Essex & Southend on Sea Waste Local Plan

Topic Paper 1: Waste Capacity Gap Update

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Introduction

BPP Consulting LLP was commissioned by Essex County Council in November 2015 to review and update key elements of data reports that form part of the Waste Local Plan evidence base. A key output of this was to produce an updated summary table of exactly how much waste will need to be provided for, for which sites would need to be allocated within the WLP. Table 1 below presents a summary of the outputs of the review and update work reported in this report.

Table 1: Summary of Predicted Capacity Shortfall Essex & Southend on Sea (worst case) (000's tonnes)

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
CDEW	907	912	917	1,001	1,020	1,023	1,026	1,029	1,032	1,034	1,036	1,442	1,512	1,512	1,512	1,542	1,642	1,642	1,642	1,642	1,642
Biowaste	110	120	190	192	193	194	195	211	212	212	213	214	214	215	216	217	217	218	219	219	220
Non Hazardous ex biowaste	33	46	56	62	65	68	70	73	76	79	82	85	87	90	93	97	100	104	107	111	115
Hazardous	*42*	*42*	*43*	*43*	*44*	*44*	*44*	*45*	*45*	*46*	*46*	*46*	*47*	*47*	*48*	*48*	*48*	*49*	*49*	*50*	*50*

The shortfall in No Hazardous waste recovery capacity excluding biowaste was found to be marginal but rising when predicted arisings were compared against operational Recovery capacity within the Plan Area. It is assumed that current operational capacity will be maintained to 2035.

Hazardous waste entry is italicised as there is no national policy expectation for net self -sufficiency to be achieved at Plan Area level.

Since this report only addresses critical aspects it should be read alongside other parts of the evidence base for a comprehensive view of the evidence base to be gained. An overarching signposting document has been produced to clarify the relationship between this report and other sources relied upon.

1 Chapter 1 Non Hazardous Waste Future Capacity Requirements

This waste stream is a combination of the Local Authority Collected Waste stream and the commercial and industrial (C&I) waste stream.

1.1 Local Authority Collected Waste (LACW)

Definitions

In the UK, until 2010, the term Municipal Solid Waste (MSW) was synonymous with waste collected by local authorities. However in 2010 the UK expanded its definition to include waste from other sources similar in nature and composition to align with the EU definition this therefore included wastes of a similar type collected from businesses by private waste collection companies for the first term.

The term "local authority collected waste" (LACW) is now used to distinguish between that waste that was formerly known as municipal solid waste (MSW) and the new wider definition of municipal solid waste (LACW plus). LACW includes waste produced by householders collected from their homes (collected household waste), waste deposited at Community Recycling Centres (CRCs) (total household waste) plus commercial waste collected by district councils, street sweepings, litter and fly tipped materials. In general the non-household waste fraction of LACW represents around 5% of total collected arisings. For the purposes of this report LACW should be taken to mean what was previously referred to as MSW.

1.1.1 Developing a LACW Growth Profile: Planning Practice Guidance

The Planning Practice Guidance (PPG)[1] states the following in relation to forecasting future MSW arisings (or more correctly LACW):

1.1.2 "How should waste planning authorities forecast future municipal waste arisings?

Forecasts of future municipal waste arisings are normally central to the development of Municipal Waste Management Strategies.

It will be helpful to examine municipal waste arisings according to source (ie household collections, civic amenity site wastes, trade waste etc.). This may allow growth to be attributed to particular factors and to inform future forecasts.

A 'growth profile', setting out the assumed rate of change in waste arisings may be a useful starting point for forecasting municipal waste arisings. The growth profile should be based on two factors:

- household or population growth; and
- waste arisings per household or per capita.

[1] Ref.: Revision date: 16 10 2014 Paragraph: 029 & 30 Reference ID: 28-029-20141016

1.1.3 How is a growth profile prepared?

A growth profile is prepared through a staged process:

- calculate arisings per head by dividing annual arisings by population or household data to establish short- and long-term average annual growth rates per household and
- factor in a range of different scenarios, eg constant rate of growth, progressively lowering growth rates due to waste minimisation initiatives.

The final forecast can then be modelled with scenarios based on the long- and short-term rate of growth per household, together with household forecasts."

It is notable that the above examples refer to either a constant rate or lowering of growth rates. As there is no mention of the possibility of a rising growth rate it could be assumed that the Government do not see increasing growth in household waste as being a scenario to be modelled.

1.2 Government Analysis of Future Household Waste Growth

In October 2013 the Government set out its latest view on future growth in municipal waste in a report published by DEFRA[2] "This document considers the likelihood of England meeting the 2020 Landfill Directive target concerning the diversion of biodegradable MSW from landfill. In doing so it considers future waste arisings as well as existing, and likely future, capacity for managing this waste stream by means other than landfill.

The modelling of future household waste arisings in the report involved forecasting forward historic trends, which results in a number of scenarios being generated as shown in Figure 1 below. It is significant that the central scenario prediction shows a small but steady fall in household waste arisings to 2020.

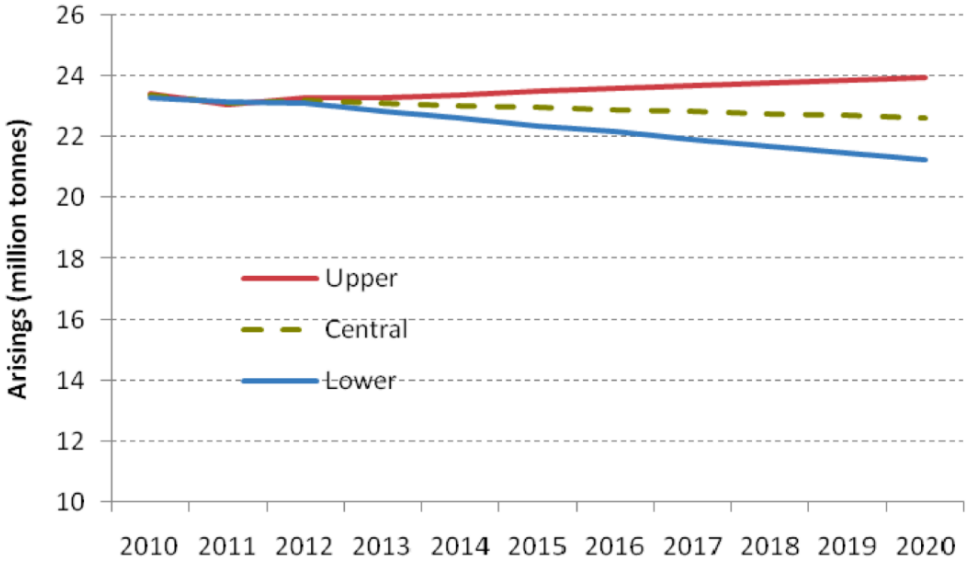

Figure 1: Defra Household Waste Arising Forecast

Source: "Forecasting 2020 Waste Arisings and Treatment Capacity (Revised February 2013)", Defra, October 2013

[2] *Forecasting 2020 Waste Arisings and Treatment Capacity (Revised February 2013, Published October 2013*).

No comment is made on the appropriateness of the modelling method used (known as SARIMA[3]) but it should be noted that justification for its use is included in the report as follows:

> *"Alternative approaches for forecasting household waste arisings were also considered; for example, models based on changes in the underlying drivers of waste, such as economic activity and waste intensity. Such alternative approaches were found to produce implausible results for household arisings with high forecast error. Therefore, the SARIMA model provides the most statistically robust forecast of future levels of household waste arisings."*

The report did consider an alternative scenario in which waste increases due to economic recovery. This involved modelling a 20% chance of a 20% increase in household waste arisings in 2020. This was carried out to test the sensitivity of conclusions being reached regarding the likelihood of meeting the Landfill Directive targets and need to fund new waste management infrastructure via PFI credits.

While the report provides a feel for the direction in which growth in household waste arisings may be headed it should of course be noted that it is intended to provide a national picture and so presents an average of what might happen across the country, thus masking any regional or local differences such as varying levels of prosperity and associated consumption. The report does however give some credence to consideration of a scenario with static or even modest declining growth as implied by the Planning Practice Guidance (PPG).

The applicability of the conclusions of the report to the situation in Essex & Southend-on-Sea should also be considered against the recent pattern observed in LACW arisings in Essex & Southend-on-Sea, that is one of a slowing in the decrease in LACW arisings and sudden increase in 2013/14 shown in Figure 2 below.

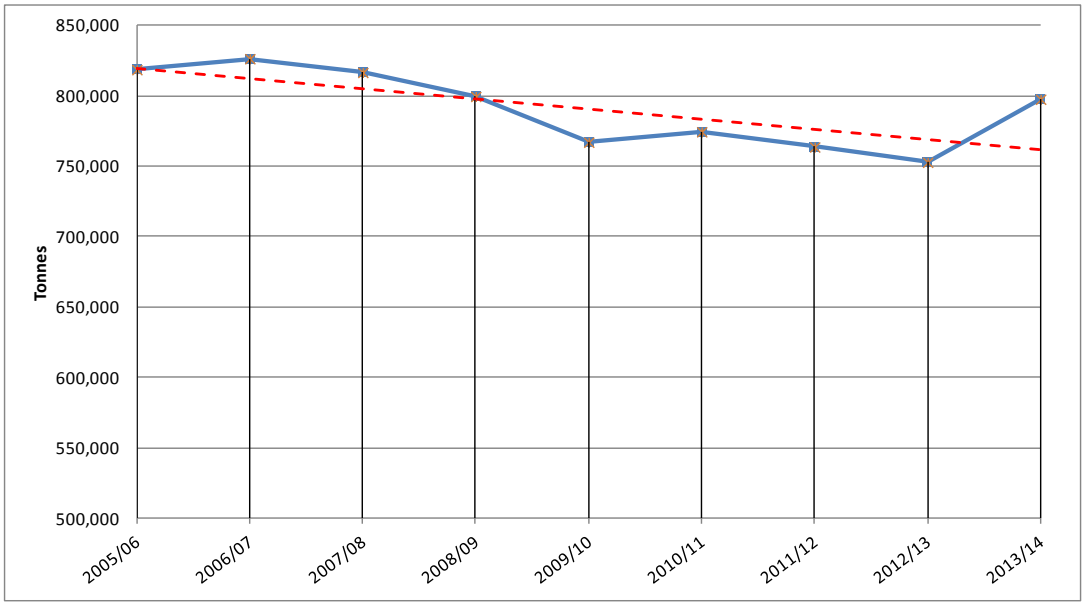

Figure 2: Trend in MSW Arisings 2004/05 to 2013/14 (dashed red line is trend line that indicates a compound annual growth rate of minus 0.33% over the period).

[3] SARIMA = Seasonal Auto-Regressive Integrated Moving Average.

Historical Arisings

Data for collected municipal solid waste arisings between 2005/06 and 2012/13 in Essex and Southend on Sea (shown above) suggests a consistent decline in arisings over the period with a levelling off during the last three years and an abrupt rise in the most recent year[4]. However the overall trend is down and without a clear reason for the sharp rise it will only become apparent over time whether the data for 2013/14 is an anomaly.

The declining trend reflects a combination of factors including changes in service provision at kerbside collections and at Community Recycling Centres (CRC). For example, the introduction of tighter controls at the CRC on inputs of trade waste would result in a reduction that will be maintained providing enforcement remains effective. Similarly, moves to alternate weekly collections have been shown to result in reductions in residual waste set out for collection at the kerbside. Conversely, the introduction of kerbside green waste collection can result in a rise in collected arisings as otherwise such waste might be retained for composting on the property. Table 2 shows service changes that may affect the baseline level of LACW arisings:

Table 2: Service changes that may impact LACW Arisings

	Measure/Event	Direction of Effect	Predicted Impact on Baseline
1	Trade Waste Ban at CRC via van permit scheme and resident only scheme	Reduction in CRC waste	Baseline reset
2	Expansion of kerbside Green waste collection)	Rise in green waste	Baseline reset
3	Kerbside Food Waste Collection	Reduction in overall quantity of food waste	Baseline reset
4	Alternate Weekly collection	Reduction in overall quantity of residual waste	Baseline reset
5	Drought/hot summer	Reduction in overall quantity of green waste	One-off and bounce back
6	Recession	Reduction overall although some increase in DIY waste	One-off and bounce back

1.3 Joint Municipal Waste Management Strategy for Essex

Since the Planning Practice Guidance points towards Municipal Waste Management Strategy as the source of forecasts it is important to consider the *Joint Municipal Waste Management Strategy for Essex (2007 to 2032)* (adopted 15.07.08). This constituted a twenty-five year plan for the future of recycling and management of municipal waste in the County, running from 2007 to 2032.

Southend on Sea produced it own Municipal Waste Management Strategy in June 2004 that identified joint working with Essex authority as highly desirable.

[4] The WDA advised that the latest audited data for 14/15 showed a continued increase in total household waste arisings compared to the previous year albeit at a slower rate.

In July 2009, Essex County Council and Southend-on-Sea Borough Council submitted an outline business case to the Department for Environment, Food and Rural Affairs for Private Finance Initiative (PFI) funding for a residual waste treatment facility to divert LACW from landfill.

1.4 Household Waste Growth Prediction

The expectations regarding future growth in household waste is set out in paragraph 4.2 of the Essex *Joint Municipal Waste Management Strategy* 2008 this states:

> *"The predicted 0.5% waste growth rate takes into account an increasing population and an increase in household numbers. The impact of new housing on waste growth is a key issue in Essex. Over the period April 2001 – March 2006 approximately 22,050 new dwellings have been built in Essex, representing an average of 4,410 new dwellings per year. Further growth is forecast over the next two decades as required in the existing Regional Spatial Strategy (RPG9 2001), the Government's Sustainable Communities Plan (2003) and the emerging Regional Spatial Strategy (RSS14) for the East of England, which highlights a number of 'key growth areas' for the region."*

The *Final Business Case* for Private Finance Initiative (PFI) funding for a residual waste treatment facility submitted in 2011 by Essex County Council & Southend-on-Sea Borough Council updates the forecasts as follows:

> *"The compound annual growth rate (CAGR) for Essex's total MSW has been 0.21% p/a for the 11 year period 1999/2000 to 2010/11 inclusive. This CAGR figure has reduced from 0.4% p/a as calculated and stated in the 2009 OBC due to reductions in total MSW arisings that have occurred in the past 2 years. It should be noted however that 2010/11 saw a 1.25% increase in MSW when compared to 2009/10.*

The forecasts used on page 8/9 of the FBC assume the same growth profile as applied to the 2009 OBC. In summary, the assumptions are 0.4% per annum increase in total MSW until 2015, reducing to 0.2% per annum from 2015 until 2020 when growth is then assumed to become stable. The total MSW tonnages were then adjusted to account for WCA and WDA recycling plans over the 5 years as documented in the Inter Authority Agreement Service Delivery Plans in order to arrive at the Residual MSW (Contract Waste) forecasts. "

The difference between the predictions in LACW arisings made in 2006 and the actual observations recorded in 2010 illustrates the difficulties associated with making reliable predictions of arisings.

No predictions of future municipal solid waste growth are included in the JMWMS. However the *Final Business Case* for the Private Finance Initiative[5] does present a scenario based on the description given above taking the actual value for 2011/12 as its starting point. This has been used as the baseline forecast for the Plan Area.

[5] Essex County Council & Southend-on-Sea Borough Council Final Business Case Department for Environment, Food and Rural Affairs Waste Infrastructure Delivery Programme (WIDP) Application for Waste Infrastructure Credits (08/12/2011)

Other forecasts modelled are as follows:

- Application of the PFI growth rates but using the 2013/14 actual arisings as a starting point.
- Application of growth rates suggested by the Defra forecast study.
- Development of a forecast based on the method proposed in the PPG i.e. calculate arisings per head and factor in a range of different scenarios, e.g. constant rate of growth, progressively lowering growth rates due to waste minimisation initiatives.

1.5 Building A Growth Profile

Following the guidance in PPG on a step by step basis:

- Establish short- term average annual growth rates per household
- Establish long-term average annual growth rates per household

PPG instructs to do so by dividing annual arisings by population or household data.

Figure 3 below shows the results of this exercise by household.

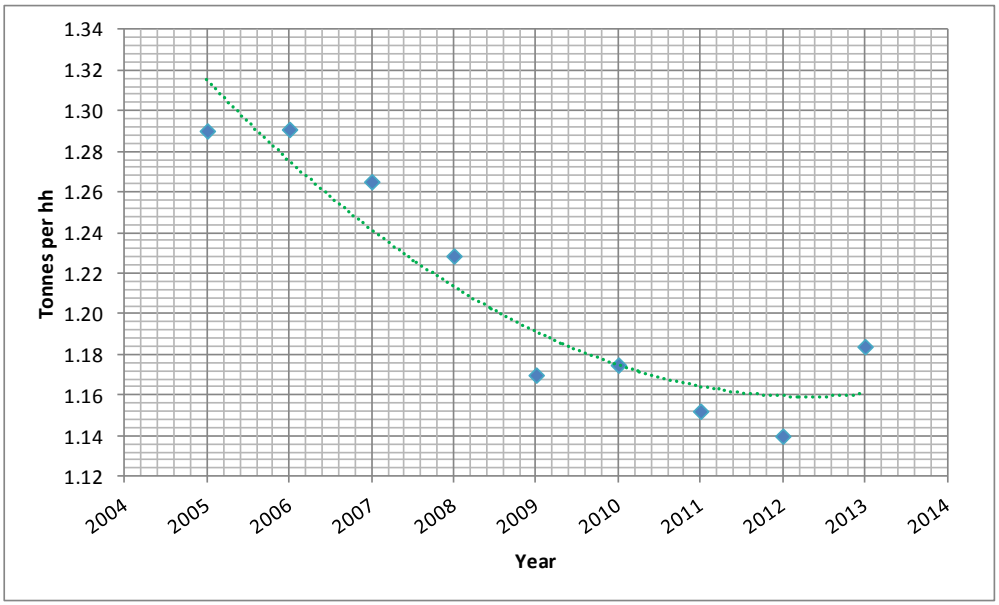

Figure 3: Plan Area Household Waste Arisings (tonnes per household)

It is evident from this that 2009 value represents a clear break between the sudden decline in tonnes per household between 2006 and 2009 and a plateauing out 2009-2013.

Therefore

- the short- term average annual growth rates per household has been calculated using 5 year average from 2009 to 2013 values resulting in an average of 1.17t/hh.
- the 10 year average annual growth rates per household is 1.21 t/hh.

Applying these values to the projected growth in households for the Plan Area as presented in Household projections published by the Department for Communities and Local Government [6] gives values over the plan period as plotted in Figure 4. The baseline taken is that applied to the PFI Business Case.

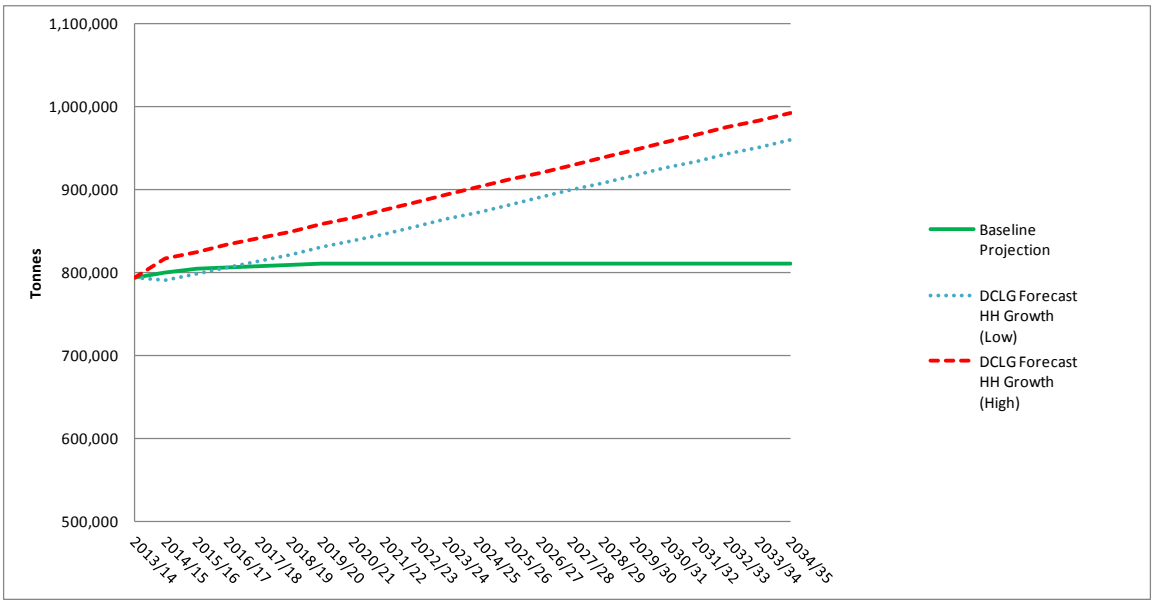

Figure 4: Forecast Plan Area Household Waste Arisings (tonnes per annum)

The application of either values results in an unchecked rise throughout the plan period potentially resulting in tonnages approaching 1 million by 2034/5 - some 200,000 tonnes greater than in 2013 i.e. 25% rise or a compound growth rate of around 1% per annum. Historical data indicates negative growth of minus 0.4% occurred while household numbers grew by an average of 0.7% over the same period suggests that a growth profile based on the assumption there is a linear relationship between growth in household numbers and growth in household waste is over simplified.

By the same token the projected rate of growth in the number of households in the Plan Area (CAGR 0.97%) must also bring into question the assumption in the Business Case baseline that zero growth will be established from 2020 and maintained beyond that point since that implies a year on year reduction in waste production per household of a similar order .

A value somewhere between the baseline and the simple linear extrapolation against projected growth in the number of households suggests itself. Hence one must consider Step 2 as suggested in the PPG of factoring in a range of different scenarios, e.g. constant rate of growth, and progressively lowering growth rates due to waste minimisation initiatives.

Consideration has been given to the following to temper the linear rise presented to reflect the fact that the relationship between household waste production and household waste number is not in fact linear:

[6] https://www.gov.uk/government/statistical-data-sets/live-tables-on-household-projections

- apply the growth rates applied in the national Defra central forecast (0.2% per annum) to the Baseline Projection and extrapolate that forwards to the end of the Plan period.
- consider what that suggests in terms of the reduction on per household arisings at the end of the Plan period.

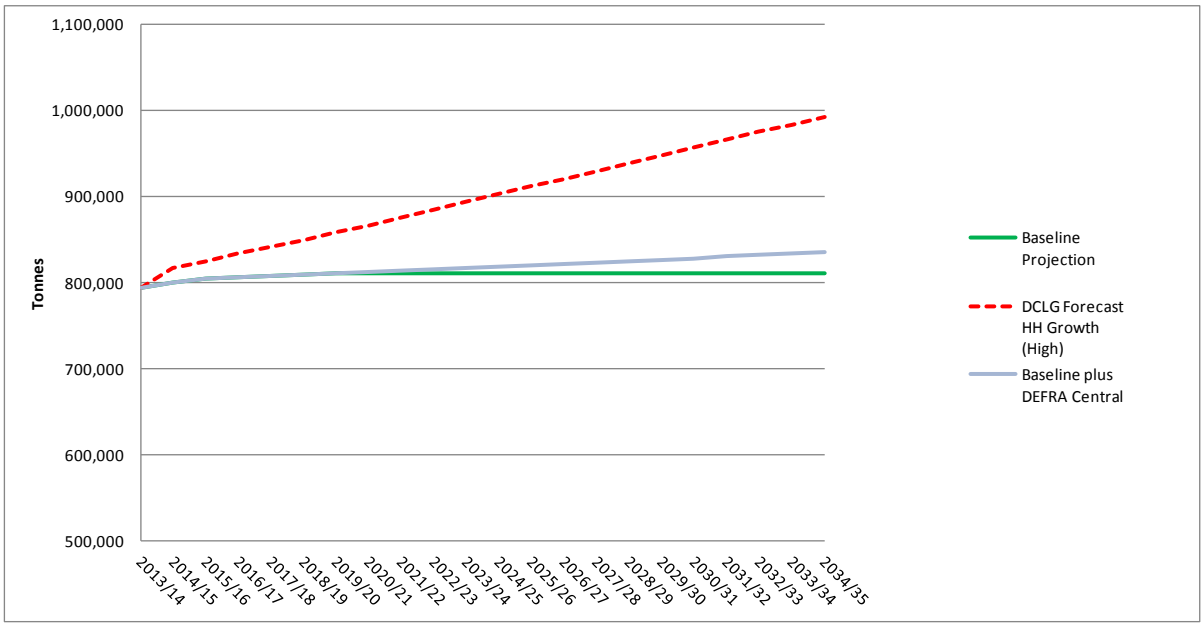

Figure 5: Revised Forecast Plan Area Household Waste Arisings (tonnes per annum)

The amended forecast gives a tonnage difference with the Business Case baseline of just less than 25,000 tonnes. It implies a waste per household factor of 1.01 tonnes as compared with the current of 1.19 tonnes.

Assuming the revised Waste Framework Directive recycling target of 50% by 2020 is met and held for the remaining period that implies just over 500kg per household of residual waste requiring management (compared with 527kg/hh in 2013/14 for Essex alone). Giving a total of 417,000 tonnes for the Plan Area at 2035, an additional tonnage of just less than 12,500 tonnes.

1.6 Conclusion

The derived scenario Baseline plus some growth (as per DEFRA Central) appears to be reasonable and more realistic than that suggested in the Business Case (zero growth post 2020). Therefore it is recommended to apply this when considering future capacity need.

However the advice given by DEFRA for Waste Forecasting for the preparation of Municipal Waste Management Strategies is equally applicable here:

"*The potential for forecasts to be wrong also suggests the merit of MWMSs which are not simply based around a 'predict and provide' mentality. MWMSs which incorporate flexibility to deal with the possibility that forecasts may not be perfectly accurate are likely to be more future-proof*."

Therefore the above exercise should only be regarded as a reasonable guide and the importance of careful definition of indicators against which progress meeting the Plan's aspirations and targets will be monitored and fed back should not be underestimated.

1.7 Calculating Need for Management of Non Hazardous Waste

1.7.1 LACW Historical Management Profile

To understand the future management needs for this waste stream it is helpful to consider the historical trends. Figure 3 shows the changing profile of management with landfill dropping below 50% in the most recent year. Energy recovery plays a very minor role and MBT only coming into play in the most recent year.

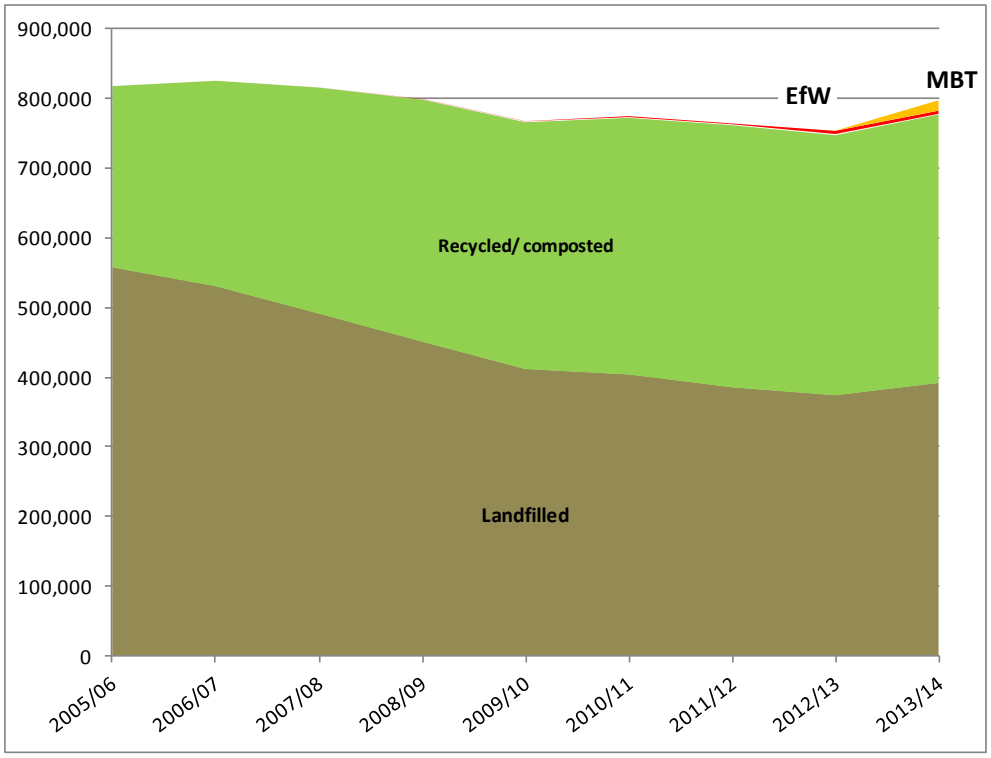

Figure 6: Essex & Southend-On-Sea LACW Management Profile 2005/06 to 2013/14
Source DEFRA dataset

1.7.2 Current LACW Management Profile

The latest figures from 2014/15 indicate that LACW generation in the Plan Area was nearly 800,000 tonnes. This includes waste materials collected at the kerbside and that taken to the Community Recycling Centres (CRCs). The management profile for this waste stream in 2013/14 was as follows:

- Recycled/composted: 48% = 386,305 tonnes
- Other: 2.5% = 19,834 tonnes
- Landfilled: 49% = 391,507 tonnes

Essex CC has entered into a contract that resulted in the provision of a Mechanical and Biological Treatment (MBT) plant at a site on Courtauld Road in Basildon with capacity to treat up to 417,000

tonnes of the residual element of local authority collected waste trade waste collected by the local Essex authorities, street sweepings, and all non-recycled waste from recycling centres for household waste across Essex and Southend. This is undergoing commissioning trials and is to come on stream in the next year.

In addition to residual waste, a contract to treat around 85,000 tonnes per annum of bio-waste that is segregated from other wastes by householders at the kerbside has been tendered. This source-segregated bio-waste comprises approximately 30,000 tonnes per annum of food waste and 55,000 tonnes per annum of food waste mixed with green garden waste.

The long term bio-waste treatment contract has been tendered to create a reliable treatment solution for this waste for the next 20 years involving the use of the following facilities at two locations

- an anaerobic digestion facility in Halstead, Essex taking food waste collected from households predominately in the north of the county; and
- anaerobic digestion in-vessel composting facility to be built at a site off Courtauld Road in Basildon, adjacent to the MBT facility. The latter is still to secure planning consent.

In addition to the above up to 90,000 tonnes of green waste is separately collected and managed at open windrow composting sites on a 4 year rolling contract.

This gives a total of LACW sourced biowaste provided or planned for of 175,000 tonnes per annum.

1.8 LACW Targets

1.8.1 Recycling

The Joint Municipal Waste Strategy stated that Essex will aim to exceed the levels of recycling and composting of household waste as set out in Waste Strategy for England 2007:

- 40% by 2010
- 45% by 2015
- 50% by 2020

It went on to express an ambition to deliver an innovative and resource efficient waste management system for the county, with an aspiration to achieve collectively 60% recycling of household waste by 2020. Since that time the revised Waste Framework Directive introduced a target of 50% household waste recycling by 2020.

If the rWFD target is to be met then at least 400,000 tonnes of material will need to be managed separately (based on arisings in 2014/15). The waste management capacity requirements to support the achievement of the WFD recycling targets varies depending on the collection method used. In particular whether materials are separated at the point of collection via segregated collection vehicles or collected together and then subsequently separated at a specialist facility (Materials Recycling Facility (MRF).

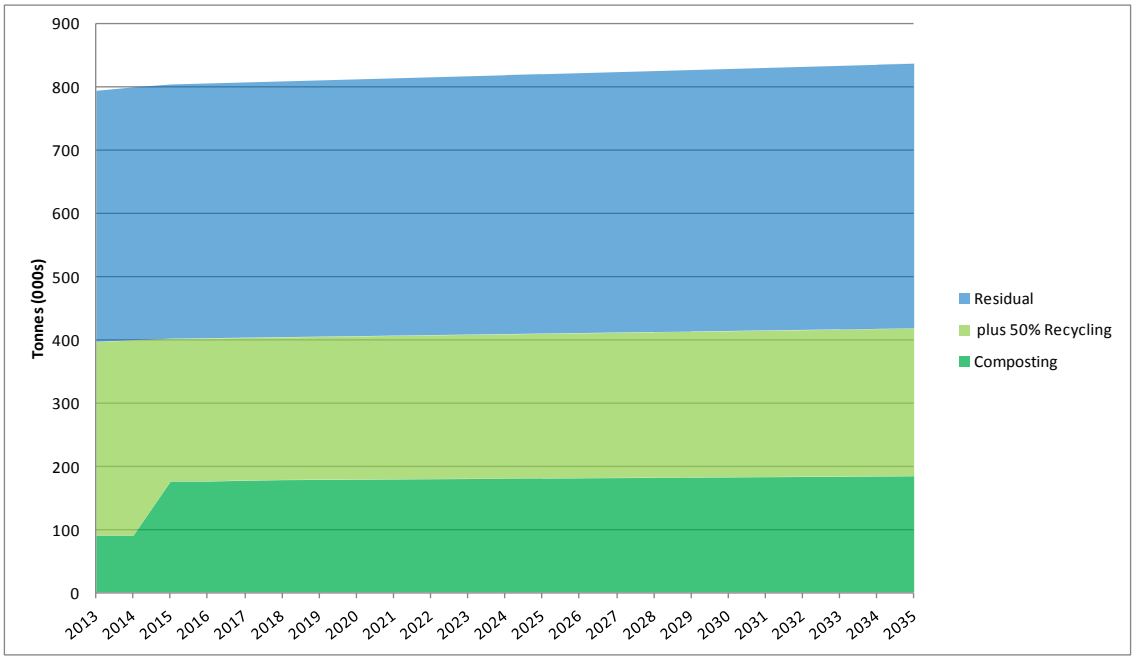

Figure 7: Essex & Southend-On-Sea LACW Management Profile 2013 to 2035

Table 3: Forecast LACW Arisings to 2035 (000s) tonnes and projected management profile

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
LACW Forecast	794	799	804	805	807	809	810	812	814	815	817	818	820	822	823	825	827	828	830	832	833	835	837
Composting	90	90	176	176	177	178	179	179	179	180	180	181	181	181	182	182	182	183	183	183	184	184	185
plus 50% Recycling	307	310	226	227	226	226	226	227	227	228	228	229	229	230	230	231	231	231	232	232	233	233	234
Residual	397	400	402	403	404	404	405	406	407	408	408	409	410	411	412	413	413	414	415	416	417	417	418

1.9 LACW Capacity Requirement

The following maximum capacity requirement is implied from the above profile of management if 100% diversion from landfill is to be achieved and net self-sufficiency is to be pursued in this waste stream:

Table 4: Forecast LACW Capacity Requirement following Profile in Table 3

Treatment Method	Facility Type	Tonnes
Composting	Open or IVC	90,000
Organic Treatment	AD or IVC	86,000
Recycling	Transfer Station (bulking) or MRF	310,000
Residual	MBT	418,000

Comparing that against the existing capacity provision the following additional requirement emerges.

1.9.1 Composting

Open Windrow or IVC

Currently there is 194,000 tonnes of consented composting capacity within the county. Of this 44,000 tonnes is IVC (Veolia site at Pitsea). Taking a simple calculation without regard to the geographical distribution of capacity vis a vis arisings there appears to be sufficient capacity in the open windrow sites alone to cater for the projected quantity of green waste (90,000 tonnes) only management requirement. This however assumes that all capacity will be retained throughout the plan period.

1.9.2 Organic Treatment

IVC or AD

Currently there is 89,000 tonnes of consented in-vessel organic treatment capacity within the county. Of this 44,000 tonnes is IVC (Pitsea) and 45,000 tonnes is AD (Tamar). Taking a simple calculation without regard to the geographical distribution of capacity vis a vis arisings there appears to be sufficient capacity in existing sites to cater for the projected quantity of food or mixed food and green waste (86,000 tonnes) management requirement with a marginal surplus of 3,000 tpa.

1.9.3 Recycling

It would be over simplistic to suggest that meeting and sustaining the recycling target of 50% would require an equivalent amount of processing/management capacity to be available since the waste management capacity requirements to support the achievement of the LACW recycling targets in particular varies depending on the collection method used. Whether materials are separated at the point of collection via segregated collection vehicles or collected together and then subsequently requires separation at a specialist facility (Materials Reclamation Facility (MRF).

Where materials are source separated it is possible for them to be delivered to separate storage areas within a depot from where the bulked up recyclates are then transported directly to reprocessors or even direct to reprocessors. These reprocessors may be at some distance from the Plan Area. In contrast to this, where materials are collected as mixed, or 'co-mingled', they need to be processed through a MRF for separation and it would be from there that the recyclates would be sent on to reprocessors. Even for co-mingled materials they may be bulked at intermediate sites before being transported on to a MRF for processing. The same can also be true for separately collected waste from commercial sources. This means there is not necessarily a linear relationship between arisings and management capacity requirement i.e. 1,000 tonnes of MRF processing capacity is not necessarily required for 1,000 tonnes of LACW to be recycled. This means that much of the material collected to meet the revised Waste Framework Directive target of 50% recycling of household waste by 2020 could be effectively managed without the provision of additional capacity.

The expectation that current arrangements will continue is reinforced by the rWFD presumption that the main target materials be separately collected unless collecting separately is shown not to be technically, environmentally and economically practicable (TEEP). Review of the TEEP assessments available online for the Essex WCA indicates that 5 of the Waste Collection Authorities for which assessment could be accessed, all material requiring 'MRF-ing' were moved to 'MRFs' outside the Plan Area with material going via bulking sites in the county. Therefore, provision of additional dedicated capacity may still not be necessary. It is considered reasonable to assume no additional capacity will be required to serve management of this stream through this route.

1.9.4 Residual Waste

Commissioning of the Mechanical Biological Treatment Facility at Tovi Eco Park began in November 2014 with full service commencement expected during 2016. Although primarily for the management of LACW, Commercial and Industrial waste may also be managed within it, should capacity be available and market forces dictate. The process reduces the weight of residual waste by around 50%. So in the case of this plant 416,000 tonnes per annum is converted into around 200,000 tpa of stabilised residual waste. This is achieved by the removal of recyclates such as glass, cardboard, plastic, aggregate and moisture loss. The resulting material may either be disposed of to landfill as a stabilised material (in a more environmentally sustainable manner) or converted into a Solid Recovered Fuel (SRF) suitable for use as a fuel in appropriate combustion plants. Since landfill avoidance is preferred and in the absence of combustion plants in the Plan area, it is currently exported to produce electricity and/or heat elsewhere in Europe. This is conducted under a short-term contract running to 2018. It is intended that a long-term solution for the management of the material will be secured through a competitive tender process managed by the County Council as Waste Disposal Authority. In the absence of a permanent solution at this time and to assure compliance with the goal of net self-sufficiency it is considered that the Plan should make provision for the management of the equivalent tonnage of residue within the Plan Area, regardless. That is to say an additional 200,000 tonnes per annum of residual waste is to be provided for.

Table 5: Capacity Status against LACW Capacity Requirement following Profile in Table 4

Treatment Method	Facility Type	Tonnes	Capacity Requirement
Composting	Open or IVC	90,000	None
Organic Treatment	AD or IVC	86,000	None
Recycling	Transfer Station (bulking) or MRF	310,000	None
Residual	MBT	418,000	200,000 tpa landfill or thermal treatment.

1.9.5 Commercial & Industrial Waste

The previous report gave a value of 1,273,735 tonnes at 2032 having applied growth rates in economic activity forecast by the East of England Economic Forecast Model (EEEFM). Closer examination reveals that because the EEEFM only ran to 2031 the 2032 value presented in its Table 4 is just a repeat of the previous year. To extend the forecast to 2035 the CAGR in the last 4 year period has been calculated (at 0.22% per annum) and this growth rate has been applied to the value for 2031 and carried forward giving a final value of 1.285 million tonnes per annum. That means that the equivalent of this tonnage should be provided for to be managed for the overall aspiration of net self-sufficiency scenario to be achieved.

Table 6: Forecast C&I Arisings to 2035 (000s) tonnes

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
C&I	1,153	1,172	1,193	1,210	1,223	1,232	1,237	1,243	1,247	1,249	1,252	1,255	1,257	1,260	1,262	1,264	1,268	1,271	1,274	1,277	1,279	1,282	1,285

1.9.6 Future Management Needs

The C&I waste stream is not subject to any statutory management or landfill diversion targets - although materials within it are targeted for example Packaging and WEEE. There is however an expectation that the Plan should seek to move waste up the hierarchy regardless of its source.

Therefore, what potential opportunity might there be to manage this stream up the Waste hierarchy is considered.

1.9.7 Biowaste

The C&I waste stream has been assessed to contain around 13% organic waste. If it were to be assumed that all that material could be effective captured for separate treatment then the following profile of arising of this material is suggested based on the above forecast.

Table 7: Forecast Biowaste Arisings within C&I Waste Stream to 2035 (000s) tonnes

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
C&I Arising Forecast	1,153	1,172	1,193	1,210	1,223	1,232	1,237	1,243	1,247	1,249	1,252	1,255	1,257	1,260	1,262	1,264	1,268	1,271	1,274	1,277	1,279	1,282	1,285
Organic Content at 13%	150	152	155	157	159	160	161	162	162	162	163	163	163	164	164	164	165	165	166	166	166	167	167

The peak quantity of biowaste projected to be produced within this stream is 167,000 tonnes per annum at 2034 and 2035.

1.9.8 Total Biowaste Provision

When aggregating the organic fraction of C&I with the biowaste fraction of LACW the picture presented in Table 8 and Figure 8 emerges. This shows a biowaste treatment capacity shortfall of between 125, 000 tonnes per annum and 220,000 tonnes per annum in 2035, with significant jumps occurring at 2017 and 2022 with the scheduled closure of facilities with time limited consents.

Table 8: Projected combined LACW & C&I biowaste management requirement and projected shortfall for Essex & Southend On Sea (ooos tonnes)

Line		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
1	**C&I Biowaste at 13% Organic Content**	155	157	159	160	161	162	162	162	163	163	163	164	164	164	165	165	166	166	166	167	167
2	**LACW Composting (Actual contracted)**	176	176	177	178	179	179	179	180	180	181	181	181	182	182	182	183	183	183	184	184	185
3	**Total Biowaste (line 1+ line 2)**	**331**	**333**	**336**	**338**	**340**	**341**	**341**	**342**	**343**	**344**	**344**	**345**	**346**	**346**	**347**	**348**	**349**	**349**	**350**	**351**	**352**
4	**Consented Operational**	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221	221
5	**minus time limited**		-8	-75	-75	-75	-75	-75	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90	-90
6	**Total capacity (line 4+line 5)**	221	213	146	146	146	146	146	131	131	131	131	131	131	131	131	131	131	131	131	131	131
7	**Total shortfall (line 3 minus line6)**	**110**	**120**	**190**	**192**	**193**	**194**	**195**	**211**	**212**	**212**	**213**	**214**	**214**	**215**	**216**	**217**	**217**	**218**	**219**	**219**	**220**
8	**Consented Non Operational**	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
9	**Total shortfall inc consented (line 7 minus line8)**	15	25	95	97	98	99	100	116	117	117	118	119	119	120	121	122	122	123	124	124	125

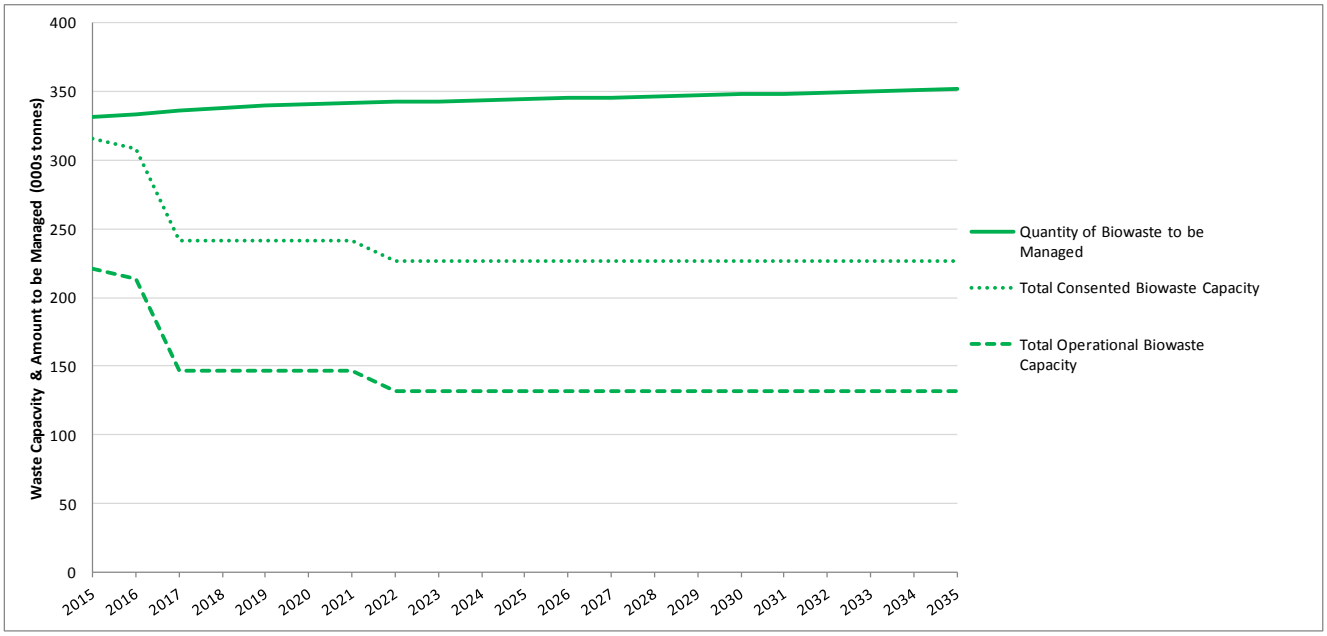

Figure 8: Plotting predicted arisings vs. operational capacity and consented capacity from 2015 to 2035 (000s tonnes)

If total provision is to be made within the Plan Area to treat with stream and move the waste up the hierarchy assuming a facility size of 35,000 tpa then the shortfall suggest that provision ought to be made as follows (assuming it is made in the first year in which it is required):

Table 9: Facility sequencing & timescale to meet projected combined LACW & C&I biowaste management requirement for Essex & Southend On Sea under high and low scenario (000s tonnes)

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Total shortfall (Total Biowaste minus Total Capacity)	110	120	190	192	193	194	195	211	212	212	213	214	214	215	216	217	217	218	219	219	220
Total shortfall inc consented operational only	15	25	95	97	98	99	100	116	117	117	118	119	119	120	121	122	122	123	124	124	125
Facilities required to make up shortfall without non operational	3		2		1																
Facilities required to make up shortfall with non operational consented			3															1			

Table 10: Summary of facility delivery sequencing to meet projected combined LACW & C&I biowaste management requirement for Essex & Southend On Sea (000s tonnes)

	High	Low
2015	3	0
2017	2	3
2019	1	0
2032	0	1
Total No Facilities	**6**	**4**

1.10 London Imports

Ongoing Duty to Cooperate correspondence[7] with the authorities developing the North London Waste Plan indicates an expectation that the Plan will provide for a tonnage of C&I waste from a baseline value of 20,353 tonnes in 2014 as follows.

Table 11: Projected Imports from North London of C&I waste to the Plan Area (tonnes)

2016	2021	2026	2031
29,547	15,589	13,589	11,882

It should be noted that virtually all of the current C&I waste accepted goes to Pitsea Landfill, which is expected to close in 2025/26.

While this is currently earmarked as continuing to go to landfill and yet Policy 5.16 (Waste net self-sufficiency) of the London Plan seeks the cessation of landfilling of biodegradable or recyclable waste by 2026. This end date happens to align with the projected closure date for Pitsea landfill. The Plan could however make provision for it to be managed through other routes. It is worth noting the Kent Minerals & Waste Plan currently completing examination makes provision for non hazardous waste from London at either landfill or energy from waste.

[7] Letter to Alethea Evans Essex County Council from Archie Onslow dated 18th December 2015 on behalf of NWLP.

1.11 Remaining Non Hazardous Waste Management Requirements

Table 12 below shows the running total of non hazardous waste requiring management across the plan period if:

1. the biowaste managed is deducted from the total projected arisings; and
2. the projected imports from North London are added.

Table 12: Projected Quantities of Non-Hazardous Waste Requiring Management exc biowaste but including imports from North London of C&I waste to the Plan Area (ooos tonnes)

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Total Non Haz Arising	1,997	2,016	2,030	2,040	2,048	2,054	2,060	2,065	2,069	2,073	2,077	2,082	2,086	2,089	2,094	2,099	2,104	2,108	2,113	2,117	2,122
Projected Biowaste Managed	420	423	425	427	428	429	431	431	432	433	434	435	436	437	438	439	439	440	441	442	443
Remaining Non Haz to be managed	1,576	1,592	1,605	1,613	1,619	1,625	1,630	1,633	1,637	1,640	1,643	1,647	1,650	1,653	1,657	1,660	1,664	1,668	1,671	1,675	1,679
Non haz imports from London	33	30	27	24	22	19	16	16	15	15	14	14	14	13	13	12	12	12	12	12	12
Non haz to be managed	**1,609**	**1,622**	**1,632**	**1,638**	**1,641**	**1,644**	**1,646**	**1,649**	**1,652**	**1,655**	**1,658**	**1,661**	**1,663**	**1,666**	**1,669**	**1,673**	**1,676**	**1,680**	**1,683**	**1,687**	**1,691**

For the purposes of the projection it has been assumed that the imports from London will follow a linear year on year reduction to 2030 after which it will stabilise.

1.12 Recycling & Recovery

Although there are no explicit recycling or recovery targets for C&I waste the need to encourage waste to move out of landfill has been taken to be the overriding objective. The predicted non hazardous waste arisings requiring management in Table 12 has been compared against existing operational and consented but non operational recycling and other recovery (such as thermal treatment) capacity to get a sense for the size of any capacity gap should one exist. It should be borne in mind that significant tonnages of LACW and some C&I waste are separately collected and managed either directly by reprocessors or via bulking sites and therefore don't require management through other capacity. However these have not been taken account of i.e. deducted from the total and therefore the assumed capacity requirement can be considered to be a pessimistic assessment.

1.12.1 Capacity Assessment

Total consented recycling and recovery management capacity within the Plan Area has been calculated to be just less than 1.6million tonnes[8]. Table 13 shows a breakdown of facility type.

Table 13: Consented Operational Capacity for facilities providing recycling and recovery capacity for C&I waste in Essex & Southend On Sea (tonnes)

Facility Type	Capacity (Tonnes)
End of Life Vehicles	387,793
Metal Recycling	398,361
Non Hazardous Materials Recycling / Recovery Facility	703,541
Tyre Recycling	11,110
	1,575,806

Table 13 shows consented operational capacity only. If consented non-operational capacity is also taken into account an additional 0.58million tonnes of recovery capacity is theoretically available. See Table 14 for the breakdown.

Table 14: Consented Non-operational Capacity for facilities that may provide recycling and recovery capacity for C&I waste in Essex & Southend On Sea (tonnes)

(MBT entry italicised as it forms a pre-treatment method so presents a risk of double counting. To be consistent with Tovi EcoPark only 50% of the capacity has been counted in the recovery capacity value above 9.[9]

Capacity Type	Consented Capacity (Tonnes)
Rivenhall EfW	360,000
Rivenhall MRF	100,000
Rivenhall MBT	*250,000*
Total	**710,000**

[8] This value excludes sites identified by the permitting regime as 'waste transfer' at some of which a degree of separation for recycling will undoubtedly be taking place . These sites collectively account for over 1 million tonnes of additional capacity, a proportion of which would count towards C&I waste recycling capacity.

[9] pers comm Claire Tomalin & Alethea Evans Principal Minerals & Waste Planners ECC

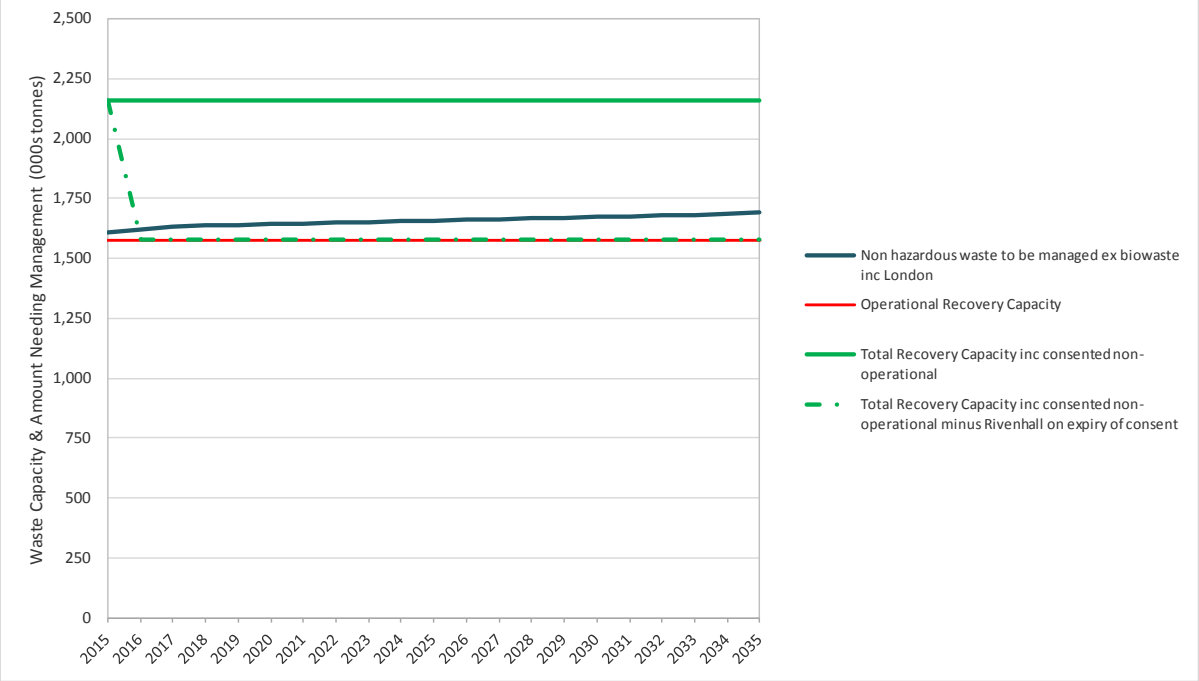

Figure 9: Projected Non-Hazardous Waste Recovery Capacity Gap (minus biowaste, plus N London)

Figure 9 above assumes that all existing operational capacity will continue to operate throughout the Plan period. There is no evidence to suggest this will not be the case and given a sufficiently robust safeguarding policy, any capacity that may be lost at these sites as a result of 'churn' from redevelopment should be replaced with equivalent.

1.13 Conclusion

Comparison between the remaining tonnage of non hazardous waste requiring management shown in Table 12. (1.7 million tonnes) and operational consented capacity (Table 13) suggests there is a growing recovery capacity shortfall for non-hazardous waste if net self-sufficiency in recovery capacity is to be achieved in the Plan Area. In 2015 it is estimated to be 33,000 tpa growing to 115,000tpa at 2035. This is illustrated in Figure 9 above. The development of consented non operational capacity would more than fill the predicted gap if the extant consent was to be implemented in time, further serving to promote the diversion of certain waste from landfill, its movement up the hierarchy and potentially providing for the recovery of residues from intermediate treatment.

2 Chapter 2 Construction, Demolition & Excavation Waste Future Capacity Requirements

2.1 Introduction

This paper updates the baseline and forecasts for Construction, Demolition & Excavation Waste (CDEW) arisings and then goes on to assess the projected capacity gap for this waste stream across Essex and Southend on Sea over the Plan period (to 2035).

2.2 Updated Estimate of CDEW Baseline Arisings

The methodology used to derive an arisings figure for 2014, is based on the methodology developed by Defra for reporting on progress made towards meeting the revised Waste Framework Directive (rWFD) target.

The method has been modified from that applied to generate the previous 2013 baseline estimate[10] for a number of reasons. In particular:

- It is considered that direct application of the national estimation approach applied by Defra for accounting for flows to and from intermediate sites (outputs minus inputs) is inappropriate to apply at Plan Area level (because flows are at Plan Area level). However, it is considered that it is appropriate to factor in flows of waste arising in the Plan Area which are transported to intermediate sites beyond the area.
- A recent change in definition of 'inactive' waste as it applied to residues from the treatment of CDEW, commonly referred to as 'trommel fines', under the landfill tax. Previously much of this material leaving 'intermediate sites' e.g. transfer stations would have been classed as soils (17 05 04) as it would go for use in restoration, however, since the clarification of the definition of 'active' waste a significant quantity of this material is now classified as residues from mechanical processing (19 12 12). Since CDEW is primarily defined as Chapter 17 waste, a proportion of outputs formerly counted as CDEW (being 17 05 04) has been reclassified as non-CDEW waste (19 12 12). To account for this 'loss' it is considered appropriate to include a proportion of this class of waste that left intermediate sites treating CDEW located in the Plan Area within the calculation.

Table 15 considers all the elements which contribute to the baseline calculation and considers issues which may lead to inaccuracy. The elements of the calculation considered are:

- Waste dealt with at facilities-such as transfer stations and treatment sites where waste is passed on for management at a different facility, referred to as 'intermediate facilities'.
- Waste sent to landfill sites
- Waste recovered at formerly exempt sites
- Waste processed as recycled aggregate.

[10] As reported in *Local Waste Arisings Addendum to the Replacement Waste Local Plan Capacity Gap Report dated: 27 November 2014 LRS*

Table 15: Comparison Between 2013 & 2014 CDEW Baseline Methodology Values

Element	Element of baseline calculation	2013 method of calculation	2013 Value	Rationale	2014 method of calculation	2014 Value
1	Waste dealt with at intermediate facilities	Waste inputs minus waste outputs.	32,249	While this approach works on a national basis it is problematic when dealing at Plan Area level as the value assumes that the transfer stations and treatment facilities which received Plan Area waste did not receive waste from any other areas. If they did then the output cannot be related to the input i.e. one cannot be sure if any difference between the input and output values is attributable to the waste received from the Plan Area or from waste received from elsewhere. Also differences at site level can merely be due to stockpiling of materials across the year rather than true diversion activity. If one simply accounts for CDEW exported to intermediate sites (i.e. sites through which waste passes before reaching its final destination) outside the Plan Area that gives a value of 422,133 tonnes. Movements to Plan Area facilities are not counted on the assumption that all materials that went through such sites ended up in an outlet that is counted elsewhere. For example residues will go on to landfill and will appear in WDI data, hardcore going for crushing is captured by recycled aggregate production data, soil going to exempt sites is captured,	CDEW from the Plan Area recorded as inputs to out of Plan Area intermediate sites in WDI 2014	422,133

				heavy recyclables such as wood and metal appear under WDI entries too. Therefore because of the above, no entry is made for movements to Plan Area sites alone.		
2	Waste sent to landfill sites	CD&E waste known to be sent to landfill	1,706,997	WDI 2012 shows less than 1 million tonnes of 'inert' waste going to landfill and WDI 2013 shows just over 1mt of 'inert' waste going to landfill so this value appears high[11]. Actual CDEW input to landfill in 2014 shown as 882,437 tonnes used.	CDEW from the Plan Area recorded in WDI 2014 as sent to landfill	882,437
3		CD& E used beneficially	-235,593	Not clear why this value was excluded from the 'to landfill 'value above (item 2)as it still indicates CDEW arising even if put to beneficial use. Therefore this figure is not subtracted from the arisings calculation.	CD& E used beneficially not excluded	0
4		CD&E waste sent from transfer station to landfill	105,829	Including movements from Plan Area transfer stations to landfill runs the risk of double counting as the value for inputs going to landfill from the Plan Area will already include that going from Plan Area transfer stations. The question is where is the residue from the waste processing sites (coded as 19 12 12) counted. The national calculation methodology [12]states that " Strategic Forum for Construction (SFfC) have developed a methodology to calculate the average proportion of all mixed waste that stems from the C&D sector" but it hasn't	191212 residues from Plan area sites sent to landfill (apportioned by % CDEW represented of input as recorded in WDI 2014)	189,253

[11] The LRS report does not explain how this figure was derived in any detail- in particular which values for the types of waste were used.

[12] Methodology for estimating annual waste generation from the Construction, Demolition and Excavation (CD&E) Sectors in England Version 1 March 2012 Defra

				been possible to establish what factor has been applied. For the purposes of this exercise we established that a total of 199,458 tonnes of this waste type was produced by Plan Area sites in 2014. To attribute the element of this due to the Plan Area it was apportioned according to the origin of the inputs. 95% of inputs to the sites shown as receiving CDEW and producing 191212 came from the Plan Area. Applying that to the total production gives the value used. It should be noted that no account has been taken of the possible contribution from non CDEW inputs to 191212 outputs so the value used may be an overestimate.		
5		CD&E waste removed from landfill	-13,932	Inert outputs from Plan Area landfill reported in WDI 2014 amounted to only 0.247 tonnes, therefore suggest that the value used should in fact be zero.	CDEW removed from landfill counted but negligible	0
6	Waste managed at (formerly) exempt sites	Apportionment of national estimate by construction output	345,803	Post 2010 exemptions were revised with limits introduced. The WDI data shows how inputs to formerly exempt sites are now captured in the formal reporting system compensating for the 'leakage' from the formal system to a large degree. 2014 WDI value is 765k tonnes.	Inputs to formerly exempt sites through WDI 2014 (Use of Waste and Recovery in/on Land)	765,000
7	Waste recycled into aggregate (MPA data and WRAP	Apportionment of MPA national value by applying proportion of construction	1,410,481	Apportionment of MPA national value by applying proportion of construction orders 4yr mean value DCLG data (2.49%) is	Apportionment of MPA national value by applying proportion of construction	1,051,597[13]

[13] The value cited in the Greater Essex Local Aggregate Assessment for 2014 is 0.812mt for 2010 ie some0.24 mt less. Therefore the value presented may be an overestimate and is considered to result in the total arisings value being a worst case scenario.

	ratios)	businesses		considered that project value is a more representative proxy for construction activity than number of businesses active in the sector. This approach is supported by the fact that Smartwaste data for construction, reports on arising by project value.	activity	
		Total	**3.35 mtpa**		**Total**	**3.31mtpa**

2.3 Calculating a Revised Baseline

Table 16: Comparison Between 2013 & 2014 CDEW Baseline Arisings Cumulative Total

Element	2013 Cumulative Total	2014 Cumulative Total
Waste dealt with by transfer stations and treatment facilities	32,249	422,133
Waste sent to landfill sites	1,595,550	1,494,000
Waste disposed at exempt sites	1,941,353	2,259,000
Waste recycled as aggregate (MPA data apportioned)	**3,351,834**	**3,310,420**

2.4 Conclusion

By using 2014 values and applying a more appropriate methodology to calculating local arisings, this analysis results in a value (3.24 million tonnes) that is higher than the original estimate (between 2.71 million to 2.82 million tonnes) reported by ECC in its Waste Capacity Gap Report 2014 but marginally lower than the 2013 value (3.35 million tonnes).

While there is a relatively small difference between the results we consider the methodology applied to generate the 2014 to be more robust and hence the 'best available'.

2.5 Updating Growth Forecast

The waste chapter of the Planning Practice Guidance (PPG) suggests the default growth scenario for CDEW arisings should in fact be zero as follows: "*Waste planning authorities should start from the basis that net arisings of construction and demolition waste will remain constant over time*". This reflects the wide fluctuations in CDEW arisings which occur from year to year as construction projects commence and complete. There is no reason to suggest that the situation is Essex is any different and therefore it is proposed that a zero growth rate, as recommended by PPG, be applied. This approach is supported by a trend analysis of arisings managed at permitted facilities over the last five years set out below.

2.5.1 Time Series Data for Inert arisings from the Plan Area managed at permitted facilities

A review of WDI datasets from 2010 to 2014 has been conducted to establish the pattern of management of inert waste at permitted facilities over time and in particular to understand the role that the introduction of permitting for formerly exempt activities has played in recent years.

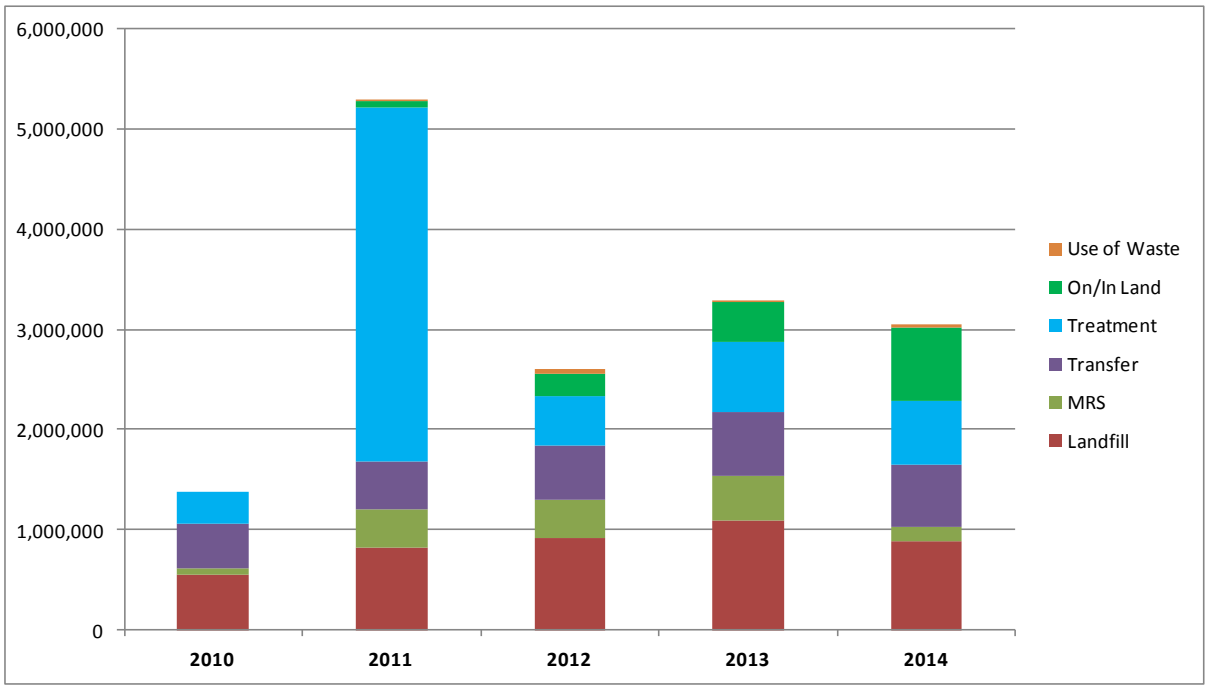

Figure 10: Inert Arisings Managed at Permitted sites from the Plan Area (2010-2014)

Source WDI

Figure 10 illustrates:

1. How the quantity of inert waste from the Plan Area managed at permitted facilities has fluctuated in the earlier years but then settled around a value of 3 million tonnes per annum.
2. The explicit recognition of the role played by the beneficial use of waste in/on land or its use (as denoted by the deep green column entry plus orange) following the introduction of permitting for these formerly exempt activities in mid 2011.
3. An exceptional value for treatment in 2011. This is attributable to 3.4 million tonnes of dredging spoil from the London Gateway Port being subject to physical treatment at a site in Thurrock. Since this is a 'one-off' (or occasional value)[14] it is considered reasonable to omit it in the ongoing annual arisings estimate for the Plan Area. Allowing for the 'one off' nature of this event, (such that the value for waste managed at permitted sites in 2011 is taken as just less than 2 million tonnes) suggests a steady progression of management of inert waste through permitted routes from 1.4 million tonnes in 2010 to 3 million tonnes in 2014.

[14] While 'landed' in the Plan Area, it is not attributable to construction related activity within Essex & Southend per se.

NB: The total values cited above are indicative of the changing pattern of management at permitted facilities over time and should not be taken to represent arisings as these values double count any handling of waste at intermediate sites such as transfer stations.

The trend in Figure 10 is plotted in Figure 11 (after exclusion of the 2011 exceptional treatment value), which shows a plateauing or flattening off now that materials going to formerly exempt sites have been accounted for. This also justifies a static growth rate going forward in the absence of any exceptional development agenda for the plan period.

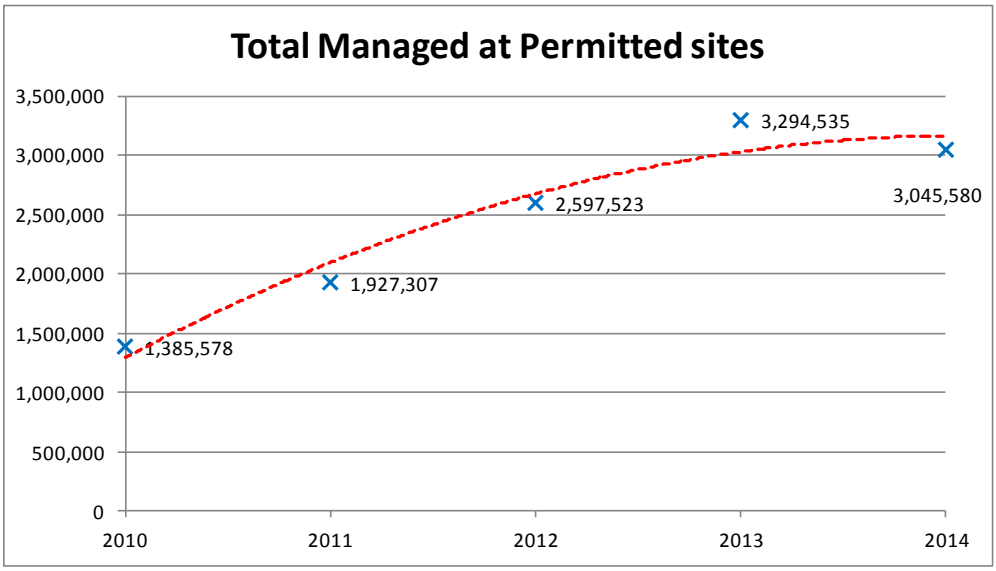

Figure 11: Trend Analysis of 'Inert Arisings Managed at Permitted sites from the Plan Area (2010-2014)

The above data relates to all inert waste attributed to the Plan Area being managed at permitted sites regardless of where those sites are located.

This equates to the total quantity of waste managed through permitted sites reporting through the Waste Data Interrogator. This value includes the same waste that may be handled at different facilities i.e. transferred and then landfilled and so does not account for double handing – the true arisings values are therefore likely to be less than those shown.

2.5.2 Modelling Future Arisings – Sensitivity Check

On the basis of the above findings modelling has been undertaken applying the revised baseline value of 3.24mtpa at the following growth rates:

Scenario 1: 0% i.e. No Growth as per PPG advice
Scenario 2: 0.3% per annum in line with baseline of EEEFM
Scenario 3: 0.9% per annum in line with LRS modelling.

The results are shown in the Table 17 and Figure 12.

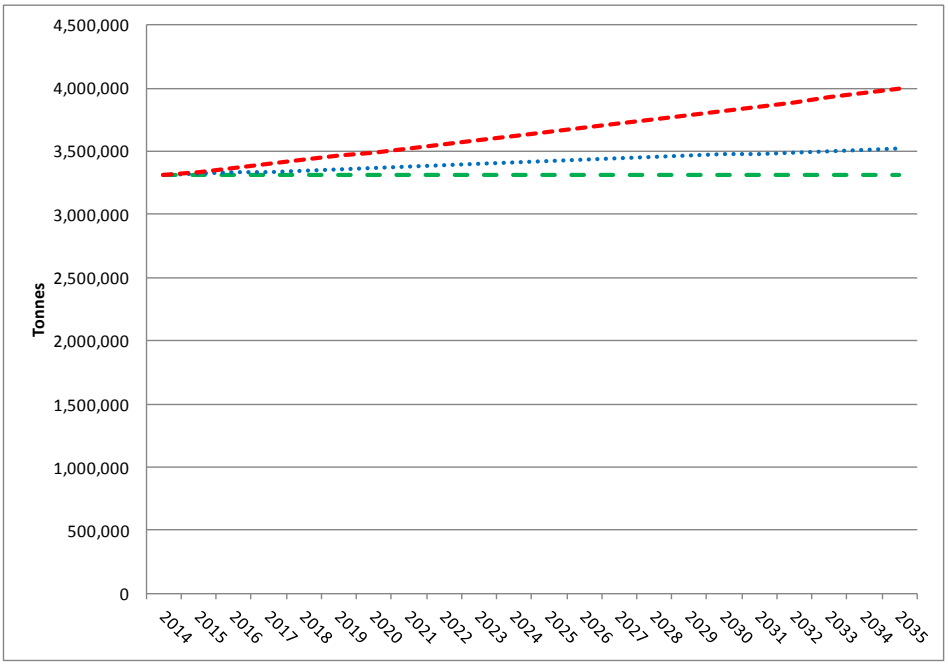

Figure 12: CDEW Forecasts Growth Scenarios Range

The above figure defines the 'cone of possibility' within which the actual trajectory is likely to fall. In view of the PPG preference for zero growth and the fact that actual arisings peak and trough from year to year values that follow closer to the lower growth rate are suggested for use in assessing future capacity requirements.

Table 17 below shows the difference between a zero growth and low growth scenario in terms of ongoing and cumulative capacity requirements.

Table 17: CDEW Forecasts- Capacity Requirements Zero Growth vs. Low Growth Scenarios

Year	2014 Est @0% pa	2014 Est @ 0.3% pa	Diff
2014	3,310,823	3,310,823	0
2015	3,310,823	3,320,756	-9,932
2016	3,310,823	3,330,718	-19,895
2017	3,310,823	3,340,710	-29,887
2018	3,310,823	3,350,732	-39,909
2019	3,310,823	3,360,784	-49,961
2020	3,310,823	3,370,867	-60,044
2021	3,310,823	3,380,979	-70,156
2022	3,310,823	3,391,122	-80,299
2023	3,310,823	3,401,296	-90,472
2024	3,310,823	3,411,500	-100,676
2025	3,310,823	3,421,734	-110,911
2026	3,310,823	3,431,999	-121,176
2027	3,310,823	3,442,295	-131,472
2028	3,310,823	3,452,622	-141,799
2029	3,310,823	3,462,980	-152,157
2030	3,310,823	3,473,369	-162,546
2031	3,310,823	3,483,789	-172,966
2032	3,310,823	3,494,240	-183,417
2033	3,310,823	3,504,723	-193,900
2034	3,310,823	3,515,237	-204,414
2035	3,310,823	3,525,783	-214,960
Totals	**62,905,640**	**64,633,315**	**-1,727,676**

This shows that at 2035 there is a difference of 215,000 tonnes and this could represent four medium size facilities or two large ones. If four medium size facilities were to be planned for, the trigger years for their development are 2019/20, 2023/24,2028/29 and 2033/34.
It should be noted that the above does not account for any provision for imports.

2.5.3 Future Capacity Requirements

Comparison between the projected baseline for CDEW over the Plan period (3.311 mtpa) against the current consented recycling capacity capable of processing this stream (2.118 mtpa) shows an immediate shortfall of 1.5mtpa increasing over time as time-limited consents close.

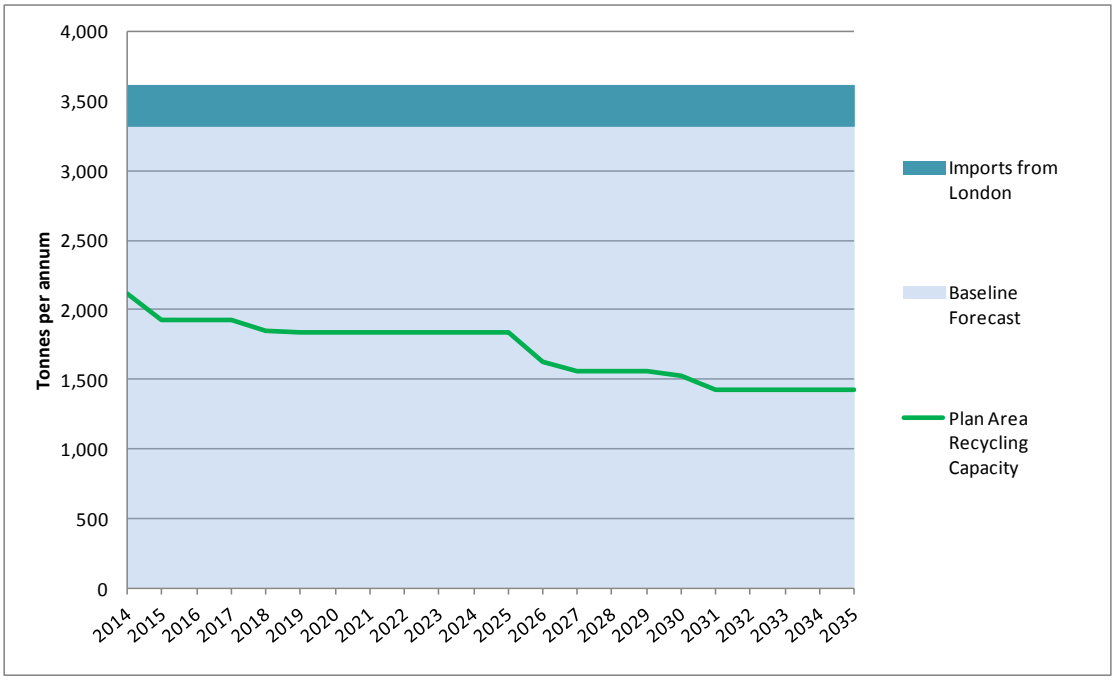

Figure 13: Inert CDEW Management Scenario for Plan Period-baseline capacity plus recycling

The management profile in Figure 10 shows that input to landfill and for beneficial use in/or on land play a major part in CDEW management currently accounting for 1.6mtpa. The breakdown is illustrated in Figure 14 below.

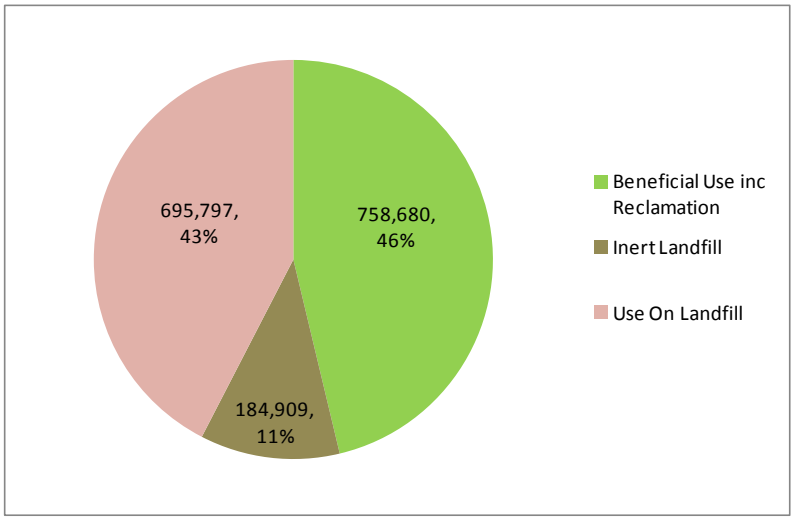

Figure 14: Profile of final Permitted Fates for Plan Area Inert CDEW (2014)

2.6 The role of Beneficial Use

In 2014 the vast majority of waste managed through this route went to facilities outside Essex with Sandon Quarry the only named site within the Plan Area receiving waste under this category. Table 18 presents the breakdown.

Table 18: Outlets to which Plan Area Inert CDEW went for Beneficial Use in 2014

Sum of Tonnes Received			
Site Category	Facility WPA	Site Name	Total
On/In Land	Barking and Dagenham W	Cranfield Golf Centre	39,766
	Cambridgeshire WPA	Chear Fen Farm	180
	Essex WPA	Sandon Quarry	215,064
	Havering WPA	Ingrebourne Links	6,714
	Hertfordshire WPA	Hoddesdon Quarry	12,708
		Waterford Landfill	560
	Suffolk WPA	Bramford Golf Centre	26,572
	Thurrock WPA	Land At North Tilbury	7,820
		Little Belhus Restoration	108,788
		London Gateway Parkland	325,110
On/In Land Total			743,282
Use of Waste	Bristol City WPA	Units A, B & C Estuary Park	165
	Cambridgeshire WPA	Bridge Foot Farm	13,410
	Havering WPA	Mr Andrew Davis	9,738
	West Sussex WPA	Landfall Farm	30
Use of Waste Total			23,343
Grand Total			766,625

Essex planning officers advise that these flows are to be classed as inert landfill since the actual planning consent under which this activity is conducted relates to continuation of infilling with inert waste to allow the completion of restoration. It should be noted that the national policy approach to the waste hierarchy prescribed in the National Waste Management Plan 2013 classes the use of certain inert waste for backfilling mineral working as 'other recovery' on a par with anaerobic digestion and thermal treatment, it being an activity that is specifically excluded from the national target for recycling/landfill diversion of CDEW introduced by the revised Waste Framework Directive. The relevant Figure is reproduced below.

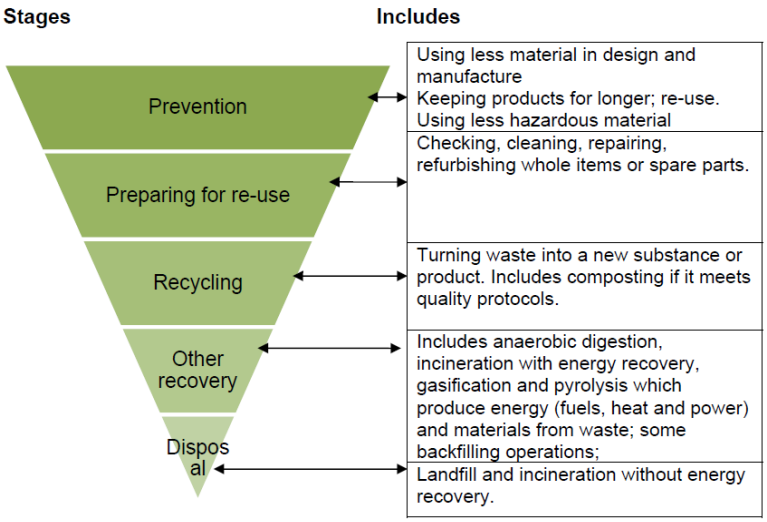

Figure 15: Waste Hierarchy (National Waste Management Plan)

2.7 The role of Inert Waste Landfill

The National Waste Management Plan 2013 states that "*...the disposal of inert waste in or on land i.e. landfill, remains a valid way of restoring quarries and worn out mineral workings where this is a planning requirement.* "The plan area has around 3.4 million m^3 of void space dedicated to inert landfill. This offers capacity for around 5.1 million tonnes of inert waste on the basis that a compaction of 1.5 tonnes per m^3 can be achieved. Inputs to inert landfill from the Plan Area in 2014 were circa 185k tonnes. Were the remaining void to be husbanded to last for the whole plan period, inputs of around 250ktpa could be accommodated. This scenario is illustrated in Figure 16.

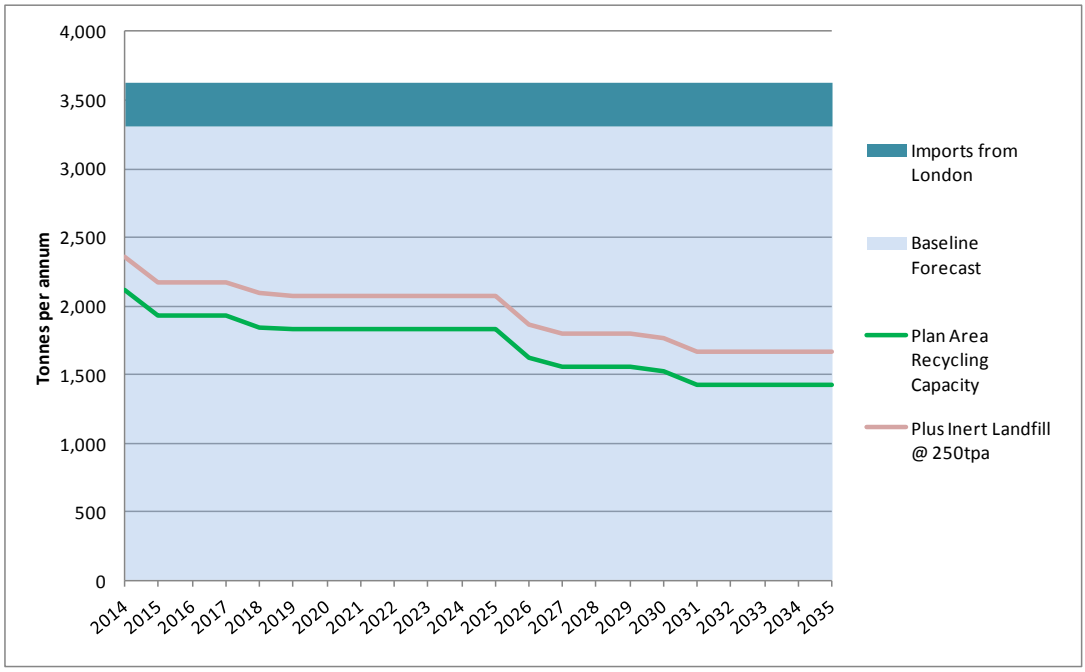

Figure 16: Inert CDEW Management Scenario for Plan Period-baseline capacity plus inert

Figure 16 shows that even with inert landfill making an ongoing contribution to management of this stream there remains a substantial capacity shortfall of between 650ktpa and 950ktpa depending on how much account is given to London's needs. This shortfall rises to between 1.3 and 1.6 mtpa approaching the end of the Plan Period as recycling capacity tails off as facilities operating on sites with temporary planning consent close.

2.8 The role of Non-Inert Waste Landfill

It is apparent from Figure 13 that inputs of inert CDEW to non-inert landfill plays a significant role in the final management of current arisings with nearly 695,000 tonnes per annum managed through this route in 2014. This represents 43% of arisings final fate at permitted sites as recorded in the WDI and equates to the shortfall indicated above if London imports are excluded.

2.8.1 The Role of Pitsea

Figure 17 plots inputs to Pitsea over the past 5 years showing the relative contribution of CDEW waste to other waste inputs. It is significant that the average of the tonnage accepted in the past 5 years equates to 654,400 tonnes, which again corresponds closely to the shortfall for Plan Area inert CDEW identified previously.

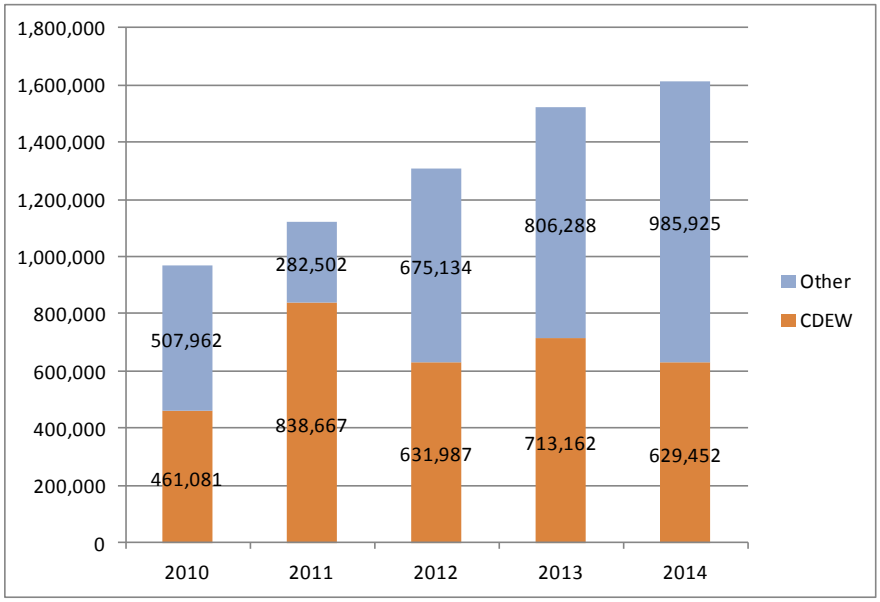

Figure 17: Inputs to Pitsea Landfill over time split by CDEW & Other (Non-inert)

A proportion of the inert material goes into the site via a screening operation while some goes direct as restoration soils. We are advised that all material that goes through the screener is used onsite i.e. none leaves and since the screening operation appears not to be separately permitted, and so does not report separately there is no need to distinguish between inputs that come via the screener and those that go direct to landfill.

2.8.2 The Future Role of Pitsea

In 2014 the landfill was granted an extension to the time limit to achieve completion and restoration to 2025. An additional 2 million m3 of restoration material is predicted to be required to achieve this. Since the site will be progressively restored it seems reasonable to simply divide the total requirement by the number of remaining years is 10 years giving an annual requirement of 200,000 tonnes. In addition to restoration material approximately 10% of inputs may be inert material for operational requirements such as road making and intermediate cover. Taking the total remaining void non-inert projected input of 3.365 million tonnes with a reducing annual input rate gives the results in the Table 19.

Table 19: Projected Inert CDEW Requirements for Pitsea Landfill to 2025

	Non-inert void	Inert Input @ 10% total	10% restoration input	Total inert input
2015	500,000	50,000	181,818	231,818
2016	450,000	45,000	181,818	226,818
2017	405,000	40,500	181,818	222,318
2018	360,000	36,000	181,818	217,818
2019	325,000	32,500	181,818	214,318
2020	290,000	29,000	181,818	210,818
2021	260,000	26,000	181,818	207,818
2022	235,000	23,500	181,818	205,318
2023	200,000	20,000	181,818	201,818
2024	180,000	18,000	181,818	199,818
2025	160,000	16,000	181,818	197,818
Totals	**3,365,000**		**2,000,000**	**2,336,500**

These values have been added to the forecast giving Figure 18 below:

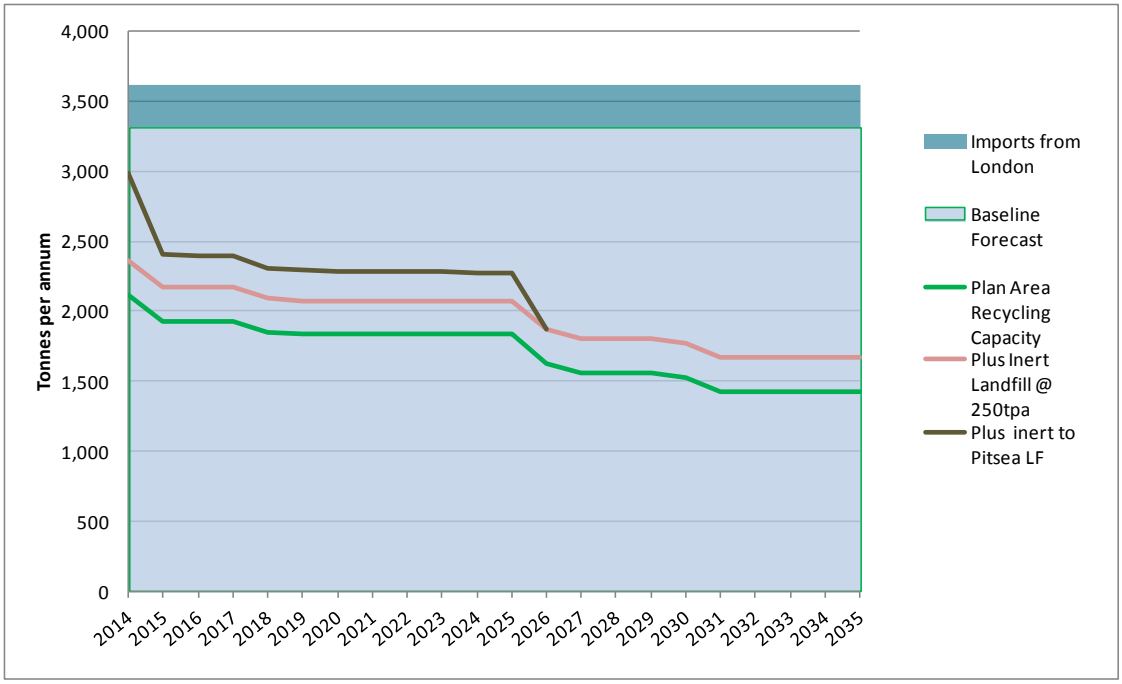

Figure 18: Inert CDEW Management Scenario for Plan Period-baseline capacity plus inert to Pitsea

2.9 Conclusion

There is an apparent shortfall between the Plan Area projected arisings and its current available management capacity in the form of recycling facilities plus inert landfill /backfilling for mineral restoration plus restoration requirements at Pitsea landfill. The shortfall ranges from between 667-907,000 tonnes in 2015 through to 1.4 to 1.6 million tonnes from 2031 onwards depending on the assumed level of recycled aggregate production. The year on year values are presented in Table 20.

Table 20: Inert CDEW Capacity Shortfall to 2035 (000's tonnes)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Baseline Forecast	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311	3,311
Shortfall (Worst Case)	***907***	***912***	***917***	***1,001***	***1,020***	***1,023***	***1,026***	***1,029***	***1,032***	***1,034***	***1,036***	***1,442***	***1,512***	***1,512***	***1,512***	***1,542***	***1,642***	***1,642***	***1,642***	***1,642***	***1,642***

3 Chapter 3: Hazardous Waste Future Capacity Requirements

3.1 Introduction

The term "hazardous waste" is used in England, Wales and Northern Ireland to describe waste with hazardous characteristics as set out in the List of Wastes (LoW) Regulations. Certain types of waste are classed as 'hazardous' because they are considered to possess properties that pose a threat to human health or the environment such as toxicity, flammability, corrosiveness and carcinogenicity. Hazardous waste is a heterogeneous waste stream with different materials arising from many different sources. Due to their differing properties many of the materials require entirely different methods of management. For example, fridges containing CFC gases and cathode ray tubes used in TV and computer monitor screens are classed as hazardous as are oily water, interceptor wastes and scrap ('End of Life') vehicles.

3.2 Calculating a Baseline Arisings Estimate

The Environment Agency's Hazardous Waste Interrogator (HWI) provides data relating to movements of waste consigned as hazardous when it changes hands. This means that hazardous waste consigned between producers and disposal/treatment facilities, as well as most consignments between treatment facilities and final disposal sites are recorded and then made available in the HWI. Where regular movements of similar types of hazardous waste occur these can be reported on an annual 'season ticket' basis. 'Consignment notes' are used to record transfers of hazardous waste and it is the information from these notes that is recorded in the HWI.

The reporting method means that the dataset is incomplete for the following reasons:

- Consignment notes are not issued where waste does not change hands, i.e. where hazardous waste is managed onsite or offsite by the producer or same operator.
- Certain types of hazardous waste may not be consigned by the producer to report the movement to the treatment site. This may only be recorded as hazardous waste on arrival by the receiving site itself. For example End of Life Vehicles which are classed as hazardous waste will not be consigned to a vehicle de-pollution site because the producer (the owner of the vehicle) does not consider it to be hazardous waste and hence it is not recorded in the HWI. However it should be recorded as hazardous waste on arrival at the de-pollution site and hence recorded in the separate Waste Data Interrogator (WDI) as an input of waste to a site with an Environmental Permit.

Both of the above result in under-reporting of arisings in the HWI. However there are aspects of the hazardous waste consignment process that allows for the possibility for double counting in the HWI which leads to over-reporting. For example if waste is moved to an intermediate management site within the Plan Area and then moved on to a further site it will be consigned twice and so double counted. See Appendix 1 for more detailed discussion of the limitations of the primary datasets.

In light of the limitations associated with sole reliance on the HWI data, a number of datasets have been accessed to generate estimates of hazardous waste arisings for the Plan Area as follows:

1. The EA Hazardous Waste Interrogator 2014 - movements.
2. The EA Waste Data Interrogator 2014 – inputs to permitted management sites.
3. The EA Waste Data Interrogator 2014 – outputs from permitted management sites.
4. The EA Pollution Inventory Site outputs 2014 - waste from significant industrial sites.

The results obtained from each dataset are set out below.

3.3 The EA Hazardous Waste Interrogator (HWI) 2014

The EA Hazardous Waste Interrogator 2014 indicates the following:

- In 2014 57,474 tonnes of hazardous waste were produced in the Plan Area;
- Of this, 3,915 tonnes were managed in the Plan Area.
- In addition 13,371 tonnes of waste were imported to the Plan Area to be managed.

3.4 The EA Waste Data Interrogator (WDI) 2014

Inputs from the Plan Area to permitted sites.

The EA WDI indicates the following:

- In 2014 85,496 tonnes of hazardous waste managed at permitted sites (both within and beyond the Plan Area) were attributed to the Plan Area as its source;
- Of this, the EA WDI indicates that 37,150 tonnes were managed in the Plan Area.
- In addition to the 37,150 tonnes of the Plan Area's own hazardous waste arisings that were managed in the Plan Area, 15,389 tonnes of waste were imported for management.

Outputs from the Plan Area permitted sites.

The EA WDI indicates the following:

- In 2014 46,237 tonnes of hazardous waste was removed from EA permitted sites operating within the Plan Area, and 6,316 tonnes went on for further management at sites within the Plan Area. Therefore this latter value should be discounted from the input total as it will otherwise be counted twice i.e. as an output once and then an input.

Closer examination of the datasets on a site by site basis revealed that many values for inputs and outputs are identical which suggests that input values are actually taken from the 'real' output values. This occurs for example for waste received at some facilities, such as Community Recycling Centres, which is not recorded when it is delivered, but will be recorded as an output via records of receipt made at onward permitted management facilities. Nevertheless where they are recorded as outputs from the Plan Area facilities they should be recorded as Plan Area waste.

The data derived from the WDI and HWI referred to is summarised in Table 21:

Table 21: The Plan Area Hazardous Waste Arisings Data Sources

	Plan Area Waste Arisings		Plan Area Management	
Data source	Quantity Managed Attributed to the Plan Area	Of which Quantity Managed outside Plan Area (exports)	Quantity Managed in Plan Area Attributed to the Plan Area	Quantity Managed in Plan Area from outside (imports)
HWI	**57,474**	53,559	3,915	13,371
WDI (inputs to facilities)	**85,496**	48,346	37,150	15,389
WDI (outputs from facilities)	**46,237**		46,237	

Blue indicates values contributing to arisings, pink to Plan Area management capacity

The table clearly shows that less waste is recorded in the HWI (57,474 tonnes) than the WDI input (85,496 tonnes) and this is because the HWI will not capture all hazardous waste movements. Similarly it shows that the WDI 2014 inputs value to Plan area sites (37,150 tonnes) do not capture all waste inputs as the WDI 2014 output value (46,237 tonnes) is higher. This is because inputs to CA sites are not recorded but are recorded as outputs plus other sites that lack weighbridges may not reliably record inputs either. This illustrates the importance of combining or integrating the different datasets to get a comprehensive value.

3.5 Pollution Inventory site inputs

The Pollution Inventory captures hazardous waste arising from certain waste management facilities such as landfills and Energy from Waste plants plus manufacturing installations that may deal with their waste onsite or send their waste for offsite management. This dataset is referred to in this report as the 'EA Pollution Inventory input 2014' values.

This dataset is considered for the following reasons:

1. The HWI may not capture all hazardous waste movements as movements where the waste doesn't change hands don't need to be consigned; and
2. The WDI input dataset doesn't capture movements to facilities that fall outside the mainstream environmental permitting regime such as High Temperature Incinerators (which are captured by the Pollution Inventory); and
3. Both the WDI input and output datasets can be prone to underreporting by misattribution of waste from one area to another or just going uncoded,

A check has therefore been made of data provided by the Environment Agency for facilities that report through the Pollution Inventory. This dataset shows that 5,755 tonnes of hazardous waste was produced by Plan Area installations reporting through this route.

3.6 Integrating the Datasets

A summary for the hazardous waste values for hazardous waste produced within the Plan Area derived from the different data sources described above is set out below in sequential order:

1. WDI inputs of waste arising in the Plan Area: 85,496 tonnes
2. HWI movements of waste arising in the Plan Area: 57,474 tonnes
3. WDI outputs from the Plan Area sites: 46,237 tonnes
4. WDI Input data of sites in Plan Area managing waste arising in the Plan Area: 37,150 tonnes
5. Pollution Inventory Plan Area site outputs: 5,755 tonnes.

In order to utilise the datasets to arrive at useful values it is necessary to go through an integration/ reconciliation process as described in the next sections.

3.7 Integrating WDI input and WDI output values

3.7.1 Top-down method

Assessing these values the following 'top down' methodology using WDI data only is suggested:

As 37,150 tonnes of the hazardous waste indicated by the WDI 2014 input data as arising within the Plan Area is actually managed within the Plan Area, and the WDI output dataset indicates that 6,316 tonnes of outputs was sent on to be managed within Plan Area facilities, to avoid double counting, this output value should be taken away from the WDI input value of 37,150 tonnes, which gives a value of 30,834 tonnes.

The resultant value is still lower than the WDI output value of 46,237 tonnes and since it is considered that the WDI input values under report (as not all inputs are recorded as hazardous e.g. at CRCs), the output value is preferred as a more accurate reflection of the quantity of hazardous waste arising in the Plan Area that is managed at sites within the Plan Area.

To arrive at a total Plan Area arisings value, the output value should then be added to the quantity indicated in the WDI input data as being managed outside the Plan Area as follows: 48,346 tonnes plus 46,237 tonnes = **94,583 tonnes**.

3.7.2 Bottom up method

An alternative approach is to attempt to reconcile the data on a fate-by-fate basis. This addresses the problem that an output from one facility might be counted again as an input to another facility that reports through the WDI. In general, because of lack of resolution in attribution results in under reporting, the higher value is preferred as it is assumed that where values are attributed to the Plan Area it has been done so correctly – this is shown in Table 22.

Table 22: The Plan Area Hazardous Waste Arisings: WDI Input vs. WDI Output Values

Source WDI 2014

Fate	WDI Plan Area Input	WDI output	Preferred Value
Landfill	7,571	7,360	7,571
Transfer	25,365	1,111	25,365
Treatment	27,225	8,964	27,225
Recovery inc MRS	25,335	27,776	27,776
Incineration		62	62
Unknown		964	964
Total	**85,496**	**46,237**	**88,963**

MRS = Metal Recycling Sites receiving End of Life Vehicles for processing

By comparing and combining WDI inputs with outputs in the way shown in Table 22, it is possible to capture some of the missing movements associated with facilities that do not report inputs as comprehensively through the WDI and other facilities such as high temperature incinerators. At this stage the emerging preferred value of 88,963 tonnes is slightly lower than that derived through the top down method (94,583 tonnes).

3.7.3 Integrating WDI and Pollution Inventory values

As mentioned above, this dataset shows that 5,755 tonnes of hazardous waste was produced by Plan Area installations reporting through this route. Further analysis of the Pollution Inventory dataset reveals the following:

- 374 tonnes of hazardous waste from these sources goes to landfill.
- 1,415 tonnes of hazardous waste from these sources is subject to storage or repacking activity that is just a precursor to further management so should be discounted to avoid double counting.
- 2,424 tonnes of hazardous waste from these sources is subject to recycling or reclamation, which would generally require specialist treatment off-site.
- 528 tonnes of hazardous waste from these sources is subject to biological, physical or chemical treatment, which may take place on-site at effluent treatment plants for example.
- 1,531 tonnes of hazardous waste from these sources is subject to thermal treatment or use as a fuel which may take place onsite if there is a combustor powering a manufacturing unit or offsite at a high temperature incinerator or cement kiln.

It should be borne in mind where a facility reports inputs of hazardous waste through the WDI it is possible that outputs from sites reporting via the Pollution Inventory are counted already in the data for those sites. If Pollution Inventory output values for facility types that also report through the WDI are greater than the actual WDI input values this indicates a shortfall in reported inputs to permitted facilities in the WDI.

Stage 1: Eliminate risk of double counting between WDI Outputs and wm installations reporting through Pollution Inventory.

Table 23: Plan Area Hazardous Waste Arisings: WDI Output vs. Pollution Inventory (WM facility) values
Source WDI 2014 plus Environment Agency PI

Fate	WDI output	Pollution Inventory waste sector only	Preferred Value
Landfill	7,360	7	7,360
Transfer	1,111	903	1,111
Treatment	8,964	228	8,964
Recycling/Recovery	27,776	170	27,776
Incineration or use as fuel	62	113	113
Unknown	612		612
Total	**45,885**	**1,423**	**45,936**

As shown above, since in all but the case of thermal treatment (incineration or use as fuel), the values given in the WDI outputs are greater than the PI outputs, the WDI outputs dataset has been favoured.

Having eliminated the scope for double counting caused by waste management facilities that report twice – once through the Pollution Inventory and once through the WDI, the following reconciliation exercise has been undertaken.

Stage 2*:* Add WDI Outputs with non wm sector Pollution Inventory Outputs

Since the outputs from both sets of facilities are separate they should be added together.

Table 24: The Plan Area Hazardous Waste Arisings: WDI Output vs. Pollution Inventory values
Source WDI 2014 plus Environment Agency PI

Fate	Values from Table 23	Pollution Inventory minus wm	Combined Value
Landfill	7,360	367	7,727
Transfer	1,111	510	1,621
Treatment	8,964	301	9,265
Recycling/Recovery	27,776	2,253	30,029
Incineration or use as fuel	113	1,418	1,531
Unknown	612		612
Total	**45,936**	**4,849**	**50,785**

Stage 3: Reconcile Resultant Data with WDI Input data

Table 25: The Plan Area Hazardous Waste Arisings: Table 23 Values vs. WDI Input
Source WDI 2014 plus Environment Agency PI

Fate	Values from Table 24	WDI Plan Area Input	Preferred Value
Landfill	7,727	7,571	7,727
Transfer	1,621	25,365	25,365
Treatment	9,265	27,225	27,225
Recycling/Recovery	30,029	25,335	30,029
Incineration or use as fuel	1,480	0	1,480
Unknown	612	0	612
Total	**50,785**	**85,496**	**92,438**

Where there is a value for WDI input greater than the combined value from Table 23 then that it is assumed to capture inputs not recorded in the other combined sources (because of greater attribution resolution) and has therefore been preferred.

3.7.4 Reconciling Combined values with HWI movement values

Scrutiny of the WDI data reveals that it under reports due to lack of attribution of all inputs. Indeed, some 4,450 tonnes of hazardous waste received at facilities reporting through the WDI are not attributed to an arisings location below the level of East of England and, with the WDI showing an additional 115,700 tonnes not attributed across the UK, there is plenty of scope for the WDI and the Plan Area specific input data to under report arisings. Therefore the resultant values have been compared with the HWI dataset and process of priority given to the larger value in the expectation that this captures movements unattributed in the WDI dataset.

Stage 4: Reconcile Resultant Data with HWI Input data

Table 26: The Plan Area Hazardous Waste Arisings: Table 23 values vs. HWI values
Source WDI 2014 plus Environment Agency PI+HWI 2014

Fate	Table 25 Value	HWI Plan Area Movement	Preferred Value
Landfill	**7,727**	**23,046**	**23,046**
Transfer	**25,365**	**17,521**	**25,365**
Treatment	**27,225**	**5,150**	**27,225**
Recycling/Recovery	**30,029**	**13,338**	**30,029**
Incineration or use as fuel	**1,480**	**5,409**	**5,409**
Unknown	**612**		**612**
Total	**92,438**	**64,464**	**111,686**

Therefore it is suggested that the quantity of hazardous waste managed that arises in the Plan Area could be in the region of 112,000 tonnes (rounded). If the quantity transferred within the Plan Area (c19,000 tonnes) is ignored (to avoid double counting) then the 'true' value of waste arising from the Plan Area is estimated to be around 93,000 tonnes per annum.

This report proceeds on the basis that the integrated values arrived at are the most accurate available and therefore 93,000 tonnes is taken as the quantity of hazardous waste arising in Essex and Southend on Sea requiring management.

3.8 Hazardous Waste Management Capacity in the Plan Area

The following section addresses the management routes followed by hazardous waste managed within the Plan Area. This provides a basis from which the baseline existing capacity might be established from which a specific need might be identified when looking at particular waste streams.

Comparison of the input and outputs shown in the WDI 2014 data indicates that around 62,000 tonnes of hazardous waste was managed at Plan Area sites as shown in Table 21. The breakdown of flows by facility type within the Plan Area is shown in Table 27 below.

Table 27: Categories of Facilities Managing Hazardous Waste in the Plan Area
Source WDI 2014

Category	Facility Type	WDI 2014 Inputs	WDI 2014 Outputs	Quantity Managed
Landfill	Non Haz (SNRHW) LF	362	n/a	362
	Non Hazardous LF	9	n/a	9
Metal Recycling	Car Breaker	12,646	6,531	12,646
	Vehicle Depollution Facility	6,551	604	6,551
	Metal Recycling	2,281	2,717	2,717
Transfer	CA Site	110	8,539	8,539
	Clinical Waste Transfer	29	29	29
	Haz Waste Transfer	24,092	24,102	24,102
	Non-Haz Waste Transfer	2,372	3,020	3,020
Treatment	Material Recycling Facility	224	137	224
	Physical Treatment	3,842	253	3,842
	WEEE treatment facility	20	242	242
	Inert Waste Transfer	0	54	54
	Physical-Chemical Treatment	0	8	8
	Grand Total	**52,539**	**46,237**	**62,345**

Comparing this value (62,345 tonnes) with the value estimated for Plan Area arisings (93,000 tonnes) suggests that, Plan Area facilities are currently managing the equivalent of just less than 67% of the quantity of hazardous waste arising within the Plan Area.

The types of facility making a significant contribution to Plan Area capacity can be identified from Table 27 above with the following sites identified as the principal contributors to management of hazardous waste within the Plan Area:

Table 28: Principal Plan Area Facilities Managing Hazardous Waste

Source WDI 2014

Facility Name	WDI 2014 Inputs	WDI 2014 Outputs	Combined	% contribution	cum %
Drovers Way	15,368	15,368	15,368	24.7%	
Cohart Asbestos Disposal Ltd	4,593	4,619	4,619	7.4%	32%
Basildon Waste Treatment Centre	3,821		3,821	6.1%	38%
Autobreak (Colchester) Ltd	3,517		3,517	5.6%	44%
Roachside Recycling Centre	3,079		3,079	4.9%	49%
Good Companions Garage	2,913		2,913	4.7%	53%
Coxtie Green Civic Amenity Site		2,494	2,494	4.0%	57%
Unit 12a Rawreth Industrial Estate	2,189		2,189	3.5%	61%
Eastern Waste Disposal Ltd	1,921		1,921	3.1%	64%
Clearaway Waste Transfer Station		1,620	1,620	2.6%	67%
Brickfields Way, End Of Life Vehicle Facility		1,504	1,504	2.4%	69%
G & L Auto Spares	1,430		1,430	2.3%	71%
S M H Products Ltd (London Branch)	1,195	1,187	1,195	1.9%	73%
Safetykleen Uk	1,051	1,051	1,051	1.7%	75%
Nationwide Metal Recycling	1,034		1,034	1.7%	77%

Further assessment of these sites is provided below:

1. The Drovers Way Transfer site is identified as the most significant contributor managing just less than 25% of the total reported inputs (15,500 tonnes) in 2014. The waste managed at this facility was primarily WEEE (11,888 tonnes) and fridges (3,480 tonnes) all of which came from within the Plan Area. The WEEE is reported as being transported to Lincolnshire for recovery, while the fridges are transported to London Borough of Havering for recovery.
2. The Cohart Asbestos Disposal site sends asbestos waste to landfill outside the Plan Area.
3. The Basildon Waste Treatment Centre is the only significant processing site. It receives both hazardous and non hazardous liquid waste from locations across Southern England with around half coming from the Plan Area. The hazardous input represented 30% total input in 2014 according to the WDI. It is not clear if the proportion of capacity is fixed or variable (e.g. due to the nature of the processes)

4,5,6. Autobreak (Colchester) Ltd, Roachside Recycling Centre and Good Companions Garage all receive End of Life vehicles for depollution.

7. Coxtie CA Site is a transfer site for LACW delivered by the public.
8. Unit 12a is an ELV depollution facility
9. Eastern Waste Disposal is recorded as a Non Hazardous Waste Transfer Station. Comparison of the inputs (1,921 tonnes) with the declared hazardous outputs (62 tonnes) indicates that separation of asbestos sheeting from mixed CDEW loads is occurring.

3.9 Summary Of Plan Area Hazardous Waste Management Capacity Assessment

Overall the well-developed network of End of Life vehicle treatment capacity represents the bulk of hazardous waste treatment capacity within the Plan Area, with the Basildon Waste Treatment Centre providing a potentially significant contribution to the wider region for the management of hazardous liquid waste.

3.10 Hazardous Waste Flows

This section considers how hazardous waste arising in the Plan Area is managed at different facilities beyond the Plan Area. It considers the following:

- Destinations of Hazardous Waste from Plan Area going for Incineration
- Out of Plan Area Landfills to which 100 tonnes or more of Plan Area Hazardous Waste was transported for management
- Destinations of Hazardous Waste (taking circa 500 tonne) from the Plan Area going for Treatment

Data was obtained from the combined datasets (WDI plus HWI) and the results are set out in Tables 29 and 30 below:

Table 29: Destinations of Hazardous Waste from Plan Area going for Incineration (2014)

Facility WPA	Site Name	Total
Bexley	Queen Mary's Hospital,	220
Birmingham City	Minworth Wastewater Treatment Works	253
Cambridgeshire	Vetspeed, Thriplow	572
Cheshire West and Chester	Ellesmere Port Incinerator	1,080
Doncaster	Trackway Ltd Kirk Sandall	299
Hampshire	Tradebe Fawley HTI	137
Kent	William Harvey Hospital Incinerator	1,023
Slough	Grundon Incinerator Colnbrook	62
Suffolk	Ipswich Clinical Waste Incinerator	1,716
Avonmouth	Avonmouth Drum Incinerator Pack2Pack UK Ltd	81
Grand Total		**5,446**

Table 30: Out of Plan Area Landfills receiving 100 tonnes + of Plan Area Hazardous Waste in 2014.

Facility WPA	Site Name	Total
Kent	Pinden Quarry	4,150
Suffolk	Folly Farm	7,251
Surrey	Redhill (Biffa)	1,794
Northamptonshire	East Northants Resource Management Facility	687
Oxfordshire	Ardley Landfill	101
Peterborough	Eye North Eastern Landfill	1,375
	Thornhaugh Landfill Site	2,456
Dudley	Himley Quarry Landfill Site	1,530
Redcar and Cleveland	ICI No 3 Teesport	3,345
	Grand Total	22,688

Table 31: Destinations of Hazardous Waste (taking circa 500 tonne) from the Plan Area going for Treatment (2014)

Table 31 shows that 19 sites account for 85% of the total quantity of hazardous waste going for treatment from the Plan Area. The only site within the Plan Area - Basildon Waste Treatment Centre listed is ranked second. The remaining 15% is managed at a further 16 sites.

Facility WPA	Site Name	Facility Type								
		Biological Treatment	Chemical Treatment	Clinical Waste Transfer / Treatment	Material Recycling Facility	Physical Treatment	Physical-Chemical Treatment	WEEE treatment facility	Total	Cum total
Cambridgeshire	Reclaimed Appliances (U K) Ltd							2,346	2,346	2,346
Essex	Basildon Waste Treatment Centre					2,247			2,247	4,593
Kent	CSG Aylesford Treatment Plant						2,106		2,106	6,699
Suffolk	Hollywell Waste Oil Facility						1,588		1,588	8,287
Richmond Upon Thames	*Arlington Oil Reclamation Facility (Sharpes)*								1,575	9,863
North East Lincolnshire	S A R Recycling Ltd				1,550				1,550	11,413
Hertfordshire	Redbournbury Treatment Plant					1,264			1,264	12,677
Medway	Kingsnorth Oil Treatment Centre, Rochester				1,161				1,161	13,838
Nottinghamshire	Bilsthorpe Oil Treatment Plant						1,062		1,062	14,900
Bedford	Stewartby Waste Management Facility		1,053						1,053	15,953
Northamptonshire	East Northants Resource Management Facility						942		942	16,896
Wakefield	Eco House							868	868	17,763
Bexley	Meridian Technical Services					775			775	18,538
Havering	Rainham Clinical Treatment Centre			759					759	19,297
Kent	Sittingbourne Weee Recycling Facility				650				650	19,947
Lincolnshire	Spittlegate Level Facility					537			537	20,484
Leeds	Wastecare Limited Valley House					504			504	20,988
East Sussex	Unit 18 & Unit 19 Cliffe Industrial Estate Lewes					497			497	21,485
Derbyshire	Castle Waste Services Treatment Centre						490		490	21,975

3.11 Analysis of Flows by Fate

The pattern or profile of management of hazardous waste produced in the Plan Area is illustrated in Figure 19 below.

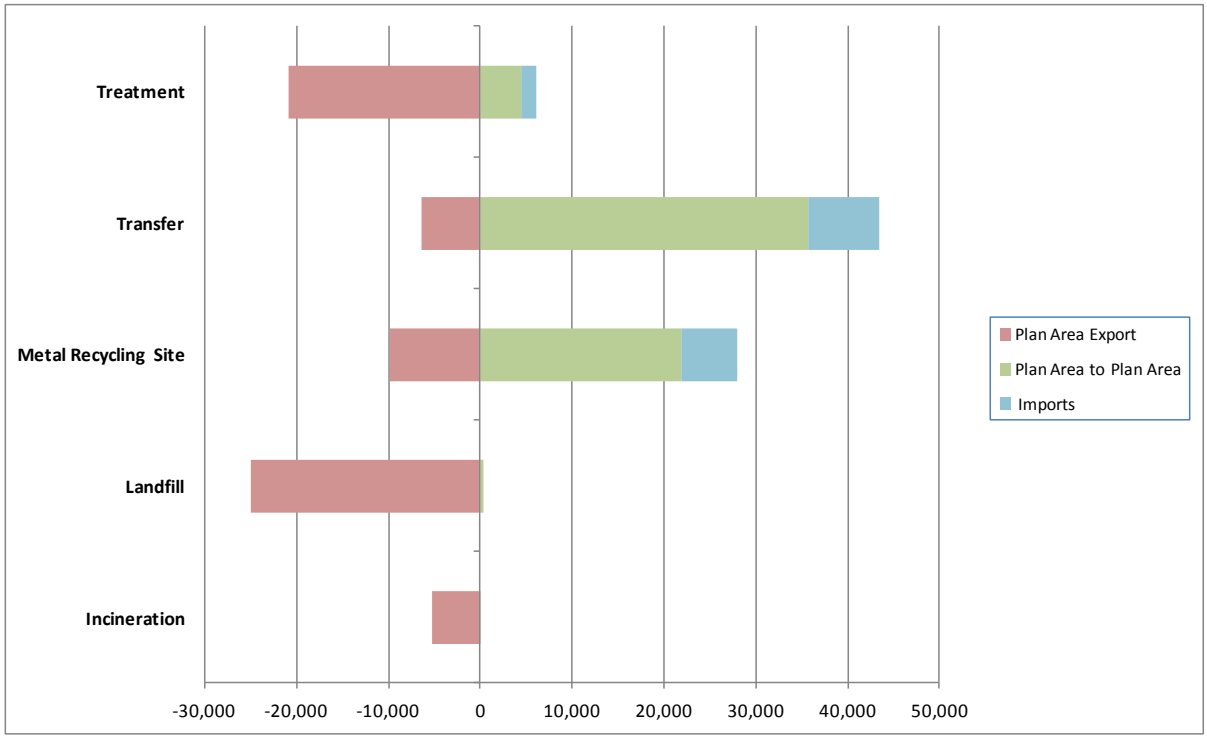

Figure 19: Hazardous Waste Management Route Flows Profile 2014

This figure illustrates that while there is substantial capacity available to process the principal hazardous waste stream arising in the Plan Area (End of Life Vehicles), it is the lack of Plan Area treatment and landfill capacity that means the Plan Area does not currently achieve net self-sufficiency for hazardous waste. To inform the 'Duty to Cooperate' exercise, an analysis of the main management routes for hazardous waste arising in the Plan Area has been completed and this is set out below.

3.12 Mapping Movements

The combined dataset was analysed to identify facilities outside the Plan Area receiving more than 100 tonnes of hazardous waste in 2014. This may be a single stream or combination going to a single facility. The results are mapped in Figure 20.

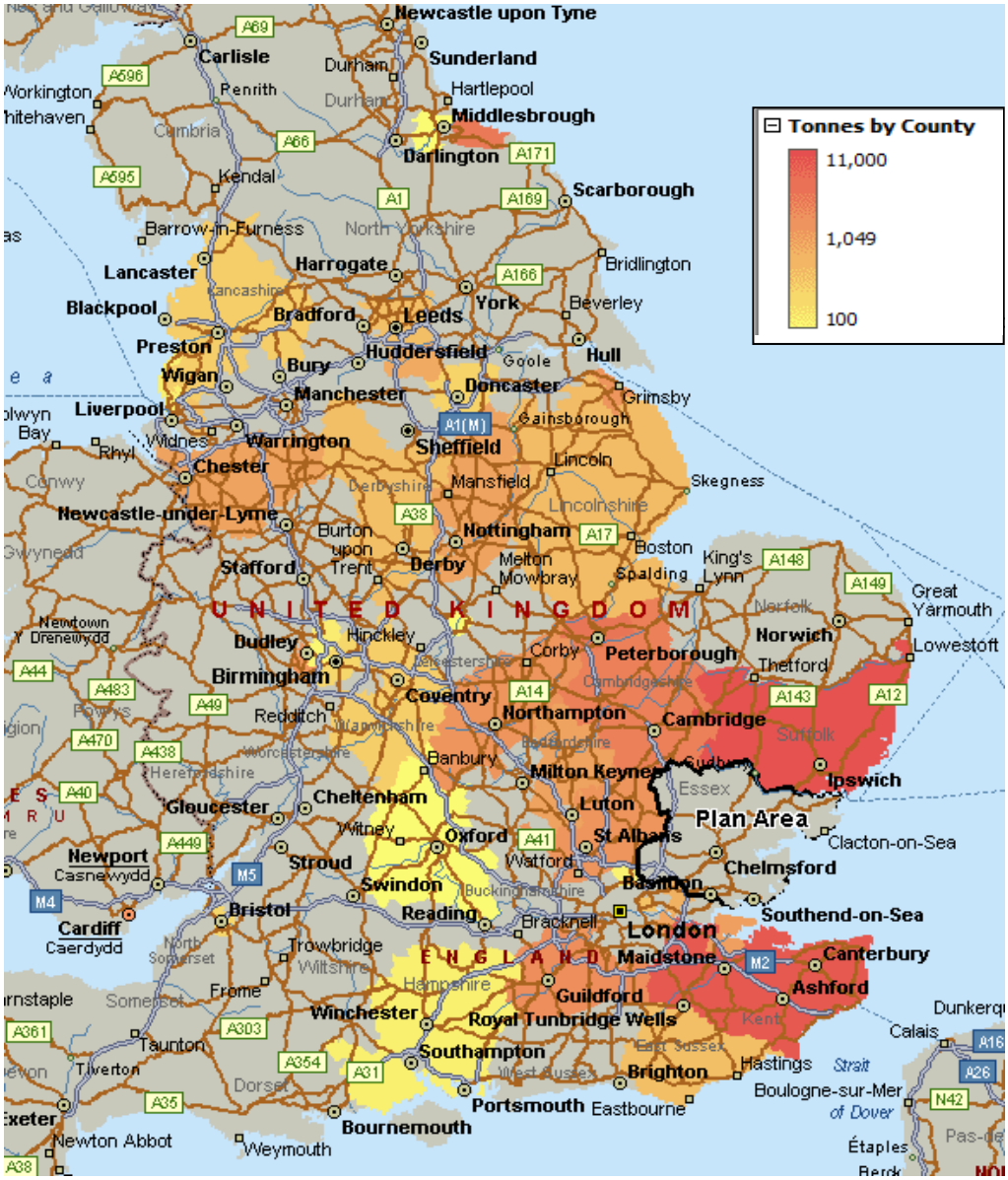

Figure 20: Essex & Southend on Sea Hazardous Waste Exports 2014 Mapped by Tonnes & Receiving WPA

The Duty to Cooperate exercise initiated should establish the long term resilience of these arrangements recognising that where there are alternative facilities these may fill any gap and against a backcloth that there is no policy expectation that individual Plan Areas need to seek to be net self sufficient for the management of this stream.

3.13 Current Management Profile

This section is intended to identify potential future requirements for capacity need to ensure the management of hazardous waste over the Plan period.

3.13.1 Landfill

The combined dataset indicates that, in 2014, only 371 tonnes of hazardous waste was disposed of to Plan Area landfill (Table 26). This compares with 22,288 tonnes of hazardous waste arisings reported as going for disposal to landfill from the Plan Area in total (Table 25), indicating that 21,917 tonnes of waste was exported. This imbalance is due to the fact that the Plan Area apparently has no dedicated landfill capacity designated to receive hazardous waste.

Closer examination of the WDI 2014 input data set and comparison with the HWI 2014 dataset reveals that in 2014 100 tonnes or more of hazardous waste from the Plan Area was managed at 8 landfill sites distributed around England as follows:

Table 32: Landfills to which 100 tonnes + of Plan Area Hazardous Waste went in 2014 with tonnages and waste types

Landfill Site	Reported Tonnes Received	Principal Waste Type	WPA
Himley Quarry	624	Contaminated Soil	Dudley
East Northants Resource Management Facility	2,352	Contaminated soil, filter cake and asbestos materials	Northamptonshire
Ardley	106	Asbestos materials	Oxfordshire
Thornhaugh	2,000	Contaminated soil/ asbestos materials	Peterborough
ICI No3 Teesport	3,905	Mixtures of demolition waste	Redcar & Cleveland
Pinden Quarry	4,150	Asbestos materials	Kent
Folly Farm Landfill	7,251	Asbestos materials	Suffolk
Redhill Landfill	1,900	Asbestos materials	Surrey

Confirmation of the continuing availability of capacity at the above sites via DtC enquiry and/ or identification of suitable alternatives and/or provision for additional capacity within the Plan Area should all be considered.

This site-by-site analysis actually indicates that a greater tonnage than either single data source suggests, was landfilled, amounting to 22,288 tonnes. This has the following breakdown by waste type:

- Asbestos materials: 15,347 tonnes
- Mixtures of demolition waste: 3,727 tonnes
- Contaminated soil: 3,526 tonnes

The prevalence of asbestos based material in the Plan Area waste going to landfill has a bearing when considering the case for the establishment of a stable non reactive hazardous waste cell within a Plan Area landfill as has been proposed at Crumps Farm Uttlesford.

3.13.2 Incineration

In contrast to landfill a total of 5,446 tonnes was sent to incineration in 2014 the bulk of which being clinical waste (Table 29 Section 4.10). Such a tonnage does not constitute a critical mass of materials to justify provision of a dedicated facility so it is unlikely that provision for such a facility would actually be deliverable. It should be noted that in this context the majority of clinical waste incinerators are located on and serving hospital sites that were upgraded to meet modern emission standards when crown immunity was removed for such facilities in the 1990s.

3.13.3 Treatment

Due to the heterogeneous nature of hazardous waste it is not appropriate to simply assess provision of an additional facility against to total tonnage shortfall indicated of circa 35,000 tonnes. Instead it is necessary to undertake more in depth investigation of the nature of waste being sent to different types of facilities to see if a critical mass might exist for a particular waste stream.

3.13.4 Principal Waste Streams

An analysis of the main waste streams arising within the Plan Area has been undertaken. Over a 100 waste types are reported by LoW codes arose within the Plan Area in 2014. Applying the 100 tonne threshold of 'significance' to screen out, just over 40 waste types account for over 97% of arisings managed. As a number of specific wastes have similar characteristics it is helpful to group the wastes into categories. This illustrates commonalities between different waste types with similar management needs. The results are showing in Table 33 below.

Table 33: Plan Area Hazardous Waste Produced in 2014 Grouped by Source/Nature

	Manufacturing	Maintenance	Incidental	ELV	CFC	Construction	Healthcare	Waste Processing	WEEE	Oil	Total by Fate
Landfill	50	0	4	0	0	22,985	0	6	0	0	**23,046**
Metal Recycling	4	7	0	24,463	620	0	0	0	138	0	**25,232**
Transfer	733	2,941	721	645	4,087	2,930	211	0	12,170	0	**24,437**
Treatment	4,400	4,796	667	2,936	1,391	1,425	919	517	4,257	6,110	**27,419**
Incineration	1,378	0	91	0	0	361	3,579	0	0	0	**5,409**
	6,565	**7,744**	**1,483**	**28,044**	**6,099**	**27,701**	**4,709**	**523**	**16,565**	**6,110**	**105,544**

Note values do not correspond directly with other tables due to data source integration.
If transfer within the Plan Area is excluded total is 87,000 tonnes.

Table 33 shows the profile of hazardous waste produced and provides a basis to establish possible future management need bearing in mind that different types of waste require different types of capacity.

3.14 Forecasting Future Arisings

Due to frequent changes in the definition of hazardous waste and refinement of guidance, reliance on historical data to establish possible future trends is not considered reliable. Reference has been made to The National Policy Statement for Hazardous Waste[15] for some guidance and considerable reliance has been placed on expert judgement in the process of generating forecast estimates for the Plan Area.

The National Policy Statement for Hazardous Waste states that arisings of hazardous waste are expected to increase for the following reasons:

- Continuing consumer demand means that hazardous waste will continue to arise as consumer durables containing hazardous materials are discarded.
- Increasing use of producer responsibility schemes , such as those provided for Waste Electrical and Electronic Equipment (WEEE) which require the separate collection of WEEE resulting in more hazardous items being removed from the mixed municipal waste stream, collected separately as hazardous waste.
- Changes to the list of hazardous properties in the revised Waste Framework Directive and changes to the European Waste List, lead to further increases in the amount of waste that must be managed as "hazardous".
- There are still uses in which components that become hazardous waste may be unavoidable for the foreseeable future. For example the use of oil in internal combustion engines.

While Planning Practice Guidance advises to extrapolate future arisings based on extrapolating time series data, because the definition of hazardous waste has tightened over time (and regulatory guidance continues to refine its scope) it is not possible to do so. Also as the baseline calculation methodology demonstrates, simple reliance on the Hazardous Waste Interrogator would significantly underestimate arisings. Therefore an approach based on generating growth factors for the principal waste types by identifying possible inhibitors and promotors of growth over the next 20 years has been applied to the baseline breakdown. Those factors have been assessed as to whether a decline, increase or no growth may result. Annual % growth rates have been assigned to arrive at estimates for arisings in 2032. This gives a total forecast arising in 2032 of 113,000 tonnes - a rise of 7% on the 2014 baseline estimate of tonnes managed of circa 106,000 tonnes. The equates to a compound annual growth rate of 0.4% per annum. Forecasts are presented in Table 34.

[15] National Policy Statement for Hazardous Waste: A framework document for planning decisions on nationally significant hazardous waste infrastructure Defra June 2013

Table 34: Estimated Forecast Arising of Hazardous Waste in Essex & Southend on Sea at 2032

NB: projected growth rates based of judgement

	Tonnes Produced 2014	Principal Source	Key Factors		Predicted Direction of Production	Factor (% pa)	Predicted quantity at 2032
			Promoter	**Inhibiter**			
Oil Residue	7,744	Surface Water Protection/ Pollution control system	Tighter regulatory control on risky sites; Increased rainfall due to climate change (more frequent emptying)	Improved spillage control; Reduced number of petrol stations	Moderate Increase	2.00%	11,281
Oil based	6,110	Transport	Greater reliance on central distribution & internet shopping; Increase in car ownership and use.	Rising fuel cost (offset by fuel duty escalator); Rising cost of management of waste with pressure to regenerate over use as fuel. Improved vehicle efficiency.	Significant rise	5.00%	15,441
CFC based	6,099	Refrigeration Equip	Fridge replacement	Fall in CFCs based stock	Rapid decline	-10.00%	824
Maufacturing	6,565	Paints & inks & cleaners		Regulatory control on solvent emissions & use	Steady decline	-5.00%	2,477
Construction	27,701	Pre 2000 Building stock - refurbishment & demolition	Increase in demolition with increase pressure for residential provision on previously developed sites.	Reduction of amount of asbestos embedded in stock	Stable for 10yrs then steady decline	-2.00%	18,871
WEEE based	16,565	TVs & Monitors	Producer Responsibility & switch to Flat Screen	Fall in CRT base stock (rise in flat screens)	Steady decline	-5.00%	6,251
ELV based	28,044	Existing vehicle stock	Increase vehicle sales displace existing stock	ELV directive pressure to improve recyclability may encourage switch to use of less hazardous materials; Longevity of vehicles improve	Moderate Increase	2.00%	40,855
Infectious	4,709	Clinical Sources	Infection control pressure	Improved source segregation driven by cost reduction pressure	Stable	0.00%	4,709
Specific	1,483	One-offs		Reduction driven by cost	Stable	0.00%	1,483
Unknown/ Various	523	Unknown		Reduction driven by cost	Stable	0.00%	523
							102,715
Expansion of Haz Waste Definition						10.00%	10,272
Total	105,544						**112,987**

3.15 Cross Checking Future Arisings Estimate with Other Studies

A regional study[16] undertaken for EERA produced in 2007 was to inform regional planning and, while it is strategic in nature, it does shed some light on the position in Essex & Southend-on-Sea.

Total hazardous waste production in 2004/05 was estimated to be 62,403 tonnes. However it should be noted that this baseline value relied on the Hazardous Waste Interrogator so can be expected to have under reported arisings as it will not have counted hazardous waste going directly to permitted sites that are not consigned.

It explored two growth scenarios using the following growth rates:
Scenario 1. Economic Growth (as used in regional statement for C&I) 3% pa ;
Scenario 2. Waste Strategy 2007 rates 2.6% pa for commercial, 0% for industrial.

Figures generated for scenario 1: 86kte by 2015, **100kte** by 2020
Figures generated for scenario 2: 78kte by 2015, **87kte** by 2020

While the annual growth rate of 0.4% indicated through the bottom up exercise is significantly lower than those used above, it starts from a significantly higher baseline (based on a more comprehensive assessment of the datasets) and so is still considered to be within reasonable realms. It should also be noted that the 2014 baseline estimate of around 93kte sits just above the values predicted for 2015 by EERA even though those predictions were based on an initial value derived from a single incomplete data source.

3.16 Possible Future Capacity Requirements

As hazardous waste is a 'catch all' term for a range of wastes that generally occur within each WPA area in relatively small quantities, to reach a 'critical mass' of inputs to make a facility viable, facilities to manage hazardous waste normally rely on catchments well beyond a particular WPA area. This means that assessments of need confined to a Plan Area alone are unlikely to be helpful in planning for the development of additional capacity. That is to say, if each WPA in assessing arisings in isolation determines their local need to be insufficient to justify further provision within their Plan Area, then it is unlikely that additional specific capacity will be promoted for development. However, across a wider area there may well be sufficient waste that constitutes a critical mass to justify investment in a new facility. Therefore, to contextualise the possible future hazardous waste management need within the Plan Area it is necessary to consider the wider context.

[16] Hazardous Waste Study for the East of England Final Study Report October 2007

3.17 National Strategy

The national position as stated in the Government *Strategy for Hazardous Waste Management in England (2010)'* considered the future need for new hazardous waste facilities in England and set out the types of facility required. The Strategy determined that the following generic types of facility would likely be required:

1. Facilities to treat oily wastes and oily sludges
2. Waste electrical and electronic equipment plants
3. Oil regeneration plant
4. Bioremediation / soil washing to treat contaminated soil diverted from landfill
5. Hazardous waste landfill
6. Treatment plant for air pollution control residues

Each of these requirements are considered in more detail below:

3.17.1 Facilities To Treat Oily Wastes And Oily Sludges

This forms the largest stream of hazardous waste in England and the national strategy identified a need for additional facilities to allow a higher proportion of this waste to be recovered. Thermal desorption is one possible technique for treating this type of waste.

Some merchant capacity already exists within the Plan Area to manage this stream offering up to 13,000 tonnes of treatment capacity (although only just less than 4,000 tonnes was utilised for this waste type in 2014). Examination of the combined dataset indicates that just over 16,000 tonnes of waste of this type was generated within the Plan Area in 2014.

3.17.2 Oil Regeneration Plant

The national Strategy identifies a need for further capacity for recycling used lubricants to a very high level back into base lubricating oil. At present, most waste oil is processed into a fuel substitute and used for energy recovery. However, to realise the benefits of moving the management of this waste up the waste hierarchy, capacity for the regeneration of waste oil needs to be increased. Any oil regeneration plant is likely to need a capacity of at least 70,000 tonnes per annum to be viable and new facilities are therefore expected to constitute nationally significant infrastructure. Examination of the combined dataset indicates that just over 6,000 tonnes of waste of this type was generated within the Plan Area in 2014. Much of this arises from the depollution of End of Life vehicles so represents an output from the permitted estate.

3.17.3 Waste Electrical & Electronic Equipment Plants

While there is sufficient capacity nationally to deal with refrigerators and CRT based WEEE, the quantity of which will diminish over time as stock changes, there is a growing need for specialist facilities to treat the Flat Panel Displays (containing mercury) used in some computer monitors, TVs and laptops. Existing facilities for the more general treatment of waste electrical and electronic equipment have not been designed to deal with this waste stream because Flat Panel Displays are relatively new and have only recently started to be discarded as waste.

Technologies for managing Flat Panel Displays are currently under development and are expected to require a large investment, which is likely to drive the development of a small number of larger facilities to manage the expected arisings.

Examination of combined dataset indicates that 23,000 tonnes of hazardous WEEE inc CFC containing equipment was generated within the Plan Area in 2014. Virtually all of which was all transferred on for processing outside the Plan Area.

3.17.4 Bioremediation / Soil Washing To Treat Contaminated Soil From Landfill

While the National Strategy identifies a need for greater capacity to treat contaminated soil. It is hard to predict what quantities may arise should construction activity revive to pre 2008 levels – and/or to meet planned housing growth. While some soil will be treated by mobile plant at the site of production, some will need to be treated off-site and there remains a need for dedicated permanent facilities including some specialist landfill.

Examination of the combined dataset indicates that 3,500 tonnes of soil classed as hazardous was sent to landfill from the Plan Area in 2014. In view of the historical industrialised nature of parts of the Plan Area, it may be that land classed as contaminated may require remediation prior to redevelopment. However this may be undertaken using mobile plant deployed on the site of production itself.

3.17.5 Hazardous Waste Landfill

Since the implementation of the Landfill Directive hazardous waste can only be disposed either to a dedicated hazardous waste landfill site or into a cell within a non-hazardous waste landfill site. In the latter case the types of waste are restricted to 'stabilised non-reactive hazardous waste' only. Hence the cells are referred to as SNRHW Cells.

The national Strategy also includes a principle to reduce reliance on landfill, which is that it should only be used where, overall, there is no better recovery or disposal option. In the case of certain waste streams such as asbestos, alternative solutions to landfill are not fully developed so it remains the preferred solution.

Examination of combined dataset indicates that 3,700 tonnes of mixtures of demolition waste classed as hazardous was generated within the Plan Area in 2014 all of which went to landfill. In addition 15,347 tonnes of asbestos based material was either sent direct to landfill or via Plan Area transfer stations.

There was only a single landfill accepting hazardous waste in the Plan Area within a separate cell at Brittons Hall Farm and this site has now closed. The nearest such alternative facility with a separate asbestos cell is in Suffolk (Folly Farm). The nearest hazardous merchant landfill is in Northamptonshire.

3.17.6 Treatment Capacity For Air Pollution Control Residues

There is a need for further facilities to treat the Air Pollution Control (APC) residues that arise from the treatment of flue gases from energy from waste plant (EfW) and other combustion plant e.g. large biomass burners. Arisings are expected to increase significantly in future years as more EfW facilities are developed nationally.

While historically hazardous waste landfill has been extensively used for this waste stream following 'conditioning', reliance on this solution for the future would be misplaced as the activity benefited

from a temporary EU derogation from compliance with the 'Waste Acceptance Criteria' specified in the EU Landfill Directive. The Government Strategy committed to eliminating reliance on this derogation by the end of 2013 so now 'special case' status will need to be sought in order to continue the practice on a site-by-site basis. Therefore alternative routes will need to be established. A number of different treatment options exist for APC residues including solidification and vitrification.

There is currently no combustion capacity operational within the Plan Area, with a preference having been made for MBT solutions to the LACW contract, and there is no consented mass burn capacity so no current predicted need for management of this waste stream arising within the Plan Area emerges. Any proposal for advanced thermal treatment will have its own residue management needs that may be catered for through a planning and permit application.

3.17.7 Projecting the Capacity Gap

While there is no policy requirement for every plan area to be self sufficient in management capacity for hazardous waste produced, there is an expectation that WPAs will contribute towards the creation/maintenance of an overall network of facilities so that in totality hazardous waste is managed effectively.

If one applies an objective of net self sufficiency to this waste stream a shortfall of circa 43,200 tonnes capacity is already apparent, assuming that Plan Area throughput equates to Plan Area capacity. Projecting that shortfall through the Plan period against the forecast rise in arisings gives the trend presented in Figure 21.

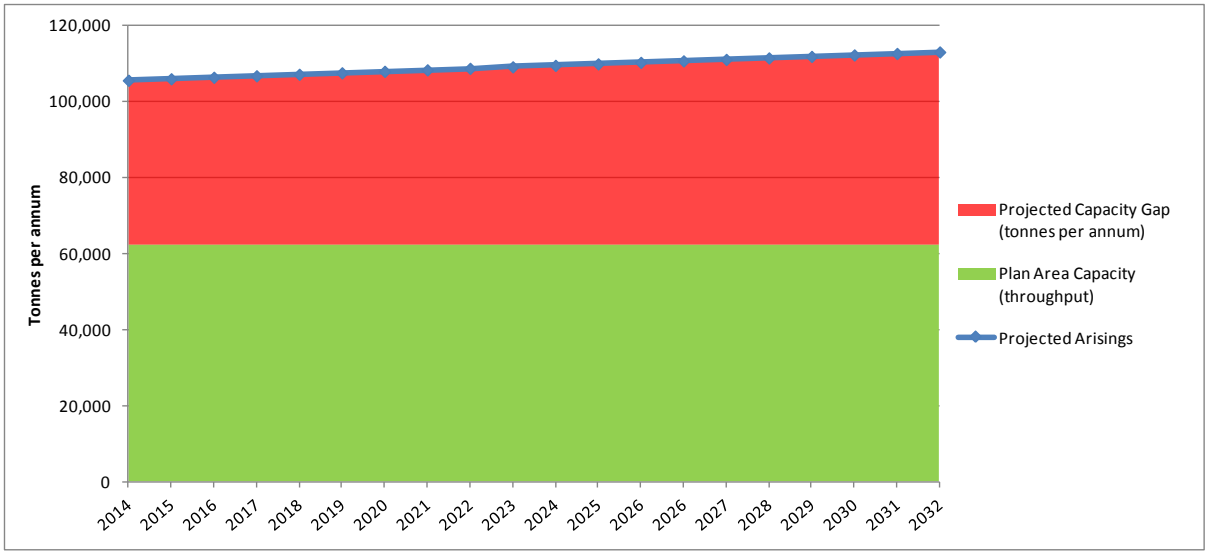

Figure 21: Projected Capacity Gap for Hazardous Waste Management in Essex & Southend on Sea

The projected year on year capacity gap is shown in Table 35.

Table 35: Estimated Forecast Capacity Gap for Hazardous Waste Arising in the Plan Area

	Projected Arisings	Plan Area Capacity (throughput)	Projected Capacity Gap (tonnes per annum)
2014	105,544	62,345	43,199
2015	105,935	62,345	43,590
2016	106,327	62,345	43,982
2017	106,719	62,345	44,374
2018	107,110	62,345	44,765
2019	107,502	62,345	45,157
2020	107,894	62,345	45,549
2021	108,286	62,345	45,941
2022	108,677	62,345	46,332
2023	109,069	62,345	46,724
2024	109,461	62,345	47,116
2025	109,853	62,345	47,508
2026	110,244	62,345	47,899
2026	110,636	62,345	48,291
2027	111,028	62,345	48,683
2028	111,420	62,345	49,075
2029	111,811	62,345	49,466
2030	112,203	62,345	49,858
2031	112,595	62,345	50,250
2032	112,987	62,345	50,642

3.18 Conclusion

The analysis indicates that:

- There is a variety of sites managing all principal hazardous waste streams from the Plan Area. Thus the arrangements appear to be reasonably resilient. The continuing availability of the capacity to 2032 should be confirmed with receiving WPAs via Duty to Cooperate arrangements.
- The vast majority of hazardous waste arising in Essex & Southend on Sea is managed through recovery (treatment plus MRS) with out of Plan Area incineration only being used as a last resort.
- Disposal to landfill still plays a significant role. Therefore consideration should be made for provision of capacity within the Plan Area should the WPA wish to reduce dependency on export of asbestos based waste in particular and make a contribution to wider management requirements.

The forecasts indicate that hazardous waste arising in Essex & Southend on Sea may grow from the current level of around 93,000 tonnes to as much as **113,000 tonnes in 2032**. However there is unlikely to be sufficient additional arisings to warrant provision of specialist facilities to deal with any stream on its own in isolation from surrounding WPAs.

4 Non Nuclear Radioactive Waste

In addition to radioactive waste from the nuclear industry, small volumes of Low Level Radioactive Waste (LLW) and Very Low Level Radioactive Waste (VLLW) are produced in the Plan area, principally from hospitals and universities.

The UK strategy for the management of solid low-level radioactive waste from the non-nuclear industry looks to waste planning authorities to take account of non-nuclear industry radioactive waste disposal requirements.

4.1 Very Low Level Radioactive Waste (VLLW)

As stated in the strategy, exempt low volume VLLW is currently disposed to landfills and incinerators used for handling other non-radioactive waste. No special provisions need to be addressed in environmental permits, and no extra provisions need to be made by waste planning authorities to allow this practice to continue.

4.2 Low Level Radioactive Waste

In contrast to VLLW most disposal of LLW requires a permit to be held by both the waste producer and the operator of the waste management facility that receives it. LLW can go either to a landfill as a 'controlled burial', the national Low Level Waste Repository (LLWR) at Drigg in Cumbria, or may be dealt with by incineration (with or without energy recovery). Currently, use of the national LLWR is usually only for particular types of LLW and other arrangements (and permits) for LLW disposals from the non-nuclear sector as 'controlled burial' in landfills are not common. LLW disposal, except for that to the national LLWR, usually takes place at facilities that are used for the management of other types of waste.

Unlike the network of facilities available to take VLLW there are considerably fewer facilities across the UK that currently take LLW. While operators of appropriate facilities may apply to take LLW at any time, in England there are currently only three landfill sites which have been granted permits to do so as shown in Table 36.

Table 36: Landfill Sites Permitted to Receive LLW (Environment Agency, December 2013)

Host WPA	Site Name	Operator	Waste Type	Source Specific
Lancashire	Clifton Marsh	Sita (Lancashire) Ltd	LLW	range of waste material types from existing and potential new customers
Northamptonshire	East Northants Resource Management Facility	Augean South Ltd	LLW	waste will mainly be generated from the decommissioning and clean up of nuclear industry sites
Cumbria	Lillyhall Landfill Site	Waste Recycling Group	High Volume - VLLW	no more than 26,000 m^3 of HV-VLLW per year and if the landfill remains operational until 2031 no more that 582,000 m^3 of HV-VLLW in total

LLW Repository Ltd (who manage the Drigg facility) published a capacity gap analysis concerning the future management of LLW in March 2013.[17] The report focused on the capacity at the sites in the above table. The main conclusions of the paper are reported as follows:

- There is adequate capacity until December 2016 at the three existing sites under existing authorisations.
- If extended authorisations for the 3 sites are granted, there is adequate capacity until 2026 after which further capacity would need to be identified.
- In the 'Northern' region there is adequate capacity until 2015 – at Lillyhall and Clifton Marsh. If extended authorisations are obtained for the existing sites, there would be adequate capacity until 2030.
- In the 'Southern' region there is adequate capacity until 2016 or until 2026 if East Northants Resource Management Facility (ENRMF) gains an extension – Beyond 2026 a further extension or additional capacity would be required within the South of the UK to accommodate LA-LLW arisings originating from this part of the country.

[17] *Low Activity Low Level Waste Capacity Assessment National Waste Programme NWP/REP/011 –March 2013*

4.3 Quantities

The Environment Agency does not hold any data on the volumes of non-nuclear radioactive waste arising in Essex and Southend and the UK Inventory[18] excludes small quantities of nuclear materials with very low concentrations of radioactivity typically produced by research establishments, universities and the non-nuclear industry ('small users'). Most radioactive waste produced by minor producers is not reported in the UK Inventory as it is either low volumes of LLW that can be disposed of by "controlled burial" at landfill sites, or low volume VLLW that can be disposed of with municipal, commercial and industrial wastes at landfill sites.

The strategy also confirms that the majority of non-nuclear industry wastes are of very small volume in comparison to the annual volumes of municipal waste (very unlikely to exceed 0.1% by volume, and there is some evidence that it will reduce-see Annex 3 of the UK strategy).

A review of radioactive source permits records on the Environment Agency website indicates that there are 24 authorisations granted to bodies spread across the Plan area that are associated with 17 locations. These permits are issued to establishments which use radioactive substances in the line of their business and it is possible therefore that, as part of their activities, they will generate some LLW or VLLW. The majority of permits have been granted to entities for commercial purposes (See Table 37 below).

Table 37: Radioactive source permits issued in the Plan Area

Source: Environment Agency website

						Producer Type			
	No.	Locations	Holder			Hospital	Research	Commercial	Nuclear
Basildon	1	1	Basildon hospital			1			
Braintree	0								
Brentwood	0								
Castle Point	0								
Chelmsford	4	3	Broomfield Hospital	Battelle UK	E2V Technologies (x2)	1		3	
Colchester	4	3	Colchester Hospital	Essex County Hospital (x2)	University of Essex	2	2		
Epping Forest	1	1	Selcia Ltd					1	
Harlow	3	2	Princess Alexandra Hospital (x2)	Argenta Discoveries		2		1	
Maldon	1	1	Magnox						1
Rochford	0								
Southend-on-Sea	3	1	Southend Hospital						
Tendring	3	2	Halterman Carless Ltd	Agrochemex (x2)				3	
Uttlesford	4	3	Takeda Cambridge (x2)	Biofocus DPI	Illumina Cambridge			4	
total	**24**	**17**				**6**	**2**	**12**	**1**

[18] Most LLW reported in the 2010 Inventory is consigned to the LLWR near Drigg. Production of future arisings of LLW is assumed to remain the same as current arisings, and is estimated for the UK as a whole up to 2080 (*The 2010 UK Radioactive Waste Inventory Main Report Report prepared for the Department of Energy & Climate Change (DECC)* and the *Nuclear Decommissioning Authority (NDA) by Pöyry Energy Limited (URN 10D/985 NDA/ST/STY(11)0004 February 2011)*

The Environment Agency did not indicate that any of the waste producers within the Plan Area produced waste management plans and this has been taken to indicate that there are no producers of significant quantities of LLW (or higher level waste) and any waste produced by the 24 authorisation holders is classed as VLLW and dealt with along with general waste.

4.4 Conclusion

Bearing in the mind, the absence of known major non-nuclear industry producers within the Plan area, quantities of LLW arisings are assessed to be relatively small within the Plan Area, and that a Government commissioned report[19] stated that this stream is likely to reduce over the Plan period, it is considered there is no need to make any special provisions to cope with volumes of radioactive waste produced by the non-nuclear sector within Essex and Southend-on-Seas during the Plan period.

As there are no facilities for managing LLW in the Plan Area it should be assumed that any that is produced is exported for management at specialist facilities. With the paucity of data it is not possible to identify which facilities may be receiving this particular type of waste, however, if it is produced it is quite possible that some of it will be managed at one or more of the three sites identified in Table 37. In view of its proximity to the Plan area the ENRMF is the landfill facility most likely to be accepting inputs of LLW from the Plan Area. However it might be managed further afield by other means such as high temperature incineration elsewhere e.g. the High Temperature Incinerator at Fawley or Ellesmere Port. Therefore in the event of capacity at ENRMF being no longer available it is expected that if necessary the waste will travel further afield. While consultation on the issues and policies of the Plan did not indicate any market interest in the development of facilities for the management of LLW in the Plan Area, the ongoing availability of capacity for receipt of LLW will be monitored during the period of the Plan[20]. A criteria based policy has been included in the plan to address any 'windfall' applications.

With regard to VLLW, it may be assumed that, where this goes for disposal at permitted waste management facilities, the quantities are included in the data provided to the Environment Agency which is reported through the WDI.

[19] Data collection on solid low-level waste from the non-nuclear sector DECC (2008)

[20] This would involve occasional checking of the general picture regarding LLW capacity via reports produced by NuLEAF and others.