



**Cyfoeth  
Naturiol  
Cymru**  
**Natural  
Resources  
Wales**

# Survey of Construction & Demolition Waste Generated in Wales 2012

Rev No FINAL



Noddir gan  
**Lywodraeth Cymru**  
Sponsored by  
**Welsh Government**



**Cyfoeth  
Naturiol**  
Cymru  
**Natural  
Resources**  
Wales

Published by:  
Natural Resources Wales  
Cambria House  
29 Newport Road  
Cardiff  
CF24 0TP

0300 065 3000 (Mon-Fri, 8am - 6pm)

[enquiries@naturalresourceswales.gov.uk](mailto:enquiries@naturalresourceswales.gov.uk)  
[www.naturalresourceswales.gov.uk](http://www.naturalresourceswales.gov.uk)

© Natural Resources Wales

All rights reserved. This document may be reproduced with prior permission of  
Natural Resources Wales

## Executive Summary

The survey of construction and demolition (C&D) waste generated in Wales for 2012 calendar year was carried out by RSK Environment Ltd in partnership with Urban Mines, managed by Natural Resources Wales (NRW) on behalf of the Welsh Government that funded the project. Ainsworth & Parkinson, Groundwork in Wales and WRc also provided support on the project.

The purpose of this study was to produce information on the quantities, origins (by industry sector and geographic region), and fate of construction and demolition (C&D) and industrial & commercial (I&C) wastes generated by businesses in Wales in 2012. A separate report has been prepared for the results of the industrial and commercial survey. This information is required by Welsh Government (WG) for a variety of reasons including:

- reporting on waste generation in compliance with the EU Waste Statistics Regulations 2002;
- informing the development of national waste policy;
- monitoring progress against national waste prevention and recycling targets;
- informing waste planners and the regulator; and
- providing data to the waste management industry to inform investment decisions.

Data was collected from 457 business sites between July 2013 and January 2014 throughout Wales of differing sector and size, and the data was grossed up using population data to regional and national level in Wales. Office for National Statistics data showed that there were 11,355 business units in Wales in 2012 with 1% in demolition, 39% in construction sectors, 11% in civil engineering and 49% in General Building. Of these business units, 58% had less than three employees and 0.5% had one hundred or more employees.

Analysis of this data concluded that in 2012:

- Welsh construction and demolition sectors generated an estimated **3.4 million tonnes** of waste. The precision for the total Wales waste generated was +/- 33.2% at 90% confidence and at regional level the generated totals were of a similar precision.
- The Civil Engineering (47%) and Construction (41%) sectors generated the majority of this waste, with a smaller proportion generated by the General Building (7%) and Demolition (4%) sectors.
- An estimated 745 thousand tonnes of construction and demolition waste was generated in North Wales, 1,437 thousand tonnes was generated in South East Wales and 1,177 thousand tonnes was generated in South West Wales.

- The preparation for re-use, recycling and other material recovery rate of non-hazardous Construction & Demolition waste excluding naturally occurring substances (EWC 17 05 04) generated in Wales was 87% in 2012. This is broadly consistent with the calculation of recovery rate using waste management industry data, which indicated a rate of 89% for 2012.
- The quantity of waste landfilled in 2012 was approximately 639 thousand tonnes.
- Comparison with previous survey results should not be made because:
  - The definition of waste has changed considerably since the previous survey, excluding a large amount of material which was previously recorded as waste.
  - The recession impacted significantly on the construction sector, reducing output and therefore waste generation.
  - There were no major infrastructure projects accounting for very large quantities of waste in 2012. This contrasts with 2005/06 when three of the five largest waste producers were involved in major projects. This illustrates the difficulty in comparing data from single years.
  - The geographical data for 2012 is reported based on the location of the construction/demolition site as opposed to the location of the business office. This reflects the fact that C&D waste generally needs to be managed close to the site of production.

**Figure 1: Construction and Demolition waste generated by sub sector**

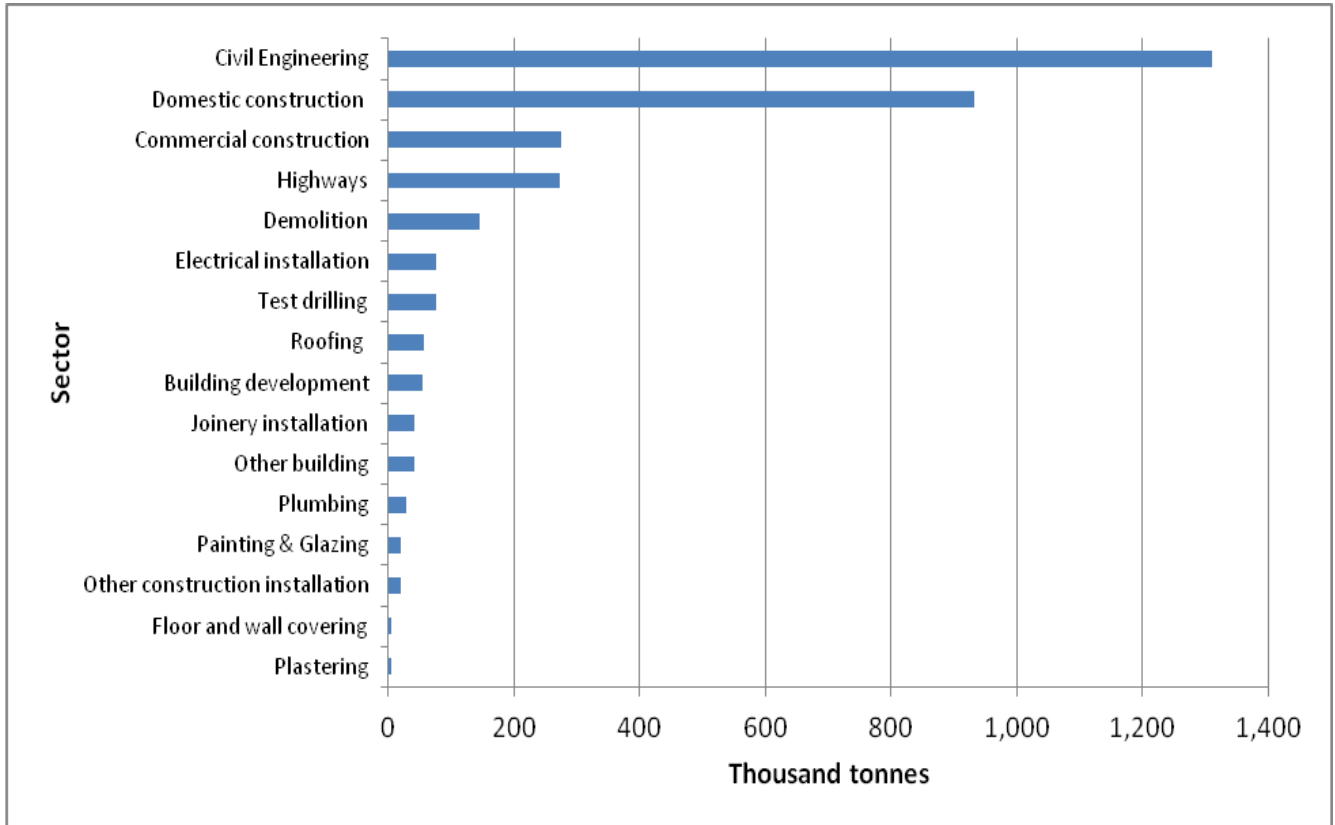


Figure 1 shows that of the 3.4 million tonnes generated by the construction and demolition sectors, approximately 1.3 million tonnes (39%) was generated by the construction of civil engineering projects sector, 932 thousand tonnes (28%) by the construction of domestic buildings sector, 275 thousand tonnes (8%) by the construction of commercial buildings sector and 273 thousand tonnes (8%) by the construction of highways, roads, airfields and sports facilities sector.

Civil Engineering generated 1.6 million tonnes of waste (47% of the total C&D waste) and consists of the following sectors:

- *Construction of highways, roads, airfields and sport facilities*
- *Construction of civil engineering constructions*

Construction generated 1.4 million tonnes of waste (42% of the total C&D waste) and consists of the following sectors:

- *Development of building projects*
- *Construction of commercial buildings*
- *Construction of domestic buildings*

- *Roofing activities & scaffold erection*
- *Test drilling & boring and other specialised construction activities*

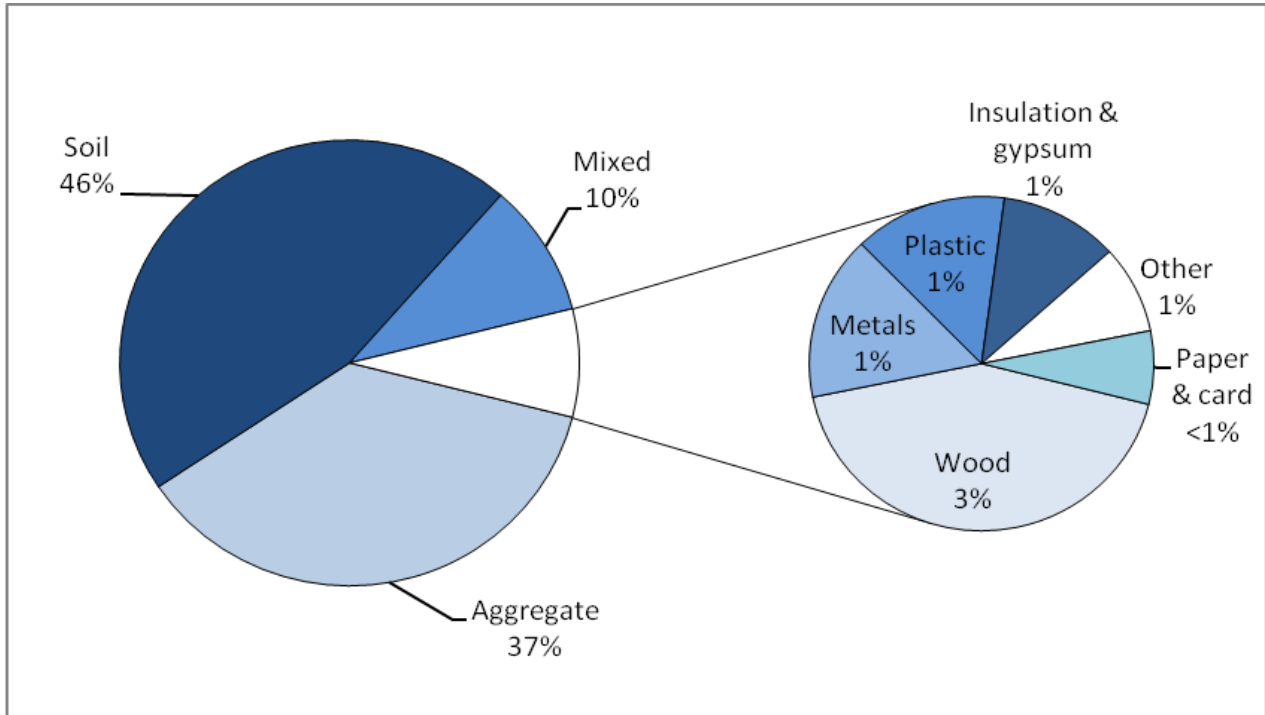
Demolition generated 145 thousand tonnes of waste (4% of the total C&D waste) and consists of the following sectors:

- *Demolition & site preparation*

General Building generated 238 thousand tonnes of waste (7% of the total C&D waste) and consists of the following sectors:

- *Electrical installation*
- *Plumbing*
- *Other construction installation*
- *Plastering*
- *Joinery installation*
- *Floor and wall covering*
- *Painting & glazing*
- *Other building completion and finishing*

**Figure 2: Composition of Construction and Demolition Waste 2012**



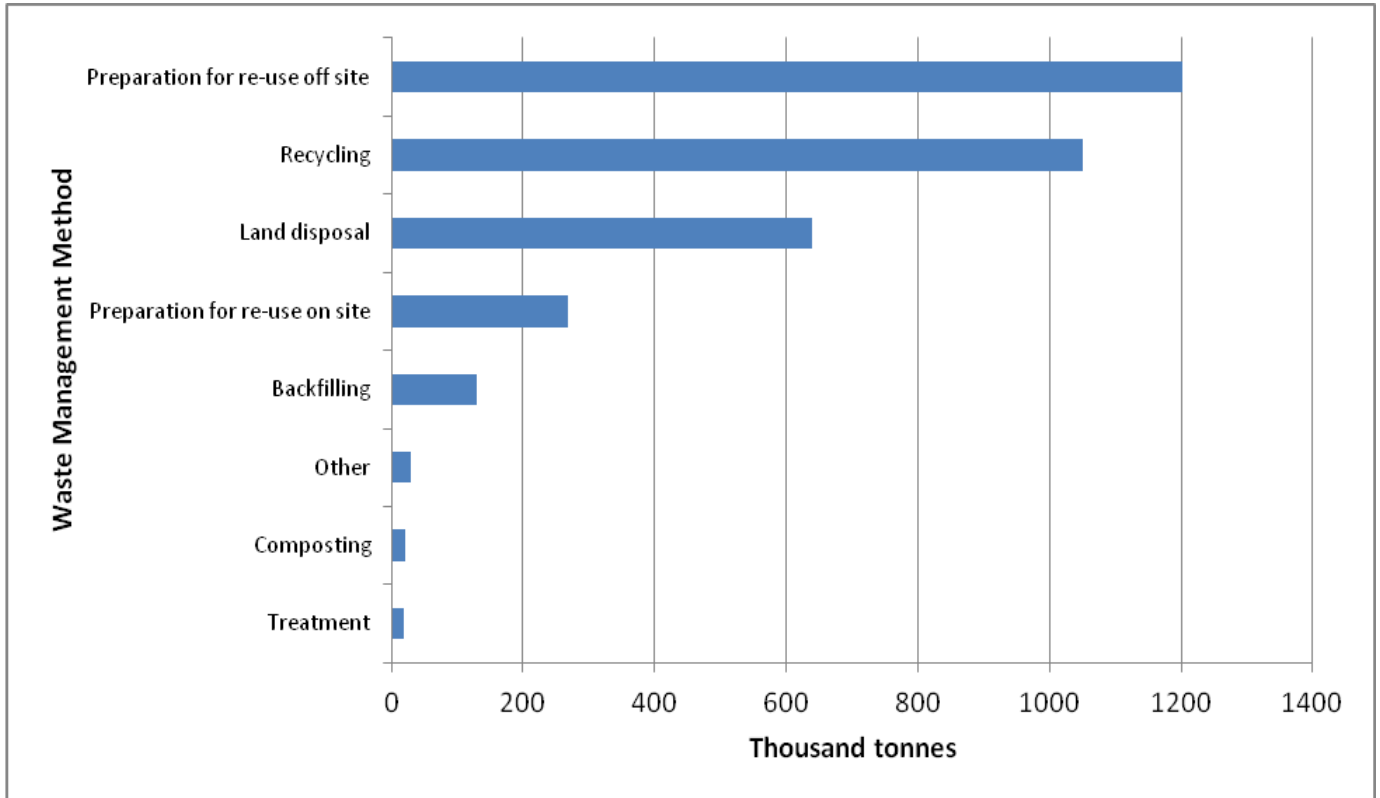
'Other' includes animal & vegetal, chemical, discarded equipment, common sludges, other mineral and other non metallic waste

Figure 2 shows that of the total waste generated by all C&D sectors, the majority was soils (46%) and aggregates (37%), followed by mixed site waste (10%) and wood waste (3%).

"Soils" as recorded in this data includes soils and stones. The EWC codes and descriptions are soil and stones containing dangerous substances (17 05 03\*), soil and stones other than those mentioned in 17 05 03 (17 05 04) and soil and stones (20 02 02).

"Aggregates" as recorded in this data contain a number of inert waste types. The EWC codes and descriptions are concrete (17 01 01), bricks (17 01 02), tiles and ceramics (17 01 03), mixtures of concrete, bricks, tiles and ceramics containing dangerous substances (17 01 06\*), other mixtures of the above (17 01 07), bituminous mixtures containing coal tar (17 03 01\*), other bituminous mixtures (17 03 02), coal tar and tarred products (17 03 03\*) and track ballast (17 05 08).

**Figure 3: Construction and Demolition waste generated by waste management method**

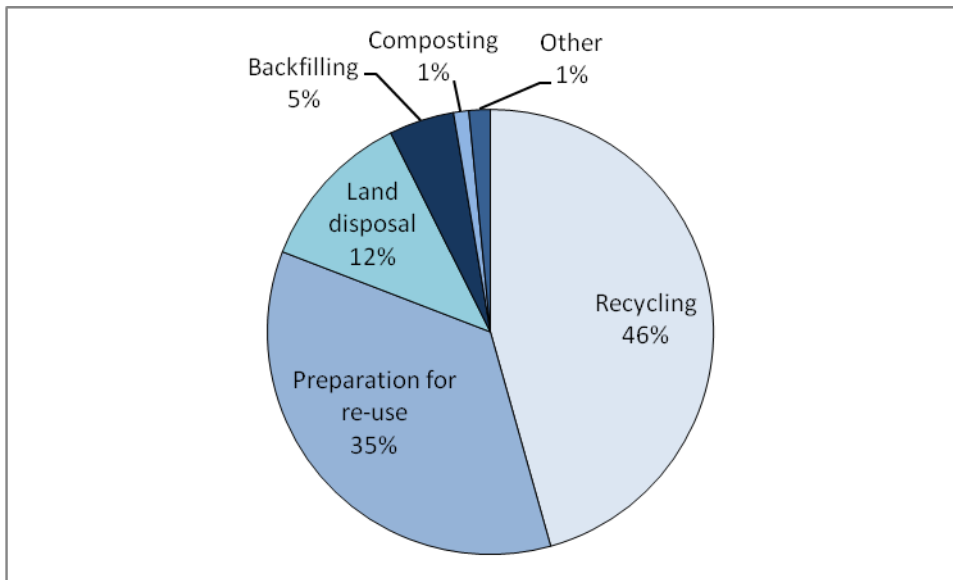


'Other' includes transfer station, land recovery, incineration, other re-use and don't know

As shown in Figure 3, the majority of the construction and demolition waste generated in 2012 was prepared for re-use. Approximately 1.2 million tonnes was prepared for re-use off site (36%) with a further 268 thousand tonnes prepared for re-use on site (8%). Approximately 1.1 million tonnes was recycled (31%) and 639 thousand tonnes was disposed of via landfill (19%). A small proportion of the total waste generated was sent for backfilling (4%).



**Figure 4: Management of waste generated in Wales 2012 excluding hazardous waste and naturally occurring soils and stones (EWC 17 05 04)**



'Other' includes land recovery, incineration, treatment, transfer station and don't know

The National waste strategy 'Towards Zero Waste' includes the following recovery target for construction and demolition wastes, which mirrors that in the EU Waste Framework Directive:

*"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."*

Following the above definition, the survey results estimate that the preparation for re-use, recycling and other material recovery rate was 87% for the C&D sector as a whole in 2012 as shown in Figure 4.

### Hazardous waste

An estimated 38 thousand tonnes of hazardous waste was generated by the Construction & Demolition sectors in 2012 out of a total waste generation of 3.4 million tonnes (1%). The C&D sector generating the largest quantity of hazardous waste was the Civil Engineering sector, which generated 29 thousand tonnes (77%).

The majority of hazardous waste generated was mineral wastes (32 thousand tonnes) with the remainder being chemical waste (3 thousand tonnes) and discarded equipment (2 thousand tonnes). Of these, contaminated soils (15 thousand tonnes) and bituminous mixtures (13 thousand tonnes) were the most common material types. Significant quantities of asbestos waste (3 thousand tonnes) and chemical solvents (2 thousand tonnes) were also generated.

### Regional Waste Generation

Estimated Regional Waste generation was as follows:

North Wales	0.74 million tonnes (+/- 29.9% at 90% confidence)
South East Wales	1.44 million tonnes (+/- 51.6% at 90% confidence)
South West Wales	1.18 million tonnes (+/- 58.3% at 90% confidence)

Of the waste generated by the Construction & Demolition Sector, approximately 43% was generated in South East Wales, 35% in South West Wales and 22% in North Wales. The Construction sector generated the majority of waste in South East Wales (50%) and North Wales (45%). In contrast, the majority of waste generated in South West Wales was from the Civil Engineering sector (61%).

Preparation for re-use was the dominant waste management method in the South East (58%) and North (46%) regions. In contrast, land disposal was the most common waste management method in the South West (39%) followed by recycling (31%).

## Contents

Executive Summary .....	ii
Contents .....	x
Figures.....	xi
Tables .....	xi
1. Introduction .....	1
1.1. Background and need for the survey .....	1
1.2. Overall Aims.....	2
1.3. Study Area .....	2
1.4. Project Management.....	2
1.5. Survey Parameters .....	3
2. Survey Design & Methodology .....	4
2.1. Introduction .....	4
2.2. Design of the Questionnaire and Sample frame.....	4
2.2.1. Core Survey Questions .....	5
2.3. Survey Delivery .....	5
2.4. Classifying Waste.....	5
2.5. Calculating Tonnages .....	7
2.6. Classifying Waste Management Methods .....	8
2.7. Non-Wastes .....	9
2.8. Backfilling.....	9
2.9. Classifying Regions.....	10
2.10. Further Detail .....	10
3. Survey results .....	11
3.1. Waste Generation - Nationally .....	11
3.2. Waste Generation - Regionally .....	16
3.3. Waste Management- Nationally .....	19
3.4. Waste Management- Regionally .....	24
3.5. Comparison with previous surveys and targets in “Towards Zero Waste” National Waste Strategy.....	25
3.6. Hazardous Waste.....	25
4. Conclusions & Recommendations .....	28
4.1. Data Confidence .....	29
4.2. Lessons learned and Recommendations .....	30

## Figures

Figure 1: Construction and Demolition waste generated by sub sector .....	iv
Figure 2: Composition of Construction and Demolition Waste 2012 .....	vi
Figure 3: Construction and Demolition waste generated by waste management method ..	vii
Figure 4 Management of waste generated in Wales 2012 excluding hazardous waste and naturally occurring soils and stones (EWC 17 05 04) .....	viii
Figure 5: Geographical Spread of C&D Business Sites Surveyed .....	3
Figure 6: Construction and Demolition waste generated in Wales 2012, % of total waste, by business size (employee numbers).....	11
Figure 7: Construction and Demolition waste generated in Wales 2012 by sector (% of total waste) .....	12
Figure 8: Waste types generated by the Demolition sector in Wales 2012 .....	13
Figure 9: Waste types generated by the Construction sector in Wales 2012.....	14
Figure 10: Waste types generated by the Civil Engineering sector in Wales 2012 .....	15
Figure 11: Waste types generated by the General Building sector in Wales 2012 .....	15
Figure 12: Waste Generated in Wales 2012, (in thousands of tonnes), by Sector and Region .....	16
Figure 13: Waste generated (as a percentage of total) in North Wales across all C&D sectors .....	17
Figure 14: Waste generated (as a percentage of total) in South East Wales across all C&D sectors .....	18
Figure 15: Waste generated (as a percentage of total) in South West Wales across all C&D sectors.....	19
Figure 16: Waste Generated by Waste Management Method .....	20
Figure 17: Waste generated in Wales 2012 by Waste Management Method and Region .	24
Figure 18: Construction & Demolition hazardous wastes generated in Wales 2012, thousands of tonnes, by Waste Type (SOC) and Region .....	27
Figure 19: Construction & Demolition hazardous waste generated in Wales by Waste Management Method .....	28

## Tables

Table 1: EWC Chapters and associated wastes included in the survey .....	6
Table 2: EWC code groupings used for presenting the survey results .....	6
Table 3 Waste management activities grouped by Waste Management Method .....	8
Table 4: Regional Waste generated by C&D sector .....	17
Table 5: Management of C&D waste generated in Wales 2012 by sector .....	21
Table 6: Management of C&D waste generated in Wales 2012 by material type .....	22
Table 7: Management of waste generated in Wales 2012 by material type, excluding hazardous waste and naturally occurring soils and stones (EWC 17 05 04) .....	23
Table 8 Construction & Demolition waste generation in Wales 2012, split between Hazardous and Non- hazardous waste by Sector (tonnes).....	26

## 1. Introduction

The purpose of this study was to produce information on the quantities, origins (by industry sector and geographic region), and fate of construction and demolition (C&D) and industrial & commercial (I&C) wastes generated by businesses in Wales in 2012. A separate report has been prepared for the results of the industrial and commercial survey. This information is required by Welsh Government (WG) for a variety of reasons including:

- reporting on waste generation in compliance with the EU Waste Statistics Regulations 2002;
- informing the development of national waste policy;
- monitoring progress against national waste prevention and recycling targets;
- informing waste planners and the regulator; and
- providing data to the waste management industry to inform investment decisions.

A separate document associated with this report contains the detailed results of the survey and technical appendices associated with the works.

### 1.1. Background and need for the survey

Some waste data on waste generated by permitted industrial facilities is available to NRW via statutory returns. However, this does not necessarily cover all waste generated by those businesses and there are many businesses that do not require an environmental permit. To ensure a comprehensive set of data across all businesses, periodic surveys are required.

There are a wide variety of needs for this kind of waste data. These include European reporting purposes, such as the EU Waste Statistics Regulations that require the United Kingdom to report bi-annual data on waste generated by sector and waste type. More specifically, in Wales it can also inform the National Waste Strategy to help monitor the targets set and provide a baseline to evaluate the Wales Waste Strategy and supporting sector plans. The current relevant targets set in the Wales Waste Strategy “Towards Zero Waste” (2010) and the Construction and Demolition Sector Plan are:

- A reduction of 1.4 per cent every year to 2050 of C&D waste managed off site, against a 2006/07 baseline;
- by 2015/16 to landfill 50% of the amount of C&D waste produced in Wales that was landfilled in the 2007 baseline;
- by 2019/20 to landfill 25% of the amount of C&D waste produced in Wales that was landfilled in the 2007 baseline.
- by 2015/16 to increase preparation for re-use, recycling and other material recovery, including backfilling operations, of non-hazardous waste excluding naturally occurring materials (EWC code 17 05 04), to a minimum of 70% by weight.
- by 2019/20 to increase preparation for re-use, recycling and other material recovery, including backfilling operations, of non-hazardous waste excluding naturally occurring materials (EWC code 17 05 04), to a minimum of 90% by weight.

The information will be used by the Welsh Government and Local Authorities to inform waste planning. It will also provide information to the waste management industry to inform decision making for future investment. Furthermore, it will provide businesses with the information needed to benchmark their current waste practices against other businesses of similar size and sector, and for developing policies to encourage efficient use of resources, waste prevention and the sustainable management of construction and demolition waste.

Surveys of construction & demolition wastes have been completed periodically with the most recent providing data for 2005-06. A new survey has been undertaken to assess the current position, particularly in light of changes to the definition of waste and the effects of the recession on the construction industry.

## **1.2. Overall Aims**

The main aims of the project were to determine how much waste from C&D businesses in Wales was generated by waste type and sector and how that waste was managed during the 2012 calendar year. Information obtained during the survey was used to estimate the composition of the sectors waste streams and where areas of improvement remain.

## **1.3. Study Area**

The geographical scope of the study included the whole of Wales, with data provided from businesses at regional level; South East, South West and North Wales. Lists of the local authorities covered by each region are provided in section 2.9.

## **1.4. Project Management**

The project was managed overall by NRW, on behalf of the Welsh Government who funded the survey. The actual survey was contracted to an environmental consultancy, RSK Environment Limited (RSK). RSK utilised Urban Mines to coordinate local sub contractors to complete the site visits and accumulate the survey data. Ainsworth & Parkinson, Groundwork in Wales and WRc also provided support on the project.

A steering group was set up in order to agree the survey methodology, make recommendations on key decisions and review draft outputs during the life time of the project. The steering group included:

- John Fry - Project Manager, NRW
- Dr Cathy O' Brien - Project Executive, NRW
- Rhiannon Phillips - Welsh Government
- Emily Finney - Welsh Government
- Liz Franks - Welsh Government
- Lucy Thomas - Welsh Government

- Sarah Mogford - Project Director, RSK
- Alison Brough – Project Manager, RSK
- Peter Scholes- Managing Director, Urban Mines
- Innes Deans - Project Manager, Urban Mines
- Andrew Davey - Project Statistician, WRc
- Alastair Halliday – Assistant Project Statistician, WRc
- Barbara Leach - WRAP
- Paul Jennings - Constructing Excellence Wales
- Emma Thomas - Constructing Excellence Wales

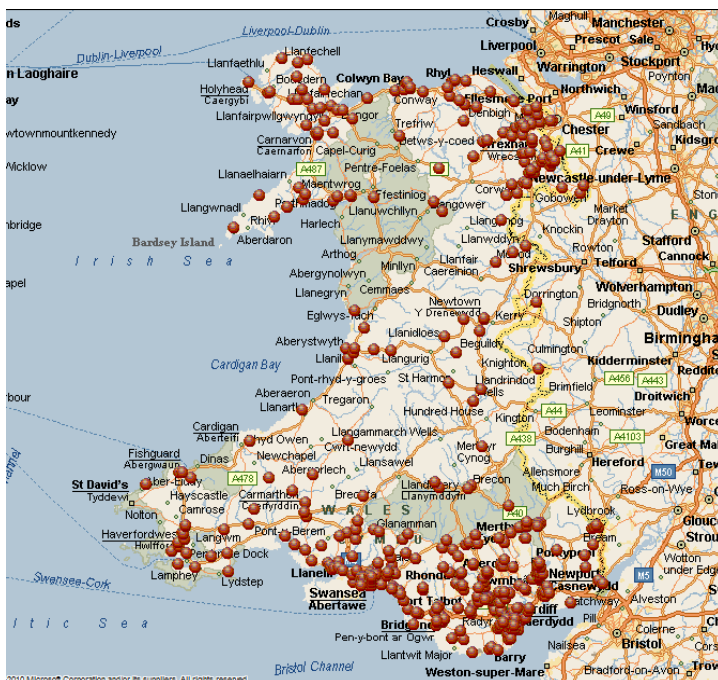
### 1.5. Survey Parameters

The survey of companies was carried out between July 2013 and January 2014, recording wastes generated by project for business sites located in Wales for the 2012 calendar year.

The survey collected waste generated data from a total of 457 business sites throughout Wales, using a structured interview process and developed questionnaire, based upon the requirements of the sample matrix developed by the project statisticians.

The businesses surveyed reflect the geographical spread of business sites throughout Wales (Figure 5). Surveys were completed in all areas and Local Authorities in Wales. The scheduling of surveyor visits was planned to minimise travel times and the carbon impact of the project.

**Figure 5: Geographical Spread of C&D Business Sites Surveyed**



## 2. Survey Design & Methodology

### 2.1. Introduction

The methodology for this survey can be summarised as follows:

What was surveyed:

- 457 construction and demolition businesses;
- businesses across the size range from those with single employees to >100 employees;
- all wastes produced per project by the C&D business in Wales in 2012;
- hazardous and non-hazardous wastes;
- “Non-wastes”<sup>1</sup> such as material directly re-used on site;
- the waste management method used to dispose of, recycle or recover the waste, including backfilling;

What was NOT surveyed:

- businesses involved in industry and commerce<sup>2</sup>;

The methodology can be summarised as follows:

### 2.2. Design of the Questionnaire and Sample frame

The structure of the primary survey database, and therefore the survey questionnaire, was designed to fulfil EU Waste Statistics Regulation reporting. The full list of survey questions is available in Appendix 4.

The development of the sample matrix and grossing up of the cleaned dataset was delivered by consultants WRc under a separate contract with NRW. The methodology used for development of the sample matrix and subsequent grossing of the survey results was based on previous surveys. Following the lessons learned from the 2005-06 survey the sample matrix was reviewed part way through the survey. This allowed for a review of any inconsistencies in the original Office of National Statistics (ONS) dataset and to reflect on actual business recruitment rates. These aspects of the project are discussed in detail in Appendices 2 and 12.

---

<sup>1</sup> Non-Wastes are not classified as wastes as defined under the Waste Framework Directive. All ‘non-wastes’ are excluded from analysis in this report.

<sup>2</sup> Industrial & Commercial wastes were surveyed using a different methodology and questionnaire; this work is reported separately.



### 2.2.1. Core Survey Questions

The survey questionnaire was designed to document individual waste streams, their nature (i.e. hazardous or non-hazardous), form (liquid, solid, gas), description (as EWC waste classification) and tonnage, as well as what happened to the waste (waste management method or fate) and where this happened to assess movements. This part of the data is fully compatible with previous waste surveys. Detailed information on the survey questionnaire is available in Appendix 4.

### 2.3. Survey Delivery

Businesses were recruited by telephone and selection was dictated by business size and sector in the sample matrix. Surveys were delivered via a structured face-to-face interview at business sites, using a laptop and database questionnaire.

The project was delivered by RSK acting as the principal contractor. Urban Mines was responsible for developing and establishing the project methodology, systems (software), and day-to-day project management. Ainsworth & Parkinson was responsible for the telephone recruitment of businesses for the survey and for booking survey visit appointments. The face-to-face survey interviews with businesses were carried out by Groundwork in Wales. The Groundwork surveyors used the structured questionnaire and software developed by Urban Mines during the survey visits. Survey data was collated centrally by Urban Mines who managed the process, trained the surveyors and telebookers, and was responsible for data management and security.

Data was collected by construction project, with location for each project noted and relevant sub-contractors used, if any. By recording sub-contractors any double counting as a result of the sub-contractor also being interviewed, could be eliminated.

The survey delivery model was designed to quality assure the data collected both during the delivery of the survey and during the grossing up phase. This was supported via training of the surveyors, design of the survey software to eliminate entry errors, joint survey visits with project managers, a telephone mini-survey of visited companies and screening incoming raw data for outliers.

### 2.4. Classifying Waste

The European Waste Catalogue (EWC) method was used to classify the wastes. The EWC chapters 15, 16, 17 and 20 were used, as described in table 1 and listed in detail in Appendix 6.

**Table 1: EWC Chapters and associated wastes included in the survey**

<b>EWC Chapter</b>	<b>Chapter Title</b>	<b>Typical Waste Types</b>
Chapter 15	waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified	Packaging, protective clothing
Chapter 16	wastes not otherwise specified in the list	Electricals, batteries,
Chapter 17	construction and demolition wastes (including excavated soil from contaminated sites)	Blocks, tiles, ceramics, wood, glass, plastics, bitumen, metals, soils, insulation, plaster board
Chapter 20	municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions	Non-metallic recyclables, garden waste, municipal like wastes

There is a methodology for mapping European Waste Catalogue (EWC) codes to Substance Oriented Classification (SOC) groups. Therefore, the results from this survey can be compared with those generated by other surveys conducted both in the UK and across Europe.

**Table 2: EWC code groupings used for presenting the survey results**

<b>Survey grouping name</b>	<b>EWC descriptions (EWC codes)</b>
Aggregates	Concrete (17 01 01), bricks (17 01 02), tiles and ceramics (17 01 03), mixtures of concrete, bricks, tiles and ceramics containing dangerous substances (17 01 06*), other mixtures of the above (17 01 07), bituminous mixtures containing coal tar (17 03 01*), other bituminous mixtures (17 03 02), coal tar and tarred products (17 03 03*) and track ballast (17 05 08).
Insulation & gypsum**	Insulation materials (17 06 03* and 17 06 04) and gypsum based materials (17 08 01* and 17 08 02).
Metallic waste	Iron and steel (17 04 05), copper, bronze, brass (17 04 01), aluminium (17 04 02), lead (17 04 03), tin (17 04 06), cables (17 04 11) mixed metals (17 04 07), metallic packaging (15 01 04) and metals (20 01 40).
Mixed waste	Glass, plastic and wood containing or contaminated with dangerous substances (17 02 04*), other construction & demolition wastes (including mixed wastes) containing dangerous substances (17 09 03*), mixed construction & demolition wastes (17 09 04), mixed packaging (15 01 06), wastes not otherwise specified (16 01 99, 16 03 05*, 16 03 06, 16 07 99, 20 01 99 & 20 03 99), mixed municipal waste (20 03 01), street cleaning residues (20 03 03) and bulky waste (20 03 07).
Non-metallic waste	Glass (17 02 02 & 20 01 02), paper & cardboard (15 01 01 & 20 01 01), rubber (16 01 03), plastic (15 01 02, 17 02 03 & 20 01 39), wood (15 01 03, 17 02 01 & 20 01 38), textile (15 01 99 & 20 01 11) and waste containing PCBs (16 02 10).
Soil	Soils and stones containing dangerous substances (17 05 03*), Other soils and stones (17 05 04 & 20 02 02)

\*hazardous wastes

\*\* excludes insulation & gypsum containing asbestos, which is reported as 'asbestos' in the survey results to avoid double counting.

Table 2 lists the EWC codes that have been grouped for the purposes of summarising the survey results.

## **2.5. Calculating Tonnages**

A key requirement of the survey was that quantities of each waste stream could be represented as weight and recorded in metric tonnes.

Surveyors were instructed to ask for documented evidence of weights wherever possible, for instance from waste transfer notes, contractor invoices, or other business records. This point was stressed during the telephone booking process and in the appointment confirmation email so that businesses could prepare these documents in advance of the visit.

Where documented evidence was not available, the surveyor was provided with a tool as part of the survey software to calculate annual tonnages from container volume and disposal frequency. The software used standard container types (summarised in Appendix 8) for volume, and a series of bulk density conversion factors (presented in Appendix 9) from which weights could be calculated by entering number of collections per year.

All the conversion factors could be overwritten by the surveyor if the standard conditions were not relevant, and surveyors were instructed to 'reality check' the resultant weights with the business representative before accepting them. For some individual items of waste (e.g. a fluorescent tube) a separate list of specific items (see Appendix 10) was also provided as part of the software package.

## 2.6. Classifying Waste Management Methods

The waste management methods were grouped as per Table 3 below.

**Table 3 Waste management activities grouped by Waste Management Method**

Prime method	Waste Management	Waste Management Description – sub category
Land disposal		Landfill
		Soakaway
		Lagoon disposal
		Deep injection (borehole)
		Other land disposal
Land recovery		Landsread
		Injection
		Other land recovery
Incineration with Energy Recovery		Incineration with energy recovery
		Pyrolysis
		Gasification
		waste derived fuel
		Other thermal treatment with energy recovery
Incineration Recovery	without Energy	Incineration without Energy Recovery
		Pyrolysis (without Energy Recovery)
		Gasification (without Energy Recovery)
		Crematorium
		Other TT without Energy Recovery
Transfer Station		transfer (as much effort as possible should be made to identify the final)
Treatment		Treated - physico/chemical
		Treated – biological
		Separation
		Mechanical Biological Treatment (MBT)
		Autoclave
		Rendering e.g. food waste into pet food manufacture
		mechanical heat treatment
		alternative treatment technologies
Recycling		source separated - collected by a waste contractor or sent direct to a reprocessor
		mixed/co-mingled sent to MRF/transfer station
		waste recycling centre/Civic Amenity site
Composting		windrow composting
		In-Vessel Composting (IVC)
		Anaerobic Digestion (AD)
		Other
Reuse		Preparation (*) for Re-use on site
		Preparation for Re-use off site
		Direct Re-use on site
		Other reuse
'other'		"other Recovery" i.e. other specialised recovery operations not specified above e.g. recovery of components from catalysts, recovery of components used for pollution abatement.
		Maceration (food waste)
		Backfilling

## 2.7. Non-Wastes

The following was included in the survey but not classified as 'waste' under the Waste Framework Directive and is therefore referred to as a 'non-wastes' in this project:

*“uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated.”<sup>3</sup>*

Where this material was managed in a different way to that specified above, it was classed as a 'waste' in this project.

In addition, any material that was identified as directly re-used at the site that they were produced were also recorded in the survey as 'non-wastes', which had not been recorded in previous Wales C&D surveys. All 'non-wastes' are excluded from analysis in this report.

## 2.8. Backfilling

Any backfilling operation has to comply with the recovery definition by replacing other materials or being prepared to fulfil a particular function. Associated with the term backfilling is the notion of a permanent placement of the material on/in particular sites, it is not intended to be returned to the economic material cycle. The term *backfilling* falls under 'other recovery'. "Other recovery" is any operation meeting the definition for "recovery" under the Waste Framework Directive, but failing to comply with the specific requirements for recycling or for preparation for re-use.

The Commission Decision 2011/753/EU defines backfilling as follows:

*“backfilling' means a recovery operation where suitable waste is used for reclamation purposes in excavated areas or for engineering purposes in landscaping and where the waste is a substitute for non-waste materials”.*

There is no specification of the type of waste other than it has to be suitable, meaning appropriate for the purpose and without causing environmental harm. Backfilling operation involves reclamation purposes in excavated areas or engineering purposes in landscaping, however it has to substitute other materials that are not waste. The condition of substituting other (non-waste) materials suggests that the reclamation or landscaping measures will be undertaken anyway, whether a suitable waste for this purpose is available or not.

---

<sup>3</sup> Article 2(1)(c) revised Waste Framework Directive

If a waste is used instead of other virgin materials, suitable for the application (complying with the necessary properties for the particular performance), and applied in a process of landscaping engineering it falls under the definition of backfilling.

## 2.9. Classifying Regions

For the purposes of reporting regional data, local authorities were grouped into the following regions:

**North:** Conwy, Denbighshire, Flintshire, Gwynedd, Isle of Anglesey, Powys (Montgomeryshire) & Wrexham.

**South East:** Blaenau Gwent, Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Newport, Powys (Brecon & Radnorshire), Rhondda Cynon Taf, Torfaen & Vale of Glamorgan.

**South West:** Bridgend, Carmarthenshire, Ceredigion, Neath Port Talbot, Pembrokeshire & Swansea

## 2.10. Further Detail

Detailed notes on how the survey was delivered, and quality assurance methods used, are given in Appendix 3. The data grossing and calculation of survey precision methodologies are provided in Appendix 12, and the lessons learned for future surveys are described in Appendix 11.

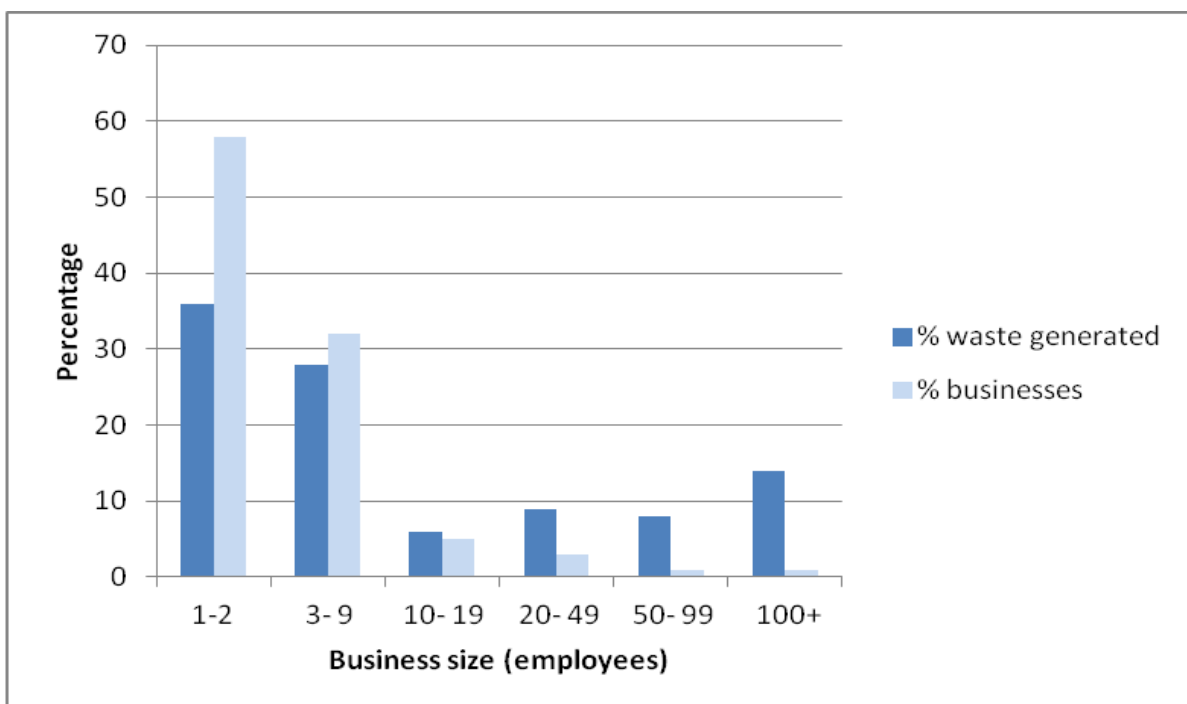
### 3. Survey results

#### 3.1. Waste Generation - Nationally

Approximately 3.4 million tonnes of construction and demolition (C&D) waste was generated in 2012. The precision for the total Wales C&D waste generated was +/- 33.2% at 90% confidence. The calculation method and further details on the precision of the data presented is summarised in Appendix 12.

The survey results indicate that the majority of total waste generated (64%) was produced by businesses with less than 9 employees. Figure 6 shows that the majority of C&D businesses (91%) are within this size band. Businesses with 100+ employees generated 14% of all waste, despite accounting for less than 1% of all C&D businesses.

**Figure 6: Construction and Demolition waste generated in Wales 2012, % of total waste, by business size (employee numbers)**



**Figure 7: Construction and Demolition waste generated in Wales 2012 by sector (% of total waste)**

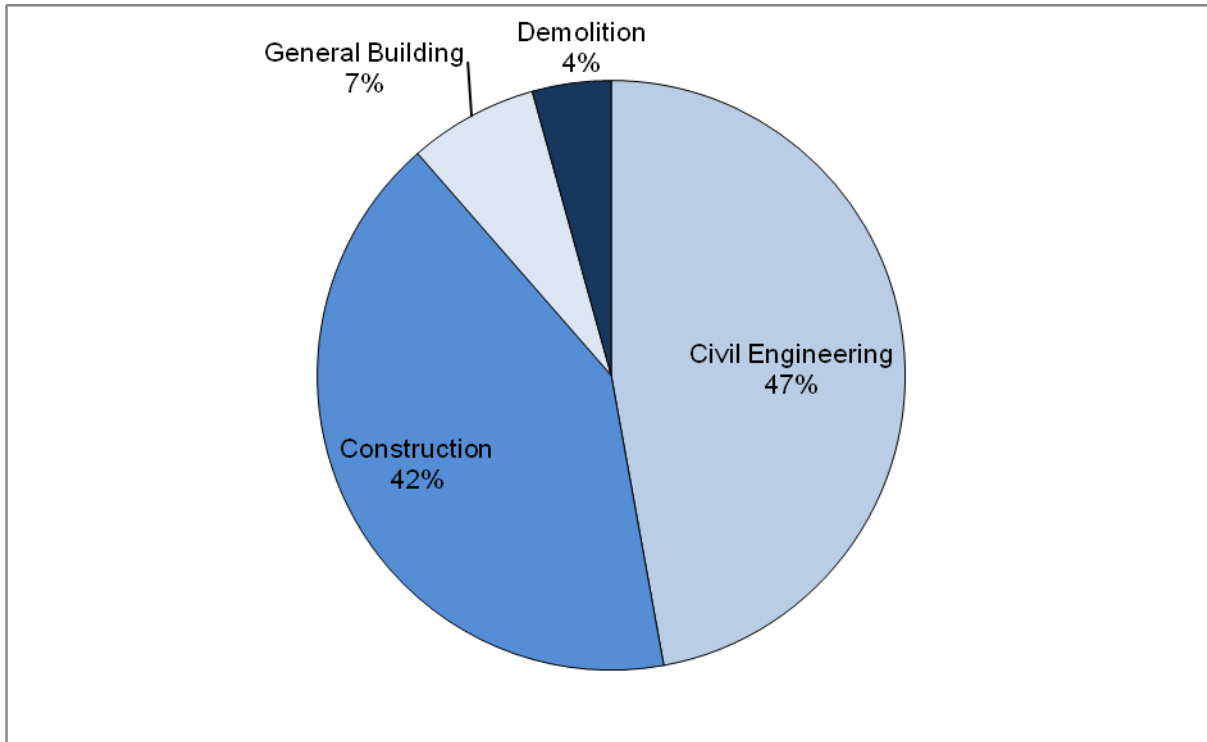
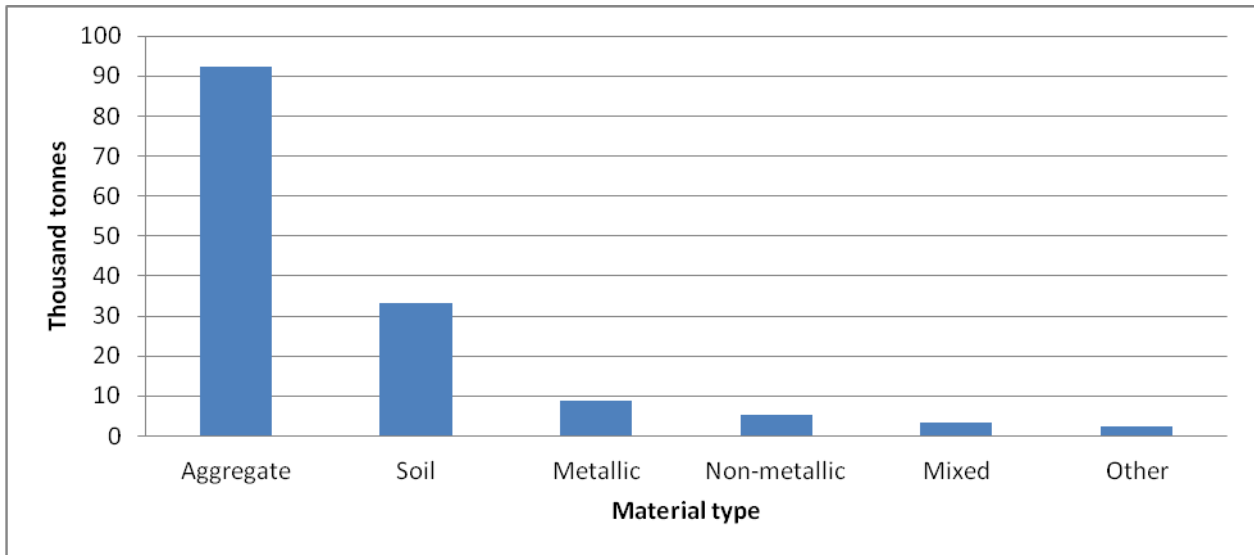


Figure 7 shows that the civil engineering sector generated the largest proportion of this waste at 1.6 million tonnes (47%) followed by the construction sector, which generated 1.4 million tonnes (42%). The general building sector generated 238 thousand tonnes (7%) and the demolition sector generated 145 thousand tonnes (4%).

Table 8 in Section 3.6 describes the quantities of waste generated by each sub-sector. The construction of civil engineering projects sector generated the largest quantity of waste at approximately 1.3 million tonnes, which was 39% of total C&D waste generated in Wales. The construction of domestic buildings sub sector also generated a large proportion of the total C&D waste, producing 932 thousand tonnes (28%). Conversely, the plastering and floor and wall covering sub-sectors generated the least amount of waste at 4 thousand and 6 thousand tonnes respectively.



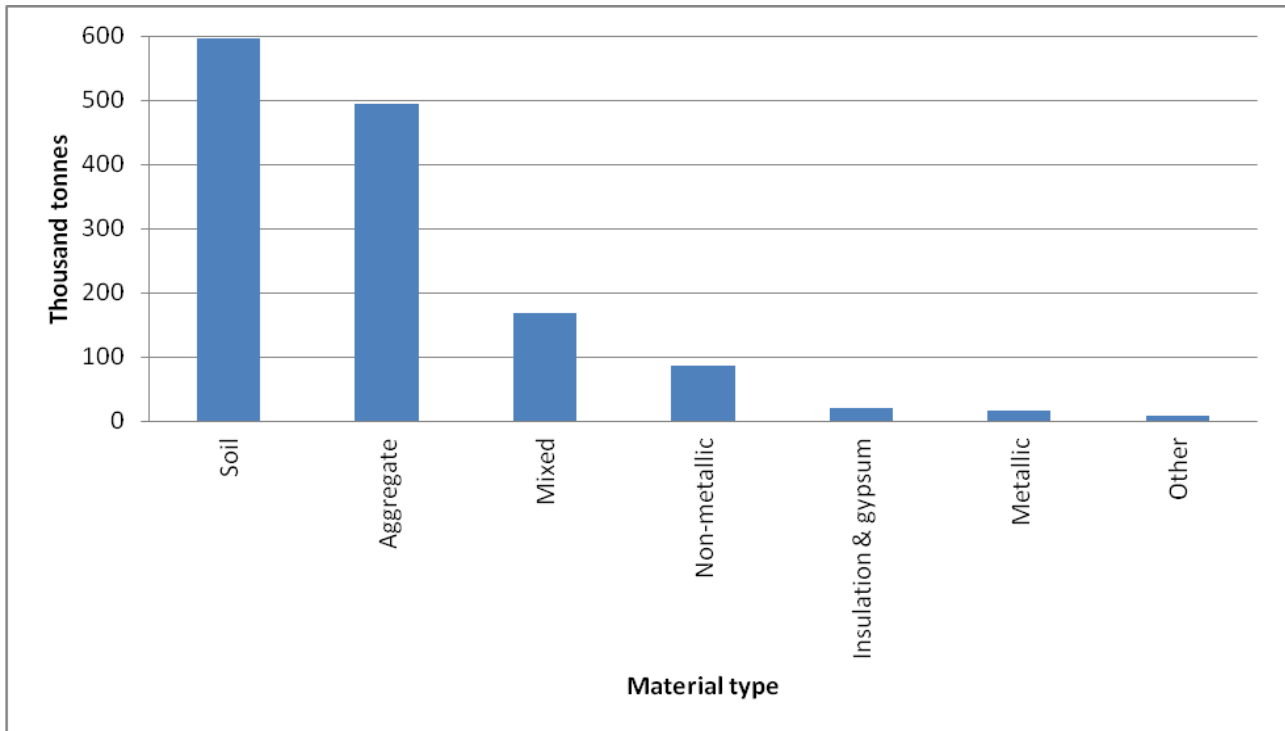
**Figure 8: Waste types generated by the Demolition sector in Wales 2012**



'Other' includes discarded equipment, animal & vegetal, insulation & gypsum and asbestos wastes

Figure 8 shows that approximately 92 thousand tonnes of waste generated by the Demolition sector was aggregates (64%), 33 thousand tonnes was soil & stones (23%) and 9 thousand tonnes was metallic waste (6%). The majority of the aggregates generated consisted of mixtures of concrete, bricks, tiles and ceramics (96%). The majority of the metallic waste generated was iron and steel (92%).

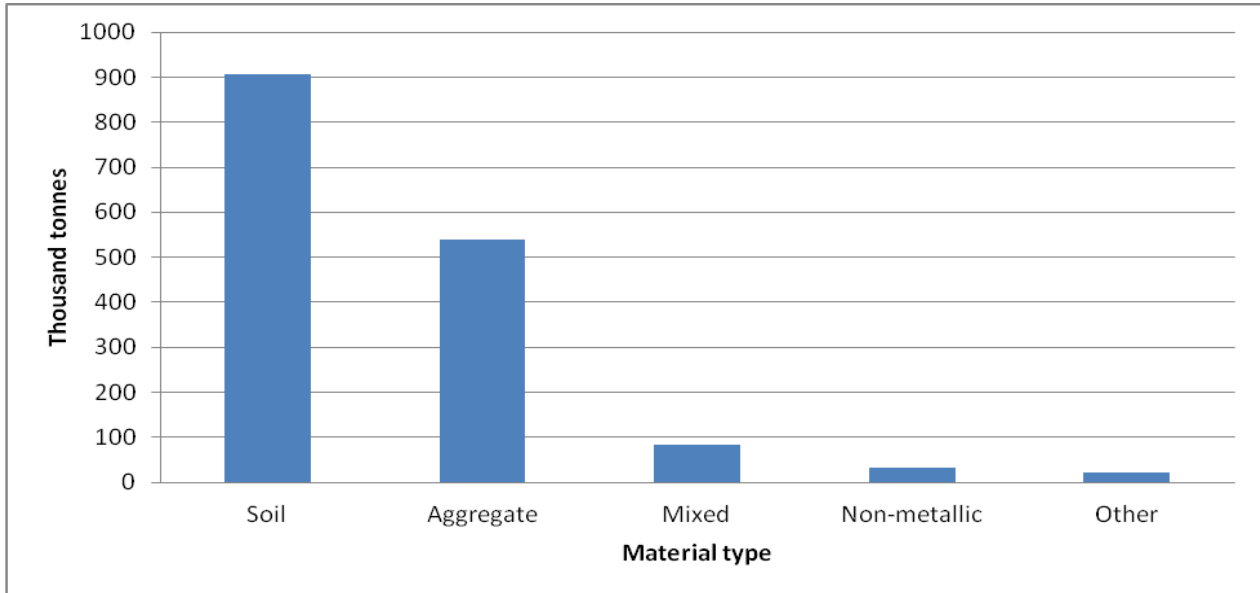
**Figure 9: Waste types generated by the Construction sector in Wales 2012**



'Other' includes discarded equipment, animal & vegetal, common sludges and asbestos wastes

Figure 9 shows that approximately 597 thousand tonnes of waste generated by the Construction sector was soils and stones (43%), 494 thousand tonnes was aggregates (35%), 169 thousand tonnes was mixed wastes (12%) and 87 thousand tonnes was non-metallic waste (6%). The majority of the aggregates generated consisted of mixtures of concrete, bricks, tiles and ceramics (88%). The majority of non metallic waste consisted of wood (76%) and plastic (17%).

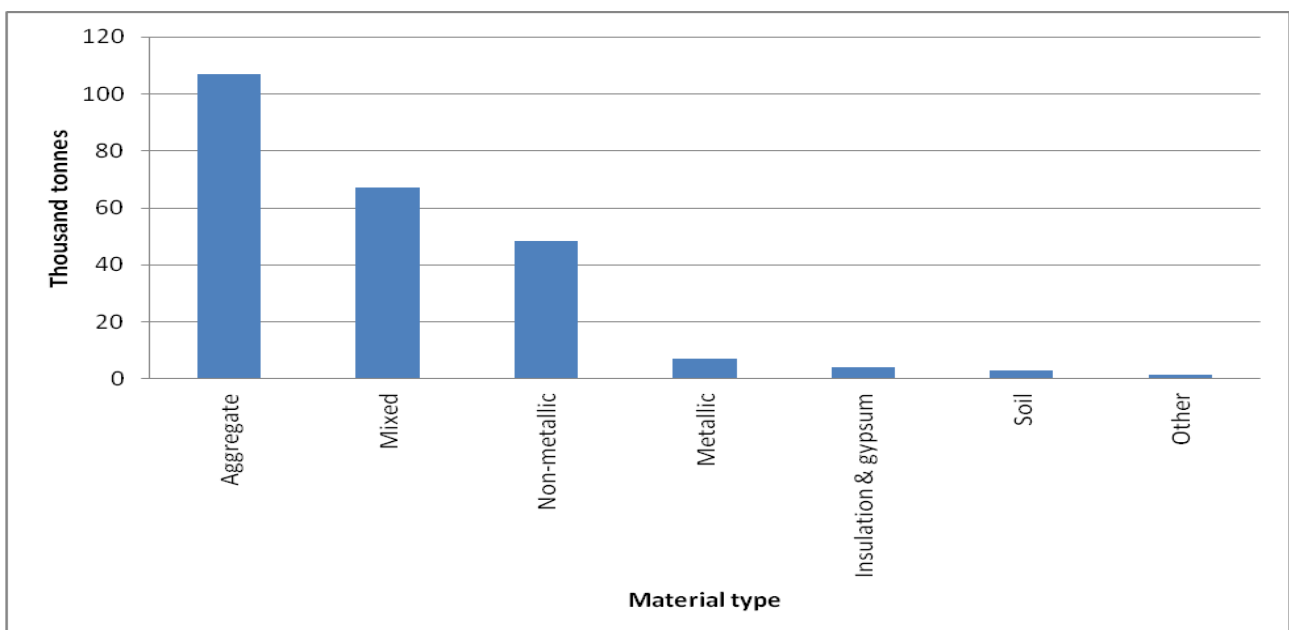
**Figure 10: Waste types generated by the Civil Engineering sector in Wales 2012**



'Other' includes discarded equipment, animal & vegetal, common sludges and other mineral wastes

Figure 10 shows that approximately 906 thousand tonnes of waste generated by the Civil Engineering sector was soils & stones (57%), 540 thousand tonnes was aggregates (34%) and 84 thousand tonnes was mixed wastes (5%). The majority of aggregates generated consisted of mixtures of concrete, bricks, tiles and ceramics (84%) and bituminous mixtures (10%).

**Figure 11: Waste types generated by the General Building sector in Wales 2012**



'Other' includes discarded equipment, animal & vegetal, common sludges and other mineral wastes

Figure 11 shows that approximately 107 thousand tonnes of waste generated by the General Building sector was aggregates (45%), 67 thousand tonnes was mixed wastes (28%) and 48 thousand tonnes was non-metallic wastes (20%). The majority of aggregates generated consisted of mixtures of concrete, bricks, tiles and ceramics (98%). The majority of non-metallic wastes generated consisted of wood (44%), plastic (31%) and paper & cardboard wastes (22%).

### 3.2. Waste Generation - Regionally

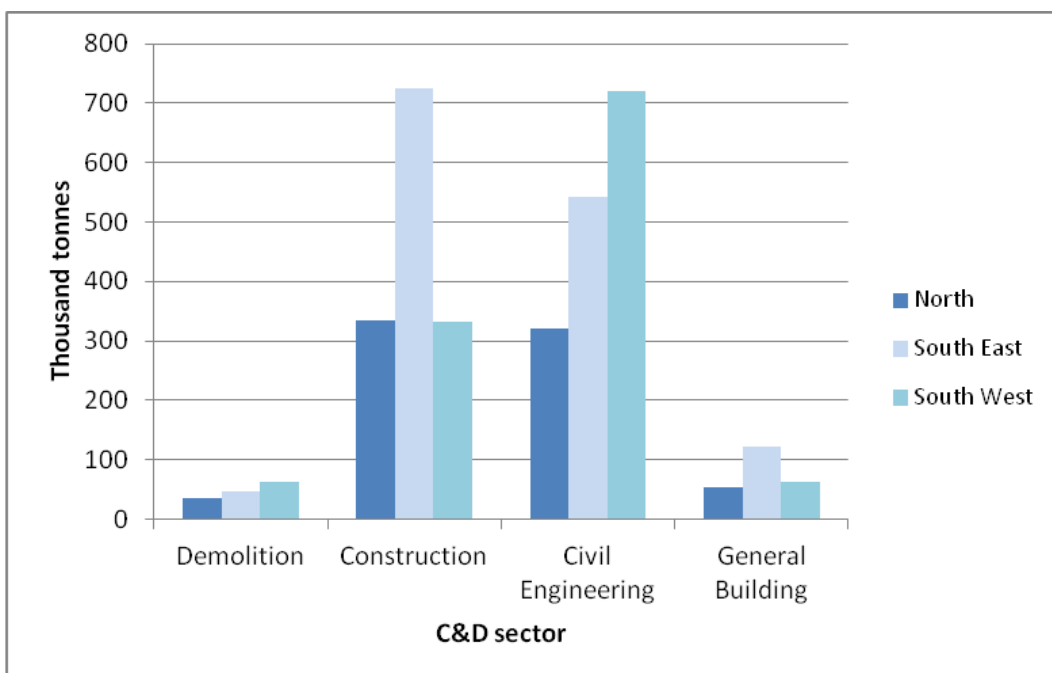
The estimated Regional breakdown of the waste generated was:

North Wales	0.74 million tonnes (+/- 29.9% at 90% confidence)
South East Wales	1.44 million tonnes (+/- 51.6% at 90% confidence)
South West Wales	1.18 million tonnes (+/- 58.3% at 90% confidence)

The geographical distribution of business sites in Wales is 29% in North Wales, 40% in South East Wales and 31% in South West Wales.

Table 4 provides estimates of the waste generated in the three regions in Wales across the construction and demolition sectors. As illustrated in Figure 12, the largest quantity of Construction (52%) and General Building (51%) waste was generated in South East Wales whereas the largest quantity of Civil Engineering (46%) and Demolition (43%) waste was generated in South West Wales.

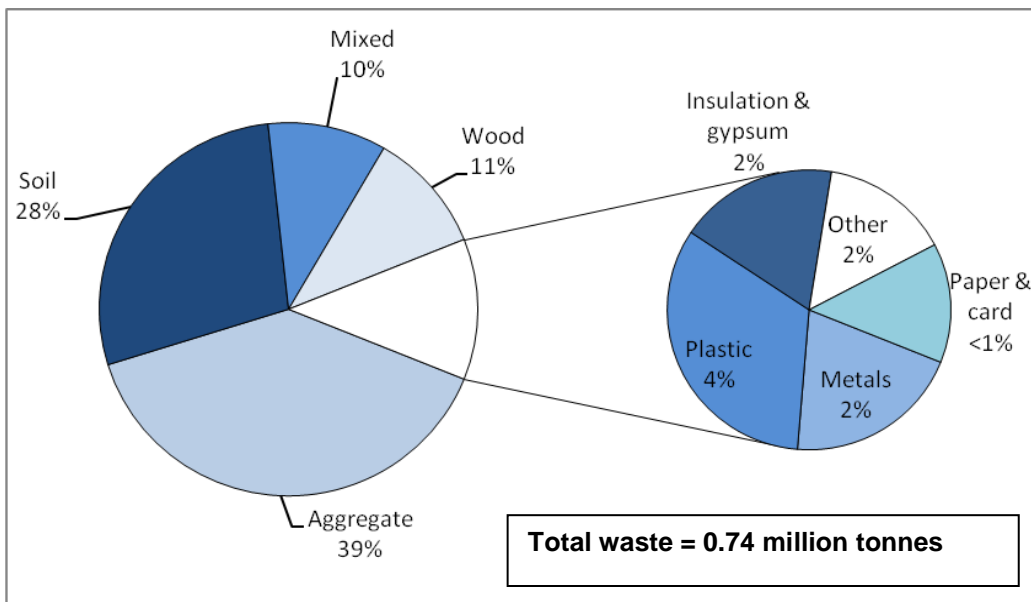
**Figure 12: Waste Generated in Wales 2012, (in thousands of tonnes), by Sector and Region**



**Table 4: Regional Waste generated by C&D sector**

Sector		Quantity of waste produced per region (thousands of tonnes per annum and % of waste stream)			
		North	South-East	South-West	Total
<b>Demolition</b>	Thousand tonnes	35.48	47.20	62.65	145.32
	%	24%	32%	43%	100%
<b>Construction</b>	Thousand tonnes	334.81	725.30	331.82	1,391.93
	%	24%	52%	24%	100%
<b>Civil Engineering</b>	Thousand tonnes	320.52	542.75	720.50	1,583.77
	%	20%	34%	46%	100%
<b>General Building</b>	Thousand tonnes	54.01	122.10	62.37	238.47
	%	23%	51%	26%	100%
<b>Total</b>	Thousand tonnes	<b>744.82</b>	<b>1,437.35</b>	<b>1,177.33</b>	<b>3,359.49</b>
	%	<b>22%</b>	<b>43%</b>	<b>35%</b>	<b>100%</b>

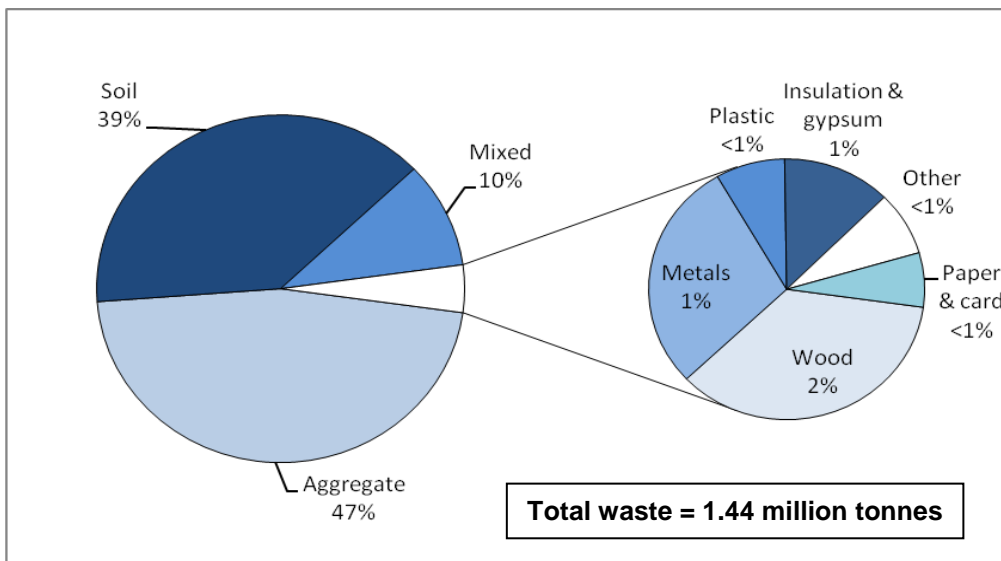
**Figure 13: Waste generated (as a percentage of total) in North Wales across all C&D sectors**



'Other' includes animal & vegetal, chemical, discarded equipment, common sludges, other mineral and other non metallic waste

Figure 13 shows that aggregates (39%) and soils (28%) were the dominant material types generated by all C&D sectors in North Wales. However, there was a higher proportion of wood (11%) and plastic (4%) generated by the C&D projects in North Wales compared to the other regions.

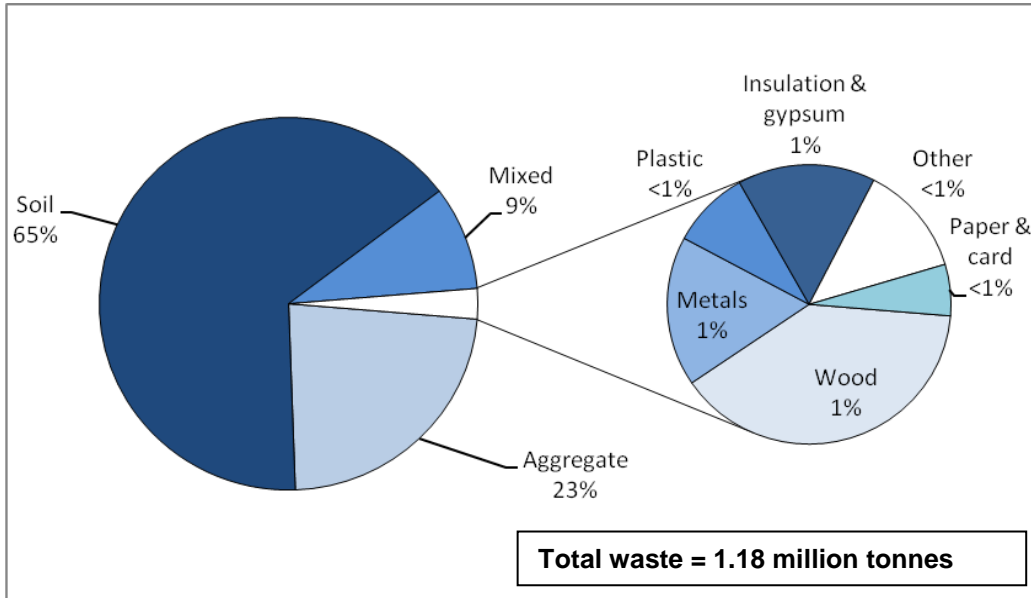
**Figure 14: Waste generated (as a percentage of total) in South East Wales across all C&D sectors**



'Other' includes animal & vegetal, chemical, discarded equipment, common sludges, other mineral and other non metallic waste

Figure 14 shows that aggregates (47%) and soils (39%) were the dominant material types generated by all C&D sectors in South East Wales. The majority of other waste generated was mixed waste (10%).

**Figure 15: Waste generated (as a percentage of total) in South West Wales across all C&D sectors**



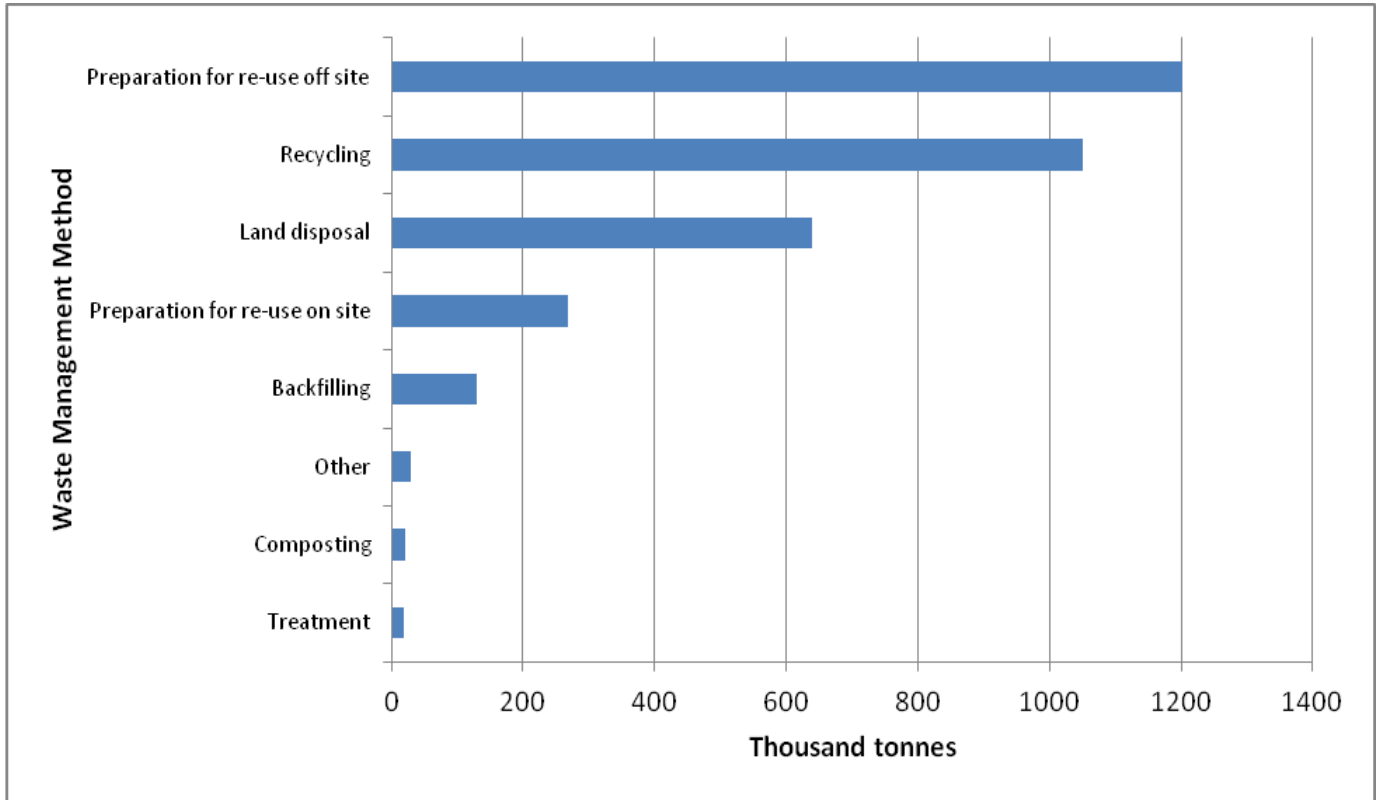
'Other' includes animal & vegetal, chemical, discarded equipment, common sludges, other mineral and other non metallic waste

Figure 15 shows that the majority of waste generated by all C&D sectors in South West Wales was soil (65%). The majority of other waste generated was aggregate (23%) and mixed waste (9%).

### 3.3. Waste Management- Nationally

Figure 16 illustrates that the majority was prepared for re-use. Approximately 1.2 million tonnes was prepared for re-use off site (36%) with a further 268 thousand tonnes prepared for re-use on site (8%). Approximately 1.1 million tonnes was recycled (31%) and 639 thousand tonnes was disposed of via landfill (19%). An estimated 130 thousand tonnes was sent for backfilling (4%). A small proportion of the waste generated was sent for other treatment and composting.

**Figure 16: Waste Generated by Waste Management Method**



'Other' includes land recovery, incineration, other re-use, transfer station and don't know

Table 5 shows that the majority of waste generated by the Demolition (80%) and Construction (60%) sectors was prepared for re-use. The majority of waste generated by the Civil Engineering (37%) and General Building (40%) sectors was recycled. The Civil Engineering sector sent the highest proportion of its generated waste to land disposal (29%) compared to the other sectors followed by the General Building sector (20%).



**Table 5: Management of C&D waste generated in Wales 2012 by sector**

Management Type		Demolition	Construction	Civil Engineering	General Building	TOTAL
Preparation for re-use	Thousand tonnes	116.59	829.04	441.83	84.70	<b>1,472.17</b>
	%	80%	60%	28%	36%	44%
Recycling	Thousand tonnes	24.61	347.60	582.77	95.99	<b>1,050.97</b>
	%	17%	25%	37%	40%	31%
Land disposal	Thousand tonnes	3.96	126.54	462.07	46.81	<b>639.39</b>
	%	3%	9%	29%	20%	19%
Treatment	Thousand tonnes	0.00	0.13	19.47	0.01	<b>19.61</b>
	%	0%	<1%	1%	<1%	1%
Backfilling	Thousand tonnes	0.00	70.74	59.69	0.00	<b>130.43</b>
	%	0%	5%	4%	0%	4%
Other	Thousand tonnes	0.15	17.87	17.94	10.96	<b>46.92</b>
	%	<1%	1%	1%	5%	1%
<b>Total</b>		<b>145.32</b>	<b>1,391.93</b>	<b>1,583.77</b>	<b>238.47</b>	<b>3,359.50</b>

'Other' includes composting, land recovery, incineration, transfer station and don't know

**Table 6: Management of C&D waste generated in Wales 2012 by material type**

Management Type		Aggregate	Soil	Mixed	Non-metallic	Metallic	Other	Total
Preparation for re-use	Thousand tonnes	593.43	830.55	2.33	37.91	6.95	1.01	<b>1,472.17</b>
	%	48%	54%	1%	22%	17%	2%	44%
Recycling	Thousand tonnes	520.32	221.64	125.54	127.98	34.91	20.58	<b>1,050.97</b>
	%	42%	14%	39%	74%	83%	42%	31%
Land disposal	Thousand tonnes	29.51	424.49	173.81	1.78	0.07	9.73	<b>639.39</b>
	%	2%	28%	54%	1%	<1%	20%	19%
Treatment	Thousand tonnes	-	15.00	4.52	-	-	0.09	<b>19.61</b>
	%	0%	1%	1%	0%	0%	<1%	1%
Backfilling	Thousand tonnes	82.10	47.18	0.80	-	-	0.35	<b>130.43</b>
	%	7%	3%	<1%	0%	0%	1%	4%
Other**	Thousand tonnes	7.91	-	16.97	4.53	-	17.57	<b>46.92</b>
	%	1%	0%	5%	3%	0%	36%	1%
<b>Total</b>		<b>1,233.27</b>	<b>1,538.86</b>	<b>323.97</b>	<b>172.19</b>	<b>41.93</b>	<b>49.33</b>	<b>3,359.50</b>

\*\*Other' materials includes animal & vegetal, chemical, discarded equipment, common sludges and other mineral waste.

\*\*\*Other' management includes composting, land recovery, incineration, transfer station and don't know

Table 6 shows the management of C&D waste by material. The majority of aggregate (48%) and soil (54%) was prepared for re-use and the majority of metallic waste (83%) and non-metallic waste (74%) was recycled. In contrast, the majority of mixed wastes generated were sent for land disposal (54%). Of the 639 thousand tonnes of C&D waste landfilled, the majority was soil (66%) and mixed wastes (27%).

**Table 7: Management of waste generated in Wales 2012 by material type, excluding hazardous waste and naturally occurring soils and stones (EWC 17 05 04)**

Management Type		Aggregate	Soil	Mixed	Non-metallic	Metallic	Other	Total
Preparation for re-use	Thousand tonnes	586.27	0.80	2.32	37.91	6.95	0.25	<b>634.50</b>
	%	48%	28%	1%	22%	17%	1%	35%
Recycling	Thousand tonnes	514.86	-	125.48	127.98	34.91	18.73	<b>821.96</b>
	%	42%	0%	39%	74%	83%	47%	46%
Land disposal	Thousand tonnes	29.24	-	173.77	1.78	0.07	6.71	<b>211.56</b>
	%	2%	0%	54%	1%	<1%	17%	12%
Treatment	Thousand tonnes	-	-	4.40	-	-	0.07	<b>4.47</b>
	%	0%	0%	1%	0%	0%	<1%	<1%
Backfilling	Thousand tonnes	82.10	2.10	0.80	-	-	0.35	<b>85.35</b>
	%	7%	72%	<1%	0%	0%	1%	5%
Composting	Thousand tonnes	-	-	13.93	-	-	6.11	<b>20.05</b>
	%	0%	0%	4%	0%	0%	15%	1%
Other**	Thousand tonnes	7.90	-	3.04	4.53	-	8.04	<b>23.51</b>
	%	1%	0%	1%	3%	0%	20%	1%
<b>Total</b>		<b>1,220.38</b>	<b>2.90</b>	<b>323.73</b>	<b>172.19</b>	<b>41.93</b>	<b>40.27</b>	<b>1,801.39</b>

\*\*Other' materials includes animal & vegetal, chemical, discarded equipment, common sludges and other mineral waste.

\*\*\*Other' management includes land recovery, incineration, transfer station and don't know

Table 7 shows the management of C&D waste by material excluding hazardous waste and naturally occurring soils and stones (EWC 17 05 04). When excluding these materials, almost all C&D waste sent to land disposal was mixed waste (82%). In addition, when excluding naturally occurring soil & stones (EWC 17 05 04), the majority of C&D waste prepared for re-use was aggregate (92%).

In terms of calculating the National Construction & Demolition recycling rate, the National waste strategy 'Towards Zero Waste' sets the following methodology and target:

*"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."*

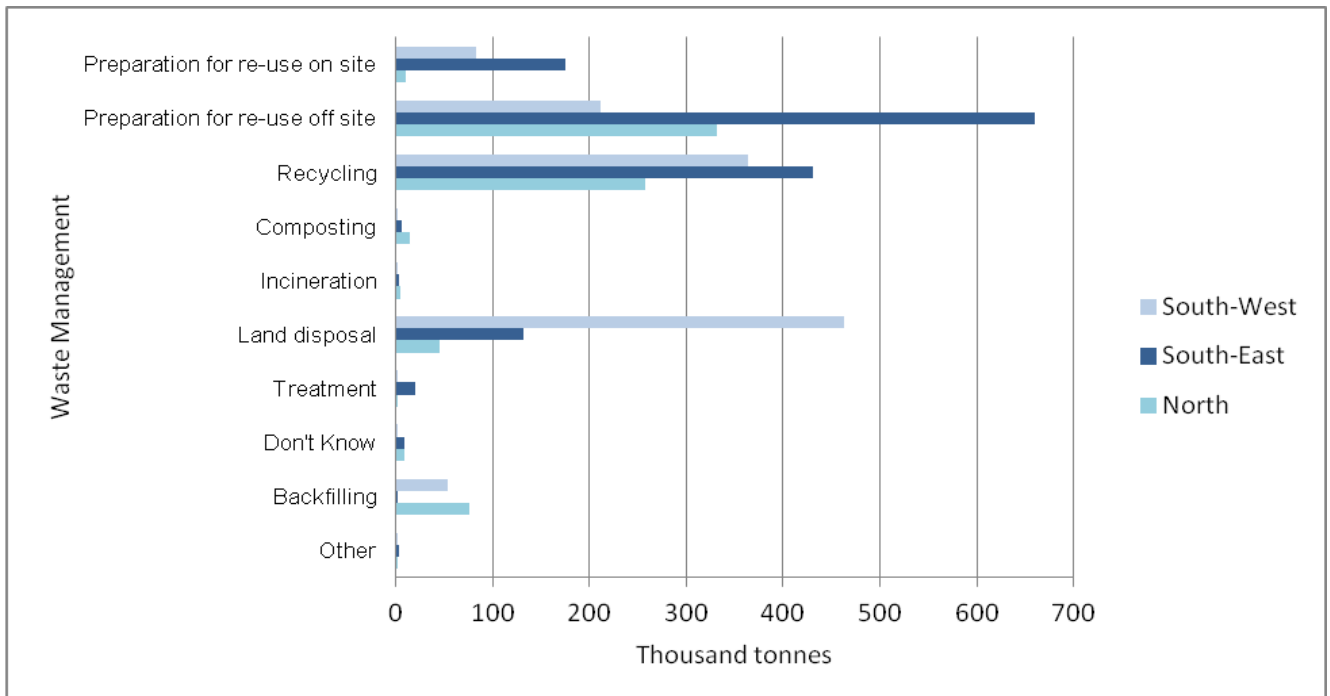
Table 7 follows the above definition and shows that the survey results estimate that the preparation for re-use, recycling and other material recovery rate was 87% for the C&D sector as a whole in 2012.

### 3.4. Waste Management- Regionally

Figure 17 shows that the predominant waste management method in North and South East Wales was preparation for re-use off site, whilst in South West Wales it was land disposal. The main reason for this was related to the management of soils and stones (EWC 17 05 04) in South West Wales, whereby approximately 208 thousand tonnes was sent to land disposal, which accounted for 57% of the waste sent to land disposal in the region.

Recycling was the second most common management method in all three regions. The largest contributors to this recycling rate in terms of waste types were mixtures of bricks, tiles and concrete (EWC 170107) in the North and South East and mixtures of soils and stones (EWC 170504) in the South West.

**Figure 17: Waste generated in Wales 2012 by Waste Management Method and Region**



'Other' includes other reuse, land recovery, transfer station, other and don't know

### **3.5. Comparison with previous surveys and targets in “Towards Zero Waste” National Waste Strategy**

Comparison with previous survey results should not be made because:

- The definition of waste has changed considerably since the previous 2005-06 survey, excluding a large amount of material which was previously recorded as waste.
- The recession impacted significantly on the construction sector, reducing output and therefore waste generation.
- There were no major infrastructure projects accounting for very large quantities of waste in 2012. This contrasts with 2005/06 when three of the five largest waste producers were involved in major projects. This illustrates the difficulty in comparing data from single years.
- The geographical data for 2012 is reported based on the location of the construction/demolition site as opposed to the location of the business office. This reflects the fact that C&D waste generally needs to be managed close to the site of production.

The preparation for re-use, recycling and other material recovery rate for the Construction & Demolition waste generated in Wales was 87% in 2012. This is comparable with the Welsh Government targets to increase preparation for re-use, recycling and other material recovery to a minimum of 70% by 2015/16 and 90% by 2019/20. The 2012 results indicate that the C&D sector is on course towards meeting these targets.

The quantity of waste landfilled in 2012 was approximately 639 thousand tonnes. NRW compared the grossed up survey data against permitted site returns for landfills. The inferred construction & demolition proportion from landfill site returns 2012 was estimated to be 646 thousand tonnes, which is only a 1% discrepancy compared to the 639 thousand tonnes reported in the survey and therefore supports the survey landfill results. Landfill returns will be used to monitor against Welsh Government landfill reduction targets for the C&D sector in future years.

### **3.6. Hazardous Waste**

An estimated 38 thousand tonnes of hazardous waste was generated by the Construction & Demolition sectors in 2012 out of a total waste generation of 3.4 million tonnes (1%). The C&D sector generating the largest quantity of hazardous waste was the Civil Engineering sector, which generated 29 thousand tonnes (77%).

**Table 8 Construction & Demolition waste generation in Wales 2012, split between Hazardous and Non- hazardous waste by Sector (tonnes)**

Type	Sector	Hazardous		Non- Hazardous		Total
		Tonnes	%	Tonnes	%	Tonnes
<b>Demolition</b>	Demolition & site preparation	1,905	1%	143,418	99%	145,323
<b>Construction</b>	Development of building projects	55	<1%	53,721	>99%	53,776
	Construction of commercial buildings	1,278	<1%	273,714	>99%	274,992
	Construction of domestic buildings	661	<1%	931,244	>99%	931,906
	Roofing activities & scaffold erection	2,506	4%	53,277	96%	55,783
	Test drilling & boring and other specialised construction activities	1,148	2%	74,326	98%	75,474
<b>Civil Engineering</b>	Construction of highways, roads, airfields and sport facilities	20,808	8%	251,818	92%	272,626
	Construction of civil engineering constructions	8,112	1%	1,303,032	99%	1,311,145
<b>General Building</b>	Electrical installation	382	<1%	76,439	>99%	76,821
	Plumbing	18	<1%	28,015	>99%	28,033
	Other construction installation	144	1%	18,961	99%	19,105
	Plastering	0	0%	4,379	100%	4,379
	Joinery installation	53	<1%	42,418	>99%	42,472
	Floor and wall covering	11	<1%	5,764	>99%	5,775
	Painting & glazing	336	2%	19,986	98%	20,322
Other building completion and finishing	162	<1%	41,404	>99%	41,566	
<b>Total</b>		<b>37,579</b>	<b>1%</b>	<b>3,321,918</b>	<b>99%</b>	<b>3,359,497</b>

Table 8 shows the waste generated by each sub sector split between hazardous and non-hazardous. The C&D sub sectors that generated the largest proportion of hazardous waste compared to total waste generated by the sub sector were the Construction of highways, roads, airfields and sport facilities sub sector (8%) and roofing activities & scaffold erection sub sector (4%).

**Figure 18: Construction & Demolition hazardous wastes generated in Wales 2012, thousands of tonnes, by Waste Type (SOC) and Region**

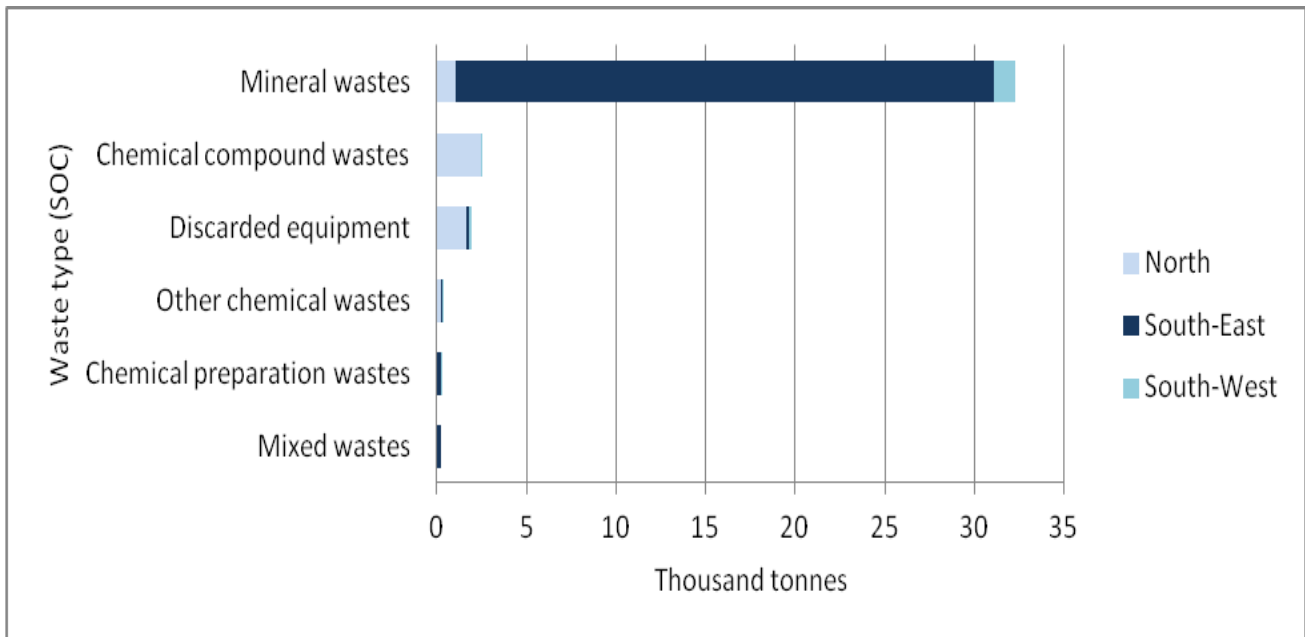
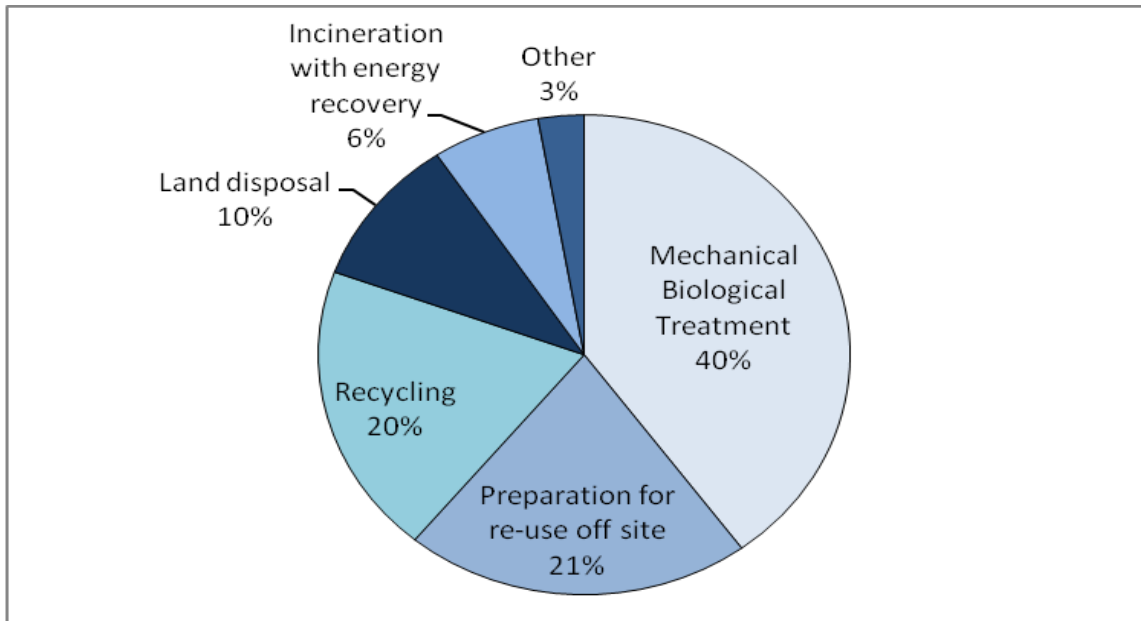


Figure 18 shows that the majority of hazardous waste generated was mineral wastes (32 thousand tonnes) with the remainder being chemical waste (3 thousand tonnes) and discarded equipment (2 thousand tonnes). Of these, contaminated soils (15 thousand tonnes) and bituminous mixtures (13 thousand tonnes) were the most common material types. Significant quantities of asbestos waste (3 thousand tonnes) and chemical solvents (2 thousand tonnes) were also generated.

Figure 18 also shows the region where each of the hazardous waste types were generated. Almost all of the mineral wastes, chemical preparation wastes and mixed wastes were generated in South East Wales. In contrast, the majority of chemical compound wastes, discarded equipment and other chemical wastes were generated in North Wales.

**Figure 19: Construction & Demolition hazardous waste generated in Wales by Waste Management Method**



'Other' includes transfer, other treatment and don't know

Figure 19 shows the range of options used to manage the construction & demolition hazardous waste generated in Wales in 2012. The largest proportion of hazardous waste generated was reported as being sent for Mechanical Biological Treatment (15 thousand tonnes), sent for preparation for re-use off site (8 thousand tonnes) and sent for recycling (7 thousand tonnes). The majority of the remainder was sent for land disposal (4 thousand tonnes) and incineration with energy recovery (2 thousand tonnes).

#### 4. Conclusions & Recommendations

The survey of the C&D waste generated in Wales 2012 interviewed 457 businesses, of differing sector and size, in a statistically valid manner. From this data a grossed total of 3.4 million tonnes of waste was estimated as generated in Wales as a whole in 2012.

Comparison with previous survey results should not be made because:

- The definition of waste has changed considerably since the previous 2005-06 survey, excluding a large amount of material which was previously recorded as waste.
- The recession impacted significantly on the construction sector, reducing output and therefore waste generation.



- There were no major infrastructure projects accounting for very large quantities of waste in 2012. This contrasts with 2005/06 when three of the five largest waste producers were involved in major projects. This illustrates the difficulty in comparing data from single years.
- The geographical data for 2012 is reported based on the location of the construction/demolition site as opposed to the location of the business office. This reflects the fact that C&D waste generally needs to be managed close to the site of production.

The preparation for re-use, recycling and other material recovery rate for the Construction & Demolition waste generated in Wales was 87% in 2012. This is broadly consistent with the calculation of recovery rate using waste management industry data, which indicated a rate of 89% for 2012. This is also comparable with the Welsh Government targets to increase preparation for re-use, recycling and other material recovery to a minimum of 70% by 2015/16 and 90% by 2019/20. The 2012 results indicate that the C&D sector is on course towards meeting these targets.

The quantity of waste landfilled in 2012 was approximately 639 thousand tonnes. NRW compared the grossed up survey data against permitted site returns for landfills. The inferred construction & demolition proportion from landfill site returns 2012 was estimated to be 646 thousand tonnes, which is only a 1% discrepancy compared to the 639 thousand tonnes reported in the survey and therefore supports the survey landfill results. Landfill returns will be used to monitor against Welsh Government landfill reduction targets for the C&D sector in future years.

#### **4.1. Data Confidence**

The survey results show that for 78% of the waste quantities recorded, entries were based on business recorded data from written sources such as invoices (19% of weight recorded), weighbridge notices (16%) and waste transfer notices (4%) or other written sources (39%). Some waste quantities were based on estimates provided by the business being interviewed (18%) where this was not possible. Less than 3% of the recorded quantities were reliant on surveyor estimates.

Further data checks were completed at the grossing up stage with the surveyors and directly with the businesses concerned. This further checked outlying data when compared to other NRW data sources, data from the previous 2005-06 survey and generated sensitivity analyses. The inferred construction & demolition proportion from NRW landfill site 2012 returns was estimated to be 646 thousand tonnes, which is very similar to the survey result of 639 thousand tonnes landfilled (1% discrepancy). NRW hazardous waste data estimated that 275 thousand tonnes of hazardous waste was generated in Wales in 2012. Combining the hazardous waste generated Construction & Demolition survey

estimation of 38 thousand tonnes to the industrial and commercial survey estimation of 239 thousand tonnes (separately reported) produced an estimated total of 276 thousand tonnes from both surveys. This is less than a 1% discrepancy with the NRW hazardous waste dataset and therefore further supports the survey results.

The procedures used ensured an effective and consistent data collection process by the surveyors. In addition, the steps to screen and check the collected and grossed data has ensured the data collected is sufficiently accurate and robust. Details of the precision of the data are published in Appendix 12 of the technical appendices document.

However it must also be acknowledged that the results from all surveys are subject to limitations with respect to the quality of estimates produced. Whilst these limitations do not alter the results or the statistical data presented in this report, they should be borne in mind by users of the data.

## **4.2. Lessons learned and Recommendations**

1. This survey has demonstrated a robust survey delivery and data methodology which can be used for future surveys both within Wales and the rest of the UK. Through investment in such surveys Welsh Government has the benefit of a series of robust waste generation data allowing for comparisons between different years and building a picture of trends and developments over time.
2. The Urban Mines project design and management process, and the software packages on which the survey delivery depended, proved themselves effective by efficiently delivering over 450 face to face surveys. In particular, using software to cluster survey visits allowed the efficient use of the surveyors' time and reduced the carbon footprint of the project.
3. As with previous surveys, this 2012 survey highlighted issues of working with the ONS VAT and PAYE dataset and the need to reassign business positions in the sample matrix due to changes in either employee number size band or sector identified during the visit. The lack of detail in the supplied data in terms of business contact information was also effectively addressed by allowing sufficient time and resource to research the data gaps.
4. Arranging survey visits for micro organisations, such as jobbing builders, tradesmen etc, was difficult because during the daytime when calls were ordinarily made to discuss the visit, the employees were out on site working. Some calls had to be made in the evening and interviews conducted over the phone to enable the survey to be convenient to these businesses.
5. The construction and demolition survey in most cases collected data on wastes generated away from the site visited, at temporary construction or demolition sites

for instance. The survey therefore relied on waste data being held in the central office for the business, with some central project offices being responsible for multiple construction sites each generating waste. However, it was found that some businesses kept waste data and records at the site where construction work had been undertaken, and therefore was not easily accessed by the surveyor. Organisations also did not necessarily hold data on a project by project basis, hampering the identification of double counting.

6. Through surveying business locations identified from the ONS Inter-Departmental Business Register (IDBR), businesses were sampled to be surveyed by employee sizeband based on a central project office rather than the construction site itself. Consequently, the amount of waste per visited location varied considerably. For example, a large construction company may have been responsible for multiple large scale projects around Wales, but the visited project office may have only employed a small number of people directly.
7. This report and its associated technical appendices are written with sufficient detail to allow reproduction of this methodology in future surveys, to allow data consistency and comparability, and flag up issues which could be addressed in future surveys to further improve delivery, such as allowing more time to quality check and gross up data prior to reporting deadlines.
8. We recommend further interpretation and analysis of the data generated by this survey to help inform and develop policy, develop planning strategy and secure opportunities in improving sustainable waste management in Wales.
9. Planning authorities can use the data at both a national and regional level to identify locations for new waste facilities that have sufficient local waste arisings to make them economically sustainable. New infrastructure will be required to further improve recycling and recovery rates.
10. These surveys results are not published as Official Statistics. However, any future such surveys will be considered for publication as Official Statistics.



**Cyfoeth  
Naturiol**  
Cymru  
**Natural  
Resources**  
Wales