Kent Waste Needs Assessment 2022 Update

Commercial & Industrial Waste Management Requirements in Kent

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Abbreviations

AD	Anaerobic Digestion
C & I	Commercial & Industrial Waste
C, D & E / CDEW	Construction, Demolition & Excavation Waste
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EEFM	East of England Forecasting Model
EfW	Energy from Waste
EWC	European Waste Catalogue
GVA	Gross Value Added
HWRCs	Household Waste Recycling Centres
LACW	Local Authority Collected Waste
MRS	Metal Recycling Site
MRF	Material Recycling Facility
RDF	Refuse Derived Fuel
WDF	WasteDataFlow
WDI	Waste Data Interrogator
WIR	Waste Incinerator Returns
WNA	Waste Needs Assessment
WPA	Waste Planning Authority
WTS	Waste Transfer Station

Glossary of Terms

Agricultural Waste	Waste produced on a 'farm' in the course of 'farming'. Agricultural waste takes both 'natural' (or organic) and 'non- natural' forms e.g., plastics and metal.
Anaerobic Digestion	A process to manage organic matter including green waste and food waste broken down by bacteria in the absence of air, producing a gas (biogas) and nutrient rich solid or liquid (digestate). The biogas can be used to generate energy either in a furnace, gas engine, turbine or to power vehicles, and digestate can be applied to land as a fertiliser.
Bio waste	Waste that can break down over time due to natural biological action/processes, such as food, garden waste and paper.
Commercial Waste	Waste from factories or premises used for the purpose of trade or business, sport, recreation or entertainment.
Construction, Demolition & Excavation Waste	Waste arising from the building process comprising demolition and site clearance waste and builders' waste from the construction/demolition of buildings and infrastructure. Includes masonry, rubble and timber.
DEFRA	The UK Government department responsible for developing national waste management policy.
Energy from Waste	The conversion of the calorific value of waste into energy, normally heat or electricity through applying thermal treatment of some sort. May also include the production of gas that can be used to generate energy.
Environment Agency	The body responsible for the regulation of waste management activities through issuing permits to control activities that handle or produce waste. It also provides up-to-date information on waste management matters and deals with other matters such as water issues including flood protection.
European Waste Catalogue (EWC)	Comprehensive listing of wastes divided into 20 chapters, most of which are industry-based, although some are based on materials and processes. Each waste type is assigned a unique six-digit code. Otherwise referred to as List of Waste (LoW).
Exemptions	Certain activities exempt from the need to obtain an environmental permit. Each exemption has specific limits and conditions that must be complied with to remain valid. Exemptions must be registered with the Environment Agency. Each registration lasts 3 years.
Green waste	Biodegradable plant waste from gardens and parks such as grass and hedge trimmings, from domestic and commercial sources suitable for composting.
Hazardous Waste Landfill	Sites where hazardous waste may be disposed by landfill. This can be a dedicated site or a single cell within a non-hazardous landfill, which has been specifically designed and designated for depositing hazardous waste.
Hazardous Waste	Waste requiring special management under the Hazardous Waste Regulations 2005 due to posing potential risk to public health or the environment (when improperly treated, stored, transported or disposed). This can be due to the quantity, concentration, or characteristics of the waste.
Household Waste	Waste from households collected through kerbside rounds, bulky items collected from households and waste delivered by householders to household waste recycling centres and "bring recycling sites", along with waste from street sweepings, and public litter bins.
Incineration	The controlled combustion of waste. Energy may also be recovered in the form of heat (see Energy from Waste).

Industrial Waste	Waste arising from any factory and from any premises occupied by an industry (excluding mines and quarries).
Landfill (including land raising)	The permanent disposal of waste to land, by the filling of voids or similar features, or the construction of landforms above ground level (land-raising).
Landfill Directive	European Union requirements restricting the landfilling of biodegradable municipal waste and requiring pre-treatment of all waste to be landfilled and separate disposal of hazardous, and non-hazardous and inert wastes.
Local Authority Collected Waste	Waste collected by or on behalf of a local authority. Includes household waste and business waste where collected by a local authority and non-municipal fractions such as construction and demolition waste delivered to HWRCs. LACW is the definition used in statistical publications, which previously referred to municipal waste.
Mass Balance	Method of assessing the quantity of waste that may be converted to recycled aggregate by comparing inputs and outputs for sites reporting through the WDI.
Materials Recycling Facility (MRF)	A facility for sorting recyclable materials from the incoming waste stream.
Mining Waste	Waste from extractive operations (i.e., waste from extraction and processing of mineral resources) including materials that must be removed to gain access to mineral resources, such as topsoil, overburden and waste rock, as well as tailings remaining after minerals have been extracted from the ore. Management subject to control through EU Directive 2006/21/EC.
Municipal Solid Waste (MSW)	Term used to capture LACW plus waste that has a similar composition arising from businesses.
'Next step' Site	Some waste to intermediate sites may not undergo any processing, thus are reported as leaving the site leave under the same EWC and are accounted for again at the 'next step' site where it is to be managed.
Non-Hazardous Waste Landfill	A landfill permitted to accept non-inert (biodegradable) wastes e.g., municipal and commercial and industrial waste and other non-hazardous (including inert) wastes. May only accept hazardous waste if a special cell is constructed.
Recovery	Subjecting waste to processes that recover value including recycling, composting or thermal treatment to recover energy.
Recycling	The reprocessing of materials extracted from the waste stream either into the same product or a different one.
Refuse Derived Fuel	A fuel produced to a contract specification by processing the combustible fraction of waste.
Residual Waste	Waste remaining after materials for re-use, recycling and composting/organic waste treatment e.g., anaerobic digestion has been removed.
The Plan area	The area subject to the Waste Local Plan to which this study relates. In this case the county of Cumbria including the Lake District National Park.
Waste Planning Authority	The authority responsible for planning for waste within a specific administrative area. In this case Cumbria County Council and the Lake District National Park Authority.
Waste Transfer Station	A site to which waste is delivered for sorting or baling prior to transfer to another place for recycling, treatment or disposal.

1 Introduction

This report is concerned with estimating future management requirements for Commercial and Industrial (C&I) Waste in Kent to 2040. The adopted Kent Minerals and Waste Local Plan (KMWLP) defines C&I waste as follows:

Commercial waste is *"Waste from premises used mainly for trade, business, sport, recreation or entertainment, as defined under Section 5.75(7) of the Environmental Protection Act 1990. For example, it is likely to include timber, metal, paints, textiles, chemicals, oils and food waste, as well as paper, card, plastic and glass."*

Industrial waste is *"Waste from any of the following premises: factory, provision of transport services (land, water and air), purpose of connection of the supply of gas, water, electricity, provision of sewerage services, provision of postal or telecommunication services."*

National Planning Practice Guidance chapter on Waste states that: "Planned provision of new capacity and its spatial distribution should be based on robust analysis of best available data" (emphasis added) (Para 035). Therefore, this exercise involves a robust analysis to identify what might be considered to be the "best available data" relating to C&I waste production and management.

This report contributes to a review and update of the evidence base supporting the Kent Minerals and Waste Local Plan (KMWLP) and, in particular, that relating to projected shortfalls in waste management capacity that may require updates to the KMWLP to ensure such shortfalls are adequately planned for e.g., by identification and allocation of suitable land that could accommodate such capacity.

The methodology for achieving this involves the following:

1. Estimating baseline C&I waste arisings;
2. assessing management methods, including routes & targets;
3. forecasting arisings for the proposed revised plan period (to 2038); and,
4. assessing existing capacity available to manage C&I waste in accordance with Plan objectives and targets and, in doing so, identifying any projected capacity gaps.

The approach taken, and the results, are described in detail in the following sections.

2 Estimating Kent C&I Waste Baseline Arisings

2.1 Context

There is no requirement on businesses to submit records of waste produced and hence estimating quantities of Commercial and Industrial waste arisings for a specific waste planning area such as Kent, with any degree of accuracy, is a challenge. Two different approaches can be taken to estimate a baseline for C&I waste as follows:

- 'Point of management' using data related to the management of C&I waste. This is primarily based on records of waste delivered to, and removed from, permitted waste facilities submitted by operators to the Environment Agency (EA). The EA collates this data in its 'Waste Data Interrogator' (WDI) on an annual (calendar year) basis. This data is supplemented by data for wastes managed at permitted sites that don't report through the WDI. This data now forms the basis for the 'Reconcile' method used to estimate C&I waste arisings at national level[1].
- 'Point of production' using data based on the profile of businesses within an Area and applying waste production factors (related to the different business profiles). This method was used in the national survey undertaken in 2009 that informed the previous approach to national estimates[2].

The update to the original Needs Assessment[3] underpinning the KMWLP (produced to support the review of the 1998 Waste Local Plan) presented the data for historical values applied to Kent. The report described the 'point of production' method using national survey data for 2009 and the 2009 Kent business profile to generate a total baseline estimate value of around 961,000 tonnes. The updated Waste Needs Assessment[4] produced to support the Early Partial Review of the KMWLP in 2017 arrived at a baseline value of 1,189,000 tonnes for 2015.

[1] DEFRA 2014, New Methodology to Estimate Waste Generation by the Commercial and Industrial Sector in England as amended by Commercial and Industrial Waste Arisings Methodology Revisions for England October 2018

[2] Commercial and Industrial Waste Survey 2009: Final Report, Defra May 2011, Available: http://archive.defra.gov.uk/evidence/statistics/environment/waste/documents/commercial-industrialwaste101216.pdf

[3] Waste Management Statistical Basis for the Kent County Council Minerals and Waste Development Framework Addendum to the Needs Assessment Modelling Technical Report Needs Assessment 2011 Update, January 2012

[4] Updated Management Requirement for C&I Waste Arising in Kent v1.1 BPP Consulting 2017

2.2 Methodology

The methodology used to estimate an updated baseline C&I waste arisings value (to be used as a starting point for forecasting C&I waste arisings in Kent) is based on the national 'Reconcile' methodology, adapted to reflect local circumstances[5]. This national methodology considers a number of datasets, in totality, to capture quantities of C&I waste that are managed rather than produced through:

(1) Permitted waste management facilities (reporting through Environment Agency Waste Data Interrogator (WDI) which since 2019 includes data for waste sent to Energy from Waste plants);

(2) taking into account the proportion sent directly for export outside the UK.

Deductions are made to eliminate:

(3) Non-relevant waste streams such as Agricultural, Mining, Construction, Demolition & Excavation Waste (C, D & E), wastewater, and hazardous waste included in the datasets; and

(4) Local Authority Collected Waste (LACW) [reported through WasteDataFlow (WDF)[6]].

In summary the methodology applies the following calculation:

C & I waste arising = (Inputs to permitted facilities + inputs to energy from waste + exports) - (C, D & E waste + mining + agricultural + wastewater + hazardous waste + LACW)

For the purposes of estimating the baseline arisings for Kent C&I waste, the above method has been adapted to reflect a local approach including computations to avoid double counting of waste inputs to 'intermediate' facilities[7] within Kent as well as interrogation of anomalous values.

Terminology

While this report is concerned with the management of C&I waste arisings it should be noted that waste arising from businesses that is similar in nature and composition to household waste is included under the term 'municipal waste'. National analysis of waste composition studies indicates that a significant proportion of waste generated by businesses not collected by Local Authorities falls within this definition. Most recent estimates for England as a whole found that around 43% of the total C&I waste stream may be waste of a type classed as municipal[8] and 60% of the commercial waste stream alone. This means that national targets set for municipal waste encompass both LACW and a significant proportion of the C&I waste stream. LACW and C&I waste may be managed at the same facilities and hence consideration of management requirements have been combined in the subsequent assessment.

[5] The methodology has been reviewed by Defra waste statisticians responsible for developing the Reconcile national method.

6 http://www.wastedataflow.org/

7 Intermediate facilities are those which do not provide the final fate of waste. That is waste received leaves for onward management at other facilities elsewhere either having been subjected to some form of treatment or just simply bulked up e.g., transfer stations

[8] National Municipal Waste Composition, England 2017 WRAP January 2020

2.2.1 Inputs to permitted facilities

Step 1: Waste Data Interrogator quantity of waste from Kent with deductions to eliminate non-C&I waste streams.

The starting point is to download all data relating to all types of waste identified as coming from Kent in the Environment Agency Waste Data Interrogator (WDI). This is displayed by management route in Table 1 below[9]. This shows that the total quantity of waste identified as coming from Kent managed through permitted sites reporting through the WDI for 2020 stood at 5.2 million tonnes.

Table 1: Waste Arising from Kent (tonnes)
Source WDI 2020

	Landfill	Metal Recycling Sites	Recovery to Land	Transfer	Treatment	Grand Total
Kent to Kent	785,241	106,738	233,997	1,006,681	1,253,895	**3,386,551**
Kent to elsewhere	377,600	112,299	168,629	336,423	826,398	**1,821,348**
Totals	**1,162,841**	**219,036**	**402,626**	**1,343,104**	**2,080,292**	**5,207,899**

Waste identified under waste codes considered to represent C, D & E Waste (Chapter 17 plus EWC 19 12 09 & 20 02 02) and therefore accounted for in the separate estimates of C, D & E waste (See BPP Consulting report on C, D & E Waste) are deducted from this total. The quantities remaining after this deduction are displayed by management route in Table 2 below and this shows that the quantity of waste identified as coming from Kent managed through permitted sites reporting through the WDI for 2020 is roughly halved to 2.77 million tonnes.

Table 2: Waste Arising from Kent minus C, D & E Waste (tonnes).
Source: WDI 2020

	Landfill	Metal Recycling Sites	Recovery to Land	Transfer	Treatment	Grand Total
Kent to Kent	222,505	49,372	7,820	742,467	612,970	**1,635,135**
Kent to elsewhere	198,809	81,832	1,435	241,867	611,907	**1,135,850**
Totals	**421,314**	**131,204**	**9,255**	**984,334**	**1,224,878**	**2,770,985**

Waste identified under waste codes considered to represent Agricultural Waste (Chapter 02 01), mining (Chapter 01) and hazardous waste (All codes with *) are accounted for separately and so are also deducted. The quantities remaining after this deduction are displayed by management route in Table 3 which shows that the quantity of waste identified as coming from Kent managed through permitted sites reporting through the WDI for 2020 is reduced to 2.55 mt.

[9] It should be noted that waste inputs to a number of other categories of facility are reported through the WDI since 2019, but for the sake of comparability these have been excluded from the above table. They are accounted for as appropriate at subsequent steps of the methodology.

Table 3: Waste Arising from Kent minus C, D & E Waste, agricultural, mining & hazardous waste.
Source: WDI 2020.

	Landfill	Metal Recycling Sites	Recovery to Land	Transfer	Treatment	Grand Total
Kent to Kent	202,871	35,171	7,820	736,391	560,337	**1,542,590**
Kent to elsewhere	167,274	73,779	1,433	234,843	537,646	**1,014,976**
Totals	**370,144**	**108,950**	**9,253**	**971,234**	**1,097,984**	**2,557,566**

2.2.2 Accounting for Local Authority Collected Waste

While LACW is not distinguishable from C&I by reference to EWC Codes, it is possible by cross referencing data from the WasteDataFlow (WDF), to ascertain the quantities of LACW managed through specific sites. Cross checking between the sites identified and the category assigned where listed in the WDI enables attribution to specific routes, as follows:

Table 4: LACW Received at Facilities included in WDI Count for Waste Arising from Kent.
Source: WDF 2020 Cross checked with WDI 2020

	Landfill	Metal Recycling Sites	Transfer	Treatment	Grand Total
Kent to Kent	26,719	15,991	361,043	237,542	**641,295**
Kent to Elsewhere	4,413	0	0	46,912	**51,325**
Totals	**31,132**	**15,991**	**361,043**	**284,454**	**692,620**

When values displayed in Table 4 are deducted from the values in Table 3 the remaining value is 1.86 million tonnes as shown in total Table 5 below. This may be referred to as the 'gross C&I waste arising' value.

Table 5: Gross C&I Waste Arising from Kent.
Source: Table 3 minus Table 4.

	Landfill	Metal Recycling Sites	Recovery to Land	Transfer	Treatment	Grand Total
Kent to Kent	176,152	19,180	7,820	375,348	322,795	**901,295**
Kent to elsewhere	162,861	73,779	1,433	234,843	490,734	**963,651**
Totals	**339,013**	**92,959**	**9,253**	**610,191**	**813,530**	**1,864,946**

Step 2: Deduct specific wastes accounted for separately (rather than complete streams)

Landfill leachate and sludges from waste water treatment plants are expressly excluded from the national Reconcile reporting method, as Defra considers counting wastes generated by waste management facilities from processes handling wastes generated elsewhere in the economy to be double counting under this overall waste stream. Based on this, the value for leachate and wastewater sludges from Kent managed at permitted facilities has also been deducted. This is calculated to be 204,613 tonnes of waste, of which 184,673 tonnes was managed within Kent.

Septic tank sludge has also been included in the deduction process at this stage as given that septic tank sludge originates from households, it is considered appropriate to deduct it on the basis that it will be managed through waste water treatment facilities rather than conventional waste management facilities. This is calculated to be 104,392 tonnes, of which almost all was managed at Kent waste water treatment sites (104,364 tonnes).

Deducting these values gives a revised headline value of 1.55 million tonnes as shown in Table 6.

Table 6: Gross C&I Waste Arising from Kent
Source: Table 5 minus Step 2 values

	Landfill	Metal Recycling Sites	Recovery to Land	Transfer	Treatment	Grand Total
Kent to Kent	176,152	19,180	7,820	375,348	33,758	**612,258**
Kent to elsewhere	162,759	73,779	1,433	234,816	470,894	**943,682**
Totals	**338,911**	**92,959**	**9,253**	**610,164**	**504,653**	**1,555,940**

Step 3: Account for any double counting subtracting value for intermediate sites (inc. waste transfer stations).

Adjustments may be needed to address recording waste at intermediate sites to account for:

- Double counting - the same waste being recorded once as an input from Kent to an initial facility in Kent, and then again as an input from Kent to a further or 'next step' facility if it goes for onward management; and
- Loss of some waste - as a consequence of residues from the processing of waste arising at intermediate sites like MRFs where some outputs may be recoded from the original source of inputs i.e., the original source identity gets lost.

3a. Deduct movements of waste arising in Kent to transfer stations within Kent

The national methodology (the 'Reconcile' method) discounts inputs to all types of transfer facility recorded in the WDI on the basis that if the waste is only being transferred there is no processing of the waste hence there is in theory no loss of waste in the movement of waste into and out of the site and a risk of double counting the same tonnage of waste managed through the site at the 'next step' site. This is illustrated in Figure 1 below:

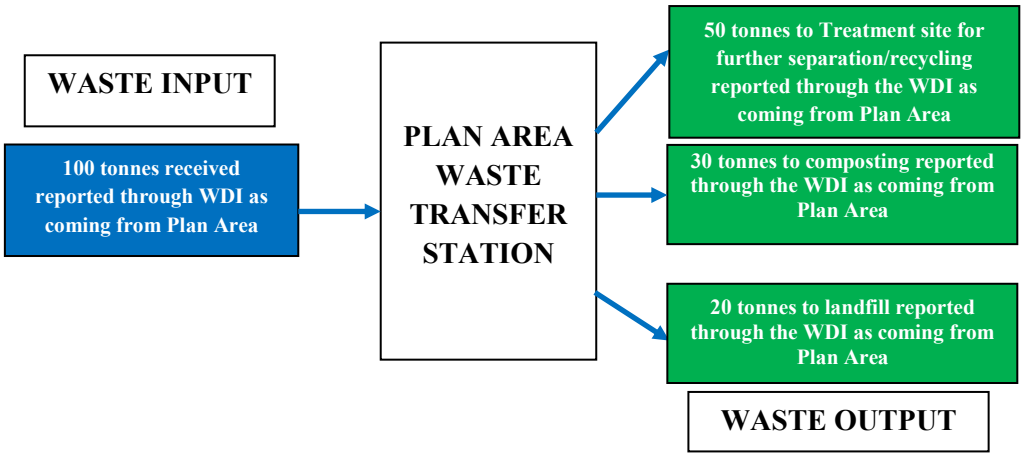

Figure 1: Schematic of Flows for Waste Transfer Stations Showing Double Counting of Wastes in WDI

However, relatively few sites classed as transfer stations under the Environment Agency permitting classification actually only operate purely as waste transfer stations, i.e., sites at which waste is solely received and bulked up for onward management, and inputs to metal recycling sites may be managed through routes that do not report through the WDI, e.g., exported to steel works abroad or delivered directly to reprocessing sites in England. While the national method includes estimates for exports and movements to reprocessors, it is not possible to disaggregate this data down to Plan Area level. Therefore, the outputs to both transfer and MRS within Kent that received waste from Kent in 2020 have been further analysed to determine whether outputs do in fact go to destinations that would otherwise be captured in the WDI or not.

Since 2019, non-hazardous transfer sites and treatment sites have been reclassified under a new field as transfer/ treatment sites in the WDI but are categorised as transfer overall. Therefore, this step applies to transfer sites as well as all sites falling under the classification of transfer/ treatment in the WDI.

1. The principal sites within the Plan Area classed as Waste Transfer Stations and Metal Recycling Sites receiving significant tonnages of C&I waste were identified.
2. Then the principal outputs of these sites were analysed by EWC code and destination.
3. For each tonnage of output waste, the input data listed in the WDI by receiving WPA and EWC code was cross checked to confirm if a comparable or greater tonnage of that waste type was declared as being received in the destination WPA area.
4. Where a greater or comparable tonnage did not appear as an input, the difference between any input value and the Plan Area site output value was recorded on the basis that where a shortfall in the WDI entry was identified that means the tonnage needs to be counted at the WTS, otherwise it will be lost (unless it appears in another dataset e.g., incineration).
5. Where a greater or comparable tonnage did appear as an input, the WTS and MRS site input was taken as having been accounted at the 'next step' site and therefore was deducted to avoid double counting.

Tables 7 and 8 presents the outcome of the analysis for each waste type (EWC) and named destination (WPA) in turn. Where the WPA is not codeable below regional level a review of entries for

destination WPAs within the specific region has been conducted to identify possible destination. If no WPA within the region is named then it is assumed that none of the waste has been counted as an input to a site within that region. For waste identified as going outside the UK it is assumed that this travels directly from Essex with the source site counted as the point of exit.

Table 7: Destinations & Fates for Principal Outputs (500t or more) of sites classified as Waste Transfer Stations within the Plan Area identified as taking C&I waste

Source: WDI 2020

EWC code	Named Destination (WPA)	WDI Cross check shortfall (tonnes)
02 03 04 materials unsuitable for consumption	Essex	2,025
15 01 01 Paper and cardboard packaging	Essex	775
	Outside UK	4,571
15 01 06 Mixed packaging	Essex	6,507
16 01 17 Ferrous metal	Thurrock	795
19 12 02 Ferrous metal	Gloucestershire	1,854
	Wales (WPA Not codeable)	2,259
	Yorks & Humber (WPA Not codeable)	815
19 12 07 wood	Essex	3,263
20 01 01 Paper and cardboard	East London Waste Authority	2,908
	Medway	2,114
	Norfolk	3,841
	Outside UK	887
20 02 02 Biodegradable waste	Cambridgeshire	3,519
	Croydon	1,260
	Essex	5,394
Total shortfall between output and declared inputs		**42,787**

Table 8: Destinations & Fates for Principal Outputs (500t or more) of sites classified as Metal Recycling Sites within the Plan Area identified as taking C&I waste

EWC code	Named Destination (WPA)	WDI Cross check shortfall (tonnes)
19 12 03 non-ferrous metal	Essex	1,661
	Outside UK	2,014
	West Midlands (WPA Not codeable)	138
Total Shortfall between output and declared inputs		**3,813**

The above exercise indicates that some of the output waste from Plan Area WTS and MRS do not appear to be accounted for at 'next step' sites. Therefore, instead of completely disregarding the inputs to Plan Area MRS and WTS by zeroing the values displayed (on the basis that the tonnages are managed through 'next step' facilities reporting through WDI), the shortfall tonnages derived from the

above computation exercise, i.e., 42,787 tones for WTS & 3,813 tonnes for MRS have been inserted instead. This gives a revised gross C&I waste headline value of c1,208,000 tonnes as shown in Table 9 below.

Table 9: Gross C&I Waste Arising from Kent
Source: Table 6 minus step 3a values

	Landfill	Metal Recycling Sites	Recovery to Land	Transfer	Treatment	Grand Total
Kent to Kent	176,152	3,813	7,820	42,787	33,758	**264,331**
Kent to elsewhere	162,759	73,779	1,433	234,816	470,894	**943,682**
Totals	**338,911**	**77,592**	**9,253**	**277,603**	**504,653**	**1,208,012**

3b. Deduct waste from intermediate facilities coded under 19 12 12 and 19 12 10
Outputs from facilities that treat waste prior to its final fate such as Material Recovery Facilities (MRF) and Mechanical Biological Treatment (MBT) plant, for example, was deducted from the national estimates to avoid double counting. These are likely to be coded under EWC Chapter 19 (Wastes from Waste Management Facilities).

Waste leaving an intermediate site that has undergone some form of waste processing may be reclassified as a waste from a waste management process, the principal waste of concern is wastes resulting from mechanical treatment (Coded under EWC 19 12 12 and 19 12 10). Waste removals data in the WDI for intermediate sites in Kent indicates that the net output of this waste type in 2020 was 362,403 tonnes. A significant tonnage of this waste is likely to arise from the sorting of skip waste which would be classed as C, D& E waste. This is generally known as 'trommel fines'. Hence initially the inputs of C, D & E waste were analysed in order to attribute the Chapter 19 accordingly. Where the input of C, D & E waste was greater than the net output of 19 12 12 and 19 12 10, all of the waste is attributed to C, D & E waste and none attributed as C&I waste. Where there was a shortfall, the remainder was counted as C&I waste. The % inputs of non-CDEW from Kent is then applied to this shortfall. This is illustrated by Figure 2 below:

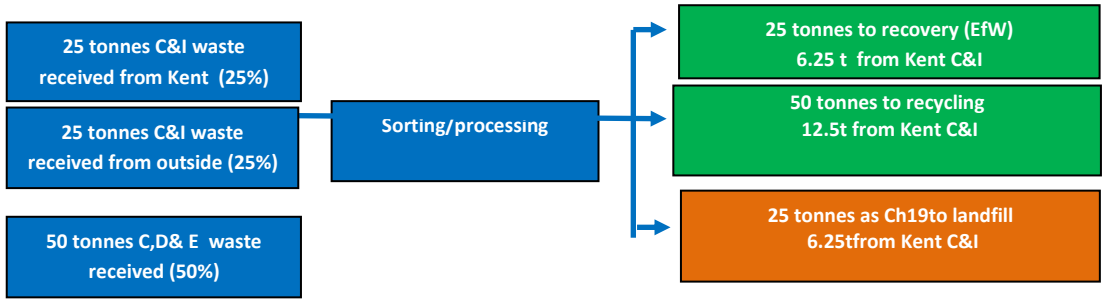

Figure 2: Schematic of Intermediate site outputs apportioned to Kent C&I

The result of this calculation is 107,830 tonnes of 19 12 12 and 19 12 10 output attributed to C&I waste. This value is then deducted from the total arisings value split across transfer and treatment sites, bringing the total arising value to c1,164,500t as shown in Table 10.

Table 10: Gross C&I Waste Arising from Kent

	Landfill	Metal Recycling Sites	Recovery to Land	Transfer	Treatment	Grand Total
Kent to Kent	176,152	3,813	7,820	0[10]	32,839	**220,624**
Kent to elsewhere	162,759	73,779	1,433	234,816	470,894	**943,682**
Totals	**338,911**	**77,592**	**9,253**	**234,816**	**503,733**	**1,164,306**

Step 4: Deduct incineration or pyrolysis of waste EWC sub chapter

Non-hazardous residues from the thermal treatment of waste (EWC code 19 01 02 + 19 01 12) needs to be deducted to avoid double counting of EfW capacity which is accounted for in Step 5. In the WDI 2020 this amounted to 189,424 tonnes which was managed at a split across landfill, MRS and treatment sites. This has been deducted from the total arisings value, bringing the total arising value to c990,000t as shown in Table 11.

Table 11: Gross C&I Waste Arising from Kent

	Landfill	Metal Recycling Sites	Recovery to Land	Transfer	Treatment	Grand Total
Kent to Kent	176,031	3,813	7,820	0	0	**187,665**
Kent to elsewhere	113,244	71,635	1,433	234,816	381,040	**802,169**
Totals	**289,276**	**75,448**	**9,253**	**234,816**	**381,040**	**989,834**

2.2.3 Additions

Step 5: Add Inputs to Energy from Waste (EfW)

Examination of EA data for inputs to EfW facilities indicates that 463,514 tonnes of waste attributed to Kent, was sent to principally 7 EfW plants in England (and hence reported in the WDI) as shown in Table 12 below:

Table 12: EfW facilities receiving >1,000t of Kent Waste

Source: WDI 2020

Facility WPA	Site Name	Tonnes
Kent	Allington Incinerator	358,342
	Kemsley Generating Station	88,977[11]
Sutton	Beddington Energy Recovery Facility	4,718
Bexley	Riverside Resource Recovery	3,792
East Sussex	Newhaven Energy Recovery Facility	3,752
Slough	Lakeside EfW Facility	2,642
Oxfordshire	Ardley Energy Recovery Facility	1,291
	Total	**463,514**

[10] Note Kent to Kent transfer has been set to 0 given deductions result in negative inputs.

[11] Examination of this data indicates it was primarily sorting residues from intermediate waste management facilities in Kent. Given that these facilities may in fact have originally received waste from sources other than Kent, an adjustment has been made to ensure that only waste attributed to Kent is counted at this stage.

Other EfW plants receiving waste from Kent received small quantities totalling 2,660 tonnes.

Since the WDF reported 326,192 tonnes of Kent LACW went to EfW in 2020, that leaves 139,982 tonnes of C&I waste from Kent going to EfW to be added to the total arising value to arrive at an overall value of c1,130,000 tonnes as shown in Table 13.

Table 13: Gross C&I Waste Arising from Kent

	Landfill	Metal Recycling Sites	Recovery to Land	Transfer	Treatment	EfW	Grand Total
Kent to Kent	176,031	3,813	7,820	0	0	125,018	**312,683**
Kent to elsewhere	113,244	71,635	1,433	234,816	381,040	14,964	**817,132**
Totals	**289,276**	**75,448**	**9,253**	**234,816**	**381,040**	**139,982**	**1,129,815**

2.2.4 Interrogation of anomalous values

It was discovered whilst undertaking the C&I 2020 baseline estimate that inputs to Redhill landfill in Surrey from Kent were reported as including 49,635 tonnes of waste coded to 19 01 12 (Bottom ash and slag). This compared with 1,562 tonnes in 2019 and 1,412 tonnes in 2018. Direct enquiry of the EA revealed this to be a data entry error, therefore the 49,635 tonnes has been deducted from the 'Kent to elsewhere' landfill tonnage and the average of the values for 2018 and 2019 has been taken instead i.e.,1,487 tonnes.

The revised C&I baseline in 2020 is shown in Table 14.

Table 14: Gross C&I Waste Arising from Kent

	Landfill	Metal Recycling Sites	Recovery to Land	Transfer	Treatment	EfW	Grand Total
Kent to Kent	176,031	3,813	7,820	0	0	125,018	**312,683**
Kent to elsewhere	65,097	71,635	1,433	234,816	381,040	14,964	**768,985**
Totals	**241,128**	**75,448**	**9,253**	**234,816**	**381,040**	**139,982**	**1,081,668**

In addition, there were two other values relating to waste sent to landfill that appeared to be anomalous as follows:

Table 15: Values of Kent C&I waste sent to Landfill investigated as possible anomalies

Waste Code	Description	2018	2019	2020
03 03 07	Mechanically separated rejects from pulping of waste paper and cardboard	62,602	66,990	62,142[12]
19 12 04	Plastic and rubber from waste treatment processes	11,054	33,013	40,518[13]

[12] DS Smith's Paper Mill at Kemsley reported 57,718 tonnes and Smurfit Kappa's plant at Snodland reported 5,055 tonnes as being sent to Kent landfill in 2020.
[13] DS Smith's Paper Mill at Kemsley reported 25,975 tonnes being sent to Kent landfill in 2020.

However, as is shown above, neither values were exceptional for 2020.

Examination of datasets for principal reprocessors

Given these two codes account for over 100,000 tonnes of waste landfilled (over one third of total C&I landfilled in 2020) further enquiry was undertaken in order to understand the values better. As the WDI also now reports on the inputs and outputs of reprocessing sites, and given that the above exercise identified outputs that originated from two paper reprocessing mills as contributing significant tonnages of waste to landfill, a further examination of data for process waste outputs from these sites has been undertaken. The process waste outputs of these sites are shown in Table 16.

Table 16: Principal reprocessor outputs and fates

	Landfill	Recovery	EfW/ incineration	Grand Total
Kent to Kent	89,133	120,914	19,428	**229,538**
Kent to elsewhere	2,987	8,363	0	**11,349**
Totals	**92,120**	**129,277**	**19,428**	**240,888**
% of total C&I (Table 12)	**32%**	**n/a**[14]	**14%**	

Table 16 shows that a significant amount of the outputs from the principal reprocessor sites in Kent is recovered and it is understood from contact with DS Smith that this relates to fibre that is applied to agricultural land for beneficial use. Given this waste would not be managed through a permitted waste management facility it has been taken not to have been reported through the WDI and hence is excluded from the total arisings to be managed. A significant amount is sent to landfill representing a third of Kent C&I waste landfilled in 2020. It is understood from DS Smith the operator of the principal source site at Kemsley Mill that measures are being put in place to meet its adopted zero waste to landfill policy that aims to eliminate landfill of residues by 2030[15]. The DS Smith sustainability report reports on the diversion of this waste from landfill to the Kemsley EfW plant (excerpt in Appendix 1).

[14] Managed through application to agricultural land.
[15] DS Smith Group Zero Waste to Landfill Policy December 2020

Comparison of 2020 Generated Estimate with Previous Estimates

Step 6: Compare value obtained against historical values

Historical values generated are shown in Table 17 below for comparative purposes.

Table 17: C&I Waste Arising Estimates for Kent (1998/9 - 2020)

Source	Environment Agency SWMA (2000)	Cambridge Econometrics	WNA Update (Jacobs)	BPP Update	BPP Update
Data Year	**1998/99**	**2006**	**2009**	**2015**	**2020**
Value (tpa)	*2,227,000 inc Medway*	1,200,000	961,000	796,500[16]	1,082,000

Comparing the 1.08 M tonne estimation arrived at, against the historical estimated values for C&I waste arisings for Kent indicates that this value is within reasonable bounds of what might be expected although it does indicate an increase of seven percent per annum on the 2015 value.

[16] To ensure comparability, this value excludes computed values for waste managed at permitting exemptions which are no longer counted in the revised Reconcile methodology and excluding waste from thermal treatment.

3 Forecasting Future C&I Waste Arisings in Kent

3.1 National Planning Practice Guidance Advice

The national PPG states when looking to forecast C&I waste:

- *"Waste planning authorities can prepare growth profiles, similar to municipal waste, to forecast future commercial and industrial waste arisings. In doing so, however, they should;*
- *set out clear assumptions on which they make their forecast, and if necessary, forecast on the basis of different assumptions to provide a range of waste to be managed;*
- *be clear on rate of growth in arisings being assumed. Waste planning authorities should assume a certain level of growth in waste arisings unless there is clear evidence to demonstrate otherwise."*

Paragraph: 032 Reference ID: 28-032-20141016 Revision date: 16 10 2014

Hence the PPG anticipates the application of a positive growth rate.

3.2 Updating the Plan Forecast

When updating a forecast one will consider the following:

- the starting point i.e., updated baseline value
- the growth rate to be applied

3.3 WNA Forecast Underpinning Adopted Kent MWLP

A helpful starting point is to update the baseline value used in the forecast in the adopted plan. The outcome is presented in Table 18 and Figure 3. This table (and figure) also sets out the difference in projected arisings applying the updated 2020 baseline value makes to that forecast in the previous WNA update (2015 arisings value). It should be noted that the previous 2015 arisings value was estimated as 1,189,000 tonnes, and, given this value was used in the forecast underpinning the Early Partial Review of the Kent MWLP, the revised forecast using the updated 2020 baseline value is compared against the forecast using this value and not the adjusted value presented in Table 17.

Table 18: C&I Waste Forecast applying Plan Annual Growth Factors to Updated Baseline

	2020	2021	2026	2031	2036	2041
Growth Factor applied		0.07	0.05	0.05	0.05	0.05
2017 WNA Forecast underpinning adopted plan	1,166,760	1,274,082	1,338,702	1,407,630	1,480,107	1,556,315
Forecast with Updated Baseline	1,081,668	1,096,723	1,152,347	1,211,680	1,274,068	1,339,668
Difference (rounded)	-85,000	-177,500	-186,500	-196,000	-206,000	-217,000

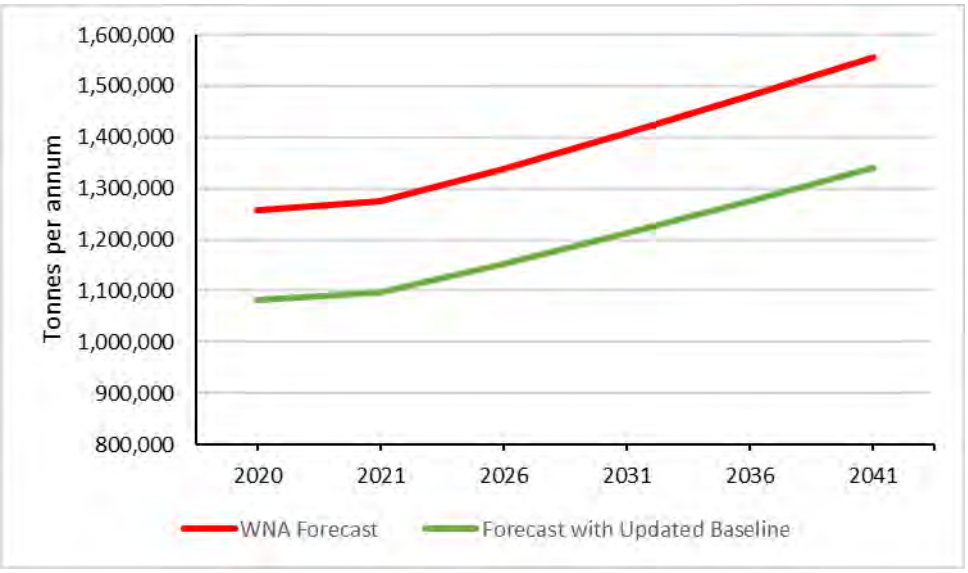

Figure 3: Comparison of Plan forecast & forecast using updated baseline value

3.4 DEFRA Analysis of Future C&I Waste Growth

Defra commissioned a Future Waste Arisings report in 2020[17] which reported in 2021. This includes the most current national growth forecast for the C&I waste stream published by Government. The method used to produce a forecasting model for C&I waste included development of a time-series forecast for gross value added (GVA) for the commercial sector and separately for the industrial sector, which could then be used to generate C&I waste arisings forecasts. The forecasts also incorporate the impact of growth in the number of businesses on C&I waste arisings by combining data on waste generated per business size and sector and adjusting the GVA to waste ratios using the growth in the number of businesses in each sector by size respectively. Two forecasting models were produced for England from 2019 to 2050: one for commercial waste arisings (refer to Figure 4) and the other for industrial waste arisings (refer to Figure 5).

[17] 'Future Waste Arisings' DEFRA, April 2021.

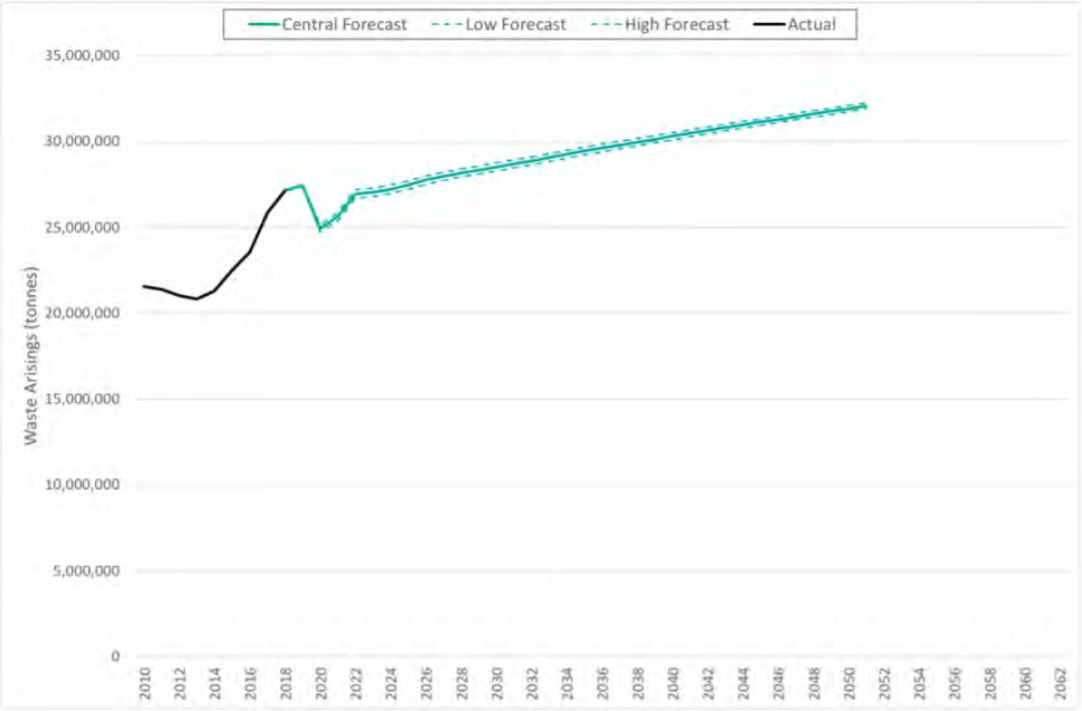

Figure 5: Commercial Waste Arisings Forecasts for England (2019-2050)
Source: Future Waste Arisings, produced for DEFRA (2021)

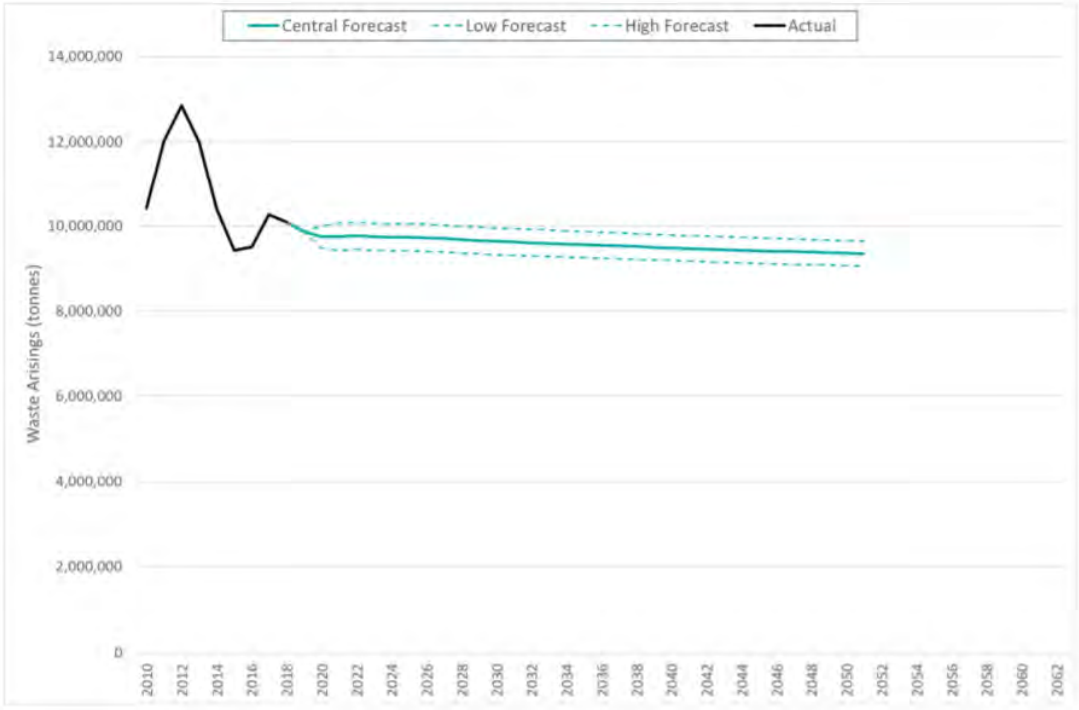

Figure 4: Industrial Waste Arisings Forecasts for England (2019-2050)
Source: Future Waste Arisings, produced for DEFRA (2021)

Figures 4 and 5 present central, low and high forecast waste arisings for the commercial and industrial sectors respectively. Commercial waste arisings are projected to increase steadily from 2022 to 2050, whilst industrial waste arisings are projected to increase slightly in 2019 to 2020 and then progressively fall from 2020 to 2050.

In order to assess how the national forecasts may be taken into account when forecasting Kent's C&I waste arisings, data points have been extracted for the 2020-2040 period as that is the period which this WNA covers. For the purpose of this exercise, the national central forecast values were used. See Appendix 2 for how the growth rates were ascertained using national central forecast values.

The average annual growth rate generated in the period 2020 to 2040 was +1.04% per annum for commercial waste and -0.17% per annum for industrial waste respectively. When combining these forecasts, a C&I waste growth rate of 0.87% per annum is generated.

3.5 C&I Forecast based on economic growth

The East of England Forecasting Model (EEFM) has projected economic growth in Kent and is based on the Gross Value Added (GVA) in Kent as estimated in 2016. Assuming that C&I waste arisings will increase in proportion to economic growth, whilst taking into account the Government objective to decouple waste growth from economic growth, it has been assumed that C&I arisings will only grow at 85% of the projected rate of economic growth as forecast by the EEFM. See Appendix 2 for the growth rates generated.

Both the Defra and EEFM forecasts result in a positive growth rate and this is consistent with the advice in nPPG. Using a positive growth rate would also ensure flexibility in the plan by reducing the risk that the amount of waste planned for is under-estimated. Therefore, both scenarios have been applied to the Kent 2020 C&I baseline value to forecast arisings to 2040 as shown in Table 19 below.

Table 19: C&I Forecast applying Growth Rates to 2020 baseline

	2020	2025	2030	2035	2040
DEFRA	*1,081,668*	1,127,630	1,177,739	1,230,075	1,284,736
EEFM		1,171,001	1,261,293	1,356,646	1,456,697

The updated baseline arisings value has been extrapolated with the following set of growth factors to generate a cone of possibilities as shown in Figure 6:

- Adopted KMWLP forecast
- DEFRA National Forecast of C&I waste
- C&I waste forecast based on EEFM GVA growth rate

Figure 6 demonstrates that the forecast projection used in the current Plan is still robust and reasonable and therefore has been selected as the preferred forecast to 2040 adjusted to the most recent baseline value.

	2020	2025	2030	2035	2040
EEFM GVA *85%	1,081,668	1,173,185	1,263,646	1,359,177	1,459,415
Plan projection	1,081,668	1,141,001	1,199,574	1,261,339	1,326,283
DEFRA Forecast	1,081,668	1,129,734	1,179,936	1,232,369	1,287,133

Figure 6: 'Cone of Possibilities' for Kent C&I waste arisings (tonnes per annum)

Note: y-axis is not set to 0

4 Projected Management Requirements

4.1 C&I Waste Targets

Determination of how waste might be managed requires assessment of how the waste in the Plan area is currently managed and then projecting how the Plan intends waste to be managed through exerting influence on the types of capacity that are developed during the plan period.

4.2 Baseline Profile

The management profile presented in Table 20 is based on the management data available through the WDI 2020. Since the WDI does not have a 'recycling' site category it is not possible to establish how much of the waste managed goes on for recycling. Therefore, the principal known fates considered are those management types that would represent a final fate reported in the WDI as follows:

- Landfill
- EfW and Recovery to Land

4.3 Landfill

As shown in Table 20 below, in 2020, it was estimated that c241,500 tonnes of C&I waste arising in Kent was sent to landfill.

4.4 'Other' Recovery

As shown in Table 20, in 2020, c149,500 tonnes of C&I waste arising in Kent was recovered of which c140,000 tonnes were sent to Energy from Waste facilities and c9,500 tonnes were sent to recovery to land sites[18].

4.5 Recycling/ composting

The difference between the sum of the tonnages for the above categories and the baseline value has been taken to represent the tonnage that went on for recycling via permitted facilities. In 2020 this amounted to c689,500 tonnes as shown in Table 20 below.

Table 20: Computed C&I Waste Management Profile

Route	Tonnes	%
Total Arisings	1,081,668	
Landfill	241,128	22%
'Other' Recovery	149,235	14%
Recycling & Reuse (remainder)	691,304	64%

[18]This usually covers to soils which fall under C, D & E waste.

4.6 Management Targets

The 2017 Waste Needs Assessment update included recycling and composting targets which were realistic and yet ambitious, reflecting the targets in the EU Circular Economy package. These targets were applied in the adopted KMWLP and are set out in Table 21.

Table 21: Commercial & Industrial Waste: KMWLP Targets

		Milestone Year		
		2020/21	2025/26	2030/31
Recycling/Composting	Target (Floor)	50%	55%	60%
Other Recovery inc Recovery to Land	Target (Ceiling)	35%	32.5%	30%
Remainder to Landfill	Target (Ceiling)	15%	12.5%	10%

Table 22 compares the profile of C&I waste management estimated for 2015 and for 2020.

Table 22: Comparison of C&I Waste Management Profile in 2015 and 2020

	Actuals		
	2015[19]	**2020**	**Difference**
Recycling/Composting	53%	64%	+11%
Other Recovery inc Recovery to Land	6%	14%	+8%
Remainder to Landfill	41%	22%	-22%

Observations

Table 22 indicates that between 2015 and 2020 the percentage of Kent C&I waste going to:

- Recycling rose significantly, by 11 percentage points;
- Landfill decreased significantly, by 22 percentage points; and
- EfW has increased by 8 percentage points to 14%.

When comparing the actual values for 2020 in Table 22 with the target values in Table 21 we find the following:

- Recycling performance exceeded the 2020/21 target by 14% and has even surpassed the target for 2030/31of 50%. This suggests that the recycling targets in the KMWLP could be more ambitious but it is important to note that the 'target' is a ‘floor’. The fact that these targets represent minima, and not limits, has been emphasised in the proposed revised text of the KMWLP.
- Landfill exceeded the ceiling set for 2020/21 (15%) by seven percentage points (7%) meaning that an estimated c76,000 tonnes of additional waste is going to landfill than intended.
- EfW remains well below the expectation for 2020/21 (35%). This is in spite of the fact that there is plentiful EfW capacity in the county. This demonstrates that while sufficient EfW

[19] 2015 % adjusted to reflect baseline with deduction of exemption and thermal treatment of waste.

capacity operate in the county, without any constraint applied to the origin of waste imposed through a planning condition, waste from outside Kent may be received at such plants in preference to C&I waste arising in Kent. This means that C&I waste may then be displaced to landfill. This is borne out by the fact that data in the London Flows report shows that substantial tonnages of waste are being imported to EfW plants in Kent, while DS Smith reports being limited to its access to the K3/SEP plant, only delivering 8,000 tonnes of its process residue produced in 2020.

4.7 Proposed Management Requirement for Extended Plan Period

The draft KMWLP 2023-2038 proposes the introduction of the targets, covering the extended Plan period to 2038, shown in Table 23.

Table 23: Commercial & Industrial Waste: Proposed KMWLP Targets

	Actual	Milestone Year			
	2020	**2025**	**2030**	**2035**	**2040**
Recycling/Composting Target (Floor)	64%	55%	60%	65%	70%
Remainder to Landfill Target (Ceiling)	22%	12.5%	10%	8.5%	5%
Other Recovery inc Recovery to Land Remainder	14%	32.5%	30%	26.5%	25%

Applying the proposed target values in Table 23 to the C&I waste forecast as shown in Table 19 gives the management requirements displayed in Table 24 below.

Table 24: C & I Waste: Proposed KMWLP Targets Management Capacity Requirements

	Milestone Year				Plan Period Peak/Cumulative Capacity Requirement
	2025	**2030**	**2035**	**2040**	
Recycling/Composting Target (Floor)	627,551	719,745	819,870	928,398	928,398
Remainder to Landfill Target (Ceiling)	142,625	119,957	107,214	66,314	1,622,000[20]
Other Recovery inc Recovery to Land Remainder	370,825	359,872	334,255	331,571	370,825

[20] Cumulative value to 2038 the end of the Plan period.

5 Conclusion

Arisings of C&I waste from Kent on 2020 were estimated to be 1,081,668 tonnes, this is c285,000 tonnes greater than the previous estimate generated for 2015 in the updated Waste Needs Assessment[21] produced to support the Early Partial Review of the KMWLP in 2017 of 796,500 tonnes.

The forecast projection used in the current Plan is considered to still be robust and reasonable and has been applied to the updated C&I baseline estimate in 2020. This produced the management requirements shown in Table 24.

Given the similarity between LACW and a substantial proportion of C&I waste, as shown by the fact that 43% of C&I waste is considered to be municipal, the capacity management requirements have been considered together in the following separate reports:

- Recycling/ organic waste treatment capacity
- Non-hazardous residual waste management capacity

[21] Updated Management Requirement for C&I Waste Arising in Kent v1.1 BPP Consulting 2017.

Appendix 1: Excerpt from DS Smith Sustainability Report 2020/21

By 2050, send zero waste to landfill

In an ideal world, only fibre would enter our circular business, but the reality is that through our recycling operations, non-fibre materials enter our business through poor quality waste streams. These must be removed before papermaking can begin and we continue to reduce waste to landfill with beneficial alternative waste destinations.

In 2021/22, 255,920 tonnes of waste was sent to landfill (2020/21: 258,225). In total, 93 per cent of waste landfilled was landfilled by our Paper division, whilst our Packaging division maintained a 99 per cent landfill diversion rate. Across the Group, 63 per cent of waste was recycled, 11 per cent was used for landspread, 9 per cent was incinerated and 17 per cent was landfilled.

Although progress was made on landfill reduction at some of our sites (c. 12,000 tonnes less compared to 2020/21), increases at other sites for various operational reasons, including increased volumes, have masked this good performance. Furthermore, anticipated reductions were not made this year owing to delays to the expected start-up of some projects. We remain confident in our pipeline of landfill reduction projects.

Landfill reduction projects at our paper mills

At Kemsley Mill, c. 8,000 tonnes of landfill waste will be diverted annually by sending waste previously landfilled to the neighbouring K3 waste-to-energy facility, which has begun to start-up this year. As well as reducing waste to landfill, this facility also produces steam for the mill by generating energy from the waste.

Appendix 2: Data from National forecast and annual growth rates applied

Year	Commercial	Growth rate	Industrial	Growth rate
2020	24,858,115		9,785,714	
2022	26,885,177	4.08%	9,857,143	0.36%
2024	27,031,316	0.27%	9,821,429	-0.18%
2026	27,635,753	1.12%	9,750,000	-0.36%
2028	28,036,798	0.73%	9,714,286	-0.18%
2030	28,437,563	0.71%	9,642,857	-0.37%
2032	28,787,095	0.61%	9,607,143	-0.19%
2034	29,187,580	0.70%	9,571,429	-0.19%
2036	29,588,484	0.69%	9,535,714	-0.19%
2038	29,956,522	0.62%	9,500,000	-0.19%
2040	30,478,261	0.87%	9,464,286	-0.19%
Average growth rate p.a.		**+1.04%**		**-0.17%**

Appendix 3: Data from East of England Forecasting Model (EEFM) and annual growth rates applied

Year	Kent GVA forecast from EEFM	Growth Rate p.a	C&I arisings forecast (85% the rate of GVA)	C&I waste forecast
2020	37328.3			1,097,034
2021	38071.1	1.99%	1.69%	1,115,591
2022	38834.6	2.01%	1.70%	1,134,606
2023	39568.8	1.89%	1.61%	1,152,841
2024	40325.0	1.91%	1.62%	1,171,568
2025	41065.4	1.84%	1.56%	1,189,852
2026	41818.4	1.83%	1.56%	1,208,396
2027	42557.7	1.77%	1.50%	1,226,555
2028	43302.4	1.75%	1.49%	1,244,799
2029	44049.9	1.73%	1.47%	1,263,065
2030	44810.3	1.73%	1.47%	1,281,598
2031	45585.5	1.73%	1.47%	1,300,443
2032	46372.1	1.73%	1.47%	1,319,517
2033	47169.6	1.72%	1.46%	1,338,805
2034	47983.7	1.73%	1.47%	1,358,446
2035	48816.5	1.74%	1.48%	1,378,486
2036	49626.1	1.66%	1.41%	1,397,919
2037	50460.4	1.68%	1.43%	1,417,895
2038	51326.0	1.72%	1.46%	1,438,568
2039	52192.8	1.69%	1.44%	1,459,219
2040	53073.5	1.69%	1.43%	1,480,148