Oxfordshire County Council

Minerals & Waste Local Plan Support

Baseline, Forecasts & Targets for Construction, Demolition & Excavation Waste Generated in Oxfordshire

Final Issue

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1 Introduction

There are four steps associated with the derivation of capacity requirements for the management of Construction, Demolition and Excavation (C, D & E) Waste, as follows:

A. Defining a Credible Baseline Value
B. Forecasting Growth: Determining appropriate growth factors
C. Determining A Profile of Current Management Routes
D. Identifying Appropriate Targets for management routes in the future

This paper considers each of these steps in turn.

2 Defining a Credible Baseline Value[1]

To provide a robust baseline of CD&E arisings from which future arisings can be calculated, two separate approaches were taken to define a range within which a baseline value is likely to fall. These are as follows:

i. Review of 2008 estimate used to underpin the draft Minerals & Waste Core Strategy
ii. Point of Production Methodology

Each approach is set out in detail below:

2.1 Review of Original Estimate

The Original Needs Assessment for Oxfordshire[2] estimated that CDE arisings in 2005 in the county were 1.44 million tonnes. This was derived from the South East Plan C&D[3] waste arisings of 14.25Mtpa for 2005 apportioned on the basis of population. The source of the SEP value is cited as the 2005 Symonds survey undertaken for central government (DCLG)[4]. The Symonds survey was based on a sample survey of operators active in the construction and demolition waste management sector including operators of crushers. The reliability of this approach is, however, subject to numerous caveats as the survey was originally not intended to derive a sub-regional value. Furthermore, the approach of apportioning the SEP value on the basis of the population does not account for the profile of construction activity within

[1] All figures rounded to the nearest thousand to avoid giving the impression of spurious precision.

[2] Waste Arisings, Capacity & Future Requirements Study (January 2008)(ERM)

[3] It should be noted that while the value is attributed to C&D waste only, the source value also encompass excavation waste.

[4] CLG Survey of Arisings and Use of Alternatives to Primary Aggregates in England (2005) http://www.communities.gov.uk/publications/planningandbuilding/surveyconstruction2005

Oxfordshire compared to other parts of the south east . We note that the withdrawn Oxfordshire Minerals & Waste Core Strategy used a value of 1.3 million tonnes pa to plan going forwards (Table 10).

2.2 Point of Production Methodology

A 'point of production' focused approach to establishing a CD&E waste arisings baseline was piloted by the Building Research Establishment (BRE) in 2010[5]. This approach calculates arisings using construction activity statistics[6] and estimates of quantities of waste produced per £100k project value from Site Waste Management Plan data (SWMP).

This method has been applied using construction waste production Benchmarks published in 2010. It should be noted that data for *excavation* and *demolition* activity is not covered by the *construction* activity statistics and so contributions for these are drawn separately from a DCLG survey (updated using WRAP 2010[7]) and information published by the National Federation of Demolition Contractors (NFDC)[8] respectively. Sources are shown in Table 1.

Table 1: C, D & E Waste Data Sources

Waste arisings source	Data sources used
Construction: Residential new build	SMARTWaste Plan and SMARTStart[9] = 16.3 Tonnes/£100K[10] Construction Statistics Annual Data[11] (£1,353 Million for 2008)
Construction: Other new build	SMARTWaste Plan and SMARTStart = 16.2 Tonnes/£100K Construction Statistics Annual Data (£3,086 Million for 2008)
Construction: Residential refurbishment	SMARTWaste Plan and SMARTStart = 9.4 Tonnes/£100K Construction Statistics Annual data (£2,178 Million for 2008)
Construction: Other refurbishment	SMARTWaste Plan and SMARTStart = 8.1 Tonnes/£100K Construction Statistics Annual data (£1,912 Million for 2008)
Demolition	NFDC data on demolition waste arisings 2008 (31.4m Tonnes for GB) Construction Statistics Annual data (Sub region (Berks, Bucks , Hants & Oxon 2008) accounted for £8,868 million of GB total contractors output[12] value – this equates to 8.3% of GB total)
Excavation	DCLG/Symonds Survey of Arisings and Use of Alternative to Primary Aggregates in England, 2005 (sub region Bucks, Berks & Oxon) updated by WRAP 2010 report.

[6] Construction Activity Statistics compiled by the ONS - 2008 is the latest year for which subregional data is displayed.

[7] WRAP – Updating data on construction, demolition and excavation waste, January 2010 Interim Progress Report

[8] Data provided by the National Federation of Demolition Contractors (NFDC). The NFDC reports that over 80% of the annual UK demolition workload is carried out by its members. The NFDC undertakes an annual survey of its membership across the UK.

[9] Reference source Baselines and benchmarks 2009 CRWP 16 March 2010 Client report number 255-103.

[10] For example for every £100k spent on a construction project, 16.3 tonnes of waste are produced

[11] ONS data for Berks, Bucks , Hants & Oxon 2008.

[12] Contractors' output is defined in the Office for National Statistics, Construction Statistics Annual as output by contractors, including estimates of unrecorded output by small firms and self-employed workers, classified to construction in the 2003 revised Standard Industrial Classification.

This method has been applied to generate indicative data for a wider sub region which includes Oxfordshire. Results are shown in Table 2 below.

Table 2: Results for sub region (tonnes)

	Construction Waste				Demolition	Excavation
	New build construction		Refurbishment			
	Residential	Other	Residential	Other		
Sub regional totals	220,500	500,000	205,000	155,000	2,611,000	2,063,000

Combined Berks, Bucks, Hants & Oxon (ONS)

Berks, Bucks Oxon Values

In both the construction activity statistics and the DCLG/Symonds study the Plan Area data is aggregated with adjacent counties: for the construction statistics the grouping includes Berkshire, Buckinghamshire, Hampshire & Oxfordshire; and for the DCLG survey the grouping includes Buckinghamshire, Berkshire and Oxfordshire i.e. does not include Hampshire.

In order to provide an estimate for the Plan Area alone a further process of data breakdown has been undertaken applying factors of apportionment (as shown in Table 3 below) to the values obtained in Table 2 using 'best fit' factors available. So, for example, the Plan Area accounted for 18.56% of the residential housing completions in the combined area of Berks, Bucks, Hants & Oxon in 2008, and so that percentage has been applied to the initial value for residential new build obtained in Table 2; and so on for each arisings source.

Table 3: Factors Used to Apportion Aggregated Arisings Derived from Applying BRE Methodology

	Construction Waste				Demolition	Excavation
	New build construction		Refurbishment			
	Residential	Other	Residential	Other		
Apportionment indicator applied	housing completions	construction employment statistics	total housing stock	construction employment statistics	construction employment statistics	construction employment statistics
Plan Area Proportion	18.56%	18.83%	19.50%	18.83%	18.83%	32.09%

Applying the apportionment factors in Table 3 to the aggregated values in Table 2 gives the values shown in Table 4.

Table 4 CDEW Arising Estimates for Plan Area Applying Table 3 Apportionment Factors to Values in Table 2 (tonnes per annum)

	Construction Waste				Demolition	Excavation
	New build construction		Refurbishment			
	Residential	Other	Residential	Other		
Estimated Plan Area Arisings	41,000	94,000	40,000	29,000	492,000	662,000

Using this method the final figures reflect a pattern of construction activity which suggests that a significant proportion of material is generated through refurbishment activity as well as through new build activity. This is significant when accounting for composition of this waste stream as the waste originating from refurbishment projects will have a different composition to that originating from new builds, due in part to different materials having been utilised in construction in the past.

Table 5: Total CDEW Arising Estimates for Plan Area *(tonnes per annum)*

	Construction	Demolition	Excavation	Total CDEW
Estimated Plan Area Arisings	204,000	492,000	662,000	**1,358,000**

Table 5 shows that the overall estimated value for the Plan Area generated through this method is 1.36 million tonnes pa *(using 2008 baseline data updated to 2010).* We note that this is closely aligned with the value used in the withdrawn Oxfordshire Minerals & Waste Core Strategy of 1.3 million tonnes pa.

This compares with the value of 1.44 mtpa cited in the original WNA for 2008/09. We believe that the method used to arrive at the lower value is as robust as that used to generate the DCLG data with the added benefit that it draws on more locally based assessment of construction sector activity.

3 Composition of C, D, & E Waste

The method used above to derive a baseline arisings figure provides a breakdown of the overall C,D & E waste stream into the following categories (to the nearest 1,000 tonnes):

- 204,000 tonnes of mixed construction waste
- 492,000 tonnes of predominately hard demolition waste
- 662,000 tonnes of predominantly soft excavation waste

The original Waste Needs Assessment made no attempt to profile this waste stream.

3.1 Demolition Waste Composition

A review of the BRE estimates of arisings from demolition activity[13] provides further information of relevance: BRE estimates that demolition arisings are made up of the following:

- 80% inert materials (59% concrete, 21% soil),
- 20 % non-inert materials such as metals, timber and plasterboard.

The National Federation for Demolition Contractors (NFDC) reports that approximately 88% of the inert materials and 100% of metals handled by the demolition contractors are processed for recycling. This suggests that 80% (inert 70% [88% of 80%] + metals (10%)) of this stream is recycled/reused. This leaves 20% of the stream requiring management as mixed non-inert waste which equals 98,400 tonnes (20% of 492,000) of mixed non-inert waste being generated from demolition.

This mixed non-inert waste can be taken from the 'hard demolition waste' fraction and added to the 'mixed construction waste' value to give a revised breakdown of the C, D & E waste stream as follows:

- 302,000 tonnes of mixed predominately non-inert construction and demolition waste (204kte + 98kte 'mixed non inert')
- 394,000 tonnes of hard demolition waste (492kte – 98kte 'mixed non inert)
- 662,000 tonnes of predominantly soft excavation waste

[13] Overview of Demolition Waste in the UK CRWP 2009

3.2 New Build Construction Waste Composition

Further analysis of composition can be undertaken using the breakdown of waste from new build residential construction presented in the latest Baseline and Benchmark report[14] produced by BRE as part of the Construction Waste & Resource Platform work to estimate arisings as shown in Table 6.

Table 6: Composition of waste from new build residential construction (ranked)

Figures do not total 100% due to rounding

Waste type	% of total arising	Waste type	% of total arising
Timber	8.5	Inert	26.3
Packaging	5.6	Concrete	22.4
Gypsum	5.2	Bricks	19.9
Insulation	2.3	Tiles & Ceramics	1.3
Plastics	2	**Total Inert**	**69.9**
Canteen/office/adhoc	1.9		
Metals	1.9		
Asphalt and tar	1.8		
Binders	0.5		
Electrical & electronic equipment	0.2		
Floor coverings (soft)	0.1		
Furniture	0.1		
Hazardous	0.1		
Liquids	0.1		
Total Non inert	**30.3**		

Table 7 applies these splits to the total Plan Area residential new build tonnage presented in Table 4.

Table 7: Application of New Build Residential Composition data in Table 6 to Estimates of New Build Residential Arisings for Plan Area

(to nearest '000 tonnes).

Total Plan Area Residential New Build	Split (tonnes)	
	Inert	Non Inert
41,000	28,700	12,300

[14] Baselines and benchmarks 2009 CRWP March 2010

This gives a refinement of the apportionment of New Build waste to inert and non inert categories gives a further revised breakdown of C, D & E waste as follows:

- 274,000 tonnes of mixed predominately non-inert construction and demolition waste (302kte – 28.7kte 'inert')
- 423,000 tonnes of hard demolition waste (394kte + 28.7kte 'inert')
- 662,000 tonnes of predominantly soft excavation waste

That is to say about a fifth (20%) of the total CDEW arisings may be composed of mixed non-inert material with up to 80% of material being inert (hard demolition and soft excavation).

3.3 Conclusion

This has an implication for the future management capacity requirement as the mixed non-inert material will have a different management capacity need - either processing or disposal - to the inert material which can more easily be made suitable for supply as engineering materials after initial processing such as crushing and/or screening.

4 Forecasting Growth: Determining appropriate growth factors

To develop realistic forecasts of growth using the Point of Production value as a baseline (1.36mtpa) we have considered the critical factors at work within each of the construction activity categories and how they relate to arisings of the different materials. The factors are:

- Planned housing numbers
- Availability/development of previously developed land
- Commercial development
- Major Projects
- Drivers for resource efficiency/waste reduction in the sector including:
- Waste management costs
- Regulatory pressures
- Voluntary Initiatives

4.1 Planned housing numbers

Figure 1 presents the cumulative projected values given in Oxfordshire's District level plans and supporting documentation for house building. [15]

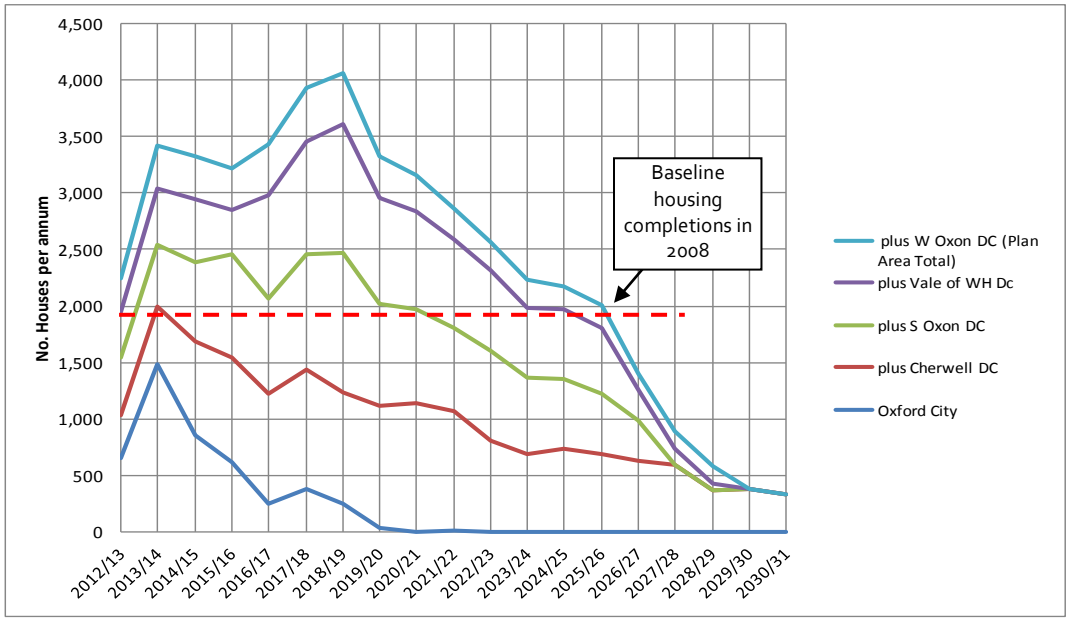

Figure 1: Projected Number of New Houses per annum by District (Cumulative)

[15] As the different District plans cover different periods some of the house building data stop before the end of the Plan period. This is not intended to suggest that no further housing will be built but in the absence of data - and in acknowledgement of a declining trend - no assumption has been made about housing growth beyond those dates.

Comparing the housing completion value for the Plan Area (1,980 in 2008) used to generate the initial baseline arising value with the 2012/13 projected house building value shows that there is a substantial rise in house building predicted, and that this rise continues year on year until at least 2026. On this basis, and all other things being equal, this indicates that the quantity of waste generated from this activity will be greater than in the baseline year.

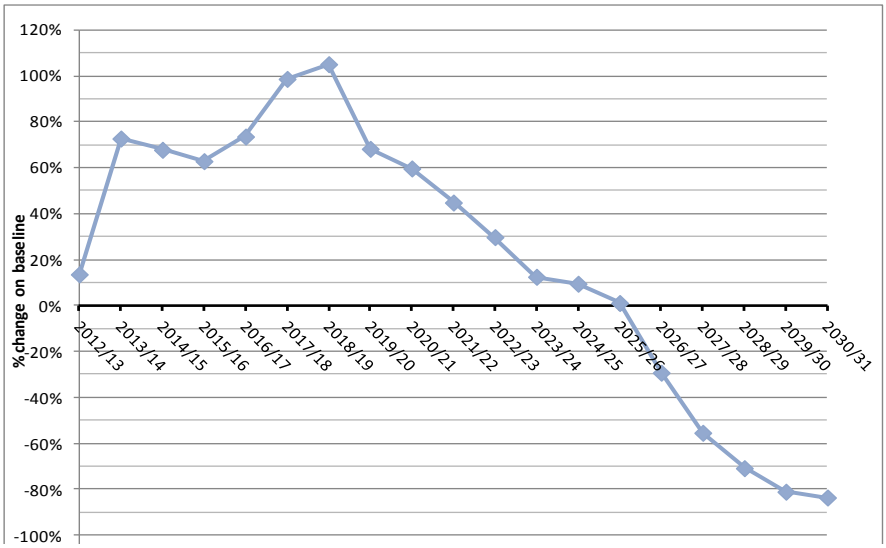

Figure 2: Projected Annual % Change in House Building in Plan Area on Baseline

Comparing the baseline with these values gives the % change on the baseline of housing completions in the Plan Area. The picture is distorted by the fact that District by District planned provision tapers off after 2020. Taking the values up to that date gives a mean change of around **5% per annum on baseline**.

The WRAP/BRE data (date) suggests that waste production per unit could be halved were all residential properties to be built to a 'good' standard. Hence some of this growth may be offset by resource efficiency improvements in construction practices reducing the amount of waste per house built. Overall a value of 4% per annum is therefore suggested to 2020. After this time the planned housing figures suggests a year on year fall of 0.5% to 2031.

4.2 Availability/development of previously developed land

The National Land Use database of Previously-Developed Land (NLUD-PDL) [16] dataset for 2009 lists a total of 199 sites within Oxfordshire totalling an area of 985 hectares. Of this 652 hectares is identified as suitable for housing. The waste associated with development of this portion is ascribed to housing. That leaves up to 333 hectares identified as suitable for other uses - predominately Employment land. Of this 3 sites totalling 2.2 hectares are identified as having potential contamination issues that compromise suitability for housing. Thus it may be assumed that these sites would give rise to potentially contaminated soil were they to be developed.

4.3 Commercial development

The quantity of commercial development is unknown but has been assumed to follow the trend in housing as some will be focussed around servicing the needs of population occupying new housing e.g. retail use and employment. However it is not expected to experience growth of similar order of magnitude and a more modest growth factor of 2.5% per annum to 2020 is assumed. See Appendix 3 for information on some significant commercial development.

4.4 Major Projects

Major projects can create major 'one-off' amounts of arisings that may place demands on waste management capacity albeit relatively short lived. In the case of Oxfordshire the following two projects have been identified:

- Arisings from the demolition of Didcot Power Station A. These have been estimated following direct approach to RWe the site owner. The vast bulk of materials - a quarter of a million tonnes - are inert and will be retained onsite following crushing. Around 50,000 tonnes of material will be removed from site with most of that being metals going for recycling.
- HS2 only clips Oxfordshire and is not expected to generate significant arisings.

[16] The NLUD is a product of returns on previously developed land supplied by local authorities across England. http://www.homesandcommunities.co.uk/nlud-pdl-results-and-analysis.

4.5 Drivers for Resource Efficiency/Waste Reduction in the Sector

4.5.1 Waste Management Costs

The prime driver affecting costs of waste management is the landfill tax. This is charged at 2 rates - one for active waste that currently stands at £80/tonne; and one for inactive waste at £2.50 /tonne.[17] Therefore it can be expected that the principal material that will be affected by this cost and the associated escalator will be non -inert waste.[18] This is particularly the case for 'tromelled fines'- residues from processing of skip waste generated by recycling sites - that is to be subject to the active rate of the tax having previously avoided it. The additional cost of dealing with these fines is expected to result in a significant rise in skip prices for mixed waste affecting construction sites. In addition rising material costs will drive construction companies to manage supply and use on sites more effectively thereby reducing wastage.

4.5.2 Regulatory pressures

i. Site Waste Management Plans: Until April 2014 any developer of a project with a value in excess of £300,000 was required to produce a produce Site Waste Management Plan (SWMP). This predicted the quantities and types of waste arising and identified appropriate management routes that demonstrated compliance with the waste hierarchy. While the statutory requirement to produce Site Waste Management Plans has been repealed SWMPs would still be required for BREEAM (BRE Environmental Assessment Method) and the Code for Sustainable Homes so any repeal of the Regulations would not affect projects being built to those standards.

ii. Definition of Waste: A number of initiatives around defining more clearly when a material becomes a waste and when a waste ceases to be waste are under development. In the case of the

[17] The use of suitable waste materials to backfill mineral quarries or restore general landfill sites is not subject to the tax. In addition an exemption from the tax also applied to waste arising from the reclamation of contaminated land. HMRC completely withdrew this Landfill Tax exemption on 31 March 2012 and anyone carrying out reclamation of contaminated land can no longer benefit from the exemption.

[18] This is borne out by the evidence gathered in relation to the Halving Waste to landfill initiative indicating that reducing inert waste to landfill has been most challenging.

former the EU funded EA managed EQual[19] programme is developing a Definition of Waste web tool. In the case of the latter this usually involved the development of a quality protocol by which the resulting material can be evidenced to be of a equivalent value as a primary material.

Quality protocols of relevance to CDEW are those applying to:

- recycled aggregates;
- recycled gypsum from waste plasterboard
- production of processed cullet from waste flat glass.

A quality protocol for wood is also under consideration.

Both of these initiatives will potentially reduce the quantity of material classed as waste requiring subsequent management.

iii. Permitting exemptions: A number of activities involving the use of construction waste benefit from exemptions from permitting - including the use of inert waste in engineering operations. However these exemptions were significantly tightened in April 2010 making the deposit of inert waste to land - including for restoration of mineral workings - more difficult without going through the permitting process. This will act as an encouragement towards retaining inert materials onsite.

iv. Voluntary Initiatives: With the recognition that CDEW arisings represent a substantial proportion of total arisings in the country and that managing these arisings represent a rising cost to the sector all sectors engaged in construction and demolition activity have been engaged in developing voluntary initiatives. These are summarised below in Table 8.

[19] Ensuring Quality of waste-derived products to achieve resource efficiency programme running from September 2011 to March 2015 http://www.environment-agency.gov.uk/aboutus/wfo/134233.aspx

Table 8: Voluntary Initiatives Affecting CDEW

Initiative	Target	Target	Comment
Halving Waste to Landfill Commitment	50% reduction of construction, demolition and excavation (CD&E) waste to landfill compared to 2008.	2012	2010 data indicates on target for C&D but not E due to increase in soils managed by landfill. Proposed target of "zero CD&E waste" to landfill by 2020 was rejected; Best practice considered to be 90% landfill avoidance
Demolition Waste Action Plan	Target of diverting 90% of demolition waste to landfill annually.	Year on Year	
Construction Resources and Waste Roadmap	Target 1: Halve the amount of (non-aggregate) construction waste produced	2015	
Sustainable Construction Strategy	Target 50% of new construction plasterboard waste recycled	2015	
End of life plasterboard waste agreement	Reduction in plasterboard waste being disposed of to landfill to zero by 2025	2025	

In addition to the above there are a number of voluntary responsibility agreements that increase the focus on resource efficiency and waste prevention allowing businesses to make the most of the cost savings possible through action in this area. This includes 20% reduction in construction packaging waste. WRAP is looking to address this issue in the construction supply chain with a new responsibility deal with the construction industry that focuses on designing out of waste too. [20]

[20] Referred to in *Defra Public Consultations Proposed repeal of Construction Site Waste Management Plan Regulations (2008) Summary of responses and Government response August 2013*

v. National Policy Pressure: The 2011 Government Review of Waste Policy addressed Construction Waste in the following terms:

" The existing Halving Waste to Landfill Commitment is on track to meet its 2012 target. While keeping the momentum going, there will be a greater focus on waste reduction at the earlier, design stages of construction projects as this is where the largest environmental and financial savings can be made. This will be part of a wider, ongoing programme of work with the industry including support for the Sustainable Construction Task Group Action Plan."

The Revised EU Waste Framework Directive sets a target for C&D waste of:

A minimum of 70% by weight of non-hazardous construction and demolition waste prepared for re-use, recycling and other material recovery by 2020.

Backfilling operations using waste to substitute other fill materials may be counted towards the target.

Naturally occurring material categorised under EWC 17 05 04 (soil & stones) is excluded from the target. i.e. use is unconstrained.

The Halving Waste To Landfill voluntary initiative referred to earlier is seen by Defra as the primary mechanism to achieving this target and there is no specific obligation placed on Local authorities to plan to meet it.

There was a National Public Service Agreement Target that all social housing be brought into a decent condition by 2010. Once this target has been met the amount of existing housing stock requiring upgrade through refurbishment will diminish.

Table 9 identifies key factors and the predicted impact on CD&E arisings within Oxfordshire over the short to midterm (5 to 10 years).

Table 9: Analysis of Factors Influencing Growth of CDEW in Plan Area in the Short Term[21]

	Predicted Future Direction	Critical Factors			Predicted impact on annual quantity of waste produced	Suggested Annual Compound Growth
		Construction Waste	Demolition Waste	Excavation Waste		
Residential						
New build	Housing growth of 5% per annum to 2020.	SWMP& cost pressures (e.g. landfill tax, materials cost) reduce wastage	Falling as Previous Developed Land opportunities become exhausted and diminishing mass of building stock over time. But conversions from commercial to residential may increase?	Falling - tighter regulation results in cost pressure to minimise waste[22]	Rising to 2020 falling thereafter	4% pa to 2020. -0.5% to 2031.
Refurbishment	Reducing stock of housing requiring upgrade to modern standards.	Scope to minimise is small; results in problematic materials inc. insulation, contaminated timber etc.	Minimal But conversions from commercial to residential may increase?	Minimal	Static	0% pa

[21] It is not clear how relevant these factors will be in 10+ years time

[22] The material that would have previously been managed at sites exempt from a permit (which would have no or low gate fee) will now cost more to manage (at permitted sites with higher gate fees) so this is expected to be a driver towards minimisation.

Commercial & Industrial						
New build	Tends to follow housing but some stock replacement	SWMP & cost pressures reduce wastage e.g. landfill tax (falling)	Falling as Previous Developed Land opportunities become exhausted and diminishing mass of building stock over time.	Some growth with development of employment uses such as business parks e.g. Didcot/Harwell and expansion of constrained sites by excavating/sub-terranean development	Modest rise	2.5% pa
Refurbishment	Restrictions on new build may encourage more refurbishment. Some conversion of commercial to residential.	Growth[23] as scope to minimise is small; problematic waste materials produced.	Minimal	Stable	Some Growth	2.5% pa
Infrastructure						
New build	Public Spending and economic restrictions restrict new build.	SWMP & cost pressures reduce wastage e.g. landfill tax (falling)	Static growth restriction offset by need to replace ageing infrastructure	Minimal growth – generally managed on site but tighter exemptions increase amount	Static – harder to predict[24].	0% pa
Refurbishment	Restrictions on new build may encourage more refurbishment	Some growth in resurfacing of existing roads[25]	Some refurbishment of ageing infrastructure	Minimal – generally absorbed by on site management	Static	0% pa

[23] There may be more refurbishment in commercial sector – so while same factors apply overall growth might be expected.

[24] Subject to approval of one off civil engineering projects

[25] anticipating switch from new build to keeping old roads running for longer but minimal waste production

4.6 Taking a Broader View of Growth Trends

The Regional Strategic Waste Monitoring Report (SWMR) produced for SERTAB[26] compared the growth rates indicated by the succession of DCLG surveys of this waste stream for the South East as below:

Table 10: Comparison of Regional Estimates for South East from DCLG Surveys
(reproduced Table6 from SERTAB SWMR 2010)

	1999	2001	2003	2005
CD&EW Estimate	13,123,000	13,444,000	15,230,000	14,245,167
Annualised Growth Rate		1.22%	6.64%	-3.23%

This trend has been substantiated by the most recent refresh study undertaken for WRAP[27] at a national level. This found that "The headline figures and 'like-for-like' comparisons are shown in Table 1 (*reproduced below*). Subject to the caveat that the data were collected in different ways in 2005 and 2008, and that therefore the categories are not always directly comparable, they show that arisings of the mainly inert fractions of CDEW fell by 7% over the 3-year period, "

Table 11: Comparison Between Estimated Arisings of CDEW in 2005 & 2008 (million tonnes)
(reproduced Table1 from WRAP 2010)

	2005	*2008*	*Change*
'Hard inert' CDEW generating recycled aggregate	42.07	43.52	+3%
Inert CDEW recovered as recycled soils	4.36	9.21	+111%
Waste (mainly excavation waste) spread on exempt sites	15.44	10.98	-29%
Mainly inert CDEW beneficially used for landfill engineering / capping	9.61	10.60	-47%
Mainly inert CDEW beneficially used to restore former quarries	10.24		
Other largely inert CDEW deposited at landfills as waste	7.90	8.93	+13%
Sub-total (largely inert CDEW)	89.63	83.24	-7%
of which deposited at permitted landfills	27.75	19.53	-30%

This suggests a continuation in the declining trend in annual production of C, D & E waste. Hence this broader view gives credence to a scenario with a declining growth rate.

[26] First Annual Strategic Waste Monitoring Report for South East England 2008-09, July 2010.

[27] Construction, Demolition & Excavation Waste Arisings, Use & Disposal for England 2008 CON900-001: Final Report WRAP April 2010

4.7 Suggested Scenarios

Key factors to be considered in developing scenarios are:

- Rate of house building and its progress as planned.
- Policy, legislation and standards pushing the sector to more sustainable approaches.

Longer term predictions for waste arising are difficult to make; but the indicated tailing off in planned house building (as indicated in Figure 1 above) and possible de-coupling of housebuilding from waste production suggests a significant fall in waste growth in the second half of the plan period.

4.8 Growth rate conclusions

Detailed consideration of growth trend expectations shown in Table 8 suggests that a positive growth rate may be more realistic to 2020. This runs counter to trends shown in the last two national surveys but reflects local house building expectations. Because the combined projected housing growth figures[28] represents an increase in house building from the baseline year of 2009/10, this indicates there will be an increase in waste arising in the short to medium term especially as construction emerges from the recession. This is expected to be offset to some degree by the fall in redevelopment of brownfield sites as these opportunities become fewer and reduction in mass of building stock that may be demolished (1970s industrial & commercial properties being converted to residential) which should hold growth in demolition waste down in the longer term. In addition the pressure to reduce waste production per unit will rise so even for the houses built the quantity produced per unit is likely to be less. Other development may follow a similar trend. Taking this into account three CDEW growth scenarios are proposed as follows:

[28] The actual reported housing completion in the Plan Area of 1,980 in 2009/10 was used to calculate the baseline value.

4.8.1 Growth scenario 1: Low

Continued reduction long term - The lower boundary assumes an annual reduction of 1% per annum to 2020, followed by a longer term reduction assumption of 0.5% per annum going forward. This is on the basis that the house building programme doesn't pick up as planned and those developments that do take place operate to a good standard of resource efficiency.

4.8.2 Growth scenario 2: Medium

Static– The middle estimate should assume zero growth going forward. This is on the basis that the house building programme doesn't pick up as planned but does get built over the Plan period and those developments that do take place do have significantly improved resource efficiency driven by CfSH and BREEAM, and WRAP voluntary initiatives.

4.8.3 Growth scenario 3: High

Increased growth long term - New build picks up to and above planned levels, with growth in CDEW from new build assumed to be held in check to some degree by pressures to reduce waste. Growth assumed to be 5% per year to 2020 and then holding at zero going forward.

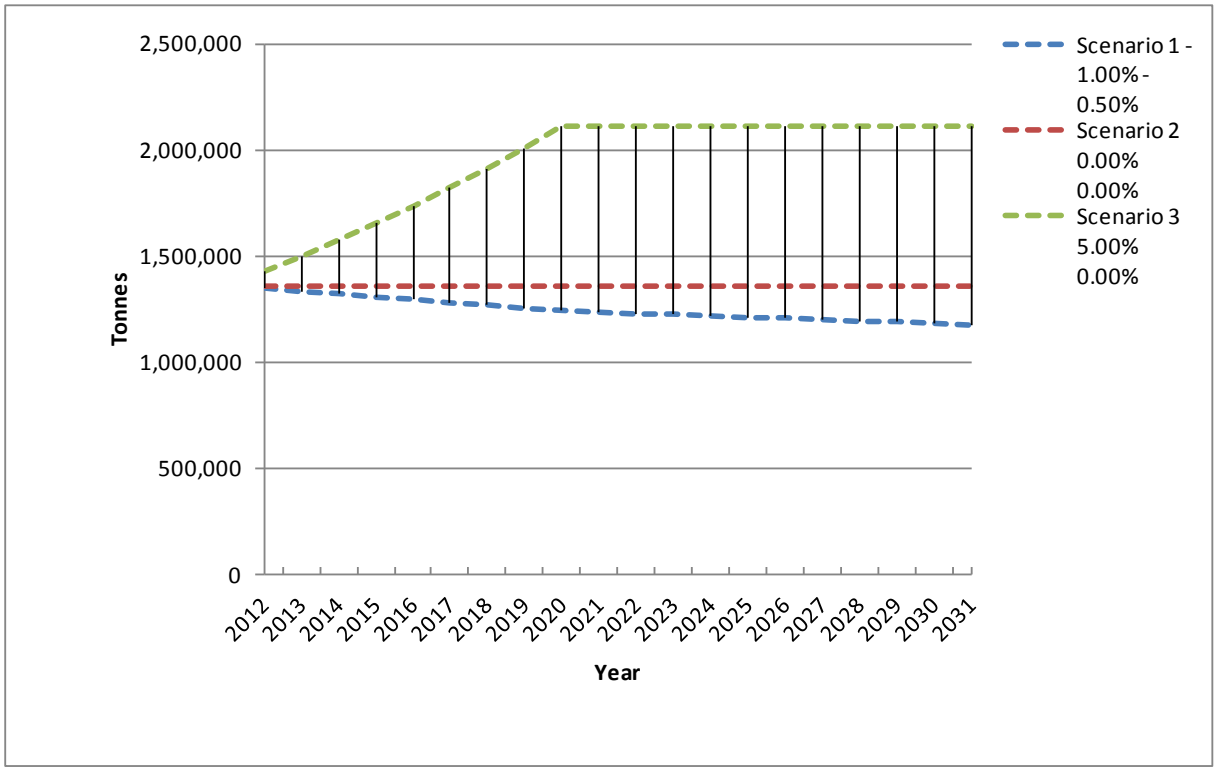

Figure 3: Suggested Growth Scenarios for CDEW Production in Plan Area *(updated baseline 2010)*

The values presented could be taken to represent a 'cone of possibility' within which there is a high probability the actual value will lie.

The above assessment indicates that a positive growth rate may be applicable for the initial plan period after which the effect of growth from a revival in construction could be offset by improved waste reducing measures. These values should also be read with caution as they are all based on professional judgement and almost inevitably will not be reflected in reality.

In our view a trajectory somewhere within the 'cone of possibility' would be most robust – so approximately between 1.2m and 2.1m tonnes per annum at 2031. We suggest Scenario 3 be used as the basis to plan going forward as it takes a positive growth rate ensuring that the plan is flexible enough to provide for an increase in arisings.

5 Management Routes

Having defined a baseline and identified a preferred growth forecast to establish credible targets for the plan it is necessary to identify the current management profile of this waste stream. This has been done through analysis of the following available datasets:

5.1 Construction Waste: WRAP 2011 BRE data

Based on an aggregation of data generated during the course of the production and monitoring of Site Waste Management Plans. This data is submitted by certain developers to the online Smartwaste tool maintained by BRe. This dataset covers projects by type e.g. civil engineering, new build housing, refurbishment and by region e.g. South East, London. It was supplied to WRAP and has been downloaded from its website.

The following categories of management route are used:

Reused: Reuse of product for the same purpose with minimal processing
Recycled: Sent direct for recycling or segregated for recycling
Recovered: Sent for recovery to a waste transfer station, composting or energy recovery
Landfill: Sent to landfill

Values by project type and region are presented - average values have been used. A total number of 3410 project data points are given for waste management routes used by a range of projects across the UK. Where there are sufficient number of values for projects in the South East the corresponding values have been used. Where there are insufficient values - as flagged by the data tool - then UK wide values have been used.

5.2 Demolition Waste: NFDC 2011/12 data

Based on returns submitted by the membership of the National Federation of Demolition Contractors (circa 160 companies said to account for circa 80% of demolition activity in the UK) giving a detailed breakdown of fates of different waste materials arising from demolition work. This presents data using the following categories:

1. Unprocessed hardcore either:
    a. used on site
    b. removed off-site for recycling or reuse
    c. crushed on-site for use on-site
    d. crushed on-site for off-site sale
2. Source segregated materials sent for recycling or reuse
3. Mixed Waste sent for Recycling
4. Non-hazardous waste sent to landfill or incineration
5. Hazardous waste sent to landfill

The elements have been allocated as shown in Table 12 below.

Table 12: Management Routes for Demolition Waste

Based on National Federation of Demolition Contractor Member Returns Data 2012

	Total amount of Hardcore produced (a+b+c+d)	Un processed hardcore used on site (a)	Unprocessed hardcore removed off-site for recycling or reuse (b)	Hardcore crushed on-site for use on-site (c)	Hardcore crushed on-site for off-site sale (d)	Source Segregated Materials sent for recycling or reuse	Total Non-Hazardous Mixed Waste sent for Recycling	Non-hazardous waste to landfill or incineration	Total Hazardous Waste to Landfill (Li +Lii)
Recycled				34.0%	10.7%				
Preparing for Recycling		10.6%	26.6%			9.4%	4.6%		
Recovered									
Disposed								2.5%	1.3%

5.3 Excavation Waste: DCLG 2005 Symonds survey

This estimated the following different routes for excavation waste:

- recycled aggregate;
- recycled soil;
- materials used for landfill engineering and landfill capping;
- material sent to exempt sites; and
- material disposed of to landfill.

Applying the tonnages allocated to the Berkshire, Buckinghamshire and Oxfordshire sub region in the survey (as per Table 2 previously) the following profile emerges:

Table 13: Management Routes for Excavation Waste

Based on DCLG Symonds Survey 2005

Route	DCLG 2005
Reused	4%
Recycled	14%
Recovered	45%
Disposed	37%

This was cross checked with data from the WRAP/BRE dataset for civil engineering projects as this was the project type assumed to involve most excavation activity and hence generate most waste of that type.

Table 14: Management Routes for Excavation Waste

Based on WRAP/BRE Dataset 2011

Route	WRAP 2011
Reused	10%
Recycled	21%
Recovered	35%
Disposed	33%

As the DCLG Survey data was gathered nearly a decade ago it has been assumed that the profile indicated by the more recent WRAP/BRE data is more representative as it shows a shift up the waste hierarchy towards greater reuse and recycling. Therefore these values have been used in generating the profile for the management of excavation waste.

5.4 Overall Estimated Management Route Profile for C,D & E waste arising in Oxfordshire

Application of the management route profiles derived from the different sources to Oxfordshire data, gives the following results.

Table 15: Predicted Management Routes for CD & E Waste Arising in Oxfordshire

	Total Construction Waste	Demolition	Excavation	Totals	%
Estimated Plan Area Arisings	*204,000*	*492,000*	*662,000*	*1,358,000*	
Recycled	16,000	221,000	69,000	306,000	23%
Preparing for Recycling	44,000	252,000	142,000	438,000	32%
Recovered	81,000	0	233,000	314,000	23%
Disposed	63,000	19,000	218,000	300,000	22%

Thus it is estimated that an overall landfill diversion rate of at least 78% is being achieved across the range of CDEW. It is also encouraging that substantial quantities of material are being managed further up the hierarchy. This is illustrated in Figure 4 below:

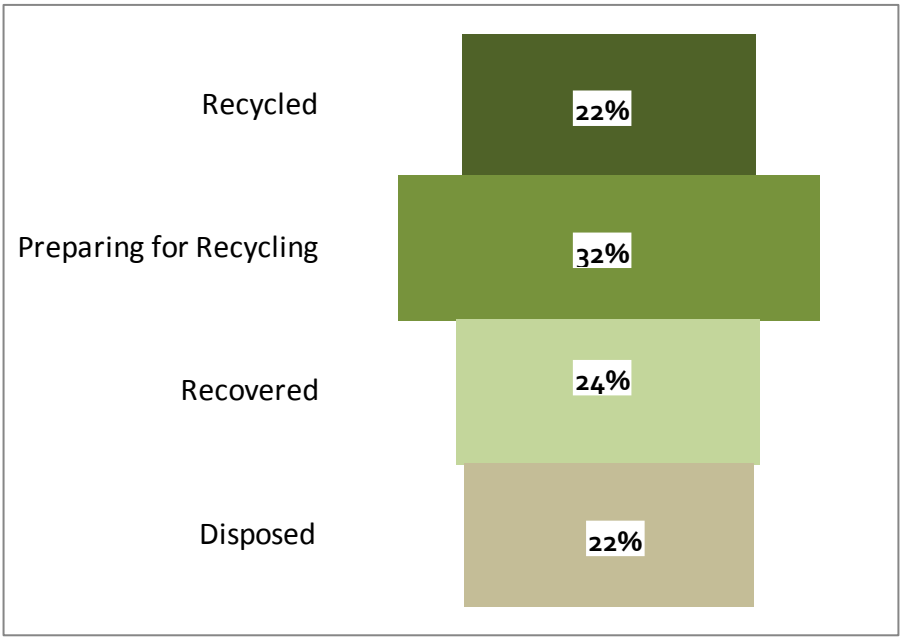

Figure 4: Management Profile for C, D & E Waste Arising in Oxfordshire by %

6 Verification of Profile

Examination of the WDI2012 data indicates that around 690,000 tonnes of Chapter 17 waste - that attributed to Construction & Demolition activity - arising from Oxfordshire was managed at permitted facilities. The breakdown of this is shown in Table16 below.

Table 16: Actual Management Routes for C, D & E Waste Arising in Oxfordshire
(Source WDI 2012)

Management Method	Landfill	MRS	On/In Land	Transfer	Treatment	Use of Waste
Total	216,000	17,000	59,000	147,000	160,000	92,000

MRS= Metal Recycling Sites; On/In Land = beneficial recovery; Treatment= all processing including recycling & composting; Use of Waste=former exempt activities producing product or putting waste to a use

Bearing in mind that an element of site input coming from Oxfordshire may not be correctly reported and that a total of 1.7 million tonnes of waste is coming from the South East region but is not ascribed down to WPA level the following observations can be made:

1. The 216,000 tonnes reported as going to landfill compares reasonably favourably with the predicted 300,000 tonnes going to landfill under the production-based profile (Section 2.2). This represents only 16% of total estimated arisings.

2. It is not possible to directly compare the other categories, as much recovery, recycling and reuse will take place at facilities that fall outside the permitting system - either at exempt sites or on the site of production.

A rapid survey of operators of crushers and screeners has been undertaken to capture this additional activity. This found that at least454,000 tonnes of reprocessing capacity operates within Oxfordshire at any one time and as much as 825,000 tonnes. This compares with the predicted recycled/prepared for recycling range of 306,000 - 744,000 tpa. This represents between 33 and61% of total arisings.

This indicates that the actual profile is substantially more skewed towards recycling and away from landfill, presenting a strong baseline position.

7 Identifying Appropriate Targets

The withdrawn Oxfordshire Minerals & Waste Core Strategy proposed submission document May 2012 proposed the following targets for Construction, Demolition and Excavation waste:

Table 17: Original Proposed CDEW Targets

	2010	2015	2020	2025	2030
Recycling	50%	50%	60%	60%	60%
Landfill/Restoration	50%	50%	40%	40%	40%

The data review indicates that at least 53% of Oxfordshire CDEW arisings is either recycled or reprocessed into a product. This leaves 24% of CDEW being either subject to a recovery process which in the case of CDEW could include:

- being further processed at a CDEW MRF to extract materials for recycling,
- thermal treatment for energy production (combustible element)
- utilisation in onsite construction and engineering ,
- use in offsite activities either at exempt or permitted landfill sites.

The remaining 23% is considered to go to landfill which may include the backfilling of mineral voids.

This profile suggests that the current targets proposed are quite unambitious and that this stream in particular offers greater opportunity to move waste up the hierarchy through conversion to product.

What is Possible?

To inform consideration of targets each of the waste streams that make up CDEW have been assessed for its amenability to different management. This is summarised below:

7.1 Construction Waste:

Current Profile:*30% disposed direct to landfill: 40% recovered: 29% recycled or used. (Table 15)*

This is a heterogeneous waste stream and presents many opportunities for material to be separated for recycling. To a large extent this is already happening with on-site segregation driven by standards such as the Code for Sustainable Homes and BREEAM supported by Site Waste Management Plans[29]. In addition recycling rates at construction waste management facilities are high - reported to be 88% for the South East overall[30]. This has been driven largely by rising landfill tax and pressure from construction companies seeking high landfill diversion rates to meet voluntary targets such as Halving Waste to Landfill..

There is scope for marginal improvements with, for example, the drive to improve the quality of gypsum derived from plasterboard so that the product meets a recognised specification for resupply to plasterboard manufacture. The use of screeners and crushers to convert waste into products is key - this requires sites to have room to expand or the creation of processing hubs on other sites. Furthermore the prospect of the higher active rate of landfill tax being levied on the deposit of trommel fine materials (soil like materials generated by trommel processing of mixed CDEW) at landfill is now making the introduction of systems to clean up this material a key area of focus.

7.2 Demolition Waste:

Current Profile:*4% disposed direct to landfill: 96% recycled, used or converted to product.*

High levels of landfill diversion are already being achieved with the sector well attuned to the maximisation of value on processing outputs. A small proportion of material from demolition – estimated 7% - is either sent to landfill or for further sorting at specialist processing sites. The focus on further improvement will be on systems that clean up residues and generate product, with a particular focus on fines being utilised as a suitable replacement for primary materials such as sand.

[29] See section 4.5.2.

[30] WRAP/BRe dataset 2011

7.3 Excavation Waste:

Current Profile:*33% disposed direct to landfill: 35% recovered: 31% recycled or used.*

The evidence from the 'Halving Waste to Landfill' initiative demonstrates that this is the most problematic waste stream to divert from landfill. In particular clay type materials that are not amenable to recycling through the application of currently adopted processing methods due to its cohesive properties. This material may be best used in the following ways:

- backfill of mineral voids
- in onsite construction and engineering work,
- off site use in exemptions or permitted landfill sites

It is estimated by operators that the cohesive clay type materials may represent 20% of arisings of this stream. i.e. 132,000 tpa and this tonnage may require disposal to landfill if alternative routes are not available. This material would be suited to inert landfill/ backfilling of mineral voids.

In summary the above analysis shows that landfilling of CDEW could be reduced to 10% in the short - medium term given the availability of suitable processing capacity.

Bearing this in mind it is considered that the following targets should be adopted.

Table 18: Proposed Amended CDEW Targets

	2010	2015	2020	2025	2030
Recycling , Use or Conversion to Product	54%	55%	60%	65%	70%
Recovery	24%	25%	25%	25%	25%
Landfill/Restoration	22%	20%	15%	10%	5%

To promote movement of waste management up the waste hierarchy, ultimately more material needs to be converted to products which replace primary materials with only the minimum amount of material - such as clays and hazardous materials such as asbestos – continuing to be landfilled.

The pace of the development of waste management technology indicates that such ambitious targets can be achieved given the right signals. Planning policy can assist in this by restricting availability of landfill capacity in the medium term while at the same time ensuring the availability of suitable recovery capacity either at new sites or by expansion of existing capacity. In addition more ambitious targets in the Minerals Core Strategy for the production of recycled minerals could assist.

Appendix 1 – Apportionment of D&E waste to Construction Activity

To show how these growth rates might influence actual waste production it is necessary to allocate the demolition and excavation estimations to construction activities. This Appendix presents an explanation of the method used for this apportionment exercise.

Table A1.1: Estimated proportion contribution of different construction related activities to Construction (not including demolition & excavation) waste arisings

	Construction Waste			
	New build construction		Refurbishment	
	Residential	Public Sector & Commercial	Residential	Public Sector & Commercial
Estimated Plan Area Arisings	41,000	94,000	40,000	29,000
% contribution	20%	46%	20%	14%

Appendix 1 – Apportionment of D&E waste to Construction Activity

To show how these growth rates might influence actual waste production it is necessary to allocate the demolition and excavation estimations to construction activities. This Appendix presents an explanation of the method used for this apportionment exercise.

Table A1.1 indicates that new build housing development accounts for around 20% of construction waste alone. However the contribution of house building to overall construction, demolition and excavation waste arisings will be larger when waste from demolition and excavation activity associated with development of housing is also taken into account.

How the excavation and demolition waste values should be apportioned between residential (housing) and non residential (public sector & commercial) development is open to interpretation. We propose a simple apportionment of the demolition and excavation waste value between residential new-build and non-residential new-build activity which is equivalent to the percentage split between residential new- build and non-residential new-build activity for construction waste.

Therefore, applying the construction waste value for new build residential (41,000 tpa) and new build non residential (94,000 tpa), gives a percentage split between new build residential and new build non residential of 30% to 70% respectively which can then be applied to the demolition and excavation waste values. Table A1.2 shows the resulting values.

Table A1.2 **Construction Activity Arisings: D&EW Apportioned to New Build Development Only**

	Construction Waste				**Demolition**	**Excavation**
	New build construction		**Refurbishment**			
	Residential	**Public Sector & Commercial**	**Residential**	**Public Sector & Commercial**		
Estimated Plan Area Arisings	41,000	94,000	40,000	29,000	492,000	662,000
% contribution	20%	46%	20%	14%	-	-
plus apportioned Demolition	149,000	343,000	-	-	-	-
plus apportioned Excavation	201,000	462,000	-	-	-	-
Totals	**391,000**	**899,000**			-	-
% of all arisings	**29%**	**66%**	**3%**	**2%**	-	-

This suggests that just over 390,000 tonnes of C, D & E waste was produced per annum from New Build Residential development activity, while just less than 900,000 tonnes of CDEW was produced per annum from New Build non Residential construction activity.

Appendix 2: Survey of CDEW Processing Capacity in Oxfordshire

Oxfordshire County Council

Minerals & Waste Local Plan Support

Estimating CDEW Reprocessing Capacity in Oxfordshire

Final Report

Version 1.2

Issued: 10th February 2014

Oxfordshire Minerals & Waste Local Plan Support

BPP Consulting Document Control

Project: **Oxfordshire Waste Needs Assessment Refresh**

Report: **CDEW Reprocessing Capacity Review**

Version Description: **Final Report**

Version No.: **1.2**

Date: **10.02.14**

Version No.	Version Description	Author	Date	Reviewed	Date
0.1	Draft for Internal review	Alan Potter	26.01.14	Ian Blake	27.01.14
1.0	Client review	Alan Potter	27.01.13	Ian Blake	
1.1	Post client review	Alan Potter	29.01.14	Ian Blake	29.01.14
1.2	Final issue	Alan Potter	10.02.14	Ian Blake	

Estimate for CDEW Reprocessing Capacity in Oxfordshire -
Final Issue v1.2 10.02.14

Oxfordshire Minerals & Waste Local Plan Support

1. Introduction & Method

This report is intended to provide an estimate of the capacity of facilities currently existing within Oxfordshire capable of processing Construction, Demolition and Excavation waste to produce a product or material which can be used in the place of a primary raw material. This is intended to inform the target setting exercise for CDEW in the Minerals & Waste Plan currently under preparation.

Starting with a top down calculation, using data generated in the CDEW data baseline and applying National Federation of Demolition Contractors (NFDC) factors (see Table 12), it is possible to estimate 232,000 tonnes of product may be produced from CDEW arising in the Plan Area. Combining this estimate with outputs of the Symonds/WRAP update of the national CDEW survey provides an estimate 337,000 tonnes of processed product .

We then sought to verify the outputs of this calculation by using bottom up data sourced from a survey of the following operating in Oxfordshire:

- mobile CDEW crusher operators;
- demolition contractors; and,
- waste site operators processing CDEW using crushers and screeners in the Plan Area.

When taken together, this suggests that a total of 825,000 tonnes of capacity may be in operation within the county at any one time.

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2. Overall Assessment

The top down methodology indicates that 337,000 tonnes of product may be produced from CDEW within the Plan Area.

The bottom up methodology indicates a value of in excess of 454,000 tonnes.

As the bottom up value is verified by operator survey we consider that this is a more reliable estimate, however we suggest some adjustment be made for omissions in the survey population. Hence an overall value of circa 825,000 tonnes of processing capacity might be considered a reasonable estimate.

3. Arriving at a Top down Value

Source 1. CDEW Data Baseline

As shown in Section 3.2 of the CDEW Baseline Report 423,000 tonnes of hard demolition waste was generated in the Plan Area in 2010. The National Federation of Demolition Contractor data shows that 55% of all hard demolition waste is crushed (on site of production or offsite). It may therefore be assumed that 232,000 tonnes of crushed material was generated in Oxfordshire in 2010.

The Symonds /WRAP survey estimates that around 105,000 tonnes of screened soil was produced from CDEW in Oxfordshire in 2010.

Combining these two gives a total of 337,000 tonnes of recycled material processed product.

Source 2: Environment Agency Exemption Register

The EA Exemption Register (September 2013) that records activities that involve the management of waste but do not require a permit providing they are conducted within limits specified in the legislation. Entries are retained for 3 years from registration shows how much CDEW was managed at facilities registered within Oxfordshire against the T5 Exemption (See Appendix 1 for detail of T5 exemption) that includes certain CDEW crushing and screening activities taking place either on the site of production or on the site of use. This indicated that 68 operations are registered under this exemption. Recognising that limits of 5,000 tonnes per annum apply to each site gives a maximum theoretical tonnage processed at such sites of 340,000 tonnes per annum.

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This value is in close alignment with the top down value of 337,000 tonnes. However there are number of caveats on the reliance on this data:

1. The registered sites could be processing materials other than soil and hardcore such as timber and glass under the exemption.
2. The figure arrived at assumes all sites operate to the legal maxima which is unlikely to be the case.

This means that the theoretical estimate of 340,000tpa above is very likely to be significantly higher than the actual amount of exempt capacity used for producing product from CDEW.

Against this, other activity to be considered is the operation of crushers for quantities of CDEW in excess of 5,000 tonnes p.a. which is not covered by the T5 exemption. NFDC data shows that over half (55%) hard materials of demolition origin are crushed onsite under a different exemption so this could mean that this activity provides a significant amount of additional CDEW processing capacity such that the 340,000 tpa value is likely to be a underestimate. This is considered below.

Taking the above into account we conclude the top down value for the production of recycled materials from CDEW processing is 337,000 tonnes per annum.

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4. Bottom Up Survey

To check the top down calculation a telephone survey of operators has been undertaken. Details of possible operators were obtained as described below:

1. District and Borough Council Registered Crusher Operators

District and Borough Councils are responsible for maintaining records of holders of mobile crusher permits (that would cover activities falling under exemption T7 (see Appendix 1)). A search of these records revealed 4 holders of permits issued within the county were dealing with waste materials under this exemption.

2. National Federation of Demolition Contractor Register

An inquiry of the National Federation of Demolition Contractors register indicated 1 contractor based in Oxfordshire. In addition 13 contractors were listed within the vicinity of Oxfordshire.

3. Industry contacts

5 further contractors were identified as operating within Oxfordshire by industry contacts.

4. Yellow Pages

A search of the online yellow pages of demolition contactors in Oxfordshire revealed 1 listed company. A further 8 were listed as serving Oxfordshire. These were contacted to establish if they operated a crusher or whether they hire one

5. Environment Agency Register of Operators of Relevant Permitted Waste Sites

Up to 23 operators were identified as operating permitted sites that might either crush or screen CDEW.

6. Aggregate Suppliers

A search of the online database operated by the Waste Resources Action Programme was undertaken to identify any operators specifically offering recycled aggregate. This did not identify any additional suppliers to those already identified from the other sources.

The survey was conducted of the period December 2013 - January 2014.

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5. Survey Results

The findings of the survey are detailed in Table 1 below. Overall, the results indicate that the following capacity is deployed in Oxfordshire:

1. 124,000 tonnes p.a. for processing hard materials.
2. 120,000 tonnes p.a. for producing screened soft materials.
3. 210,000 tonnes p.a. for processing both soft and hard materials

This results in a combined total capacity of **454,000 tonnes** p.a., with 395,000 tpa of capacity being at permitted sites and just over 60,000 tpa being processed via mobile plant.

The findings are shown in the Table below.

Table 1: Oxfordshire CDEW Recycled Products Producer Survey

	Plant		Output				
			Crushed Material		Screened Soil		Combined
Operator	Crusher	Screener	Material	Product	Material	Product	Product
In County							
David Einig Contracting	1	1		40,000			
Maylarch Environmental Ltd			600				
Earthline Ltd	2	2		20,000	20,000	20,000	
McKenna Environmental		1	16,000	4,000		20,000	
Sheehan	1	1					90,000
Aasvogel Waste Management		1			15,000		
Smiths and Sons (Bletchington) Ltd							120,000
Grabloader Ltd	1	1		15,000		15,000	
Grundon	2	3	10,000		9,000	21,000	
Hanson UK	1						
K J Millard Ltd	1						
Fergal Contracting Co. Ltd	1	1					
Out of County							
Wycombe Demolition Ltd			1000				
Cuddy demolition			8,000				
Balicrest Ltd			5,000				
Dismantling & Engineering Services Ltd			500				
DSM Demolition Ltd			5,000				
Totals			**45,100**	**79,000**	**44,000**	**76,000**	**210,000**
			124,100		***120,000***		***210,000***

In addition to the capacity shown in this table a further two facilities were identified where crushed materials are remanufactured into added value product. The total input of these sites is around 100,000 tonnes per annum. In one case the input material is sourced primarily from commercial/industrial sources -reject blocks, reject sand, gravel and cement and power station furnace bottom ash - supplied to a block works. In the other case outputs from the Smiths process are used with a cement binder to produce paving slabs. As the former operation does not involve materials sourced from CDEW and the latter is using input already counted under Smith this additional capacity is not included.

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5.1 Analysis

The operator survey identified a total of 454,000 tonnes p.a. of CDEW processing capacity being deployed within Oxfordshire for the production of recycled materials.

However we believe this to be an under estimate for actual activity within the county for the following reasons:

1. A number of sites were not captured by the survey because of non-respondent.

   The WDI 2012 data for Oxfordshire suggests that around 400,000 tonnes of Chapter 17 wastes was managed at permitted transfer and treatment sites which are likely to undertake processing resulting in the production of recycled product. While the permitted site operators that were surveyed declared a capacity of 395,000 tonnes (see Table xx below) their combined WDI 2012 returns only accounted for about 200,000 tonnes.[1]. Therefore that suggests that the non-respondent sites account for the remaining 200,000 tonnes and equivalent processing capacity.

2. The majority of capacity identified is at established waste management sites (395,000 tpa) and therefore activities benefitting from the T5 exemption is likely to be under reported in the survey.

   We suggest that these activities - albeit transient/temporary - might account for a further 170,000 tonnes of capacity i.e. half of the theoretical maximum.

[1] This is largely because two major facilities have come on stream whose operation is not counted fully in the WDI2012 data.

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5.2 Conclusion

Table 2 below shows the different estimates derived from the different elements of this survey as described above. When taken together, this suggests that a total of 825,000 tonnes of capacity may be in operation within the county at any one time.

Table 2: Oxfordshire CDEW Recycled Products Production Capacity Estimate

	Actual Survey Result	Additional Estimated	Running Total
Permitted Sites	395,000	200,000	595,000
T5 Exemptions		170,000	765,000
Mobile crushers permitted and T7	60,100	0	825,100

BPP Consulting

10.02.14

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Appendix 1: T5 and T7 Permitting Exemptions

T5 - The Screening & Blending Of Waste

This exemption allows temporary small-scale treatment of wastes to produce an aggregate or a soil at a place such as a construction or demolition site.

- up to 5,000 tonnes of specified wastes can be stored or treated over a three-year period.
- Waste can't be stored for longer than 12 months.
- Treatment can only be carried out at the place where the waste is to be used or where the waste is produced. This applies even if the resultant material is no longer considered to be waste.
- When the waste has been treated the following options are available:
- If the treated waste meets the requirements of a Waste Quality Protocol (Please see The Quality Protocols - WRAP) then it will no longer be considered a waste.

Example activities include:

Screening of soils on a demolition site to remove wood and rubble before sending the soils to a construction site for reuse.

Blending of soils and compost that has been produced under an exemption on a construction site to produce a better soil for landscaping works on that site.

Crushing wastes (except bricks, tiles and concrete) prior to screening or blending.

Grading of waste concrete after crushing to produce a required type of aggregate.

T7 - Treatment of waste bricks, tiles & concrete by crushing, grinding or reducing in size

This exemption is registered by the local Environmental Health Authority where the operator has its principle place of business. This means that mobile crushers - which are generally in use -may operate within Oxfordshire but be registered elsewhere.

Crushing bricks, tiles or concrete, at a level greater than that provided in the T7 exemption requires a Part B permit.

Appendix 3: Predicted Growth in Non Residential Development

The UK Science Vale Enterprise Zone (UKSV EZ), includes 64ha at Harwell and 28ha at Milton Park. Development potential at the Harwell site is estimated to be 35 hectares.

The UKSV enterprise zone (EZ) status was awarded in 2011 on the basis that the designated areas would be fully developed by 2016. The prolonged downturn in economic activity has meant this target will not been met. However take up of land is expected to accelerate, although the scale of the EZ suggests that it may take 10 years or more for it to be fully developed and occupied.

This development is expected to accommodate 8,400 jobs, of which 5,000 are net additional. If these are distributed proportionately to land, then 5,800 jobs would be at Harwell (net 3,500). At the same density, the whole Harwell site would accommodate nearly 9,000 jobs (5,400 net), in addition to the 4,500 already based there. This would have a bearing both on CDEW production during development and also C&I waste production once established and occupied.

Table A3.1 summarises the current and prospective development potential on the Enterprise Zone and the rest of the Harwell site.

Table A3.1 Area of Harwell UKSV Enterprise Zone to be developed

	SVUK Enterprise Zone		Rest of Harwell – already developed	Rest of Harwell – to be developed	Total Harwell
	Harwell	Milton Park			
Land (ha)	64	28	n/a	35	n/a
Existing employment			4,500		4,500
Potential (gross) new employment	5,800	2,600		3,200	9,000
Net new employment (allowing for displacement)	3,500	1,600		1,900	5,400

Note: gross to net based on estimates in EZ submission

After Figure 4.1 Economic Forecasting to Inform the Oxfordshire Strategic Economic Plan and Strategic Housing Market Assessment Final report for Vale of White Horse District Council and partners 5 December 2013