

Northern Ireland 2008 CDEW Report

Comparing 2008 estimates with those from 2005/06

CAPITA SYMONDS

successful people, projects and performance

Contents

1.	Executive Summary	1
2.	Introduction	2
3.	The 2005/06 Estimates	3
4.	Recycled Aggregate and Soil	5
5.	CDEW Entering Licensed Landfills	7
6.	Registered Exempt Sites	9
7.	The Non-Inert Fraction of CDEW	10
8.	The New Waste Framework Directive Target	12

Document Control

Created by	Date	Signed
David Knapman	Sept 2009	DJK
Checked by		
Douglas Myall & Richard Smith	Sept 2009	DM & RAS
Commented on by NIEA	Nov 2009	
Issued as Final	Nov 2009	DJK

Capita Symonds House, Wood Street, East Grinstead, West Sussex RH19 1UU
Tel 01342 327161 Fax 01342 315927 www.capitasymonds.co.uk
Capita Symonds Ltd

Error! AutoText entry not defined.
www.capitasymonds.co.uk

1. EXECUTIVE SUMMARY

- 1.1 The purpose of this report is to draw together information on CDEW from the 2008 WSRR Report, and to compare that information with the estimates generated in 2006 covering the year 2005/06.
- 1.2 The 2008 information in this report comes from a combination of the analysis of site returns and the survey of registered exempt sites on which a separate report has been produced.
- 1.3 The 2006 survey population of aggregate and soil recyclers covered work done on sites that are neither licensed nor exempt from licensing (as well as on licensed and exempt sites), and as a consequence the estimate was much higher than the more restricted 2008 figure. It is therefore not possible to make a direct comparison of the two estimates.
- 1.4 The tonnage of CDEW entering landfills was 90% higher in 2008 than in 2005/06. An important part of the explanation for that change can be found in the standstill in site closure activities at some of the largest landfill sites in 2005/06 while closure licences were being processed. Once closure conditions were agreed, large tonnages of inert soils started entering such sites, and the 2008 estimate may well prove to be above the long-term norm.
- 1.5 The estimate for CDEW being used on registered exempt sites in 2008 was 6% higher than the equivalent estimate in 2005/06.
- 1.6 Site returns covering the non-inert fraction of CDEW (which was not surveyed in 2006) were lower than might have been expected, based on experience elsewhere in the UK. Some of the apparently missing tonnage may be accounted for by structural steel which was exported from Northern Ireland for recycling elsewhere.

2. INTRODUCTION

- 2.1 In 2006 Capita Symonds ran a dedicated survey in Northern Ireland on behalf of EHSNI covering the inert fraction of Construction, Demolition and Excavation Waste (CDEW), resulting in a report entitled 'Survey of Arisings and Use of Construction, Demolition and Excavation Waste as Aggregate in Northern Ireland in 2004/05 & 2005/06'. That survey covered three material streams: the recycling of 'hard' demolition waste as aggregate (by crushing and/or screening), the use or management of the various sorts of CDEW that entered licensed landfills, and the use of those elements of CDEW that were used on registered exempt sites.
- 2.2 The purpose of the present report is to identify the extent to which the evidence for 2008 that was collected and collated in 2009 (again, by Capita Symonds, this time for NIEA, as part of the reporting process required for compliance with the EU's Waste Statistics Regulation No. 2150/2002) differs from the previous survey evidence (and in particular the evidence for 2005/06, which was considered to be more reliable than the equivalent estimate for 2004/05).
- 2.3 The evidence for 2008 came from:
- (i) site returns made by the operators of licensed waste sites;
 - (ii) estimates of missing values not included in the site returns made by those same operators of licensed waste sites; and
 - (iii) returns received as a consequence of a survey of operators of registered exempt sites.
- 2.4 The available evidence concerning the non-inert fraction of CDEW is also discussed, as are the implications of the target established in the new Waste Framework Directive (2008/98/EC).
- 2.5 This report does not go into any detail regarding the survey methods used (in 2006 or 2009), or the manipulation of site returns data to deal with the issue of missing values. This can be found in the report on the 2006 survey, in the report on the 2009 exemptions survey and in the Quality Report produced as part of the WSRR process.

3. THE 2005/06 ESTIMATES

3.1 The estimates derived from the 2005/06 survey results are shown below in Table 3.1 (in the original report, the data are reported in Table 6.1).

Table 3.1: Overview of 2005/06 CDEW survey results

Description of material, and what was done with it	Type	Fate	Tonnes	Line Ref
Hard C&D/excavation waste crushed and/or screened for use as aggregate	Hard	R	569,034	A
Excavation waste/mixed CDEW screened for use as soil (including some topsoil)	Soil	R	19,679	B
Sub-total 1: Recycled aggregate and soil		R	588,713	
Hard C&D waste used for landfill engineering or restoration	Hard	U	106,483	C
Excavation waste used for landfill engineering or restoration	Soil	U	233,103	D
Mixed CDEW (or unspecified material) used for landfill engineering or restoration	Mixed	U	5,812	E
Sub-total 2: Material used for landfill engineering or restoration		U	345,399	
Hard C&D waste spread on registered exempt sites	Hard	U	6,404	F
Clean unmixed excavation waste and other soils spread on registered exempt sites	Soil	U	419,251	G
Mixed CDEW spread on registered exempt sites	Mixed	U	53,952	H
Sub-total 3: Material used at registered exempt sites		U	479,608	
Clean unmixed hard C&D waste disposed of at landfills	Hard	D	79,543	J
Mixed and/or contaminated hard C&D waste disposed of at landfills	Hard	D	0	K
Clean excavation waste disposed of at landfills	Soil	D	72,575	L
Mixed and/or contaminated excavation waste disposed of at landfills	Soil	D	0	M
Mixed CDEW and unspecified materials disposed of at landfills	Mixed	D	149,523	N
Sub-total 4: Material disposed of as waste at licensed landfills		D	301,642	
Total			1,715,362	

Source: Capita Symonds, 2006 Survey Report, Table 6.1

3.2 These results are further summarised in Table 3.2 (Table 6.4 in the original report), using the classifications into materials types (Hard = 'hard' C&D waste, Soil = soil and excavation waste,

and Mixed = mixed CDEW) and 'fate' (R = recovered / recycled, U = used without processing, and D = Disposed of as waste) as assigned to each row in Table 3.1.

3.3 The reference letters in the final column of Table 3.1 are used to help organise the commentary on the differences between 2005/06 and 2008 which is provided later.

Table 3.2: Types of CDEW and their management, 2005/06 (tonnes)

Material	Recovered / recycled	Used without processing	Disposed of as waste	Total
'Hard' C&D waste	569,034	112,887	79,543	761,465
Soil and excavation waste	19,679	652,354	72,575	744,609
Mixed CDEW	0	59,764	149,523	209,288
Total	588,713	825,005	301,642	1,715,362

Source: Capita Symonds

4. RECYCLED AGGREGATE AND SOIL

- 4.1 As part of the 2009 Exemptions Survey, 37 forms were mailed to companies believed to be involved in processing CDEW into aggregates and/or soil, and 59 were mailed to companies involved in spreading CDEW onto land. Because of the lack of a clear dividing line between these two groups, the same survey form was sent to both, giving them an opportunity to report activity under both headings, where relevant.
- 4.2 Twenty responses were received from the first group (representing a response rate of 54.1%). Seven of these were nil returns. Thirty eight responses were received from the second group (64.4%), including a small number who reported that they were also processing CDEW.
- 4.3 The returns from the two groups were grossed-up separately and then combined. The outcome of this process is presented in Tables 4.1 and 4.2 below. The difference between the totals in Tables 4.1 and 4.2 comes about as a result of some companies selling materials during 2009 that had been stockpiled in previous years. It is concluded that the best estimate of 2008 waste arisings and management would be based on the figures given in Table 4.1.

Table 4.1: Overall estimate of CDEW processed by exemption holders in 2008 (input materials)

Description	Tonnes
Hardcore mixed with soil	22,991
Excavated materials (soil, rock etc)	31,899
Mixed concrete, bricks etc	6,581
Road planings	41,407
Total	102,880 ± 46% 56,103-150,205

Source: Capita Symonds

Table 4.2: Overall estimate of products made from CDEW sold by exemption holders in 2008

Description	Tonnes
Hardcore / fill / aggregate	120,189
Topsoil	925
Other useable soil / low-grade fill	5,180
Steel	426
Residual waste materials (i.e. non-useable soil / mixed materials / fines)	710
Total	127,428 ± 56% 69,173-198,788

Source: Capita Symonds

- 4.4 These tonnage estimates are much lower than the recycling estimates derived from the 2006 survey, because the two surveys measured different things. The 2006 survey covered 51 companies thought (with different degrees of probability) to be offering a CDEW crushing and/or screening service, or to be crushing and/or screening CDEW that they had generated themselves (generally when acting as demolition contractors). By contrast, the 2009 survey was restricted to those companies that held an exemption from waste management licensing which allowed them to process CDEW at a specified site.
- 4.5 The 2005/06 estimates were based on 12 non-nil responses, which came from operators who between them reported recycling 264,369 tonnes of aggregates / soil. Eight of those 12 responses came from the sub-group thought most likely to be engaged in CDEW recycling. Three came from the sub-group thought to be possibly involved in recycling, and one came from a third (and rather larger) sub-group comprising companies that were thought unlikely to be involved in recycling, at least on a large scale. The three groups were grossed-up separately, reflecting their different characteristics.
- 4.6 Only one of the eight respondents in the first sub-group held an exemption in 2008, so seven of the eight were not surveyed in 2009. It therefore has to be concluded that although the two mailing lists had a reasonable overlap, they were by no means the same. Indeed, three of the operators who reported CDEW recycling activity via the 2009 survey were not on the 2006 mailing list.
- 4.7 This is largely a reflection of the fact that much crushing and screening is done using hired equipment on construction sites which do not require, and are therefore not covered by, an exemption.
- 4.8 The 2006 survey included 'waste' processed on the site where it was produced and re-used. If inert waste produced on a site and subsequently processed into aggregate (on the same site) complies with the aggregates Quality Protocol, then the material will effectively not enter regulatory control.
- 4.9 As a consequence, the 102,880 tonnes reported in Table 4.1 above cannot be regarded as equivalent to the 569,034 tonnes of hard C&D/excavation waste crushed and/or screened for use as aggregate reported in Line A of Table 3.1 plus the 19,679 tonnes of excavation waste/mixed CDEW screened for use as soil (including some topsoil) reported in Line B.
- 4.10 Even if the slightly higher estimates from Table 4.2 (which, as explained above, included some drawing down of stocks established in previous years) were used instead, this would not make any material difference to this conclusion.
- 4.11 With the benefit of hindsight it would have been helpful if the 2006 survey had distinguished between materials which were being recycled on registered exempt sites and other recycled materials, because that would have made it possible to see whether this fraction had grown, shrunk or remained constant over the intervening period. In the absence of that information, and given the difference between the two survey populations, it is not possible to conclude whether CDEW recycling rose or fell in Northern Ireland between 2005/06 and 2008.

5. CDEW ENTERING LICENSED LANDFILLS

5.1 Table 5.1 represents an out-take from Table 3.1, limited to that fraction of the total CDEW stream which was either used at, or disposed of within, licensed landfills.

Table 5.1: Overview of 2005/06 CDEW survey results – Landfills only

Description of material, and what was done with it	Type	Fate	Tonnes	Line Ref
Hard C&D waste used for landfill engineering or restoration	Hard	U	106,483	C
Excavation waste used for landfill engineering or restoration	Soil	U	233,103	D
Mixed CDEW (or unspecified material) used for landfill engineering or restoration	Mixed	U	5,812	E
Sub-total 2: Material used for landfill engineering or restoration		U	345,399	
Clean unmixed hard C&D waste disposed of at landfills	Hard	D	79,543	J
Mixed and/or contaminated hard C&D waste disposed of at landfills	Hard	D	0	K
Clean excavation waste disposed of at landfills	Soil	D	72,575	L
Mixed and/or contaminated excavation waste disposed of at landfills	Soil	D	0	M
Mixed CDEW and unspecified materials disposed of at landfills	Mixed	D	149,523	N
Sub-total 4: Material disposed of as waste at licensed landfills		D	301,642	
Total			647,041	

Source: Capita Symonds, 2006 Survey Report, Extract from Table 6.1

5.2 The tonnage entering landfills in 2008 can be derived from two separate sets of site returns submitted by landfill operators:

- (i) CDEW entering active landfills, either for use or for disposal as waste; and
- (ii) CDEW being used to cap / restore closed landfills.

5.3 CDEW being used to cap a closed cell at a landfill which was still accepting waste for disposal in a different cell would fall into the first of the two categories above.

5.4 In 2008 the tonnages of inert or largely inert CDEW reported by landfill operators included:

- (i) 33,297 tonnes of 'hard' CDEW entering active landfills (equivalent to lines C and J in Table 5.1);
- (ii) 80 tonnes of bituminous CDEW entering active landfills;

-
- (iii) 8,995 tonnes of mixed CDEW entering active landfills (equivalent to lines E and N in Table 5.1);
 - (iv) 824,091 tonnes of soil and stones entering active landfills (equivalent to lines D and L in Table 5.1); and
 - (v) 334,128 tonnes of soil and stones being used to cap closed landfills (equivalent to line D in Table 5.1).
- 5.5 These elements total 1,200,591 tonnes of CDEW, which is almost 90% higher than the total estimate for CDEW entering landfills in 2005/06 (as reported in Table 5.1). An important part of the explanation for this apparently surprising outcome is that landfill operators had until recently been advised to defer restoration activities until site closure licences were in place, and some of the largest closed landfills were not accepting capping and restoration materials during 2005/06. By contrast, there will have been an element of catching up in 2008 on those same sites, contributing to the much higher tonnage reported on site returns.
- 5.6 It is also worth noting that:
- (i) 90% of the soil and stones reported as entering active landfills in 2008 was accounted for by three large inert landfills; and
 - (ii) 66% of the soil and stones reported as being used to cap closed landfills in 2008 was accounted for by one site. This share fell to 48% when imputed values (which were calculated to fill gaps in the reported data) were included in the calculation.
- 5.7 Because some of the landfills, including one of the three large inert landfills referred to above, did not provide four quarterly returns, the figures reported in paragraph 5.6 are based on a calculation which includes data imputed for facilities where quarterly returns were missing¹. The approach to imputing missing data is described in full in the WSRR Quality Report. Most of the additional (imputed) tonnage comes from that one large inert landfill (which contributed 253,680 tonnes) and closed landfills receiving waste for capping, which did not provide site return data.
- 5.8 The rise in tonnage between 2005/06 and 2008 appears to be real, but it appears to be partly due to the more comprehensive nature of quarterly site returns compared to survey data collected from active landfills.

¹ Counter-intuitively, the figure of 90% is not changed when imputed data are included.

6. REGISTERED EXEMPT SITES

- 6.1 The approach taken to estimating the tonnage of CDEW being deposited on registered exempt sites was essentially the same in 2006 and 2009 (though there were differences in the questions that were asked).
- 6.2 The central estimate of the tonnage of CDEW spread on land in 2008 was 508,832 tonnes, broken down as follows:
- (i) 424,580 to 480,825 tonnes of unprocessed clean soil / excavation material (or materials that had been processed by someone else before it reached the reporting site) at the 90% confidence interval (i.e. 448,436 tonnes \pm 7%);
 - (ii) 3,550 to 11,329 tonnes of soil / excavation material that the respondents had processed themselves (i.e. 6,035 tonnes \pm 88%); and
 - (iii) 31,977 to 83,076 tonnes of hardcore / broken bricks / fill / aggregate / road planings most of which had been processed to some degree (i.e. 54,361 tonnes \pm 53%).
- 6.3 This compares with the 2005/06 estimate of 479,608 tonnes, which was subject to a very similar breakdown by materials type (see lines F, G and H of Table 3.1).
- 6.4 Given the confidence intervals around these central estimates, there are no grounds for thinking that there was a significant change in the tonnage of CDEW used on registered exempt sites between 2005/06 and 2008.

7. THE NON-INERT FRACTION OF CDEW

- 7.1 Whereas previous estimates of CDEW have concentrated on the inert fraction, there is an increasing interest in understanding more about the non-inert fraction of waste from construction sites, and in particular:
- (i) metals;
 - (ii) glass;
 - (iii) paper and card;
 - (iv) plastics; and
 - (v) wood.
- 7.2 Actual site returns provide real data for waste arisings under these categories. Tonnage returns have been extracted for the appropriate Eurostat waste codes where the waste was also reported as coming from the construction sector, and these are reported below in Table 7.1.
- 7.3 We have not included in Table 7.1 the following specialist (non-mineral) waste streams shown as coming from the construction industry²:
- (i) 01.03 / waste oil / 8 tonnes;
 - (ii) 02 / non-hazardous chemical waste / 1 tonne;
 - (iii) 02 / hazardous chemical waste / 33 tonnes;
 - (iv) 03.2 / hazardous effluent sludges / 52 tonnes;
 - (v) 07.3 / rubber / 2 tonnes;
 - (vi) 08 / hazardous discarded equipment / 4 tonnes;
 - (vii) 09 / animal and vegetable waste / 81 tonnes;
 - (viii) 10.1 / household and similar waste / 11,434 tonnes; and
 - (ix) 10.2 / mixed and undifferentiated materials / 53 tonnes.
- 7.4 The justification for excluding by far the largest of these nine categories (household and similar waste) is that it is not by any stretch CDEW. The other eight categories account for a total of 234 tonnes, which is too small to justify further detailed attention.
- 7.5 The actual site returns for the five main categories of non-inert CDEW are recorded in the first data column of Table 7.1. However, it is necessary to add to these tonnages additional imputed tonnages to account for site returns made without an SIC code (i.e. without stating from which sector of the economy they came), and what are referred to in the WSRR Quality Report as Group 2&3 returns and Group 4&5 returns.

² It should be noted that figures do not include data from non-responding sites and hence no imputed data or data collected from hazardous consignment notes are included in the totals presented.

Table 7.1: Non-Inert CDEW, 2008 (tonnes)

Material (and Eurostat code)	Reported	Missing SIC code	Groups 2&3	Groups 4&5	Total
Metals (06)	4,817	1,280	2,887	2,501	11,485
Glass (07.1)	16,625	16,160	3,664	507	36,956
Paper and card (07.2)	1,188	420	385	313	2,306
Plastics (07.4)	1,944	205	1,101	1,003	4,253
Wood (07.5)	14,742	2,004	4,831	3,544	25,121
Total	39,316	20,069	12,868	7,868	80,121

Source: Capita Symonds

- 7.6 Estimates of the tonnage of non-inert CDEW arisings in England have ranged between 7.5 and 22 million tonnes, and a study by Capita Symonds for WRAP (Recycling Rates for non-Inert C&D Waste, June 2007) concluded that in the absence of reliable data, using the mid-point between these two extremes as a working estimate (e.g. roughly 12.4 million tonnes, or about 15% of the tonnage of inert CDEW) was not unreasonable. Further research is currently in hand to see whether a better figure can be obtained from a mixture of site returns data and observations.
- 7.7 If 12.4 million tonnes is a reasonable estimate for England, we would have expected to find a figure of more like 225,000 tonnes in Northern Ireland, with metal (structural steel) being the largest single element.
- 7.8 We have previously observed (in relation to the WSRR process in 2006) that significant tonnages of scrap steel, including a lot of structural steel, were being exported from Northern Ireland. If this was happening in 2008, then those movements were not picked up by the site returns analysed by us. Based on the above, there are therefore grounds for believing that the estimate in Table 7.1 understates the metal content.

8. THE NEW WASTE FRAMEWORK DIRECTIVE TARGET

- 8.1 Directive 2008/98/EC states (in Article 11.2(b)) that “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 materials defined in category 17 05 04 in the list of waste shall be increased to a minimum of 70% by weight.”
- 8.2 This is equivalent to requiring that 70% (by weight) of total arisings of CDEW (not counting naturally occurring soils and rock) must be made suitable for one of the specified ‘good’ outcomes by 2020. ‘Good’ outcomes are deemed to occur where materials are re-used, recycled or recovered (including backfilling using waste instead of other materials). The total weight to be used for calculation purposes excludes both hazardous CDEW and 17 05 04 (naturally occurring materials), but includes the non-inert fraction of CDEW (e.g. wood, steel, plastics etc).
- 8.3 Without a reliable breakdown to show whether materials that are entering landfills are being used (for a ‘good’ outcome) or disposed of as waste, the calculation cannot be made. Unfortunately that level of detail is not available for the 2008 estimates.
- 8.4 This are also problems associated with the tracking of CDEW as it moves between different waste facilities. For example, when CDEW is initially received at a waste facility and subject to a preparatory treatment activity, the facility codes the waste as arising from the construction sector on the site waste return. However, if that waste did not undergo a final waste treatment or management activity, it will move onto a further waste facility. The second waste facility in the treatment chain will record the waste as having arisen from another waste facility and hence the waste sector, as opposed to the construction sector. Hence the CDEW can no longer be identified as CDEW and hence how that waste is finally treated or managed cannot be accurately estimated. There is evidence that the use of transfer stations is more common in Northern Ireland than it is in, say, England³.
- 8.5 A further issue relates to CDEW which is delivered straight to a landfill rather than to any intermediate waste facility. Receiving landfills (both those closed and receiving waste for capping or those still operational) in all instances in the 2008 site returns recorded all waste received as either being managed as D1 or D5 – which corresponds to disposing of waste by land filling. Hence the codes used to record how waste is managed is not overly conducive to estimate the quantity of waste reused as engineering capping at operational landfills, although it can be assumed that closed landfills use CDEW for capping, despite the use of the D1 or D5 disposal code.
- 8.6 An indicative calculation using the 2005/06 estimates can be made, as follows.
- 8.7 ‘Good’ outcomes in 2005/06 included:
- (i) 588,713 tonnes from Lines A and B of Table 3.1; plus
 - (ii) 106,483 tonnes from Line C of Table 3.1; plus
 - (iii) 5,812 tonnes from Line E of Table 3.1; plus
 - (iv) 6,404 tonnes from Line F of Table 3.1; plus
 - (v) 53,952 tonnes from Line H of Table 3.1; plus

³ The proportion of inert CDEW entering English landfills coded under EWC Chapter 17 codes (i.e. identified as from a construction or demolition site) far outweighs that coming from transfer stations, and coded under EWC Chapter 19 codes.

(vi) whatever tonnage of non-inert CDEW was recovered.

8.8 The relevant 'Total' value in 2005/06 included:

- (i) 1,715,362 tonnes (the total from Table 3.1); less
- (ii) 233,103 tonnes from Line D of Table 3.1; less
- (iii) 419,251 tonnes from Line G of Table 3.1; plus
- (iv) the total tonnage of non-inert CDEW.

8.9 The 'good' tonnage was therefore 761,364 tonnes plus the recovered tonnage of non-inert CDEW, and the 'total' was 1,002,651 tonnes plus the total tonnage of non-inert CDEW.

8.10 Table 8.1 shows the overall outcome of this calculation for a range of assumptions regarding the total tonnage of non-inert CDEW and the assumed recovery rate for that waste (in percentage terms).

Table 8.1: Performance against Directive target (of 70%) under a range of assumptions, using 2005/06 inert CDEW data and a range of assumptions for non-inert CDEW

Total tonnage of non-inert CDEW	33% recovery of non-inert CDEW	50% recovery of non-inert CDEW	66% recovery of non-inert CDEW
80,000 tonnes	72.8%	74.0%	75.2%
160,000 tonnes	70.0%	72.4%	74.6%
240,000 tonnes	67.6%	70.9%	74.0%
320,000 tonnes	65.5%	69.7%	73.5%
400,000 tonnes	63.7%	68.5%	73.1%
480,000 tonnes	62.0%	67.5%	72.7%

Source: Capita Symonds