government will ask Environment Agency Wales and Constructing Excellence in Wales to ensure that the relevant waste protocols are promoted within the construction & demolition sector community, to make better use of waste as a resource.

Actors: Welsh Government, Environment Agency, WRAP, Constructing Excellence in Wales.

Wales specific actions

Increasing recycled content and recyclability

f) Increasing recycled content of products and materials used in Government funded projects

As part of the Welsh Government’s sustainability requirements and objectives, at least 10% of the total value of materials and products used in all new buildings promoted or supported by the Welsh Government or WGSBs should be of recycled or reused content.

Evidence suggests this target is easily achievable, for example, new steel product contains 60% recycled content, and concrete blocks 30% recycled content. Contractors within the Industry are imposing internal targets for recycled content of between 10 -20%, for example Willmott Dixon’s Sustainable Materials Policy⁴⁵.

The Welsh Government will review the success of this target and consult whether the target can be increased, or not.

Actors: Welsh Government

Consultation question 8: Should this target be increased? If so, what would be an appropriate target?

g) Working with product manufacturers to increase recyclability of products

The Welsh Government would like to work with manufacturers to develop products which are more sustainable throughout their lifetime – seeking voluntary “extended producer responsibility”. The aim is to obtain signed up commitment from the sectors involved. Ecodesign will ensure that products and packaging are designed so that when they reach their end of life they can be easily recycled.

⁴⁵ <http://www.willmottdixongroup.co.uk/assets/w/d/wd-sustainable-materials-policy.pdf>

WRAP are working with a number of manufacturers of packaging and products to investigate the development of more easily recyclable items. This will be explored in the Industrial and Commercial Sector Plan. The construction and demolition sector will be encouraged to ensure that these principles are adopted in their supply chains.

Actors: Welsh Government, WRAP, Constructing Excellence in Wales

h) Working with product manufacturers to increase recycled content

The Welsh Government and the Welsh European Funding Office (WEFO), via WRAP Cymru, have funded the REMake project. This project supplies vouchers to deliver technical advice to 25 Welsh SME businesses in the Convergence regions, who wish to incorporate recycled content or increase the levels of recycled content in their products.

In addition, WRAP Cymru, with Welsh Government funding, have established a de-minimis grant which offers capital support to those organisations wishing to incorporate recycled content into their products. The grant supports Welsh SME business for up to 30% of the capital costs (up to a maximum of £50K) associated with the incorporation of recycled content or an increase in the levels of recycled content in their products.

Actors: Welsh Government, WRAP Cymru, retailers, manufacturers

i) Assessing the current use of secondary and recycled aggregates in Wales

The Aggregates Levy was introduced by the Finance Act 2001, which came into effect in April 2002. Part of the money generated by the Levy has been used to set up the Aggregates Levy Sustainability Fund Wales (ALSFW) to address the environmental costs associated with aggregate extraction. The Fund addresses issues specific to Wales:

- legacy of old minerals permissions;
- promoting the use of alternative materials to aggregates;
- reducing the impact of aggregate extraction;
- environmental and amenity benefits to communities affected by aggregate extraction;
- conserving sites of special interest; and
- education projects linked to quarrying.

In Wales, a significant volume of recycled aggregate is generated from the inert element of the builders' skip. The use of this recycled aggregate has a double benefit: it reduces input to landfill and reduces the need for extraction of virgin material from quarries so preserving a finite resource. Historically there has been

resistance to use of recycled material because of perceived and actual quality issues. The vast majority of highway schemes including footpaths and car parks, whether constructed by the private or public sectors, are ultimately adopted by the local authority. Local authority engineers need assurance that the material incorporated in works meets their specification and the use of virgin material from well known sources provides that assurance.

Constructing Excellence in Wales received monies from the ALSFW to fund the development of projects to increase the use of recycled aggregate in Wales. The Recycled Aggregate for Minor Schemes (RAMS) project set out to demonstrate that recycled aggregate could meet all the engineering requirements for unbound sub base in schemes such as lightly trafficked roads, footpaths, car parks etc. The outcome of the extensive research work led to a subsequent project Testing Recycled Aggregates for Minor Schemes (TRAMS). The TRAMS project consisted of a year long programme of testing for 15 producers throughout Wales in order to determine quality and consistency.

The results and conclusions from both RAMS and TRAMS have informed the development by Constructing Excellence in Wales of a specification for recycled aggregate in minor schemes which will be published in autumn 2011. This specification will be promoted by the Welsh Government, through Constructing Excellence in Wales, to the Local Authority Highways Departments in Wales with the object of ensuring that recycled material becomes the first choice for use in minor highway works.

Actors: Welsh Government

Increasing recycling rates and the quality of recycle

j) Mandatory provision of a separate collection for paper, metal, plastic and glass

Article 11(1)b of the revised Waste Framework Directive has set a requirement on Member States to promote high quality recycling and to this end they must establish “separate collections” of waste where technically, environmentally and economically practicable, and to do so for at least paper, metal, plastic and glass by 1 January 2015. This applies to wastes from businesses as well as from households and public bodies. This requirement is transposed in Wales via the Waste (England and Wales) Regulations 2011. The terms on which the collections would be offered and its pricing would be left for commercial decision.

The Welsh Government will ensure that all waste collection companies and local authorities are made aware of this requirement.

Actors: Welsh Government, waste management companies

k) Potential interventions to secure greater source segregation of recyclable materials

Whilst the previous action will result in a comprehensive service being set up for the four materials, there are other interventions that may be necessary to address further market failures in respect of increasing recycling of C&D and other wastes.

Cardboard (as packaging) and wood are priority waste streams and the need to recycle more from the C&D waste stream has been identified earlier.

The Welsh Government has commissioned a further study to consider instruments that could be used to facilitate businesses recycling their waste. This may include new interventions such as:

- The new statutory requirement for local authorities to offer a comprehensive separate waste recycle collection service for businesses – to extend to further waste streams (e.g. wood and cardboard);
- A requirement placed on waste producers to keep recyclable materials separate at source to facilitate their recycling to a high quality;
- Extending the revised Waste Framework Directive requirement for all waste collection companies to provide a separate collection service for food and cardboard as well as for paper, metal, plastic and glass;
- An introduction of landfill bans for specific materials – with biodegradable waste a priority (using provisions under the Waste (Wales) Measure 2010);
- An introduction of energy-from-waste bans for specific materials.

In evaluating the options designed to increase recycling from the commercial sector, due consideration will be given as to whether the options would provide some market certainty for waste management companies operating in this area.

Actors: Welsh Government

1) Development of Trade Waste Bring Sites

The construction sector is dominated by micro & small to medium sized enterprises (SMEs). The C&D Waste Arisings Survey carried out in 2005, identified that a major barrier to recycling for these enterprises was lack of space for segregating materials; small builders working on domestic maintenance and refurbishment projects do not have the same level of available space to segregate waste materials as that available on large construction sites.

In addition to the potential to increase recycling opportunities, it is also hoped that these facilities will aid in reducing fly-tipping incidents within Wales. There were nearly 3000 incidents of C&D waste being fly-tipped in 2010-11. A study carried out on behalf of Defra in 2006, concluded that one of the main contributing factors to fly-tipping was availability of waste management facilities⁴⁶.

The proposal is to develop a network of Trade Waste Bring Sites (TWBS) established at existing builders merchant sites. The TWBS will offer segregated waste facilities for trade customers, predominantly general builders, to deposit

⁴⁶ Fly-tipping: Causes, Incentives and Solutions – Webb, Marshall, Czarnomski & Tilley, Jill Dando Institute of Crime Science, UCL (2006)

relatively small quantities of dry recyclable items such as timber, cardboard, plastics, metals, glass and gypsum at the builders merchant. The facility will be partnered with a waste management organisation working to PAS 402:2009.

The Welsh Government has tasked Constructing Excellence in Wales to work in conjunction with the Environment Agency to establish a pilot TWBS to trial the concept over a 6 month period. The pilot will be monitored and used to explore the feasibility, determine the regulatory position, and to assess the potential impacts on reducing fly-tipping incidents. If successful, the company running the pilot propose to develop a network of facilities for businesses to deposit their recyclable wastes.

Actors: Environment Agency Wales, Constructing Excellence in Wales, WRAP Cymru, local authorities

m) Reporting on recycling performance by expanding the network of Waste Management Organisations inspected to PAS402:2009 via Green Compass Scheme

PAS 402:2009 Waste Resource Management – Specification for performance reporting is a BSI published specification for waste management organisations to demonstrate their performance. Sponsored by Constructing Excellence in Wales with funding from Welsh Government the specification was developed with the waste management industry to provide guidelines for the reporting of performance. It requires waste management organisations to make an assessment of their performance and calculate their achieved landfill diversion and materials recovery rates against a defined methodology.

The Green Compass Scheme is an accreditation scheme developed to provide a framework within which organisations working to PAS 402:2009 can obtain independent third party inspection to verify their performance data and ensure full compliance with the standard. It allows customers disposing of waste with these organisations the certainty that their waste will be collected, checked, recycled or disposed of in an environmentally sound fashion.

Constructing Excellence in Wales has received funding from the Welsh Government and Welsh European Funding Office (WEFO) to provide support to Welsh waste management organisations to achieve PAS 402:2009 via the Green Compass Scheme. It is anticipated that by the end of 2011, 90 waste management companies will have joined the scheme.

The Welsh Government wishes to see all waste management companies in Wales operating to PAS 402:2009..

Actors: Welsh Government, Constructing Excellence in Wales

n) Support for the improvement of the recycling infrastructure

Support for recycling companies within Wales is provided through two main routes. General support is provided through the Welsh Government's Department of

Business, Enterprise, Technology and Science (DBETS) under its “Energy and Environment Sector” support programme, and more targeted support is provided through schemes run by WRAP with Welsh Government funding support. These include:

- eEquip – a residual value leasing scheme which helps companies secure favourable terms for leasing new and second hand recycling plant and machinery.
- A scheme to support an interim manager to who will give a business additional capacity to develop or strengthen relevant businesses.
- Consultancy support to the reprocessing industry in the form of technical, financial, IP (intellectual property) or marketing expertise. Any grants provided by WRAP for new infrastructure will only be released once appropriate planning approval and environmental permits (and including any necessary assessments, e.g. EIA) have been secured.
- SME Recycling Support – grants are available for SMEs and Non -SMEs to develop services for the collection of recyclates from SMEs. These cover capital costs i.e. plant, infrastructure, bins, skips and revenue costs of marketing the new/extended service offering. Target materials are - Paper & card, Food, wood, plastics, WEEE and others (on a case by case basis) Up to 30% of project cost can be supported.
- Accelerating Reprocessing Infrastructure Development (ARID) – This scheme is part funded by the Welsh European Funding Office and applies to SMEs in the Convergence area only. It offers capital support for strategic reprocessing infrastructure projects, focussing primarily, but not exclusively, on commercial and industrial waste. Target materials are organics/compost, plastics, treated/contaminated wood, WEEE, textiles, flooring, tiles, insulation & composites and the focus will be closed loop and ‘up-cycling, ensuring a ‘value added’ approach. Up to 40% of eligible project costs can be supported.

Actors: WRAP Cymru

o) Allowing businesses to use household waste recycling centres (for recyclate only)

Local Authorities are encouraged to allow businesses to deposit recyclable wastes at Household Waste Recycling Centres (HWRC) or Civic Amenity (CA) sites, for a charge that would fully recover costs. Potentially HWRCs and CA sites could play an important future role within Wales as there is sufficient unused potential capacity for HWRC and CA sites to take in recyclable materials from businesses. The Welsh Government is working with the Welsh Local Government Association (WLGA) to undertake an investigation to examine the potential to utilise these facilities to receive business waste for recycling.

The Welsh Government will also discuss with local government in Wales ways to ensure that expanding the collection of recyclate from businesses will not adversely affect Local Authorities’ compliance with the Landfill Allowances Scheme.

Actors: WRAP, Local Authorities

Education and awareness

p) Increasing awareness and behaviour change towards recycling

The Welsh Government, in conjunction with its deliver partners, will extend its awareness raising and behaviour change campaign on the benefits of recycling. Increasing awareness about recycling opportunities within the sector is a fundamental step in assisting to meet the waste recycling targets, in particular for the general building sub-sector.

Actors: Welsh Government, Constructing Excellence in Wales, WRAP, Ecodesign Centre for Wales

q) Increase awareness about using recycled products

Construction companies need to be encouraged not only to ensure that they optimise recycling of their waste, but that they also use recycled products and materials with recycled content in their projects. An awareness campaign will be initiated to educate companies as to what is available on the market and the specifications they should be requiring of their suppliers.

Actors: Welsh Government, Constructing Excellence in Wales

r) Recycling Best Practice guidance for construction & demolition sector

The Welsh Government recognises that there is much recycling best practice guidance and associated tools currently available, for example the simple 'green guide' to the environmental impacts of building materials, developed by BRE, which builds on Defra's '*Environmental Profiling of Construction Products and Common Building Elements*'. Work will be undertaken by Constructing Excellence in Wales to coordinate available material, identify gaps and raise awareness of the best available guidance to the construction and demolition industry.

Actors: Welsh Government, Constructing Excellence in Wales

Consultation Question 9: Do you consider these actions to be sufficient to meet the recycling targets? If not, what other measures would you suggest?

3.5.7 The need for additional evidence

The Welsh Government is exploring ways to build on its existing evidence base, drawing, as appropriate, on studies undertaken elsewhere, and commissioning as necessary, and with other as appropriate, new research, where appropriate. Areas where additional evidence may be needed in respect of recycling and preparation for reuse include:

- The Welsh Government wishes to undertake a survey of secondary and recycled aggregate use in Wales, updating the Wales Environment Trust survey 2007.

3.5.8 Recycling indicators and review of progress

3.5.8.1 Monitoring and measuring

It will be necessary to develop indicators to enable progress against the targets established on recycling and preparation for reuse to be reviewed. The following indicators are proposed in Table 15:

Table 15 - Proposed indicators to measure progress on recycling and preparation for reuse

What we will monitor	How we will monitor	Who will monitor it
Quantity of C&D Waste being recycled	We will continue at present to conduct C&D Waste Surveys to record the quantity of waste generated by the sector. We will endeavour to introduce a new reporting system, which will allow construction companies to record waste and which will feed into the duty of care obligation.	Environment Agency Wales Welsh Government
Increased access to recycling	We will monitor the number of Trade Waste Bring Sites within a region.	Environment Agency Wales Constructing Excellence in Wales
Quantity of materials returned to Trade Bring Sites	We will monitor the quantity of C&D unused material returned to Trade Bring Sites that have joined the Bring Site scheme.	Environment Agency Wales Constructing Excellence in Wales
Number of C&D Companies using a Green Compass Company	We will monitor the number of companies that have registered for Green Compass status	Constructing Excellence in Wales
Extent of Third Sector Involvement	We will monitor the number of third sector companies involved with reuse and preparation for reuse	Welsh Government / Cylch
Extent and effectiveness of recycling awareness campaigns	We will monitor the number of organisations taking part in recycling awareness workshops or requesting campaign literature.	Welsh Government / Waste Awareness Wales
Improved Community Engagement	We will monitor the number of community programmes benefiting from Surplus Centre	Constructing Excellence in Wales / Cylch

3.5.8.2 Review

It is accepted that recycling will continue to be a priority as a higher proportion of waste is driven up the hierarchy. Consequently, the Welsh Government will carry out an ongoing review of how much waste is being recycled and quality of recyclate produced, and what guidance is required to assist the sector to achieve higher recycling rates and to encourage use of more recycled products.

3.5.9 Summary of recycling actions

Action	By Whom	By When	Method
Welsh Government influencing Global and EU initiatives	Welsh Government	Long term	Various
Consultation on increasing recycling targets under Producer Responsibility Obligations (Packaging Waste) Regulations	Welsh Government	Short term	Legislation
Encouraging the use of sustainable substitutes for aggregates	Welsh Government	Short term	Legislation
Cement Sector Plan	Environment Agency	Short term	Implementation and Review in collaboration with the cement sector
Waste Protocols Project	Environment Agency	On-going	Implementation and Review in collaboration with business
Consideration of extended producer responsibility	Welsh Government, DEFRA, Devolved administrations	Long term	Possible End-of-Life Building Directive
Public procurement contracts	Welsh Government	Short term	Policy
Review construction related procurement guidance for private sector	Construction Excellence in Wales	Short term	Guidance
Increasing recycled content in products and materials	Welsh Government	Medium term	Policy
Working with product manufacturer's to increase recycled content	WRAP, Constructing Excellence in Wales	Medium term	Funding
Assessing the current use of	Welsh Government	On-going	Funding

Action	By Whom	By When	Method
secondary aggregates in Wales			
Mandatory provision of a separate collection for paper, metal, plastic and glass	Welsh Government	Medium term	Legislation
Potential interventions to secure greater source segregation of packaging	Welsh Government	Medium term	Legislation
Trade Waste Bring Sites	Constructing Excellence in Wales, Environment Agency Wales, Welsh Government	Short to medium term – From 2010 to 2020	Existing with expansion of the scheme over the next few years.
Green Compass Scheme	Welsh Government, Constructing Excellence in Wales	Short term	PAS 402:2009
Support for the improvement of the recycling infrastructure	WRAP Cymru	On-going	Funded programme of research and support
Increasing the role of design	Welsh Government, Ecodesign Centre, Constructing Excellence in Wales	On-going	Education and Guidance
Ecodesign of products	Welsh Government, Ecodesign Centre, Constructing Excellence in Wales	On-going	Research and Development
Increasing awareness and behaviour change towards recycling	Waste Awareness Wales Constructing	On-going	Education and Guidance

Action	By Whom	By When	Method
	Excellence in Wales, WRAP		
Support for C&D business	Welsh Government, Constructing Excellence in Wales	On-going	Business support
Using recycled and reused products	Welsh Government, Constructing Excellence in Wales	On-going	Education and Guidance
Green Guide to building materials specification	Welsh Government, Constructing Excellence in Wales, BRE	On-going	Education and Guidance

3.6 Other recovery and disposal

This section covers a part of the waste hierarchy that is of less significance than the other parts hence it is dealt with in less detail. But nonetheless, there are some important issues that need consideration, and this section focuses on these.

3.6.1 Definitions

Other recovery of source separated waste streams

The revised **Waste Framework Directive** states in Article 4 that the following waste hierarchy shall be applied as a priority order in waste prevention and management legislation and policy

- *Prevention*
- *Preparing for reuse*
- *Recycling*
- **Other recovery – e.g. energy recovery, and**
- ***Disposal***

The revised **Waste Framework Directive** defines recovery in Article 3(57) as being:

- *‘Recovery’ means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II sets out a non-exhaustive list of recovery operations.*

Annex II includes the following recovery operations which can apply when a separated waste stream has been used in an application where it has either not met the relevant end of waste criteria, or national quality standard, and is thus still a waste:

- *R1 – Use principally as a fuel or other means to generate energy – for example the use of contaminated waste wood as a fuel;*
- *R10 – Land treatment resulting in benefit to agriculture or ecological improvement – for example, where green or food waste is applied directly to land without prior biological treatment (composting or AD).*

Article 12 of the rWFD requires Member States to ensure that, where recovery in accordance with Article 10(1) is not undertaken, waste undergoes safe disposal operations in compliance with Article 13 (protection of human health and the environment). This requirement is fulfilled by means of the proposed transposition of Article 13 Protection of the Environment and Human Health.

3.6.2 Benefits

For certain separated wastes, optimised energy recovery options offer the best environmental option due to their mixed nature or the lack of reuse or recycling options. These include (but are not necessarily limited to):

- Treated, coated or composite wood and wood products which cannot be feasibly reused or recycled – i.e. chipboard, melamine, certain furniture items etc.
- Mixed and composite plastic residues.
- Mixed textiles and fabrics – i.e. low grade flooring materials, mattress flock etc.
- Low grade or contaminated paper and card – i.e. food packaging etc.
- Mixed low grade waste streams – i.e. vehicle fragmentation fluff

When considering such wastes, the efficiency of the energy recovery facility is key to ensuring that the material is managed in the most appropriate manner, and each waste stream needs to be considered on its own merits.

As well as the recovery of energy, “other recovery” also includes activities such as the spreading of biowastes to land, for agricultural or ecological benefit. The materials are spread as waste and are subject to the controls of the Environmental Permitting Regulations 2007 (as amended), and is only allowed if agricultural/ecological benefit can be proven, and no environmental harm occurs.

The main exception for the C&D sector to any of waste hierarchy options already discussed is asbestos. Asbestos was widely used as a building material from the 1950’s to the 1980’s, and although its use was in decline after this point, any building built before 2000 may contain asbestos. The total amount of asbestos still contained within our building stock is unknown. Article 7 of the Waste Framework Directive requires that the Member States waste management plans should include reference to any special arrangements for particular wastes. For asbestos the Best Practicable Environmental Option has been assessed as double bagging and disposal to landfill (EHS, 2004).

3.6.3 Specific objectives

- To ensure that source separated waste streams that cannot feasibly be recycled are recovered in an environmentally and economically beneficial way. Recovery of source separated waste streams (e.g. treated wood) only takes place where this is the preferred route for these waste streams taking into account the waste hierarchy and a life cycle approach
- To eliminate the landfilling of waste, with a particular focus on biodegradable waste and hazardous waste.
- To reduce the amount of residual waste generated.
- To meet targets capping the level of energy from waste and landfill.
- To design out the use of “legacy wastes” that cannot be recycled and which can only be energy recovered or landfilled (unless an LCA demonstrates that its use represents the best environmental option over other materials).
- To ensure an adequate collection system for residual waste, including for hazardous waste.
- To secure the development of an integrated and adequate network of sustainable waste management facilities to manage residual waste, ensuring that the necessary sustainable residual waste recovery and

disposal infrastructure is made available or accessible for all sectors in Wales to meet the targets set in TZW and proposed in the relevant sector plans.

- To encourage businesses to recover residual wastes on site.
- To deliver good carbon reduction outcomes from residual waste treatment plants (e.g. high energy efficiency EfW plants).
- To ensure access to an adequate network of facilities for the treatment and disposal of hazardous waste.
- To ensure that the planning system facilitates the development of residual waste facilities in the right place at the right time and that local people and businesses understand better why sustainable waste management facilities are in their locality, that they are safe, and that they benefit the community and society as a whole both economically and in environmental terms.

3.6.4 Targets

To reduce Wales' greenhouse gas emissions and make the most of our valuable resources, waste must be diverted from landfill. Landfilling of all wastes will be phased out as far as possible in the period up to 2025. It is hoped that this target will be achieved primarily through waste prevention, reuse and increased segregation and recycling of wastes, but alternative recovery options, further down the waste hierarchy, also need to be considered.

Construction and Demolition Waste	2015/16	2019/20
Landfilling	50% of the amount of C&D waste produced in Wales that was landfilled in the 2007 baseline.	75% of the amount of C&D waste produced in Wales that was landfilled in the 2007 baseline.

3.6.5 Actions

Actions at a UK level

a) Reducing reliance on landfill

The landfill tax escalator is intended to have a significant impact on reducing the landfilling of waste in the UK. The current standard rate (2011-2012) is £56 per tonne (a low rate of £2.50 per tonne, introduced in April 2008, applies to those inactive (or inert) wastes listed in Schedule 2 of the Landfill Tax (Qualifying Material) Order 1996). The standard rate will rise by £8 per tonne each year until it reaches a level of £80 in 2014/15. This acts as an incentive for C&D companies to reduce landfill.

Actors: Construction and demolition companies

Wales specific actions

It is the Welsh Government's policy that landfill is minimised to as close to zero as possible and that residual waste that cannot be recycled should be sent to high efficiency energy from waste plants.

Regulation and enforcement

b) Energy recovery for "difficult" wastes

The Welsh Government proposes to support the development of appropriate energy from waste routes for separated wastes (e.g. treated waste wood) where this is the best practicable environmental option. The C&D survey data showed that approximately 6% of all wood waste from the sector is being sent to waste transfer stations, with no evidence of its final destination. It is highly possible that the majority of this is treated wood, for which there are limited recovery options at present and which may also be ultimately going to landfill. Energy from waste routes would provide a solution higher up the waste hierarchy.

Actors: Welsh Government

c) Potential abuse of waste exemptions

Any waste recovery (including treatment) or disposal operation needs to be authorised by a permit. A waste exemption is a very specific type of low risk waste recovery, disposal or handling operation that does not require a permit. Most exemptions need to be registered with the Environment Agency. Under the Environmental Permitting (England and Wales) Regulations 2010 the following exemptions are relevant to the construction & demolition sector:

- U1 – Use of waste in construction - allows the use of suitable wastes for small scale construction instead of using virgin raw materials e.g. using crushed bricks, concrete, rocks and aggregate to create a noise bund around a new development and then using soil to landscape it to enable grass to grow.
- U2 – Use of baled end-of-life tyres in construction – allows the use of a small number of baled end-of-life tyres in construction projects.
- U8 – Direct and beneficial use of waste for a specified purpose - allow the use of waste where it is suitable for use without treatment, in order to reuse wastes and reduce use of virgin materials e.g. waste wood or stones to construct walls or structures.
- T5 – Screening and blending of waste - allows small-scale treatment of wastes to produce an aggregate or a soil.
- T7 - Treatment of waste bricks, tiles and concrete by crushing, grinding or reducing in size (this exemption is registered through the relevant local authority rather than the Environment Agency).
- S2 – Storage of waste in a secure place - allows storage of specific waste streams at a secure place at a different place to where the waste was produced, before the waste is transported to another site for recovery e.g. storing construction and demolition waste, capable of

being reused without treatment, at an intermediate site before it is moved to another place for reuse.

The Welsh Government is concerned that there is potential for the abuse of these exemptions, for example the use of non-exempted wastes in construction works. The Environment Agency will be asked to review the use of these exemptions and identify whether any actions are required to prevent abuse.

Actors: Environment Agency

d) Consultation on the Introduction of Restrictions on the Landfilling of certain wastes

The Welsh Government has obtained powers under the Waste (Wales) Measure 2010 to enable Welsh Ministers to introduce Regulations banning or restricting the disposal of materials in landfill. In 2010 the Welsh Government and DEFRA jointly consulted on the introduction of landfill bans for a variety of wastes including food, paper and card, plastic and metals.

In September 2011, the Welsh Government issued the Programme for Government 2011-2016. In this, the Welsh Government set out its intention to introduce regulations to restrict biodegradable materials going to landfill⁴⁷. Biodegradable waste is one of the major causes of methane from landfill. One tonne of biodegradable waste produces between 200 and 400 cubic metres of landfill gas⁴⁸ and as such diverting it from landfill disposal is of major importance in meeting the one planet objectives set in Towards Zero Waste. Biodegradable waste is generated in small percentages by the C&D sector, 1% of the total C&D waste generated in the 2007 EA Waste Survey. That is a total of 119,000 tonnes generated of which 47,000 tonnes was sent to landfill.

The Welsh Government will consult on introducing a ban on the landfilling of biodegradable wastes and may, in due course, consult on detailed proposals for the introduction of landfill bans of other materials as well.

Actor: Welsh Government

e) Tackling the fly-tipping of construction and demolition waste

Fly-tipping is a serious environmental crime which poses a threat to humans and wildlife, damages our environment, and spoils our enjoyment of our towns and countryside.

The number of incidents involving construction, demolition and excavation waste had been falling since 2007, but there were 209 more incidents in 2010-11

⁴⁷ Welsh Government Programme for Government 2011-2016: Annex – Delivery Programme Manifesto Commitments

⁴⁸

http://www.surreycc.gov.uk/sccwebsite/sccwspages.nsf/LookupWebPagesByTITLE_RTF/Landfill+sites?opendocument

compared to 2009-10. C&D waste is also the second most commonly-tipped waste after household waste. There is no evidence to suggest that all of these incidents are from the C&D industry as it is common practice for small builders to leave waste with householders, but whether it is the builder or the householder who carries out the act of fly-tipping there is an obvious need for action.

The Welsh Government has provided funding to the Fly-tipping Action Wales initiative since 2006. The initiative is co-ordinated by Environment Agency Wales and involves over 50 partners across Wales including the 22 local authorities, the Police and Fire Services and other organisations affected by fly-tipping.

The objectives of Fly-tipping Action Wales are:

- To make it harder for offenders to fly-tip
- To increase the risk of getting caught and punished for fly-tipping
- To reduce the financial incentives to fly-tip
- To make it easier for people to reduce, reuse, recycle and dispose of waste legally
- To remove the excuses used by fly-tippers

The initiative's actions are designed to prevent fly-tipping and to ensure successful prosecution of fly-tippers.

Key successes for the initiative have been:

- A reduction in the total number of fly-tipping incidents of 23% since 2007.
- A reduction of 21% between 2007 and 2011 in the cost of clearing fly-tipping.
- An increase in the ratio of prosecutions to incidents from 1 prosecution for every 1306 incidents in 2006-07 to 1 prosecution for every 476 incidents in 2010-11.

The Welsh Government will continue to support Fly-tipping Action Wales, and will work with the partners to tackle issues specific to C&D waste. It will use data generated by the FlyCapture database to monitor the incidents involving construction demolition and excavation waste to ensure that the increase in incidents during the last 12 months don't become a longer term trend.

Fly-tipping Action Wales will use its extensive network to understand further the motivation for fly-tipping and the barriers to accessing legal waste management services, share best practice, highlight issues and offer solutions. In addition to its All Wales project, during 2011-12 it will work intensively within the Valleys Regional Park area, using innovative techniques and working closely with partners to increase awareness and reduce its blight on the communities of the area. It plans to run legal training workshops with the aim of increasing the rate of fly-tipping prosecutions. It will continue to educate the public and businesses of their legal obligations and where/how to dispose of waste in order to prevent fly-tipping.

Actors: Fly-tipping Action Wales, Welsh Government

3.6.6 Need for additional evidence

In relation to biodegradable waste, the Assembly Government will explore opportunities to:

- a) C&D Waste Survey and compositional analysis of landfilled residual C&D waste;
- b) Investigate alternative methods of handling C&D biodegradable wastes for example the role of energy from waste; and
- c) In line with 4.5.4.2, undertaking research into restricting C&D biodegradable waste from landfill.

3.6.7 Indicators and review of progress

3.6.7.1 Monitoring and measuring

It will be necessary to develop indicators to enable progress against the targets established for diversion from landfill to be reviewed. The following indicators are proposed in Table 16 :

Table 16 - Proposed indicators to measure progress against diversion from landfill targets

What will be monitored	How it will be monitored	Who will monitor
Quantity of C&D waste recovered or disposed of to landfill.	Periodic C&D Waste Surveys will be used to estimate the quantity of waste generated by the sector in Wales and its management.	Environment Agency Wales
Number of fly-tipping incidents involving C&D waste	FlyCapture reports (annual)	Environment Agency Wales
Number of inert landfills accepting C&D waste, and their capacity	Survey of landfill operators (annual)	Environment Agency

3.6.7.2 Review

It is accepted that, while emphasis should now be on driving waste up the hierarchy, diverting waste from landfill will continue to be a key priority in the short term. Consequently, the Welsh Government will carry out an ongoing review of how much waste is diverted from landfill and what guidance is required to assist with reducing the reliance on landfill, and consideration of alternative recovery options where prevention, reuse or recycling of waste are not viable.

3.6.8 Summary of actions for landfill diversion

Action	By Whom	By When	Method
Energy recovery for “difficult” wastes	Welsh Government	Medium term	Publication of Waste hierarchy guidance Market review and development
Potential abuse of waste exemptions	Environment Agency	Medium term	Review of exemption use will be carried out by Environment Agency Wales, resulting in recommendation for further action as required.
Landfill Tax	UK Treasury	Existing	Legislation
Consult on ban of biodegradable waste to landfill, with possible extension to other materials	Welsh Government	Medium terms	Consultation on the Introduction of Restrictions on the Landfilling of certain wastes
Tackling the fly-tipping of construction and demolition waste	Fly-tipping Action Wales, Welsh Government	Medium term	Use outputs from the FlyCapture database to analyse trends, use network of contacts to assess motivation for fly-tipping, barriers to accessing legal waste management facilities/services, share best practice, highlight issues and offer solutions.

3.7 Roles and Responsibilities

In achieving waste reduction, increased preparation for reuse and recycling within the C&D sector, each of the identified actors below has a role to play, not only individually but also in concert along the life cycle of the project:

Government

The Welsh Government has a vital role to play in leading and ensuring that clear messages are presented in relation to implementation of the Sector Plans. It will be responsible for aligning C&D waste policy with all other Government policies and strategies. Other key areas of responsibility include:

- Welsh Government has full devolved responsibility for waste, and has primary legislative powers in relation to waste.
- Welsh Government has a strong role at a national and international level to drive waste prevention using instruments available to it to overcome market failures and drive change.
- Welsh Government is responsible for meeting EU Directives, including producing waste plans.
- Welsh Government will lead on developing new policy areas which can assist in delivering the targets of Towards Zero Waste.
- Welsh Government will lead in the development of a C&D resource efficiency policy, to be presented to the European Commission for consideration.
- Welsh Government will support innovation.
- Welsh Government as a key construction client will use procurement lead initiatives to drive change.
- Welsh Government will ensure national awareness and behaviour change campaigns are implemented.

Public Sector

The public sector is a major construction client in Wales; central and local government procures 40% of the construction industry's outputs⁴⁹. The European Union recognises the important role that the public sector has to play in helping to face important challenges confronting Europe, such as climate change, promoting employment creation, strengthen the innovation capacity of the European industry by publishing its "Communication on public procurement with focus on how to underpin "Europe 2020" priorities" (EU DG MARKT/C3).

The public sector is encouraged to work with their suppliers to provide opportunities to develop better value solutions, via:

- Early contractor involvement
- Collaboration and joint procurement

⁴⁹ WRAP http://www.wrap.org.uk?construction/how_do_i_reduce_waste/sectors/index.html

- Best practice policy

Local Authorities

Local authorities act as planning authorities and are generally the main provider of building control services.

Key areas of responsibility include:

- Enforce Packaging Essential Requirements Regulations.
- As clients, social landlords.
- Develop local prevention regimes using a range of tools such as business support.
- Support the development of the third sector.
- Foster demand for innovation, environmentally friendly and/or socially responsible products or services via procurement.
- Planning authority
- Minerals planning authority

Construction Companies

C&D companies are the primary producers of C&D waste. However, they undertake projects for a range of clients, who may also have assigned a designer or architect to the project. C&D companies are therefore only one party in a supply chain responsible for producing C&D waste.

Civil Engineers

Civil engineering generates the largest volumes of waste (predominantly soils and aggregates) and contributes the most to the reuse and recycling figures. However they contribute 52% of the waste sent to landfill.

Demolition Companies

Demolition activities generate large quantities of priority materials. Demolition companies are limited in their ability to influence waste prevention activities by the nature of their activity. The way in which they undertake their demolition activities can influence the amount of preparation for reuse and recycling that can be achieved from the demolished materials.

General Builders

General builders account for only 4% of the total waste generated. However, they are responsible for nearly 24% of the ecological footprint of construction and demolition waste analysed in the ARUP Ecological footprint study.

Clients

Clients are the first party in the supply line with ownership of the completed construction project and under proposed Site Waste Management Plan Regulations in Wales; they will bear the ultimate responsibility of the development. The greatest opportunity for improving material resource efficiency and waste prevention occurs at the design stage between the client and designer. Clients in conjunction with designers have a key role to play in waste prevention, through efficient design solutions. The client plays a key role in determining the impact of the project, for example through the materials specification and the amount of waste generated.

Architects / Designers

In conjunction with the client, designers/architects play a significant role in the prevention of waste. A designer can influence the type, volume, management and environmental impact of waste through the choice of design, materials and through the action of designing out waste. There is an important role for designers to include materials that can be easily recycled at the end of their life and to include recycled materials in the development.

Manufacturers

The products disposed of by the C&D sector are inevitably produced by a manufacturer. Manufacturers have a significant responsibility for how their products are produced, sold and packaged and in helping to secure more waste prevention and less waste both in terms of wasted product and their packaging. Manufacturers have a role to play in developing products which contain less hazardous materials and which will not result in more legacy wastes in the future through the development of alternative materials.

Manufacturers should ensure that the products they produce are easy to reuse and recycle and to contain a higher proportion of recycle instead of virgin raw material.

Suppliers and Retailers

As part of the supply chain suppliers/retailers have a role to play in delivering the targets in Towards Zero Waste. They have a responsibility for how products and materials are sold and packaged and can influence waste prevention through a reduction in packaging and in relation to returned and obsolete items.

Third Sector Organisations

The third sector is involved in a range of preparation for reuse and recycling activities from collection to reprocessing. There are a number of opportunities for the third sector in the handling of C&D waste including the potential to provide services for preparation for reuse and recycling collections.

The third sector is one of the main centres for preparation for reuse activity within Wales and has a key role in working with communities, individuals, waste collectors and reprocessors to ensure that products are reused where possible. This sector can play an important role in promoting environmental and economic gains achieved through higher preparation for reuse, recycling and resource efficiency in tandem with social gains, for example through the creation of training and employment opportunities (i.e. repair). This sector is also responsible to carry out their waste related activities in a way that does not endanger human health or the environment.

Waste Management Sector

As organisations with the responsibility to collect and recover waste materials, waste management companies have a key role to play in ensuring that strong links between collection methods and end markets are developed and work to the benefit of Wales. They have a key role to play in assisting C&D companies meet the objectives of Towards Zero Waste and of the C&D Waste Sector Plan and by aiming for high levels of recycling and the development of services to encourage preparation for reuse and diversion from landfill.

Reprocessors and waste management companies also have a role to carry out their operations in a manner which does not endanger human health or the environment.

4. Links to other sector plans

Sector Plan	Link
Collection, Infrastructure and Markets	<p>The draft Collections, Infrastructure and Markets Sector Plan was published for consultation on 10th March 2011. It seeks to create the conditions for a sustainable approach to resource management by ensuring that services are set up in Wales to guarantee the collection of a high volume of clean, source segregated recyclate that can then be delivered to reprocessors based in Wales as far as possible, and that closed loop end markets are developed for the recyclates. The draft plan seeks to retain the economic value of the recyclate within the Welsh economy, as far as possible.</p> <p>The draft plan identifies where improvements in recyclate collection are required and where opportunities to develop infrastructure exist. The draft plan aims to facilitate developments in infrastructure by demonstrating need for such investments. It will also help to identify the skills and qualifications required to support the changing nature of the waste management infrastructure.</p>
Public Sector	<p>The Public Sector Plan is in development and will establish how the public sector in Wales will manage resources efficiently, develop sustainable procurement activities and prevent waste production arising from provision of services in relation to healthcare, education, local government, justice administration and emergency response in Wales. It will set out a challenging action plan which will aid the public sector to provide leadership to all other sectors and become a driver of change.</p> <p>There are strong links between the C&D Sector Plan and the Public Sector Plan as the public sector is a major construction client in Wales. Local government procures some 40% of the construction industry's outputs⁵⁰. Value Wales estimated that in Wales, public construction procurement accounts for approximately 20% of overall annual Welsh public sector procurement spend (Value Wales, 2009). Therefore, any proposed actions relating to driving change through procurement of services and materials will be developed further via the Public Sector Plan.</p>
Industrial and Commercial	The Industrial and Commercial Sector Plan is in the process of development and will focus specifically

⁵⁰ WRAP – http://www.wrap.org.uk/construction/how_do_i_reduce_waste/sectors/index.html

	<p>on:</p> <ul style="list-style-type: none"> • commercial waste arising from any premises which are used wholly or mainly for trade, business, sport recreation or entertainment (excluding household and industrial); • industrial waste arising from any factory and from any premises occupied by an industry (excluding mines and quarries); • products (and associated packaging) produced or sold from the industrial and commercial sector that eventually become waste – in accordance with the principle of extended producer responsibility. This includes products used in construction. <p>The Plan scope is likely to cover:</p> <ul style="list-style-type: none"> • waste prevention – including of wastes produced by the sector, and in relation to producer responsibilities in respect of products produced by the sector (with a focus on eco-design); • preparation for reuse; • source segregation and separate collection of key recycle streams, including paper, card, metal, glass and plastic; • ecodesign of products and packaging produced and/or sold by the sector in order to increase reuse and recyclability, and increase the recycled content; and • sustainable management of residual waste.
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5. Summary of Actions

Timescale	Key Objective and Supporting Actions
Short term – now until 2015	<p>Government:</p> <p>To help support the delivery of the waste prevention, preparing for reuse, recycling and other recovery & disposal targets up to 2015 through:</p> <ul style="list-style-type: none"> • Transposition of the revised Waste Framework Directive (2008/98/EC) • Produce legislation to introduce Site Waste Management Plans (SWMPs) • Produce legislation to introduce a charging scheme for SWMPs (Waste (Wales) Measure 2010 – section 12(2)(e)) • Development of waste hierarchy guidance in respect to construction and demolition waste • Waste awareness communications and educational campaigns • Encourage a reclamation led approach to construction • Encourage implementation of the Demolition Protocol • Consult on increasing recycling targets under Producer Responsibility Obligations (Packaging Waste) Regulations • Encouraging use of sustainable substitutes for aggregates • Provide support for development of sustainable procurement policies within the public sector <p>Others:</p> <ul style="list-style-type: none"> • Design solutions for construction products • Incorporating waste minimisation principles into building design and throughout the supply chain • Waste Reduction Voluntary Agreement • Waste awareness communications and educational campaigns • Welsh Government directed support for SMEs to reuse surplus materials • Preparation of a pre-refurbishment survey • Expand the network of waste management organisations inspected to PAS402:2009 via the Green Compass Scheme
Medium term – 2015 until 2025	<p>Government:</p> <p>To help support the delivery of the waste prevention, preparing for reuse, recycling and other recovery & disposal targets up to 2025:</p>

	<ul style="list-style-type: none"> • Greening public procurement • Sustainability clauses for Government grants • Waste awareness communications and educational campaigns • Infrastructure to support the reuse of surplus materials for community benefit • Increase recycled content of products and materials used in Government funded projects • Mandatory provision of a separate collection for paper, metal, plastic and glass • Investigate potential interventions to secure greater source segregation of recyclable materials • Review of consultation on the introduction of restrictions on the landfilling of certain wastes • Reduce biodegradable waste to landfill • Support development of appropriate energy from waste routes for “difficult” wastes <p>Others:</p> <ul style="list-style-type: none"> • Encourage use of value engineering for large construction projects • Greening the Welsh Housing Quality Standard Refurbishment • Minimising wastage factor • Waste awareness communications and educational campaigns • Infrastructure to support the reuse of surplus materials for community benefit • Explore options for a system of characterising sustainable construction products • Further develop the role of the Third Sector in preparing for reuse • Work with product manufacturers to increase recyclability of products • Investigate potential abuse of waste exemptions within the construction and demolition sector • Tackle the fly-tipping of Construction and Demolition wastes
<p>Long term – 2025 until 2050</p>	<p>Government:</p> <p>To help support the delivery by 2050 of the One Planet levels of waste and zero waste (100 percent recycling) goals of Towards Zero Waste, Government may need to:</p>

	<ul style="list-style-type: none"> • Consideration of extended Producer Responsibility <p>Others:</p>
Ongoing	<p>Government:</p> <ul style="list-style-type: none"> • Seek to influence global and EU initiatives • Promote the Welsh Government’s Sustainable Development Charter and encourage sector sign up • Assess the current use of secondary aggregate in Wales <p>Others:</p> <ul style="list-style-type: none"> • Waste Reduction Voluntary Agreement • Promotion of relevant waste protocols within the Construction and Demolition sector • Development of a Trade Waste Bring Sites network • Increase the role of design for recycling • Increase awareness and behaviour change towards recycling • Increase awareness about using recycled and reused products • Provide support for construction and demolition businesses

6. Monitoring, Measurement and Evaluation

Progress will be reported periodically and will also be reported regularly against targets. The plan will be web based and will be maintained as a 'living' document. Ways of engaging with the sector to ensure recording of waste produced and management of such ways will be investigated. The Welsh Government will work with other partners to ensure that tools are suitable for the information needed from the sectors identified in this plan.

ANNEX 1: Glossary

Anaerobic digestion - A biological process where biodegradable wastes, such as kitchen or food waste, is encouraged to break down in the absence of oxygen in an enclosed vessel. It produces carbon dioxide, methane (which can be used as a fuel to generate renewable energy) and solids/liquors known as digestate which can be used as fertiliser.

Biodegradable waste - means any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and paperboard

Biopolymers are polymers derived from biomass. They may be natural polymers (e.g. cellulose), or synthetic polymers made from biomass monomers (e.g. Polylactic Acid) or synthetic polymers made from synthetic monomers derived from biomass (e.g. Polythene derived from bioethanol). Oxy-degradable (degradable) plastics are not biopolymers.

Biowaste - This includes biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants.

Closed loop recycling - Recycling where recycled materials are being used continually for the same purpose, for example a glass bottle recycled into new glass product rather than downgraded, for example being used as an aggregate.

Commercial and industrial waste - Commercial waste is waste arising from any premises which are used wholly or mainly for trade, business, sport recreation or entertainment, excluding household and industrial waste. Industrial waste is waste from any factory and from any premises occupied by an industry (excluding mines and quarries).

Composting - An aerobic, biological process in which organic wastes, such as garden and kitchen waste, are converted into a stable granular material which can be applied to land to improve soil structure and enrich the nutrient content of the soil.

Construction and demolition waste – Construction and demolition waste is waste arising from activities carried out by construction companies, demolition companies, civil engineering companies and general builders. In the main, it relates to waste types listed in Chapter 17 of the List of Wastes (Wales) Regulations 2005, although it also includes other wastes generated by these organisations arising from their construction and demolition activities.

Eco design - A strategic design management process that is concerned with minimising the impact of the life cycle of products and services. Approaches include life cycle analysis, design for disassembly and reducing the negative impact of a product on the environment (for example by removing hazardous chemicals or materials without compromising the design).

Ecological footprint - The ecological footprint methodology calculates the land area needed to feed, provide resource, produce energy and absorb the pollution (and waste) generated by our supply chains.

Energy from waste - Technologies include anaerobic digestion, direct combustion (incineration with energy recovery), use of secondary recovered fuel (an output from mechanical and biological treatment processes), pyrolysis and gasification. Any given technology is more beneficial if heat and electricity can be recovered. The Waste Framework Directive considers that where waste is used principally as a fuel or other means to generate electricity it is a recovery activity provided it

complies with certain criteria, which includes exceeding an energy efficiency threshold.

Europe 2020 Strategy - Europe 2020 is the EU's growth strategy for the coming decade. In a changing world, we want the EU to become a smart, sustainable and inclusive economy. These three mutually reinforcing priorities should help the EU and the Member States deliver high levels of employment, productivity and social cohesion. Concretely, the Union has set five ambitious objectives - on employment, innovation, education, social inclusion and climate/energy - to be reached by 2020. Each Member State will adopt its own national targets in each of these areas. Concrete actions at EU and national levels will underpin the strategy.

Global hectares - One global hectare is equal to one hectare of biologically productive space with world average productivity. Global hectares are the unit of measurement for ecological footprinting.

Household Waste Recycling Centre (HWRC) - Site provided by the local authority for the recycling of household waste including bulky items such as beds, cookers and garden waste as well as other recyclables, free of charge.

Kitchen waste - This term refers to the organic component of household waste e.g. vegetable peelings, tea bags, banana skins. Often also referred to as "food waste".

Landfill sites - Any areas of land in which waste is deposited. Landfill sites are often located in disused mines or quarries. In areas where they are limited or no ready-made voids exist, the practice of landraising is sometimes carried out, where waste is deposited above ground and the landscape is contoured.

Legacy waste - Materials or products that it is not feasible to recycle either now or in the foreseeable future due to their hazardous nature, composite make-up, the costs of treatment for recycling or the way their use leads to contamination at end of life. They therefore cannot feasibly be returned into the chain of utility via reuse or high quality recycling.

Municipal waste - For the purpose of this sector plan, municipal waste means 'municipal waste as collected by local authorities'. It includes household waste and any other wastes collected by a Waste Collection Authority (WCA), or its agents, such as municipal parks and gardens waste, beach cleansing waste, commercial or industrial waste and waste resulting from the clearance of fly-tipped materials. WCA - A local authority charged with the collection of waste from each household in its area on a regular basis. They can also collect, if requested, commercial and industrial wastes from the private sector.

NACE – European Union classification system for economic activities

Open loop recycling - Where the end product of recycling is used to replace something else, e.g. glass is recycled into aggregate which replaces virgin aggregate.

PAS100 - The British Standards Institution's 'Publicly Available Specification for Composted Materials' (PAS 100) sets out a minimum compost quality baseline, upon which composters should build as appropriate to the product types and markets targeted.

PAS110 - The purpose of this PAS is twofold: to ensure that digested materials are made using suitable inputs and effectively processed by anaerobic digestion (AD) for sufficient time; and to ensure that the process has been well managed and monitored so as to produce digested material that meets market needs and protects the environment.

PAS 402 - PAS 402 is a specification for performance reporting that can be adopted by waste management organisations. The specification provides the

framework for the demonstration of performance against key areas of delivery, including landfill diversion and materials recovery, assuring potential and existing customers of the service they are procuring.

Preparing for reuse - Means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be reused without any other pre-processing.

Producer responsibility - A 'producer responsibility' approach is intended to require producers who put goods or materials onto the market to be more responsible for these products or materials when they become waste. In some cases, producers will also be asked to reduce the level of hazardous substances in their products and to increase the use of recycled materials and design products for recyclability.

Recycling - Involves the reprocessing of wastes, either into the same product or a different one. Many non-hazardous industrial wastes such as paper, glass, cardboard, plastics and scrap metals can be recycled. Special wastes such as solvents can also be recycled by specialist companies, or by in-house equipment.

Reduction - Achieving as much waste reduction as a priority waste action. It can be accomplished within a manufacturing process involving the review of production processes to optimise utilisation of raw (and secondary) materials and recirculation processes. It can be cost effective, both in terms of lower disposal costs, reduced demand for raw materials and energy costs. It can be carried out by householders through actions, such as home composting, reusing products and buying goods with reduced packaging.

Reprocessor - A person who carries out one or more activities of recovery or recycling.

Residual waste - this is waste collected from households, commerce and industry (including certain construction and demolition activities) which has not been separated at source.

Resource efficiency – Managing raw materials, energy and water in order to minimise waste and thereby reduce cost.

Reuse - Using a product again for the same or different use.

SOC codes Substance Oriented Classification describes wastes by materials only, regardless of their origin. The European Waste Classification (EWC) coding system describes waste both by its physical properties, and by the sector from which it was generated. SOC codes reflect only the material type of the waste, regardless of the source sector. This allows easier interpretation of the results, as several different EWC codes relating to similar materials which require the same treatment methods, can be grouped together.

Social enterprise - A social enterprise is a business with primarily social objectives whose surpluses are principally reinvested for that purpose in the business or in the community, rather than being driven by the need to maximise profit for shareholders and owners.

Sustainability appraisal - Single appraisal tool which provides for the systematic identification and evaluation of the economic, social and environmental impacts of a proposal.

Treatment - Physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery.

Upcycling - Upcycling happens where high embedded energy raw materials are substituted by lower embedded energy secondary raw materials that can be subsequently be closed loop recycled.

Waste arisings - The amount of waste generated in a given locality over a given period of time.

Waste hierarchy - Sets out the order in which options for waste management should be considered based on environmental impact. It is a useful framework that has become a cornerstone of sustainable waste management.

Zero waste – ‘Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.’ (Zero Waste International Alliance www.zwia.org).