NORTH LINCOLNSHIRE GREEN ENERGY PARK

Planning Act 2008

Infrastructure Planning (Applications Prescribed Forms and Procedure) Regulations 2009

North Lincolnshire Green Energy Park

Annex 1 - Defra Response Table

PINS reference: EN010116

February 2025

Revision number: 0

Executive Summary	
Extract	NLGEPL Response
Our current use of resources is economically, environmentally and socially unsustainable and we are determined to transition to a circular economy in the UK. To achieve this, all efforts must be made to prevent waste from arising in the first instance. Where waste does occur, we need to manage it in the most resource-efficient way possible, preparing items for reuse, or recycling those items that cannot be reused. To this end, The Environmental Targets (Residual Waste) (England) Regulations 2023 set a statutory target to ensure that the total mass of all residual waste (excluding major mineral wastes) arising in England for 2042 does not exceed 287kg per person.	In Annex 1 of the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46), the Applicant defined three scenarios for waste arisings in the DCO submission which were subsequently updated - High Recycling, Median Recycling, and Low Recycling. The resulting figures for total residual water per capita in 2042 are 255kg, 310kg, and 367kg respectively. This approach recognises Defra's statement in the Residual Waste Infrastructure Note (the "Note") that "*detailed policies to achieve reductions beyond the packaging reforms and create the circular economy have not yet been developed. Detailed analysis and forecasts of residual waste arisings post-2035 are, therefore, not currently possible*." The Applicant's approach recognises this difficulty by defining a range of plausible scenarios to address future uncertainty and the outcome broadly aligns with Defra's figures.
This note presents the evidence and analysis relating to municipal residual waste arisings and infrastructure capacity in England from 2020 to 2035, accounting for the effect of Defra's packaging reforms. Consideration is also given to total residual waste (excluding major mineral wastes) arisings in 2042. This note is intended to support decision makers in planning for residual waste treatment to support the transition to a circular economy.	The Note (Table 1) has 57% of municipal waste collected for recycling in 2035 was based on the three packaging reform measures listed, recognising that additional measures not yet specified must be deployed to achieve the 65% target. In the Applicant's Median Recycling scenario, set out within Annex 1 of the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46), a recycling rate of 55% of household waste in 2035 and 77.5% of C&I waste are assumed, leading to an overall recycling rate of 68%. Again, this aligns with Defra's assumptions.

The evidence presented in this note demonstrates that England is on track to send less than 10% of municipal waste to landfill by 2035, at least in terms of residual waste infrastructure provision. This is based on modelling the implementation of: - Extended Producer Responsibility for packaging in 2025 - Simpler Recycling for non-micro businesses in 2025, households in 2026, and micro businesses in 2027 – which will require collections for dry recyclable materials and food and garden waste, unless a transitional arrangement applies - a Deposit Return Scheme for drinks containers in 2027	The Applicant assumes that where the Note states, "*England is on track to send less than 10% of municipal waste to landfill by 2035"* that landfill provides some flexibility to allow for variation in recycling rates without any conflict with 'fixed' throughput capacity. Albeit that it's a maximum, 10% equates to several EfW facilities. Landfill will have negative environmental impacts greater than options higher up the waste hierarchy, thus the Applicant's submissions modelled the waste destined for landfill requiring recovery capacity (Annex 1 of Document Reference 9.46). It is noted that 2% of residual MSW is assumed to be un-processable at EfW plants (see Table 6 of the Note). Given that landfill ranks below energy recovery in the waste hierarchy. the Applicant's view is that this 2% should be used in Defra's calculations (for example in Table 2), whilst recognising the ability to divert more than this to landfill to deal with variations and uncertainty in recycling rates.
In 2035, total energy recovery capacity is estimated to include 18.8 megatonnes (Mt) in comparison to 19.4Mt of municipal residual waste. Total residual waste treatment capacity is forecast to be approximately 24.9Mt, including an allowance for capacity in landfills to manage 10% of all municipal solid wastes.	**Residual waste arising.** The forecasts submitted by the Applicant range from 16 to 23 Mt of total residual waste in 2035, with 19.2Mt in the Median Recycling scenario (Annex 1 of Document Reference 9.46). The analysis submitted categorises waste as household or Commercial & Industrial (C&I) waste rather than municipal or non-municipal waste. Municipal waste includes C&I waste which is similar in nature and composition to household waste, so much but not all the Applicant's C&I waste projection falls into the municipal waste category. The Note accepts that it has not considered non-municipal waste and estimates this as 5.4Mt per annum in 2022 - see section 5.1. Hence the Applicant's analysis is more conservative than the Defra forecast in the Median scenario.

	EfW Capacity. Defra has modelled 18.8Mt in 2035. The Applicant's submitted analysis is 17.6Mt in the High Scenario Case, which includes all operational and in-construction capacity. The Applicant's analysis assumes older facilities close after 50 years of operation and was based on permitted capacities as of January 2024. The Applicant's analysis corresponds well with Defra's given the uncertainties involved.
The evidence presented in this note does however identify that there are certain areas in England, in particular the East Midlands and East of England, where alternative treatment options to landfill for municipal residual wastes are required	The Applicant's analysis in January 2024, set out in the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46), showed a capacity gap in the central case (Case E) of 0.911Mt for East Midlands and Yorks & Humber combined, and -0.249Mt for just Yorks & Humber. Subtracting one from the other showed a capacity gap for East Midlands in 2035 of 1.1Mt. The Applicant's submitted forecast aligns with the Defra modelling. More recent analysis for the Applicant by Footprint Services, set out Annex 2 of this submission, concludes that currently around 1.5Mt per annum of combustible residual waste within 100 miles of the Project transportable by road or by rail which is currently either landfilled or exported – this catchment area includes much of East Midlands and East of England.
The assessment undertaken does not consider treatment needs for non- municipal residual wastes. While some non-municipal residual wastes currently disposed of in landfill could be managed through existing energy recovery facilities as volumes of municipal residual waste reduce, creating 'headroom', it may be that alternative or additional facilities are required to divert these wastes, where they cannot be prevented or recycled, away from landfill. Alternatively, declining municipal residual waste	The Applicant's analysis, in the Applicant's response to request for further information by the Secretary of State (Annex 1 of Document Reference 9.46) included non-municipal residual wastes and made an assumption on the combustible percentage of residual waste. The Applicant's analysis assumed a 50-year lifetime for EfW plants, leading to the closure of the Coventry, Stoke, and Eastcroft facilities by 2035 in addition to the publicly announced closure of Edmonton. In the "High Capacity" scenario, all other plants remain open. The Low and

volumes may facilitate the decommissioning of older, less efficient residual waste management infrastructure in some areas to avoid over-capacity	Medium Capacity scenarios included only plants judged to have high or medium Carbon Capture and Storage (CCS) potential. (The Medium scenario included 50% of capacity of consented pipeline projects whereas the Low did not.) This recognises Defra's point that in a dynamic market there is the possibility that older/less efficient/non-CCS-ready facilities may well be replaced by more modern and efficient facilities better placed for CCS. The Applicant remains of the view that this is a reasonable approach for dealing with capacity uncertainty.
Based on current population growth estimates, the total volume of residual waste (excluding major mineral wastes) in England in 2042 will need to be at most approximately 17.6Mt to meet the legally binding residual waste target. This is for both municipal and non-municipal residual wastes, and acts as a long-term signal for our residual waste treatment capacity needs that should be taken into account when planning or considering residual waste treatment infrastructure.	The Applicant's analysis in the Applicant's response to request for further information by the Secretary of State (Annex 1 of Document Reference 9.46) assumes 15.2Mt, 18.6Mt, and 22.0Mt in our High Recycling, Median Recycling, and Low Recycling scenarios respectively. The Defra note aligns more closely to our Median scenario.
While there are a number of waste incineration facilities that are consented, but not yet under construction, it is highly unlikely that these will be brought forward if sufficient waste volumes cannot be secured via contracts to make a proposed development financially viable	The Applicant agrees with the statement that is "*highly unlikely that the consented sites will be* brought *forward"* but not just based on the waste supply. The grid connection queue reforms in the electricity sector could result in some of these sites losing their grid connection. The planning portal shows over 50% of the sites with planning consent having expired. Some consented sites do not appear to have obtained an environmental permit yet, and we also note that the Government proposes to extend Decarbonisation Readiness criteria to projects applying for permits from March 2026. Many consented sites are small sites and may not meet the proposed criteria, and most are not adjacent to any planned carbon capture infrastructure.

	Based on these factors, the Applicant's analysis in January 2024, see the Applicant's response to request for further information by the Secretary of State (Annex 1 of Document Reference 9.46) assumed in our submitted forecasts, that 50% of consented pipeline projects are realised. The Note recognises that overcapacity is unlikely to materialise in practice because facilities will not be built without adequate waste contracts. In some cases, permissions are a necessary part of preparing compelling competitive tenders so it is to be expected that not all consented capacity will be built (and history shows this).
The government is committed to transitioning to a circular economy, in which we maximise resource use and minimise residual waste arisings. Where residual wastes do occur, they should be managed in the most efficient manner. This means that we will only support the development of further residual waste treatment infrastructure where they meet a clearly defined need to facilitate the diversion of non-recyclable waste away from landfill, or enable the replacement of older, less-efficient facilities	The Applicant agrees with the transitioning to a circular economy - this is supported by the inclusion in the Application of the plastic recycling facility, the separation and recycling of metals from the bottom ash, the use of cleaned bottom ash and flue gas residues combined with the CO_2 captured from the plant to form concrete products. In addition, raw water and condensate are treated on site for re-use. The waste heat generated from the carbon capture and combustion processes will be used for the district heat network serving up to 6000 new-build homes with the available capacity to connect additional existing or new homes and businesses to the 11km primary spine of the heat network in the future. The Project is efficient and serves a need for residual waste treatment in the two regions identified in the Note as short of operational capacity and as, Annex 2 of this submission notes, it will be well placed to facilitate the diversion of residual waste from landfill. It is also a project which, by virtue of all of its components, will readily enable the replacement of older, less efficient facilities and the need to export waste.

The government is committed to transitioning to a circular economy, in which we maximise resource use and minimise residual waste arisings. Where residual wastes do occur, they should be managed in the most efficient manner. This means that we will only support the development of further residual waste treatment infrastructure where they meet a clearly defined need to facilitate the diversion of non-recyclable waste away from landfill, or enable the replacement of older, less-efficient facilities	The Project objectives are aligned to the government commitment to the transition to a circular economy[1] and it was established in 2018 to target residual waste destined for landfill and to intercept processed waste being exported through the Humber Ports. As set out in Annex 2 of this submission 172,000 tonnes of residual waste (Annex 2 para 82 of this submission) from the East Midlands is exported through Immingham which is now the largest port for waste exports in the UK exporting 336,000 tonnes in 2024 (Annex 2 para 95 of this submission). It is estimated that 1.5m tonnes of combustible waste is landfilled or exported from residual waste sourced within 100 miles of the Project (Annex 2 para 1(i) of this submission).
The data in this note suggests that while we are approaching a point where national residual waste treatment capacity is sufficient to manage municipal residual wastes, there are regional variations. Evidence also suggests that alternatives are required to support the diversion of non-municipal wastes from landfill.	The Applicant has included combustible non-municipal waste arisings and the opportunity to recycle plastics from waste arisings. As set out Annex 2 of this submission, current data gathered under FoI requests indicates the regional combustible residual waste for a defined 100-mile radius from the Project totals 1.5m tonnes per annum (Annex 2 para 1(i) of this submission) of domestic and non-domestic residual waste. The Applicant's analysis in the Applicant's response to request for further information by the Secretary of State (Annex 1 of Document Reference 9.46) included both household waste which would be classified as 'municipal' and C&I waste which would be classified 'non-municipal' in the Note.
We do not, however, support the development of overcapacity of energy recovery infrastructure in England and will work to strengthen planning considerations to ensure that this does not happen. For those energy recovery developments we do need,	The Applicant supports the intent to prevent the development of over-capacity having provided Waste MoUs (see Annex 3 of Document Reference 9.46) all of which are located in the East Midlands. The Note highlights the operational capacity deficit in the East Midlands and the

[1] The price of plastic: ending the toll of plastic waste: Government Response to the Committee's Third Report, January 2023

we will only support projects that offer the best efficiency and are future proofed towards supporting our net zero objectives. This means that further developments must be able to demonstrate that making use of the heat they produce is viable and that they can be built carbon capture ready, in accordance with the government's 'decarbonisation readiness' requirements once they come into force. The government will also explore how to incentivise the decommissioning of facilities that are less efficient, cannot support our net zero objectives or are no longer required.	East of England, the capacity that will be required to divert C&I waste from landfill, and assumes up to 10% of municipal waste will still be landfilled in 2035. There will however be a demand from local authorities to utilise energy recovery facilities that are carbon capture enabled. The Local Government Association estimate that the proposal by the UKETS to include EfW plants from 2028 will cost local authorities £747m per annum in 2028 rising to £1.1bn in 2036[2]. The waste industry has identified that the unintended consequence of the inclusion of EfWs in the UKETS is that the price of RDF could double if the EfW operators could not pass the cost of the carbon tax on the waste back to the waste authority. Therefore, a new generation of energy recovery facilities, with carbon capture enabled, will need to be built and commissioned before the inefficient units are decommissioned to avoid additional residual waste going to landfill. The Applicant also notes that no new energy recovery facilities will be built that are not carbon-capture ready and heat networks enabled. The Applicant has established comprehensive support for the District Heat Network (DHN) as an integrated element of the Project. This includes 17 customers with heat offtake Heads of Terms negotiated subject to DCO consent, which were included in an application for the Green Heat Network Fund. The Applicant has now proposed an amendment to requirement 17 (Combined heat and power) of the draft DCO to build the northern spur of the district heat network. In the latest Round of the Green Heat Network Fund, DESNZ identified that the district heat network (DHN) was financially viable and self-funding, this is shown in Annex 8 of this submission. The Applicant is proposing an amendment to requirement 17 (Combined heat and power)

[2] https://www.local.gov.uk/about/news/misfiring-incineration-tax-could-heap-billions-unfunded-costs-councils

	of the draft DCO to include a commitment to the “northern spur” of the district heat network as part of an 11km utility corridor that shares other utilities, including carbon dioxide, water, power, fibre and hydrogen (see Annex 3 of this submission). The Project has been designed to deliver the best energy efficiency to utilise waste heat from the combustion process and the carbon capture facility delivering an R1 factor (energy utilisation efficiency factor) of 0.755 [APP-044]. The inclusion of the district heat network increases the RI factor above 0.8. The plastic recycling facility has been designed into the Project to facilitate the diversion of plastics within the RDF supply from energy recovery to recycling. The Applicant is confident of the need for the PRF and has now offered additional wording to amend the DCO requirement 23 (PRF) to build the PRF alongside the ERF (see Annex 3 of this submission). The commitment has been included within the draft DCO [REP10-005] to carbon capture a minimum amount of carbon dioxide (requirement 19) and for the mineralisation of some of the carbon dioxide into concrete products. In addition, the utilisation of carbon dioxide captured, and the low-carbon hydrogen produced could be used to supply the Sustainable Aviation Fuels (SAF) plant planned for Humberside. This could create a carbon negative facility with a reduced carbon footprint for air travel. The Applicant has appended a technical note from Fichtner Consulting Engineers, as the technical lead for the DCO application, at Annex 7 of this submission to confirm that sufficient footprint is available to include full carbon capture and the suitability of the biogenic CO2 produced to support SAF production. The inclusion of EfWs in the UKETS will be a sufficient commercial driver for those facilities that are unable to pass the “carbon tax” back to the

	waste authority, to decommission plants that are unable to deploy carbon capture (See LGA Reference above to potential costs to waste authorities). These will be facilities with insufficient footprint to include carbon capture, locations that are not close to any planned carbon capture pipeline or do not have an alternative option for carbon transport or utilisation.

Extract	NLGEPL Response
Resources are finite and precious, and their extraction and manufacture can cause environmental harm. All efforts must be made to prevent waste from arising in the first instance. Where waste does occur, we need to manage it in the most resource-efficient way possible, preparing items for reuse, or recycling those items that cannot be reused.	The Applicant has designed the Project to addresses its resource efficiency, re-use and recycling in many ways: a) Transport to and from the site by rail (see Annex 6 of this submission) and by river for low-carbon transportation. b) Recycling – the Applicant's proposed amendments to the draft DCO within this submission commits to the Plastic Recycling Facility (PRF) [REP10-005] which will remove at least 25,000 tonnes per annum of plastics that can be recycled which will increase the recycling rate by recycling plastics from pre-processed RDF and this will increase the profile of biogenic carbon dioxide captured from the ERF. c) CO_2 Capture – the carbon content of the waste converted to CO_2 will be utilised into concrete products [REP6-018] or Sustainable Aviation Fuel (SAF) capturing biogenic CO_2 from the combustion process and the SAF will displace the use of fossil fuels (see Annex 7 of this submission) d) Ash Recycling - from the waste processed over 500 tonnes of metals will be recycled [REP6-018] and up to 130,000 tonnes per annum of bottom ash and flue gas residues converted into 285,000 tonnes of "green" concrete

	products. The circa 55,000 tonnes of carbon dioxide per year will be sequestered in the "green" concrete products and help to decarbonise the construction industry which is deemed to be a "hard to decarbonise sector". e) Water Recycling – all water produced from the condensate of up to 97,500 tonnes per annum [AS-033] as a result of the waste combustion will be recycled for use in the boilers, producing hydrogen by electrolysis from the recycled water, the District Heat Network (DHN) or supplying recycled water to the newly created wetland area. f) Recycled water to provide hydrogen for heavy good vehicles – the DCO application includes providing high-pressure hydrogen refuelling for local transport and rapid charging for electric vehicles (Work No. 8 in [DCO REP10-004]). From an annual volume of residual waste of up to 760,000 tonnes of RDF, the following elements will be recycled: i) Plastics recycled – 25,000 tonnes ii) Condensate recovered from full carbon capture - 97,500 tonnes iii) Ash and flue gas residue – 130,000 tonnes iv) Metals recovered and recycled – 5,000 tonnes v) CO_2 captured at least 54,387 tonnes

	Up to 312,500 tonnes from potential residual waste of 760,000 tonnes will be reused or recycled. These elements of the Project will increase the recycling of residual waste by up to 41%. The 65-acre wetland area which will flood underlying peat seams will also have the potential to capture an additional 170 tonnes of carbon dioxide per annum (see Annex 5 of this submission) and increase the biodiversity net gain by over 13.7%, with an increase in hedgerows of 30% and an increase in water courses of 60%. (as set out in APP-058). The Environment Agency Natural Capital guidance has encouraged the Applicant to include a summary of these environmental benefits which are included as a DCO requirement (see requirement 6 (Landscape design) which requires the landscaping scheme which is to be submitted and approved to be in accordance with the plans in appendix I (Biodiversity Net Gain Report) of the Ecology and Nature Conservation Chapter of the Environmental Statement [AS-026] (see Annex 5 of this submission). The Natural Capital generated to these provide biodiversity net gain figures which deliver significant environmental benefits for the local community and is designed to link together pools of biodiversity managed by the Lincolnshire Wildlife Trust and will provide additional funded apprenticeships for the region.

	The commitment within the DCO to deliver a 13.7% BNG is a voluntary provision to establish additional environmental benefits from the Project.
To this end, The Environmental Targets (Residual Waste) (England) Regulations 2023 sets a statutory target to ensure that the total mass of residual waste (excluding major mineral wastes) arising in England for 2042 does not exceed 287kg per person. This is the equivalent of a 50% reduction from 2019 levels.	As set out in Annex 1 of the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46) the Applicant defined three scenarios for waste arisings in the DCO submission which were subsequently updated - High Recycling, Median Recycling, and Low Recycling. The resulting figures for total residual waste per capita in 2042 are 255kg, 310kg, and 367kg respectively. This approach recognises Defra's statement in the Residual Waste Infrastructure Note (the "Note") that "*detailed policies to achieve reductions beyond the packaging reforms and create the circular economy have not yet been developed. Detailed analysis and forecasts of residual waste arisings post-2035 are, therefore, not currently possible*." The Applicant's approach recognises this difficulty by defining a range of plausible scenarios to address future uncertainty.
Recovering energy from residual waste, including through the supply of electricity and heat, or through processing waste into fuel for use elsewhere in the economy, while making a valuable contribution to our energy generation and decarbonisation needs, should be seen as the last resort to prevent waste being disposed of in landfill or incinerated without recovering energy.	As set out within ES Chapter 3, Project Description and Alternatives [REP6-018] the Applicant's approach is to divert waste from landfill and intercept waste going for export, in support of the waste hierarchy. 25,000 tonnes per annum of waste plastics that could be commercially recycled will be recycled through the Plastics Recycling Facility (PRF). All by-products arising

	from the non-recyclable waste are recycled or reused including the condensate generated from the moisture in the residual waste. The northern spur of the District Heat Network (DHN) will be established before the ERF is operational to provide waste heat to local industry and potentially to up to 6,000 new homes being built on the Lincolnshire Lakes development. In addition to providing the hydrogen fuel for transport and power for electric vehicles, there are plans to supply biogenic CO_2 and low-carbon hydrogen to a regional producer of Sustainable Aviation Fuel (SAF). SAF will displace the use of fossil fuels for aircraft (see Annex 7 of this submission).
We are introducing 3 major waste reforms to improve the way resources and waste are managed: • an Extended Producer Responsibility (EPR) scheme for packaging • Simpler Recycling in England • a Deposit Return Scheme (DRS) for drinks containers	The Note recognises that there will need to be additional measures introduced to reach the 65% recycling target. The Applicant believes that part of the additional measures required will be the investment in the ability to clean and sort plastics. The Applicant has committed to construct the Plastic Recycling Facility (PRF) (see Annex 3 of this submission) in support of recycling plastics from residual waste streams after the Defra measures have removed any uncontaminated plastics but before energy recovery. This will ensure any additional plastic that has not been separated from the residual waste, will be recycled. The benefit of the PRF being co-located with the ERF is that any biogenic

	contamination and non-recyclable factions can be processed through the ERF.
This set of packaging reforms are expected to reduce residual waste through incentivising and improving recycling. The packaging reforms are estimated to reduce annual municipal residual waste arisings by 18% by 2035 relative to 2020 figures.	The Applicant's forecast to achieve a 65% recycling target by 2035 (See Annex 1 of Document Reference 9.46) supports the proposed packaging reforms to reduce residual waste and to incentivise an improved recycling rate. However, any estimated forecasted reduction in residual waste could result in an under-estimation of energy recovery capacity which would lead to increased residual waste to landfill.
This note presents the evidence and analysis relating to municipal residual waste arisings and infrastructure capacity in England from 2020 to 2035, an assessment period that aligns with targets set under the Waste (England and Wales) Regulations 2011 (https://www.legislation.gov.uk/uksi/2011/988/contents)	The Applicant's own evidence (See Annex 1 of Document Reference 9.46) submitted in January 2024 sets out its assumptions and analysis. The approach and assumptions (and resulting conclusions) are broadly aligned with the Note in respect of projected residual waste arising and infrastructure capacity for municipal waste alone with a recycling rate of 65% by 2035.
This analysis has accounted for the effect of the packaging reforms on municipal recycling rates and, therefore, the amount of municipal residual waste generated. Consideration is given to the residual waste reduction target. However, detailed policies to achieve reductions beyond the packaging reforms and create the circular economy have not yet been developed. Detailed analysis and forecasts of residual waste arisings post- 2035 are, therefore, not currently possible. There will likely be additional factors that affect the future composition and tonnage of municipal residual waste that have not been considered within this note	The Applicant's approach, set out in Annex 1 of the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46) recognises this difficulty by defining a range of plausible scenarios to address future uncertainty. Defra's analysis in the Note aligns in the median part of our range, recognising some minor differences in methodology and assumptions. Consequently, we believe Defra's analysis is broadly

	consistent with the Applicants, noting the Defra model only considered municipal waste.
This note has been prepared to consider residual waste arisings in England at both a regional and national level. Local authorities consider their waste treatment capacity needs at local level and this note will support decision making regarding the need for additional or alternative residual waste management infrastructure. A proposed plant must not compete with greater waste prevention, reuse, or recycling, or result in overcapacity of residual waste treatment. This position is set out in the Energy National Policy Statement for renewable energy infrastructure, which establishes planning considerations for nationally significant generation projects that fall outside of local planning authority competence, including energy from waste (EfW) facilities generating more than 50 megawatts in England	The Applicant acknowledges the need to move waste to optimise waste treatment and the need for local authorities to consider the local level whilst considering national and regional capacity. This is exemplified in the recent case of Cambridgeshire Council contracting waste processing in Newry County Down in Northern Ireland over 400 miles from the waste arisings. Defra notes the under capacity in the East of England and East Midlands that the Project will serve, evidenced by existing movements to local landfill and export through the Humber Ports (see Annex 2 Section 8 of this submission). The Applicant has committed in the DCO to process only residual waste (Requirement 15 of the DCO [REP10-004]) which by Defra's definition is waste that has undergone treatment to remove recycling material. Waste Producers are bound by regulation to apply the hierarchy and to confirm that this has been the case in transfer notes. The Applicant has established as part of the DCO submission [AS-031], which has been reaffirmed in the Cover Letter accompanying this response, that the Project serves a regional need, supporting the recycling target and without competing with existing operational capacity.
This note does not set out to prioritise one form of energy recovery treatment over another. The UK has a thriving competitive market for	The Applicant will have a commitment under the EA permit to deploy "Best Available Technologies" (BAT)

waste management services. There are a range of recovery options, both established and emerging, available to waste handling operators, which will be selected according to market conditions and local needs, taking account of the waste hierarchy and the need to ensure the best available environmental outcome for the waste.	with regard given to those technologies with a proven track record. The site that was built for the Derbyshire waste authority is an example where a technology is theoretically efficient but in reality, has failed to operate since 2016. The energy from waste industry has unfortunately shown that not all technologies have delivered the operational efficiency that was contracted as shown by the two EfW sites recently mothballed by Aviva. The Plastic Recycling Facility (PRF) is an example where recent developments in technology have delivered the ability to clean, sort and process plastic waste streams effectively and efficiently, but the waste industry does not have enough sites that include this level of selection (as evidenced by Cambridgeshire Council sending waste over 400 miles to secure the treatment required for recycling at a commercially viable cost).
This note is intended to support decision makers in planning for residual waste treatment to support our national resources and deliver a circular economy. Based on forecasts of waste arisings and infrastructure capacity, headline results indicate that there will be sufficient residual waste infrastructure capacity (including an allowance of no more than 10% municipal waste to landfill) to treat forecast municipal residual waste arisings from around 2026 until the end of the assessment period, at the national level. There are however certain areas in England where alternative treatment options to landfill for municipal residual wastes is required to further support our environmental objectives and obligations.	The Applicant agrees with the Note's approach. The location of the Project serves the needs of the East of England and the East Midlands and aligns with the Note's observations about where regional capacity is needed. As highlighted in the responses above, the Defra model excludes the combustible content of C&I waste and assumes 10% of residual waste continues to go to landfill. The appended analysis by Footprint Services identifies 1.5m tonnes of combustible residual waste being landfilled or exported within a 100-mile

There is also likely a need for alternative treatment options to landfill for non-municipal residual wastes	catchment area of the Project (see Annex 2 para 2(i) of this submission). The Applicant notes that 2% of residual MSW is assumed to be un-processable at EfW plants (see Table 6 of the Note). Given that landfill ranks below energy recovery in the waste hierarchy, the Applicant's view is that this 2% should be used in Defra's calculations (for example in Table 2), whilst recognising the ability to divert more than this to landfill to deal with variations and uncertainty in recycling rates.
We will continue to monitor waste infrastructure capacity due to its important role supporting the transition to a circular economy and informing future policy directions.	The Applicant welcomes the commitment to continue to monitor the waste infrastructure capacity and the Applicant will also continue to monitor the end-to-end waste infrastructure to deliver the quality of data as shown in the Footprint Report (see Annex 2 para 2(i) of this submission). In line with Defra's observations, the Project would not proceed to construction without contracts or the confidence it will attract sufficient residual waste. (see Annex 3 of Document Reference 9.46).

1. Background	
Extract	NLGEPL Response
Residual waste is typically mixed waste that may be suitable for energy recovery or disposal to landfill, such as that collected from households and businesses in black bags or wheelie bins, as distinct from waste collected or otherwise segregated for recycling or reuse.	The Applicant agrees with Defra's definition of residual waste.
The government is committed to transitioning to a circular economy, which will support economic growth, deliver green jobs, promote efficient and productive use of resources, minimise negative environmental impacts and help us accelerate to net zero. Reducing residual waste is supported by a number of targets in the Waste (England and Wales) Regulations 2011 (https://www.legislation.gov.uk/uksi/2011/988), including at least 65% of municipal solid waste (by weight) being recycled and less than 10% of municipal solid waste (by weight) being sent to landfill by 2035. The Environmental Targets (Residual Waste) (England) Regulations 2023 (https://www.legislation.gov.uk/uksi/2023/92/contents/made) sets a statutory target to ensure that the total mass of residual waste (excluding major mineral wastes) for 2042 does not exceed 287kg per person. This is the equivalent of a 50% reduction from 2019 levels.	The Applicant submitted (Annex 1 of Document Reference 9.46) assumptions for the three recycling scenarios: • The "High Recycling" case assumes waste reduction targets are achieved, with 65% household waste recycling by 2035 and 70% by 2042, and 80% C&I waste recycling by 2042. • The "Median Recycling" case assumes 55% household recycling by 2035 and 60% by 2042, and 77.5% C&I waste recycling by 2042. • The "Low Recycling" case assumes 45% household recycling by 2035 and 50% by 2042, and 75% C&I waste recycling by 2042. The resulting figures for total residual water per capita in 2042 are 255kg, 310kg, and 367kg respectively. This approach recognises Defra's statement in the Note that "*detailed policies to*

	achieve reductions beyond the packaging reforms and create the circular economy have not yet been developed. Detailed analysis and forecasts of residual waste arisings post-2035 are, therefore, not currently possible." The Applicant's approach recognises this difficulty by defining a range of plausible scenarios to address future uncertainty.
2.1 Packaging reforms	
Defra's packaging reforms are expected to provide a significant contribution towards the reduction in residual waste and are composed of 3 interconnected reforms.	The Applicant notes there is some uncertainty around the effect and the timing of the reforms, to the extent that more (or less) capacity might be needed, such that the flexibility of the landfill contribution might be needed, and/or additional capacity in the pipeline – see Annex 2 of this submission.
Simpler Recycling in England	
Simpler Recycling will mean that across England it will be possible to recycle the same materials. These reforms will make it easier for people to do the right thing, maximise use, minimise waste and increase recycling rates. The improved recycling system will support investment in domestic reprocessing facilities, creating UK jobs and increasing resource security. Additionally, these reforms will mean that people can recycle the same items at home, work or school throughout England. These policies will make it much easier to know what can and cannot be recycled and will increase recycling rates. By increasing recycling of the materials covered by Simpler Recycling, the policy will reduce the tonnage of these materials sent to residual waste treatments.	The Applicant welcomes measures to simplify recycling in the UK but would note that this will require significant investment in the cleaning and separation of contaminated recyclate, particularly in the regions where landfill and RDF export are currently the predominant waste treatment choice. The Applicant notes that the Note states that there would need to be additional measures introduced to achieve the target recycling rates.

	In Annex 1 of the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46) the Applicant's "High Recycling" case assumes waste reduction targets are achieved, with 65% household waste recycling by 2035 and 70% by 2042, and 80% C&I waste recycling by 2042. The "Median Recycling" case assumes 55% household recycling by 2035 and 60% by 2042, and 77.5% C&I waste recycling by 2042. The "Low Recycling" case assumes 45% household recycling by 2035 and 50% by 2042, and 75% C&I waste recycling by 2042. These ranges recognise uncertainty about the impact of any new policies and the need for additional policies to meet the 2042 residual waste per capita of 287kg.
A Deposit Return Scheme (DRS) for drinks containers in England, Scotland and Northern Ireland:	
A DRS for drinks containers will require consumers to pay a deposit at the point of purchase and then return their drinks container to a specific return point for recycling to redeem the deposit. The financial incentive offered to consumers to return their drinks containers to designated return points provides the incentive to increase drinks container recycling. It will improve the quantity and quality of the recycled material and reduce the number of littered drinks containers in the environment. By increasing the recycling of drinks containers, the policy will reduce the tonnage of these items sent to residual waste treatments.	As above.

Reforming the packaging producer responsibility system in the United Kingdom	
The EPR scheme for packaging invokes the 'polluter pays' principle and requires obligated producers to become responsible for the cost of managing the packaging they place on the market, net of any revenues obtained from recycling. These payments will be facilitated via a modulated fee system that incentivises obligated producers to use less packaging, or where it is necessary, for it to be recyclable. Under a modulated fee system, the fees paid will vary according to specific criteria relating to aspects of the packaging's treatment cost, including the effect on the environment. Modulated fees should incentivise recyclability of packaging by rewarding good design and penalising poor design. By increasing the recycling of packaging, the policy will reduce the tonnages of packaging sent to residual waste treatments.	As above. Modulated "fees" may result in some material substitutions (e.g. card for plastics) that increase mass. In time, they might lead to an increase in biopolymers that would enhance the carbon credentials of the Applicant's facility.

2. Methodology	
Extract	NLGEPL Response
3.1 Municipal waste arisings	
Our municipal waste arisings forecasts have been modelled using 2 scenarios. A business-as-usual scenario and a scenario that accounts for the packaging reforms being implemented. No policies outside of the packaging reforms have been included within this analysis.	The Applicant notes Defra's two scenarios which reflects the three scenarios deployed in the High, Median and Low scenarios (Annex 1 of Document Reference 9.46) used by the Applicant in their analysis to try and incorporate the uncertainty in forecasting recycling rates.
The packaging reforms will have the largest effect on the waste management system, this, along with a lack of comparable data for other policies, means that only the effect of the packaging reforms have been quantified within the modelling. There are other relevant policies, for example, the Plastic Packaging Tax, expansion of the UK Emissions Trading Scheme to include waste incineration and EfW, and the near elimination of biodegradable waste from landfill. These policies are expected to affect waste arisings but are not within the scope of the analysis.	In Annex 1 of the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46) the Applicant acknowledges the intent of the policies and the uncertainty in quantifying modelled outcomes and is aligned with their planned outcome, and would note the following the potential outcomes: a) The plastic packaging tax might increase the mass and biomass content of residual waste. b) The changes to the UKETS in 2028 will put commercial pressure on less efficient and non-Carbon Capture (CC) -ready facilities. Eliminating biodegradable waste from landfill will likely increase the demand for EfW higher up the hierarchy and eat into the 10% buffer if biodegradable waste is not treated in anaerobic

	digestion facilities, in-vessel composting or composting facilities.
The waste arisings forecasts were produced as part of the analysis supporting the development of the Environmental Targets (Residual Waste) (England) Regulations 2023 (https://www.legislation.gov.uk/uksi/2023/92/contents/made), with updated input data and reflect the latest policy positions.	The Applicant used the Environmental Targets (Residual Waste) (England) Regulations 2023.
The Future Waste Arisings project commissioned by Defra to forecast total waste generation figures in a range of different streams, forms the basis of the business-as-usual scenario. The project modelled municipal waste as the total of waste from households, plus non-household municipal waste (NHM). It used a number of socio-economic drivers to forecast the separate waste streams. The drivers used to forecast waste from households figures in the model were: • historic waste from households tonnages • gross disposable household income (GDHI) • Index of Multiple Deprivation (IMD) (https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019)(https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019) and Office for National Statistics (ONS) population mid-year estimates (https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotland andnorthernireland) and projections	The Applicant described the approach taken in the submitted analysis [REP3-040]. This approach is broadly similar to Defra's, leading to broadly similar results recognising the uncertainties involved in projecting into the future.

(https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/2020basedinterimnationalpopulationprojectionsyearendingjune2022estimatedinternationalmigrationvariant)	
The drivers used to forecast non-household municipal tonnages were historic NHM tonnages, derived by Defra from Waste Data Interrogator and gross value added (based on Office for Budget Responsibility (OBR) gross domestic product (GDP) forecasts (https://obr.uk/data/#historical)) for the food and manufacturing and services sector (https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalandrealregionalgrossvalueaddedbalancedbyindustry) (excluding activities from households). The combined effect of Simpler Recycling, the DRS for drinks containers and EPR for packaging on residual municipal waste arisings in England is not included in the Future Waste Arisings business-as-usual scenario	The Applicant's approach essentially used the same data sources [REP3-040].
To separate the generation of waste forecast into residual and recycling tonnages, predicted rates of 'non-residual treatment' were applied to the arisings, based upon the historic data. The non-residual treatment rate captures all waste sent to end treatment that is not landfill, incineration, or energy recovery (including transport fuels or waste sent overseas for energy recovery).	The Applicant has appended the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission that provides some analysis on recycling and non-municipal combustible residual waste, with evidence of both municipal and non-municipal waste being sent to landfill, incineration and export.
To obtain a forecast that includes the effects of the packaging reforms, the cumulative recycling rates under the packaging reforms, from their final impact assessment modelling, have been applied to the model. Waste arisings and methodology for estimating residual waste levels are separate and part of residual waste reduction target modelling.	The Applicant agrees that the proposed packaging reforms could deliver the targeted recycling rates over time. This aligns with the Applicant's approach of reaching 287kg of residual waste per capita by 2042 as set out in Annex 1 of the Applicant's response to request for

	further information by the Secretary of State (Document Reference 9.46).
For waste from households, the estimated packaging reform recycling rates were used to forecast residual waste arisings as waste from households recycling rates were shown to be a good predictor of residual tonnages when applied to the historic data (meaning the vast majority of waste from households was either recycled or sent to residual treatment).	The Applicant agrees that the proposed packaging reforms could deliver the targeted recycling rates over time. This aligns with the Applicant's approach set out in Annex 1 of the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46).
For non-household waste, recycling rates alone were not a suitable predictor of tonnages at residual treatment due to larger tonnages of residual waste treated at recovery facilities and complexities in the available data used to calculate the recycling rates. For example, this includes the use of materials recovery facilities to recover waste from the residual stream.	The Applicant has appended the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission that provides some analysis on recycling and non-municipal combustible residual waste.
Therefore, for NHM, an approximate 13 percentage point recovery rate was added on top of the estimated packaging reforms recycling rates to arrive at an assumed non-residual rate. The recovery rate accounts for process losses, waste that is treated in the devolved governments, and data limitations.	The Applicant's analysis also assumed higher recycling rates for C&I compared to household waste as set out in Annex 1 of the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46).
While the effects of the Simpler Recycling recycling rate feed into the model, some of the assumptions and methodology used within the waste arisings methodology in this note differ from those used in the final impact assessment for Simpler Recycling. The assumptions used here are in line with those used in the analysis supporting the residual waste reduction target, where the analytical context takes account of	The Applicant accepts the basis for the methodology deployed as it aligns with similar outcomes to the Defra Note (Annex 1 of Document Reference 9.46

all three reforms that make-up the packaging reforms rather than Simpler Recycling alone.	
A main difference relates to the waste arisings business-as-usual scenario. As outlined above, the residual waste reduction target modelling utilised a number of socio-economic drivers to forecast separate waste streams, for both waste from households and NHM.	The Applicant accepts the basis for the methodology deployed (Annex 1 of Document Reference 9.46).
Other differences include the use of a recovery rate for NHM and the inclusion of food manufacturing waste in NHM in the targets proposal analysis and the proportion of mixed waste codes, that are assumed to be municipal in each assessment.	The Applicant accepts the basis for the methodology deployed (Annex 1 of Document Reference 9.46).
The recovery rate was calculated by measuring the difference between historic non-household municipal residual tonnages (that is calculated using the estimated proportion of waste generated that was not recycled based on estimated NHM recycling rates) and Environment Agency (EA) regulatory historic data (for example, data on waste received at landfill and incineration facilities).	The Applicant accepts the basis for the methodology deployed (Annex 1 of Document Reference 9.46).
In the analysis for the resource efficiency and waste reduction target proposal, 20% of the code 19 12 12 (sorting residues from mechanical sorting of waste) was assumed to originate from construction and demolition activity (and 80% was counted as municipal waste). For the Simpler Recycling final impact assessment, all of code 19 12 12 is deemed municipal.	The Applicant did not address this explicitly in its analysis because it did not use the municipal/non-municipal categorisation. The Applicant has appended the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission that provides detailed analysis on the profile and anomalies of the use of EWC waste codes from waste arisings through aggregation to the final waste destination. This profile also changes significantly between regions.

The effects of packaging reform in the residual waste reduction target modelling includes an 80% 'capture' rate of recyclate that is applied to the tonnages of recycled NHM. The NHM capture rate reflects an estimate of the proportion of businesses that correctly recycle all material all the time. The 80% rate is in line with the central Simpler Recycling scenario. There is some uncertainty associated with this assumption, so a sensitivity using a more conservative (higher residual waste levels) 70% rate has also been modelled within this note, in line with the lower Simpler Recycling sensitivity scenario.	The Applicant's analysis assumed 75-80% recycling of C&I waste (Annex 1 of Document Reference 9.46), depending on scenario (with no regional variation) and so is comparable with Defra's approach. The Applicant has commissioned the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission that provides some analysis on the profile and anomalies of the use of EWC waste codes from waste arisings through aggregation to the final waste destination for both Municipal and C&I waste arisings. This profile also changes significantly between regions. The Applicant would wish to note that not all recyclate is recycled and support Defra's pragmatic approach.
Residual waste forecasts in this note are derived from the ambition level modelling used in the residual waste reduction target analysis. This differs from the method used to calculate the metric for the residual waste reduction target, which is used to report progress against the target in the published statistics notice (https://www.gov.uk/government/statistics/estimates-of- residual-waste-excluding-major-mineral-wastes-and-municipal-residual-waste-in-england). Therefore, residual waste estimates in this note will differ from those in the published statistics notice. Further detail on the methodologies used for the ambition level modelling and the metric can be found in the target's evidence report	The Applicant has commissioned the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission, that provides some analysis on recycling and non-municipal combustible residual waste which has analysed current publicly available data and Freedom of Information requests to reach realistic forecasts.

(https://consult.defra.gov.uk/natural-environment- policy/consultation-on-environmental-targets/supporting_documents/Resource%20efficiency%20and%20waste%20reduction%20targets%20%20Detailed%20evidence%20report.pdf)	The Applicant accepts the basis for the methodology deployed by Defra based on the scope of municipal waste only.
3.2 Infrastructure capacity	
Within this note, residual waste treatment infrastructure capacity refers to the treatment of residual waste through: • domestic energy recovery (either as received or pre-treated by mechanical or biological processes) • exporting as refuse-derived fuel (RDF) for energy recovery overseas • disposal in landfill	The Applicant's analysis also considered these disposal options (Annex 1 of Document Reference 9.46).
Energy recovery operational capacity forecasts are produced by the Waste Infrastructure Delivery Programme (WIDP). These forecasts for energy recovery facilities using municipal solid waste feedstocks in England include EfW, advanced thermal treatment (ATT) and advanced combustion technology (ACT) facilities. The forecast contains 3 categories of infrastructure: 1. operational 2. under construction 3. consented	The Applicant submitted analysis [REP3-040] in which it describes the methodology used to calculate current and future operational capacity. This is broadly similar to Defra's, and considered the same three categories. The analysis yielded similar results recognising the uncertainties involved in projecting into the future.
These forecasts account for operational capacity rather than total permitted capacity. Forecasts assume that facilities will remain operational throughout the assessment period unless there is evidence otherwise.	The Applicant agrees with this approach [REP3-040] given that operating capacity is clearly more certain than the permitted pipeline (where it is unclear how much of this will be realised).

	The Applicant's analysis assumed facilities have an operating life of 50 years. In the Applicant's analysis (Annex 1 of Document Reference 9.46) different capacity scenarios were developed to address uncertainty in the amount of consented capacity which will be realised.
To calculate the forecast operational capacity of operational facilities, WIDP uses average throughput (the last 3 years where available) as a proxy for operational capacity.	The Applicant's analysis used the same approach and so is aligned with the Note (Annex 1 of Document Reference 9.46).
For consented facilities or those under construction, the WIDP forecasts assume that the facilities will operate at 90% of their permitted capacity, however, this capacity estimate is further risk adjusted on a facility-by-facility basis. The risk adjusted capacity of under construction and consented infrastructure is only added to the total available capacity in the year that the facilities are expected to become operational. It is also assumed that once plants come on stream, they will remain operational and will not be decommissioned within the assessment period unless there is evidence to the contrary.	The Applicant accepts the 90% assumption for plants under construction is reasonable, and this assumption was also adopted in the Applicant's own analysis (Annex 1 of Document Reference 9.46). The Applicant included a portion of consented capacity in the Median Capacity case, recognising that not all consented projects will be built owing to consent expiry, loss of grid connection agreements, lack of decarbonisation readiness, or an inability to secure fuel supply contracts in certain regions.
WIDP also incorporates the waste arisings forecast outlined in the section above into their infrastructure forecasts. This is to assess whether there will be sufficient residual waste to warrant currently consented, at the time of forecasting, energy recovery infrastructure being developed (in the forecast). When existing energy recovery capacity (including in- construction) plus the consented capacity due to come on-stream exceeds the annual forecasted tonnages of available residual waste,	The Applicant accepts the basis for the approach deployed by Defra, noting the uncertainty around the realisation of consented projects discussed in the preceding point (Annex 1 of Document Reference 9.46).

it is assumed that any new capacity will not be developed to come on-stream in that year (that is on the risk adjusted date).	
Currently consented capacity is, therefore, capped in reference to forecast residual waste arisings. This is because consented capacity is highly unlikely to be financed for construction unless sufficient waste feedstocks under long term contracts are secured. When existing EfW capacity plus the new capacity due to come online does not exceed annual forecasted tonnages of available residual waste, it is assumed that any new capacity will come online on the risk adjusted date.	This is consistent with the Applicant's view that consented projects will be realised only if there is sufficient residual waste, as they will be unable to secure financing if they cannot demonstrate waste contract commitment. Accordingly, there is little if any risk of overcapacity at the national level whilst noting there is a risk of under capacity as the Note identifies at the regional level in the East of England and the East Midlands. The Defra Note suggests that only consented sites that support the circular economy and Net Zero target will be supported for development in the future
For the energy recovery forecasts included in this note, WIDP used the spring 2024 update of the residual waste arisings forecasts produced to support the Residual Waste Reduction Target (as outlined within the 'Municipal waste arisings' section above).	The Applicant accepts the Defra data source but would note that this update does not appear to be in the public domain. The Applicant's analysis of January 2024 (Annex 1 of Document Reference 9.46) was based on publicly available information at the time and which appears to be broadly in line with the Note.
3.3 Sensitivity analysis	
Due to the limited scope of the analysis and data uncertainty, the results presented in this note should be recognised as a forecast, not a precise prediction. To mitigate the uncertainty associated with the 80% NHM capture rate assumption, a sensitivity	The Applicant acknowledges the Note's recognition of the uncertainties inherent in a forecasting exercise and its pragmatic approach. The scenario approach

analysis using a more conservative (higher residual waste levels) 70% rate has been modelled in Appendix A.	outlined in the Applicant's analysis (Annex 1 of Document Reference 9.46) deal with this by exploring a range of plausible outcomes. The Note shows a need for capacity to serve the East of England and the East Midlands and NHM and accepts the need for some additional capacity to service these needs. As the Applicant has already stated in this response, any overcapacity in the pipeline is unlikely to come forward and manifest itself as operational overcapacity.

4. **Results**	
Extract	NLGEPL Response
4.1 Municipal waste arisings	
Municipal waste refers to household waste and waste from other sources which is similar in nature and composition to household waste, including 'household-like' waste generated by businesses and collected by private contractors.	The Applicant is aligned with this definition
Table 1: Forecasted annual municipal waste arisings, residual waste arisings, and tonnage collected for recycling - 19.4m tonnes residual in 2035 based on a successful ePR	The Applicant is aligned with the Defra forecast in the Note. The Applicant's "Medium Recycling scenario" shows 19.2Mt in 2035 (Annex 1 of Document Reference 9.46) for all residual waste (municipal and non-municipal).

	The Applicant is unsure why the two bottom rows of Table 1 add up to less than the top row. It seems to imply some waste is neither recycled nor counted as residual. 1-19.4/51.1 implies 63% recycled. 29.2/51.1 implies 57% recycling. The recycling figures should include composted waste as well.
Table 1 shows the effect that the packaging reforms are expected to have on the tonnage of municipal waste collected for recycling and, therefore, residual waste arisings. In the business-as-usual scenario (without the effect of the packaging reforms), municipal residual waste arisings are forecast to increase from 23.6Mt in 2020 to 27.8Mt by 2035. When accounting for the effects of packaging reforms, municipal residual waste arisings are forecast to decrease from 23.6Mt in 2020 to 19.4Mt by 2035, alongside a 10.9Mt increase in material collected for recycling.	The Applicant supports the planned outcomes of the new packaging and recycling reforms noting that these represent forecast predictions which remain to be achieved, which is reflected in the analysis submitted (Annex 1 of Document Reference 9.46).
4.2 Forecasted residual waste infrastructure capacity	
As detailed in Table 2, there is 20.6Mt of residual waste infrastructure capacity in England. Of this total, 14.3Mt is energy recovery infrastructure capacity. In the absence of existing facilities ceasing operation, it is forecast that residual waste capacity will reach 24.9Mt in 2035, of which 18.8Mt will be (operational) energy recovery infrastructure. This forecast includes landfill allowance capacity of 10% of municipal waste, as per the target set out in the Waste (England and Wales) Regulations 2011.	The Applicant is aligned with these assumptions but as stated above has chosen to include the combustible element of non-municipal going to landfill as this equates to an additional 3.2m tonnes of waste going to landfill across England in 2023 (Annex 2 para 3(i) of this submission) with 1.6m tonnes being landfilled within a 100-mile radius of the Project that could be recovered (Annex 2 para 3(iii) of this submission) The Applicant's view is that the assumption for landfill allowance for municipal waste should be limited to 2% (equal to the assumed non-combustible fraction of residual waste), as energy recovery above landfill in the waste hierarchy.

Cement kilns are not included within the analysis due to insufficient available data. It is, however, unlikely that excluding cement kilns will have a material effect on total energy recovery capacity as tonnes per annum of residual waste processed in these facilities is likely very small.	The Applicant accepts the approach. The Applicant's own analysis included cement kiln capacity during the examination process (Annex 1 of Document Reference 9.46).
Table 2: Forecasted annual residual waste treatment infrastructure capacity, RDF exports and landfill allowance.	The Applicant submitted analysis of EfW infrastructure capacity [REP3-040] and has presented regional-specific data relating to RDF consumed by EfW facilities including non-municipal waste, exports and landfill in Annex 2 of this submission. This analysis shows the additional non-municipal residual waste that is not included in the Defra model of which 2.8m tonnes per annum is sent to EfWs (Annex 2 para 78 of this submission).
Notes for Table 2: • Mechanical biological treatment (MBT)-type processes do result in mass loss due to moisture loss and some carbon loss, however, this has not been taken into consideration here as it is deemed minimal. • Future RDF exports are forecast using the assumption that RDF exports fall by 20% of new EfW capacity that comes online in the previous year. Forecast MBT capacity is not included in the total as this would be double • counting capacity. Totals may not sum due to rounding. • 2020 capacity being lower than 2020 arisings is due to greater than 10% of municipal arisings being sent to landfill.	The Applicant accepts the Note's assumption and exclusions. See Annex 2 of this submission for commentary on the latest position on RDF exports which show a rise again in exports in 2024 to 1.8m tonnes.
In addition to operational capacity shown in Table 2, Table 3 shows that to date approximately 3.9Mt (permitted capacity) of energy recovery facilities are under construction. Additionally, as of October 2024 a	The Applicant included a portion of consented capacity in the Median Capacity case, (Annex 1 of Document Reference 9.46)

further approximately 9.5Mt of energy recovery (permitted) capacity has received planning consent, but has not yet entered construction. This consented capacity consists almost entirely of proposed merchant EfW facilities that have no underlying local authority contract.	recognising that not all consented projects will be built owing to consent expiry, loss of grid connection agreements, lack of decarbonisation readiness, or an inability to secure fuel supply contracts is certain regions.
While this consented capacity is significant, we do not assume that all consented capacity will be built in addition to existing capacity. Typically, a proposed merchant facility development will first secure planning consent, then gain an environmental permit to operate, and secure a (typically 15- year) contract for the disposal of residual waste feedstock and financing before construction begins.	The Applicant included a portion of consented capacity in the Median Capacity case (Annex 1 of Document Reference 9.46) recognising that not all consented projects will be built owing to consent expiry, loss of grid connection agreements, lack of decarbonisation readiness, or an inability to secure fuel supply contracts is certain regions.
If a consented development cannot secure a long-term contract for feedstock supply, it is highly unlikely that it will receive financing and proceed to construction. Some of this consented capacity may also constitute replacement capacity for existing facilities nearing end of life. Consented capacity, therefore, should be viewed as a pool of potential projects that may or may not be constructed in line with local residual waste management needs	The Applicant agrees that the consented pipeline does not represent overcapacity. It is the potential to meet the need to treat residual waste from both municipal and non-municipal sources, to support the circular economy approach, Net Zero targets and subject to contracts and financing being secured.
Table 3: Operational, under construction and planned energy recovery facilities (including ATTs and ACTs) in England as of October 2024 – 35 consented with total capacity of 9.5m tonnes	Table 3 is broadly in line with the Applicant's own analysis, recognising that the Applicant's analysis was undertaken in January 2024 (Annex 1 of Document Reference 9.46) so will not include developments since then.
4.3 Regional energy recovery infrastructure	

The data presented in Table 3 can be broken down by planning region, as presented in Figure 1. Figure 1 shows that some areas currently have greater operational and under construction energy recovery capacity than local authority collected residual waste arisings, while other regions currently have operational and under construction energy recovery treatment capacity below their volume of local authority collected residual waste arisings.	As an example of this, the Applicant notes the recent decision by the Cambridgeshire Councils to secure a contract to process waste over 400 miles away shows the regional availability of primary capacity and the same movement of waste is shown by the movement of waste out of a region for export and landfill.
This could be for a variety of reasons, including certain areas treating a greater volume of non-local authority collected residual waste via energy recovery or making use of rail networks to source residual waste from a range of locations. Other regions may be in the process of contracting and procuring energy recovery facilities, as alternative treatment options to landfill. Almost all regions currently have total operational and under construction energy recovery capacity lower than overall residual municipal solid waste arisings for that region, reflecting the mix of residual waste treatment options set out in Table 2.	The Applicant agrees with this reasoning.

Figure 1 does show however that there are a number of regions where consented capacity far exceeds municipal residual waste arisings. As detailed above, consented facilities should be considered a pool of potential projects, not a guarantee of development of those facilities. Without securing a contract for managing residual wastes consented facilities are highly unlikely to ever be built. The results presented in Figure 1 should, however, be taken into account by developers and decision makers when determining the need for proposed waste treatment capacity	The Applicant is aligned with the Note's conclusion for the need in the East of England and the East Midlands. The Applicant has identified, in the Waste Trends Summary Report by Footprint Services at Annex 2 78 of this submission, 1.5m tonnes of both Municipal and non-municipal waste going to local landfill and export that has been treated and could be recovered in the East of England and the East Midlands. The two largest pipeline projects in East Midlands are the Boston Alternative Energy Project and Uniper's EMERGE project. The Applicant's research suggests that there is considerable doubt as to whether these projects will proceed [REP3-040]. So far as it is aware, the Boston project has not yet secured an environmental permit. The planning consent for EMERGE expires in March 2025 and there is doubt as to the project's future following Fortum's disposal of its shares in Uniper.
While regard must be given to the proximity principle, which encourages residual waste to be recovered in one of the nearest appropriate facilities, this must not be over-interpreted. It does not require using the absolute closest facility to the exclusion of all other considerations. Accepting waste from, or sending waste to, another council, city, or region in many cases may be the best economic and environmental solution and be the only outcome achievable at a given time that is the most consistent with the proximity principle. The ability to source waste from a range of locations and organisations helps ensure existing capacity is used effectively and efficiently	The Applicant fully supports this policy approach and encourages this to be considered in the planning balance. The Applicant is aligned with the Note in that the proximity principle also applies to where waste is currently treated, as identified in Annex 2 of this submission, of residual waste that could be recovered that is landfilled or exported within a 100-mile radius of the Project.

Figure 1: Operational, under construction and consented energy recovery capacity in England broken down by planning region. Figure 1 shows operational energy recovery capacity (dark blue), in construction capacity (light blue) and consented capacity (grey), broken down by planning region. These are represented in a stacked bar chart, with English regions on the x-axis and tonnes of waste on the y-axis. Residual municipal solid waste arisings for each planning region is shown with a red line, and local authority residual waste arisings for 2022 to 2023 are shown with a yellow line. The data presented in Figure 1 is presented Table 4.	The Applicant included a portion of consented capacity in the Median Capacity case (Annex 1 of Document Reference 9.46), recognising that not all consented projects will be built owing to consent expiry, loss of grid connection agreements, lack of decarbonisation readiness, or an inability to secure fuel supply contracts is certain regions.
Table 4: Operational, under construction and consented energy recovery capacity (Mt) in England broken down by region.	The Applicant agrees with this approach but would note that not all consented projects will be built owing to consent expiry, loss of grid connection agreements, lack of decarbonisation readiness, or an inability to secure fuel supply contracts is certain regions (Annex 1 of Document Reference 9.46).
Regional energy recovery infrastructure – East Midlands, East and North East capacity	
Analysis of the local authority collected waste statistics (https://www.gov.uk/government/statistics/local-authority-collected-waste- management-annual-results) shows that 7 local authorities reported sending more than 40% of their residual waste to landfill in 2022 to 2023, shown in Table 5. These results broadly align with the English regions shown in Figure 1 where the areas with the lowest operational energy recovery facilities (East of England and East Midlands) include 4 of the 7 local authorities who sent more than 40% of their residual waste to landfill.	The Applicant is closely aligned with the Defra data and has provided an analytical breakdown of regional residual waste treatment within a 100-mile radius of the Project in the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission (specifically Section 7 Conclusions 2, 3 & 4). This supports the view that a lack of appropriate EfW capacity leads to higher landfill rates.

Table 5: Residual waste treatment of local authority collected waste 2022 to 2023.	The Applicant is closely aligned with the Defra data and provided an analytical breakdown of regional residual waste treatment within a 100-mile radius of the Project (Annex 2, Conclusions 2, 3, & 4 of this submission).
4.4 Types of residual waste treatment	
Energy Recovery	
Energy recovery is the current and forecast predominant residual waste treatment option, namely EfW facilities. It refers to the process of recovering energy, usually in the form of electricity and heat, but also via conversion of waste into fuels for use in other areas of the economy, via the thermal treatment of waste feedstocks.	The Applicant is aligned with the Note's description. The Applicant has appended analysis of the proportion of residual waste tonnage that is treated through EfW facilities with 20% municipal residual waste being processed in 2023 (Annex 2, para 78 of this submission). Municipal MSW sent to EfWs totals 12m tonnes, but total MSW sent to EfWs in 2023 totals 14.8m tonnes – establishing that 2.8m tonnes of MSW sent to EfWs in 2023 was non-municipal residual waste. This establishes that the Defra capacity model does not include this 2,8m tonnes. (Annex 2 para 78 of this submission).
Between 2024 and 2035, the operational capacity of energy recovery facilities in England is forecast to increase by 4.5Mt. Technologies that are included within the term energy recovery, here, are: • conventional EfW – electricity only • conventional EfW – combined heat and power • ATTs and ACTs – such as gasification and pyrolysis	The Applicant notes that the track record of advanced technologies is very poor, making them un-bankable for many investors. Three such facilities have recently been mothballed due to poor availability. The Applicant agrees that nearly all capacity is based on conventional combustion technology because it is tried, tested and bankable.

ATT and ACT facilities using residual waste as a feedstock, while not currently in widespread use within England, may continue to emerge over the forecast period. This is likely to be driven, for example, by the desire to develop facilities to produce low carbon or recycled carbon fuels, including sustainable aviation fuel or hydrogen, to deliver carbon savings within the transport sector or across other sectors of the economy. Where they have been consented, they have been considered within the consented capacity figure in Table 3. As for all energy recovery facilities, residual waste treatment capacity needs at a national and local level must be considered when designing and planning for these facilities.	See previous comment. The Applicant included consented ATT and ACT projects in its analysis [REP3 040].
Landfill	
Landfill continues to be used as a residual waste disposal option in England. However, in accordance with the waste hierarchy, Defra is seeking to minimise waste to landfill. This is underpinned by the target set out in the Waste (England and Wales) Regulations 2011 to send no more than 10% of municipal waste arising to landfill by 2035, and the decarbonisation pathways that require the near elimination of biodegradable waste sent to landfill from 2028.	The Applicant has commissioned the Footprint Report that provides some analysis on the use of landfill for both Municipal and C&I waste arisings. This profile also changes significantly between regions and demonstrates with the analysis focusing on Yorkshire and Humberside, East Midlands and the East of England with these regions being within a 100-mile radius of the Project. This will support the ability to get below 10% buffer if there is appropriate EfW capacity (Annex 2 Sections 6&7).
EA data (https://data.gov.uk/dataset/237825cb-dc10-4c53-8446-1bcd35614c12/remaining-landfill-capacity) shows that at the end of 2023 (the most recent data available at the time of writing), the total remaining permitted landfill capacity in England was 325,898,697 cubic metres (m3). This includes all landfill types (that is non-hazardous landfill, non-hazardous landfill with a stabilised non-reactive hazardous waste	The Applicant is aligned on the available landfill capacity but has concerns as to whether landfill sites will remain viable and open with reduced tonnages being processed.

cell, inert landfill, hazardous merchant landfill and hazardous restricted landfill).	
The remaining non-hazardous landfill capacity in England was 193,275,182m3 which, using a conversion factor, equates to approximately 224Mt of remaining capacity (conversion factor 1.159 (https://randd.defra.gov.uk/ProjectDetails?ProjectId=20309)). This figure captures the reported remaining capacity of around 250 permitted landfill sites in England.	The Applicant has commissioned the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission, that provides some analysis on the use of landfill for both Municipal and C&I waste arisings. This profile also changes significantly between regions and focuses on the Defra identified capacity shortfall in the East of England and the East Midlands.
Table 2 demonstrates that in order to send less than 10% of municipal waste to landfill by 2035, this would equate to no more than 5.2Mt being disposed of in this way.	The Applicant's observation on the Defra assumption is that 10% of recoverable waste still entering landfill by 2035 is significant volumes of waste given the environmental impacts of landfill, compared with EfW, even if it is a maximum percentage. Assuming (as the Note does) that 2% of residual waste is non-combustible, the aim should be to recover energy from the remainder. The Applicant's analysis assumes that all combustible residual waste is sent for energy recovery if sufficient capacity is available. (Annex 1 of Document Reference 9.46)
RDF exports	
Total RDF exports from England are forecast (based on Defra assumptions) to fall from 2.4Mt in 2020 to 0.5Mt in 2035. This forecast is based on the internal assumption that RDF exports will fall by 20% of the new energy recovery capacity that comes on stream in the previous year.	The Applicant has commissioned the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission, that provides some analysis on the volume of RDF exports for both Municipal and C&I waste arisings within a 100-mile radius of the Project. This profile also changes significantly between regions and is continuing to increase in 2024. The Applicant would note that this figure does not include the 1.6m tonnes of recyclable plastic that is exported from the UK each year for

	which the end use is subject to some concern (as per the Environment, Food and Rural Affairs Committees 'The Price of plastic: ending the toll of plastic waste' report (dated November 2022) [3]. The all-party select committee for Environment, Food, and Rural Affairs (see reference above) had tabled a proposal to ban the export of all plastics for recycling by 2027, all of which would require a capacity for processing in the UK. which will include the additional 18% recycled based on the Defra packaging and recycling measures. The Project has committed to the Plastic recycling Facility in its DCO [REP10-004] to increase the current regional recycling capacity and to further boost the overall recycling rate.
There is, however, uncertainty surrounding the future of RDF exports from England due to external factors, for example the exchange rate and foreign RDF import tax rates, acting as determinants of demand for RDF exports from England. The internal market for RDF may also change in future, with emerging residual waste treatment technologies, such as the conversion of residual waste to transport fuel, seeking to access a greater portion of RDF feedstocks.	See above. The Applicant has commissioned at Annex 2 of this submission, that provides some analysis on the volume of RDF exports for both Municipal and C&I waste arisings. This profile also changes significantly between regions and is continuing to increase in 2024. The volume of RDF exports passing through Immingham and Felixstowe account for 594,000 tonnes of the 1.8m tonnes of exports in 2024.

[3] Environment, Food and Rural Affairs Committee (November 2022). Online: https://publications.parliament.uk/pa/cm5803/cmselect/cmenvfru/22/report.html#:~:text=A%20%E2%80%9Cstrategic%20ambition%20%5B%E2%80%A6%5D,2024%20and%2062%25%20in%202030.

5. **Additional Considerations**	
Extract	NLGEPL Response
While the focus of the analysis within this note relates to the municipal waste forecasts detailed in preceding sections, there are factors outside the scope of this analysis that should be taken into account when considering the management of residual wastes as a whole.	Noted. The Applicant has commissioned the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission, that provides some analysis on the volume of RDF use by EfWs, landfill and exports for both Municipal and C&I waste arisings. This profile also changes significantly between regions which identifies the additional residual waste from non-municipal sources.
5.1 Non-municipal, non-major mineral residual wastes	
In addition to the municipal forecasts outlined above, Defra has published statistics (https://www.gov.uk/government/statistics/estimates-of-residual-waste-excluding-major-mineral-wastes-and-municipal-residual-waste-in-england) estimating the total amount of residual waste (excluding major mineral wastes) and municipal residual waste generated in England.	Noted. The Applicant has commissioned the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission, that provides some analysis on the volume of RDF used by EfWs, landfill and for exports for both Municipal and C&I waste arisings. This profile also changes significantly between regions and focuses on a 100-mile radius of the Project.
In 2022, the estimated amount of residual waste excluding major mineral wastes per person in England was 558.8kg, the equivalent of 31.9Mt. Using these statistics, we can estimate that in 2022 there were approximately 5.4Mt of non-municipal, non-major mineral residual wastes. This figure has been calculated by subtracting the total tonnage of residual municipal waste (published in Defra's Estimates of Residual Waste (Excluding Major Mineral Wastes) and Municipal Residual Waste in	The Applicant presented its analysis a different way, but the estimate of total residual waste for 2022 was much lower than this - around 22Mt. This could be because Defra's figure includes residual waste not suitable for EfW (Annex 1 of Document Reference 9.46). In Annex 1 of the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46)

England (https://www.gov.uk/government/statistics/estimates-of-residual-waste-excluding- major-mineral-wastes-and-municipal-residual-waste-in-england) from the total tonnage of residual waste excluding major mineral wastes.	the Applicant agrees the case for the 31.9Mt figure. The Applicant would note that its submitted analysis scoped this out in using a conservative approach from the outset.
Residual municipal waste includes several waste codes that are not present in the excluding major mineral wastes measure: 20 02 02 (soils and stones) and 20 02 03 (other non-biodegradable waste). This figure is therefore likely to be an underestimation of the total tonnage of non-municipal, non-major mineral waste generated in England that is sent to landfill, put through incineration, or sent overseas for energy recovery.	The Applicant is agreed that this is an underestimation. The Applicant has presented data on non-municipal residual waste in Annex 2 of this submission.
Non-municipal residual wastes not being treated at energy recovery facilities or exported as RDF are likely being managed through disposal at landfill. While Table 2 presents an allowance of 10% municipal residual waste being disposed of in landfill (equating to 5.2Mt in 2035), it is estimated that there is 224Mt non-hazardous landfill capacity in England. As municipal residual wastes decrease, through overall waste reduction and improved recycling, it is likely that headroom for non-municipal residual wastes will become available at existing and under construction energy recovery facilities.	The Applicant agrees with the Note that there is a demand for additional EfW capacity to process non-municipal residual waste, which currently can't be met because there is insufficient headroom at existing and under-construction facilities. The Applicant has presented data on the 10% landfill assumption earlier in this response document.
While total available capacity will be in part determined by changes in waste composition and calorific value, as well as other controls on throughput, every effort should be made to utilise this existing capacity and maximise efficiency of these assets rather than developing additional stand-alone facilities, leading to potential risk of over-capacity of energy recovery facilities in England and the creation of stranded assets.	The Applicant is aligned with this view whilst recognising that there should be an opportunity for competitive forces to allow inefficient and non-CCS-ready capacity to be succeeded by more efficient CCS-ready facilities.

It is recognised, however, that additional energy recovery facilities may be required. In particular to support the near elimination of biodegradable waste being disposed in landfill, although every effort should be made to minimise or recycle those wastes. This could result in development of residual waste treatment capacity over the coming years in excess of our infrastructure requirements in line with the long-term residual waste reduction target in 2042. However, as further wastes are prevented and recycling improves to meet this target, and deliver a circular economy, it is likely that the oldest, least efficient facilities or those facilities that are no longer viable will be decommissioned.	The Applicant agrees with this point and recognises that the market is dynamic and that competition will result in removal of some existing facilities which are less efficient and not future proofed, and some of those in the pipeline.
Important to this success will be preventing recyclable material, now or in the future, being locked into long-term contracts for residual waste treatment. To this end, the Simpler Recycling policy update on 29 November 2024 (https://www.gov.uk/government/publications/simpler-recycling-in-england-2024 (https://www.gov.uk/government/publications/simpler-recycling-in-england- policy -update) set out the new default requirements and local authorities flexibility to suit local need.	The Applicant agrees with this approach.
5.2 Persistent organic pollutants (POPs)	
Waste incineration, including EfW facilities, play an important role in destroying POPs that are present in municipal and other wastes. While POPs can be present in mixed municipal waste, some waste incinerators also accept segregated POPs waste streams, such as waste upholstered domestic seating and plastic from waste electrical and electronic equipment.	The Applicant acknowledges the role that EFW may play in the management of these waste streams. Its conservative approach to the assessment of residual waste fuel has not considered these separately and may underestimate the need for recovery as a result.

These waste streams are currently a relatively small percentage of residual wastes, amounting to approximately 200 to 300 kilotonnes (kt) per year in England. However, arisings of waste containing POPs are likely to increase, potentially significantly, as waste producers and regulators identify more wastes containing POPs, and as legislation is updated, including as a result of new POPs listings agreed by parties to the UN Stockholm Convention. Our preliminary analysis suggests that by 2025 up to a further 106 to 158kt per year of plastic and construction waste could require incineration and, beyond this, there is also up to 2.5Mt per year of waste that contains chlorinated paraffins that may require incineration.	The Applicant did not specifically consider these waste streams in its assessment of residual waste fuel, but recognises the potential need for EfW capacity in order to treat them appropriately. As a result, the Applicant's conservative approach may underestimate the need for recovery through EfW.
This preliminary analysis is highly uncertain due to several factors including the estimate of presence of POPs being based on limited literature across countries, the size of the waste streams, where the waste is currently destined for (EfW or landfill), the international position on what levels of POPs in waste are considered to be 'low' and thus may not require destruction, and the timing and nature of subsequent updates to domestic legislation.	The Applicant's analysis did not specifically take account of the potential for growth of waste containing POPs requiring destruction via combustion.
This analysis will need further verification through sampling and testing and engagement with industry to assess the amounts of POPs present in waste. This analysis is also likely to be an overestimate as the quantity of waste requiring incineration will be reduced through treatment (for example targeting of affected POPs-rich components rather than whole items) and by regulators taking targeted action. The timing of these effects is also uncertain.	Noted. The Applicant will follow the planned verification by Defra.

While not specifically identified within the municipal residual waste forecasts detailed within this note, the management of POPs and the need to incinerate these wastes will play an important role in determining the required level of residual waste infrastructure.	The Applicant's analysis did not specifically take account of potential growth of these waste streams. The Applicant recognises that the need to destroy POPs in waste may influence the required level of residual waste infrastructure.
5.3 Composition of residual waste and calorific value	
As well as changes in the total tonnage, the packaging reforms and the forthcoming expansion of the UK Emissions Trading Scheme (https://www.gov.uk/government/consultations/uk-emissions-trading-scheme-scope- expansion-waste) to include fossil carbon emissions from waste incineration and EfW, may lead to changes in the composition of municipal residual waste. In particular, through removing or incentivising the removal of greater quantities of plastics from the residual waste stream, such as through the separate collection of plastic films.	The Applicant is cognisant of the potential impact on the profile of future waste streams and the pressure that will be placed on waste management to handle increased volumes of plastic packaging coupled with the need to export 60% of current packaging waste[4] and has included the plastics recycling facility as a future proofing / efficiency measure (see Annex 3 of this submission) to further sort and recycle the RDF waste stream to increase the recycling rate and to maintain a high biogenic content to the energy recovery facility. This will also impact the calorific value of the combusted portion of the waste stream as the removal of plastics will reduce the net calorific value of the waste processed by the ERF.
This may affect the calorific value of residual waste, which is a measure of how much energy is available per tonne of waste. The higher the calorific value, the more energy can potentially be captured from the waste. Different waste components have different individual calorific values for example, food waste tends to have a relatively low value due to its high moisture content, while plastic has a much higher one. Differing proportions of these will therefore change the overall calorific value.	

[4] Environment, Food and Rural Affairs Committee (November 2022). Online: https://publications.parliament.uk/pa/cm5803/cmselect/cmenvfru/22/report.html#:~:text=A%20%E2%80%9Cstrategic%20ambition%20%5B%E2%80%A6%5D,2024%20and%2062%25%20in%202030.

The volume of waste that may be processed through an EfW facility is partly determined by the calorific value of the waste combusted. In simple terms, should calorific value increase, the facility may have to process less waste to moderate combustion temperatures, should calorific value decrease, the facility may be able to process more waste within operational thermal parameters. If residual municipal waste composition changes significantly in future, this may affect the calorific value of the residual waste requiring treatment and, consequently, on the effective operational capacity of existing facilities. It is important to note, however, that any effect may also be governed by additional technical and regulatory considerations, such as bunker capacity and grate loading limits, or planning and permitting conditions the facility may be subject to.	
These considerations are not part of the analysis undertaken in this note. Some technologies can cope with a broad range of calorific values and water content, while others require much more specific levels to operate efficiently, meaning the likely effect of any calorific value changes will be highly facility specific and dependent on a complex set of considerations.	
Regardless, this is an important consideration and energy recovery processes, including those planning for new or replacement facilities, need to ensure that their requirements do not act as a brake, or hindrance to improved recycling, or risk being unviable due to changes in calorific value. Approaches need to be flexible enough to cope with such change or to seek out routes, with due consideration to the waste hierarchy, to rebalance the calorific value whilst minimising the fossil content of waste going to energy recovery.	
5.4 Long-term residual waste reduction target	

Based on current population growth estimates and the legally binding target for the total mass of residual waste (excluding major mineral wastes) to not exceed 287kg per person, the total volume of all residual waste (excluding major mineral wastes) in England in 2042 will need to be at most approximately 17.6Mt.	The Applicant defined three scenarios for waste arisings in Annex 1 to the Applicant's response to request for further information by the Secretary of State (Document Reference 9.46) which were subsequently updated - High Recycling, Median Recycling, and Low Recycling. The resulting figures for total residual water per capita in 2042 are 255kg, 310kg, and 367kg respectively. This approach recognises Defra's statement in the Residual Waste Infrastructure Note (the "Note") that "*detailed policies to achieve reductions beyond the packaging reforms and create the circular economy have not yet been developed. Detailed analysis and forecasts of residual waste arisings post-2035 are, therefore, not currently possible*." Our approach recognises this difficulty by defining a range of plausible scenarios to address future uncertainty whilst accepting the targets set.

6. **Conclusion**	
Extract	NLGEPL Response
This note is intended to support decision makers in planning for residual waste treatment needs and to support our national resources and deliver a circular economy. The analysis presented here will support the planning process and should be given due consideration when proposing, designing, or considering residual waste infrastructure treatment needs. The results presented should be used to ensure that we do not deliver overcapacity, especially where this risks compromising waste prevention or recycling now or in the future.	The Applicant has given the Note full consideration and considers Defra's analysis to broadly align with its approach and assumptions in considering the need for additional regional residual waste infrastructure. As a result, the Applicant has put forward additional DCO requirement commitments to ensure it will not deliver overcapacity and will meet the increase in the recycling rate with the Plastics Recycling Facility (proposed amendments to

	requirement 23 (PRF) of the draft DCO)) (see Annex 3 of this submission) and establishing that capacity needs identified in the East Midlands region and capacity at the regional level is not exceeded (Annex 2 Section 8&9 of this submission).
Results of the analysis undertaken in this note are presented in Figure 2, which demonstrates that the government is on track to send less than 10% of municipal waste to landfill by 2035, at least in terms of residual waste infrastructure provision. This is based on modelling the implementation of EPR for packaging in 2025, Simpler Recycling for non-micro businesses in 2025, households in 2026, and micro businesses in 2027, which will require collections for dry recyclable materials and food and garden waste, unless a transitional arrangement applies, and a DRS for drinks containers in 2027. The modelling undertaken demonstrates that, following implementation of these policies, there will be sufficient residual waste energy recovery (including waste incineration) infrastructure capacity to treat forecast municipal residual waste arisings at a national level.	The Applicant notes that non-municipal waste arisings were not included in the Note's analysis, and that this could add a further 3.2m tonnes per year of combustible but non-recyclable waste (Annex 2 Section 7.4 of this submission). The Note's analysis assumes that around 5m tonnes of municipal waste per annum will continue to be landfilled. The Applicant's view is that a large proportion of this is combustible and should be processed through energy recovery rather than be landfilled based on the established waste hierarchy. This would be commercially and environmentally more efficient. The Applicant further notes that the need to decarbonise the waste sector will drive a need to fit carbon capture to EfW facilities, and that this will not be possible technically or economically at all existing facilities. Hence this will drive a need for new more efficient installations which are CCS-ready. The Applicant further notes that the Note's analysis identifies a shortage of capacity in certain regions. These include East Midlands and East of England – the Project is well placed and will help to serve these regions (Annex 2 Section 7 of this submission).
Figure 2: Forecast residual waste infrastructure capacity and municipal waste arisings (2020 to 2035) – packaging reforms with 80% NHM capture rate, from internal Defra analysis.	The Applicant accepts the Defra approach.

Figure 2 information: Figure 2 includes blue and red dashed lines that show forecast municipal waste arisings. Total municipal solid waste arisings (red line) are forecast to increase across 2020 to 2035, from 45.2Mt to 51.1Mt. The tonnage of municipal solid waste sent to residual waste treatments (blue line) is forecast to decrease from 23.6Mt in 2020 to 19.4Mt in 2035. The blue line shows a clear reduction in residual waste as a result of the implementation of the packaging reforms, as more waste is moved out of residual waste treatments and into recycling. The shaded areas represent residual waste treatment capacity, with the green dashed line showing the total infrastructure capacity including RDF exports and an allowance of sending 10% municipal residual waste to landfill.	The Applicant has commissioned the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission, that provides some analysis on the volume of waste arisings for both municipal and non-municipal waste that identifies current trends in waste treatment. This profile also changes significantly between regions as identified for the East of England and the East Midlands in a 100-mile radius of the Project (Annex 2 Section 7 of this submission). The Applicant restates its view that only the non-combustible fraction of municipal residual waste (around 2%) should be sent to landfill. Energy recovery should be the preferred disposal option for the remainder given its position in the waste hierarchy which would add to the capacity required.
The evidence presented in this note identifies that there are certain areas in England, in particular East Midlands and East of England, where alternative treatment options to landfill for municipal residual wastes is currently required.	The Applicant is aligned with the Defra Note in identifying the East of England and the East Midlands being short on EfW capacity for municipal residual waste, plus the recognition that additional capacity will be required for the combustible residual non-municipal waste (Annex 2, Section 7,8&9 of this submission).
The assessment undertaken does not consider treatment needs for non-municipal residual wastes. While some non-municipal residual wastes disposed of in landfill could be managed through existing energy recovery facilities as volumes of municipal residual waste reduce, creating 'headroom', it may be that alternative or additional facilities are required to divert these wastes, where they cannot be prevented or recycled, away from landfill. Alternatively, declining municipal residual waste volumes may facilitate the decommissioning of older, less efficient	The Applicant has included analysis by Footprint Services of regional waste arisings within a 100-mile radius of the Project. This analysis demonstrates a need for additional energy recovery capacity (Annex 2 Section 7,8&9 of this submission). The Applicant also identified that some EfW facilities would reach end of life before 2035 which included likely decommissioning of facilities that did not achieve the R1 standard and would be unlikely to deliver carbon capture [REP3-040].

residual waste management infrastructure in some areas to avoid over-capacity.	
Based on current population growth estimates, the total volume of residual waste (excluding major mineral wastes) in England in 2042 will need to be at most approximately 17.6Mt to meet the government's legally binding residual waste environmental target. This is for both municipal and non- municipal residual wastes, and acts as a long-term signal for our residual waste treatment capacity needs that should be taken into account when planning or considering residual waste treatment infrastructure.	The Applicant is aligned with the Note on the targets adopted and the importance of the non-municipal residual waste treatment to achieve these targets (Annex 2 para 34 of this submission).
While there are a number of waste incineration facilities that are consented, but not yet under construction, these will not be brought forward to construction if sufficient waste volumes cannot be secured via contracts to make a proposed development financially viable.	The Applicant is aligned to Defra on this point and has responded with additional reasons why consented sites may not be built. The grid connection queue reforms in the electricity sector could result in some of these sites losing their grid connection including the Hams Hall site in Birmingham. The planning portal shows over 50% of the sites with planning consent having expired. Some consented sites do not appear to have obtained an environmental permit yet, and we also note that the Government proposes to extend Decarbonisation Readiness criteria to projects applying for permits from March 2026. Many consented sites are small sites and may not meet the proposed criteria, and most are not adjacent to any planned carbon capture infrastructure. Based on these factors, the Applicant's analysis in January 2024 assumed in our submitted forecasts, that 50% of consented pipeline projects are realised (REP3-040).

The government is committed to transitioning to a circular economy, in which we maximise resource use and minimise residual waste arisings. Where residual wastes do occur, they should be managed in the most efficient manner. This means that we will only support the development of further residual waste treatment infrastructure where they meet a clearly defined need to facilitate the diversion of non-recyclable waste away from landfill, or enable the replacement of older, less-efficient facilities.	The Applicant is totally aligned with this commitment and has demonstrated increased recycling with the Plastic recycling Facility (see Annex 3 of this submission), a Project that exemplifies the circular economy principles with up to 41% of the residual waste being recycled or reused by the Project (Ref response 1a in this table) being re-used or recycled.
The data in this note suggests that while we are approaching a point where national residual waste treatment capacity is sufficient to manage municipal residual wastes, there are regional variations. Evidence also suggests that alternatives are required to support the diversion of non-municipal wastes from landfill.	The Applicant is aligned with the Note, noting the regional capacity demands and the need to provide capacity for non-municipal residual waste (Annex 2 Section 7,8&9 of this submission).
We do not, however, support the development of overcapacity of energy recovery infrastructure in England and will work to strengthen planning considerations to ensure that this does not happen. For those energy recovery developments we do need, we will only support projects that offer the best efficiency and are future proofed towards supporting our net zero objectives. This means that further developments must be able to demonstrate that making use of the heat they produce is viable and that they can be built carbon capture ready, in accordance with the government's 'decarbonisation readiness' requirements once they come into force. The government will also explore how to incentivise the decommissioning of facilities that are less efficient, cannot support our net zero objectives or are no longer required.	The Applicant is aligned with this approach to avoid operational over-capacity. It recognises the need for additional capacity in some regions and the need to transition to EfW facilities that support the circular economy and the Net Zero commitments (Annex 2 Section 7 of this submission). The Applicant's draft DCO already commits to delivery of the carbon capture utilisation and storage facility (**CCUS**), which must be constructed and commissioned within 6 months of the commissioning of the ERF (requirement 18), and that the CCUS will capture a minimum quantity of CO_2 (requirement 19). The Applicant's proposed amendment to DCO requirement 17 commits to construction of the northern spur of the DHN and to DCO requirement 23 commits to construction and commissioning of the plastic recycling facility. In this way, the Proposed

	Development is therefore future proofed towards supporting net zero objectives.

Appendix A – sensitivity analysis	
Extract	NLGEPL Response
Packaging reforms impact sensitivity: 70% NHM capture rate	
The effect of the packaging reforms in the residual waste reduction target modelling used in the main analysis above includes an 80% 'capture' rate of recyclate that is applied to the tonnages of recycled NHM. The non-household municipal capture rate reflects an estimate of the proportion of businesses that correctly recycle all material all the time. The 80% rate is in line with the central Simpler Recycling scenario. To mitigate the uncertainty associated with this assumption, a sensitivity analysis using a more conservative (higher residual waste levels) 70% rate has been modelled, as presented in Figure 3. In the sensitivity scenario municipal residual waste in 2035 is forecast to be 21.5Mt, compared to 19.4Mt in the main scenario	The Applicant undertook its analysis in a different way, with an estimate of total residual waste for 2035 of 19.2Mt in its Median Scenario and 22.6Mt in its Lower Recycling scenario but the output on the numbers is comparable (Annex 1 of Document Reference 9.46).
The results in the sensitivity scenario indicate that there will be sufficient residual waste infrastructure capacity to send less than 10% municipal waste to landfill by 2035. In 2035, total residual waste infrastructure capacity is forecast to be 24.9Mt (including an allowance of no more than 10% municipal waste to landfill) in comparison to 21.5Mt of municipal residual waste.	The Applicant notes that non-municipal waste arisings were not included in the Note's analysis, and that this could add a further 3.2m tonnes per year to combustible but non-recyclable waste (Annex 2 para 77 of this submission). The Note's analysis assumes that around 5m tonnes of municipal waste per annum will continue to be landfilled. The Applicant view is that a large proportion of this is combustible and should be processed through energy recovery rather than be landfilled based on the established waste hierarchy. This would be commercially and environmentally more efficient. The Applicant further notes that the need to decarbonise the waste sector will drive a need to fit carbon capture of EfW facilities, and that this will not be possible technically or economically at all existing facilities. Hence this may drive a need for new more efficient installations which are CCS-ready.

	The Applicant restates its view that only the non-combustible fraction of municipal residual waste (around 2%) should be sent to landfill. Energy recovery should be the preferred disposal option for the remainder given its position in the waste hierarchy.
Figure 3: Sensitivity analysis: residual waste infrastructure capacity and municipal waste arisings (2020 to 2035) – packaging reforms with 70% NHM capture rate from internal Defra analysis.	The Applicant is aligned with the Note, noting the regional capacity demands and the need to provide capacity for non-municipal residual waste (Annex 2 Section 7,8&9 of this submission).
Figure 3 information: Figure 3 represents the sensitivity scenario which models a NHM capture rate of 70%. It includes blue and red dashed lines that show forecast municipal waste arisings. Total municipal solid waste arisings (red line) are forecast to increase across 2020-2035, from 45.2Mt to 51.1Mt. The tonnage of municipal solid waste sent to residual waste treatments (blue line) is forecast to decrease from 23.6Mt in 2020 to 21.5Mt in 2035. The blue line shows a clear reduction in residual waste as a result of the implementation of the packaging reforms, as more waste is moved out of residual waste treatments and into recycling. This reduction is smaller than the main scenario (Figure 2), which assumes an 80% non-household municipal capture rate. The shaded areas represent residual waste treatment capacity, with the green dashed line showing the total infrastructure capacity including RDF exports and an allowance of sending 10% municipal residual waste to landfill.	The Applicant notes the sensitivity analysis indicates a potential need for more regional EfW capacity.
Under the sensitivity scenario, while there are greater forecast volumes of municipal residual waste, it is not until 2039 that this is forecast to result in additional energy recovery capacity coming online, beyond that which comes online in the main scenario (assuming no further policy	The Applicant notes the economic and environmental pressure to introduce carbon capture for the recovery of both municipal and non-municipal waste by 2028[5] which will increase capacity demand for facilities where CO_2 can be captured, utilised and/or

[5] https://www.theccc.org.uk/wp-content/uploads/2024/11/Letter-CCC-response-to-advice-on-implementing-the-expansion-of-the-UK-ETS.pdf

interventions or other factors minimise residual waste). This is due to the assumption that energy recovery capacity will not come online if existing operational capacity plus new capacity exceeds available residual waste. Therefore, under the 70% non-household municipal scenario it is assumed that more municipal residual waste is sent to landfill.	sequestered. The option to use landfill environmentally and commercially should not be the first choice. Recycling, reuse and energy recovery should be prioritised above landfill.

Appendix B – assumptions and limitations	
Extract	NLGEPL Response
Limitations	
There are a number of limitations that have been identified and should be taken into account when viewing these results. These include the following.	The Applicant is aligned with the identified limitations and has included some additional comments below
The future policies within scope of the analysis are the packaging reforms	
There are other proposed policies and external forces that may affect the volume, composition, and treatment of residual waste over time that have not been accounted for within this analysis. For example, the Plastic Packaging Tax (https://www.gov.uk/government/collections/plastic-packaging-tax), intended expansion of the UK Emissions Trading Scheme to include waste incineration and EfW (https://www.gov.uk/government/consultations/uk-emissions- trading-	The Applicant notes the waste industry's experience that the unintended consequence of the Plastic Packaging Tax has been that some manufacturers have reduced the recycling option to 30% as it is commercially preferential, as per the Environment, Food and Rural Affairs Committee report[6]. The expansion of the UKETS will have a profound impact on local authorities who have calculated that the carbon-tax levied on waste that is not recycled will have an annual cost of £747m

[6] Environment, Food and Rural Affairs Committee (November 2022). Online: https://publications.parliament.uk/pa/cm5803/cmselect/cmenvfru/22/report.html#:~:text=A%20%E2%80%9Cstrategic%20ambition%20%5B%E2%80%A6%5D,2024%20and%2062%25%20in%202030.

scheme-scope-expansion-waste), the near elimination of biodegradable waste to landfill (https://www.gov.uk/government/consultations/near-elimination-of- biodegradable-waste-to-landfill), the introduction of mandatory waste tracking (https://consult.defra.gov.uk/environmental-quality/waste-tracking/), or the transition to a circular economy	per annum in 2028 and £1.1bn by 2036[7] unless the EfW estate is upgraded to include carbon capture. The option to upgrade existing EfW facilities will depend on land availability, proximity to a carbon pipeline or non-pipeline transport and the cost per tonne of fitting carbon capture considering the current carbon price. The elimination of biodegradable waste from landfill is estimated to equate to 1m tonnes per annum in 2022 with 53% (5m tonnes per annum) of the UK's food waste is already going to EfWs for incineration[8]. The Applicant supports the tracking of waste and the move towards a circular economy.
Data uncertainty surrounding non-household municipal arisings	
Comparisons between NHM arisings forecasts and data on all wastes received at permitted waste sites suggests forecasts may overestimate the tonnage of NHM that reaches residual waste treatment infrastructure. To account for this, a recovery rate has been applied to NHM arisings reflecting process losses, waste treated in the devolved governments and data limitations.	The Applicant has commissioned the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission that provides some analysis on the volume of waste arisings for both municipal and non-municipal waste that identifies current trends in waste treatment. The report contains analysis of the current trends in recycling at Section 4 which suggests that the targets are challenging. This profile also changes significantly between regions.
This analysis does not consider EfW capacity in context of combustible non-municipal residual waste arisings	

[7] https://www.local.gov.uk/parliament/briefings-and-responses/lga-response-consultation-desnz-uk-emissions-trading-scheme
[8] https://www.wrap.ngo/sites/default/files/2024-01/WRAP-Food-Surplus-and-Waste-in-the-UK-Key-Facts%20November-2023.pdf

Defra's estimates of residual waste (excluding major mineral wastes) and municipal residual waste in England estimate that in 2020 total residual waste (excluding major mineral wastes) arising were 31.9Mt, of which 26.5Mt were municipal residual wastes. The assumed 5.4Mt of non-municipal residual wastes are not included in this analysis	The Waste Trends Summary Report by Footprint Services at Annex 2 of this submission commissioned by the Applicant estimates that around 3.2Mt of combustible C&I waste is currently landfilled in England, of which 1.6m is within 100 miles of the Project.
However, it is likely that a significant proportion of these non-municipal wastes are combustible and will require alternative treatment to landfill, in accordance with the waste hierarchy. While some of this waste could be managed as capacity becomes available in existing facilities, it is possible that energy recovery capacity may need to grow beyond our projections for facilities to be developed to process combustible non-municipal residual waste and divert this waste from landfill.	The Waste Trends Summary Report by Footprint Services at Annex 2 of this submission estimates that of the non-municipal waste arisings, 50% are deemed combustible at Section 3.3. Of this combustible non-municipal waste arising, 1.6m tonnes per annum are currently landfilled within 100 miles of the Project (Annex 2 para 72 of this submission). The Applicant has previously shared the MoU documents agreed with waste aggregators (see Annex 3 Document Reference 9.46) who treat, landfill and export some of these non-municipal waste arisings and are all located within the East Midlands. Applicant's project will meet the need for such non-municipal wastes in the East Midlands.
Uncertainty surrounding the realisation of energy recover capacity forecasts	
This has, in part, been mitigated by adjusting energy recovery operational capacity forecasts in reference to forecasted tonnages of available residual waste.	The Applicant agrees with a level of uncertainty on energy recovery capacity forecast for all the reasons we have included in our response [REP3-040]. The additional waste associated with residual non-municipal waste, which is out of scope for the Defra Note, would suggest that lack of operational capacity will cause more waste to enter landfill than modelled in the Defra Note.

Uncertainty surrounding RDF export forecasts	
Future levels of RDF exports will likely be influenced by factors such as the exchange rate and spare residual waste infrastructure capacity in Europe	The Applicant's analysis assumes exports decline to zero over time as it believes it is not prudent to assume that exports will always be possible, and that the UK should be 'self-sufficient' in waste treatment. Annex 2 of this submission shows that 336,000 tonnes of RDF were exported through Immingham. in 2024 – a 34% increase (Annex 2, Conclusion 4 of this submission) The Project is expected to treat some of this residual waste which would otherwise be exported.
This analysis is not an environmental assessment of where is best to send residual waste	
Instead it is a capacity assessment of England's residual waste infrastructure capacity whilst sending less than 10% of municipal solid waste to landfill by 2035.	The Applicant restates its view that only the non-combustible fraction of municipal residual waste (around 2%) should be sent to landfill. Energy recovery should be the preferred disposal option for the remainder given its position in the waste hierarchy.
Assumptions	
Table 6: summary of assumptions and associated uncertainties	The Applicants high, median and low scenarios for residual waste arising reflect this uncertainty (Annex 1 of Document Reference 9.46).
The residual waste forecast assumes that the effects of the packaging reforms are in line with packaging reforms impact assessment modelling at the time of analysis	The Applicant's analysis modelled a range of recycling scenarios to take account of the packaging reforms and the need for further measures to achieve the municipal waste recycling target of 65% by 2035 (Annex 1 of Document Reference 9.46).

	The Applicant welcomes the initiatives by Defra but as noted, although the new measures still do not secure this target without additional incentives. During the period that is needed to attain this level of recycling, additional waste arising will go to landfill.
An approximate 13 percentage point recovery rate is added to the NHM recycling rate to arrive at the non-residual rate	The Applicant's analysis also assumed a higher recycling rate for C&I waste compared to household waste (Annex 1 of Document Reference 9.46).
The modelling of the effects of the packaging reforms on residual waste levels uses an 80% 'capture' rate of recyclate that is applied to the tonnages of recycled NHM	The Applicant's analysis assumes recycling rates for C&I waste in the range 75-80% depending on the scenario (Annex 1 of Document Reference 9.46).
Refuse derived fuel exports fall by 20% of new energy recovery capacity that comes online in the previous year	The Applicant's analysis assumed exports decline to zero by 2035 (Annex 1 of Document Reference 9.46).
Currently consented (as of October 2024) energy recovery capacity will not come online if existing operational capacity plus new capacity exceeds available residual waste	The Applicant agrees that consented pipeline projects will not be realised if they are unable to secure a supply of residual waste. The Applicant included a portion of consented capacity in the Median Capacity case, [REP3-040] recognising that not all consented projects will be built owing to consent expiry, loss of grid connection agreements, lack of decarbonisation readiness, or an inability to secure fuel supply contracts is certain regions.
Energy recovery forecasts assume that facilities will remain operational throughout the assessment period unless there is evidence otherwise	The Applicant notes the Note's assumption on operational facilities whilst recognising: i) Facilities will have a technical operating lifetime beyond which

	it is not economic to keep running (The Applicant's analysis assumed 50 years. [REP3-040]. ii) The need to decarbonise the waste sector to meet Net Zero will means that existing facilities without the ability to economically install carbon capture may be succeeded by new facilities which can fit carbon capture.
2% of residual municipal solid waste is assumed to be unprocessable at energy recovery plants and is sent to landfill	The Applicant notes the 2% figure being assumed as "un-processable" – this is a reasonable assumption. The Applicant's analysis assumes only non-combustible waste should continue to go to landfill (Annex 1 of Document Reference 9.46). Note – the Project will recycle all the bottom ash, flue gas residues, metal and aggregate. It is envisaged that no residues from the facility will be landfilled.
Non-municipal wastes are not contained within these forecasts.	The Applicant's analysis included non-municipal wastes. The Applicant has commissioned the Waste Trends Summary Report by Footprint Services at Annex 2 of this submission, that provides some analysis on the volume of waste arisings for both municipal and non-municipal waste that identifies current trends in waste treatment. This profile also changes significantly between regions (Annex 2 Sections 7,8&9).
Residual waste forecasts are derived from the ambition level modelling used in the Residual Waste Reduction Target analysis, rather than the method used to calculate the metric for the target.	The Applicant is aligned with this assumption noting its overall projection for total residual waste appears more conservative than the Defra analysis (Annex 1 of Document Reference 9.46).

Appendix C – energy recovery and local authorities	
Extract	NLGEPL Response
Evolution of energy recovery in England	
Energy recovery from residual waste has grown significantly over the last 20 years. In 2000 approximately 2.4Mt (10%) of local authority residual waste in England was treated through 9 EfW facilities. There were 50 operational energy recovery facilities in England as of October 2024. The development of energy recovery capacity since 2000 can be described as follows.	The Applicant agrees with this statement (Annex 2 Section 5.2 of this submission).
Initial phase of development	
The initial phase of development (2006 to 2019) was led by the local authority sector through the Private Finance Initiative (PFI) or Public Private Partnership (PPP) contractual arrangements. These contractual arrangements were based on 25-year operational lives and provided the operator with a guaranteed minimum tonnage of waste or exclusivity rights over the waste arising in the local authority catchment. Essentially, the guaranteed minimum tonnage of waste was 'locked up' for a 25-year period.	The Applicant is aligned to the Defra description and would add that the guaranteed minimum tonnage in some contracts is now zero to leave local authorities more flexibility in future waste management. Many of the merchant contracts which are now the majority of contracts awarded are zero-based contracts[9].
At the end of the 25-year period the EfW plant would revert to the local authority who, at this point can decide to continue to operate the facility or decommission it. This decision would be taken in context of the local	The Applicant is aligned with this analysis but would note that the same issue will face these plants with the need for CO_2 capture.

[9] https://www.contractsfinder.service.gov.uk

authority's continuing waste management needs, in addition to the technical and commercial viability of continuing to operate the EfW plant.	
Some local authorities decided not to go down the PPP route, preferring instead to rely on capacity being developed by others (including overseas operators). In this case the local authorities were able to procure capacity based on simple service-based contracts of typically 5 to 10 years duration.	The Applicant notes and agrees this point and is aligned with Defra on the potential impact on residual waste treatment with shared contracts and shorter duration to maintain flexibility for future waste management strategies.
Second phase of development	
The second phase of development covers the period from 2020. New developments are primarily led by the private or 'merchant' sector ('M' in Figure 4). Here there is no underlying local authority contract. Instead, the contractual guarantees for supply of waste are provided by waste management companies who act as aggregators of waste. These companies are generally able to provide guaranteed minimum tonnages of approximately 15 years to developers who then raise the finance for the plant.	The Applicant envisages that local authorities will choose to process non-recyclable waste in a facility offering carbon capture to limit the financial exposure of the UKETS changes and to meet their own Net Zero policies.
The development of EfW capacity since 2006 is illustrated in Figure 4, which counts local authority third party usage under the PPP banner and highlights recent merchant capacity development. The data in Figure 4 is taken from WIDP forecasts	The Applicant is aligned with the operational facilities and the facilities under construction with these factors included in the analysis submitted as part of the DCO application [REP3-040].
Figure 4 information: Figure 4 is a stacked bar chart showing how energy recovery capacity and contract types for energy recovery facilities have changed since 2006, and how it is projected to change to 2027. It shows that overall the number of facilities (yellow line) has increased from 16 in 2006, to 50 in 2024 and a forecast 63 in 2027. Between 2006 and 2027, PPP contracts (in blue) are the most common. Numbers of PFI contracts (in orange) increase between 2011 and 2019, but still represent a minority of	The Applicant notes the changing pressures on waste authorities to secure greater flexibility in waste contracting that encourage targets on recycling but will all need to address the issue of carbon taxes. The change in profile of facilities to more merchant facilities supports the earlier conclusion by Defra that such facilities will not be built if they are not well placed to meet remaining

contracts. Between 2019 and 2027, the number of merchant contracts (that have no underlying local authority contract) (in grey) have grown and are forecast to grow significantly, increasing from approximately 2% of total contracted tonnage in 2019 to approximately 33% of contracted tonnage in 2027	capacity needs with sufficient contracts in place AND are future proofed with carbon capture, use of heat and the changes planned to the UKETS before 2028.
Local Authority contracts	
As shown in Figure 5, local authority contracted capacity for energy recovery will decline over time through contracts coming to an end, unless they are renewed, with most existing local authority developments reaching end of contract life by the mid-2040s. Contracts will only be renewed if there is residual waste requiring treatment and the existing facility continues to represent a commercially viable treatment solution. This will allow energy recovery infrastructure capacity levels to adapt to reducing volumes of residual waste in the longer term.	The Applicant is aligned with the Note's assessment and notes that future contracts will need to reflect a dependency on waste sorting and cleaning infrastructure to capacity to deliver a 65% recycling target by 2035 and ensure that overcapacity in market does not materialise
Where local authority contracts are renewed, these will typically be on a 5-to-10-year basis, through an operating and maintenance contract if it is a local authority's primary residual waste management facility or a service contract for a third party local authority. Further 25-year contracts would only be seen in the case of new local authority facilities	The Applicant is aligned with the Note's reasoning but would note that further 25-year contracts could only be envisaged if the nominated EfW plant is CO_2 capture enabled.
Figure 5: Local authority contracted tonnage.	
Future of energy recovery	
The Department for Energy Security and Net Zero (DESNZ) are updating the decarbonisation readiness requirements (https://www.gov.uk/government/consultations/decarbonisation-readiness-updates- to-the-2009-carbon-capture-readiness-requirements)	The Applicant is aligned with decarbonisation readiness and has committed that the Project is CO_2 capture enabled (see requirement 18 (Commissioning) of the draft DCO [REP10-004] requires the CCUS to be constructed and commissioned within

to include EfW facilities. The proposals would require new build and substantially refurbished EfW facilities to be built in such a way that they can easily decarbonise by retrofitting carbon capture within the plant's lifetime. While this is not expected to significantly affect currently operational facilities, or developments that have already secured an environmental permit, in the longer term this may result in a shift towards locating new EfW developments to facilitate access to carbon capture and storage networks, either directly or via transportation. Only those facilities that can satisfy this requirement will be supported once this comes into force. This broadly aligns with a recommendation from the National Infrastructure Commission.	6 months of commissioning of the ERF) with sufficient space to deliver 100% carbon capture in the future (Annex 7 of this submission). The Project is located next to the Keadby Power Station which is included on the route of the proposed East Coast Cluster Low Carbon Pipelines and the site has both rail and river links to Immingham and the Viking Pipeline[10].
Carbon capture and storage for EfW can also result in negative emissions from permanent storage of carbon captured from combustion of the biomass within residual waste. This would be subject to meeting the greenhouse gas removals standard or relevant criteria. Negative emissions will play an important role in reaching net zero by offsetting emissions generated elsewhere in the economy. Two EfW carbon capture and storage projects, Viridor's facility at Runcorn and Encyclis' Protos Energy Recovery Facility development at Ellesmere Port, both in Cheshire, have been taken forward to negotiations for support under the waste industrial carbon capture business model	The Applicant envisages that the Project will attain carbon-negative status before 2035. Discussions are already well advanced to supply CO_2 to a new facility in the region to produce SAF. This could see a demand for 470,000 tonnes of CO_2 per annum for the pilot site. This would not be reliant on the construction and commissioning of the proposed carbon pipeline for the East Coast Cluster or the Viking program. The site is well positioned to link into these clusters in the future once the schemes are funded, built and commissioned. As an aside, the facility has also committed to a 13.7% biodiversity net gain (BNG) as secured by Requirement 6 of the Draft DCO [REP10-004] which includes a 65-acre wetland area involving the saturation of peat seams that would provide a potential carbon capture capacity of 13,000 tonnes per annum.

[10] https://eastcoastcluster.co.uk/

The government is also exploring how new plants can export heat from day one and are incentivised to export heat as soon as possible after commencing operation, and at most within 3 years. Developers are encouraged to discuss the potential for co-location or connection to a heat offtake customer with local planning authorities when developing their proposals for waste and non-waste development	The Applicant has amended the DCO requirements to include a commitment to build the District Heat Network (DHN) from a 1-mile stretch of the new access road to the whole of the Northern Spur. (draft DCO requirement 17 Combined heat and power)) (see Annex 3 of this submission). The Project will commit to installing the DHN in association with the high voltage supply between the site and the Scunthorpe North substation which accounts for 7km of the 11km DHN. The 7km section of the DHN will be in place ahead of the operation of the ERF facility. The southern half of the DHN will also be able to supply 6000 new homes and the DHN pipework will be buried along with water pipes delivering water to the site.
Residual waste infrastructure outputs, specifically those produced via advance thermal treatments and advanced conversion technologies, have the potential to deliver carbon savings in other areas of the economy beyond the waste sector. In this context, competition to access residual waste feedstocks may increase significantly in future. For example, the Department for Transport has confirmed support for use of the fossil component of residual waste, in addition to the biomass portion, through the Renewable Transport Fuel Obligation (RTFO) https://www.gov.uk/government/consultations/supporting-recycled-carbon-fuels- through-the-renewable-transport-fuel-obligation/outcome/supporting-recycled- carbon-fuels-through-the-renewable-transport-fuel-obligation-government-response) as a feedstock to produce recycled carbon fuels for the transport sector.	The Applicant would have a commitment under an EA permit to deploy “Best Available Technologies” (BAT). The site that was built for the Derbyshire waste authority is an example where a technology is theoretically efficient but in reality, has failed to operate since 2016. The energy from waste industry has unfortunately shown that not all technologies have delivered the operational efficiency that was contracted as shown by the two EfW sites recently written off by Aviva. The challenges of the contamination in the municipal waste supply have encouraged many global investors to support the use of biogenic CO_2 and low-carbon hydrogen to produce e-polymers and e-SAF rather than using the non-recyclable waste feedstocks particularly because of the reliance on biogenic CO_2.

	The feedstock contracts for waste-derived SAF show preference for sorted baled plastic that has traditionally been exported (1.6m tonnes per annum) (as per the Environment, Food and Rural Affairs Committees 'The Price of plastic: ending the toll of plastic waste' report (dated November 2022))[11]. The challenge to the arisings of mechanically treated waste where any plastics capable of recycling have already been removed, and by Defra's definition are contaminated.
DESNZ is also exploring support for eligible projects using residual waste feedstocks to produce low carbon hydrogen under the Net Zero Hydrogen Fund, Hydrogen Production Business Model, and the Hydrogen BECCS Innovation Programme. Non-mechanical recycling, using pyrolysis of waste plastics to produce polymers for production of new plastics, is another emerging technology that may lead to a reduction in residual waste volumes in the future as currently non-recyclable materials become recyclable. This has the potential to create circularity for certain plastics and would be preferable to using this material for energy recovery, although priority must continue to be given to minimising waste and increasing the reuse of products. Recycling should only be preferable for wastes that cannot be avoided.	In addition to the provision of the plastic recycling facility, the Applicant has applied for up to 40MW of low-carbon hydrogen and a hydrogen refuelling station for HGVs in line with the DESNZ strategies [REP6-018].
Conventional incineration with energy recovery currently predominates the mix of energy recovery infrastructure within England with a small number of gasification facilities, generally using the syngas produced to generate electricity via a gas	The Applicant agrees that these emerging technologies may have a role to play in the future, but as noted above, the track record of projects using residual waste (including RDF) as a feedstock is very poor. It would not be prudent to rely on future

[11] Environment, Food and Rural Affairs Committee (November 2022). Online: https://publications.parliament.uk/pa/cm5803/cmselect/cmenvfru/22/report.html#:~:text=A%20%E2%80%9Cstrategic%20ambition%20%5B%E2%80%A6%5D,2024%20and%2062%25%20in%202030.

turbine. This mix may change in future as wider decarbonisation ambitions increasingly inform investment decisions for new infrastructure. The Advanced Fuels Fund has already awarded a total of £69,494,000 to support several residual waste gasification projects seeking to produce sustainable aviation fuel (SAF) in the UK. These include Alfanar's Lighthouse Green Fuels project in Teesside, Fulcrum BioEnergy's NorthPoint facility in Ellesmere Port, Esso's Solent SAF project, and Velocys' Altalto project in Immingham. The Department for Transport's ambition is to see 5 commercial-scale sustainable aviation fuel production facilities under construction in the UK by 2025.	step changes in technology when planning future infrastructure needs.
Development of advance thermal treatment and advance conversion technology facilities that can safely, efficiently, and sanitarily manage residual waste could come to supersede conventional EfW in the coming years if the technology is able to prove itself as the optimum means of managing residual waste.	See previous comment on the poor track record of these technologies to date.
Regardless of the specific technology or advances in sustainability of energy recovery facilities, in order to meet our residual waste reduction target, all residual wastes (excluding major mineral wastes) must not exceed approximately 17.6Mt in 2042. Residual waste infrastructure must not lock-in materials that compromises the achievement of this target, minimising waste and maximising recycling and resource efficiency. To that end, government does not support overcapacity of energy recovery treatment regardless of the technology used and all new developments must demonstrate the genuine need for additional or replacement energy recovery treatment capacity	The Applicant supports the 2042 target. The Applicant's previous analysis (Annex 1 of Document Reference 9.46) and Annex 2 of this submission, has demonstrated that the project will treat residual waste which is currently being exported or landfilled, and hence will help to address the capacity shortage which the Note identifies in the East Midlands and East of England. The Applicant agrees with the Note's statement that consented pipeline projects will be realised only if there is sufficient residual waste available, so there is little risk of overcapacity [REP3 040]. The Applicant also agrees that there is uncertainty when projecting into the future, particularly around the

	effectiveness of policies such as the packaging reforms. The ability to landfill up to 10% of municipal residual waste allows some flexibility to deal with this uncertainty. However, when assessing the need for energy recovery infrastructure the target should be to send only the non-combustible fraction (around 2%) to landfill, rather than 10%, consistent with the waste hierarchy.