

Determination of an Application for an Environmental Permit under the Environmental Permitting (England & Wales) Regulations 2016

Decision document recording our decision-making process

The Variation Number is: EPR/TP3036KB/V004
The Operator is: Biffa Waste Services Limited
The Installation is located at: Newhurst Energy Recovery Facility, Shepshed, Leicestershire. LE12 9BU.

What this document is about

This is a decision document, which accompanies a variation notice.

It explains how we have considered the Operator's Application for a substantial variation to their Environmental Permit, and why we have included the specific conditions in the variation notice we have issued to the Operator. It is our record of our decision-making process, to show how we have taken into account all relevant factors in reaching our position. Unless the document explains otherwise, we have accepted the Operator's proposals.

We try to explain our decision as accurately, comprehensively and plainly as possible. Achieving all three objectives is not always easy, and we would welcome any feedback as to how we might improve our decision documents in future. A lot of technical terms and acronyms are inevitable in a document of this nature: we provide a glossary of acronyms near the front of the document, for ease of reference.

Preliminary information and use of terms

A permit was granted to the Operator in 2011. We refer to this permit as the '**Original Permit**' in this document.

We gave the application the reference number EPR/TP3036KB/V004. We refer to the application as "the **Application**" in this document in order to be consistent.

The number we gave to the variation notice is EPR/TP3036KB/V004. We refer to the variation notice as 'as the **Notice**' in this document.

The Application was duly made on 11/05/2018.

The Operator is Biffa Waste Services Limited. We refer to Biffa Waste Services Limited as 'the **Operator**' in this document.

Biffa Waste Services Limited facility is located at Newhurst Quarry, Shepshed, Leicestershire LE12 9BU. We refer to this as "the **Installation**" in this document.

Glossary of acronyms used in this document

(Please note that this glossary is standard for our decision documents and therefore not all these acronyms are necessarily used in this document.)

AAD	Ambient Air Directive (2008/50/EC)
APC	Air Pollution Control
AQS	Air Quality Strategy
BAT	Best Available Technique(s)
BAT-AEL	BAT Associated Emission Level
BREF	BAT Reference Note
COMEAP	Committee on the Medical Effects of Air Pollutants
CROW	Countryside and rights of way Act 2000
CV	Calorific value
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
DD	Decision document
EAL	Environmental assessment level
EIAD	Environmental Impact Assessment Directive (85/337/EEC)
ELV	Emission limit value
EMAS	EU Eco Management and Audit Scheme
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2010 (SI 2010 No. 675) as amended
ES	Environmental standard
EWC	European waste catalogue
FSA	Food Standards Agency
GWP	Global Warming Potential
HHRAP	Human Health Risk Assessment Protocol
HPA	Health Protection Agency (now PHE – Public Health England)
HW	Hazardous waste
HWI	Hazardous waste incinerator
IBA	Incinerator Bottom Ash
IED	Industrial Emissions Directive (2010/75/EU)
I-TEF	Toxic Equivalent Factors set out in Annex VI Part 2 of IED

I-TEQ	Toxic Equivalent Quotient calculated using I-TEF
LCV	Lower calorific value – also termed net calorific value
LfD	Landfill Directive (1999/31/EC)
LOI	Loss on Ignition
MBT	Mechanical biological treatment
MSW	Municipal Solid Waste
MWI	Municipal waste incinerator
NOx	Oxides of nitrogen (NO plus NO ₂ expressed as NO ₂)
NCV	Net calorific value
Opra	Operator Performance Risk Appraisal
PAH	Polycyclic aromatic hydrocarbons
PC	Process Contribution
PCB	Polychlorinated biphenyls
PEC	Predicted Environmental Concentration
PHE	Public Health England
POP(s)	Persistent organic pollutant(s)
PPS	Public participation statement
PR	Public register
PXDD	Poly-halogenated di-benzo-p-dioxins
PXB	Poly-halogenated biphenyls
PXDF	Poly-halogenated di-benzo furans
RGS	Regulatory Guidance Series
SAC	Special Area of Conservation
SCR	Selective catalytic reduction
SGN	Sector guidance note
SNCR	Selective non-catalytic reduction
SPA(s)	Special Protection Area(s)
SS	Sewage sludge
SSSI(s)	Site(s) of Special Scientific Interest
SWMA	Specified waste management activity
TDI	Tolerable daily intake
TEF	Toxic Equivalent Factors
TGN	Technical guidance note
TOC	Total Organic Carbon

UN_ECE United Nations Environmental Commission for Europe
US EPA United States Environmental Protection Agency
WFD Waste Framework Directive (2008/98/EC)
WHO World Health Organisation
WID Waste Incineration Directive (2000/76/EC) – now superseded by IED

1 Our decision

We have issued the Variation Notice to the Operator. This will allow it to operate the Installation, subject to the conditions in the Notice.

We consider that, in reaching that decision, we have taken into account all relevant considerations and legal requirements and that the permit will ensure that a high level of protection is provided for the environment and human health.

This Application is to vary the operations of an installation which is subject principally to the Industrial Emissions Directive (IED).

2 How we reached our decision

2.1 Receipt of Application

The Application was duly made on 11/05/2018. This means we considered it was in the correct form and contained sufficient information for us to begin our determination but not that it necessarily contained all the information we would need to complete that determination: see below.

The Operator made no claim for commercial confidentiality. We have not received any information in relation to the Application that appears to be confidential in relation to any party.

2.2 Consultation on the Application

We carried out consultation on the Application in accordance with the EPR, our statutory PPS and our own internal guidance RGS Note 6 for Determinations involving Sites of High Public Interest. We consider that this process satisfies, and frequently goes beyond the requirements of the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, which are directly incorporated into the IED, which applies to the Installation and the Application. We have also taken into account our obligations under the Local Democracy, Economic Development and Construction Act 2009 (particularly Section 23). This requires us, where we consider it appropriate, to take such steps as we consider appropriate to secure the involvement of representatives of interested persons in the exercise of our functions, by providing them with information, consulting them or involving them in any other way. In this case, our consultation already satisfies the Act's requirements.

We advertised the Application by a notice placed on our website, which contained all the information required by the IED, including telling people where and when they could see a copy of the Application. We also placed an

advertisement in the Loughborough Echo (04/07/2018) and Leicester Mercury (04/07/2018).

We made a copy of the Application and all other documents relevant to our determination available to view on our Public Register at the Environment Agency's Trentside Office, Scarrington Road, Nottingham. Anyone wishing to see these documents could do so and arrange for copies to be made. The Application was also made available to view on our .gov.uk website.

We sent copies of the Application to the following bodies, which includes those with whom we have "Working Together Agreements":

- *Leicestershire County Council*
- *Public Health England*
- *Health and Safety Executive*
- *Charnwood Borough Council*
- *Severn Trent Water*
- *Director of Public Health*

These are bodies whose expertise, democratic accountability and/or local knowledge make it appropriate for us to seek their views directly. Note under our Working Together Agreement with Natural England, we only inform Natural England of the results of our assessment of the impact of the installation on designated Habitats sites.

Further details along with a summary of consultation comments and our response to the representations we received can be found in Annex 4. We have taken all relevant representations into consideration in reaching our determination.

2.3 Requests for Further Information

Although we were able to consider the Application duly made, we did in fact need more information in order to determine it. We issued two Schedule 5 Notices requesting additional information on 18/09/2018 and 20/11/2018. We also requested additional information by email on 05/11/2018, 12/11/2018, 06/12/2018, 24/01/2019, 12/02/2019 and 28/02/2019. A copy of each information notice and email has been placed on our public register.

We made a copies of the responses to our requests available to view on public register.

3 The legal framework

The Notice is issued, under Regulation 20 of the EPR. The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal

requirements for activities falling within its scope. In particular, the regulated facility is:

- an *installation* and a *waste incineration plant* as described by the IED;
- an *operation* covered by the WFD, and
- subject to aspects of other relevant legislation which also have to be addressed.

We address some of the major legal requirements directly where relevant in the body of this document. Other requirements are covered in a section towards the end of this document.

We consider that, in issuing the Variation notice, it will ensure that the operation of the Installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

We explain how we have addressed specific statutory requirements more fully in the rest of this document.

4 Assessment of the proposed changes to the installation.

4.1 Proposed changes

The facility remains an installation. The listed activity remains unchanged. There are no significant changes to the proposed abatement systems technology, cooling system technology or electricity generation system. There are no new discharges to surface water or sewer proposed. Waste types and raw materials remain unchanged.

The main changes to the operation of the installation as a result of the Operator's proposals are detailed below:

- Increase of the annual permitted annual throughput of waste from 300,000 tonnes to 350,000 tonnes and increase in the design net calorific value (NCV) of the waste incinerated at the facility from 10 MJ/kg to 10.5 MJ/kg
- Allow the option of 1 or 2 incineration lines, as 1 or 2 flues housed within with a single stack.
- Use of activated carbon odour abatement system in the event that only one incineration line is proposed.
- Changes to site layout (but no overall change to ERF building footprint) including – change to position of flue stack; the office and ancillary accommodation is now housed within the main ERF building; minor

changes to internal road layout and sub-station; and provision of additional air cooling fans.

- Update of original permit application documents to reflect the changes listed above.

The Operator confirmed during the determination that they will be using lime as the reagent for the acid abatement system. The original permit included a pre-operational condition (PO8) for the Operator to confirm if sodium carbonate or lime was to be used as the reagent. The Operator has opted for lime. Either reagent is BAT and the use of one over the other is not considered significant in environmental terms in this case. We have therefore deleted the pre-operational condition from the permit.

Also during the determination Operator requested an amendment to the monoxide limit in the limit. There are two alternative limits for carbon monoxide in IED, the original permit contained the limit 100mg/m³ (1/2hr – average). We have amended this limit to 150mg/m³ (95% of all 10-minute averages in any 24-hour period).

Note that the Application also contained proposals to remove the IBA storage cover, and store IBA outside. The Operator withdrew these proposals during the determination. Therefore the IBA storage proposals remain as per the original permit.

Also in addition to the changes the proposals no longer include the flue gas treatment plant bypass during start up and shut downs. Such a bypass is no longer considered BAT. For this reason condition 2.3.13 is deleted from the permit.

4.2 Key Issues in the Determination

The key issues arising during this determination were emissions to air, noise and odour and we therefore describe how we determined these issues in most detail in this document.

The conclusions from our assessment are that with regards to emissions to air is that there is no significant increase in process contributions of pollutants at human or ecological receptors. Therefore we remain satisfied that emissions to air from the installation will not lead to an exceedance of an ES at receptors or significant damage or pollution at ecological receptors. With regards to noise and odour we remain satisfied that the impacts at nearby sensitive receptors will not be significant.

4.3 Accident management

The Operator's existing accident management techniques remain unchanged. However, the Operator has submitted a Fire Prevention Plan (FPP) as part of the Application. When the original permit was issued there was no

requirement for a formal fire prevention plan. However, operators of certain types of waste treatment and transfer facilities, including non-hazardous waste incinerators, are now required to have a Fire Prevention Plan.

We have assessed and approved this plan and incorporated this within the operating techniques table S1.2 meaning that the site must follow such requirements. We have also included condition 3.6.1 in the permit which requires the Operator to follow the operating techniques in the approved Fire Prevention Plan.

We recognise that some of the finer detail in the FPP (such as location of hydrants for example) may change after detailed design. Therefore we have set pre-operational condition PO10 in the permit for the Operator to submit a revised FPP after the detailed design stage.

We are satisfied that appropriate measures will be in place to prevent fires and to minimise the impact from a fire if it was to occur.

4.4 Operating techniques

We have specified that the Operator must operate the Installation in accordance with the following documents contained in the Application:

Description	Parts Included
Variation Application EPR/TP3036KB/V004	Response to question in the Application Form 3d, 5a, 5b, 5c, 5d, 6 of Part C2; Responses to questions 3a, 3b, 3c, 3d, 4a, 4b, 5a, 6a, 6b, 6c, 6d, 6e and Appendix 6 of Part C3. And supporting documents including Non-Technical Summary, Best Available Techniques and Operating Techniques (BATOT) statement (V2 May 2018), Environmental Risk Assessment (May 2018), Air Emissions Risk assessment (V1 May 2018), Human Health Risk Assessment (V1 May 2018), Residue Management plan (May 2018), Nitrogen Oxides (NOx) Abatement Review (May 2018), Flood Risk Assessment (June 2014), Fire Prevention Plan (May 2018) – Duly made 11/03/2018. The following parts are excluded - Techniques relating to proposed changes to the storage of IBA.
Additional information	BATOT10 Operating Techniques and Best Available Techniques (BAT) Statement Appendix 10 (received 21/09/2018)
Response to Schedule 5 Notice (Request made on 18/09/2018)	Responses to questions 1 -18 and 27-28. (response received 30/10/2018)

Response to request for information (email sent 05/11/2018)	All parts (response received 30/11/2018)
Response to Schedule 5 Notice (Request made on 20/11/2018)	Response to questions 1 -3. (response received 18/12/2018) Note that responses to 4 and 5 refer to micronutrient spray and are not included.
Responses to request for additional information (email sent 06/12/2018)	Response to questions 1 -5. (response received 18/12/2018)
Responses to request for additional information (email sent 28/02/2018)	Newhurst Energy recovery Facility (ERF) BS4142:2014 Noise Assessment Feb 2019 (SLR Ref No: 416.00034.00577)

The details set out above describe the techniques that will be used for the operation of the Installation that have been assessed by the Environment Agency as BAT; they form part of the Permit through Permit condition 2.3.1 and Table S1.2 in the Permit Schedules.

The waste types and raw materials remain unchanged.

We have limited the capacity of the Installation to 350,000 tonnes per annum. This is based on the installation operating approximately 8083 hours per year at a nominal capacity of 43.3 tonnes per hour. With a net calorific value of 10.5 MJ/kg.

We remain satisfied that the Installation will be designed, constructed and operated using BAT for the incineration of the permitted wastes. We remain satisfied that the operating and abatement techniques are BAT for incinerating the waste types currently permitted.

4.5 Assessment of Emission to Air

4.5.1 Application of Environment Agency guidance 'risk assessments for your environmental permit'

A methodology for risk assessment of point source emissions to air, which we use to assess the risk of applications we receive for permits, is set out in our guidance 'Air emissions risk assessment for your environmental permit' and has the following steps:

- Describe emissions and receptors
- Calculate process contributions
- Screen out insignificant emissions that do not warrant further investigation
- Decide if detailed air modelling is needed
- Assess emissions against relevant standards

- Summarise the effects of emissions

The methodology uses a concept of “process contribution (PC)”, which is the estimated concentration of emitted substances after dispersion into the receiving environmental media at the point where the magnitude of the concentration is greatest. The methodology provides a simple method of calculating PC primarily for screening purposes and for estimating process contributions where environmental consequences are relatively low. It is based on using dispersion factors. These factors assume worst case dispersion conditions with no allowance made for thermal or momentum plume rise and so the process contributions calculated are likely to be an overestimate of the actual maximum concentrations. More accurate calculation of process contributions can be achieved by mathematical dispersion models, which take into account relevant parameters of the release and surrounding conditions, including local meteorology – these techniques are expensive but normally lead to a lower prediction of PC.

4.5.2 Use of Air Dispersion Modelling

For incineration applications, we normally require the applicant to submit a full air dispersion model as part of their application. Air dispersion modelling enables the process contribution to be predicted at any environmental receptor that might be impacted by the plant.

Once short-term and long-term PCs have been calculated in this way, they are compared with Environmental Standards (ES).

Where an Ambient Air Directive (AAD) Limit Value exists, the relevant standard is the AAD Limit Value. Where an AAD Limit Value does not exist, AAD target values, UK Air Quality Strategy (AQS) Objectives or Environmental Assessment Levels (EALs) are used. Our web guide sets out EALs which have been derived to provide a similar level of protection to Human Health and the Environment as the AAD limit values, AAD target and AQS objectives. In a very small number of cases, e.g. for emissions of lead, the AQS objective is more stringent than the AAD value. In such cases, we use the AQS objective for our assessment.

AAD target values, AQS objectives and EALs do not have the same legal status as AAD limit values, and there is no explicit requirement to impose stricter conditions than BAT in order to comply with them. However, they are a standard for harm and any significant contribution to a breach is likely to be unacceptable.

PCs are considered **Insignificant** if:

- the **long-term** process contribution is less than **1%** of the relevant ES; and
- the **short-term** process contribution is less than **10%** of the relevant ES.

The **long term** 1% process contribution insignificance threshold is based on the judgements that:

- It is unlikely that an emission at this level will make a significant contribution to air quality;
- The threshold provides a substantial safety margin to protect health and the environment.

The **short term** 10% process contribution insignificance threshold is based on the judgements that:

- spatial and temporal conditions mean that short term process contributions are transient and limited in comparison with long term process contributions;
- the threshold provides a substantial safety margin to protect health and the environment.

Where an emission is screened out in this way, we would normally consider that the Applicant's proposals for the prevention and control of the emission to be BAT. That is because if the impact of the emission is already insignificant, it follows that any further reduction in this emission will also be insignificant.

However, where an emission cannot be screened out as insignificant, it does not mean it will necessarily be significant.

For those pollutants which do not screen out as insignificant, we determine whether exceedences of the relevant ES are likely. This is done through detailed audit and review of the applicant's air dispersion modelling taking background concentrations and modelling uncertainties into account. Where an exceedance of an AAD limit value is identified, we may require the applicant to go beyond what would normally be considered BAT for the Installation or we may refuse the application if the applicant is unable to provide suitable proposals. Whether or not exceedences are considered likely, the application is subject to the requirement to operate in accordance with BAT.

This is not the end of the risk assessment, because we also take into account local factors (for example, particularly sensitive receptors nearby such as a SSSIs, SACs or SPAs). These additional factors may also lead us to include more stringent conditions than BAT.

If, as a result of reviewing of the risk assessment and taking account of any additional techniques that could be applied to limit emissions, we consider that emissions **would cause significant pollution**, we would refuse the Application.

4.5.3 Assessment of Impact on air quality

A full assessment of the potential impacts from emissions to air from the installation was carried out as part of the original permit determination. This assessment was updated for this Variation Application. The updated

assessment concluded that levels of pollutants emitted to air following the changes proposed in this variation will not result in the exceedance of a relevant ES and therefore will not result in significant pollution of the environment or harm to human health.

The assessment submitted with this Variation Application reflects the proposed operational changes to annual throughput and NCV. Also the installation will have either a single flue (under the 1 incineration line scenario) or 2-flues housed within a single windshield (under the 2 incineration lines scenario). The updated modelling assessment has been based upon a single flue, the Operator has stated that the common modelling approach for 2 flues within the same windshield is to model them as a single flue. We are satisfied that the modelling reflects operation as either a 1 or 2 line plant.

The operational changes result in variations to the flue gas flows, emission rates of pollutants and exit velocities of the gases, as compared to the original permit assessment. This means the original air quality assessment is no longer valid and therefore a new updated assessment has been submitted.

Note that the air quality assessment in the original permit application assumed a different waste throughput, net calorific value and assumed that the installation operated with 2 incineration lines and therefore 2 stack emission points.

The new air quality assessment assessed the Installation's potential emissions to air against the relevant air quality standards, and the potential impact upon human health and nearby conservation and habitat sites. The assessment predicts the potential effects on local air quality from the Installation's stack emissions using the AERMOD v9 dispersion model, which is a commonly used computer model for regulatory dispersion modelling. The model used 5 years of meteorological data collected from the weather station at East Midlands Airport between 2009 and 2013. The impact of the terrain surrounding the site upon plume dispersion was considered in the dispersion modelling.

The air quality impact assessments, and the dispersion modelling upon which they were based, employed the following assumptions.

- First, they assumed that the ELVs in the Permit would be the maximum permitted by Article 46(2) and Annex VI of the IED. These substances are:
 - Oxides of nitrogen (NO_x), expressed as NO₂
 - Total dust
 - Carbon monoxide (CO)
 - Sulphur dioxide (SO₂)
 - Hydrogen chloride (HCl)
 - Hydrogen fluoride (HF)
 - Metals (Cadmium, Thallium, Mercury)
 - Polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo furans (referred to as dioxins and furans)
 - Gaseous and vaporous organic substances, expressed as Volatile Organic Carbon (VOC)

- Second, they assumed that the Installation operates continuously at the relevant long-term or short-term ELVs, i.e. the maximum permitted emission rate. Except for Cr(VI), Antimony, Arsenic, Lead, total Chromium, Cobalt, Copper, Manganese, Nickel and Vanadium they have calculated the emission rates from the maximum measured concentrations detailed in the Environment Agency's 'guidance on assessing group 3 metal stack emissions from incinerators' V4 2016.
- Third, the model also considered emissions of pollutants not covered by Annex VI of IED, specifically ammonia (NH₃) and Polychlorinated biphenyls (PCBs). Emission rates used in the modelling have been drawn from data in the Waste Incineration BREF and are considered further in section 4.5.3.

We are in agreement with this approach. The assumptions underpinning the model have been checked and are precautionary.

The way in which the Operator used dispersion models, its selection of input data, use of background data and the assumptions it made have been reviewed by the Environment Agency's modelling specialists to establish the robustness of the Operator's air quality impact assessment. The output from the model has then been used to inform further assessment of health impacts and impact on habitats and conservation sites.

Our review of the Operator's assessment leads us to agree with the Operator's conclusions. We have also audited the human health impact assessment and similarly agree that the conclusions drawn in the report are acceptable. Note that we have included a pre-operational condition in the permit (PO7) requiring the Operator to provide written confirmation of whether the installation will operate with either one or two incineration lines. The written confirmation shall include details of the final incinerator technology configuration and a review of the air dispersion modelling submitted as part of the Air Emission Risk Assessment. Should any significant changes be identified an updated air dispersion modelling assessment shall be submitted as a part of a new variation application which would need to be assessed and approved by us before the Operator could commence operations.

The Operator's modelling predictions are summarised in the following sections.

4.5.2 Assessment of Air Dispersion Modelling Outputs

The Operator's modelling predictions are summarised in the tables below.

The Operator's modelling predicted peak ground level exposure to pollutants in ambient air. We have conservatively assumed that the maximum concentrations occur at the location of receptors.

Whilst we have used the Operator's modelling predictions in the table below, we have made our own simple verification calculation of the percentage process contribution and predicted environmental concentration. These are

the numbers shown in the tables below and so may be very slightly different to those shown in the Application. Any such minor discrepancies do not materially impact on our conclusions.

Table 1 – Predicted impacts to air from the Installation at point of maximum impact (non-metal pollutants).

Pollutant	ES	Background	Process contribution (PC)		Predicted environmental concentration (PEC)	
	µg/m ³		µg/m ³	µg/m ³	% of ES	µg/m ³
NO ₂	¹ 40	27.3	0.4	1.0	27.7	69.3
	² 200	54.6	7	3.5	--	--
PM ₁₀	¹ 40	19.5	0.03	0.1	--	--
	³ 50	19.5	0.1	0.2	--	--
PM _{2.5}	¹ 25	11.8	0.03	0.1	--	--
SO ₂	⁴ 266	5	13	4.9	--	--
	⁵ 350	5	3	0.9	--	--
	⁶ 125	5	1	0.9	--	--
HCl	⁷ 750	0.5	3	0.4	--	--
HF	⁸ 16	3.5	0.01	<0.1	--	--
	⁷ 160	7	0.3	0.2	--	--
CO	⁹ 10,000	332	4	<0.1	--	--
	30,000	332	16.8	0.1	--	--
VOC*	¹ 5	0.4	0.03	0.6	--	--
NH ₃	¹ 180	3.06	0.03	<0.1	--	--
	¹⁰ 2500	6.12	3	0.1	--	--
PCBs*	¹⁰ 0.2	0.000106	0.02	10	0.02	10.1
	¹⁰ 6	0.000212	2.35	39.2	2.35	39.2

Notes
 *VOC as benzene
¹ Annual mean
² 99.79th percentile of 1 hour means
³ 90.41st percentile of 24 hour means
⁴ 99.9th percentile of 15 minute means
⁵ 99.73rd percentile of 1 hour means
⁶ 99.18th percentile of 24 hour means
⁷ 1 hour average
⁸ monthly average
⁹ maximum daily running 8 hour mean
¹⁰ 1 hour maximum
 *PCB based on waste case emission concentration of 7mg/m³

Table 2 – Predicted impacts to air from the Installation at point of maximum impact (metal pollutants).

Pollutant	ES	Background	Process contribution (PC)	Predicted environmental
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					concentration (PEC)	
	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	% of ES	$\mu\text{g}/\text{m}^3$	% of ES
Cd (and Tl)	¹ 0.005	0.0001	0.0001	2	0.0002	4
Hg	¹ 0.25	0.0015	0.0001	0.1	--	--
	7.5	0.0030	0.02	0.3	--	--
Sb	¹ 5	0.0001	<0.0001	<0.1	--	--
	² 150	0.0002	0.002	<0.1	--	--
Pb	¹ 0.25	0.0044	0.0001	0.1	--	--
Cu	² 200	0.0027	0.01	<0.1	--	--
Mn	¹ 0.15	0.0028	0.0002	0.1	--	--
	² 1500	0.0057	0.02	<0.1	--	--
V	¹ 5	0.0007	0.00002	<0.1	--	--
	³ 1	0.0015	0.004	0.4	--	--
As	¹ 0.003	0.0005	0.0001	3.3	0.0006	20
Cr (II)(III)	¹ 5	0.0035	0.0003	<0.1	--	--
	² 150	0.0070	0.03	<0.1	--	--
Cr (VI)	¹ 0.0002	0.0007	0.0000004	0.2	--	--
Ni	¹ 0.02	0.0006	0.0006	3.1	0.001	6
Notes ¹ Annual mean ² 1 hour maximum ³ 24 hour maximum						

(i) Screening out emissions which are insignificant

From the tables above the following emissions can be screened out as insignificant in that the process contribution is < 1% of the long term ES and <10% of the short term ES. These are:

- PM_{10} , $PM_{2.5}$, SO_2 , HCl, HF, CO, VOC, NH_3 , Hg, Sb, Pb, Cu, Mn, V, Cr(II)(III) & Cr(VI).

Therefore we consider the Operator's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation subject to the detailed audit referred to below.

(ii) Emissions unlikely to give rise to significant pollution

Also from the tables above the following emissions (which were not screened out as insignificant) have been assessed as being unlikely to give rise to significant pollution in that the predicted environmental concentration is less than 100% (taking expected modelling uncertainties into account) of both the long term and short term ES.

- *PCB, Ni, As, Cd, Tl & NO_2* - Also note that the Operator did not assess process contribution of Cobalt and Polycyclic aromatic hydrocarbons (PAH). We carried out our own check modelling assessment which

showed that the process contributions for these pollutants would not lead to an exceedance of an ES.

For these emissions, we have carefully scrutinised the Operator's proposals to ensure that they are applying the Best Available Techniques to prevent and minimise emissions of these substances.

4.5.3 Consideration of key pollutants

(i) Nitrogen dioxide (NO₂)

The impact on air quality from NO₂ emissions has been assessed against the ES of 40 µg/m³ as a long term annual average and a short term hourly average of 200 µg/m³. The model assumes a 70% NO_x to NO₂ conversion for the long term and 35% for the short term assessment in line with Environment Agency guidance on the use of air dispersion modelling.

The above tables show that the peak long term PC is 1% of the ES and therefore cannot be screened out as insignificant. Even so, from the table above, the emission is not expected to result in the ES being exceeded. The peak short term PC is below the 10% insignificance threshold so can therefore be screened out as insignificant. Note that there is no significant increase in long or short term process contributions of NO₂ when compared against the results of the air quality impact assessment carried for the original permit.

(ii) Particulate matter PM₁₀ and PM_{2.5}

The impact on air quality from particulate emissions has been assessed against the ES for PM₁₀ (particles of 10 microns and smaller) and PM_{2.5} (particles of 2.5 microns and smaller). For PM₁₀, the ES are a long term annual average of 40 µg/m³ and a short term daily average of 50 µg/m³. For PM_{2.5} the ES of 25 µg/m³ as a long-term annual average to be achieved by 2010 as a Target Value and by 2015 as a Limit Value has been used.

The Operator's predicted impact of the Installation against these ESs is shown in the tables above. The assessment assumes that **all** particulate emissions are present as PM₁₀ for the PM₁₀ assessment and that **all** particulate emissions are present as PM_{2.5} for the PM_{2.5} assessment.

The above assessment is considered to represent a worst case assessment in that: -

- It assumes that the plant emits particulates continuously at the IED Annex VI limit for total dust, whereas actual emissions from similar plant are normally lower.
- It assumes all particulates emitted are below either 10 microns (PM₁₀) or 2.5 microns (PM_{2.5}), when some are expected to be larger.

We have reviewed the Operator's particulate matter impact assessment and are satisfied in the robustness of the Operator's conclusions.

The above assessment shows that the predicted process contribution for emissions of PM₁₀ is below 1% of the long term ES and below 10% of the short term ES and so can be screened out as insignificant. Therefore we consider the Operator's proposals for preventing and minimising the emissions of particulates to be BAT for the Installation.

The above assessment also shows that the predicted process contribution for emissions of PM_{2.5} is also below 1% of the ES. Therefore the Environment Agency concludes that particulate emissions from the installation, including emissions of PM₁₀ or PM_{2.5}, will not give rise to significant pollution.

Note that there is no significant increase in long or short term process contributions of PM₁₀ or long term PM_{2.5} when compared against the results of the air quality impact assessment carried for the original permit.

There is currently no emission limit prescribed nor any continuous emissions monitor for particulate matter specifically in the PM₁₀ or PM_{2.5} fraction. Whilst the Environment Agency is confident that current monitoring techniques will capture the fine particle fraction (PM_{2.5}) for inclusion in the measurement of total particulate matter, the original permit includes an improvement condition (IC2) which requires a full analysis of particle size distribution in the flue gas, and hence determine the ratio of fine to coarse particles. This condition will remain in the permit. In the light of current knowledge and available data however the Environment Agency is satisfied that the health of the public would not be put at risk by such emissions, as explained in section 4.6.3.

(iii) Acid gases, SO₂, HCl and HF

From the tables above, short-term emissions of HCl and HF can be screened out as insignificant in that the process contribution is <10% of the short term ES. There is no long term ES for HCl. HF has 2 assessment criteria – a 1-hr ES and a monthly EAL – the process contribution is <1% of the monthly EAL and so the emission screens out as insignificant if the monthly ES is interpreted as representing a long term ES.

There is no long term EAL for SO₂ for the protection of human health. Protection of ecological receptors from SO₂ for which there is a long term ES is considered in section 4.7.

Emissions of SO₂ can also be screened out as insignificant in that the short term process contribution is also <10% of each of the three short term ES values. Therefore we consider the Operator's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

(iv) Emissions to Air of CO, VOCs, PAHs, PCBs, Dioxins and NH₃

The above tables show that for CO and VOC emissions, the peak long term PC is less than 1% of the ES and the peak short term PC is less than 10% of the ES and so can be screened out as insignificant. Therefore we consider

the Operator's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

The above tables show that for PCB emissions, the peak long term PC is greater than 1% of the ES and therefore cannot be screened out as insignificant. Even so, from the table above, the emission is not expected to result in the ES being exceeded. The peak short term PC for PCBs is marginally above the level that would screen out as insignificant (>10% of the ES). However it is not expected to result in the ES being exceeded. It should also be noted that the emission concentration for PCB used in the Operator's assessment of 7mg/m³ is considered very much a worst case and is likely to be significantly lower than this.

With regards to PAHs as already discussed above the Operator did not calculate a PC for this pollutant, for this reason we carried out our own assessment which showed that process contributions of PAHs would not lead to an exceedance of the ES. The Operator is required to prevent, minimise and control PAH emissions using BAT. We are satisfied that PAH emissions will not result in significant pollution.

There is no ES for dioxins and furans as the principal exposure route for these substances is by ingestion and the risk to human health is through the accumulation of these substances in the body over an extended period of time. This issue is considered in more detail in section 4.6.2.

From the tables above NH₃ can be screened out as insignificant in that the process contribution is < 1% of the long term ES and <10% of the short term ES. The ammonia emission is based on a release concentration of 10 mg/m³. We are satisfied that this level of emission is consistent with the operation of a well controlled SNCR NO_x abatement system.

(V) Summary

For the above emissions to air, for those emissions that do not screen out, we have carefully scrutinised the Operator's proposals to ensure that they are applying the BAT to prevent and minimise emissions of these substances. Therefore we consider the Operator's proposals for preventing and minimising emissions to be BAT for the Installation. Dioxins and furans are considered further in section 4.6.2.

4.5.4 Assessment of Emission of Metals

The Operator has assessed the impact of metal emissions to air, the results are shown in table 2 above.

Annex VI of IED sets three limits for metal emissions:

- An emission limit value of 0.05 mg/m³ for mercury and its compounds (formerly WID group 1 metals).
- An aggregate emission limit value of 0.05 mg/m³ for cadmium and thallium and their compounds (formerly WID group 2 metals).

- An aggregate emission limit of 0.5 mg/m³ for antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel and vanadium and their compounds (formerly WID group 3 metals).

In addition the UK is a Party to the Heavy Metals Protocol within the framework of the UN-ECE Convention on long-range trans-boundary air pollution. Compliance with the IED Annex VI emission limits for metals along with the Application of BAT also ensures that these requirements are met.

With specific reference to the group 3 metals (Sb, As, Cr(II)(III), Cr(VI), Co, Cu, Pb, Mn, Ni and V) the Operator has calculated the emissions rates used in the modelling assessment on the maximum measured concentrations detailed in the Environment Agency's guidance note 'guidance on assessing group 3 metal stack emissions from incinerators' V4 2016. The measured concentrations are derived from monitoring at 18 Municipal Waste Incinerators and Wood Waste co-incinerators between 2007 and 2014. The Cr (VI) concentrations are based on stack measurements for total Cr and measurements of the proportion of Cr(VI) (to total chromium) in Air Pollution Control (APC) residuals collected at the same plant. We are satisfied that the emissions rates used are appropriate and precautionary.

In section 4.5.2 above, the following emissions of metals were screened out as insignificant:

- Hg, Sb, Pb, Cu, Mn, V, Cr(II)(III) & Cr(VI).

Also in section 4.5.2, the following emissions of metals whilst not screened out as insignificant were assessed as being unlikely to give rise to significant pollution:

- *As, Cd, Tl & Ni*

There were no metal emissions requiring further assessment. The Operator has concluded that exceedences of the EAL for all metals are not likely to occur. We agree with the Operator's conclusions. The installation has been assessed as meeting BAT for control of metal emissions to air.

4.5.5 Consideration of Local Factors

(i) Impact on Air Quality Management Areas (AQMAs)

Charnwood Borough Council have declared Air Quality Management Areas (AQMAs) with respect to NO₂. These are located around the City of Loughborough, with the closest being approximately 3.6km from the installation. The 2017 Air Quality Annual Report, by Charnwood Borough Council, states that the maximum NO₂ concentration recorded within the AQMA was 37.9µg/m³ with is marginally below the ES. The Operators air quality assessment shows that the maximum NO₂ process contribution at the AQMA is predicted to be <1% of the ES and therefore insignificant. We are

therefore satisfied that emissions from the Installation will not lead to an exceedance of the ES at the AQMA.

4.6 Human health risk assessment

4.6.1 Our role in preventing harm to human health

The Environment Agency has a statutory role to protect the environment and human health from all processes and activities it regulates. We assessed the effects on human health for this application in the following ways:

i) **Applying Statutory Controls**

The plant will be regulated under EPR. These regulations include the requirements of relevant EU Directives, notably, the industrial emissions directive (IED), the waste framework directive (WFD), and ambient air directive (AAD).

The main conditions in an EfW permit are based on the requirements of the IED. Specific conditions have been introduced to specifically ensure compliance with the requirements of Chapter IV. The aim of the IED is to prevent or, where that is not practicable, to reduce emissions to air, water and land and prevent the generation of waste, in order to achieve a high level of protection of the environment taken as a whole. IED achieves this aim by setting operational conditions, technical requirements and emission limit values to meet the requirements set out in Articles 11 and 18 of the IED. These requirements include the application of BAT, which may in some circumstances dictate tighter emission limits and controls than those set out in Chapter IV of IED on waste incineration and co-incineration plants. The assessment of BAT for this installation is detailed in section 6 of this document.

ii) Environmental Impact Assessment

Industrial activities can give rise to odour, noise and vibration, accidents, fugitive emissions to air and water, releases to air (including the impact on Photochemical Ozone Creation Potential (POCP)), discharges to ground or groundwater, global warming potential and generation of waste. For an installation of this kind, the principal environmental effects are through emissions to air, although we also consider all of the other impacts listed. Section 4.5 above explains how we have approached the critical issue of assessing the likely impact of the emissions to air from the Installation on human health and the environment and any measures we are requiring to ensure a high level of protection.

iii) Expert Scientific Opinion

We take account of the views of national and international expert bodies. The gathering of evidence is a continuing process. Although gathering evidence is not our role we keep the available evidence under review. The following is a summary of some of the publications which we have considered (in no particular order).

An independent review of evidence on the health effects of municipal waste incinerators was published by **DEFRA** in 2004. It concluded that there was no convincing link between the emissions from MSW incinerators and adverse effects on public health in terms of cancer, respiratory disease or birth defects. On air quality effects, the report concluded "Waste incinerators contribute to local air pollution. This contribution, however, is usually a small proportion of existing background levels which is not detectable through environmental monitoring (for example, by comparing upwind and downwind levels of airborne pollutants or substances deposited to land). In some cases, waste incinerator facilities may make a more detectable contribution to air pollution. Because current MSW incinerators are located predominantly in urban areas, effects on air quality are likely to be so small as to be undetectable in practice."

The European Integrated Pollution Prevention and Control Bureau stated in the Reference Document on the Best Available Techniques for Waste Incineration August 2006 "European health impact assessment studies, on the basis of current evidence and modern emission performance, suggest that the local impacts of incinerator emissions to air are either negligible or not detectable."

HPA (now **PHE**) in 2009 stated that "The Health Protection Agency has reviewed research undertaken to examine the suggested links between emissions from municipal waste incinerators and effects on health. While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable". In January 2012 **PHE** confirmed they would be undertaking a study to look for

evidence of any link between municipal waste incinerators and health outcomes including low birth weight, still births and infant deaths.

The first part of the study was published on 31st October (*Fetal growth, stillbirth, infant mortality and other birth outcomes near UK municipal waste incinerators; retrospective population based cohort and case-control study. Ghosh, R.E. Environment International, 31/10/2018*). The study found that living near an incinerator and being exposed to emissions from an incinerator were not associated with an additional risk of any of the birth outcomes investigated. These were multiple births, sex ratio, low birth weight, still birth, preterm delivery, neonatal mortality (deaths in the first month of life) and post-neonatal mortality (deaths from the second month of life up to the end of the 12th month of life).

PHE's position remains that modern, well run municipal waste incinerators are not a significant risk to public health.

Policy Advice from Government also points out that the minimal risk from modern incinerators. Paragraph 22 (Chapter 5) of WS2007 says that "research carried out to date has revealed no credible evidence of adverse health outcomes for those living near incinerators." It points out that "the relevant health effects, mainly cancers, have long incubation times. But the research that is available shows an absence of symptoms relating to exposures twenty or more years ago when emissions from incinerators were much greater than is now the case." **Paragraph 30 of PPS10** explains that "modern, appropriately located, well run and well regulated waste management facilities should pose little risk to public health."

The **Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (CoC)** issued a statement in 2000 which said that "any potential risk of cancer due to residency (for periods in excess of 10 years) near to municipal solid waste incinerators was exceedingly low and probably not measurable by the most modern epidemiological techniques." In 2009, CoC considered six further relevant epidemiological papers that had been published since the 2000 statement, and concluded that "there is no need to change the advice given in the previous statement in 2000 but that the situation should be kept under review".

Republic of Ireland Health Research Board report stated that "It is hard to separate the influences of other sources of pollutants, and other causes of cancer and, as a result, the evidence for a link between cancer and proximity to an incinerator is not conclusive".

The **Food Safety Authority of Ireland (FSAI) (2003)** investigated possible implications on health associated with food contamination from waste incineration and concluded: "In relation to the possible impact of introduction of waste incineration in Ireland, as part of a national waste management strategy, on this currently largely satisfactory situation, the FSAI considers that such incineration facilities, if properly managed, will not contribute to dioxin levels in the food supply to any significant extent. The risks to health

and sustainable development presented by the continued dependency on landfill as a method of waste disposal far outweigh any possible effects on food safety and quality.”

Health Protection Scotland (2009) considered scientific studies on health effects associated with the incineration of waste particularly those published after the Defra review discussed earlier. The main conclusions of this report were: “(a) For waste incineration as a whole topic, the body of evidence for an association with (non-occupational) adverse health effects is both inconsistent and inconclusive. However, more recent work suggests, more strongly, that there may have been an association between emissions (particularly dioxins) in the past from industrial, clinical and municipal waste incinerators and some forms of cancer, before more stringent regulatory requirements were implemented. (b) For individual waste streams, the evidence for an association with (non-occupational) adverse health effects is inconclusive. (c) The magnitude of any past health effects on residential populations living near incinerators that did occur is likely to have been small. (d) Levels of airborne emissions from individual incinerators should be lower now than in the past, due to stricter legislative controls and improved technology. Hence, any risk to the health of a local population living near an incinerator, associated with its emissions, should also now be lower.”

The **US National Research Council Committee on Health Effects of Waste Incineration (NRC) (NRC 2000)** reviewed evidence as part of a wide ranging report. The Committee view of the published evidence was summarised in a key conclusion: “Few epidemiological studies have attempted to assess whether adverse health effects have actually occurred near individual incinerators, and most of them have been unable to detect any effects. The studies of which the committee is aware that did report finding health effects had shortcomings and failed to provide convincing evidence. That result is not surprising given the small populations typically available for study and the fact that such effects, if any, might occur only infrequently or take many years to appear. Also, factors such as emissions from other pollution sources and variations in human activity patterns often decrease the likelihood of determining a relationship between small contributions of pollutants from incinerators and observed health effects. Lack of evidence of such relationships might mean that adverse health effects did not occur, but it could mean that such relationships might not be detectable using available methods and sources.”

The **British Society for Ecological Medicine (BSEM) published a report in 2005** on the health effects associated with incineration and concluded that “Large studies have shown higher rates of adult and childhood cancer and also birth defects around municipal waste incinerators: the results are consistent with the associations being causal. A number of smaller epidemiological studies support this interpretation and suggest that the range of illnesses produced by incinerators may be much wider. Incinerator emissions are a major source of fine particulates, of toxic metals and of more than 200 organic chemicals, including known carcinogens, mutagens, and hormone disrupters. Emissions also contain other unidentified compounds

whose potential for harm is as yet unknown, as was once the case with dioxins. Abatement equipment in modern incinerators merely transfers the toxic load, notably that of dioxins and heavy metals, from airborne emissions to the fly ash. This fly ash is light, readily windborne and mostly of low particle size. It represents a considerable and poorly understood health hazard.”

The BSEM report was reviewed by the HPA and they concluded that “Having considered the BSEM report the HPA maintains its position that contemporary and effectively managed and regulated waste incineration processes contribute little to the concentrations of monitored pollutants in ambient air and that the emissions from such plants have little effect on health.” The BSEM report was also commented on by the consultants who produced the Defra 2004 report referred to above. They said that “It fails to consider the significance of incineration as a source of the substances of concern. It does not consider the possible significance of the dose of pollutants that could result from incinerators. It does not fairly consider the adverse effects that could be associated with alternatives to incineration. It relies on inaccurate and outdated material. In view of these shortcomings, the report’s conclusions with regard to the health effects of incineration are not reliable.”

A **Greenpeace** review on incineration and human health concluded that a broad range of health effects have been associated with living near to incinerators as well as with working at these installations. Such effects include cancer (among both children and adults), adverse impacts on the respiratory system, heart disease, immune system effects, increased allergies and congenital abnormalities. Some studies, particularly those on cancer, relate to old rather than modern incinerators. However, modern incinerators operating in the last few years have also been associated with adverse health effects.”

The Health Protection Scotland report referred to above says that “the authors of the Greenpeace review do not explain the basis for their conclusion that there is an association between incineration and adverse effects in terms of criteria used to assess the strength of evidence. The weighting factors used to derive the assessment are not detailed. The objectivity of the conclusion cannot therefore be easily tested.”

From this published body of scientific opinion, we take the view stated by the HPA that “While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable”. We therefore ensure that permits contain conditions which require the installation to be well-run and regulate the installation to ensure compliance with such permit conditions.

iv) Health Risk Models

Comparing the results of air dispersion modelling as part of the Environmental Impact assessment against European and national air quality standards effectively makes a health risk assessment for those pollutants for which a standard has been derived. These air quality standards have been developed

primarily in order to protect human health via known intake mechanisms, such as inhalation and ingestion. Some pollutants, such as dioxins, furans and dioxin like PCBs, have human health impacts at lower ingestion levels than lend themselves to setting an air quality standard to control against. For these pollutants, a different human health risk model is required which better reflects the level of dioxin intake.

Models are available to predict the dioxin, furan and dioxin like PCBs intake for comparison with the Tolerable Daily Intake (TDI) recommended by the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment, known as COT. These include the HHRAP model.

HHRAP has been developed by the US EPA to calculate the human body intake of a range of carcinogenic pollutants and to determine the mathematic quantitative risk in probabilistic terms. In the UK, in common with other European Countries, we consider a threshold dose below which the likelihood of an adverse effect is regarded as being very low or effectively zero.

The TDI is the amount of a substance that can be ingested daily over a lifetime without appreciable health risk. It is expressed in relation to bodyweight in order to allow for different body size, such as for children of different ages. In the UK, the COT has set a TDI for dioxins, furans and dioxin like PCB's of 2 picograms I-TEQ/Kg-body weight/day (N.B. a picogram is a million millionths (10⁻¹²) of a gram).

In addition to an assessment of risk from dioxins, furans and dioxin like PCB's, the HHRAP model enables a risk assessment from human intake of a range of heavy metals. In principle, the respective ES for these metals are protective of human health. It is not therefore necessary to model the human body intake.

COMEAP developed a methodology based on the results of time series epidemiological studies which allows calculation of the public health impact of exposure to the classical air pollutants (NO₂, SO₂ and particulates) in terms of the numbers of "deaths brought forward" and the "number of hospital admissions for respiratory disease brought forward or additional". COMEAP has issued a statement expressing some reservations about the applicability of applying its methodology to small affected areas. Those concerns generally relate to the fact that the exposure-response coefficients used in the COMEAP report derive from studies of whole urban populations where the air pollution climate may differ from that around a new industrial installation. COMEAP identified a number of factors and assumptions that would contribute to the uncertainty of the estimates. These were summarised in the Defra review as below:

- Assumption that the spatial distribution of the air pollutants considered is the same in the area under study as in those areas, usually cities or large towns, in which the studies which generated the coefficients were undertaken.

- Assumption that the temporal pattern of pollutant concentrations in the area under study is similar to that in the areas in which the studies which generated the coefficients were undertaken (i.e. urban areas).
- It should be recognised that a difference in the pattern of socio-economic conditions between the areas to be studied and the reference areas could lead to inaccuracy in the predicted level of effects.
- In the same way, a difference in the pattern of personal exposures between the areas to be studied and the reference areas will affect the accuracy of the predictions of effects.

The use of the COMEAP methodology is not generally recommended for modelling the human health impacts of individual installations. However it may have limited applicability where emissions of NO_x, SO₂ and particulates cannot be screened out as insignificant in the Environmental Impact assessment, there are high ambient background levels of these pollutants and we are advised that its use was appropriate by our public health consultees.

Our recommended approach is therefore the use of the methodology set out in our guidance for comparison for most pollutants (including metals) and dioxin intake model using the HHRAP model as described above for dioxins, furans and dioxin like PCBs. Where an alternative approach is adopted for dioxins, we check the predictions ourselves.

4.6.2 Assessment of Intake of Dioxins, Furans and Dioxin like PCBs

A full assessment of the potential impact on Human Health was made as part of the determination for the Original Permit in 2011. This assessment has been repeated to account for the changes proposed in this variation.

We have assessed the impact of emissions for all the parameters listed in section 4.5 above. The assessments compared the predicted emissions against relevant air quality standards which have been developed primarily in order to protect human health. The assessment indicated that the Installation emissions were either insignificant; or where the impact of an emission of a pollutant is not insignificant the assessment showed that the predicted process contributions would not lead to the exceedance of an ES.

For Dioxins and Furans for which there are no air quality standards the assessment concentrated on the overall intake including inhalation and ingestion. In the original permit application the Operator assessed the daily intake of dioxins and furans by local receptors resulting from the operation of the proposed facility was assessed against the Tolerable Daily Intake (TDI) values for dioxins and furans established by the World Health Organisation (WHO) and the UK Committee on Toxicity (COT). The results showed that the predicted daily intake of dioxins at all receptors, resulting from emissions from the proposed facility, were significantly below the recommended TDI levels.

For dioxins, furans and dioxin like PCBs, the principal exposure route is through ingestion, usually through the food chain, and the main risk to health is through accumulation in the body over a period of time.

The human health risk assessment calculates the dose of dioxins and furans that would be received by local receptors if their food and water were sourced from the locality where the deposition of dioxins, furans and dioxin like PCBs is predicted to be the highest. This is then assessed against the Tolerable Daily Intake (TDI) levels established by the COT of 2 picograms I-TEQ / Kg bodyweight/ day.

The results of the Operator’s assessment of dioxin intake are detailed in the table below (worst – case results for each category are shown). The results showed that the predicted daily intake of dioxins, furans and dioxin like PCBs at all receptors, resulting from emissions from the proposed facility, were significantly below the recommended TDI levels.

Location	Receptor Type*	Process Contribution**	% of TDI
Maximum Ground Level Impact (hypothetical exposure)	Farmer Adult	1.7×10^{-3}	0.09%
	Farmer Child	2.1×10^{-3}	0.10%
Maximum Ground Level Impact at residential receptor	Farmer Adult	3.3×10^{-5}	<0.01%
	Farmer Child	9.6×10^{-5}	<0.01%

*Present at the point of maximum impact of the ERF emissions consuming predominantly home grown plants and home reared animals.

**Calculated maximum daily intake of dioxins by local receptors resulting from the operation of the proposed facility (I-TEQ/ kg-BW/day)

4.6.3 Particulates smaller than 2.5 microns

The existing permit requires the Operator to monitor particulate emissions using the method set out in Table S3.1 of Schedule 3 of the Permit. This method requires that the filter efficiency must be at least 99.5 % on a test aerosol with a mean particle diameter of 0.3 µm, at the maximum flow rate anticipated. The filter efficiency for larger particles will be at least as high as this. This means that particulate monitoring data effectively captures everything above 0.3 µm and much of what is smaller. It is not expected that particles smaller than 0.3 µm will contribute significantly to the mass release rate / concentration of particulates because of their very small mass, even if present. This means that emissions monitoring data can be relied upon to measure the true mass emission rate of particulates.

Nano-particles are considered to refer to those particulates less than 0.1 µm in diameter (PM_{0.1}). Questions are often raised about the effect of nano-particles on human health, in particular on children’s health, because of their high surface to volume ratio, making them more reactive, and their very small size, giving them the potential to penetrate cell walls of living organisms. The small size also means there will be a larger number of small particles for a given mass concentration. However the HPA statement (referenced below) says that due to the small effects of incinerators on local concentration of

particles, it is highly unlikely that there will be detectable effects of any particular incinerator on local infant mortality.

The HPA (now PHE) addresses the issue of the health effects of particulates in their September 2009 statement 'The Impact on Health of Emissions to Air from Municipal Incinerators'. It refers to the coefficients linking PM₁₀ and PM_{2.5} with effects on health derived by COMEAP and goes on to say that if these coefficients are applied to small increases in concentrations produced, locally, by incinerators; the estimated effects on health are likely to be small. PHE note that the coefficients that allow the use of number concentrations in impact calculations have not yet been defined because the national experts have not judged that the evidence is sufficient to do so. This is an area being kept under review by COMEAP.

In December 2010, COMEAP published a report on The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom. It says that "a policy which aims to reduce the annual average concentration of PM_{2.5} by 1 µg/m³ would result in an increase in life expectancy of 20 days for people born in 2008." However, "The Committee stresses the need for careful interpretation of these metrics to avoid incorrect inferences being drawn – they are valid representations of population aggregate or average effects, but they can be misleading when interpreted as reflecting the experience of individuals."

PHE also point out that in 2007 incinerators contributed 0.02% to ambient ground level PM₁₀ levels compared with 18% for road traffic and 22% for industry in general. PHE noted that in a sample collected in a day at a typical urban area the proportion of PM_{0.1} is around 5-10% of PM₁₀. It goes on to say that PM₁₀ includes and exceeds PM_{2.5} which in turn includes and exceeds PM_{0.1}.

This is consistent with the assessment of this application which shows emissions of PM₁₀ to air to be insignificant.

We take the view, based on the foregoing evidence, that techniques which control the release of particulates to levels which will not cause harm to human health will also control the release of fine particulate matter to a level which will not cause harm to human health.

4.6.4 Assessment of Health Effects from the Installation

We have assessed the health effects from the operation of this installation in relation to the above (sections 4.6.1 to 4.6.3). We have applied the relevant requirements of the national and European legislation in imposing the permit conditions. We are satisfied that compliance with these conditions will ensure protection of the environment and human health.

Taking into account all of the expert opinion available, we agree with the conclusion reached by PHE that "While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with

complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable.”

In carrying out air dispersion modelling as part of the Environmental Impact assessment and comparing the predicted environmental concentrations with European and national air quality standards, the Operator has effectively made a health risk assessment for many pollutants. These air quality standards have been developed primarily in order to protect human health.

The Environment Agency has reviewed the methodology employed by the Operator to carry out the health impact assessment. We are satisfied that methodology is appropriate.

Overall, taking into account the conservative nature of the impact assessment (i.e. that it is based upon an individual exposed for a life-time to the effects of the highest predicted relevant airborne concentrations and consuming mostly locally grown food), it was concluded that the operation of the proposed facility will not pose a significant carcinogenic or non-carcinogenic risk to human health.

Public Health England were consulted on the Application and concluded that they had no significant concerns regarding the risk to the health of humans from the installation. Details of the response provided by Public Health England to the consultation on this Application can be found in Annex 4.

The Environment Agency are therefore satisfied that the Operator's conclusions presented above are soundly based and we conclude that the potential emissions of pollutants including dioxins, furans and metals from the proposed facility are unlikely to have an impact upon human health.

4.7 Impact on Habitats sites, SSSIs, non-statutory conservation sites.

4.7.1 Sites Considered

There are no Habitats (i.e. Special Areas of Conservation, Special Protection Areas and Ramsar) sites within 10Km of the proposed Installation.

The following Sites of Special Scientific Interest are located within 2Km of the Installation:

- Newhurst Quarry SSSI
- Beacon Hill, Hangingstone and Out Woods (SSSI)
- Ives Head SSSI

The following non-statutory local wildlife and conservation sites are located within 2Km of the Installation:

- Morley Quarry (LNR)
- Blackbrook Reservoir Fields LWS
- Morley Lane Field LWS
- White Horse Wood LWS

- Abbey Road Grassland LWS
- Little Garendon LWS
- Little Garendon Oaks LWS
- Charley Road Fields LWS
- Iveshead LWS
- Lubcloud Field LWS
- Lubcloud Alder Woodland LWS
- Lubcloud Crack Willow LWS
- British Piece LWS
- Longcliffe Golf Course LWS
- Five Tree Plantation LWS
- Charley Woodland Sweet Chestnut LWS
- Charley Wood and Beech LWS
- Home Farm Wood LWS
- Nanpantan Hall Wood LWS
- Buck Hill LWS
- Nanpantan Reservoir LWS
- Hermitage Estate LWS
- Burleigh Wood LWS
- Booth Wood LWS
- White Horse Wood Ancient Woodland
- Outwood Ancient Woodland
- Holywell Wood Ancient Woodland

4.7.2 SSSI Assessment

There are 3 SSSIs within 2km of the installation, they are Newhurst Quarry SSSI, Ives Head SSSI and Beacon Hill, Hangingstone and Out Woods SSSI.

We assessed the impact on Newhurst Quarry SSSI as part of the original permit determination. The SSSI is designated for its geological features. The installation boundary is outside of the SSSI boundary and there are no direct emissions to the site. We concluded in the original permit determination that the Installation is not likely to damage any of the geological or physiological features which are of special interest. We are satisfied this remains the case.

The impact on Beacon Hill, Hangingstone and Out Woods SSSI was not assessed as part of the original permit determination, as it was not considered to be within 2km of the installation. The mapping system used for the screening assessment has been updated since the original permit determination and the screening assessment now shows that the northern tip of the SSSI is with 2km of the installation boundary. We have therefore decided that for this determination to include the SSSI within our assessment. Also Ives Head SSSI was not considered in the original permit determination because the site was not designated as a SSSI at the time of the original determination.

For Ives Head SSSI the reason for notification is as a geological feature. The Installation has no direct emissions to the SSSI. Significant deposition of acidic gases or particulates, can potentially impact on geological features, however we are satisfied that significant deposition of acidic gases or particulates will not result from the Installation as these pollutants will be abated prior to emission from the stack. Therefore we are satisfied the geological features will not be adversely affected and the installation is not likely to damage the geological or physiological features.

Beacon Hill, Hangingstone and Out Woods, is located approximately 1.95km from the installation boundary. This SSSI has both geological features and ecological features and therefore the Operator has carried out an assessment of the potential impact on the site. With regards to the geological features, there are no direct emissions to the SSSI, and whilst there are emissions to air from the installation there will be no adverse impact on the geological features. Significant deposition of acidic gases or particulates, can potentially impact on geological features, however we are satisfied that significant deposition of acidic gases or particulates will not result from the installation as these pollutants will be abated prior to emission from the stack. Therefore we are satisfied the geological features will not be adversely affected and the installation is not likely to damage the geological or physiological features.

The only risk to the ecological features of the SSSI is from emissions to air. These features are listed in the SSSI citation (<https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1002689.pdf>) and include lowland mixed deciduous woodland and lowland dry heath; which provides habitat for assemblages of breeding birds, several plant and tree species, newts and badgers. The SSSI is split into 9 units, the units closest to the Installation are described as Broadleaved, Mixed and Yew Woodland. The latest report on the condition of the SSSI by Natural England describes the condition of all but one of the units as either unfavourable recovering or unfavourable declining. For the units that are declining the reason is given as forestry and woodland management. Note that the unit closest to the Installation (Unit 8) the condition is described as favourable.

The habitats listed can potentially be susceptible to damage from emissions of NO_x, SO₂, NH₃, HF, Nitrogen deposition and acid deposition. The Operator has therefore completed an assessment of the impact from emissions to air.

The Applicant provided an assessment of the impact of relevant pollutants from the ERF and using air dispersion modelling predicted the process contribution (PC) of each pollutant on the SSSI. The assessment also calculated the predicted environment concentration (PEC), this is the sum of the process contribution and the background pollution levels.

In accordance with our habitats assessment process, which has been agreed with Natural England, if the process contribution is less than 1% of the relevant long-term critical level or load or less than 10% of the short-term critical level or load we consider the impact to be insignificant and we can conclude that the permission is not likely to damage any of the flora or fauna which are of special interest. And if the process contribution is above the

threshold but the PEC is below 70% we can also conclude that the permission is not likely to damage.

Where the process contribution is above the threshold and the PEC exceeds 70% then an assessment must be made of the significance of the process contribution from the permission and whether it is likely to result in damage to the SSSI.

The result of the Applicant's modelling assessment is as follows:

Pollutant	ES ($\mu\text{g}/\text{m}^3$)	Back-ground ($\mu\text{g}/\text{m}^3$)	Process Contribution (PC) ($\mu\text{g}/\text{m}^3$)	PC as % of ES	Predicted Environmental Concentration (PEC) ($\mu\text{g}/\text{m}^3$)	PEC as % ES
Direct Impacts²						
NO _x Annual	30	22.3	0.20	1.0%	22.5	75%
NO _x Daily Mean	75	44.6	4.2	6%	-	-
SO ₂	10 ⁽¹⁾	2.0	0.05	<1%	-	-
Ammonia	1 ⁽¹⁾	2.35	0.01	<1%	-	-
HF Weekly Mean	0.5		0.01	2%	-	-
HF Daily Mean	5		0.02	<1%	-	-
Deposition Impacts²						
N Deposition (kg N/ha/yr)	10	37.38	0.12	1.2%	37.50	375%
Acidification (Keq/ha/yr)	CLminN: 0.142 CLmaxN: 1.882 CLmaxS: 1.525 ⁽³⁾	N = 2.59 S = 0.3 Total = 2.89	N = 0.08 S = 0.017 Total = 0.025	1.3%	-	-

(1) The lichen and bryophyte sensitivity standards for ammonia and sulphur dioxide have been assigned for this assessment as the presence of these features has been recorded in the site Management Plan for at least one of the sections of the site.

(2) Direct impact units are $\mu\text{g}/\text{m}^3$ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

(3) The Operators assessment used the higher critical load in their assessment, we have applied the lower critical load in the table above as a worse case assessment. We consulted with Natural England to ensure the correct critical load was applied

The assessment shows that for HF, SO₂ and NH₃ when compared against the relevant critical levels the process contributions are less than the 1% (long-term) and 10% (short-term) thresholds. We have therefore concluded that emissions of these pollutants are not likely to damage any of the flora, fauna or geological or physiological features which are of special interest. Note that there is no long term critical level for HF.

With regards to NO_x, Nutrient Nitrogen deposition and Acid deposition the assessment shows that process contributions are marginally greater than the 1% threshold. The assessment shows that for NO_x the PC is 1.0% of the critical level, for nutrient nitrogen deposition the PC is 1.2% of the lower critical load and for acid deposition the PC is 1.3% of the lower critical load. Note that a direct comparison with the process contributions predicted in the original determination is not possible for the reasons stated above an assessment of the impact on the Beacon Hill, Hangingstone and Out Woods SSSI was not made as part of the original permit determination. However, to give an indication of whether there would be a significant increase in process contributions under the new proposals, it is possible to compare the maximum predicted ground level concentrations of NO_x, SO₂, HF and HCl.

Maximum Predicted Ground Level concentrations		
Pollutant	Max PC µg/m ³ original permit	Max PC µg/m ³ variation
NO _x (annual mean)	0.4	0.4
SO ₂ (24hour)	1.5	0.9
NH ₃ (annual mean)	0.03	0.03
HF (1 hour average)	0.4	0.3

The comparison shows that there is no increase in comparable process contributions (for NO_x, SO₂, NH₃ and HF) when comparing the predicted impacts from the original proposals to the updated proposal. This indicates that the assessed process contributions at the SSSI are unlikely to be significantly increased as a result of this variation.

The assessment has been based on an air dispersion modelling assessment. We have audited the Operator's modelling assessment, including carrying out our own check modelling; and we agree with the assessments conclusions.

As the process contributions have been shown to be only marginally above the 1% insignificance threshold, we have considered the assumptions that have been made in the modelling assessment. The modelling assessment has been based on conservative assumptions with the plant operating under worst case conditions at all times, including:

- Modelling predictions that are based on the plant emitting NO_x of 200 mg/m³ continuously throughout the year. This is because the permit for the site includes a 200mg/m³ limit for NO_x. Actual emissions are likely to be significantly lower than this, as the plant will need adequate headroom to allow for fluctuations in NO_x emissions in order to avoid breaching the permitted limit.
- The assessment is based on the plant operating 24 hours per day, 365 days per year. In reality this will not happen as the plant will experience shutdowns and periods of reduced work load.

- Air dispersion modelling takes into consideration other worst case scenarios, including the use of 5 years weather data to account for all conditions.

For these reasons the actual process contributions will be less than that predicted in the modelling assessment. We therefore consider that as the predicted PCs for NO_x, nutrient nitrogen deposition and acid deposition are only marginally exceeding the 1% threshold, the actual process contributions are likely to be less than this and are likely to be at or below the 1% threshold. Also, in the case of nutrient deposition and acid deposition the background is already significantly exceeding the critical loads at the site.

As discussed above the condition of all but one of the Units of the SSSI is described as either unfavourable recovering or unfavourable declining. With the reason for the Units declining cited as forestry and woodland management with no reference to the background air quality. Also Unit 8 which is the closest unit to the Installation and therefore where the impact from the installation is likely to be at its maximum, the condition is described as favourable this is despite the background nutrient nitrogen deposition and acid deposition significantly exceeding the critical loads.

The Operator's worst case assessment shows that the increase to the background deposition from the Installation will be negligible in comparison to the existing background deposition (PC is predicted to be 0.3% of the existing background for nutrient nitrogen deposition; and 0.86% of the acid deposition critical load). Therefore we are satisfied that emissions to air from the Installation will not have a discernable adverse impact on the features of the SSSI. Particularly as the condition of the closest part of the SSSI to installation is described as favourable despite the existing high background pollution.

For these reasons we are satisfied that the proposed permission is not likely to damage any of the flora or fauna which are of special interest. We have completed an Appendix 4 CRoW Assessment detailing our full assessment of the impact on the SSSIs which is available to view on the public register.

4.7.3 Assessment of other conservation sites

Conservation sites are protected in law by legislation. The Habitats Directive provides the highest level of protection for SACs and SPAs, domestic legislation provides a lower but important level of protection for SSSIs. Finally the Environment Act provides more generalised protection for flora and fauna rather than for specifically named conservation designations. It is under the Environment Act that we assess other sites (such as local wildlife sites) which prevents us from permitting something that will result in significant pollution; and which offers levels of protection proportionate with other European and national legislation. However, it should not be assumed that because levels of protection are less stringent for these other sites and that they are not of considerable importance. Local sites link and support EU and national nature

conservation sites together and hence help to maintain the UK's biodiversity resilience.

For SACs SPAs, Ramsars and SSSIs we consider the contribution PC and the background levels in making an assessment of impact. In assessing these other sites under the Environment Act we look at the impact from the Installation alone in order to determine whether it would cause significant pollution. This is a proportionate approach, in line with the levels of protection offered by the conservation legislation to protect these other sites (which are generally more numerous than Natura 2000 or SSSIs) whilst ensuring that we do not restrict development.

Critical levels and loads are set to protect the most vulnerable habitat types. Thresholds change in accordance with the levels of protection afforded by the legislation. Therefore the thresholds for SAC SPA and SSSI features are more stringent than those for other nature conservation sites.

Therefore we would generally conclude that the Installation is not causing significant pollution at these other sites if the PC is less than the relevant critical level or critical load, provided that the Operator is using BAT to control emissions.

The Operator has assessed the impact on the non-statutory sites, the assessment showed that process contributions will be below the relevant critical level and loads at the sites assessed. The threshold for significance for these sites is 100%. Even using the maximum predictions and worst case sensitivities from all the wildlife sites presented by the Operator the PCs are significantly below the 100% threshold.

We have audited the Operator's assessment and carried out our own check modelling. Taking uncertainties in to account our predictions at this site and the other sites agree with the Operator's conclusions.

We are satisfied that the Installation will not cause significant pollution at the sites. The Operator is required to prevent, minimise and control emissions using BAT.

4.7.3 Assessment of other Habitats and Species

As part of our assessment we check on protected sites, habitats and species which have the potential to be impacted by the activity being proposed. This is done using our own internal screening tools to generate a list of sites and species. We also had a number of consultation responses expressing concern over impacts on nearby sites and species.

According to our records there are protected species within 2km of the Installation. These species are present around the Blackbrook Reservoir approximately 1.5km west of the Installation and Nanpantan Reservoir approximately 1.7km east of the installation. The species are aquatic and are

likely to be vulnerable to any significant adverse changes to water quality. As discussed above the only discharge from the facility is of uncontaminated surface water to Shortcliff Brook, this will not change as result of this variation. We are therefore satisfied that there will not be a significant adverse impact on the protected species

Comments received from the public consultation for this application (as detailed in Annex 4) also identified populations of Bats, Badgers, Great Crested Newts, White Clawed Crayfish and Birds that are present close to the Installation. As discussed above the Operator has assessed the impacts on both statutory and non-statutory habitat sites and we are satisfied that any impacts on these sites will not be significant. We believe that the habitats contained within these sites are likely to be the main areas frequented by such species even though it may the case that the species are not recorded as being integral to them.

We are also satisfied that any other areas are protected as part of our general duties to protect the wider environment and to not allow any significant pollution, and as such we believe that protecting these supporting habitats will inherently protect the associated species noted within the public consultation.

4.8 Impact of abnormal operations

Article 50(4)(c) of IED requires that waste incineration and co-incineration plants shall operate an automatic system to prevent waste feed whenever any of the continuous emission monitors show that an emission limit value (ELV) is exceeded due to disturbances or failures of the purification devices. Notwithstanding this, Article 46(6) allows for the continued incineration and co-incineration of waste under such conditions provided that this period does not (in any circumstances) exceed 4 hours uninterrupted continuous operation or the cumulative period of operation does not exceed 60 hours in a calendar year. This is a recognition that the emissions during transient states (e.g. start-up and shut-down) are higher than during steady-state operation, and the overall environmental impact of continued operation with a limited exceedance of an ELV may be less than that of a partial shut-down and re-start.

For incineration plant, IED sets backstop limits for particulates, CO and TOC which must continue to be met at all times. The CO and TOC limits are the same as for normal operation, and are intended to ensure that good combustion conditions are maintained. The backstop limit for particulates is 150 mg/m³ (as a half hourly average) which is five times the limit in normal operation.

Article 45(1)(f) requires that the permit shall specify the maximum permissible period of any technically unavoidable stoppages, disturbances, or failures of the purification devices or the measurement devices, during which the concentrations in the discharges into the air may exceed the prescribed

emission limit values. In this case we have decided to set the time limit at 4 hours, which is the maximum period prescribed by Article 46(6) of the IED.

These abnormal operations are limited to no more than a period of 4 hours continuous operation and no more than 60 hour aggregated operation in any calendar year. This is less than 1% of total operating hours and so abnormal operating conditions are not expected to have any significant long term environmental impact unless the background conditions were already close to, or exceeding, an ES. For the most part therefore consideration of abnormal operations is limited to consideration of its impact on short term ESs.

In making an assessment of abnormal operations the following worst case scenario has been assumed:

- Group 1 Metals are 100% above permitted emission
- Group 2 Metals are 300% above permitted emission
- Group 3 Metals are 200% above permitted emission
- NO_x emissions of 600 mg/m³ - 50% above permitted emission
- Particulate emissions of 150 mg/m³ – 400% above permitted emission
- SO₂ emissions of 300 mg/m³ - 50% above permitted emission
- CO emissions of 400 mg/m³ - 300% above permitted emission
- HCl emissions of 600 mg/m³ - 900% above permitted emission
- HF emissions of 10 mg/m³ - 150% above permitted emission

This is a worst case scenario in that these abnormal conditions include a number of different equipment failures not all of which will necessarily result in an adverse impact on the environment (e.g. a failure of a monitoring instrument does not necessarily mean that the incinerator or abatement plant is malfunctioning). This analysis assumes that any failure of any equipment results in all the negative impacts set out above occurring simultaneously.

The result on the Operator's short-term environmental impact is summarised in the table below.

Pollutant	ES	Backgr ound	Process contribution (PC)		Predicted environmental concentration (PEC)	
	µg/m ³	µg/m ³	µg/m ³	% of ES	µg/m ³	% of ES
NO ₂	¹ 200	54.6	20	9.9	--	--
PM ₁₀	² 50	19.5	2	3	--	--
SO ₂	³ 266	5	77	28.7	82	30.5
	⁴ 350	5	20	5.7	--	--
HCl	⁵ 750	0.5	201	26.9	202	26.9
HF	⁵ 160	7	3	2.1	--	--

CO	⁶ 10,000	332	28	0.3	--	--
NH ₃	¹⁰ 2500	6.12	2	0.1	--	--
Mercury	⁷ 7.5	0.003	0.07	0.9	--	--
Antimony	⁷ 150	0.0002	0.01	<0.1	--	--
Chromium (III)	⁸ 150	0.007	0.09	0.1	--	--
Copper	⁸ 200	0.0027	0.03	<0.1	--	--
Manganese	⁸ 1500	0.0057	0.06	<0.1%	--	--
Vanadium	⁸ 1	0.0015	0.01	0.6	--	--
Notes ¹ 99.79 th percentile of 1 hour means ² 90.41 st percentile of 24 hour means ³ 99.9 th percentile of 15 minute means ⁴ 99.73 rd percentile of 1 hour means ⁵ 1 hour average ⁶ maximum daily running 8 hour mean ⁷ 1 hour maximum ⁸ 24hr maximum						

From the table above the emissions of the following substances can still be considered insignificant, in that the PC is still <10% of the short-term ES.

- NO₂, PM₁₀, HF, CO, NH₃, Mercury, Antimony, Chromium (III), Copper, Manganese & Vanadium.

Also from the table above emissions of the following emissions (which were not screened out as insignificant) have been assessed as being unlikely to give rise to significant pollution in that the predicted environmental concentration is less than 100% of short term ES.

- SO₂ & HCl

Impact of dioxin abnormal conditions

The Operator has also predicted the impact of abnormal emissions for dioxins, furans and dioxin like PCB emissions, the concentration used in the assessment have been sourced from a study commissioned by the Environment Agency (AEA, Investigation of Waste Incinerator Dioxins during Start-up and shut-down operating phases (2008)). The study found a maximum concentration of 0.58ng (TEQ)/m³ at any point during start-up and shut-down process. The Operator has applied this concentration to dioxins and the same factor increase for the PCBs for the allowable 60 hours per year they consider this to be a precautionary approach. The dioxin and PCB intake has been pro-rated on this basis and then combined.

The result of the Operator's assessment of abnormal emissions of dioxins and dioxin like PCBs daily intake is as follows:

Location	Type	Process Contribution Intake (pg TEQ/kg(BW)/day)	%TDI
Maximum Ground Level Impact (hypothetical exposure)	Farmer Adult	1.7×10^{-3}	0.09
	Farmer Child	2.1×10^{-3}	0.10
Maximum Ground Level Impact at residential area	Farmer Adult	3.3×10^{-5}	<0.01
	Farmer Child	9.6×10^{-5}	<0.01

We have carried out our own abnormal emissions checks, these checks agreed with the Operator's conclusions in that the installation is unlikely to lead to any short term breaches of the relevant ES at any sensitive receptors.

We are therefore satisfied that it is not necessary to further constrain the conditions and duration of the periods of abnormal operation beyond those permitted under Chapter IV of the IED.

4.9 Odour

Due to the proposed increase to waste tonnage and potential change to the number of incineration lines we have reviewed the existing odour management techniques. The existing techniques are that waste accepted at the installation will be delivered in covered vehicles or within containers and bulk storage of waste will only occur in the installation's waste bunker. A roller shutter door will be used to close the entrance to the tipping hall outside of the waste delivery periods and combustion air will be drawn from above the waste storage bunker in order to prevent odours and airborne particulates from leaving the facility building. We are satisfied that these techniques remain appropriate despite the proposed operational changes.

As discussed earlier in this document the Operator is proposing to operate with either 1 or 2 incineration lines. Under the scenario where the installation operates with 2 incineration lines, shutdowns are likely to result in only one incineration line being down at a time therefore waste will not be allowed to build up in the reception hall and combustion air will continue to be drawn from above the waste storage bunker and will minimise odour and airborne particles leaving the building.

However if the installation operates with only 1 incineration line, in the event of a shutdown, the Operator will be unable to continue to draw combustion air therefore an alternative method of odour abatement is required. Whilst closing the doors will limit the spread of odour, air should be extracted and treated via a separate system.

Following a request by us, the Operator has proposed an alternative odour abatement system, for the scenario when only one incineration line is proposed. The proposed system uses a process known as adsorption, where odorous gases within the waste reception hall will be vented through a bed of

activated carbon prior to being released to atmosphere. The odorous molecules that contact the adsorbent surface will be captured therefore minimising odours emissions. The Operator has stated that the system will be designed to allow for up to 2 air changes per hour in the reception hall. It will also incorporate inlet dust filters that will protect the activated carbon from dust laden air. During periods of shutdown, all doors to the waste reception area will remain closed to minimise fugitive releases of odours from the building. There will also be regular odour monitoring during a shutdown.

We are satisfied that the proposed odour management techniques are BAT.

The operator has stated that the final design of the odour abatement system (activated carbon filter) is yet to be finalised, this means that monitoring procedures for the abatement system are yet to be finalised, monitoring of the system is key to its continuing effectiveness, therefore we have included a pre-operational in the permit (PO8) requiring the Operator to submit a commissioning plan and monitoring procedure for the odour abatement system for approval by the Environment Agency. Improvement condition IC7 has been added that requires the Operator to submit a report that demonstrates the effectiveness of the activated carbon abatement system.

We have also included a pre-operational condition (PO9) for the Operator to demonstrate, during commissioning, they can achieve negative pressure throughout the waste reception hall.

Based upon the information in the Application we are satisfied that the appropriate measures will be in place to prevent or where that is not practicable to minimise odour and to prevent pollution from odour.

4.10 Noise and vibration

Due to the proposed changes the Operator has reviewed the existing noise impact assessment. The reviewed assessment takes into consideration the operational changes proposed under this variation. Also following a request by us they have carried out an updated background noise survey at locations representative of the nearest sensitive receptors. This ensures that the current soundscape is reflected in the assessment.

The noise impact assessment identified local noise-sensitive receptors, potential sources of noise at the installation and noise attenuation measures. Measurements were taken of the prevailing ambient noise levels to produce a baseline noise survey and an assessment was carried out in accordance with BS 4142:2014 to compare the predicted plant rating noise levels with the established background levels.

Based on their predictions and the BS4142 assessment the Operator has concluded that by incorporating BAT, as demonstrated in their assessment, the site will have a low impact during the daytime period. They conclude that their assessment indicates an 'adverse' impact during the night-time period,

but state that 'the ambient sound levels during night-time are relatively high' so consider that there would therefore not be an adverse impact at receptors. They also stated that they consider it 'reasonably practicable to further reduce sound levels from the Tipping Hall to achieve rating levels below background' at receptors.

We audited the Operator's assessment using Cadna-A 2019, using the Operator's sound power levels, source locations, HGV movements, on-site buildings and other parameters contained in the Operator's assessment and noise modelling files.

The conclusions from our audit agreed that with appropriate mitigation during the daytime impacts at the closest sensitive receptors will be low. However during night-time our audit indicated that up to a 'significant adverse' impact cannot be ruled out at one of the sensitive receptors. We identified that the Tipping Hall louvers are the dominant noise source for the noise impact at the receptor, therefore the louvers will be required to be designed with sufficient mitigation so as to ensure the noise levels do not result in an adverse impact at the receptor. It was also noted in our audit that the existing topographical features within the Charnwood Quarry site beyond the permit boundary, and therefore potentially outside the Operator's control offered screening of some of the noise source from receptors. Therefore if, in the future, the topography changes this could increase the impact at receptors.

For these reasons we requested additional information from the Operator. We requested confirmation that there will be adequate acoustic mitigation from the tipping hall louvers so as to avoid a significant adverse impact at receptors. We also requested reassurance that the existing topography will not change within quarry, in particular an earth embankment located to the east of the installation.

In response to our request the Operator has confirmed that they control the wider quarry and have updated the noise assessment to confirm that there would be no changes to the landform outside of the installation boundary. They have also confirmed that the noise from the tipping hall would be mitigated and defined during the detailed design stage, so as not to exceed background levels at the receptor during the night-time period and this specification has been included in the contract with the technology provider.

We have therefore included a pre-operational condition (PO11 in table S1.4 of the permit) in the permit for the Operator to review the noise assessment based on the final design of the installation and provide evidence that noise from the tipping hall will not exceed background levels at nearby receptors during the night-time period. We are also satisfied that the noise attenuation offered by the existing topography within the quarry will remain.

We are satisfied, subject to our approval of the response to pre-operational condition PO11, that appropriate measures will be in place to prevent or where that is not practicable to minimise noise and vibration and to prevent pollution from noise and vibration outside the site. Note that the original permit

contained a similar condition relating to noise (PO4) the new condition supersedes this condition. PO4 contained a requirement to assess the potential impact on potential Peregrine Falcon nesting sites within Newhurst Quarry. We have retained this requirement in the condition.

We have also included a requirement in pre-operational condition PO4 for the commissioning plan to include proposals for the validation of the noise assessment.

4.11 Emissions to Water

It remains the case that the permit restricts the discharge into Shortcliffe Brook to uncontaminated surface water from car parks and roads. The discharge drains to the attenuation lagoon via a silt and oil interceptor. Once in the attenuation lagoon there will be settlement of residual suspended solids and then a controlled release into Shortcliffe Brook, as detailed in the Flood Risk Assessment. We remain satisfied that there will be no significant adverse impact on water quality in Shortcliffe Brook. Note that we have included 'uncontaminated surface water' in the source in table S3.2 to clarify that only uncontaminated water can be discharged

4.12 Global Warming

CO₂ is an inevitable product of the combustion of waste. The amount of CO₂ emitted will be essentially determined by the quantity and characteristics of waste being incinerated, which are already subject to conditions in the Permit. It is therefore inappropriate to set an emission limit value for CO₂, which could do more than recognise what is going to be emitted. The gas is not therefore targeted as a key pollutant under the IPPC Directive or under the Waste Incineration Directive, e.g. it is not included in Annex III to the IPPCD, which lists the main polluting substances that are to be considered when setting emission limit values (ELVs) in Permits.

We have therefore considered setting equivalent parameters or technical measures for CO₂. However, provided energy is recovered efficiently, which we remain satisfied that it will be, there are no additional equivalent technical measures (beyond those relating to the quantity and characteristics of the waste) that can be imposed that do not run counter to the primary purpose of the plant, which is the destruction of waste. Controls in the form of restrictions on the volume and type of waste that can be accepted at the Installation and permit conditions relating to energy efficiency effectively apply equivalent technical measures to limit CO₂ emissions.

4.13 Monitoring during normal and abnormal operations

The monitoring requirements that are already set in the permit remain unchanged as a result of this variation.

4.14 Reporting

Reporting requirements that are already set in the permit remain unchanged as a result of this variation.

4.14 Template changes

Since the original permit was issued there have been a number of changes to our permit template for incineration, as part of this variation we have taken the opportunity to vary or include a number of conditions in permit to reflect those in our standard template. The following condition have been added or varied:

1.2.3 – this condition requires a four yearly review of the viability of CHP implementation.

2.3.6 to 2.3.11 – these condition relate to abnormal operations. They have been varied to reflect requirements IED and remove reference to WID.

3.1.1 – This conditions limits emissions and has been varied to remove reference to WID.

3.2.4 and PO14 in Table S1.4 – These conditions have been included to reflect requirements set out in IED.

3.6.1 – this condition requires the Operator to implement fire prevention procedures in line with the approved fire prevention plan.

3.7.1 and 3.7.2 – these conditions specifically refer to the control of pests.

4.3.1 and 4.3.2 - These conditions have been included to reflect requirements set out in IED.

4.2.2 – Condition relation to reporting requirements, part d of the condition has been varied to remove reference to WID and include reference to IED.

Improvement conditions IC1, IC2, IC4, IC5 and IC6 in table S1.3 – wording in conditions have been updated, however requirements remain unchanged.

Pre-operational condition PO1, PO2, PO3, PO5 and PO6 in table S1.4 - wording in conditions have been updated, however requirements remain unchanged.

Schedule 4 Reporting Table S4.1 – This table has been updated to provide clarification of reporting requirements.

Schedule 4 Reporting Table S4.4 – We have issued updated reporting forms with the permit.

Schedule 6 has been varied to remove reference to WID and include reference to IED.

5 Other legal requirements

In this section we explain how we have addressed other relevant legal requirements, to the extent that we have not addressed them elsewhere in this document.

5.1 The EPR 2016 and related Directives

The EPR delivers the requirements of a number of European and national laws.

5.1.1 Schedules 1 and 7 to the EPR 2016 – IED Directive

We address the requirements of the IED in the body of this document above and the specific requirements of Chapter IV in Annex 1 of this document.

There is one requirement not addressed above, which is that contained in Article 5(3) IED. Article 5(3) requires that “In the case of a new installation or a substantial change where Article 4 of Directive 85/337/EC (now Directive 2011/92/EU) (the EIA Directive) applies, any relevant information obtained or conclusion arrived at pursuant to articles 5, 6 and 7 of that Directive shall be examined and used for the purposes of granting the permit.”

- Article 5 of EIA Directive relates to the obligation on developers to supply the information set out in Annex IV of the Directive when making an application for development consent.
- Article 6(1) requires Member States to ensure that the authorities likely to be concerned by a development by reason of their specific environmental responsibilities are consulted on the Environmental Statement and the request for development consent.
- Article 6(2)-6(6) makes provision for public consultation on applications for development consent.
- Article 7 relates to projects with transboundary effects and consequential obligations to consult with affected Member States.

The grant or refusal of development consent is a matter for the relevant local planning authority. The Environment Agency’s obligation is therefore to examine and use any relevant information obtained or conclusion arrived at by the local planning authorities pursuant to those EIA Directive articles.

In determining the Application we have considered the following documents: -

- The Environmental Statement submitted with the planning application.
- The decision of the Leicestershire County Council to grant the variation to planning permission on 26/03/2015.
- The report and decision notice of the local planning authority accompanying the grant of planning permission.

From consideration of all the documents above, the Environment Agency considers that no additional or different conditions are necessary.

5.1.2 Schedule 9 to the EPR 2016 – Waste Framework Directive

As the Installation involves the treatment of waste, it is carrying out a *waste operation* for the purposes of the EPR 2016, and the requirements of Schedule 9 therefore apply. This means that we must exercise our functions so as to ensure implementation of certain articles of the WFD.

We must exercise our relevant functions for the purposes of ensuring that the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste and that any waste generated is treated in accordance with Article 4 of the Waste Framework Directive.

The conditions of the permit ensure that waste generation from the facility is minimised. Where the production of waste cannot be prevented it will be recovered wherever possible or otherwise disposed of in a manner that minimises its impact on the environment. This is in accordance with Article 4.

We must also exercise our relevant functions for the purposes of implementing Article 13 of the Waste Framework Directive; ensuring that the requirements in the second paragraph of Article 23(1) of the Waste Framework Directive are met; and ensuring compliance with Articles 18(2)(b), 18(2)(c), 23(3), 23(4) and 35(1) of the Waste Framework Directive.

Article 13 relates to the protection of human health and the environment. These objectives are addressed elsewhere in this document.

Article 23(1) requires the permit to specify:

- (a) the types and quantities of waste that may be treated;
- (b) for each type of operation permitted, the technical and any other requirements relevant to the site concerned;
- (c) the safety and precautionary measures to be taken;
- (d) the method to be used for each type of operation;
- (e) such monitoring and control operations as may be necessary;
- (f) such closure and after-care provisions as may be necessary.

These are all covered by permit conditions.

We remain satisfied that the intended method of waste treatment is acceptable from the point of view of environmental protection so Article 23(3) does not apply.

We remain satisfied that the conditions of the permit ensure that the recovery of energy take place with a high level of energy efficiency in accordance with Article 23(4).

Article 35(1) relates to record keeping and its requirements are delivered through permit conditions.

5.1.3 Schedule 22 to the EPR 2016 – Water Framework and Groundwater Directives

To the extent that it might lead to a discharge of pollutants to groundwater (a “groundwater activity” under the EPR 2016), the Permit is subject to the requirements of Schedule 22, which delivers the requirements of EU Directives relating to pollution of groundwater. The Permit will require the taking of all necessary measures to prevent the input of any hazardous substances to groundwater, and to limit the input of non-hazardous pollutants into groundwater so as to ensure such pollutants do not cause pollution, and satisfies the requirements of Schedule 22.

No releases to groundwater from the Installation are permitted. The Permit also requires material storage areas to be designed and maintained to a high standard to prevent accidental releases.

5.1.4 Directive 2003/35/EC – The Public Participation Directive

Regulation 60 of the EPR 2016 requires the Environment Agency to prepare and publish a statement of its policies for complying with its public participation duties. We have published our public participation statement.

This Application has been consulted upon in line with this statement, as well as with our guidance RGS6 on Sites of High Public Interest, which addresses specifically extended consultation arrangements for determinations where public interest is particularly high. This satisfies the requirements of the Public Participation Directive.

Our decision in this case has been reached following extended public consultation. The way in which this has been done is set out in Section 2. A summary of the responses received to our consultation and our consideration of them is set out in Annex 4.

5.2 National primary legislation

5.2.1 **Environment Act 1995**

(i) Section 4 (Pursuit of Sustainable Development)

We are required to contribute towards achieving sustainable development, as considered appropriate by Ministers and set out in guidance issued to us. The Secretary of State for Environment, Food and Rural Affairs has issued *The Environment Agency’s Objectives and Contribution to Sustainable Development: Statutory Guidance (December 2002)*. This document:

“provides guidance to the Agency on such matters as the formulation of approaches that the Agency should take to its work, decisions about priorities

for the Agency and the allocation of resources. It is not directly applicable to individual regulatory decisions of the Agency”.

Paragraph 4.2 of this Guidance provides the objectives we are to pursue when discharging our main operational functions. As far as determining applications for water discharge permits is concerned, this states that we are:

‘To protect, enhance and restore the environmental quality of inland and coastal surface water and groundwater, and in particular: to address both point source and diffuse pollution; to implement the EC Water Framework Directive; and to ensure that all relevant quality standards are met.’

The Environment Agency considers that it has pursued the objectives set out in the Government’s guidance, where relevant, and that there are no additional conditions that should be included in this Permit to take account of the Section 4 duty

In respect of regulation of industrial pollution through the EPR, the Guidance refers in particular to the objective of setting permit conditions “*in a consistent and proportionate fashion based on Best Available Techniques and taking into account all relevant matters...*”. The Environment Agency considers that it has pursued the objectives set out in the Government’s guidance, where relevant, and that there are no additional conditions that should be included in this Permit to take account of the Section 4 duty.

For waste the guidance refers to ensuring waste is recovered or disposed of in ways which protect the environment and human health. The Environment Agency considers that it has pursued the objectives set out in the Government’s guidance, where relevant, and that there are no additional conditions that should be included in this Permit to take account of the Section 4 duty.

(ii) Section 5 (Preventing or Minimising Effects of Pollution of the Environment)

We are satisfied that our pollution control powers have been exercised for the purpose of preventing or minimising, remedying or mitigating the effects of pollution.

(iii) Section 6(1) (Conservation Duties with Regard to Water)

We have a duty to the extent we consider it desirable generally to promote the conservation and enhancement of the natural beauty and amenity of inland and coastal waters and the land associated with such waters, and the conservation of flora and fauna which are dependent on an aquatic environment. We consider that no additional or different conditions are appropriate for this Permit.

(iv) Section 6(6) (Fisheries)

We have a duty to maintain, improve and develop fisheries of salmon, trout, eels, lampreys, smelt and freshwater fish. We consider that no additional or different conditions are appropriate for this Permit.

(v) Section 7 (Pursuit of Conservation Objectives)

This places a duty on us, when considering any proposal relating to our functions, to have regard amongst other things to any effect which the proposals would have on sites of archaeological, architectural, or historic interest; the economic and social well-being of local communities in rural areas; and to take into account any effect which the proposals would have on the beauty or amenity of any rural area.

We considered whether we should impose any additional or different requirements in terms of our duty to have regard to the various conservation objectives set out in Section 7, but concluded that we should not.

(vi) Section 39 (Costs and Benefits)

We have a duty to take into account the likely costs and benefits of our decisions on the applications ('costs' being defined as including costs to the environment as well as any person). This duty, however, does not affect our obligation to discharge any duties imposed upon us in other legislative provisions.

In so far as relevant we consider that the costs that the permit may impose on the applicant are reasonable and proportionate in terms of the benefits it provides.

(vii) Section 108 Deregulation Act 2015 – Growth duty

We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit.

Paragraph 1.3 of the guidance says:

“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”

We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The

guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.

We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.

(viii) Section 81 (National Air Quality Strategy)

We have had regard to the National Air Quality Strategy and consider that our decision complies with the Strategy, and that no additional or different conditions are appropriate for this Permit.

5.2.2 Human Rights Act 1998

We have considered potential interference with rights addressed by the European Convention on Human Rights in reaching our decision and consider that our decision is compatible with our duties under the Human Rights Act 1998. In particular, we have considered the right to life (Article 2), the right to a fair trial (Article 6), the right to respect for private and family life (Article 8) and the right to protection of property (Article 1, First Protocol). We do not believe that Convention rights are engaged in relation to this determination.

5.2.3 Countryside and Rights of Way Act 2000 (CROW 2000)

Section 85 of this Act imposes a duty on Environment Agency to have regard to the purpose of conserving and enhancing the natural beauty of the area of outstanding natural beauty (AONB). There is no AONB which could be affected by the Installation.

5.2.4 Wildlife and Countryside Act 1981

Under section 28G of the Wildlife and Countryside Act 1981 the Environment Agency has a duty to take reasonable steps to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which a site is of special scientific interest. Under section 28I the Environment Agency has a duty to consult Natural England in relation to any permit that is likely to damage SSSIs.

We assessed the Application and concluded that the Installation will not damage the special features of any SSSI. This was recorded on a CROW Appendix 4 form.

The CROW assessment is summarised in greater detail in section 4.7 of this document. A copy of the full Appendix 4 Assessment can be found on the public register.

5.2.5 Natural Environment and Rural Communities Act 2006

Section 40 of this Act requires us to have regard, so far as is consistent with the proper exercise of our functions, to the purpose of conserving biodiversity. We have done so and consider that no different or additional conditions in the Permit are required.

5.3 National secondary legislation

5.3.1 **Water Environment (Water Framework Directive) Regulations 2017**

Consideration has been given to whether any additional requirements should be imposed in terms of the Environment Agency's duty under regulation 3 to secure compliance with the requirements of the Water Framework Directive and the EQS Directive through (inter alia) environmental permits, and its obligation in regulation 33 to have regard to the river basin management plan (RBMP) approved under regulation 314 and any supplementary plans prepared under regulation 32. However, it is felt that existing conditions are sufficient in this regard and no other appropriate requirements have been identified.

We are satisfied that granting this application with the conditions proposed would not cause the current status of the water body to deteriorate.

5.3.3 **The Persistent Organic Pollutants Regulations 2007**

We have explained our approach to these Regulations, which give effect to the Stockholm Convention on POPs and the EU's POPs Regulation, above.

5.4 Other relevant legal requirements

5.4.1 Duty to Involve

S23 of the Local Democracy, Economic Development and Construction Act 2009 require us where we consider it appropriate to take such steps as we consider appropriate to secure the involvement of interested persons in the exercise of our functions by providing them with information, consulting them or involving them in any other way. S24 requires us to have regard to any Secretary of State guidance as to how we should do that.

The way in which the Environment Agency has consulted with the public and other interested parties is set out in section 2 of this document. The way in which we have taken account of the representations we have received is set out in Annex 4. Our public consultation duties are also set out in the EP Regulations, and our statutory Public Participation Statement, which implement the requirements of the Public Participation Directive. In addition to meeting our consultation responsibilities, we have also taken account of our guidance in Environment Agency Guidance Note RGS6 and the Environment Agency's Building Trust with Communities toolkit.

ANNEX 1: APPLICATION OF CHAPTER IV OF THE INDUSTRIAL EMISSIONS DIRECTIVE

IED Article	Requirement	Delivered by
45(1)(a)	The permit shall include a list of all types of waste which may be treated using at least the types of waste set out in the European Waste List established by Decision 2000/532/EC, if possible, and containing information on the quantity of each type of waste, where appropriate.	Condition 2.3.3(a) and Table S2.2 in Schedule 2 of the Permit.
45(1)(b)	The permit shall include the total waste incinerating or co-incinerating capacity of the plant.	Condition 2.3.3(a) and Table S2.2 in Schedule 2 of the Permit.
45(1)(c)	The permit shall include the limit values for emissions into air and water.	Conditions 3.1.1 and 3.1.2 and Tables S3.1 and S3.1(a) in Schedule 3 of the Permit.
45(1)(d)	The permit shall include the requirements for pH, temperature and flow of waste water discharges.	Not Applicable
45(1)(e)	The permit shall include the sampling and measurement procedures and frequencies to be used to comply with the conditions set for emissions monitoring.	Conditions 3.5.1 to 3.5.5 and Tables S3.1, S3.1(a), S3.2 and S3.4 in Schedule 3 of the Permit.
45(1)(f)	The permit shall include the maximum permissible period of unavoidable stoppages, disturbances or failures of the purification devices or the measurement devices, during which the emissions into the air and the discharges of waste water may exceed the prescribed emission limit values.	Conditions 2.3.10 and 2.3.11.
46(1)	Waste gases shall be discharged in a controlled way by means of a stack the height of which is calculated in such a way as to safeguard human health and the environment.	Condition 2.3.1(a) and Table S1.2 of Schedule 1 of the Permit.
46(2)	Emission into air shall not exceed the emission limit values set out in part of Annex VI.	Conditions 3.1.1 and 3.1.2 and Tables S3.1 and S3.1a.

IED Article	Requirement	Delivered by
46(2)	Emission into air shall not exceed the emission limit values set out in parts 4 or determined in accordance with part 4 of Annex VI.	Conditions 3.1.1 and 3.1.2 and Tables S3.1 and S3.1a.
46(3)	Relates to conditions for water discharges from the cleaning of exhaust gases.	There are no such discharges as condition 3.1.1 prohibits this.
46(4)	Relates to conditions for water discharges from the cleaning of exhaust gases.	There are no such discharges as condition 3.1.1 prohibits this.
46(5)	Prevention of unauthorised and accidental release of any polluting substances into soil, surface water or groundwater. Adequate storage capacity for contaminated rainwater run-off from the site or for contaminated water from spillage or fire-fighting.	The application explains the measures to be in place for achieving the directive requirements
46(6)	Limits the maximum period of operation when an ELV is exceeded to 4 hours uninterrupted duration in any one instance, and with a maximum cumulative limit of 60 hours per year. Limits on dust (150 mg/m ³), CO and TOC not to be exceeded during this period.	Conditions 2.3.10 and 2.3.11
47	In the event of breakdown, reduce or close down operations as soon as practicable. Limits on dust (150 mg/m ³), CO and TOC not to be exceeded during this period.	Condition 2.3.10
48(1)	Monitoring of emissions is carried out in accordance with Parts 6 and 7 of Annex VI.	Conditions 3.5.1 to 3.5.5. Reference conditions are defined in Schedule 6 of the Permit.
48(2)	Installation and functioning of the automated measurement systems shall be subject to control and to annual surveillance tests as set out in point 1 of Part 6 of Annex VI.	condition 3.5.3, and tables S3.1, S3.1(a), and S3.4
48(3)	The competent authority shall determine the location of sampling or measurement points to be used	conditions 3.5.3 and 3.5.4

IED Article	Requirement	Delivered by
	for monitoring of emissions.	
48(4)	All monitoring results shall be recorded, processed and presented in such a way as to enable the competent authority to verify compliance with the operating conditions and emission limit values which are included in the permit.	Conditions 4.1.1 and 4.1.2, and Tables S4.1 and S4.4
49	The emission limit values for air and water shall be regarded as being complied with if the conditions described in Part 8 of Annex VI are fulfilled.	conditions 3.1.1 and 3.1.2 and 3.5.5
50(1)	Slag and bottom ash to have Total Organic Carbon (TOC) < 3% or loss on ignition (LOI) < 5%.	Conditions 3.5.1 and Table S3.4
50(2)	Flue gas to be raised to a temperature of 850°C for two seconds, as measured at representative point of the combustion chamber.	Condition 2.3.6, Pre-operational condition PO5 & PO6 and Improvement condition IC6 and Table S3.3
50(3)	At least one auxiliary burner which must not be fed with fuels which can cause higher emissions than those resulting from the burning of gas oil liquefied gas or natural gas.	Condition 2.3.7
50(4)(a)	Automatic shut to prevent waste feed if at start up until the specified temperature has been reached.	Condition 2.3.6
50(4)(b)	Automatic shut to prevent waste feed if the combustion temperature is not maintained.	Condition 2.3.6
50(4)(c)	Automatic shut to prevent waste feed if the CEMs show that ELVs are exceeded due to disturbances or failure of waste cleaning devices.	Condition 2.3.6
50(5)	Any heat generated from the process shall be recovered as far as practicable.	(a) The plant will generate electricity (b) Operator to review the available heat recovery options every 4 years (Conditions 1.2.1 to 1.2.3)
50(6)	Relates to the feeding of infectious clinical waste into the furnace.	No infectious clinical waste will be burnt

IED Article	Requirement	Delivered by
50(7)	Management of the Installation to be in the hands of a natural person who is competent to manage it.	Conditions 1.1.1 to 1.1.3 and 2.3.1 of the Permit.
51(1)	Different conditions than those laid down in Article 50(1), (2) and (3) and, as regards the temperature Article 50(4) may be authorised, provided the other requirements of this chapter are met.	No such conditions Have been allowed
51(2)	Changes in operating conditions do not cause more residues or residues with a higher content of organic polluting substances compared to those residues which could be expected under the conditions laid down in Articles 50(1), (2) and (3).	No such conditions Have been allowed
51(3)	Changes in operating conditions shall include emission limit values for CO and TOC set out in Part 3 of Annex VI.	No such conditions Have been allowed
52(1)	Take all necessary precautions concerning delivery and reception of Wastes, to prevent or minimise pollution.	Conditions 2.3.1, 2.3.3, 2.3.4, 2.3.5, 3.2.1, 3.3.1 and 3.7.1.
52(2)	Determine the mass of each category of wastes, if possible according to the EWC, prior to accepting the waste.	Condition 2.3.3 & 2.3.4 and Table S2.2 in Schedule 3 of the Permit.
52(3)	Prior to accepting hazardous waste, the operator shall collect available information about the waste for the purpose of compliance with the permit requirements specified in Article 45(2).	Not applicable
52(4)	Prior to accepting hazardous waste, the operator shall carry out the procedures set out in Article 52(4).	Not applicable
52(5)	Granting of exemptions from Article 52(2), (3) and (4).	Not applicable
53(1)	Residues to be minimised in their amount and harmfulness, and recycled where appropriate.	Conditions 1.4.1, 1.4.2 and 3.5.1 with Table S3.4.
53(2)	Prevent dispersal of dry residues and dust during transport and storage.	Conditions 1.4.1 2.3.1, 2.3.3 and 3.2.1.
53(3)	Test residues for their physical and chemical characteristics and	Condition 3.5.1 and Table S3.4 and pre-

IED Article	Requirement	Delivered by
	polluting potential including heavy metal content (soluble fraction).	operational condition PO3.
55(1)	Application, decision and permit to be publicly available.	All documents are accessible from the Environment Agency Public Register.
55(2)	An annual report on plant operation and monitoring for all plants burning more than 2 tonne/hour waste.	Condition 4.2.2 and 4.2.3.

ANNEX 2: Pre-Operational Conditions

Based on the information on the Application, we consider that we do need to impose additional pre-operational conditions. These conditions are set out below and referred to, where applicable, in the text of the decision document. We are using these conditions to require the Operator to confirm that the details and measures proposed in the Application have been adopted or implemented prior to the operation of the Installation.

Reference	Pre-operational measures
PO7	At least two years prior to the commencement of commissioning, the Operator shall submit to the Environment Agency for approval, written confirmation of which option (one or two incineration lines) that was specified in application EPR/TP3036KB/V004 will be implemented at the installation. The written confirmation shall include details of the final incinerator technology configuration and a review of the air dispersion modelling submitted as part of the Air Emissions Risk Assessment (as part of EPR/TP3036KB/V004). The review shall identify if there are any changes to the assessment and if any significant changes, in the opinion of the Environment Agency, are identified the Operator shall submit to the Environment Agency for approval, via a new variation application, an updated detailed modelling air dispersion assessment in line with the final incinerator technology configuration. The assessment shall be completed in line with the Environment Agency's guidance, <i>Air emissions risk assessment for your environmental permit and Environmental permitting: air dispersion modelling reports</i> . The assessment shall include an air dispersion model as defined in the above guidance and a revised human health risk assessment.
PO8	<p>Should the final procurement decision be made to construct and operate a single incineration line, an odour abatement system (carbon filtration system) shall be provided to control odours during commissioning, breakdown or shutdown. Prior to the commencement of commissioning of the installation, the Operator shall submit a written report to the Environment Agency for approval that includes:</p> <ul style="list-style-type: none"> • A commissioning plan for the installation of the odour abatement system (inlet dust filters and carbon filter). A timeframe for its installation that should be prior to receipt of any waste at site shall also be included. • A monitoring procedure. The procedure shall outline how the following parameters will be monitored as agreed in writing with the Environment Agency and in line with manufacturer's recommendations: <ul style="list-style-type: none"> • inlet and outlet VOC concentration • bed operating temperature • inlet gas temperature • gas flow rate • pressure differential • gas moisture content <p>The procedure shall identify trigger levels to initiate remedial actions and determine when the carbon filter media requires replacement.</p>
PO9	During commissioning, the Operator shall carry out tests to demonstrate whether the furnace combustion air will provide the required air flows to ensure that negative pressure is achieved throughout the reception hall. The tests shall demonstrate whether air is pulled through the reception hall and bunker area into the furnace and carbon filter odour abatement system (if the installation has only one incineration line) with dead spots minimised. The Operator shall submit a report to the Environment Agency for approval, and obtain the Environment Agency's written approval to it, summarising the findings along with any proposed improvements if required.
PO10	At least 3 months prior to the commencement of commissioning the operator shall confirm if any changes are required to the fire prevention plan after the detailed design stage of the installation. The operator shall submit a revised version of the plan that was submitted with the application (if required) to the Environment Agency for approval. The plan shall be in line with current Environment Agency guidance on fire prevention plans.
PO11	Prior to the commencement of commissioning of any part of the installation, the

	Operator shall submit to the Environment for Approval a review of the Noise Impact Assessment (Newhurst Energy Recovery Facility (ERF) BS4142:2014 Noise Assessment Feb 2019 (SLR Ref No: 416.00034.00577)) based on the final design of the installation. The review shall include evidence that the noise rating level from the Tipping Hall will not exceed the background sound level at the nearby noise-sensitive receptors during the night-time period. The review shall also include an assessment of the impact of noise on potential Peregrine Falcon nesting sites within Newhurst Quarry.
PO12	<p>Prior to the commencement of commissioning, the Operator shall submit a written report to the Agency detailing the waste acceptance procedure to be used at the site. The waste acceptance procedure shall include the process and systems by which wastes unsuitable for incineration at the site will be controlled.</p> <p>The procedure shall be implemented in accordance with the written approval from the Agency.</p>
PO13	<p>Prior to the commencement of commissioning the Operator shall submit the written protocol referenced in condition 3.2.4 for the monitoring of soil and groundwater for approval by the Environment Agency. The protocol shall demonstrate how the Operator will meet the requirements of Articles 14(1)(b), 14(1)(e) and 16(2) of the IED.</p> <p>The procedure shall be implemented in accordance with the written approval from the Agency.</p>

ANNEX 3: Improvement Conditions

Based in the information in the Application we consider that we need to set an additional improvement condition. This condition is set out below - justifications for this condition is provided at the relevant section of the decision document. We are using this condition to require the Operator to provide the Environment Agency with details that need to be established or confirmed during and/or after commissioning.

Reference	Improvement measure	Completion date
IC7	<p>Where the installation operates with a single incineration line, and an odour abatement system has been provided to control odours during shutdown or breakdown, the Operator shall carry out an assessment and characterisation of the odour profile within the areas of waste storage (the bunker and reception halls) and demonstrate how this air is treated by the odour abatement system. The Operator shall submit a written report to the Environment Agency for approval that outlines:</p> <ul style="list-style-type: none">• The chemical composition of the odorous air generated within the areas of waste storage (the bunker and reception halls).• The suitability of the proposed odour abatement (inlet dust filters and carbon filters) for treating all expected odours from the facility.• Any improvements necessary along with timescales for implementation should additional abatement be required.	Within 15 months of first receipt of waste at the site.

ANNEX 4: Consultation Responses

A) Advertising and Consultation on the Application

The Application has been advertised and consulted upon in accordance with the Environment Agency's Public Participation Statement. The way in which this has been carried out along with the results of our consultation and how we have taken consultation responses into account in reaching our draft decision is summarised in this Annex. Copies of all consultation responses have been placed on the Environment Agency public register.

The Application was advertised on the Environment Agency website from 04/07/2018 to 01/08/2018 and in the Loughborough Echo and Leicester Mercury on 04/07/2018. The Application was made available to view at the Environment Public Register at the Environment Agency's Trentside Office, Scarrington Road Nottingham.

It was brought to our attention following the consultation period that an application document was missing from website, and therefore was not available to the public to view via the website. For this reason we re-opened the consultation period and made the missing document available to view on our website. The consultation period was re-opened from 26/09/2018 to 12/10/2018.

The following statutory and non-statutory bodies were consulted: -

- *Leicestershire County Council*
- *Public Health England*
- *Health and Safety Executive*
- *Charnwood Borough Council*
- *Severn Trent Water*
- *Director of Public Health*

1) Consultation Responses from Statutory and Non-Statutory Bodies

Response Received from Public Health England	
Brief summary of issues raised:	Summary of action taken / how this has been covered
Based on the information contained in the application supplied to us, Public Health England has no significant concerns regarding the risk to the health of the local population from the installation.	None required.

2) **Consultation Responses from Members of the Public and Community Organisations**

The consultation responses received were wide ranging and a number of the issues raised were outside the Environment Agency's remit in reaching its permitting decisions. Specifically questions were raised which fall within the jurisdiction of the planning system, both on the development of planning policy and the grant of planning permission.

Guidance on the interaction between planning and pollution control is given in the National Planning Policy Framework. It says that the planning and pollution control systems are separate but complementary. We are only able to take into account those issues, which fall within the scope of the Environmental Permitting Regulations.

a) **Representations from local Councillors.**

Representations were received from a local councillor who raised the following issues.

Brief summary of issues raised:	Summary of action taken / how this has been covered
Concern about research which post-dates the original permit determination which reports increased risk of pollution from NO _x and CO ₂ from energy from waste plants.	No details of the research referred to in this response has been provided. We are aware of and take account of a range of views of national and international expert bodies with regards to pollution and health effects from incinerators, see section 4.6 for further details. We are satisfied emission of NO _x will not lead to the exceedance of an ES. See section 4.5.3 for details of our assessment. With regards to CO ₂ see section 4.1.2 for details of our assessment.
Concern about risk from particles PM _{2.5} and smaller which are not easily measurable.	We are satisfied that particulate emissions from the installation, including emissions of PM ₁₀ and PM _{2.5} will not give rise to significant pollution or harm to human health (see section 4.6 & 4.5.2). We take advice from PHE on health matters and their current position is that modern, well run municipal waste incinerators are not a significant risk to public health remains valid. With regards to monitoring of PM _{2.5} we are confident that current monitoring techniques will capture

	<p>the fine particle fraction (PM_{2.5}) for inclusion in the measurement of total particulate matter – see section 4.6.3. An improvement condition (IC2) is included in the existing permit that will require a full analysis of particle size distribution in the flue gas, and hence determine the ratio of fine to coarse particles.</p>
<p>Concern about a planning proposal for 3,200 new homes and employment land downwind of the installation.</p>	<p>If a planning application has been made then the existence of the incinerator will be considered as part of the planning process. In any case with regards to emissions to air the Operator's dispersion modelling showed the maximum concentrations in the modelled grid, so these represent 'worst case' predictions. Therefore making predictions at further discrete receptor locations is not required as these will be lower than the area of maximum concentration. We therefore consider that no significant impacts will result at locations not specifically assessed. In addition we have assessed impacts from odour and noise and we are satisfied that there will be no significant pollution at the closest receptors.</p>
<p>Concern that the local topography, especially the South Charnwood Hills will effect dispersion of pollutants from the stack.</p>	<p>Local topography has been accounted for in the modelling assessment and our check modelling. The methodology used for the air dispersion modelling assessment are generally conservative and based on worst case scenarios.</p>
<p>Request that should the permit be issued verified emissions data should be published in a timely way.</p>	<p>The Operator is required to report monitoring data periodically in line with the requirements set in Schedule 4 of the permit. The Operator's reported monitoring data reported will be placed on the public register.</p>

b) Representations from Community and Other Organisations

Representation received from Loughborough University.

Brief summary of issues raised:	Summary of action taken / how this has been covered
<p>Concern raised that emissions to air from the installation may be a threat to the health of the athletes training and competing on campus and to the larger population of students exercising regularly at the Loughborough University Campus. Concern that WHO Air Quality Guideline values are based upon general ambient concentrations and do not take into account the impact of physical activity, so inappropriate for assessing the impact on athletes training at the University and the determination should therefore be delayed until further research on the impact on elite athletes is carried out.</p>	<p>Following assessment of emissions to air from the installation we found process contributions of all pollutants assessed (including NO_x, PM₁₀ and PM_{2.5}) at Loughborough University will be insignificant. We are therefore satisfied that emissions to air from the installation will not cause significant harm to human health. We are also satisfied that the Environmental Standards used in the assessment are set to be generally protective of a range of people doing a range of activities.</p> <p>There is research to show that people undertaking athletic activities can be more at risk from pollution in ambient air. However our detailed assessment has shown that the incinerator will have a negligible impact on ambient air pollution levels and therefore any impact from the installation on the health of elite athletes training or in competition at Loughborough University will also be negligible. We are therefore satisfied that we have sufficient information to make a decision now and that a delay to the determination is not required.</p> <p>We asked Public Health England (PHE) to comment on the issues raised. Their response repeated their position that modern, well-managed incinerators make only a small contribution to local concentrations of air pollutants. They highlighted that for example recent PHE funded published research found that</p>

	ambient background concentrations (PM10) are around 3-5 orders of magnitude higher than modelled contributions from incinerators. A copy of the PHE's full response can be found on public register.
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Napantan Ward Residents Group, Loughborough Air Quality Protection Group, Stuart Brady Labour Party Candidate, Storer and Ashby Areas Residents' Group & Shepshed Against Incinerator Group.

Brief summary of issues raised:	Summary of action taken / how this has been covered
Comments about air emissions and air quality risk assessment	
Concern raised that at the time the original permit was issued the UK government had yet to implement the EUs requirement for particulate pollution to be measured against the PM _{2.5} standard. Instead only PM ₁₀ were assessed.	We have assessed particulate matter against the standards for PM ₁₀ and PM _{2.5} . PM ₁₀ is all particles of 10 µm diameter and less and PM _{2.5} are 2.5 µm and less. We are satisfied that we have assessed against the appropriate standards. Further details of our assessments are in section 4.6.3 of this decision document.
Concern raised that there is no equipment that can measure PM _{2.5} and so background pollution levels are unknown.	As discussed in section 4.6.3, we are satisfied that emissions of PM _{2.5} will be insignificant.
Concern that there has been several important developments that means more people will be living or working within less than a mile of the proposed installation than were considered in the original application. Developments include the Science Park, Business Park and the new Stonebow Village.	<p>The Operator's air dispersion modelling showed the maximum concentrations in the modelled grid, so these represent 'worst case' predictions. Therefore meaning predictions at further discrete receptor locations is not required as these will be lower than the area of maximum concentration. We therefore consider that no significant impacts will result at locations not specifically assessed.</p> <p>Noise and odour impacts were considered at the closest receptors and we are satisfied that there will be no significant pollution. Therefore impacts at receptors further away will be less.</p>
Concern that meteorological data used in the assessment (East Midlands Airport) is not representative of the local conditions.	We are satisfied that the meteorological data used in air dispersion modelling is valid, however as part of our audit of the air

	<p>dispersion modelling we have conducted sensitivity analysis of the model using alternative meteorological data and this did not change the conclusions of the assessment.</p>
<p>Concern about the local topology and that Loughborough lies in a dip and will be effected by a temperature inversion on days of no wind. This will increase pollution levels.</p>	<p>ADMS and AERMOD models the effect of local inversion layers, by taking account of topography and hourly meteorological conditions such as wind speeds and temperatures. Although the specific weather conditions at the installation may not be reproduced exactly in the modelling, sensitivity checks to the most conservative meteorological conditions over five years from different sites take account of variations in the data. There are specific models available that consider temperature inversions such as in valleys. USEPA suggests using the Calpuff model which claims to model local inversion effects and fumigation effects. We have conducted multiple studies comparing the Calpuff model to the more commonly used models (ADMS, AERMOD). Our check modelling indicates that the predictions can indeed be higher using this alternative modelling software and met data with short-term impacts showing the greatest sensitivity. However, we found that any differences in the results are within the modelling uncertainties and generally do not affect the conclusions</p>
<p>Concern that the WHO is due to issue revised guidelines for Air Quality in 2020 and the permitting decision should be deferred until these guidelines have been issued.</p>	<p>The Environmental Standards (ES) used for this permit determination are derived from the national air quality objectives and EU limit target values We are satisfied that the ES used are appropriate. We acknowledge that these Environmental Standards may change in the future however we cannot delay the permitting process. Any future changes will be considered in our periodic review of</p>

	permits. We can and will vary permits where required.
Concern that air dispersion modelling assessment was not completed to the latest standards, taking account of local geography and all receptors.	We have audited the Operator's dispersion modelling, our audit included checking it considered local conditions, including topography and background pollution levels and receptors. We are satisfied that the modelling is suitable for assessing the impact from the Installation.
Concern that nano-particles cannot be effectively filtered from waste-incinerator emissions.	Although bag filters are highly efficient they are not 100% efficient and some particulate matter will be emitted. We take the view that techniques which control the release of particulates to levels which will not cause harm to human health will also control the release of fine particulate matter (including nano particles) to a level which will not cause harm to human health. See section 4.6.3 of this document for further details.
Concern that overall air emissions will be underestimated for those emissions that are only monitored periodically.	The permit requires continuous monitoring for emissions to air of particulates, oxides of nitrogen, sulphur dioxide, carbon monoxide, total organic carbon, hydrogen chloride and ammonia. Other substances are required to be monitored quarterly or bi-annually. These requirements are in line with the IED and we consider these measures to be appropriate for this Installation. Metals and dioxins will be monitored periodically. The prevention and minimisation of dioxins and furans is achieved through injection of activated carbon, optimisation of combustion control, avoidance of de novo synthesis and the effective removal of particulate matter. The plant will have to shut-down if the furnace temperature is below 850°C or if the activated carbon injection fails. The primary control for metals is particulate abatement and particulates will be continuously monitored. The Permit also requires continuous

	<p>monitoring of several process variables (e.g. combustion temperature) to ensure that the incinerator is running optimally and minimising emissions.</p> <p>We are satisfied that the monitoring requirements in the permit are appropriate.</p>
<p>Concern that experts state that there is no safe limit for PM_{2.5}</p>	<p>We have assessed PM_{2.5} against the relevant ES, 25ug/m³, which has been set by recognised experts to protect against significant impacts. Impacts compared to the ES have been shown to be insignificant. Section 4.5.3 and 4.6.3 of this decision document has further details. We are satisfied that the ESs used are appropriate.</p>
<p>Concern that emissions of pollutants including PM_{2.5} are much higher during start-up and shut-down.</p>	<p>The emissions limits set by IED chapter IV do not apply at start-up and shut-down. The combustion units will be fired on a support fuel (gas oil) during start up and shut down, to ensure that the temperature meets the required levels before waste is permitted to be fed for incineration. This support fuel is automatically fed if the temperature of the furnace falls below a permitted level. The impacts at start-up and shut down, when emission limits do not apply, are not likely to be significant.</p> <p>With regards to particulates including PM_{2.5} combustion gases will be routed through particulate filters during start-up and shut-down. We are therefore satisfied that there will not be a significant impact at start-up or shut-down.</p>
<p>Concern that an alternative air dispersion modelling assessment using weather data from Loughborough University weather station shows that emissions of PM_{2.5} will be dispersed over much wider area than that showed by the Operator's dispersion modelling assessment which uses</p>	<p>We are satisfied that air dispersion modelling assessment carried out by the Operator is appropriate. We have carried out our own check modelling assessment and we agree with the Operator's conclusions. With regards to flume projections submitted in the consultation response, we are unable to comment</p>

<p>meteorological data from East Midlands Airport.</p>	<p>if the meteorological data used would be representative of the Installation, as there is no information provided regarding the exact location of the weather station, surface characteristics used or the number of years used in their assessment.</p> <p>However, we have compared the maximum PC detailed in the response which is 60.23 ng/m³ against the current environment standard for PM_{2.5} of 25 ug/m³. We observe that the PC would not exceed 1% of this limit, and would therefore be considered insignificant. The Operator's assessment and our own check modelling also concluded that the process contribution of PM_{2.5} will be insignificant.</p> <p>We are satisfied that our assessment of the impact of particulates was precautionary as we have made several worst case assumptions that would make predictions conservative. For example, the plant is assumed to be operating at 100% of its permitted limit all the time. Which in our experience of regulating such facilities would not be true, it would more likely be operating at around 10% of their permissible limit.</p> <p>We have also made other conservative assumptions like considering all of the particulate matter emitted to be either 100% PM₁₀ or 100% PM_{2.5} in our assessment.</p>
<p>Comments about health impacts</p>	
<p>Concern raised over publications that link air pollution to adverse human health.</p>	<p>We accept that air pollution can lead to adverse impacts on human health, however specifically regarding emissions from incinerators the PHE's position, from whom we take advice on health effects, is "While it is not possible to rule out adverse health effects from modern, well regulated municipal waste</p>

	<p>incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable. This view is based on detailed assessments of the effects of air pollutants on health and on the fact that modern and well managed municipal waste incinerators make only a very small contribution to local concentrations of air pollutants.”</p> <p>PHE is not aware of any evidence that requires a change in their position statement.</p> <p>Our view is that there will not be a significant effect on health. This is in line with Public Health England’s position statement as discussed in section 4.6 of this decision document.</p>
<p>Concern raised over the increased impact from NO_x emissions on the environment and human health from the proposed incinerator.</p>	<p>As discussed in section 4.5.1 we are satisfied that emissions of NO_x will not be significant and will not lead to the exceedance of the ES.</p>
<p>Concern raised over the increased impact from PM_{2.5} and nano particles emissions on the environment and human health from the proposed incinerator.</p>	<p>The Operator’s assessment shows that PM_{2.5} impacts will be insignificant even when making the worst case assumption that all emitted particulates are PM_{2.5}.</p> <p>Section 4.6.3 has further details including consideration of smaller ‘nano’ particles.</p>
<p>Concern raised that athletes at Loughborough University will suffer much more from the effects of pollution due to increased breathing rates while exercising.</p>	<p>Following assessment of emissions to air from the installation we found process contributions of all pollutants assessed (including NO_x, PM₁₀ and PM_{2.5}) at Loughborough University will be insignificant. We are therefore satisfied that emissions to air from the installation will not cause significant harm to human health. We are also satisfied that the Environmental Standards used in the assessment are set to be generally protective of a range of people doing a range of activities.</p>

	<p>There is research to show that people undertaking athletic activities can be more at risk from pollution in ambient air. However our detailed assessment has shown that the incinerator will have a negligible impact on ambient air pollution levels and therefore any impact from the installation on the health of elite athletes training or in competition at Loughborough University will also be negligible. We are therefore satisfied that we have sufficient information to make a decision now and that a delay to the determination is not required.</p> <p>We asked Public Health England (PHE) to comment on the issues raised. Their response repeated their position that modern, well-managed incinerators make only a small contribution to local concentrations of air pollutants. They highlighted that for example recent PHE funded published research found that ambient background concentrations (PM10) are around 3-5 orders of magnitude higher than modelled contributions from incinerators. A copy of the PHE's full response can be found on public register.</p>
Comments about impacts at ecological sites	
<p>Concern that white-clawed crayfish are present in the streams that receive runoff from the site. Concern that particulate matter will be washed into the streams adjacent to the incinerator and effect the crayfish.</p>	<p>The existing proposals for management of surface water, which does not change as a result of this variation, is that clean surface water (rainwater) from roofs will be captured and stored in tanks within the building for use in the process. Surface water from roadways will be passed via silt and oil interceptors to a surface water attenuation pond, following settlement it will be discharge at a controlled rate from the installation into Shortcliffe Brook. We are satisfied that the various pollution prevention measures</p>

	proposed by the Operator as a whole will prevent pollution, including from particulate matter, occurring and therefore wildlife, including the white-clawed crayfish if present in the receiving waters will not be adversely impacted.
Concern about the impact on local ecology and wildlife including ancient woodland and plantation, forest, SSSIs, great crested newts, foraging badgers, commuting bats and nesting birds	We remain satisfied that the installation will not have a significant adverse impact on nearby ecological receptors. See section 4.7 of this document for details of our assessment.
Comments about waste types	
Concern over lack of control over waste types, including hazardous waste, which will be received.	The Operator will have pre-acceptance procedures to ensure that only those wastes that the plant is permitted to receive will be received (the Permit does not allow the receipt of hazardous waste). Waste acceptance procedures will then be used to check waste as received. It is BAT to have procedures to deal with unacceptable wastes (such as hazardous wastes) should they be received. Pre-operational condition PO12 is included in the permit and requires the Operator to provide a report detailing the waste acceptance procedures for Environment Agency's approval.
Concern of mercury from light bulbs.	It is possible that light bulbs could be placed in household bins and burned if received at the incinerator under the municipal waste code. However they are likely to be small in number and will not affect emissions significantly. The proposals include the dosing of activated carbon into the exhaust gas stream, which is BAT for mercury control.
Concern that plastics will be burnt and will produce dioxins and PCBs	Waste types are not changing as a result of this variation. We remain satisfied that the existing types are appropriate for incineration and the proposed operating techniques will ensure that emissions of pollutants (including PCB and dioxins) will be minimised and will not lead to

	significant pollution of the environment or harm to human health.
Concern that due to suitable waste becoming less available in the future that waste will be sourced from further away which will increase the indirect emissions over a greater area due to traffic.	Availability of waste and where waste is sourced from is not a consideration for the determination of this variation.
Comments about impacts from increased traffic	
Concern about pollution from HGVs	<p>The air quality assessment considered existing background pollution levels which includes emissions from traffic. Movement of traffic to and from the Installation is outside our remit but will normally be an issue for the planning authority to consider. Our consideration is whether the emissions from traffic could affect the prevailing pollutant background levels which could be a consideration where there are established high background concentrations contributing to poor air quality. In this case the small increase in pollutants from traffic would not affect the background levels to the point where it would affect the conclusions of the air quality assessment.</p> <p>Vehicle movements within the Installation boundary are considered within the remit of the Environmental permit. However the emissions from this limited area are highly unlikely to be significant and will not affect the conclusions of the air quality impact assessment.</p>
Comments about impacts from IBA and fly ash	
Concern raised over heavy metal content of IBA and how it will be disposed of.	We remain satisfied that IBA will be recovered or disposed of at an appropriately licensed waste management facility. The Operator's stated aim is to recycle the IBA as aggregate.
Concern about increased risk of releases of toxic ash when handling bottom ash and fly ash.	The proposed techniques for the management of ash have not changed as a result of this variation. We therefore remain satisfied that

	ash will be managed appropriately and will not lead to significant pollution or harm to human health.
Concern about Operator competence	
Concern about the competence of the Operator.	The Operator's competence was assessed in the original determination and it remains the case that we have no reason to believe that the Operator will not be competent.
Concern about other impacts and issues	
Concern raised about the high number of incinerators along the M1 corridor and the pollution already generated by vehicles on the M1.	Decisions over the location of energy from waste facilities is not a consideration for the Environmental permitting process. It is our role is to determine whether appropriate measures are used to prevent or minimise emissions and whether any impacts on the environment and human health are acceptable. We have assessed the impact from the installation, including consideration of background pollution levels (which includes background pollution caused by the nearby M1), and we are satisfied that emissions from the installation will not lead to significant harm to the environment or human health.
Concern raised that due to reducing domestic wastes there is a risk that there will not be enough available waste and the incinerator will burn recyclable materials to maintain profits.	The permit restricts the Operator from burning separately collected waste unless it is contaminated. See condition 2.3.3 (c) in the permit.
Concern that the surface run-off from the facility could have an adverse impact on Shortcliffe Brook and Burleigh Brook, including flooding and risk to nearby housing, roads and water table.	As discussed in section 4.11 operating techniques for surface water runoff remain unchanged. We are satisfied that they are appropriate. The Operator has submitted an updated Flood Risk Assessment as part of the variation application. In this it explains runoff will be collected in an attenuation lagoon prior to controlled discharge into Shortcliffe Brook, the discharge rate is calculated to minimise the risk of flooding downstream.
Concern that there are new housing developments due to be built in the	The Operator's air dispersion modelling showed the maximum

<p>local area (Garendon Park) and the potential impact the incinerator could have on these receptors.</p>	<p>concentrations in the modelled grid, so these represent 'worst case' predictions. There will be no significant pollution of the environment or harm to human health at these locations. Therefore making predictions at further discrete receptor locations is not required as impact there will be lower than the area of maximum concentration.</p> <p>Noise and odour impacts were considered at the closest receptors. Therefore impacts at receptors further away will be less.</p>
<p>Concern over the adverse impact on listed buildings in Garendon Park.</p>	<p>The only pathway for damage would be acid rain caused by acid gas emissions then affecting stonework on buildings; or from emissions of dust and particulates.</p> <p>We have considered impacts of acid gases and dust/particulates and the impacts were shown to be insignificant. We are satisfied that impacts from this Installation will not have a significant adverse effect on local buildings.</p>
<p>Concern about inspections particularly if they are announced.</p>	<p>We can carry out both announced and un-announced inspections if required. The Environment Agency will regulate the site carrying out a continual assessment of the plant's operations and its environmental performance. This will be achieved in the following ways:</p> <ul style="list-style-type: none"> • The Operator must monitor emissions and report the results to us; • We will periodically inspect the installations, review monitoring techniques and assess monitoring results to measure the performance of the plant; • We will carry out on-site audits of operator monitoring; • The Operator's monitoring results are placed on the public register. <p>Copies of inspections reports and</p>

	monitoring results will be available on our public register to view by the public.
Concern that alternative waste treatment methods should be considered.	This issue is outside the scope of this variation and in any event mass burn incineration is still an acceptable treatment method and we remain satisfied the proposals are BAT.

c) Representations from Individual Members of the Public

These raised many of the same issues as have been addressed above. Therefore only those issues additional to those already considered are listed below.

Brief summary of issues raised:	Summary of action taken / how this has been covered
Comments about air emissions and air quality risk assessment	
Concern raised that the nearby M1 and airport are already polluting the air and the incinerator will just add to this.	The air quality impact assessment took account of the existing background air quality. See section 4.5 for further details.
Concern that the proposals would result in increased air pollution over Loughborough.	We are satisfied that emissions to air will not result in significant pollution. See sections 4.5 of this decision document for further details.
Concern raised that the filter bags cannot capture all particulates including those smaller than PM ₁₀ . They will also release substances when damaged.	Although bag filters are highly efficient they are not 100% efficient and some particulate matter will be emitted. The impact assessment was based on emissions at the ELV. Even based on this worst case assessment impacts were predicted to be insignificant for both PM ₁₀ and PM _{2.5} . It remains the case that the Operator has proposed a multi compartment bag filter, this allows individual bags to be isolated in case of an individual failure. Complete failure of the filters is therefore highly unlikely. In the event that the ELV is exceeded the plant will have to stop feeding waste. There will also be planned maintenance and periodic replacement of bags.
Comments about health impacts	
Concern raised over health impacts on local people.	Our view is that there will not be a significant effect on health. This is in line with Public Health England's

	<p>position statement as discussed in section 4.6 of this decision document. PHE's position is "While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable. This view is based on detailed assessments of the effects of air pollutants on health and on the fact that modern and well managed municipal waste incinerators make only a very small contribution to local concentrations of air pollutants."</p> <p>PHE is not aware of any evidence that requires a change in their position statement.</p>
Concern raised about emissions of particulates and the health effects.	We are satisfied emissions of particulates will be insignificant. See section 4.5.2 & 4.6.3 of this decision document has more details on our assessment particulate impacts.
Concern raised over the findings in the recent UKWIN report 'Waste Incineration and Particulate pollution: A Failure of Governance'.	The Environment Agency have produced a briefing note that responds to the points raised in the UKWIN report - Environment Agency internal briefing note on UKWIN article July 2018 . We remain satisfied that the impacts from this installation will be acceptable
Concern about dioxin emissions.	We are satisfied that potential emissions of dioxins and furans from the proposed facility are unlikely to have a significant impact on human health or the environment. See section 4.6.2 of this decision document for further details.
Comments about noise impacts	
Concern raised over risk of increased noise from the facility.	We have assessed the predicted noise impacts from the installation and we are satisfied that the noise impacts will not lead to significant pollution. See section 4.10 of this document for further details.
Comments about odour impacts	
Concern about adverse impacts due	As discussed in section 4.9 we are

to odour.	satisfied fugitive emissions of odour will not have a significant adverse impact on human health or the environment
Concern about Operator competence	
Concern raised over Covanta's competence.	Covanta are not the Operator of the Installation the Operator is Biffa Waste Services Limited.
Comments about impacts from IBA	
Concern over the risk of pollution and harm to human health from the proposed changes to the storage and handling of IBA.	The Operator withdrew proposals to change the techniques for storage of IBA. The proposed techniques for the management of ash has therefore not changed as a result of this variation. We remain satisfied that ash will be managed appropriately and will not lead to significant pollution or harm to human health.
Comments about other impacts and issues	
Concern that the technology is out of date and discredited.	We remain satisfied that the technology proposed is BAT.
Concern raised that there is unused capacity in current incinerators and waste will need to be imported from further afield.	Availability of waste is not a consideration for the determination of this variation.
Questions raised over whether there will be any employment opportunities for local people.	Creation of jobs does not form part of the Environmental Permit decision making process.
View expressed that the location of the installation is not suitable.	Location is primarily a land use planning issue. We have a legal duty to determine any application made to us for an environmental permit. Our role is to determine whether appropriate measures are used to prevent and minimise emissions and whether any impacts on the environment and human health are acceptable. Location is relevant so far as it has the potential to have an adverse impact on sensitive receptors. We have considered the location of receptors in making our decision.
Concern that the application documents are too technical for the public to fully understand.	We are aware that the Application does contain a lot of detailed technical information however this is necessary to fully describe the proposals. The application does however contain a non-technical

	summary of the proposals.
Concern that the public were not informed of the consultation	The way we have consulted in set out in section 2.2 of this decision document. We are satisfied that we took appropriate steps to inform people about the Application. This was borne out by the large number of responses we received.
Concern that there is a contradiction in the application (Q10. Page 16 – Appendix 6 of the Application Form). The Operator has answered yes to replacing continuous HCl monitoring with periodic monitoring yet have written text saying they will ‘undertake continuous monitoring to ensure that comprehensive monitoring programme is undertaken’. It also contradicts the response to question 11 which says they will continuously monitor HCl.	We asked the Operator to clarify their proposals and they have confirmed that continuous monitoring of HCl will be undertaken. This will be a requirement of the permit.
Concern that the local area is losing green belt land as a result of this development.	This is a land use planning issue. It is not something we can consider as part of our determination.
Concern raised about the frequency of inspections by the Environment Agency.	<p>We are satisfied that our regulation of the site will be appropriate and we will inspect the site as often as we consider necessary. We regulate the site by carrying out a continual assessment of plant operations and its environmental performance. This will be achieved in the following ways;</p> <ul style="list-style-type: none"> • The operator must monitor emissions and report the results to us. • We will regularly inspect the Installations, review monitoring techniques and assess monitoring results to measure the performance of the plant. • We will carry out on-site audits of operator monitoring at least once a year; • The operators’ monitoring results are placed on the public registers.