New South Wales Environmental Protection Authority and New South Wales Department of Planning & Environment

Eastern Creek The Next Generation energy from waste facility

Response to submissions merit review

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1 Glossary of key terms

Term	Definition
CAGR	Compound Annual Growth Rate
CEMP	Construction Environmental Management
C&I waste	Commercial and Industrial waste
C&D waste	Construction and Demolition waste
CRW	Chute Residual Waste
DADI	Dial-A-Dump Industries
DEHP	Department of Environment and Heritage
DGR	Director General Requirements
DIRD	Department of Infrastructure, Regional
EC	Eastern Creek
EfW	Energy from Waste
EIS	Environmental Impact Statement
ELV	End of Life Vehicles
EPL	Environmental Protection License
EPS	Environmental Protection Statement
ERA	Extended Regulated Area
EU-IED	European Union-Industrial Emissions
EWC	European Waste Catalogue
Floc waste	The residue from the shredding of car and metal products
GHG	Green House Gas
LGA	Local Government Area
MLA	Metropolitan Levy Area
MPC	Materials Processing Centre
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
NCV	Net calorific value
NGER	National Greenhouse and Energy Reporting

Term	Definition
NSW DP&E	New South Wales Department of Planning
NSW EPA	New South Wales Environmental Protection
NSW EfW PS	New South Wales Energy from Waste Policy Statement
Residual waste	The remaining waste after separation and material recovery has taken place
RR	Resource Recovery
RDF	Refuse-derived fuel
RtS	Response to Submission
SEAR	Secretary's Environmental Assessment
SEPA	Scottish Environment Protection Agency
SEPP-WSEA	State Environmental Planning Policy-Western Sydney Employment Area
SNCR	Selective non-catalytic reduction
SRF	Solid Recovered Fuel
SSD	State Significant Development
SWF	Specified Waste Fractions
TIA	Traffic Impact Assessment
TNG	The Next Generation
TOR	Terms of Reference
tpa	tonnes per annum
WARR	Waste Avoidance and Resource Recovery

2 Background and scope of work

Arup was first appointed in November 2014 to undertake an adequacy review of the technical components of The Next Generation (TNG) (NSW) Energy from Waste Facility, Eastern Creek EIS. This was undertaken by Arup in December 2014, and this information was used to inform the New South Wales Environmental Protection Authority (NSW EPA) response on the adequacy of the EIS documentation.

In June 2015, Arup was appointed by the NSW EPA to:

Conduct a merit assessment of the Concept Design Report (dated 11 March 2015 and prepared by Fichtner Consulting Engineers Limited) and relevant sections of the Environmental Impact Statement (dated April 2015 and prepared by Urbis Pty Ltd).

Specifically determine whether the Concept Design Report and EIS demonstrated that:

- The TNG facility will use current international best practice techniques with respect to process design and control; emission control equipment design and control; emission monitoring with real-time feedback; arrangements for the receipt of waste; management of residues from the energy recovery process;
- The proposed technologies are proven, well understood and capable of handling the variability and type of waste feedstock; and
- Whether the TNG facility delivers on all aspects of the NSW Energy from Waste Policy Statement (EfW PS) (2015) (including meeting emission limits).

In May 2016, Arup undertook a gap analysis of the documents submitted as part of the assessment process for TNG EfW facility located in Eastern Creek, Sydney, in order to identify potential information and assessment gaps as a result of further information that has been provided by the Proponent in November 2015 and February 2016. This assessment was undertaken on behalf of the NSW EPA.

The purpose of the review was to determine the basis of design used in the element assessments for the EIS. The assessment aimed to identify where the basis of design had changed, whether the changed basis of design impacted the element assessment and what gaps and inconsistencies were now present in the EIS as a result of changes to the design basis.

In November 2016, Arup were requested to undertake a review of the amended documents (amended EIS) submitted in November 2016 as part of the test for adequacy. The assessment was undertaken on behalf of NSW EPA and D of P&E. This was a continuation of previous reviews completed by Arup.

The purpose of this review was to identify how queries raised in the previous two reviews had been addressed in the current documentation submitted by the Proponent, as well as ensuring that the TNG facility met the requirements of the NSW EfW PS and the Terms of Reference (TOR) for the EIS[1].

[1] Director-General's Environmental Assessment Requirements Application number SSD 6236

Arup was appointed in October 2017 to undertake an adequacy review of the TNG energy from waste facility, Eastern Creek, response to submission report (RtS) (dated 29th September 2017). The RtS was submitted by the Proponent in response to submissions received by the DP&E from the exhibition of the amended EIS.

High-level adequacy was checked against:

1. The NSW EfW PS.
2. The Director General Requirements (DGRs) (application number SSD 6236, date of issue December 2013).
3. The Arup technical note (dated 16 March 2017) which presented key technical queries from a review of the amended EIS submitted by TNG NSW Pty Ltd ('the Proponent') submitted in November 2016.

The October 2017 adequacy review did not identify any major omissions. Some partial inadequacies and missing information were identified specifically relating to community consultation and soil and water assessment. A copy of the adequacy review is provided in Appendix A for information.

In January 2018, Arup were appointed by the NSW EPA and NSW DP&E to conduct a detailed merit review of the same TNG facility RtS. This merit review focuses on the technical content of the RtS, including:

- assessment of waste feedstock availability, quantity and composition.
- use of international best practice techniques with respect to process design and control; emission control equipment design and control' emission monitoring with real-time feedback; arrangements for the receipt of waste and management of residues from the energy recovery process
- the degree to which the proposed technologies are proven, well understood and capable of handling the proposed variability in and type of waste feedstock.
- key inconsistencies identified in pervious review.
- whether the TNG facility will meet all relevant aspects of the NSW EPA EfW PS and the DGR.

This report documents the merit review.

3 Summary of findings

A detailed merit assessment has been undertaken by Arup on the response to submission report submitted by TNG (the Proponent) dated 29th September 2017, as part of their application data for a Development Consent under Section 89E of the NSW Environmental Planning and Assessment Act 1979.

The merit review focused on three main areas:

1. Material availability and eligibility in accordance with the NSW EfW PS.
2. The suitability of the named principal reference facility based on the criteria set out in the NSW EfW PS.
3. An overall review of the EIS chapters and RtS against the TOR and the NSW EPA EfW PS.

A detailed assessment of the feedstock review presented by the Proponent was undertaken, in order to ascertain whether there is sufficient eligible waste feedstock available in the MLA, that;

- adheres to the Proponent's design fuel mix,
- meets the requirements of the resource recovery criteria in the NSW EPA EfW PS, and
- is within control of their current or proposed operations.

The Proponent proposes there is 552,500 tonnes of eligible design fuel, however an assessment by Arup of the methodology used to determine this figure suggests that the figure includes double counting of eligible wastes, incorrect application of the resource recovery criteria to operational facilities, and inclusion of ineligible wastes. Therefore, the Arup assessment of the feedstock review considers there is approximately 280,000 tpa of eligible waste, which meets the prescribed design fuel mix and is within control of the Proponent's current and proposed operations.

The Multifuel Energy Limited, Ferrybridge Multifuel 1 EfW facility has been presented by the Proponent as the principal reference facility to the TNG facility based on the criteria set out in the NSW EfW PS. It is agreed that the Ferrybridge Multifuel 1 facility is in a similar jurisdiction (the UK) and uses the same technology as the proposed TNG facility. The overall design characteristics and chemical composition of the two design fuel mixes are similar. However, based on the information provided by the Proponent, the waste streams comprised in the design fuel mix for the proposed TNG facility are not wholly comparable to the waste streams making up the design fuel mix for the Ferrybridge facility.

On this basis, the TNG facility based on the information provided in the RtS report and all other information provided by the Proponent to date, is not deemed compliant with the NSW EfW PS.

The waste types currently accepted at the Ferrybridge Multifuel 1 facility based on the waste returns for 2016 are RDF and other wastes derived from the mechanical treatment of wastes which are most likely be from a MSW and C&I

source. In a direct comparison to what is currently operationally processed at Ferrybridge Multifuel 1, only the C&I residual waste fraction of the design fuel mix could be considered a like waste type. Taking only the C&I residual waste into account would translate to a maximum eligible waste quantity of 202,348 tpa based on the adjusted figures undertaken for this review.

Ferrybridge Multifuel 1 is also permitted to accept a range of wastes types which are sourced from MSW, C&I and C&D.

A detailed examination of the individual waste types in the TNG design fuel mix in comparison to the permitted waste types accepted at the Ferrybridge Multifuel 1 facility indicate that some of the individual waste types could be considered similar like waste types to what is permitted for acceptance at Ferrybridge, although residual floc waste is not considered a similar like waste type. On this basis, the quantity of approximately 280,000 tpa as identified in the Arup assessment of material availability would be the maximum eligible waste feedstock under the Proponent's control.

An overall review of EIS chapters and the RtS has found no major issues or omissions. Some partial issues have been observed in relation to:

- Cumulative impact assessment.
- Risk assessment levels and methodology.
- Community consultation.

Noise and traffic EIS chapters were reviewed in detail and minor issues were observed, see sections 7.2 and 7.3.

A comprehensive review of the proposed TNG facility against the NSW EfW PS has also been undertaken, and no additional issues have been observed other than those previously mentioned above.

As a general comment, there is a lack of transparency, refinement and sufficient cross-referencing between the different documentation provided and previous submissions. As such, the report can be confusing to read and there are multiple instances of unfinished sentences and information sources that are not adequately referenced.

4 Material availability

4.1 Introduction and data sources

The TNG facility has a proposed capacity of 552,500 tpa. It is considered critical that sufficient material availability to feed the facility can be demonstrated to justify the project need.

A feedstock review, Appendix J, has been prepared as part of the RtS by MRA Consulting Group. In addition, Arup also requested additional supporting information, and two spreadsheets 'MRA TNG Tonnes 12072017.xlsx' and 'MRA EfW Available Market Tonnes 10072017 v2.xlsx' were provided by the Proponent to assist in this merit review[2]. Furthermore, queries relating to the feedstock review were sent to MRA, and their responses are taken into account in this review.

4.2 Proposed waste feedstock

The waste feedstock for the TNG facility, as outlined in section 4.1.1 of the RtS report, is as follows:

1. Chute Residual Waste (CRW) from the Genesis MPC.
2. General Solid Waste (non-putrescible) currently disposed of to the Genesis EC landfill.
3. Material Recovery Facility (MRF) residue waste from 'qualified resource recovery facilities' currently disposed of to the Genesis EC landfill.
4. Floc waste from car and metal shredding undertaken by other parties and currently disposed of to the Genesis EC landfill.
5. Commercial and Industrial residual waste after resource recovery carried out at Genesis or by others.
6. Other 'specified waste fractions' (SWF) 'compliant with EfW policy (this includes insulation, carpet/underlay, compounds, asphalt, insert incl. non-hazardous buildings waste)'.

Table 1 shows the Proponent's proposed design fuel mix (as per page 15 of the RtS project design brief).

[2] Spreadsheets were provided 'locked' so presented data could only be reviewed at face value

Table 1 proposed design fuel mix

	CRW	MRF residual waste	Floc waste	Mixed C&I Waste	Specified Waste Fractions	Total	Design fuel mix NCV MJ/kg
Fuel mix, %	19.90%	12.06%	14.73%	40.93%	12.37%	**100%**	**12.30**
Fuel mix, tpa	109,954	66,653	81,361	226,162	68,370	**552,500**	**N/A**

The feedstock review by MRA states that there is *'at least 552,500 tonnes per annum of waste eligible for energy recovery via current and planned facilities'.*

The NSW EfW PS defines eligible waste fuels as *'those that are considered by the EPA to pose a low risk of harm to human health and the environment due to their origin, composition and consistency'*, and the following wastes are categorised by the EPA as eligible waste fuels:

1. Biomass from agriculture
2. Forestry and sawmilling residues
3. Uncontaminated wood waste
4. Recovered waste oil
5. Organic residues from virgin paper pulp activities
6. Landfill gas and biogas
7. Source-separated green waste (used only in process to produce char)

As the Proponent's facility is proposing to thermally treat waste that is not listed as an eligible waste fuel, it is subject to the requirements of an energy recovery facility. As defined in the NSW EfW PS '*energy recovery facilities may only receive feedstock from waste processing facilities or collection systems that meet the criteria outlined in table 1'.* The MRA feedstock review serves to demonstrate the available waste and quantities of waste that meet the table 1 resource recovery criteria of the NSW EfW PS. Therefore, eligible in this context is defined as eligible as per the resource recovery criteria presented in table 1 of the NSW EfW PS and Arup have adopted this terminology also for consistency. It does not mean that the waste identified by the review is necessarily considered an eligible waste fuel (as defined in section 3 of the NSW EfW PS).

It is noted that the NSW EPA have an expectation that the resource recovery criteria under the NSW EfW PS is applied on a per facility basis, rather than on a collective waste stream basis.

4.2.1 Assumptions and limitations

It should be noted throughout section 3 of this review that waste quantities may not precisely match with those in the feedstock review by MRA. This is due to rounding errors.

Unless otherwise stated, all waste quantities are for the financial year 2017 (FY17). According to the Proponent's plans, the TNG facility will not be in operation until 2019, however as the majority of figures presented in the MRA feedstock review are for FY17, including quantities of waste from the Proponent's existing facilities, feedstock availability has therefore been reviewed on the basis of FY17.

In undertaking this merit review, Arup have only used data that has been provided by the Proponent or is publically available.

Where adjusted figures have been calculated as part of this review, these are coloured green in tables.

4.3 Eligible feedstock arising from the Proponent's existing and planned facilities

The MRA feedstock review presents four currently operational facilities from which the Proponent states they can readily secure feedstock from for the TNG facility; as they are under the Proponent's operational control. These are as follows:

1. The Genesis facility at Eastern Creek (EC), which receives source separated waste from C&D sources, and outputs source separated wastes.
2. The Genesis Material Processing Centre (MPC), which receives mixed waste from C&D sources, undertakes recovery of recyclables and produces a Chute Residual Waste (CRW).
3. The Genesis Eastern Creek landfill, which receives residual waste from C&I and C&D waste MRF processing, as well as separated waste streams from C&I and C&D waste, residual waste from paper mills and secondary processors in addition to floc waste.
4. The Genesis facility at Alexandria, which receives mixed waste from C&D sources. It is understood the Alexandria facility is a transfer station.

In addition, the Proponent presents one new facility, a C&I dirty MRF, which would receive mixed C&I waste and undertake resource recovery.

The Genesis facility at EC, the Genesis MPC and the Genesis EC Landfill are all co-located at the same site at EC, which is also the TNG facility location. The C&I dirty MRF would also be located at EC. These facilities are discussed in turn in the following sections.

4.3.1 The Genesis facility at EC

The Genesis facility at EC currently accepts and processes separated waste streams, predominantly source separated C&D waste. The Genesis facility has

been classified by MRA as a facility that processes separated waste streams for the purposes of eligibility under the resource recovery criteria.

Of the different streams of source separated C&D waste received at the Genesis facility, 100% of textile, tyre and wood waste has been allocated as eligible as per the resource recovery criteria, although it is noted in the MRA feedstock review that the TNG facility design prohibits tyre waste as a fuel and therefore this has been discounted.

Based on the data presented in the MRA feedstock review (which it is stated has been sourced from weighbridge records) the Genesis facility at EC would provide a total of 751 eligible tonnes of waste per annum (wood and textile waste).

A further assessment is presented in the MRA feedstock review based on a planned expansion to the Genesis facility at EC. It is stated the total waste received will increase from 206,714 tonnes per annum (tpa) to 465,000 tpa, a factored increase of 2.24. It is stated in the MRA feedstock review that the overall Genesis site has an Environmental Protection License limit (EPL) of accepting 1,300,000 tonnes of waste per annum. The proposed C&I dirty MRF (see section 4.3.4) has a proposed capacity of 455,000 tpa and the Genesis MPC will be expanded to a processing capacity of 380,000 tpa. Therefore 465,000 tpa represents the remainder of licensed processing capacity, which it is assumed the Genesis EC facility will be able to fully utilise.

From the expanded Genesis EC facility, the amount of source segregated textiles and wood waste the Proponent will receive is stated to increase by 88,682% (11 tpa to 9,755 tpa) and 7,801% (741 tpa to 57,804 tpa) respectively.

Under current operation, wood represents 0.358% and textiles 0.005% of all waste received at the Genesis EC facility. Under the planned expansion these proportions change to 12.59% and 2.10% respectively. Furthermore, the additional waste represents a significant proportion of total available waste in the MLA market place (as estimated by MRA), particularly for textile waste which represents 55% of the predicted total, see Table 2. It is debateable if the Proponent would be able to secure such a high proportion of source separated textile waste. It is probable that over the life of the TNG facility textile waste will become an increasingly sought after waste due to its high calorific value and non-putrescible content for other secondary processors and facilities producing RDF/SRF. Without any evidence provided to justify the significant increase and change in proportions of waste streams received (MRA have simply stated that that wood and textiles will be the focus of growth and given prioritisation), a conservative adjustment has been undertaken on these quantities reflecting the current proportion of waste wood and textiles received, see Table 3.

Table 2 textile and wood waste received at the Genesis EC facility, as presented in the MRA feedstock review (FY17)

Material	Total quantity predicted available in MLA, tpa	Quantity received at Genesis EC facility, tpa	% of total available in MLA	% claimed as eligible	Eligible quantity received at Genesis EC facility, tpa
Textiles	17,598	9,755	55%	100%	9,755
Wood	336,481	57,804	17%	100%	57,804

Table 3 adjusted textile and wood waste received at the Genesis EC facility (FY17)

Material	Current proportions received in MRA feedstock review, %	% claimed as eligible in MRA feedstock review	Adjusted predicted quantity, tpa
Textiles	0.005%	100%	25
Wood	0.358%	100%	1,667

4.3.2 Genesis MPC

The Genesis MPC facility currently accepts mixed waste; predominantly C&D sourced mixed waste. The Genesis MPC has been classified as a facility that processes mixed C&D waste for the purposes of eligibility under the resource recovery criteria. The Genesis MPC is effectively understood to operate as a MRF, undertaking resource recovery for recyclable materials.

Under current operation, 25% of the input waste (169,265 tpa) has been stated as eligible, at 42,316 tpa. The same criteria have been applied for the planned expansion. This is based on applying the *'up to 25% by weight of the waste stream received at a processing facility'* criteria. However, this assumes that 25% of the input waste stream to the Genesis MPC facility ends up as a residual stream i.e. it is not recovered for recycling. MRA have confirmed that the current Genesis MPC achieves a recycling rate of 'higher than 80%'. A recycling rate of 80% would result in residual fraction of 20%, meaning that assuming 25% as eligible would result in diverting material from recycling to energy recovery. This is not an acceptable implementation of the resource recovery criteria. Table 4 summarises this information and presents an adjusted eligible waste figure based on the 80% recovery rate at the MPC. The underlined values show where the adjusted value is lower than the original.

Table 4 input waste material and eligible waste at the Genesis MPC (FY17)

Phase	Material	Total input, tpa	% claimed as eligible in MRA feedstock review	Eligible waste claimed in MRA feedstock review, tpa	Adjusted eligible waste available @ 80% recovery rate, tpa	Difference, tpa
Current operation	Current waste input to MPC	169,265	25%	41,978 (42,316 before deduction of hazardous and e-waste)	33,604 (33,853)	8,125 (8,712)
Planned expansion	Additional waste input to MPC	210,735	25%	52,262 (52,684 before deduction of hazardous and e-waste)	41,836 (42,147)	10,115 (10,848)
Total (current and planned operation)	**Total waste input to MPC**	**380,000**	**25%**	**94,240 (95,000 before deduction of hazardous and e-waste)**	**75,440 (76,000)**	**18,240 (19,560)**

Therefore, the total amount of eligible waste from current operations at the Genesis MPC is estimated to be 33,853 tpa, or 75,440 tpa in total if planned expansions are completed.

4.3.3 The Genesis EC landfill and the Genesis facility at Alexandria

The Genesis EC landfill accepts residual waste from C&I and C&D waste processors as well as floc waste from metal/car recycling plants. Floc waste is claimed by MRA to be 100% residual from a resource recovery activity, under the assumption that the previous facility is meeting the relevant NSW EPA EFW PS resource recovery criteria. However, Arup consider that floc waste does not fall under C&I resource recovery criteria and further that no consultation with NSW EPA is documented in the MRA review on this waste streams eligibility to be classified under the NSW EPA EFW PS resource recovery criteria.

The Genesis facility at Alexandria is stated to be a transfer station. The Proponent states some recovery of recyclables takes place at Alexandria, but no further detail is provided. Typically, transfer stations only undertake ad-hoc resource recovery to remove and address gross contamination and do not undertake systematic resource recovery; their main purpose is to consolidate and bulk up waste for onward transfer.

Table 5 shows a summary and review of these received waste streams, with adjusted quantities are associated justification provided by Arup where required. The MRA feedstock review has removed hazardous and electronic waste components based on relevant composition data. It is also observed that a waste compositional audit was undertaken on residual waste from Visy MRF. However, in determining hazardous and e-waste components, this composition appears to have been applied to four categories of waste material received at the EC Landfill:

- Mixed – from glass recycling plants
- Mixed – from C&I processors
- Other – mill rejects
- Other – MRF

Only MRF residual waste and mixed waste from C&I processors are likely to be suitable material streams to apply this composition to, however no adjustment has been made by Arup.

Table 5 waste material received at the EC landfill and Arup review (FY17)

Phase	Category of waste material	Total input, tpa	Resource Recovery (RR) criteria applied to previous processing facility in MRA feedstock review	% claimed as eligible in MRA feedstock review	Eligible waste claimed in MRA feedstock review, tpa	Arup review comments	Adjusted eligible waste tonnage, tpa
Current operation	Residual floc waste	54,241	Facility processing mixed C&I waste	100%	54,241 (54,241 before deduction of hazardous and e-waste)	Floc waste is not included under this RR criterion[3], nor any other RR criteria, and no consultation with NSW EPA is documented in the MRA review on this waste stream - therefore it has been removed.	0 (0)
	Mixed – from glass recycling plants	18,862	Facility processing mixed C&I waste	100%	18,153 (18,862)	Glass recycling plant residual waste could contain a high proportion of glass depending on pre-processing which is not a combustible fuel. However, it can be fed into an EfW facility as part of the fuel mix, so no adjustment made.	18,153 (18,862)
	Mixed – C&I processors	17,510	Facility processing mixed C&I waste	100%	16,852 (17,510)	None, noting assumptions made by MRA[4].	16,852 (17,510)

[3] Note 4 under table 1 of the NSW EfW PS states that *'the C&I no limit category is likely to apply only to mixed waste collected from single generators of large volumes of waste (e.g. supermarkets) or precinct based businesses (e.g. shopping centres). Proponents will need to demonstrates that each entity generating waste has effective and operating collection systems for **all** waste streams they generated that have reuse of recycling opportunities (e.g. paper/cardboard collection; organic collection; and residual waste collection). Proponents wishing to use the C&I no limit category will need to contract the EPA to determine the eligibility of each entity'.*

[4] Assumption 6 on page 30 of the MRA feedstock review states that *'MRA assumed that residual from metal recyclers and C&I dirty MRFs received by the Proponent amount to less than 50% of the wastes received by the facilities'.*

Phase	Category of waste material	Total input, tpa	Resource Recovery (RR) criteria applied to previous processing facility in MRA feedstock review	% claimed as eligible in MRA feedstock review	Eligible waste claimed in MRA feedstock review, tpa	Arup review comments	Adjusted eligible waste tonnage, tpa
	Mixed – Genesis Alexandria	15,841	Facility processing mixed C&D waste	100%	15,715 (15,841)	Not adequately demonstrated that the transfer station is undertaking legitimate resource recovery. Therefore, this has been removed.	0
	Other – mill rejects	7,176	Facility processing mixed C&I waste	100%	6,906 (7,176)	None, noting assumptions made by MRA[5].	6,906 (7,176)
	Other – MRF	25,709	Facility processing mixed C&I waste	100%	24,742 (25,709)	About 13% by weight has been determined incombustible based on the VISY MRF audit (Appendix G to MRA review). However, it can be fed into an EfW facility as part of the fuel mix, so no adjustment made.	24,742 (25,709)
	Textiles	47	Separated waste streams – textile waste	100%	47 (47)	None.	47 (47)
	Wood	13	Separated waste streams – waste wood	100%	13 (13)	None.	13 (13)

[5] Assumption 4 on page 30 of the MRA feedstock review which effectively states that it is assumed material received by the Proponent from paper mills and other secondary processors amounts to less than 10% of the source-separated materials received by the processing facility.

Phase	Category of waste material	Total input, tpa	Resource Recovery (RR) criteria applied to previous processing facility in MRA feedstock review	% claimed as eligible in MRA feedstock review	Eligible waste claimed in MRA feedstock review, tpa	Arup review comments	Adjusted eligible waste tonnage, tpa
Subtotal for current operation		**139,399**		**100%**	**136,669** **(139,399)**		**66,713** **(69,317)**
Planned expansion	Residual floc	27,120		100%	21,120 (21,120)	Floc waste is not included under this RR criterion[6], nor any other criteria, and no consultation with NSW EPA is documented in the MRA review on this waste stream - therefore it has been removed.	0 (0)
Total (current and planned operation)		**150,688**		**100%**	**150,688**		**66,713**

[6] Note 4 under table 1 of the NSW EfW PS states that *'the C&I no limit category is likely to apply only to mixed waste collected from single generators of large volumes of waste (e.g. supermarkets) or precinct based businesses (e.g. shopping centres). Proponents will need to demonstrates that each entity generating waste has effective and operating collection systems for **all** waste streams they generated that have reuse of recycling opportunities (e.g. paper/cardboard collection; organic collection; and residual waste collection). Proponents wishing to use the C&I no limit category will need to contract the EPA to determine the eligibility of each entity'.*

4.3.4 Genesis C&I dirty MRF

It is proposed in the MRA feedstock review that a new C&I dirty MRF facility will be constructed and have a capacity of 455,000 tpa.

The MRA feedstock review has applied 50% eligibility criteria as per the *'facility processing mixed C&I waste'*. However, an average 72% recycling rate for C&I at dirty MRF is calculated as part of the MRA C&I mass balance (figure 6 in the MRA feedstock review). Therefore, the eligible waste from the C&I dirty MRF has been adjusted as shown in Table 6, assuming a conservative 70% recycling rate.

Table 6 input waste material and eligible waste at the Genesis C&I dirty MRF (FY17)

Phase	Material	Total input, tpa	Claimed eligible, tpa	Adjusted eligible, @ 70% recovery, tpa
Planned expansion	Mixed C&I Waste	455,000	226,162 (227,500 before deduction of hazardous and e-waste)	135,695 (136,500)

4.3.5 Summary of eligible feedstock waste arising from the Proponent's existing and planned facilities

Table 7 presents a summary comparison of the claimed eligible feedstock in the feedstock review undertaken by MRA compared to the adjusted eligible feedstock presented as part of this review.

The total adjusted feedstock for current operations is 101,069 tpa, the total adjusted feedstock for planned expansion is 179,223 tpa; presenting a combined total of 280,292 tpa.

Table 8 presents the original fuel mix and overall NCV, and the adjusted fuel mix and overall NCV (based on waste stream specific NCV information provided by the Proponent). The NCV of the adjusted mix is slightly higher at 13.10 MJ/kg.

Table 7 summary comparison of claimed and adjusted eligible feedstock waste (FY17)

Phase	Facility	Received waste stream	Total input that could be eligible, tpa	Output waste stream	Eligible waste claimed in MRA feedstock review, tpa[7]	Adjusted eligible waste claimed, tpa[7]	Difference, tpa
Current operation	Genesis EC facility	Source separated C&D waste	752	Source separated wood and textiles	752	752	0
	Genesis MPC	Mixed C&D waste	169,265	CRW	41,978	33,604	8,374
	Genesis EC landfill and Genesis Alexandria	Residual from C&D, C&I MRF Floc waste	139,399 total, comprising of: 54,124 floc waste 66,653 residual C&I waste 60 source separated 15,841 transferred from Alexandria	Residual from C&D, C&I Floc waste	136,668	66,713	69,955
Sub-total			**446,094**		**179,398**	**101,069**	**78,389**
Planned expansion	Genesis EC facility	Source separated C&D waste	67,559	Source separated wood and textiles	67,559	1,692	65,867
	Genesis MPC	Mixed C&D waste	210,735	CRW	52,262	41,836	10,426

[7] After removal of hazardous and e-waste components

Phase	Facility	Received waste stream	Total input that could be eligible, tpa	Output waste stream	Eligible waste claimed in MRA feedstock review, tpa[7]	Adjusted eligible waste claimed, tpa[7]	Difference, tpa
	Genesis EC landfill	Floc waste	27,120	Floc waste	27,120	0	27,120
	Genesis C&I dirty MRF	Mixed C&I waste	465,000	MRF residual from C&I	226,162	135,695	139,500
Sub-total			**770,414**		**373,103**	**179,223**	**193,880**
Total			**1,079,830**		**552,501**	**280,292**	**272,209**

Table 8 original fuel mix compared to adjusted fuel mix

	CRW	MRF residual	Floc waste	Mixed C&I waste	Specified waste fractions	Design fuel mix NCV MJ/kg
Original fuel mix, %	19.90%	12.06%	14.73%	40.93%	12.37%	**12.30**
Original fuel mix, tpa	109,954	69,257	81,361	226,162	68,370	**N/A**
Adjusted fuel mix, %	26.92%	23.78%	0.00%	48.42%	0.87%	**13.10**
Adjusted fuel mix, tpa	75,440	66,653	0.00	135,695	2,444	**N/A**

NCV MJ/kg	14.71	18.79	11.00	9.41	13.24	**N/A**

4.4 Eligible tonnes available in the MLA market

The MRA feedstock review states that modelling identifies approximately 894,100 tonnes of residual waste disposed of from a waste processing facility in the 2017 financial year could have achieved a higher-order resource recovery outcome via energy recovery, in the Metropolitan Levy Area (MLA) market. Discounting municipal solid waste (MSW), as it is stated this is not the first target waste stream for the Proponent and MSW derived feedstock has not been presented in the design fuel mix or the basis of design at any point by the Proponent, a total of 551,200 tpa eligible waste is presented, of which 336,700 tpa is from C&I waste sources and 214,500 tpa is from C&D waste sources.

It is not qualified by MRA in their presentation of eligible waste in the MLA market from waste processing facilities if the individual facilities generating the residual waste meet the NSW resource recovery criteria, although it is acknowledged by Arup that this would be complex and time consuming to demonstrate. Therefore, in reality it is possible that some of the residual waste presented may not be eligible if the individual facility generating the residual waste does not meet the resource recovery criteria.

It is also noted that double counting of waste between the MLA market and the Proponent's current and planned facilities feedstock (as reviewed in section 4.3) is not adjusted for in the feedstock assessment; and therefore some of the waste figures in the MLA market assessment are considered an over estimate. Adjustments have been made by Arup as appropriate in the following sections (4.4.1 to 4.4.4.).

4.4.1 C&I waste

NSW State of the Environment data 2015 on *'waste disposed and recycled by waste stream for NSW, 2002-03 to 2012-13'* has been used as the basis of C&I waste estimates in the MLA market. As the waste tonnages presented in this data represent NSW, a scaling factor has been applied to account for just waste within the MLA. This factor is derived from WARR data on C&I waste tonnages (disposed, recycled and total generated) for Sydney and the ERA up to 2008-2009. This methodology is considered reasonable.

Amounts of C&I waste disposed, recycled and total generated have then been used to create a mass balance, presented in the MRA feedstock review. It is assumed that generated C&I waste goes to five onward destinations:

1. The Earthpower Anaerobic Digestion (AD) plant (50,000 tpa)
2. Source segregated and secondary processors (3,098,361 tpa)
3. Dirty MRF (a dirty MRF processes mixed waste) (43,743 tpa)
4. Disposal within NSW to landfill (1,565,587 tpa)
5. Interstate transport to Queensland (7,000 tpa)

The MRA feedstock review states that the Earthpower AD plant has a negligible residual output, as the input waste is 'pre-processed'. However, 5,000 tpa are still claimed as eligible waste, based on 10% and *'facility processing source-separated food or source-separated food and garden waste'* in the resource recovery criteria. No actual data is presented on the amount of residual waste from Earthpower. It is considered that 5,000 tpa would amount to more than *'negligible residual'*, however no adjustment has been made by Arup on this component as the quantity is relatively small.

Regarding source separated C&I waste and mixed C&I waste received by dirty MRF in the MLA market, adjustments have been made for source segregated C&I waste and waste sent to C&I dirty MRF in Table 9 and Table 10 respectively, where the amount of eligible waste claimed is higher than the current residual waste, as this is not an acceptable implementation of the resource recovery criteria. The underlined values show where the adjusted value is lower than the original.

Table 9 C&I waste source segregated and sent to secondary processors (FY17)

	Quantity presented in MRA feedstock review, tpa	**Adjusted quantity, tpa**
Received by SS & secondary processors	3,098,361	3,098,361
Recycled by SS & secondary processors	2,805,184	2,805,184
SS & secondary processors residual	293,178	293,178
Eligible Tonnes	309,836	293,178

Table 10 waste received by C&I dirty MRF (FY17)

	Quantity presented in MRA feedstock review, tpa	**Adjusted quantity, tpa**
Received by dirty MRF	43,743	43,743
Recycled from dirty MRF	31,406	31,406
Dirty MRF residual	12,337	12,337
Eligible Tonnes	21,872	12,337

As presented in Table 5 of this review, the total adjusted eligible quantity of source segregated C&I waste is 69,317 tpa (before removal of hazardous or e-waste components). Therefore, the amount of source separated C&I residual waste from processing in the MLA market reduces to 223,921 tpa, based on the total

presented in the MRA feedstock review of 293,178 tpa. 223,921 tpa should therefore be considered the maximum additional eligible amount from the MLA market for potential use as a fuel at the TNG facility.

4.4.2 C&D waste

NSW State of the Environment 2015 data on *'waste disposed and recycled by waste stream for NSW, 2002-03 to 2012-13'* has been used as the basis of C&D waste estimates. As the waste tonnages presented in this data represent NSW, a scaling factor has been applied to account for just waste within the MLA. This factor is derived from WARR data on C&D waste tonnages (disposed, recycled and total generated) for Sydney and the ERA up to 2008-2009.

Amounts of C&I waste disposed, recycled and total generated have then been used to create a mass balance, presented in the MRA feedstock review. For C&D waste, it is assumed that generated C&D waste goes to four destinations:

1. Homogenous waste to homogenous waste processors (4,772,599 tpa)
2. Mixed waste to C&D MRF (858,041 tpa)
3. Disposal within NSW to landfill (1,700,133 tpa)
4. Interstate transport to Queensland (494,000 tpa)

It is noted that only mixed waste to C&D MRF that eligible waste is claimed from in the MRA feedstock review. The figure is based on data from the NSW EPA '*Report into the C&D waste stream 2000-2005'* and projected forward to the current year, FY17. This dataset is over 12 years old, and it is likely that using it as a basis for forward projections will result in low confidence levels. However, a more up to date dataset is not available.

Eligible waste is claimed at 25% for a facility processing mixed C&D waste, as per the resource recovery criteria, presenting a total of 214,510 tpa in the MLA market.

However, double counting of waste between the MLA market and the Proponent's current operations is not taken into account. On the basis of the MLA wide C&D waste mass balance, mixed C&D waste to C&D MRF includes the mixed C&D waste that is being received at the Proponent's Genesis MPC facility. Table 11 summarises this.

Table 11 C&D waste adjustment for double counting between MLA market and the Proponent's current operation (FY17)

Phase	Mixed C&D waste to C&D MRF in MLA market presented in MRA feedstock review, tpa	Claimed eligible waste presented in MRA feedstock review, tpa	Mixed C&D to Genesis MPC presented in MRA feedstock review, tpa	Adjusted mixed C&D waste to C&D MRF in MLA market, tpa	Adjusted eligible waste, tpa
Current operation	858,401	214,600	169,265	688,776	172,194

Therefore, when the waste already being received at the Proponent's current operations at the Genesis MPC is taken into account, the mixed C&D waste to C&D MRF in the MLA market reduces to 688,776 tpa, with the maximum eligible tonnage representing 172,194 tpa. This eligible tonnage is lower than the current estimated residual waste from MRF C&D processing (at 257,412 tpa).

4.4.3 MSW

MSW is not considered a priority waste stream feedstock by the Proponent for the EfW facility, and MSW quantities are not included as part of the original headline eligible MLA market supply figure of 551,200 tpa.

Local Government Area (LGA) data for NSW from the *'NSW Local Government WARR Data Report 2014-15'* has been used as the basis of MSW estimates in the MLA market.

Amounts of MSW disposed, recycled and total generated have then been applied to a mass balance, according to the LGA household bin collection system in place (either 3-bin food and garden organics, 3-bin garden organics or 2-bin systems). It is assumed that generated MSW goes to five onward destinations:

1. AWT (Advanced Waste Treatment)
2. MRF to recover recyclables
3. A facility processing garden waste
4. A facility processing garden waste (GO) and/or food waste (FOGO)
5. Disposal within NSW to landfill

As no MSW is currently processed at the Proponent's current operations, or is proposed to be processed as part of planned expansion to operations, there is no double counting with the MLA predicted market quantities.

As with C&I waste in the market MLA market waste, the eligible waste calculation for MSW in some instances exceeds the predicted amount of residual MSW waste, and this is not an acceptable implementation of the resource recovery criteria. Table 12 summarises the MSW in the MLA market, with

adjustments made for where residual waste is higher than the maximum eligible amount.

Table 12 MSW in MLA market that is processed via a facility (FY17)

	2-bin					3-bin GO					3-bin FOGO				
Receiving facility	**MSW received, tpa**	**MSW residual, tpa**	**Eligible %**	**Claimed eligible, tpa**	**Adjusted eligible, tpa**	**MSW received, tpa**	**MSW residual, tpa**	**Eligible %**	**Claimed eligible, tpa**	**Adjusted eligible, tpa**	**MSW received, tpa**	**MSW residual, tpa**	**Eligible %**	**Claimed eligible, tpa**	**Adjusted eligible, tpa**
AWT	326,778	183,597	25%	81,694	81,694	320,402	200,331	40%	128,161	128,161	40,572	35,719	No limit	40,572	**35,719**
MRF – source separated recyclables	105,545	7,550	10%	10,555	**7,550**	474,627	30,882	10%	47,463	**30,882**	35,635	2,532	10%	3,563	**2,533**
FOGO[8]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	47,765	3,173	10%	4,446	**3,137**
GO	34,312	2552	5%	1,716	1,716	488,043	15,630	10%	24,402	**15,630**	N/A	N/A	N/A	N/A	N/A
Total	**466,635**	**193,699**	**N/A**	**93,965**	**90,960**	**1,283,972**	**246,843**	**N/A**	**200,026**	**174,674**	**123,972**	**41,424**	**N/A**	**48,911**	**41,425**

The underlined quantities in Table 12 indicate where the eligible amount of MSW has been reduced compared to the original quantities claimed in the MRA feedstock review. Overall, this results in 307,059 tpa of MSW potentially available, opposed to the original figure of 342,902 tpa.

[8] FOGO for 2-bin includes drop off and pick-up.

4.4.4 Potential eligible tonnes available in the MLA market

The MRA feedstock review states that modelling has identified 5,923,824 tonnes of waste that was directly landfilled in MLA in the 2017 financial year[9]. This is waste that had not undergone any form of resource recovery, and is therefore not eligible fuel for the TNG facility. However, should this directly landfilled waste undergo processing and resource recovery it could become potential eligible fuel.

This is a reasonable observation, with the exception that this figure includes some doubling counting including:

1. Mixed C&I waste that is planned to go to the Proponent's new C&I dirty MRF.
2. Mixed C&D waste that is planned to go to the Proponent's expansion of the Genesis MPC facility.
3. Source separated waste that is derived from the same headline figures as presented C&I and C&D waste tonnages but are presented as additional, separate waste streams, whereas they should be accounted for within the C&I and C&D mass balances.

Table 13 shows that the Proponent plans to receive up to 465,000 tpa of mixed C&I waste to the new dirty MRF. The would reduce the amount of C&I waste to landfill in the MLA market to 1,100,587 tpa.

Table 13 Mixed C&I waste adjustment for double counting between MLA market and the Proponent's planned operation (FY17)

Phase	Mixed C&I waste direct to landfill in MLA market as presented in MRA feedstock review, tpa	Mixed C&I waste to Genesis dirty MRF as presented in MRA feedstock review, tpa	Adjusted mixed C&I waste to landfill in MLA market, tpa
Planned expansion	1,565,587	465,000	1,100,587

Table 14 shows that the Proponent plans to receive up to 210,735 tpa of mixed C&D waste to the MPC expansion. This would reduce the amount of mixed C&D waste to landfill in the MLA market to 1,489,398 tpa.

[9] 5,022,040 tpa is presented in table 9 in Appendix B of the feedstock assessment, however it has been confirmed with MRA that their correct proposed total figure is 5,923,824 tpa for FY17.

Table 14 Mixed C&D waste adjustment for double counting between MLA market and the Proponent's planned operation (FY17)

Phase	Mixed C&D waste direct to landfill in MLA market as presented in MRA feedstock review, tpa	Mixed C&D waste to Genesis MPC as presented in MRA feedstock review, tpa	Adjusted mixed C&D waste to landfill in MLA market, tpa
Planned expansion	1,700,133	210,735	1,489,398

Table 15 source separated C&D and C&I waste adjustment (FY17)

Phase	Source separated waste stream, tpa	Quantity in MLA, tpa	MRA feedstock review quantity claimed (to Genesis EC)	Adjusted quantity to Genesis EC, tpa	Adjusted quantity in MLA, tpa
Planned expansion	C&I wood waste	174,904		867	174,037
	C&I textile waste	7,393		11	7,382
	C&D wood waste	161,577		800	160,777
	C&D textile waste	10,205		14	10,191
Total		**354,079**		**1,692**	**352,387**

MRA have assumed the above source separated quantities Table 15 are separated quantities of waste as generated. However, based on their derivation it is not clear if the quantities are derived from mixed C&I and C&D waste streams disposed to landfill. Therefore, double counting is potentially occurring in relation to source separated waste streams or mixed disposal to landfill. However, as the adjusted quantities are minimal (1,692 tpa) this does not have a material effect on the overall estimations and no further adjustment has been undertaken by Arup.

Table 16 presents the original summary in the MRA feedstock review of eligible tonnes and potential eligible tonnes of waste in the MLA market, compared against adjusted quantities calculated by Arup. The underlined values show where the adjusted value is lower than the original.

As presented in the MRA feedstock review:

- ‘Existing tonnes’ presents waste in the MLA market that is currently processed through a resource recovery facility and therefore has an eligible component.
- ‘Potential tonnes’ includes waste in the MLA market that is currently disposed directly to landfill, and is therefore currently not eligible as feedstock under the resource recovery criteria. However, if this waste were to be processed at resource recovery criteria compliant facilities, it could be potential compliant feedstock. ‘Potential tonnes’ are presented as a cumulative total for mixed C&I waste, mixed C&D waste and source-separated waste such that it includes the ‘existing tonnes’ quantity in addition to the ‘potential tonnes’ quantity. For MSW it is presented as a standalone figure. It is unclear why the data has been presented in this way, and it is considered potentially misleading. For clarity, Arup have presented existing and potential tonnes separately, and a total figure is also provided.

Table 16 summary of eligible tonnes and potential eligible tonnes of feedstock waste in the MLA market (FY17).

Waste stream	Processing facility	% residual waste allowed for energy recovery	Assumptions/interpretation	Policy allowance	Existing tonnes processed in the MLA, tpa	Existing eligible tonnes processed in the MLA (compliant with policy) ,tpa	Potential tonnes available for processing in the MLA, tpa	Potential eligible tonnes available in the MLA (compliant with policy), tpa	Adjusted existing eligible tonnes processed in the MLA, tpa	Adjusted potential eligible tonnes available for processing in the MLA, adjusted, tpa	Adjusted eligible total (includes adjusted existing and adjusted potential), tpa	Arup review comment
Mixed municipal waste (MSW)	Facility processing mixed MSW waste where a council has separate collection systems for dry recyclables and food and garden waste	No limit by weight of the waste stream received at a processing facility	Assumes no limit to waste stream received at AWT plants - currently the only facilities processing "mixed MSW".	100%	40,572	40,572	70,647	70,647	35,719	70,647	106,366	Existing eligible tonnes adjusted to reflect residual data, see section 4.4.3.
	Facility processing mixed MSW waste where a council has separate collection systems for dry recyclables and garden waste	Up to 40% by weight of the waste stream received at a processing facility	Assumes up to 40% of waste stream received at AWT plants - currently the only facilities processing "mixed MSW" - are eligible.	40%	320,402	128,161	1,224,368	489,747	128,161	489,747	617,908	None.
	Facility processing mixed MSW waste where a council has a separate collection system for dry recyclables	Up to 25% by weight of the waste stream received at a processing facility	Assumes up to 25% of waste stream received at AWT plants - currently the only facilities processing "mixed MSW" - are eligible.	25%	326,778	81,694	428,774	107,193	81,694	107,193	188,887	None.
SUB-TOTAL					**687,752**	**250,427**	**1,723,789**	**667,587**	**245,574**	**667,587**	**913,161**	

Waste stream	Processing facility	% residual waste allowed for energy recovery	Assumptions/interpretation	Policy allowance	Existing tonnes processed in the MLA, tpa	Existing eligible tonnes processed in the MLA (compliant with policy) ,tpa	Potential tonnes available for processing in the MLA, tpa	Potential eligible tonnes available in the MLA (compliant with policy), tpa	Adjusted existing eligible tonnes processed in the MLA, tpa	Adjusted potential eligible tonnes available for processing in the MLA, adjusted, tpa	Adjusted eligible total (includes adjusted existing and adjusted potential), tpa	Arup review comment
Mixed commercial and industrial waste (C&I)	Facility processing mixed C&I waste	Up to 50% by weight of the waste stream received at a processing facility	Assumes that a C&I dirty MRF is classified as "facilit[ies] processing mixed C&I waste" under this policy.	50%	43,743	21,872	1,609,330	804,665	12,337	550,294	572,165	Potentially eligible tonnes in the MLA market adjusted to take into account reduced amount to landfill (see section 4.4.4) due to double counting with Proponent's new C&I dirty MRF.
	Facility processing mixed C&I waste where a business has separate collection systems for all relevant waste streams	No limit by weight of the waste stream received at a processing facility	Difficult to prove - all mixed C&I waste tonnes aggregated under "Facility processing mixed C&I waste"	100%	-	-	-	-	-	-	-	None.
SUB-TOTAL					**43,743**	**21,872**	**1,609,330**	**804,665**	**12,337**	**550,294**	**562,631**	
Mixed construction and demolition waste (C&D)	Facility processing mixed C&D waste	Up to 25% by weight of the waste stream received at a processing facility	Assumes mixed C&D waste refers to non-source separated waste generated from C&D sources. The following are NOT included in this category: source-separated C&D waste (e.g. concrete, bricks), garden organics	25%	858,041	214,510	2,558,174	639,543	172,194	372,350	544,544	Potentially eligible tonnes in the MLA market adjusted to take into account reduced amount to landfill (see section 4.4.4) due to double counting with Proponent's expansion of MPC and reduced amount to C&D MRF due to double counting with Proponent's existing operations (see section 4.4.2)
SUB-TOTAL					**858,041**	**214,510**	**2,558,174**	**639,543**	**172,194**	**372,350**	**544,544**	

Waste stream	Processing facility	% residual waste allowed for energy recovery	Assumptions/interpretation	Policy allowance	Existing tonnes processed in the MLA, tpa	Existing eligible tonnes processed in the MLA (compliant with policy) ,tpa	Potential tonnes available for processing in the MLA, tpa	Potential eligible tonnes available in the MLA (compliant with policy), tpa	Adjusted existing eligible tonnes processed in the MLA, tpa	Adjusted potential eligible tonnes available for processing in the MLA, adjusted, tpa	Adjusted eligible total (includes adjusted existing and adjusted potential), tpa	Arup review comment
Source-separated recyclables from C&I	Facility processing source-separated recyclables from C&I	Up to 10% by weight of the waste stream received at a processing facility	The NSW EPA has confirmed that 10% of C&I generated waste received by pulp mills and glass plants, if documented, would be eligible	10%	3,098,361	309,836	3,098,361	309,836	223,921	0	223,921	All source-separated waste streams are processed; therefore, no additional 'potential' waste are available assuming no changes to modelling assumptions. Reduced from 293,178 tpa to account for double counting as 69,317 tpa currently received at Genesis EC landfill.
Source-separated recyclables from MSW	Facility processing source-separated recyclables from MSW	Up to 10% by weight of the waste stream received at a processing facility	Assumes 10% of the waste stream received by MRFs from kerbside recycling is eligible.	10%	615,807	61,581	615,807	61,581	40,965	0	40,965	All source-separated waste streams are processed; therefore, no additional 'potential' waste are available assuming no changes to modelling assumptions. Reduced from 61,581 tpa to account for total residual waste from MSW source separated recyclables processing being 40,965 tpa (see section 4.4.3).

Waste stream	Processing facility	% residual waste allowed for energy recovery	Assumptions/interpretation	Policy allowance	Existing tonnes processed in the MLA, tpa	Existing eligible tonnes processed in the MLA (compliant with policy) ,tpa	Potential tonnes available for processing in the MLA, tpa	Potential eligible tonnes available in the MLA (compliant with policy), tpa	Adjusted existing eligible tonnes processed in the MLA, tpa	Adjusted potential eligible tonnes available for processing in the MLA, adjusted, tpa	Adjusted eligible total (includes adjusted existing and adjusted potential), tpa	Arup review comment
Source-separated garden waste	Facility processing garden waste	Up to 5% by weight of the waste stream received at a processing facility	Assumes 5% of the waste stream received at a GO facility from municipal sources is eligible. Assumes garden organics sourced from C&I or C&D sources are negligible.	5%	522,356	26,118	522,356	26,118	17,346	0	17,346	All source-separated waste streams are processed; therefore, no additional 'potential' waste are available assuming no changes to modelling assumptions. Reduced from 26,118 tpa to account for total residual waste from MSW source separated garden waste processing being 17,346 tpa (see section 4.4.3).
Source-separated food waste (or food and garden waste)	Facility processing source-separated food or source-separated food and garden waste	Up to 10% by weight of the waste stream received at a processing facility	Assumes 10% of the waste stream received at a FOGO facility from municipal and C&I sources is eligible. Assumes FOGO sourced from C&D sources are negligible.	10%	97,765	9,776	97,765	9,776	3,137	0	3,137	All source-separated waste streams are processed; therefore, no additional 'potential' waste are available assuming no changes to modelling assumptions. Reduced from 97,765 tpa to account for total residual waste from MSW source separated food or source separated garden waste processing being 3,137 tpa (see section 4.4.3).
SUB-TOTAL					**4,334,289**	**407,311**	**4,334,289**	**407,311**	**285,369**	**0**	**285,369**	
Waste wood	Residual wood waste sourced directly from a waste generator e.g. manufacturing facility		Assumes no limit to waste wood directly sourced from a waste generator	100%	336,481	336,481	336,481	336,481	336,481	0	336,481	All source-separated waste streams are processed; therefore, no additional 'potential' waste are available assuming no

Waste stream	Processing facility	% residual waste allowed for energy recovery	Assumptions/interpretation	Policy allowance	Existing tonnes processed in the MLA, tpa	Existing eligible tonnes processed in the MLA (compliant with policy) ,tpa	Potential tonnes available for processing in the MLA, tpa	Potential eligible tonnes available in the MLA (compliant with policy), tpa	Adjusted existing eligible tonnes processed in the MLA, tpa	Adjusted potential eligible tonnes available for processing in the MLA, adjusted, tpa	Adjusted eligible total (includes adjusted existing and adjusted potential), tpa	Arup review comment
												changes to modelling assumptions.
Textiles	Residual textiles sourced directly from a waste generator		Assumes no limit to textiles directly sourced from a waste generator	100%	17,598	17,598	17,598	17,598	17,598	0	17,598	All source-separated waste streams are processed; therefore, no additional 'potential' waste are available assuming no changes to modelling assumptions.
Waste tyres	End-of-life tyres		Assumes no limit to tyres directly sourced from a waste generator	100%	116,539	116,539	116,539	116,539	116,539	0	116,539	All source-separated waste streams are processed; therefore, no additional 'potential' waste is available assuming no changes to modelling assumptions.
Biosolids	Used only in a process to produce a char for land application			100%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A as not as suitable fuel for the TNG facility and Proponent has not included in potential feedstock estimations.
Source-separated food and garden organics	Used only in a process to produce a char for land application			100%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A as not as suitable fuel for the TNG facility and Proponent has not included in potential feedstock estimations.
SUB-TOTAL				**N/A**	**470,618**	**470,618**	**470,618**	**470,618**	**470,618**	**0**	**470,618**	

Waste stream	Processing facility	% residual waste allowed for energy recovery	Assumptions/interpretation	Policy allowance	Existing tonnes processed in the MLA, tpa	Existing eligible tonnes processed in the MLA (compliant with policy) ,tpa	Potential tonnes available for processing in the MLA, tpa	Potential eligible tonnes available in the MLA (compliant with policy), tpa	Adjusted existing eligible tonnes processed in the MLA, tpa	Adjusted potential eligible tonnes available for processing in the MLA, adjusted, tpa	Adjusted eligible total (includes adjusted existing and adjusted potential), tpa	Arup review comment
GRAND TOTAL				**N/A**	**6,394,443**	**1,364,738**	**10,696,200**	**2,989,724**	**1,186,092**	**1,590,230**	**2,776,322**	

Table 16 indicates there is currently approximately 1,186,092 tpa of eligible waste in the MLA of which a maximum of approximately 762,531 tpa comply with the proposed TNG facility design fuel mix, which includes 354,079 tpa of source separated wood and textile waste.

Table 16 estimates there is the potential of 1,590,230 tpa of additional eligible waste of which approximately 922,643 tpa would comply with the proposed TNG facility design fuel mix.

A significant investment in resource recovery infrastructure will be needed across the MLA to realise the potential eligible fuel that is currently going to landfill. It is probable that other EfW and RDF processing facilities will be also developed into the future and would compete for any new available eligible feedstock.

4.4.5 Waste growth and sensitivity analysis

MLA eligible waste tonnes have been projected over a 25 year time period in the MRA feedstock review. This has been done utilising a compound annual growth rate (CAGR), which is an average measure of historic growth. In addition, a sensitivity analysis has been undertaken, based on four growth scenarios at -1%, 2%, 4% and 6.2% CAGRs, as well as a defined business-as-usual scenario which uses the derived CAGR forecast on a linear basis. Furthermore, no sensitivity analysis has been undertaken to look at the effect of potentially increasing recycling and recovery rates over time, which would have been beneficial. Some minor issues have been observed with the sensitivity analysis specific to each waste stream, as follows.

4.4.5.1 C&I waste growth

A CAGR of 1.8% has been derived for C&I waste, based on historical data from 2002-2003 to 2012-2013. It appears this CACR is incorrect, and that based on the data presented it should be 1.63%.

However, since 2008-09, growth in waste generation has slowed, and waste growth was 0.5% and -13.5% in 2010-11 and 2012-13 respectively. Therefore, it could be argued it is not representative to apply a positive growth rate when the most recent data displays a decline in the rate of positive growth to negative growth.

4.4.5.2 C&D waste growth

A CAGR of 4.5% has been derived for C&D waste, based on historical data from 2002-2003 to 2012-2013. This CACR is incorrect, and that based on the data presented it should be 4.06%.

4.4.5.3 MSW growth

A CAGR of 5.5% has been derived for MSW, based on historical data from 2002-03 to 2012-2013. This CACR is incorrect, and that based on the data presented it should be 4.95%.

4.5 Conclusions and recommendations

In conclusion, the presented MRA feedstock assessment is over optimistic in its estimation of available waste streams, due to three main reasons:

1. In multiple instances, the amount of eligible waste claimed exceeds the amount of waste that is actually residual. This would result in waste currently being recycled/recovered being diverted to energy from waste, and in effect the resource recovery criteria have been applied as a target, rather than a threshold limit that needs to take into account current recycling and recovery activities. This is not an acceptable implementation of the resource recovery criteria, and could represent the cannibalisation of higher order resource recovery.
2. Unjustified increases in target waste streams. For example, under the expansion of the Genesis EC facility, the amount of source segregated textiles and wood waste the Proponent will be able to acquire is assumed to increase by 88,682% (11 tonnes per annum to 9,755 tonnes per annum) and 7,801% (741 tonnes per annum to 57,804 tonnes per annum).
3. Double counting of waste feedstock between the Proponent's current/planned operations and the MLA market.

Furthermore, it is noted that the total available eligible feedstock is dependent on the significant expansion of two facilities (the Genesis MPC and the Genesis EC) and the construction of a new facility (the Genesis C&I dirty MRF). The waste feedstock associated with these expansions should only be considered once the facilities are built and commissioned. However, Arup have not made any adjustment in the event that this combined expansion and new construction does not occur.

Based on the review of the data presented in this report, the Proponent has access to 101,069 tpa of eligible waste from their current operations. If all of their planned expansion to operations take place and are operationally and commercially successful, they will have access to a further 179,223 tpa of eligible waste, resulting in a total of total of 280,292 tpa. This represents about 50% of the planned stage 1 capacity (552,500 tpa) of the TNG facility.

It is recommended that only waste that has been processed through facilities licenced for resource recovery and meeting the NSW EfW PS resource recovery criteria is accepted and treated at the TNG facility. There should be no waste accepted at the facility directly from the source of generation.

Other errors have been observed in the MRA feedstock assessment, but these are viewed not to be material and are unlikely to result in significant changes to the key figures presented, especially as all figures are estimations.

In conclusion, the Arup assessment of the MRA feedstock review considers there is approx. 280,000 tpa of eligible waste, which meets the prescribed TNG design fuel mix and is within their current and future operations. Therefore, the capacity of the proposed TNG facility should be considered in light of this and should be derived from the treatment of mixed C&I waste and/or mixed C&D waste or

source separated C&I waste and C&D waste that has been screened and processed through a resource recovery facility.

5 Adequacy of technology

The facility proposes to use a moving grate system with water and air cooled grate bars, as well as an air cooled condenser for exhaust gas cooling and SNCR flue gas treatment design to meet EU IED and NSW air emission limits. The supplier of the technology will be HZI (Hitachi Zosen Inova).

Under the NSW EfW PS, a key requirement of the policy is to demonstrate the adequacy of the technology selected through reference to fully operational plants using the same technologies and treating like waste streams in other similar jurisdictions. One of the key technical queries raised by Arup in March 2017 concerned the appropriateness of the selected technology for the treatment of the proposed quantities of C&D waste, as a representative facility treating C&D waste at a similar proportion of the overall feedstock was not adequately referenced.

The proposed throughput of the facility has been halved from the original application, and the design fuel mix has been altered which has resulted in the percentage of C&D waste in the proposed fuel mix reducing. Additional analysis and assessment of the proposed waste streams have now been undertaken as part of the RtS. It is noted that the technology proposed is unchanged from the original application.

5.1 Reference facilities

5.1.1 Information Sources

In addition to the information provided in the RtS, further information relating to reference facilities was provided by Ramboll for the purposes on this review on the 31st of January, and 9th and 12th of February 2018. Table 17 lists the documents received by Arup from Ramboll relating to referenced facilities for comparison against the proposed TNG facility.

Table 17 received information relating to referenced facilities

Document	Date acquired	Description
Analysis of Waste Samples	31/01/2018	Chemical and compositional analysis of CRW and MRF streams done by HRL.
Referenced Facilities Summary	09/02/2018	A summary of the referenced plants chemical composition for comparison against TNG's proposed plants feedstock.
Referenced Facilities Summary: Detailed data	09/02/2018	Original documentation from referenced facilities. Comprises of chemical compositions, feedstock components and design specifications.
Analysis of Floc Samples	12/02/2018	Chemical compositional analysis of floc waste stream done by HRL.

The following documents were received by Arup from Ramboll relating to feed stock composition at the TNG facility as shown in Table 18.

Table 18 received information relating to chemical analysis of the Proponent's waste streams

Document	Date acquired	Description
TNG Feedstock Chemical Composition	09/02/2018	Chemical analysis and composition of the proposed feedstock for TNG's proposed plant
C&I Waste Chemical Composition	12/02/2018	Chemical composition submitted by Ramboll

In addition, the following publically available information has been obtained by Arup as shown in Table 19.

Table 19 additional publically available information to inform reference facility review

Document	Date acquired	Description
Ferrybridge Multifuel Facility Permit Number EPR/SP3239FU (obtained via UK Environment Agency)	08/03/2018	Environmental permit for the operation of the Ferrybridge Multifuel Facility
Incinerator Waste Returns 2016, specifically in relation to Ferrybridge Multifuel Facility EPR/SP3239FU (obtained via UK Environment Agency)	27/2/2018	Waste data returns by tonnage and EWC code for year 2016

5.1.2 Nominated Reference Facility – Ferrybridge Multifuel 1

Ferrybridge Multifuel 1 EfW facility in the UK is presented by the Proponent as the most comparable reference facility to the TNG facility.

The NSW EfW PS requires that:

Energy recovery facilities must use technologies that are proven, well understood and capable of handling the expected variability and type of waste feedstock. This must be demonstrated through reference to fully operational plants using the same technologies and treating like waste streams in other similar jurisdictions.

It is agreed that the Ferrybridge Multifuel 1 facility in a similar jurisdiction (the UK) and uses the same technology (air cooled moving grate supplied by HZI). However, it is still not clear if it treats *'like waste streams'*.

The examination of 'like waste streams'[10] can be considered in a number of ways. The primary consideration is to consider the overall waste stream, i.e. whether it is sourced from MSW, C&I or C&D. However, this method of assessment assumes that the classification of these waste streams are the same in the reference facility jurisdiction to the proposed facility jurisdiction.

[10] Waste streams are defined as per section 5 of the NSW waste levy guidelines

The second consideration is to consider the overall design characteristics of the fuel mix, in terms of calorific value and throughput.

The third consideration is to consider the physical (waste type) and chemical composition of the different components of the design fuel mix and consider whether they compare to the fuel mix permitted and accepted at the reference facility.

5.1.2.1 Comparison of the design fuel mixes based on source waste stream

The design fuel mix for the Ferrybridge Multifuel 1 facility is to accept a mixture of residual MSW in the form of SRF, C&I and wood waste. The fuel mix presented by the Proponent for Ferrybridge Multifuel 1 is based on design data and comprises: 10% Specified Waste (wood waste), 30% mixed C&I waste and 60% solid recovered fuel (SRF) sourced from residual MSW.

On a direct comparison based of the waste streams in the design fuel mix Multifuel 1 facility, the TNG facility cannot be considered 'like' to the Ferrybridge Multifuel 1 reference facility, as the majority of the Ferrybridge deign fuel mix is derived from a MSW waste stream and the TNG facility is not proposing to accept any MSW waste. The Ferrybridge Multifuel 1 facility also does not explicitly define C&D waste in its design fuel mix, noting that wood waste could derive from C&D sources.

5.1.2.2 Comparison of design fuel mixes based on overall design characteristics

The Ferrybridge Multifuel 1 facility is comparable to the Proposed TNG facility in terms of throughput and design fuel NCV, at 13.50 MJ/kg and 512,000 tpa.

Table 20 comparison of TNG Design fuel mix to Ferrybridge Multifuel 1 design fuel mix.

	SRF (sourced from MRF & MSW)	**CRW (sourced from mixed C&D)**	**MRF residual**	**Floc waste**	**Mixed C&I waste**	**Specified Waste Fractions (i.e. s.s. waste)**	**Design Fuel Mix NCV MJ/kg**
TNG facility fuel mix, %		19.90%	12.06%	14.73%	40.93%	12.37%	**12.30**
Ferrybridge fuel mix %	60%	0%	Included in SRF	Only specific fractions	30%	10% (wood waste from C&D)	**13.50**

5.1.2.3 Comparison of fuel mixes based on chemical composition

This review agrees with the Proponent that it is beneficial to also compare waste on its chemical properties; in addition to source of origin and physical properties.

Audits have been undertaken on the CRW, MRF residual and Floc waste by the Proponent to determine physical composition and chemical properties. C&I waste definition has been based on existing desk based data.

Table 21 presents the chemical analysis of the TNG facility relative to all the reference facilities presented by the Proponent. The Ferrybridge Multifuel 1 fuel mix does appear to have similar chemical composition to the TNG facility. It is noted that the ash figure for the proposed TNG facility design fuel mix is significantly greater than that quoted for Ferrybridge, however, this is not considered to be a significant technical or environmental concern, assuming that all ash generated on site is controlled and managed appropriately. It is also noted that as with the fuel mix data presented in Table 20, this data is based on design data only and not operational data.

Table 21 chemical analysis data of fuel mix for all facilities presented

Facility / location	Carbon	Hydrogen	Nitrogen	Sulphur	Chloride	Bromine	Oxygen	Ash	Water	Check
TNG, Australia	**31.5%**	**4.2%**	**0.7%**	**0.2%**	**0.2%**	**No value**	**20.0%**	**21.7%**	**21.4%**	**100.0%**
Grossräschen, Germany	46.9%	2.5%	5.1%	0.5%	1.0%	No value	19.0%	25.0%	No value	100.0%
Heringen, Germany	No value	No value	No value	No value	No value	No value	No value	No value	No value	0.0%
Premnitz, Germany	28.50%	3.96%	0.32%	0.18%	0.54%	No value	19.49%	25.00%	22.00%	100.0%
Hannover, Germany	No value	No value	No value	No value	No value	No value	No value	No value	No value	0.0%
Knapsack, Germany	No value	No value	No value	No value	No value	No value	No value	No value	No value	0.0%
Ferrybridge, UK	**35.6%**	**5.2%**	**0.6%**	**0.2%**	**0.5%**	**No value**	**25.1%**	**12.8%**	**20.0%**	**100.0%**
Riverside, UK	26.6%	3.8%	0.5%	No value	No value	No value	17.8%	19.7%	30.8%	99.2%
TIRME, Mallorca	No value	No value	No value	No value	No value	No value	No value	No value	No value	

5.1.2.4 Consideration of waste types accepted at the Ferrybridge facility

Although the comparison of waste streams in the design fuel for the TNG facility and Ferrybridge Multifuel 1 facility concluded that they are not like, it is reasonable to consider the waste types that make up the composition of the different components of the design fuel mix and whether they compare to the fuel mix operationally accepted and permitted at the Ferrybridge Multifuel 1 facility.

Operational waste types accepted

Waste data returns have been obtained for the Ferrybridge Multifuel 1 facility, which are publically available via the UK Environment Agency. These are summarised in Table 22. 2016 is the only year for which waste data returns are available for the Ferrybridge Multifuel 1 facility. It is noted that the facility was fully commissioned in 2015. The waste return data demonstrates that only two waste types were accepted at the facility being RDF and other wastes from the mechanical treatment of waste. These waste streams are most likely in the UK to be from a MSW and C&I source.

Table 22 Ferrybridge Multifuel 1 facility waste data returns for 2016[11]

EWC Code	Permit Reference	Operator	Site Name	Site Category	EWC Description	Total Tonnes
191210	SP3239FU	Ferrybridge MFE Limited	Ferrybridge Multifuel Plant EPR/SP3239FU	Incineration	combustible waste (refuse derived fuel)	468,223.83
191212	SP3239FU	Ferrybridge MFE Limited	Ferrybridge Multifuel Plant EPR/SP3239FU	Incineration	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11	99,678.59

Consideration of the nominated waste types permitted for acceptance

The environmental permit for the Ferrybridge Multifuel 1 facility, which is publically available via the UK Environment Agency, has been obtained for the purposes of this review. This is included in Appendix F.

[11] Contains Environment Agency information © Environment Agency and/or database right.

Schedule 2 of the permit includes a list of permitted waste types for the incineration plant, using the European Waste Catalogue (EWC) waste classification system[12]. This list of permitted waste types includes a broad range of waste types; including (at a high level):

- Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing (02)
- Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard (03)
- Wastes from the leather, fur and textiles industries (04)
- Waste packaging, absorbents, wiping clothes, filter materials and protective clothing not otherwise specified (15)
- Wastes not otherwise specified in the list (16)
- Construction and demolition wastes (17)
- Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use (19)
- Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions (20)

The Scottish Environment Protection Agency (SEPA) and Natural Scotland published a guidance report in November 2015 titled *Guidance on using the European Waste Catalogue (EWC) to code waste.* This document provides useful guidance on EWC codes and how to assign waste codes, and provides guidance on commonly used codes for inputs and outputs of typical waste processing facilities.

[12] The EWC contains 20 chapters that are based upon the source that generated the waste or upon the type of waste. Each chapter is identified by a two-digit number:
e.g. 20 Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions.

Within each chapter are a number of sub-chapters that further describe the source or type of waste. Each sub-chapter is identified by a four digit number:
e.g. 20 01 separately collected fractions (except 15 01)

The sub-chapters contain descriptions of specific waste streams. Each waste is identified by a unique six digit number:
e.g. 20 01 01 paper and cardboard

Some waste streams can be either on-hazardous or hazardous depending on the exact composition of the waste stream. These waste streams have ‘mirror entries’ in the EWC and are generally differentiated by the use of the term ‘containing dangerous substances’ or words to the same effect.

5.1.3 Consideration of individual waste types in the TNG facility design fuel mix in comparison to permitted waste types accepted at the Ferrybridge Multifuel 1 facility.

5.1.4 Floc Waste

Chapter 16 of the EWC lists wastes not otherwise specified in the list and 16 01 prescribes *end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13, 14, 16 06 and 16 08*).

Typical inputs and outputs of ELV facilities are listed under 16 01 and EWC codes commonly used for outputs from fragmentisers/shredder operations are listed under 19 10 *wastes from shredding of metal-containing wastes.*

The Ferrybridge Multifuel 1 facility is permitted to only accept end-of-life tyres (16 01 03) and plastic (16 01 19) and no waste categorised under 19 10 are permitted.

A floc waste audit was undertaken and the results were presented by the Proponent as part of the RtS documentation. A summary of the composition is presented in Table 17 (as per the floc waste audit).

Table 23 floc waste composition for TNG facility

Material	% composition
Paper/Cardboard	0.4%
Wood/timber	3.0%
Rubber/leathers	4.8%
Polystyrene	0.8%
Plastic	20.6%
Metal (Ferrous and non-ferrous)	1.4%
Textiles	10.9%
Fines	58.1%

Applying the EWC codes of permitted waste types based on the Ferrybridge Multifuel 1 permit, to the composition of floc waste proposed by the Proponent, only separated plastic would be permitted for treatment which is about 20% of the floc waste by weight.

Concerns remain as to the suitability of floc waste as a suitable fuel for the TNG facility. Whilst it is acknowledged that a composition study was undertaken of the floc waste received at Genesis, the study concluded that the floc contains a high proportion of fines at 58.1% which are not defined other than by particle size (less than 10mm). Many of the other EWC codes under end-of-life vehicle waste (16 01) and wastes from shredding of metal-containing wastes (19 10) include wastes that are hazardous (denoted by an asterisk), including:

- 16 01 04* end-of-life vehicles
- 16 01 07* oil filters
- 16 01 08* components containing mercury
- 16 01 09* components containing PCBs
- 16 01 10* explosive components (for example air bags)
- 16 01 11* brake pads containing asbestos
- 16 01 13* brake fluids
- 16 01 14* antifreeze fluids containing hazardous substances
- 10 01 21* hazardous components other than those mentioned in 16 01 07 to 16 01 11 and 16 01 13 and 16 01 14
- 19 10 01 iron and steel waste
- 19 10 02 non-ferrous waste
- 19 10 03* fluff-light fraction and dust containing hazardous substances
- 19 10 04 fluff-light fraction and dust other than those mentioned in 19 10 03
- 19 10 05* other fractions containing hazardous substances
- 19 10 06 other fractions other than those mentioned in 19 10 05

The Ferrybridge Multifuel 1 permit does not allow for the acceptance of any of the above 16 01 or 19 10 EWC codes, and therefore it is concluded that Ferrybridge Multifuel 1 is not permitted to accept floc waste of a similar composition and nature to what is being sought by the Proponent. Given the high percentage of fines in the floc waste it is possible that the fines could contain hazardous material given the propensity of potential hazardous substances in ELVs.

Furthermore, section 4 of this report concludes that floc waste is not an eligible waste under the NSW EPA PS, and does not meet the criteria for resource recovery criteria for energy recovery facilities.

On this basis, it is recommended floc waste is removed from the design fuel mix for the proposed TNG facility.

5.1.5 C&D Waste

The Proponent's updated project definition brief (September 2017) states in section 2.2.1 that C&D waste in Europe and C&D waste in NSW are not comparable, and therefore descriptors of residue waste by reference to their origin are eschewed. This argument is then continued with the statement that in NSW C&D waste is not source separated – separation takes place at processing facilities, whereas in Europe C&D waste is more commonly source separated. It is argued this results in C&D waste in Europe comprising of different source segregated types and a residual that are all combined with C&I waste, whereas in NSW it comprises a mixed stream.

In the UK it is common to reach recovery rates of greater than 80% for C&D waste as a result of established behaviour with regard to source separation and well established recycling end markets[13]. Therefore, it is possible that the residual fraction could end up in secondary processing facilities producing SRF/RDF or due to its likely residual composition of fines, organics and hazardous, will go straight to landfill for disposal.

Under the EWC C&D waste is classified under waste code 17 and could also be considered under 19 12 wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified.

The Ferrybridge Multifuel 1 facility is permitted to accept the following waste types under Codes 17 and 19 12:

- 17 Construction and demolition wastes (including excavated soil from contaminated sites)
    - 17 02 wood, glass and plastic
    - 17 02 01 wood
    - 17 02 03 plastic
    - 17 09 other construction and demolition wastes
    - 17 09 04 mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03
- 19 Wastes from waste management facilities, off-site waste water treatment plants and preparation of water intended for human consumption and water for industrial use
    - 19 12 wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
    - 19 12 01 paper and cardboard
    - 19 12 04 plastic and rubber
    - 19 12 07 wood other than that mentioned in 19 12 06
    - 19 12 08 textiles

[13] The overall recovery rate for C&D waste in the UK was 89.9% for 2014 according to last available data (Department for Environment Food & Rural Affairs, Government Statistical Service, UK Statistics on Waste, 22 February 2018)

- 19 12 10 combustible waste (refuse derived fuel)
- 19 12 12 other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

Source separated C&D waste would be classified under the EWC 17 codes.

The Genesis EC facility accepts source segregated C&D waste and the Genesis MPC accepts mixed C&D waste. The processed materials and residuals from both of these processes can be classified under EWC 19 12.

While it is noted that there is not explicitly defined C&D waste type accepted at the Ferrybridge facility, it is reasonable that source separated C&D waste and the CRW if generated from the mechanical treatment of waste, could be considered to comprise of similar like waste types to what is permitted at Ferrybridge Multifuel 1.

5.1.6 C&I waste

The Ferrybridge Multifuel 1 facility is permitted to accept a range of C&I waste types which are similar in composition to many of the fractions which could make up the MSW and C&I waste used to derive the residual SRF/RDF. The facility is also permitted to accept residual MSW & C&I waste from the mechanical treatment of waste; as follows:

- 19 12 wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
- 19 12 01 paper and cardboard
- 19 12 04 plastic and rubber
- 19 12 07 wood other than that mentioned in 19 12 06
- 19 12 08 textiles
- 19 12 10 combustible waste (refuse derived fuel)
- 19 12 12 other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

The Proponent is proposing to construct a dirty C&I MRF onsite for the treatment of C&I mixed waste. The adjusted estimate undertaken for this review (refer to section 4) indicates that this facility will produce approx. 135,695 tpa of eligible waste. Other sources of residual C&I waste could be available from third party facilities treating and processing mixed C&I waste. The processed materials and residuals from the C&I dirty MRF can be classified under EWC 19 12.

As detailed in section 5.1.4, the Ferrybridge Multifuel 1 waste data returns indicate that the only wastes received during 2016 as RDF or waste from the mechanical treatment. In addition, the Ferrybridge Multifuel 1 facility is permitted to accept a range of C&I wastes that are of a similar nature to fractions of MSW and C&I waste.

Therefore, it is reasonable that residual C&I waste from a C&I MRF could be considered to comprise of similar like waste types to what is accepted and permitted at Ferrybridge Multifuel 1.

5.1.7 MRF Residual Waste

The Ferrybridge Multifuel 1 facility is permitted to accept certain wastes from specific waste management treatment facilities. Specifically, Ferrybridge Multifuel 1 is permitted to accept wastes from:

- 19 02 wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
- 19 02 03 premixed wastes composed only of non-hazardous wastes
- 19 02 10 combustible wastes other than those mentioned in 19 02 08 and 19 02 09
- 19 05 wastes from aerobic treatment of solid wastes
- 19 05 01 non-composted fraction of municipal and similar wastes
- 19 05 02 non-composted fraction of animal and vegetable waste
- 19 12 wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
- 19 12 01 paper and cardboard
- 19 12 04 plastic and rubber
- 19 12 07 wood other than that mentioned in 19 12 06
- 19 12 08 textiles
- 19 12 10 combustible waste (refuse derived fuel)
- 19 12 12 other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

Residual wastes from source separated materials as defined in the NSW EfW PS Table 1 Resource Recovery Criteria for Energy Recovery facilities, so long as they do not contain any hazardous material, could be coded under 19 05 and 19 12. It should be noted that wastes from the anaerobic treatment of wastes are classified under 19 06 of the EWC and are not permitted for acceptance at Ferrybridge Multifuel 1.

Therefore, it is reasonable that residual MRF waste could be considered to comprise of similar like waste types to what is permitted at Ferrybridge Multifuel 1.

It is noted that Ferrybridge Multifuel 1 does not accept waste from anaerobic treatment of wastes. The MRA feedstock review includes residual waste from the EarthPower AD Plant, and therefore it is assumed that residual waste from this facility has been considered in the design fuel mix. Until such time further

examination of this waste type is carried out to determine its suitability for incineration, and whether any additional pre-treatment measures are required (e.g. reduction in moisture content), it is recommended that this feedstock is excluded from the design fuel mix.

5.2 Conclusions and recommendations

The NSW EfW PS seeks a reference facility operating in a similar jurisdiction, using the same technologies and treating like waste streams. The waste streams proposed in the TNG facility design fuel mix are not of similar sources to the Ferrybridge design fuel mix.

On this basis, the TNG facility based on the information provided in the RtS report and all other information provided by the Proponent to date, is not deemed compliant with the NSW EfW PS.

The overall design characteristic and chemical composition of the two design fuel mixes are similar.

The waste types currently accepted at the Ferrybridge Multifuel 1 facility based on the waste returns for 2016 are RDF and other wastes derived from the mechanical treatment of wastes which are most likely be from a MSW and C&I source. Ferrybridge is also permitted to accept a range of wastes which are sourced from MSW, C&I and C&D.

An examination of the individual waste types in the TNG design fuel mix in comparison to the permitted waste types accepted at the Ferrybridge Multifuel 1 facility indicate that some of the individual waste types could be considered similar to what is permitted for acceptance at Ferrybridge. It is noted that the floc waste proposed as part of the design fuel mix for the TNG facility is not considered similar to the types of ELV waste permitted at Ferrybridge.

6 Review against other key components of the NSW EfW PS

The Proponent's RtS submission has also been reviewed against all the criteria set out in the NSW EPA PS. The full review is provided in Appendix G. The main documents that contain information relating to this are:

- The project definition brief
- The RtS report
- The BAT memo
- The MRA feedstock review.

The main findings of this review, other than those that in are relation to feedstock and adequacy of technology (which are covered in sections 4 and 5 of this review) and consultation (covered in section 7.1 of this review) are as follows:

NSW EfW PS criteria: ***If a waste has a content of more than 1% of halogenated organic substances, expressed as chlorine, the temperature should be raised to 1100°C for at least 2 seconds after the last injection of air.***

Primary chemical analysis waste audit data has been collected by the Proponent on the five design fuel mix waste streams. Chloride content ranges from 0.06% to 0.6% and it is argued this is a sufficiently low level to ensure 1% chloride content will not be reached. Furthermore, it is argued that the PVC content of the CRW could be lowered by applying further separation processes, although no guarantee is given.

Arup have recommended that only waste that has been derived from the treatment of mixed C&I waste and/or mixed C&D waste or source separated C&I waste and C&D waste that has been screened and processed through a resource recovery facility. A defined maximum chloride limit on any feedstock received at the facility should be defined, and regular testing and analysis to demonstrate compliance should be carried out.

Arup consider that with demonstrated chemical analysis combined with the proposed waste mixing in the bunker, chloride levels should likely remain below 1%.

7 Review of EIS chapters

The RtS and amended EIS chapters have been reviewed against the TOR. A full record of this review is presented in Appendix B.

Noise and traffic EIS chapters have been reviewed in further detail by experienced Arup noise and traffic practitioners; see sections 7.2 and 7.3 respectively.

7.1 Review against the TOR

No major omissions or issues have been observed in the review against the TOR.

Partial issues have been observed in relation to:

- Cumulative impact assessment. The RtS submission would have benefited from commenting on cumulative impacts previously assessed in section 27 of the Amended EIS and if they have changed, as well as inclusion of a larger project radius from the Proponent site to consider projects such as the M4 and M7 motorway.
- Risk assessment levels and methodology. In the context of the revised stage 1 proposal under the RtS submissions, the level of risk for each environmental risk may have changed and ideally should be re-assessed as part of the RtS submission. Furthermore, under the risk methodology used, risk descriptors do not include details/description of the scale and magnitude of impacts.
- Further community consultation. The RtS report would have benefitted from an overview of consultation undertaken between May 2017 and the RtS report submission date, as well as a summary and discussion on the planned consultation post-RtS. This data is not included.

Please refer to Appendix C for a more detailed discussion of these aforementioned issues.

Furthermore, Arup consider the following areas that could have benefited from additional detail and/or assessment and are discussed as follows:

TOR requirement: ***Detailed description of the development, including need for the development; alternatives considered; engineering and/or architectural plans; justification for the development taking into consideration its location, any environmental impacts of the development, suitability of the site and whether the development is in the public interest.***

The Proponent has described the project need in section 2.1 of the RtS Report. A description of the Amended Proposal is provided in section 3 and Appendix D of the RtS Report.

Section 3.1.1 of the RtS report states that staging of the works is set out in the CEMP (submitted with the amended EIS at Appendix BB) and confirmed in the Addendum letter in Appendix F. The Addendum letter (Appendix F to the RtS Report) states that the staging of the project into Stage 1 and 2 will not affect the previously issued CEMP submitted with the amended EIS in Appendix BB.

A brief summary of the reasons for site selection is provided in section 2.1.1 of the RtS report. Section 6.3.3 states that alternative sites were not considered, as this location was selected due to the opportunity to provide synergies with the Genesis MPC facility through sharing of infrastructure, allowing for improved operations and production. In addition, the Proponent suggests that another location would place additional traffic impacts and risk in transfer of waste along public roads.

Section 6.3.3 of the RtS Report summarises the advantages of the proposed site location, which have previously been discussed in the amended EIS in section 5.1.1.

Arup considers that the RtS report would benefit from providing an assessment of alternative sites considered and justification provided as to why alternatives were not feasible.

TOR requirement: ***Likely interactions between the development and existing, approved and proposed operations in the vicinity of the site.***

Overview of local current and proposed future operating facilities identified including an assessment of the cumulative impacts was provided in the amended EIS in section 27. This was indicated in Table 11, section 8 of the RtS Report but no further information was supplied.

Section 27 of the amended EIS discusses specific cumulative impacts associated with noise, traffic, air quality, flora and fauna, cultural heritage, soil and water and visual amenity with mitigation measures recommended. Sections on cumulative impacts have also been provided under the relevant environmental elements discussed in the amended EIS.

Arup consider that the RtS Report would have benefited from further information on whether the cumulative impacts have changed as a result of the revised proposal.

TOR requirement: ***Consolidated summary of all the proposed environmental management, mitigation and monitoring measures, highlighting all commitments included in the EIS.***

Chapter 9, Table 12 of the RtS Report summarises the environmental management measures for the proposed development and refers the reader to section 28.2 of the amended EIS, however, this is an incorrect report reference; rather section 27.3 of the amended EIS details the environmental management measures for the Project.

Where management measures have been amended for the Project based on project changes, these have been adequately highlighted in Chapter 9, Table 12 of the RtS Report.

For construction noise monitoring in Chapter 9, Table 12 of the RtS Report, cross-referencing is not correct - not evident where details of noise monitoring are provided in the RtS Report.

Applicable monitoring programs for construction and operation of the facility have been identified Chapter 9, Table 12 of the RtS Report.

TOR requirement: ***A demonstration that the development is consistent with the Broader Western Sydney Employment Area Draft Structure Plan 2013.***

Submissions indicated that there were concerns with the consistency of the proposed development with existing land use and zoning. As highlighted in section 6.3.1 of the RtS Report, section 8.3.2.2 of the amended EIS demonstrated that the proposed development is consistent with the objectives of the IN1 General Industrial zone, and that no works are proposed to be undertaken within the E2 Environmental Conservation zone. It is also stated that the development would be categorised as 'electricity generating works' in the absence of other use definitions in the SEPP WSEA and would be considered 'Industry' under SEPP WSEA and permissible with consent under the provisions of the IN1 General Industrial Zone.

It should be noted that there is a caveat around the definition of 'Industry' permitted with consent in the IN1 General Industrial zone, as the SEPP (WSEA) states that industries (other than offensive or hazardous industries) are permitted with consent. One submission was made on this basis, and the Proponent has responded that where an Environment Protection Licence is required for the proposed development to operate, DPE must consult with the EPA when preparing environmental assessment requirements and when making a determination on the project proposal. If the approved SSD requires an EPL to operate, the EPA cannot refuse to issue an EPL if the SSD is approved. Given the Proponent's' expectation that all necessary EPLs would be obtained from the EPA, on the basis that the proposal is not a hazardous and offensive industry and therefore permissible with consent in the IN1 General Industrial Zone.

TOR requirement: ***a description of the water demands and a breakdown of water supplies***

While section 6.10.2 of the RtS report states that the revised Civil Infrastructure Report (Appendix H of the RtS Report) discusses water availability, consumption rates and demand, Appendix H of the RtS Report does not discuss construction water availability, rates and demand. Updated construction water requirements should be provided for the revised proposal. It is noted that construction water was discussed in section 4.6.9 of the amended EIS; however, it is anticipated that these figures would change as a result of the revised proposal.

Section 7.2.5 of Appendix H (Civil Infrastructure Report) states that consultation with Sydney Water indicates that while SEPP 59 (for the Eastern Creek Precinct) states there are concerns with capacity and elevations for potable water connection, there is unlikely to be an issue with constant 7l/s connection to facilitate project operations, but that this would be confirmed through a Section 73 application.

TOR requirement: ***During the preparation of the EIS, you should consult with the relevant local, State and Commonwealth Government authorities, service providers, community groups or affected landowners. In particular, you must consult with:***

- Environmental Protection Agency

- Blacktown City Council

- NSW Health

- WorkCover NSW

- Department of Primary Industries, including the NSW Office of Water

- NSW Roads and Maritime Service

- Office of Environment and Heritage (including the Heritage Branch)

- NSW Fire Brigade

- Rural Fire Service

- Transgrid/Endeavour Energy

- Civil Aviation Safety Authority

- local community and other stakeholders.

The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.

Section 6.4.1 of the RtS Report outlines that the Proponent undertook public exhibition and consultation in accordance with the requirements of the EP&A Act with standard exhibition timeframes. The public exhibition and consultation period for this project appears to have complied with the minimum 30 day exhibition requirement for SSD applications under the EP&A Act. The Proponent should note that the NSW EfW PS (NSW EPA 2015) recommends that during design development, an effective stakeholder and community consultation programme should be undertaken to develop an understanding of the resource recovery outcomes and to manage any perceived impacts. It is unclear from the information provided in both the EIS and RtS what about ongoing community consultation will be undertaken during construction and operation.

It is also noted that there appears to be gaps in the number of stakeholders that were consulted with during the preparation of the RtS Report. From the list of stakeholders in Table 8 of section 6.4.1, it was not indicated whether NSW Health, WorkCover NSW, Department of Primary Industries (including NSW Office of Water), NSW Roads and Maritime Service, NSW Fire Brigade, Rural Fire Service, Transgrid/Endeavour Energy and Civil Aviation Safety Authority were consulted with during RtS report preparation. However, on review of Chapter 6 of the amended EIS, it was noted that the following stakeholders were consulted:

- EPA; Blacktown City Council; Penrith City Council; Work Cover NSW; DPI, including NSW Office of Water; NSW RMS; OEH; Heritage Branch; NSW Fire Brigade; Rural Fire Service; TransGrid; Civil Aviation Safety Authority; NSW Health; and DIRD.

An update on any recent consultation with the stakeholders nominated in the SEARs would have been beneficial to the discussion.

Appendix H Civil Infrastructure Report details the consultation undertaken with Sydney Water by Land Partners.

Section 6.10.3 states that TNG has entered into a Connection Investigation and Negotiation Agreement (CINA) to enable TransGrid to provide an Offer to Connect to the high voltage transmission network, via TransGrid's existing Sydney West 330/132kV substation.

7.2 Noise

A review of the noise assessment had the following key observations:

- Although the noise assessment is based on the previous design and should ideally have been re-assessed, that this is likely to over-predict operational noise levels and hence be conservative.
- Construction noise assessment is generally thought to be conservative.
- Road traffic noise assessment does not include an absolute noise limit assessment – this should be included to meet traffic noise assessment requirements.
- Noise mitigation is not defined.

The full noise review is presented in Appendix D.

7.3 Traffic

A review of the traffic assessment concluded that whilst the revised assessment letter (dated 18th September 2017) included as part of the RtS assumes a 50% trip reduction from the original impact assessment which is proportional to the reduction in waste capacity, the trip generation may have been underestimated due to the following:

- Staff trips – the number of employees required for the amended facility may not be directly proportional to the capacity of the TNG facility. There will be some overarching positions such as administrative staff, maintenance crew and environmental services that will be required regardless of the production capacity of the facility;
- Input waste / fuel deliveries – the reduction rate for these trips should be determined comparing the quantity of the materials expected from external facilities in the amended development compared to the original TIA;
- Miscellaneous deliveries – depending on factors such as storage capacity of the amended facility and shelf life of the materials, the frequency of the deliveries may not be reduced proportionally to the capacity of the facility; and
- Ash removal – the assessment should consider frequency of ash removal, rather than quantity in isolation.

The full traffic review is presented in Appendix E.

7.4 GHG assessment

The GHG emissions assessment has followed the NGER technical guidelines. Scope 1 and 2 emissions must be accounted for. Scope 3 emissions are optional to report under the NGER Act. Scope 2 emissions for the facility will be negligible as the facility will be a net exporter of electricity. Scope 1 emissions are the main focus of the report.

Calculations for scope 1 "emissions for waste incineration" CO_2-e (tpa) emissions were derived using method 1 from the National Greenhouse and Energy Reporting Technical Guidelines, and appear to be correct.

Scope 2 emissions "substitution of grid electricity" presents figures that don't seem to be in line with the suggested method of calculation. The amount of electricity diverted from the grid is presented as 594,600,000 kWh, whereas the correct number based on the design parameters is 549,600,000 kWh. However, the CO_2-e diverted of 461,664 tpa appears to be correct.

Over the suggested 25-year period the facility has the potential to create a reduction of 13.6 to 17.1Mt CO_2-e.

8 Overall conclusions and recommendations

The *'TNG energy from waste facility, Eastern Creek, response to submission report'* (dated 29th September 2017) has undergone a detailed merit review.

This merit review focused on three main areas:

1. Material availability and eligibility in accordance with the NSW EfW PS.
2. The suitability of the named principal reference facility based on the criteria set out in the NSW EfW PS.
3. An overall review of the EIS chapters and RtS against the TOR and the NSW EfW PS.

It is concluded that the eligible feedstock quantities put forward by the Proponent are over estimations and are not fully compliant with the NSW EfW PS. Adjusted estimations undertaken as part of this review demonstrated that significantly less eligible material than proposed by the Proponent will be available in the MLA as potential feedstock in accordance with the Proponent's design fuel mix. In conclusion, this review considers there is approximately 280,000 tonnes per annum of eligible feedstock under the Proponent's current or future control through their own operations. There is merchant feedstock capacity potentially available in the MLA market, however, to become eligible, new resource recovery infrastructure will need to be developed.

The NSW EfW PS seeks a reference facility operating in a similar jurisdiction, using the same technologies and treating like waste streams. The waste streams proposed in the TNG design fuel mix are not of similar sources to the Multifuel Energy Limited, Ferrybridge Multifuel 1 facility design fuel mix.

On this basis, the TNG facility based on the information provided in the RtS report and all other information provided by the Proponent to date, is not deemed compliant with the NSW EfW PS.

In a direct comparison to what is currently operationally processed at Ferrybridge, only the C&I residual waste fraction of the design fuel mix could be considered a like waste stream. Taking only the C&I residual waste into account would translate to a maximum eligible waste quantity of 202,348 tpa based on the adjusted figures undertaken for this review.

A detailed examination of the individual waste types in the TNG design fuel mix in comparison to the permitted waste types accepted at the Ferrybridge Multifuel 1 facility indicate that some of the individual waste types could be considered similar like waste types to what is permitted for acceptance at Ferrybridge, although residual floc waste is not considered a similar like waste type. On this basis, the quantity of approximately 280,000 tpa as identified in the Arup assessment of material availability would be the maximum eligible waste feedstock under the Proponent's control.

An overall review of EIS chapters and the RtS has found no major issues or omissions. Some partial issues have been observed in relation to:

- Cumulative impact assessment
- Risk assessment levels and methodology
- Community consultation

Noise and traffic EIS chapters were reviewed in detail and minor issues were observed, see sections 7.2 and 7.3.

A comprehensive review of the proposed TNG facility against the NSW EfW PS has also been undertaken, and no additional issues have been observed other than those previously mentioned above.

As a general comment, there is a lack of transparency, refinement and sufficient cross-referencing between the different documentation provided and previous submissions. As such, the report can be confusing to read and there are multiple instances of unfinished sentences and information sources that are not adequately referenced.

Appendix A

October 2017 adequacy review

Memorandum

ARUP

To	Chris Ritchie, NSW DPE Sally Munk, NSW DPE Deanne Pitts, NSW EPA	Date	17 October 2017
Copies	Therese Manning Giles Prowse	Reference number	239880-03
From	Joyanne Manning	File reference	
Subject	SSD6236: Energy from Waste, Eastern Creek RtS		

Arup received the DADI Energy from Waste, Eastern Creek, Response to Submissions Report on 3rd October 2017, and undertook an Adequacy check against:

1. NSW EPA Energy from Waste Policy
2. Director General Requirements (DGRs)
3. Arup Technical Note dated 16 March 2017 – EIS Review – Key Technical Queries.

In general, the adequacy review against the NSW EPA Energy from Waste Policy and the DGRs did not identify any major omissions. We identified some partial inadequacies or missing information including:

- Community consultation information. The commentary provided on the Community Consultation was very much retrospective and there was no commentary on what commitments to consult with the community going forward, other than provision of the ongoing 1800 community line and project email.
- A revised soil and water assessment has not been provided and RtS notes it is pending.

Memorandum

Response to Arup Technical Note dated 16 March 2017 – EIS Review – Key Technical Queries.

Query 1: There is insufficient evidence that the proposed technology can operate successfully given the proposed levels (approx. 50%) of C&D feedstock waste. If a representative facility cannot be established, the proponent needs to clearly define and articulate the differences the proposed feedstock will cause in both process and emissions and demonstrate that any difficulties can be mitigated to ensure successful operation of the proposed facility.

This query has been partially addressed by the RtS.

Additional analysis and assessment has been undertaken in order to comprehensively identify the potential composition of the feedstock and allow comparison to the design fuels of the nominated reference facilities.
The RtS proposes an argument that the nomenclature in Europe for C&D and C&I is different to that in Australia and therefore waste streams that would be reported as C&D in Australia could be considered C&I dependent on how they are treated at source and managed post generation.
On this basis it is claimed that the design fuel for the Ferrybridge facility in the UK is comparable to that of TNG, however no further information is provided on the design fuel for Ferrybridge than has been provided in previous documentation - 10% Specified Waste, 30% Mixed C&I and 60% MRF and MSW.
The Ferrybridge Facility is very comparable in terms of throughput and design fuel NCV.

The chemical composition of the TNG design fuel has been graphed in comparison to a number of comparable facilities (although these comparable facilities are not individually identified and for each chemical property TNG was within the maximum and minimum values presented.

For completeness and to facilitate an independent assessment on the suitability of Ferrybridge as the nominated reference facility it would be beneficial if all source data on the design fuel and its operation is provided on the Ferrybridge facility, this could be done even confidentiality if commercially sensitive.

Query 2: A detailed, evidenced-based, fully transparent explanation of how C&D residual waste composition has been calculated, including the recovery rates used, should be provided.

An evidence based description on what 'other' waste comprises of is required.

This query has been addressed by the proponent undertaking a detailed compositional and chemical analysis study of the CRW as part of the MRA Consulting Group Report – Feedstock review in accordance with the Resource Recovery Criteria of the NSW EfW Policy Statement (Appendix J).

Query 3: An evidence-based, transparent explanation on the actual available C&D waste tonnages suitable as feedstock that are available in the SMA area is required.

This query has been addressed by the proponent undertaking a detailed assessment of the available C&D waste in the SMA as part of the MRA Consulting Group Report – Feedstock review in accordance with the Resource Recovery Criteria of the NSW EfW Policy Statement (Appendix J).

Query 4: A detailed, evidenced-based, fully transparent explanation of how C&I residual waste composition has been calculated, including the recovery rates used, should be provided. An evidence-based description of what 'other' waste comprises of is required.

This query has not been listed as an issue under Appendix A Response to Submissions Table Industry and Government and has not been adequately addressed.

The MRA report does attempt to quantify the overall potential available residual C&I waste.

A detailed evidence based fully transparent explanation on its composition has not been provided. No compositional analysis of the residual C&I waste stream has been undertaken.

Query 5: An evidence-based, transparent explanation on the actual available C&I waste tonnages suitable as feedstock that are available in the SMA area is required.

This query has not been listed as an issue under Appendix A Response to Submissions Table Industry and Government although it has been partially addressed.

The MRA report does attempt to quantify the overall potential available residual C&I waste.

Query 6: An evidence-based justification needs to be given why the Proponent is assuming a waste growth rate from data that is over seven years old. The implications of a waste reduction rate needs to be fully considered with regard to long term waste availability. This could be demonstrated through a waste forecast model, which would estimate predicted waste tonnages over the planned operational period of the proposed facility.

This query has been addressed as part of the MRA Consulting Report – Appendix J. A growth model and sensitivity analysis for the eligible tonnes in the MLA Market is provided as Appendix D to this report.

Query 7: A detailed, evidence-based and fully transparent explanation of how CRW composition has been calculated, including the recovery rates used, is required.

A detailed compositional breakdown of wood waste is required.

This query has been addressed as part of the MRA Consulting Report – Appendix J.

A detailed CRW compositional audit was undertaken by EC Sustainable in April 2017.

Wood waste was sorted and segregated into untreated (MDF and all other) and treated (CCA and lead painted) and detailed by day as a percentage by weight of the sample size.

Query 8: Robust, evidence-based data is required to give a definitive detailed floc waste composition for Australia to allow for a comprehensive comparison to European floc waste.

A detailed comparison of the process used in Australia and Europe to treat ELV is required including clear identification of any differences and the impact this may have on the generated floc.

Identification of EfW facilities in Europe processing floc waste is needed, including composition, quantity and percentage floc waste in the overall waste stream. Consideration of any special operational or handling procedures employed at facilities accepting floc waste should also be articulated.

This query has been partially addressed in the RtS.

Memorandum

A floc waste composition study was undertaken by Anne Prince Consulting in August 2016, and reported as part of the MRA Consulting Report - Appendix J. The physical composition of a number of floc waste samples was analysed and a limited suite of chemical compositional analysis is presented.

Section 2.7.3 of the Ramboll PDB provides a short commentary on the process to generate floc waste in Australia in comparison to the EU. In addition, a table is provided showing a range and chemical composition of floc waste in Europe. The reference source of this table is not provided.

The chemical composition of Australian floc waste is also provided but again the reference source for this data is not provided. It is therefore unclear if the chemical profile of the floc waste is based on the compositional study undertaken by Anne Prince Consulting in August 2016.

The Ramboll report provides reference and commentary to the processing of floc waste in European EfW facilities and has it listed as a reference feedstock under Mixed C&I in Table 13 Reference Facilities – Fuel Mix. The percentage of floc waste being processed is not stated.

Consideration of any special operational or handling procedures employed at facilities accepting floc waste have not been articulated.

Query 9: A definitive, evidence-based estimation of the percentage of different types of TWW in the waste feedstock is required.

Detailed acceptance procedures that will be employed at the facility to remove TWW from all waste sources that will be accepted are required.

If adequate removal of TWW cannot be guaranteed, provision of a combustion temperature of 1,100 °C for two seconds operation needs be re-considered.

Scenario modelling of varying concentrations of TWW should be undertaken to demonstrate if TWW does enter the feedstock the threshold levels it will not have a significant negative impact in accordance with the EfW Policy.

This query has been mostly addressed by the RtS. TWW is discussed in Section 2.7.2 of the Ramboll PDB.

The compositional analysis of the CRW examined the composition of wood waste within this stream.

The current acceptance procedures at the Genesis facility have been documented and provided as evidence that TWW would not enter the design fuel stream.

On the assumption that TWW will not enter the design fuel mix, the proponent ascertains there is no requirement to raise the temperature to 1,100°C. No scenario modelling is presented of varying concentrations of TWW, on the basis that all TWW will be absent from the design fuel.

Query 10: Detailed procedures required on how the proposed facility will be run during commissioning and operational phases by operational staff, including training requirements and qualifications.

Memorandum

The query is addressed by the RtS.

Section 6.5 provides details on the staffing requirements, qualifications, education and experience per role.

A comment is made in Section 6.5 that *essentially an EfW facility is a small thermal power plant that is fuelled by waste, in this sense it will be sufficient to recruit people who have qualifications and experience in operating and maintaining fossil fuel power plants*.

It is vital that the facility is manned with experienced staff in operating EfW facilities, as the waste handling requirements and APC systems will be significantly more complex than for a facility that is fired by a homogenous fossil fuel. The functionality of the facility will be greatly dependent on achieving the correct and balanced fuel mix, the operation of the furnace and the APC system.

It is noted that Section 6.5 states that Hitachi Zosen Inova (HZI), a globally recognised technology provider and recognised O&M of EfW facilities will be responsible for plant operations and management.

Joyanne Manning

16/10/2017

Appendix B

Full EIS TOR review

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	Detailed description of the site, and any existing or approved operations	Section 3 and 8 of the RtS Report Section 2 of the Amended EIS	Chapter 3 of the RtS Report provides a summary of the proposed project changes. Chapter 8, Table 11 of the RtS Report states that the detailed site description and details of existing and approved site operations are described in Chapter 2 of the amended EIS.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	Detailed description of the development, including need for the development; alternatives considered; engineering and/or architectural plans; justification for the development taking into consideration its location, any environmental impacts of the development, suitability of the site and whether the development is in the public interest	Section 2.1 of the RtS Report Section 3 and Appendix D of the RtS Report Section 3.1.1 and Appendix F of the RtS Report and Appendix BB of the amended EIS Section 2.1.1 and 6.3.3 of the RtS Report	The proponent has described the project need in Section 2.1 of the RtS Report. A description of the Amended Proposal is provided in Section 3 and Appendix D of the RtS Report. Section 3.1.1 states that staging of the works is set out in the CEMP (submitted with the amended EIS at Appendix BB) and confirmed in the Addendum letter in Appendix F. The Addendum letter (Appendix F to the RtS Report) states that the staging of the project into Stage 1 and 2 will not affect the previously issued CEMP submitted with the amended EIS in Appendix BB. A brief summary of the reasons for site selection is provided in Section 2.1.1 of the RtS Report. Section 6.3.3 states that alternative sites were not considered, as this location was selected due to the opportunity to provide synergies with the Genesis MPC facility through sharing of infrastructure, allowing for improved operations and production. In addition, the proponent suggests that another location would place additional traffic impacts and risk in transfer of waste along public roads. The RtS report would benefit from providing an assessment of alternative sites considered and justification provided as to why alternatives were not feasible. Section 6.3.3 of the RtS Report summarises the advantages of the proposed site location, which has previously been discussed in the amended EIS in Section 5.1.1.	P

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	Likely interactions between the development and existing, approved and proposed operations in the vicinity of the site	Table 11, Section 8 of the RtS Report refers the reader to Section 27 of the amended EIS.	Overview of local current and proposed future operating facilities identified including an assessment of the cumulative impacts was provided in the amended EIS in Section 27. This was indicated in Table 11, Section 8 of the RtS Report but no further information was supplied. Section 27 of the amended EIS discusses specific cumulative impacts associated with noise, traffic, air quality, flora and fauna, cultural heritage, soil and water and visual amenity with mitigation measures recommended. Sections on cumulative impacts have also been provided under the relevant environmental elements discussed in the amended EIS. The RtS Report would have benefited from further information on whether the cumulative impacts have changed as a result of the revised proposal.	P
Arup (DGR)	Consideration of any relevant statutory provisions	Section 7.4.3 of the RtS Report Section 7 of the amended EIS	Section 7.4.3 of the RtS Report confirmed that the proposed facility was assessed against the applicable environmental planning instruments. Further, the amended EIS provided an assessment of the facility in the context of the applicable planning instruments.	Y
Arup (DGR)	Risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment	Table 11, Section 8 of the RtS Report refers the reader to Section 26 of the amended EIS.	Table 11, Section 8 of the RtS Report states that Chapter 26 of the amended EIS provides an environmental risk analysis for the project in accordance with AS/NZS ISO 31000:2009 *Risk Management - Principles and Guidelines* (Standards Australia 2009). Details on the risk descriptors have been provided, but details of the scale/level of impacts (eg description of risk levels) would benefit the risk assessment table.	P

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	Detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: a description of the existing environment, using sufficient baseline data; an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; and description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage significant risks to the environment;	Table 12, Chapter 9 of the RtS Report Section 27 of the amended EIS	The RtS Report provides a summary of the key issues specified below, including a description of the existing environment, assessment of potential impacts and consideration of applicable guidelines and policies in the context of submissions received. Mitigation measures were summarised in Table 12 Chapter 9 of the RtS Report. Assessment of staging options and cumulative impacts was provided in the amended EIS (refer Section 27).	Y
Arup (DGR)	Consolidated summary of all the proposed environmental management, mitigation and monitoring measures, highlighting all commitments included in the EIS.	Chapter 9, Table 12 of the RtS Report Section 27.3 of the amended EIS	Chapter 9, Table 12 of the RtS Report summarises the environmental management measures for the proposed development and refers the reader to Section 28.2 of the amended EIS, however, this is an incorrect report reference; rather Section 27.3 of the amended EIS details the environmental management measures for the Project. Where management measures have been amended for the Project based on project changes, these have been adequately higlighted in Chapter 9, Table 12 of the RtS Report. For construction noise monitoring in Chapter 9, Table 12 of the RtS Report, cross-referencing is not correct - not evident where details of noise monitoring are provided in the RtS Report. Applicable monitoring programs for construction and operation of the facility have been identified Chapter 9, Table 12 of the RtS Report.	P

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	The EIS must also be accompanied by a report from a qualified quantity surveyor providing: a detailed calculation of the capital investment value (CIV) of the development (as defined in clause 3 of the Environmental Planning and Assessment Regulation 2000), including details of all assumptions and components from which the CIV calculation is derived; a close estimate of the jobs that will be created by the development during construction and operation; and verification that the CIV was accurate on the date that it was prepared.	Section 6.5	The CIV report (Appendix C of the RtS Report) was updated to reflect the stage 1 development of the EfW facility. However, the updated CIV should have been discussed in the body of the RtS Report. It would be beneficial for the proponent to refer to this report in Chapter 8, Table 11 as well. Further details on operational staff, including training requirements and qualifications has been provided in Section 6.5 and Appendix X of the RtS Report. This appears to be sufficient to address details on skills requirements. However, given the changes in staging of the works (eg Stage 1 only), a revised construction employment estimate and any changes to the construction schedule should be provided in the RtS Report.	Y
Arup (DGR)	an assessment of the development against State Environmental Planning Policy (Western Sydney Employment Area) 2009;	Section 6.2.1.2 of the RtS Report Section 7.3 of the amended EIS	In response to submissions which raised concerns that the proposal is not consistent with the SEPP (WSEA) and associated precinct plan, the proponent has responded that the proposal is considered consistent with the SEPP WSEA (refer Section 6.2.1.2 of the RtS Report). The proponent indicates that it is not necessary for development categorised as State Significant to demonstrate consistency with local development control plans. Under the provisions of the EP&A Act, the provisions of a DCP are to be applied flexibly where it can be demonstrated that, despite a 'non-compliance', the proposal achieves the objectives of the control. The proponent discusses that the proposal will achieve the objectives of the control in Section 6.2.1.2.	Y
Arup (DGR)	A demonstration that the development is consistent with the Broader Western Sydney Employment Area draft Structure Plan 2013;	Section 6.2 of the RtS report Section 7.3 of the amended EIS	In respect of the revised proposal, Section 6.2 of the RtS Report would have benefited from a statement from the proponent indicating that the revised proposal is generally consistent with the structure plan as previously highlighted in Section 7.3 of the amended EIS.	P

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	Justification that the site is suitable for the proposed development;	Section 6.3.1	Submissions indicated that there were concerns with the consistency of the proposed development with existing land use and zoning. As highlighted in Section 6.3.1 of the RtS Report, Section 8.3.2.2 of the amended EIS demonstrated that the proposed development is consistent with the objectives of the IN1 General Industrial zone, and that no works are proposed to be undertaken within the E2 Environmental Conservation zone. It is also stated that the development would be categorised as 'electricity generating works' in the absence of other use definitions in the SEPP WSEA and would be considered 'Industry' under SEPP WSEA and permissible with consent under the provisions of the IN1 General Industrial Zone. It should be noted that there is a caveat around the definition of 'Industry' permitted with consent in the IN1 General Industrial zone, as the SEPP (WSEA) states that industries (other than offensive or hazardous industries) are permitted with consent. One submission was made on this basis, and the proponent has responded that where an Environment Protection Licence is required for the proposed development to operate, DPE must consult with the EPA when preparing environmental assessment requirements and when making a determination on the project proposal. If the approved SSD requires an EPL to operate, the EPA cannot refuse to issue an EPL if the SSD is approved. Given the proponents' expectation that all necessary EPLs would be obtained from the EPA, it is considered that the proposal is not a hazardous and offensive industry and therefore permissable with consent in the IN1 General Industrial Zone.	Y
Arup (DGR)	Demonstration that satisfactory arrangements have been or would be made to provide, or contribute to the provision of, the necessary local and regional infrastructure required to support the development.	Section 3.4 and Appendix I of RtS Report.	Proponent has identified that an amended subdivision plan has been developed to support the preparation of a VPA.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	Details on Boiler ash		Estimation of ash generation is presented in table 21 of the RtS project definition brief. Additional detail presented on boiler ash in 6.1.1 of the WMR (appendix J) to the amended EIS (Nov 2016).	Y
Arup (DGR)	a description of the classes and quantities of waste that would be thermally treated at the facility;		Fuel mix for the TNG facility is presented on page 15 of the RtS project definition brief, although this is only presented in percentage terms and not absolute tonnage quantities. The same information is presented in figure 11, section 4 of the RtS report.	P
Arup (DGR)	demonstrate that waste used as a feedstock in the waste to energy plant would be the residual from a resource recovery process that maximises the recovery of material in accordance with Environment Protection Authority Guidelines;		See comments in main Arup merit review (section 4) with regard to feedstock availability and review of the MRA feedstock review	P
Arup (DGR)	procedures that would be implemented to control the inputs to the waste to energy plant, including contingency measures that would be implemented if inappropriate materials are identified;		Appendix 2 to the project definition presents the TNG waste fuel quality assurance procedures. However, this procedure only applies to existing operations for the quality assurance of chute residual waste and not all planned waste streams that form the fuel mix for the TNG facility.	P
Arup (DGR)	details on the location and size of stockpiles of unprocessed and processed recycled waste at the site;		N/A	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	demonstrate any waste material (e.g. biochar) produced from the waste to energy facility for land application is fit-for-purpose and poses minimal risk of harm to the environment in order to meet the requirements for consideration of a resource recovery exemption by the EPA under Clause 51A of the Protection of the Environment Operations (Waste) Regulation 2005;		Composition of bottom ash has been based on (UK) energy from waste data taken from facilities processing MSW. Recommend that bottom ash is landfill until provided otherwise suitable for recovery.	Y
Arup (DGR)	procedures for the management of other solid, liquid and gaseous waste streams;		Residue handling of bottom ash, boiler ash, air pollution control residue and staff waste are detailed in section 6.10 of the project definition brief and section 6.6.4 of the RtS report. Initial identified licenced facilities open to accept APC residue have not been identified.	Y
Arup (DGR)	describe how waste would be treated, stored, used, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future offsite waste disposal methods;		Adequate descirptions of how feedstock waste will be treated, stored, used and disposed of on site are provided. See above for comments on residues from incineration treatment process.	Y
Arup (DGR)	identify the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2007.		N/A	

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	a quantitative assessment of the potential air quality and odour impacts for the development on surrounding landowners and sensitive receptors under the relevant Environment Protection Authority guidelines;	Sections 6.11, 6.12 and 6.20, Appendix O and Q of RtS Report Amended EIS Sections 11 & 17	Appendix O concludes that the quantitative assessment of potential risks to human health from air and particulates (dust) were considered to be low and acceptable for most complete exposure pathways. A revised odour assessment was provided as Appendix Q of the RtS Report and concludes that odour concentrations would be below the applicable impact assessment criterion at all sensitive receptors.	Y
Arup (DGR)	a description of construction and operational impacts, including air emissions from the transport of materials	Sections 6.11, 6.12 and 6.20 and Appendix N	Section 6.20 of the RtS Report addresses fugitive (principally odour) emissions and outlines that any impacts are manageable through the various plant management measures to be adopted by the Project. Section 6.12 of the RtS Report provides an update to the air quality assessment on receipt of submissions. Updates to the scenarios and modelling has indicated that in the 'upset' scenario in the event of plant failure, the probability of exceedances of NSW impact critiera are extremely low and no exceedances were noted when the contribution of the EfW facility is added to the maximum background. Emissions from trucks entering the site and other construction emissions are adequately described in Section 6.11 and 6.12 of Appendix N. A Dust Management Plan for the construction phase is recommended in Section 6.12.3 of Appendix N, however, it doesn't appear to be summarised in Chapter 9, Table 12 of the RtS Report. All management measures should be summarised in a consolidated list as required by the SEARs.	Y
Arup (DGR)	a human health risk assessment covering the inhalation of criteria pollutants and exposure (from all pathways i.e., inhalation, ingestion and dermal) to specific air toxics	Sections 6.11, 6.12 and Appendix O of the RtS Report	Section 6.11 of the RtS Report indicates that the HHRA has been updated to address the concerns raised by submissions demonstrating that the calculated hazard risk is acceptable for the EfW facility. Appendix O concludes that the qualitiative assessment of potential risks to human health from odour, noise, ozone, hazards and soil and water were considered to be low and acceptable and did not warrant quantitative assessment within the risk assessment.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	details of any pollution control equipment and other impact mitigation measures for fugitive and point source emissions	Section 6.11.1 of the RtS Report and Section 9.1 and 9.2 of Appendix N of the RtS Report	Section 6.11.1 of the RtS Report states that irrespective of the air pollution control system, the contribution of an EfW facility to the PM2.5/nanoparticles ground level concentration is negligible. Appendix N also notes that there is an overall improvement in the ground level concentration predictions for both criteria pollutants and air toxics compared to the previous studies undertaken for the EIS and is now a single stack source and an effective halving of the predicted mass emission rates from the facility. In addition, a summary of best available technologies (BAT) has been provided in Section 6.1 of Appendix N.	Y
Arup (DGR)	a demonstration of how the waste to energy facility would be operated in accordance with best practice measures to manage toxic air emissions with consideration of the European Union's Waste Incineration Directive 2000 and the Environment Protection Authority's draft policy statement NSW Energy from Waste	Section 6.12.3 of the RtS Report	Section 6.12.3 of the RtS Report states that the proponent has developed the design and operational parameters of the EfW facility to meet the key performance requirements outlined in the relevant environmental, operational and safety requirements of Australian and NSW regulatory frameworks, with the expected emissions to be produced by the EfW facility as defined by emission limits for waste incineration set by the European Union's Industrial Emissions Directive. The best available technology (BAT) for flue gas treatment has been adopted for the project, and appears to have been designed to meet the in-stack concentration limits for waste incineration set by the EU IED and the POEO Clean Air Regulations requirements of the EPA EfW Draft Policy Statement.	Y
Arup (DGR)	an examination of best practice management measures for the mitigation of toxic air emissions	Section 6.1 of Appendix N of the RtS Report	Section 6.1 of Appendix N provides a summary of the BATs used to control emissions in similar overseas facilities. In addition, general controls and procedures have been proposed for the EfW facility in accordance with good practice from overseas examples.	Y
Arup (DGR)	details of the proposed technology and a demonstration that it is technically fit for purpose	Section 6.12 and Appendix N of the RtS Report	Appendix N states that the EfW facility will incorporate best available technology (BAT) for flue gas tratment based on existing facilities in the United Kingdom and Europe. Details on the flue gas treatment is provided in Section 2.2 of Appendix N.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	description of all potential noise sources such as construction, operational, on and off-site traffic noise;	Section 6.16 and Appendix P of the RtS Report	Section 6.16 and Appendix P of the RtS Report provides a revised Noise and Vibration Impact Assessment conducted for Stage 1. In response to submissions, the revised assessment addresses cumulative impacts and low frequency noise and provides further justification for out of hours work.	Y
Arup (DGR)	a quantitative noise impact assessment including a cumulative noise impact assessment in accordance with relevant Environment Protection Authority guidelines	Section 6.16 and Appendix P of the RtS Report	The revised Noise and Vibration Impact Assessment provides an assessment of cumulative noise and covers the applicable EPA guidelines and appears to meet the amenity criteria under the Eastern Creek Precinct Plan.	Y
Arup (DGR)	Details of noise mitgation, management and monitoring measures	Section 6.16 and Appendix P of the RtS Report	Section 6.9 of Appendix P provides a summary of the noise mitigation and management measures, while Chapter 9, Table 12 of the RtS Report summarises the construction and operation noise management measures as required by the SEARs.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	description of the water demands and a breakdown of water supplies	Section 6.10.2 and Appendix H of the RtS Report	While Section 6.10.2 of the RtS report states that the revised Civil Infrastructure Report (Appendix H of the RtS Report) discusses water availability, consumption rates and demand, Appendix H of the RtS Report does not discuss construction water availability, rates and demand. Updated construction water requirements should be provided for the revised proposal. It is noted that construction water was discussed in Section 4.6.9 of the amended EIS; however, it is anticipated that these figures would change as a result of the revised proposal. Section 7.2.5 of Appendix H (Civil Infrastructure Report) states that consultation with Sydney Water indicates that while SEPP 59 (for the Eastern Creek Precinct) states there are concerns with capacity and elevations for potable water connection, there is unlikely to be an issue with constant 7l/s connection to facilitate project operations, but that this would be confirmed through a Section 73 application.	P
Arup (DGR)	description of the measures to minimise water use	Section 9, Table 12 of RtS Report Section 16.4.7.4 of the Amended EIS	Options for water capture and re-use were discussed in Section 16.4.7.4 of the amended EIS. Measures to minimise water use are summarised in Section 9, Table 12 of the RtS Report.	Y
Arup (DGR)	a detailed water balance	Section 7.2.2 of Appendix H of the RtS Report Section 16.4.7.1 of the Amended EIS	Section 16.4.7.1 and Appendix P of the amended EIS and Section 7.2.2 of Appendix H of the RtS Report provides details on water demand and discharges for the EfW facility.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	description of the construction erosion and sediment controls	Section 9, Table 12 of RtS Report	The proponent states that they will prepare a detailed Erosion and Sediment Control Plan (ESCP) for the construction phase of the project in accordance with applicable standards.	Y
Arup (DGR)	a description of the surface and stormwater management system, including on site detention, and measures to treat or reuse water	Section 6.10.1 and Appendix H of the RtS Report	As part of the RtS Report, Section 6.10.1 discusses that stormwater management parameters have been updated to reflect the changes to the facility design and location of fill pads (detailed in revised Civil Infrastructure Report at Appendix H). The proponent states that the revised Civil Infrastructure Report confirms that a stormwater system consistent with good management practices can be provided for the proposed development.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	an assessment of potential surface and groundwater impacts associated with the development including the details of impact mitigation, management and monitoring measures	Section 6.10, Section 9 (Table 12), Appendix H and Appendix BB of RtS Report Section 16.4 of the amended EIS	Appendix BB of the RtS Report provides an assessment of the current perched groundwater and surface water beneath and adjacent the site and was found to not currently be impacted by the site (or adjacent sites). It is noted that Chapter 8, Table 11 does not refer to Appendix BB as providing further information on the SEARs. A reference to this Appendix should be made in Table 11 of the RtS report. Section 6.10 and Appendix BB of the RtS Report provides details on a revised perched groundwater and surface water assessment for the Stage 1 proposal in response to submissions. Section 16.4 of the amended EIS provides an assessment of the potential surface and groundwater impacts associated with the project. It is noted that in Section 9, Table 12, surface and groundwater management measures are detailed for the project. Table 12 also states that monitoring of groundwater surrounding the waste bunkers and a surface water quality monitoring program would be undertaken. Section 6.10.4 and Appendix H of the RtS Report identifies that the proposed flood levels of the creek to the south of the site do not adversely affect the proposed site, given that flood levels associated with the creek are at least 2m below the proposed finished levels of the site.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	an assessment of any potential existing soil contamination	Section 9, Table 12 of the RtS report Section 16.4.1 of the amended EIS	Management measures for contamination are detailed in Section 9, Table 12 of the RtS report. Section 16.4.1 of the amended EIS confirmed through a detailed site investigation that chemical concentrations detected in the soil were within the NEPM Guidelines for continued industrial use.	Y
Arup (DGR)	details of traffic types and volumes likely to be generated during construction and operation	Section 6.18 and Appendix U of the RtS Report Section 18.5.4 and 18.5.5 of the amended EIS	Section 6.18.1 of the RtS Report provides a response to community concerns regarding the impact of additional truck movements in the context of the Stage 1 development. Appendix U of the RtS Report provides a letter confirming that the Stage 1 development only would result in a reduction in trips and resultant traffic generation. In addition, the reduction in development traffic volumes indicated that the intersection of Wallgrove Road and Wonderland Drive would continue to operate with an unchanged and acceptable LOS. Section 6.18.2 of the RtS Report indicates that 43 car-parking spaces would be provided for the project and that no anticipated impact is expected to arise due to overflow parking demand. Section 18.5.4 and 18.5.5 of the amended EIS provided an assessment of traffic impacts on the external road network during construction and operation. Section 18.5.5.3 of the amended EIS provided an assessment of the vehicle movements associated with ash residues.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	an assessment of the predicted impacts of this traffic on the safety and capacity of the surrounding road network and a description of the measures that would be implemented to upgrade and/or maintain this network over time	Section 6.18 and 9 and Appendix U of the RtS Report Section 18.5 of the amended EIS	Section 18.5 of the amended EIS provided an assessment of the potential impacts of traffic on the surrounding road network. It was confirmed by the proponent in Section 6.18 of the RtS Report, based on public submissions, that due to the Stage 1 development, traffic impacts are unlikely to impact on the capacity of the existing road network. This is confirmed in a letter by Traffix in Appendix U of the RtS Report. Chapter 9, Table 12 of the RtS Report confirms that a Construction Traffic Management Plan would be prepared prior to construction. In addition, the proponent confirms that car-parking and access will be designed and constructed in accordance with relevant Australian Standards.	Y
Arup (DGR)	details of key transport routes, site access, internal roadways, infrastructure works and parking	Section 6.18 of the RtS Report	General discussion of these issues is provided in Section 6.18 of the RtS Report. Key transport routes and site access was assessed as part of the amended EIS.	Y
Arup (DGR)	detailed plans of the proposed layout of the internal road network and parking on site in accordance with the relevant Australian standards	Appendix U of the RtS Report	Appendix U of the RtS Report confirms that access arrangements remain unchanged and do not affect the swept path analysis undertaken in the original TIA. The proponent confirms that internal manoeuvrability remains compliant with applicable Australian standards.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	including an assessment of the potential impacts to threatened species, populations and communities, and their habitat(s)	Section 3.2.2 Section 6.9 and Chapter 9 Table 12 and Appendix G	Section 3.2.2, Section 6.9, Table 12 and Appendix G of the RtS Report : Vegetation clearing impacts have been reduced and letters provided from Abel Ecology (Appendix G Offsets Strategy) summarises the responses to OEH comments. The letters state that impacts are reduced and offsets areas do not include riparian areas, as per consultation with OEH. The proposed offset strategy proposes 18.9 credits to offset the vegetation removal and would: - Purchase HN528 and/or HN526 credits available publicly for other sites, as available - Use the published and accepted methods e.g. NSW Biodiversity Offsets Policy for Major Projects (OEH September 2014) and Biobanking Methodology to generate offsets on the site in areas not proposed for development.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	if required describe how the principles of "avoid, mitigate, offset" have been used to minimise the impacts of the proposal on biodiversity	Section 3.2.1, 6.9 and 9 (Table 12) and Appendix G2 of the RtS Report	Section 3.2.1 of RtS Report discusses a reduction in impact to River Flat Eucalypt Forest (RFEF) due to reduced laydown pads required for the construction and ongoing maintenance/servicing of the facility. Mitigation measures are detailed in Chapter 9, Table 12 of the RtS Report and include an update based on the reduction in impact to vegetation. Section 6.9 and Appendix G2 of the RtS Report outlines the proposed offset strategy of a revised figure of 18.9 credits to offset the vegetation removal, achieved by a mix of the following methods: 1. Purchase HN528 and/or HN526 credits available publicly for other sites as available. 2. Use the published and accepted methods eg: *NSW Biodiversity Offsets Policy for Major Projects* (OEH September 2014) and *Biobanking Methodology* to generate offsets on the site areas not proposed for development. The proponent notes in Appendix G2 of the RtS Report that some components of the land south of the development footprint (edge of laydown pads) could be biobanked to provide protection and management in perpetuity and the proponent would undertake all reasonable attempts to secure offsets and document accordingly.	Y
Arup (DGR)	an assessment of the proposed building height, scale, signage and lighting, particularly from nearby public receivers and significant vantage points of the broader public domain	Section 6.15 and Appendix S of the RtS Report	Appendix S provides a revised Visual Impact Assessment to reflect the Stage 1 development. It includes additional assessment locations and visualisations and appears to provide a more comprehensive representation of the impacts from a variety of viewpoint locations. Section 5 of Appendix S discusses construction material selections, visual screening and management of lighting impacts, while Section 6.15.1 of the RtS	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
			Report provides a summary of the architectural design of the EfW facility.	
Arup (DGR)	details of design measures to ensure the project has a high design quality and is well presented, particularly in the context of the broader Western Sydney Employment Area	Section 6.15 and Appendix S of the RtS Report	Details of mitigation measures, such as construction material selection, visual screening and lighting management measures are provided in Section 5 of Appendix S and are summarised in Section 6.15.2 of the RtS report. Chapter 9, Table 12 of the RtS report provides mitigation measures that address the context of the WSEA.	Y
Arup (DGR)	consideration of any impact on flight paths	Section 6.15 and Appendix S, L and W of the RtS Report	Appendix W provides an update on the assessment of flight paths in the context of the Stage 1 development. It was determined that no further impacts were noted with regards to assumptions made for Western Sydney Airport. Consideration of bird strike and monitoring in accordance with applicable frameworks was also discussed in Section 6.17.2 of the RtS Report and noted as a mitigation measure in Chapter 9, Table 12 of the RtS Report.	Y
Arup (DGR)	a detailed photo-montage based analysis of the visual impacts of development and emissions stacks	Section 4 of Appendix S	Section 4 of Appendix S provides photo-montage analysis for Stage 1.	Y
Arup (DGR)	a full greenhouse gas assessment (including an assessment of the potential scope 1, 2 and 3 greenhouse gas emissions of the project, and an assessment of the potential impacts of these emissions on the environment	6.13 and Appendix N of the RtS Report	An updated greenhouse gas assessment has been provided by the proponent for Stage 1 of the EfW facility to address concerns from submissions on the amended EIS. The revised GHG assessment concluded that Stage 1 of the EfW facility would have a net positive GHG impact. This is also the same for the 'upset' scenario, with emissions a non-factor for the EfW facility.	Y

DG Requirement	Environmental Assessment Requirements / General Requirements	RtS Report Section	RtS Report (September 2017) Review Comments - Jan 2018	Merit against TOR (Y/N/Partial)
Arup (DGR)	a detailed description of the measure that would be implemented on site to ensure that the project is energy efficient	6.13 and Appendix N of the RtS Report	Section 10.3.5 of Appendix N provides estimation of net GHG emissions, while Section 4 provides benchmarking against major NSW generators.	Y
Arup (DGR)	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000*. These documents should be included as part of the EIS rather than as separate documents.	Section 3, Appendix D, E and H of the RtS Report	Section 3 of the RtS Report provides details on the proposed project amendments for the Stage 1 development. Revised plans, project definition brief and architectural plans are provided as appendices to the RtS Report to cover off on changes to the Stage 1 development.	Y

Arup (DGR)	During the preparation of the EIS, you should consult with the relevant local, State and Commonwealth Government authorities, service providers, community groups or affected landowners. In particular, you must consult with: - Environmental Protection Agency - Blacktown City Council - NSW Health - WorkCover NSW - Department of Primary Industries, including the NSW Office of Water - NSW Roads and Maritime Service - Office of Environment and Heritage (including the Heritage Branch) - NSW Fire Brigade - Rural Fire Service - Transgrid/Endeavour Energy - Civil Aviation Safety Authority - local community and other stakeholders. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.	Section 6.4.1, 6.10.3 and Appendix H of the RtS Report Chapter 6 of the amended EIS	Section 6.4.1 of the RtS Report outlines that the proponent undertook public exhibition and consultation in accordance with the requirements of the EP&A Act with standard exhibition timeframes. The public exhibition and consultation period for this project appears to have complied with the minimum 30 day exhibition requirement for SSD applications under the EP&A Act. The proponent should note that the *NSW Energy from Waste Policy Statement* (NSW EPA 2015) recommends that during design development, an effective stakeholder and community consultation programme should be undertaken to develop an understanding of the resource recovery outcomes and to manage any perceived impacts. What about ongoing community consulation for the project? However, there appears to be gaps in the number of stakeholders that were consulted with during the preparation of the RtS Report. From the list of stakeholders in Table 8 of Section 6.4.1, it was not indicated whether NSW Health, WorkCover NSW, Department of Primary Industres (including NSW Office of Water), NSW Roads and Martime Service, NSW Fire Brigade, Rural Fire Service, Transgrid/Endeavour Energy and Civil Aviation Safety Authority were consulted with during RtS report preparation. However, on review of Chapter 6 of the amended EIS, it was noted that the following stakeholders were consulted: - EPA; Blacktown City Council; Penrith City Council; Work Cover NSW; DPI, including NSW Office of Water; NSW RMS; OEH; Heritage Branch; NSW Fire Brigade; Rural Fire Service; TransGrid; Civil Aviation Safety Authority; NSW Health; and DIRD. An update on any recent consultation with the stakeholders nominated in the SEARs would have been beneficial to the discussion. Appendix H Civil Infrastructure Report details the consultation undertaken with Sydney Water by Land Partners. Section 6.10.3 states that TNG has entered into a Connection Investigation and Negotiation Agreement (CINA) to enable	P

			TransGrid to provide an Offer to Connect to the high voltage transmission network, via TransGrid's existing Sydney West 330/132kV substation.	

Appendix C

Technical Note on key EIS observations

Technical Note

ARUP

To	Joyanne Manning Giles Prowse	Date	29 January 2018
Copies		Reference number	239880-03
From	Amy Flinn	File reference	
Subject	SSD6236: Energy from Waste, Eastern Creek RtS		

Arup reviewed the DADI Energy from Waste, Eastern Creek, Response to Submissions (RtS) Report in the context of the requirements detailed in the Secretary's Environmental Assessment Requirements (SEARs).

Arup has identified some partial inadequacies or missing information including:

- Cumulative impact assessment
- Risk assessment levels and methodology
- Further community consultation.

These items are discussed in further detail below.

1 Cumulative impact assessment

1.1 General assessment

While it is noted that Section 27 of the Amended EIS assessed the cumulative impacts of the proposed development, the RtS Report would have benefited from providing commentary on whether the cumulative impacts previously assessed in Section 27 of the Amended EIS have changed as a result of the revised Stage 1 proposal.

Section 27 of the Amended EIS assessed cumulative impacts generally of projects within the immediate vicinity of the proposed EfW facility (eg Hanson's site, ongoing development of sites within the Eastern Creek Precinct (Jacfin, Australand, the Department of Planning and Environment (DP&E) and Sargents), and general urbanisation in the broader Western Sydney Employment Area (WSEA)). Table 99 of the Amended EIS provided a cumulative impact identification matrix that summarised the types of likely impacts to these sites/projects and provided further detail in the sections below.

The cumulative impact assessment would have been strengthened in the Amended EIS and subsequently in the RtS Report by including projects from a larger radius from the site, such as the nearby M4 Smart Motorway project, with a particular focus on cumulative traffic and noise impacts.

1.2 Specific environmental issues assessment

It is noted that the RtS Report provides commentary on specific cumulative impacts by environmental issue in response to a particular submission, rather than a consolidated 'Cumulative Impact Assessment' chapter that assesses and summarises the cumulative impacts as a result of the Stage 1 development.

When considering specific environmental issue cumulative impacts in the RtS Report, the proponent has provided revised assessments of cumulative effects in regards to the following environmental issues:

- Air quality
- Noise
- Human Health Risk Assessment (HHRA) with respect to dioxins and furans impact
- Traffic
- Odour

The suitability of these revised assessments with respect to the SEARs requirements are summarised in Table 1 below.

Table 1 Suitability of revised assessments of cumulative effects by environmental issue

Report Reference	Cumulative effect assessed	Assessment findings
Appendix N, Section 9.2 and Section 7.2 of the RtS Report	Air Quality	• A revised Air Quality Assessment (Appendix N) updated the background air quality data to assess the Stage 1 proposal only and considered the cumulative impacts. Under various scenarios, the proponent provided a conservative estimate of cumulative impact as it was determined from the modelling that the probability of a maximum observed value occurring at the time of a maximum predicted value was very small. The revised Air Quality Assessment found that there were no exceedances of the NSW EPA criteria when the EfW facility contribution was added to the maximum background levels. • Section 7.2.7 of the RtS Report identified that the EfW Facility would expect a maximum 126 additional trucks added to the road network and would have a non-discernable difference in local air quality in the context of the nearby M4 and M7 motorways. • The proponent determined that the cumulative air quality impact was minimal, with no exceedances of the NSW EPA criteria when the EfW facility contribution is added to maximum background concentrations under expected operating conditions. The revised assessment of the Stage 1 facility appears to be appropriate in response to the SEARs requirements.
Appendix P, Section 6.7 and	Noise	• The cumulative noise impact of the development has been revised based on the assumption of Stage 1 only according to the Industrial Noise

Report Reference	Cumulative effect assessed	Assessment findings
Section 6.16 of the RtS Report		Policy's (INP) amenity criteria. The cumulative noise of the EfW facility and the Hanson development was determined to comply with the amenity criteria and the Eastern Creek Precinct Plan goal of 39 dB. The cumulative effect of the EfW facility with the Genesis Xero Waste Facility and Hanson Asphalt Batching Plant were determined at a worst case of 55 dB(A) at the southern boundary of the proposed EfW facility. • The proponent indicated that adverse operational cumulative noise impacts would not be expected. • The RtS Report concluded that the Stage 1 noise levels for cumulative noise were well within the required noise criteria, with the assessment appearing to be appropriate in response to the SEARs requirements.
Appendix O and Section 7.1.5 of the RtS Report	Dioxins and furans assessed in the HHRA	• The RtS Report provided an updated HHRA as Appendix O and summarised the cumulative impact assessment of criteria pollutants (including dioxins and furans) and determined no exceedances of the Department of Environment and Conservation Criteria (2005) *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* when the EfW Facility contribution was added to the maximum background concentrations. The revised assessment appears to be generally appropriate in response to the SEARs requirements.
Appendix U and Section 7.6.1 of the RtS Report	Traffic	• The proponent indicates in Section 7.6.1 of the RtS Report that traffic generated by the Stage 1 proposal represented a small proportion of traffic generated by the wider Western Sydney area, and that it was unlikely to have a significant impact on the ability of the surrounding road network to operate at an acceptable level into the future. It is also indicated that the operation of the EfW facility would maintain the Level of Service (LoS) B at the intersection of Wallgrove Road and Wonderland Drive. • The proponent concludes in Appendix U that the amended Stage 1 proposal represents a significant reduction in traffic generation on the external road network compared to the original proposal and that the Stage 1 proposal is therefore considered appropriate from a traffic planning perspective. • Section 7.6 of the RtS Report notes that there were several submissions concerned that the proposal had not considered the cumulative impact on road congestion with the proposed airport. While the proponent does not specifically refer to the proposed airport in their response, the general conclusion of Section 7.6 was that the proposed development would represent only a small proportion of the traffic generated by the wider Sydney area. • However, a cumulative traffic assessment in the context of larger developments in the area, including consideration of the combined effects of traffic generation for the M4 and M7 motorway projects and

Report Reference	Cumulative effect assessed	Assessment findings
		the proposed airport, would have strengthened the cumulative traffic impact assessment for the Project.
Appendix Q and Section 7.7.1 of the RtS Report	Odour	• In response to submissions on the Odour Assessment submitted with the Amended EIS, the cumulative assessment of odour sources was updated in Appendix Q of the RtS Report. On review of the existing and proposed odour sources on the site, the proponent predicted that the odour concentrations would be below the impact assessment criterion for all sensitive receptors. • As discussed in Section 6 of Appendix Q, the cumulative odour emissions from the Project were based on odour monitoring completed for the Genesis facility. Appendix Q assumed that the EfW facility would divert some of the residual waste currently being landfilled at the Genesis facility and would consequently reduce potential odour sources within the landfill area. However, the extent to which the abatement would be achieved has not been quantified as part of this assessment. Quantification of this would have strengthened the cumulative odour impact assessment. • The proponent confirms in the RtS Report that the EfW facility is unlikely to result in an unreasonable adverse off-site odour impact.

1.3 Recommendations

The RtS Report would have benefited from including a summary of the cumulative impacts associated with the revised Stage 1 proposal. While the proponent did provide an update on the cumulative impacts by applicable environmental issue, the RtS Report would have been strengthened by a dedicated section of the report providing:

- a statement that cumulative impacts of the Stage 1 proposal have reduced from the previous iteration of the proposal
- a consolidated summary of the cumulative impacts identified for the project
- any management measures to address these impacts.

The RtS Report would have been further strengthened by including projects from a larger radius from the site, such as the nearby M4 and M7 motorway projects and the proposed airport, particularly in relation to cumulative traffic and noise impacts.

One further item that would have strengthened the cumulative odour assessment would be to quantify the proposed diversion of residual waste from the Genesis facility to the EfW facility and assess the consequent impact this would have on odour emissions, not just within the landfill area, but the EfW facility site as well.

2 Risk assessment levels and methodology

As required by the SEARs, *"a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment"* was to be provided in the EIS.

In Section 8, Table 11 of the RtS Report, the proponent states that the environmental risk assessment requirements of the SEARs have been addressed in Section 26 of the Amended EIS, while no further attachments have been provided in support of the revised Stage 1 proposal in the RtS Report. A number of shortcomings with the environmental risk assessment were identified upon review of the RtS Report and the Amended EIS, which are discussed further below.

2.1 Risk assessment shortcomings

It is considered that in the context of the revised Stage 1 proposal, the level of risk may have changed, and consequently should have been re-assessed as part of the RtS Report given the change in scale of the development.

It is understood that the Amended EIS environmental risk assessment (Section 26) was undertaken in accordance with the SEARs' nominated standards and guidelines (eg AS/NZS 4360:2004 Risk Management (Standards Australia) and HB 203:203:2006 Environmental Risk Management – Principles & Process (Standards Australia)). However, upon review of Section 26 of the Amended EIS, it appears that while the risk descriptors have been provided, details on the scale and level of impacts (eg description of risk levels of very low, low, medium and high) have not been provided.

For the RtS Report, the environmental risk assessment should have been updated in the context of the revised Stage 1 proposal, and would have benefited from defining the risk levels. HB 203:203:2006 Environmental Risk Management – Principles and Process recommends a process to determine risk level definitions for a project. By defining the risk levels, this would have enabled the reader to understand the actual definition of the risk level, rather than inferring it from their reading of the environmental assessment.

A further element that would have strengthened the environmental risk assessment would be to provide a residual risk assessment for any risk levels listed as medium or high prior to treatment. This would have enabled a residual risk level to be ascribed to any impacts that demonstrate an improvement in the risk level post-treatment with the application of mitigation measures in accordance with the process recommended in HB 203:203:2006 Environmental Risk Management – Principles and Process.

2.2 Recommendations

While it is noted that Section 26 of the Amended EIS provided an environmental risk assessment for the project, the RtS Report did not provide any further environmental risk assessment attachments in support of the revised Stage 1 proposal. It is considered that the environmental risk assessment in Section 26 of the Amended EIS is not current in the context of the revised Stage 1 proposal and would benefit from an update through the RtS Report. The following items are recommended to strengthen the assessment:

- An update to the environmental risk assessment in the context of the revised Stage 1 proposal, given the change in scale of the development
- Define the risk level descriptions for very low, low, medium and high in accordance with the process recommended in HB 203:203:2006 Environmental Risk Management – Principles and Process
- Undertake a residual risk assessment for any risk levels listed as medium or high prior to treatment. This would demonstrate an improvement in the risk levels post-treatment with the application of mitigation measures.

3 Further community consultation

The RtS Report provides a summary of the community consultation undertaken since the preparation of the amended EIS up to May 2017. It is noted that public exhibition and consultation of the EfW facility has been undertaken in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* (EP& Act).

3.1 Community consultation program

While Section 6 of the Amended EIS provided an overview of the consultation undertaken for the project to date (covering pre-lodgement engagement, outcome of formal exhibition of original EIS) and the RtS Report summarised the consultation undertaken between the submission of the amended EIS up to May 2017, the RtS Report did not provide a summary of the community consultation undertaken between May 2017 and the date of submission of the RtS Report to DP&E.

In addition, the RtS Report did not provide a summary of the planned consultation (in the form of a Community Engagement Plan or similar) post-RtS Report throughout the project lifecycle, from agency negotiation and project approval, to construction, and operation.

3.2 Recommendations

The RtS Report would have benefited from a discussion of the planned consultation post-RtS Report. In addition, a summary of the community consultation undertaken between May 2017 and the date of submission of the RtS Report to DP&E should have been provided. Any further proponent documentation should include details on further community consultation (eg details of a Community Engagement Plan or similar) for ongoing consultation on the project.

Appendix D

Noise assessment review

Memorandum

ARUP

To	Giles Prowse	Date	25 January 2018
Copies	Click here to enter text.	Reference number	Click here to enter text.
From	Simon Ham	File reference	Click here to enter text.
Subject	Review of Noise Impact Assessment for Energy from Waste Facility, Eastern Creek (SSD 6236)		

In response to your email request received on 18th January 2017, this memorandum summarises the findings from a review undertaken of the Noise Impact Assessment Report by Pacific Environment Limited dated 21 August 2017 in relation to the Energy from Waste Facility, Eastern Creek (SSD 6236) Project.

In the review, it was noted that the noise assessment is based on a previous operational design, and therefore the noise assessment is not consistent with the current project design brief (Rev10) or current architectural layouts.

The consequence of this is that the noise assessment assesses some operational plant that has been removed in the current design and as such is likely to slightly over-predict operational noise levels providing an element of conservatism.

However, this lack of consistency begs the question of does the noise input data associated with the design change have an impact on the remaining plant selections and hence the validity of noise data used in the noise assessment.

The approach to assessing construction noise is generally conservative in reportedly assuming that all plant will operate simultaneously and at the closest location to noise sensitive properties, this is an unlikely situation in practice and as such likely to result in an over-prediction of construction noise.

The road traffic noise assessment is good in so far as it goes, however, it is missing the second part of the assessment criteria, absolute noise limit assessment.

The report contains mention of noise mitigation, but at the same time provides no definition of what mitigation will be provided, this should be clearly defined.

The consequence of these factors results in conclusions drawn in the noise assessment that should not be relied upon and it is recommended that the noise assessment should be updated to reflect the current proposed development and comments provided below.

The following sections of this memo present a summary of the review comments.

Memorandum

Noise Impact Assessment Report Rev 11, 21 August 2017

Section	Description	Comment
2.2.1 - Overview	Report refers to the Project Definition Brief (rev 4a) to define the plant that is assessed.	The Project Definition Plan is currently at Rev 10 according to the information provided as part of this review. This suggests that the operational noise assessment requires updating to account for changes to the current Project Definition Brief.
2.2.1 – Overview & 2.2.2 – Proposed operations	Description of stage 1 construction and operation bullets and buildings.	The noise assessment identifies differing buildings and quantities of processes to that defined in the architectural drawings dated 21/09/17 & the project definition brief dated 29/09/17. This further indicates that the noise assessment is based on an outdated proposal for the facility and as such needs updating to reflect the current proposals. It is noted that the noise assessment assumes more plant than the current proposal, as such this indicates that the noise assessment may be conservative and over predict assuming the plant assessed in the noise assessment is consistent with the latest proposal as shown in the project definition brief and architectural drawings.
4.1 – Construction noise	Project construction noise criteria	The defined construction noise management noise levels for the Project are consistent with the NSW Interim construction noise guideline (DECCW 2009) and represent current best practice.

Section	Description	Comment
4.2.3 – Project specific operational noise levels	Project operational noise criteria	These have been checked and based on available information are consistent with statutory noise limits.
4.5 – Sleep disturbance	Sleep disturbance criteria	It is noted that the criteria defined is based on a screening criterion s identified in the INP application notes in the absence of further and definite research. This suggests that the extensive research on sleep disturbance undertaken by the World Health Organisation and the recommended noise criteria (refer to Night Noise Guidelines for Eurpoe) have not been considered fully in setting the sleep disturbance criteria for the Project. It is also noted that the sleep disturbance criteria defined for the Project is in an LA1 parameter which is a reasonable representation of a maximum event level. The WHO guidance clearly defines health effects in terms of both a period noise level and an event related noise level. It is recommended that sleep disturbance criteria are developed taking account of this detailed research by WHO to define appropriate noise criteria for sleep disturbance.

Memorandum

Section	Description	Comment
Table 5-2	Hours. It is noted that a number of activities are identified as requiring outside standard hour works	For assessment purposes this is fine, however, these activities should be more tightly constrained by limiting as follows: 1) Activities at risk of continuing beyond standard working hours dur to requirement of the process i.e. large continuous concrete pours, slip-forming, etc should only commence at the beginning of standard hours and Monday to Friday only in order to minimise the continuation of works beyond standard hours. 2) With regard to the EFW technology provider plant installation and façade / roofing installation, outside of working hours may only be undertaken where essential due to over-sized deliveries or a process that must be continuous in construction for safety reasons in addition to being limited to 45 days at most over 18 months. Where activities outside of standard hours are required, activities must be sequenced to provide respite period to residents.

Section	Description	Comment
5.5 – Construction Noise Management	Noise mitigation – Erskine Park	There is nothing that commits the Project to provision of noise mitigation. Erskine Park is predicted to experience impacts. Given the duration of works combined with predicted impacts and outside standard hours working a commitment should be made to providing an acoustic barrier to control construction noise from the site in the direction of Erskine Park. The noise barrier should be installed at the earliest opportunity and could be used to form the permanent site boundary.
6.1 – Mitigation considerations in Project Design	Design Mitigation measures	This section is unclear whether mitigation has been incorporated in the design or whether it has been investigated. Please clearly define what noise mitigation measures have been included in the design.
6.5 – Operational noise assessment	Noise corrections	It is noted that the 5 dB(A) Correction for tonal, intermittent, impulsive or low frequency noise characteristics has not been adopted in the assessment. Energy to waste facilities typically give rise to distinct characteristic noise emissions different to the surrounding environment, for example turbine noise, pressure release safety valve blow off, high pressure steam line, blowers, compressors, etc. Noise sources such as these are normally considered to attract the 5 dB(A) weighting accordingly for assessment.

Section	Description	Comment
6.7.2 – cumulative impacts in Eastern Creeek Business Park	Cumulative noise levels – what are the	There is a description of other noise emitting developments that are considered to contribute cumulatively to noise, however, there is no definition of the noise contribution from each within which to validate the assertion that 55dB(A) is to be expected. Please define.
6.8 Health impacts	Current guidance	Reference is made to the WHO guidelines for community noise (WHO 1980). This guidance has been superseded and significant further research undertaken with revised guidance on noise impacts provide by WHO in the Night Noise guidelines for Europe (2009), this defines many parameters regarding impacts of noise on health and defines current criteria. Assessment should be updated to take due account.
6.9 - Operational Noise Mitigation, Management and Recommendations	Noise mitigation	This section asserts that noise mitigation measures have been incorporated into the design and refers to section 6.1 and appendix E, both of which define noise management procedures, but not noise mitigation. Please define noise mitigation measures incorporated into the Project.

Section	Description	Comment
7.2 – Traffic Volumes	Traffic Noise prediction	The statements about change in traffic volume relative to change in traffic noise associated with it are correct, it is an insignificant number of vehicles associated with the development compared to existing traffic, therefore the change in noise level will be insignificant. However, this only addresses the change in noise level aspect of traffic noise criteria. What it doesn't address is the absolute traffic noise criteria. In order to determine compliance with the absolute noise criteria it will be necessary to undertake calculations (spreadsheet or more commonly noise modelling) to determine the absolute road traffic noise levels and hence determine if compliance with criteria is achieved. This should be undertaken to meet the traffic noise assessment requirements.
General	Compliance and conclusions	Based upon the comments above certain elements of this assessment require additional work to fully assess compliance of the development, impacts and necessary mitigation. Consequentially the conclusions drawn from the current noise assessment cannot be relied upon wholly.

Section	Description	Comment
Appendix A – Site Layout	Site Layout drawings presented in the report are dated 20/02/15, current architectural dwgs provided for the purposes of this review are dated 21/9/17.	In the absence of any clear diagram elsewhere advising differently, it is assumed that the operational noise modelling undertaken for the assessment is on the basis of the plant and locations shown in Appendix A site layout plans. These differ significantly to the current architectural plans which suggests that the operational noise assessment is not valid for the currently proposed layout and as such requires updating.
Appendix C – Receivers and Operational Noise Contours	Noise Contours	I understand the title relates to operational noise. However, construction noise contours should also be provided either here or in a separate appendix.

Appendix E

Traffic assessment review

Memorandum

ARUP

To	Giles Prows	Date	25 January 2018
Copies	Vincent Chan	Reference number	Click here to enter text.
From	Sham Handalage	File reference	Click here to enter text.
Subject	Review of Traffic Impact Assessment for Energy from Waste Facility, Eastern Creek (SSD 6236)		

In response to email request received on 18th January 2017, this memorandum summarises the findings from a review undertaken on a Traffic Impact Assessment Report by Traffix dated November 2016 and letter responses from Graham Pinder (Traffix) dated 18th September 2017.

In the review, it was noted that the initial Traffic Impact Assessment (TIA) was undertaken in support of a proposed Energy from Waste Electricity Generation Plant with capacity for up to 1.35 million tonnes of waste per annum. It is expected to operate over 24 hours a day and seven days a week, accommodating up to 55 staff over three shifts. The TIA report details the traffic impacts associated with construction and operation of this Electricity Generation Plant, which will allow for unsalvageable and uneconomic residue waste from the Genesis Xero Material Processing Centre and Waste Transfer Station to be used for generation of electrical power.

The recent changes to the proposed facility has reduced its capacity to 552,200 tonnes, with the changes to the original traffic impact assessment detailed in an addendum letter dated September 2017.

The following sections of this memo present a summary of the review comments.

Memorandum

Traffic Impact Assessment Report, November 2016

Section	Description	Comment
6.1.2 Waste / Fuel Deliveries	Report states that the trucks are anticipated to carry an average load of 22 tonnes.	It is not clear how the average load of 22 tonnes per truck was calculated. This is the main defining factor of the anticipated trip generation. It is noted that the General Mass Limit (GML) for trucks is typically up to 20 tonnes, however, Higher Mass Limits (HML) may apply on application to RMS. Therefore, more information regarding design vehicle(s) considered to determine this value will be recommended to provide.
	The total anticipated 336 truck trips / day has been evenly distributed over 24 hour period to determine peak hourly trip generation of 14 trucks/hour.	The calculation assumes even distribution of trips over 24 hour period, which may not be realistic in practical operational scenarios, and leads to an underestimate of the peak hour trip generation. Various deliveries (including new input material from external sources and other miscellaneous deliveries – refer to the next comment) would be expected to deliver during day time rather than night time due to the operating hours of the source facilities. In general peak hour is assumed to be around 10 per cent of AADT. Therefore, in absence of any other data, to calculate peak hour trip generation using Annual Average Daily Trips (AADT), it is recommended to use factor of 0.1 for each corresponding peak period to comply with Traffic Modelling Guidelines specified by RMS.

Section	Description	Comment
6.1.3. Miscellaneous Deliveries	8 trucks per day for miscellaneous deliveries has been evenly distributed over 24 hour period to calculate 0.3 trucks per hour.	In absence of any other data on arrival and departure flows of these miscellaneous truck deliveries, it is recommended to use factor of 0.1 for each corresponding peak period to comply with Traffic Modelling Guidelines specified by RMS.
6.1.4. Ash Residue and Bottom Ash Removal	It has mentioned that residue material being removed from site can be loaded onto the emptied waste / fuel trucks.	In order to remove and transport these residual material safely, there might be a requirement of special vehicle types, therefore empty waste delivery trucks may not be able to be used for this purpose. However, it was noted that for the purpose of the TIA, separate trucks for ash removal was assumed, therefore no changes will be required.
Appendix B-1	Even though the overall performance of the intersection shown to be Level of Service B, the eastern and western approaches of the intersection are already operating above the maximum acceptable operational threshold.	With the additional trip generation due to proposed facility, the performance of the intersection, particularly at eastern and western approaches has slightly worsened whilst keeping the overall Level of Service of the intersection unchanged. However, it is anticipated that compared to the current operational condition of this intersection, the impact associated with the proposed facility is small.

Addendum letter in response to submission dated 18th September 2017

The letter dated 18th September presented the results of a revised assessment assuming a 50% trip generation reduction from the original TIA, which is proportional to capacity reduction in the amended facility. This reduction rate has been applied to all trip generating components which may underestimate the total trip generation due to following reasons:

- Staff trips – the number of employees required for the amended facility may not be directly proportional to the capacity of the proposed facility. There will be some overarching positions such as administrative staff, maintenance crew and environmental services that will be required regardless of the production capacity of the facility;

- Input waste / fuel deliveries – the reduction rate for these trips should be determined comparing the quantity of the materials expected from external facilities in the amended development compared to the original TIA;
- Miscellaneous deliveries – depending on factors such as storage capacity of the amended facility and shelf life of the materials, the frequency of the deliveries may not be reduced proportionally to the capacity of the facility; and
- Ash removal – the assessment should consider frequency of ash removal, rather than quantity in isolation.

In the review, it was agreed that 50% reduction into the capacity will pose a significant reduction into the total trip generation. However, incorporating reduction rate that is directly proportional to the capacity reduction may not reflect a realistic trip generation scenario and may pose the risk of underestimated trip generation. This may then lead to an optimistic assessment of the impact on the external road network.

Furthermore, the analysis do not take any potential impacts associated with M4 and M7 motorways upgrade works in to consideration. However, considering the minimal traffic generation anticipated form the proposed facility, cumulative impacts are likely to be small.

Appendix F

Ferrybridge Multifuel 1 EfW facility environmental permit

Permit with introductory note

The Environmental Permitting (England & Wales) Regulations 2010

Ferrybridge MFE Limited

Ferrybridge Multifuel Facility
Ferrybridge Power Station
Knottingley
West Yorkshire.

Permit number

EPR/SP3239FU

Ferrybridge Multifuel Facility
Permit Number EPR/SP3239FU

Introductory note

This introductory note does not form a part of the permit

This permit controls the operation of an installation, whose purpose is the disposal of waste with energy recovery in an incineration plant. The relevant listed activity is Section 5.1 Part A(1)(c) The incineration of non-hazardous waste in an incineration plant with a capacity of 1 tonne or more per hour. The permit implements, primarily, the requirement of the EU Directives on Integrated Pollution Prevention and Control and Waste Incineration.

The main features of the permit are as follows. The installation is located on land adjacent to the Ferrybridge Power Station Site, close to the A1 (M). It lies 1km north-west of the village of Ferrybridge, 2km north-west of Knottingley, 1.9km south-east of Ferry Fryston, and 3 km northeast of Pontefract. Grid reference SE 447335, 424995.

The facility has a throughput limit of 675,000 tonnes per annum of waste including refuse derived fuel, waste wood and commercial and industrial waste. The installation will generate approximately 76MWe of electricity, of which approximately 69MWe will be exported. Waste is delivered to the facility by both road and rail.

The installation covers the entire facility including two combustion lines, waste reception, waste storage, water use, drainage, flue gas and air supply systems, boilers, facilities for the treatment of exhaust gases, on-site facilities for treatment and storage of residues and water recycling, stacks, devices and systems for controlling incineration operations, recording and monitoring conditions.

Moving grate technology is used for burning the waste material. The furnace design ensures that a temperature of at least 850°C for a period of at least two seconds is achieved in the combustion chamber. To ensure that the temperature does not fall below 850°C, auxiliary burners firing a fuel of low sulphur gas oil is automatically triggered by online process monitoring equipment.

Hot gases from the furnace pass into a boiler. Steam raised in the boiler is passed to a turbine to generate electricity, for export to the National Grid.

Combustion gases are cleaned before they are released to atmosphere. There are four components to the gas cleaning, abatement technique:

- Selective Non-Catalytic Reduction (SNCR), involving the injection of ammonia into the combustion chamber above the flame, provides for the abatement of nitrogen oxides;
- dry lime reagent, injected to neutralise acid gas compounds;
- activated carbon, injected to absorb mercury, dioxins and furans;
- bag filtration to remove fine particulates. The residues of the bag filters are collected and directed to a residues silo.

Cleaned flue gases exiting the abatement system of each of the incinerator lines are discharged through a 100m tall stack. Each line has its own flue within a common windshield.

All plant areas are surfaced to the appropriate standards for the activities within those areas. All liquid tanks and drums, whose emissions to water or land could cause pollution, are contained in adequate bunding constructed in line with industry best practice standards and sized to contain 110% of the tank contents. Materials used for surfacing of process areas and bunds are resistant to the materials they may come into contact with.

There are no discharges to controlled waters apart from uncontaminated surface water run-off from roads, vehicle parking areas, roofs of buildings, other hardstanding and landscaped areas which are discharged to Fryston Beck via two discharge points. All waste waters from on-site processes will be reused within the installation.

Odour problems are not expected from the facility. Any potential odours from storage of the waste materials are extracted from the storage bunker and used as combustion air within the furnace, thereby destroying any potentially odorous compounds.

The main solid residues produced by the facility are bottom ash and air pollution control (APC) residues. Bottom ash will be transferred off-site to a suitably licensed waste treatment facility. APC residues are hazardous waste and will be sent off site to an appropriate licenced facility for disposal.

The status log of the permit sets out the permitting history, including any changes to the permit reference number

Status Log of the permit		
Detail	**Date**	**Comments**
Application EPR/SP3239FU/A001	Duly made 26/03/2012	
Additional Information in response to Schedule 5 Notice Received	20/07/2012 & 25/07/2012	
Additional information received	03/05/2012	
	30/07/2012	
	17/08/2012	
	07/09/2012	
	14/09/2012	
	19/10/2012	
Permit EPR/SP3239FU/A001 determined	30/11/2012	

End of Introductory Note

Permit

The Environmental Permitting (England and Wales) Regulations 2010

Permit number
EPR/SP3239FU

The Environment Agency hereby authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2010

Ferrybridge MFE Limited ("the operator"),

whose registered office is

55 Vastern Road
Reading
Berkshire
RG1 8BU

company registration number **07712297**

to operate an installation at

Ferrybridge Multifuel Facility
Ferrybridge Power Station
Knottingley
West Yorkshire.

to the extent authorised by and subject to the conditions of this permit.

Name	Date
Anne Nightingale	30/11/2012

Anne Nightingale

Authorised on behalf of the Environment Agency

Conditions

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.2 Energy efficiency

1.2.1 The operator shall:

(a) take appropriate measures to ensure that energy is recovered with a high level of energy efficiency and energy is used efficiently in the activities;

(b) review and record at least every four years whether there are suitable opportunities to improve the energy recovery and efficiency of the activities; and

(c) take any further appropriate measures identified by a review.

1.2.2 The operator shall provide and maintain steam and/or hot water pass-outs such that opportunities for the further use of waste heat may be capitalised upon should they become practicable.

1.2.3 The operator shall review the practicability of Combined Heat and Power (CHP) implementation at least every 2 years. The results shall be reported to the Agency within 2 months of each review.

1.3 Efficient use of raw materials

1.3.1 The operator shall:

(a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;

(b) maintain records of raw materials and water used in the activities;

(c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and

(d) take any further appropriate measures identified by a review.

1.4 Avoidance, recovery and disposal of wastes produced by the activities

1.4.1 The operator shall take appropriate measures to ensure that:

(a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and

(b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 or the Waste Framework Directive; and

(c) where waste disposal is necessary, this is undertaken in a manner which minimised its impact on the environment.

1.4.2 review and record at least every four years whether changes to those measures should be made; and take any further appropriate measures identified by a review.

2 Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the "activities").

2.1.2 Waste authorised by this permit in condition 2.3.3 shall be clearly distinguished from any other waste on the site.

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

2.3 Operating techniques

2.3.1 (a) The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.

(b) If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan specified in schedule 1, table S1.2 or otherwise required under this permit, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the Environment Agency.

2.3.2 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.

2.3.3 Waste shall only be accepted if:

(a) it is of a type and quantity listed in schedule 2 table S2.2; and

(b) it conforms to the description in the documentation supplied by the producer or holder; and

(c) if having been separately collected for recycling, it is contaminated and otherwise destined for landfill.

2.3.4 The operator shall ensure that where waste produced by the activities is sent to a relevant waste operation, that operation is provided with the following information, prior to the receipt of the waste:

(a) the nature of the process producing the waste;

(b) the composition of the waste;

(c) the handling requirements of the waste;

(d) the hazardous property associated with the waste, if applicable; and

(e) the waste code of the waste.

2.3.5 The operator shall ensure that where waste produced by the activities is sent to a landfill site, it meets the waste acceptance criteria for that landfill.

2.3.6 Waste fuel shall not be charged, or shall cease to be charged, if:

(a) the combustion chamber temperature is below, or falls below, 850^{o}C; or

(b) any continuous emission limit value in schedule 3 table S3.1(a) is exceeded; or

(c) any continuous emission limit value in schedule 3 table S3.1 is exceeded, other than under WID abnormal operating conditions ; or

(d) monitoring results required to demonstrate compliance with any continuous emission limit value in schedule 3 table S3.1 are unavailable other than under WID abnormal operating conditions.

2.3.7 The operator shall have at least one auxiliary burner in each line at start up or shut down or whenever the operating temperature falls below that specified in condition 2.3.6, as long as incompletely burned waste is present in the combustion chamber. Unless the temperature specified in condition 2.3.6 is maintained in the combustion chamber, such burner(s) may be fed only with fuels which result in emissions no higher than those arising from the use of gas oil, liquefied gas or natural gas.

2.3.8 The operator shall record the beginning and end of each period of “WID abnormal operation”.

2.3.9 During a period of “WID abnormal operation”, the operator shall restore normal operation of the failed equipment or replace the failed equipment as rapidly as possible.

2.3.10 Where, during “WID abnormal operation”, any of the following situations arise, the operator shall, as soon as is practicable, cease the burning of waste until normal operation can be restored:

(a) continuous measurement shows that an emission exceeds any emission limit value in schedule 3 table S3.1 due to disturbances or failures of the abatement systems, or continuous emission monitor(s) are out of service, as the case may be, for a total of 4 hours uninterrupted duration;

(b) the cumulative duration of “WID abnormal operation” periods over 1 calendar year exceeds 60 hours on an incineration line;

(c) continuous measurement shows that an emission exceeds any emission limit value in schedule 3 table S3.1 (a) due to disturbances or failures of the abatement systems;

2.3.11 The operator shall interpret the end of the period of “WID abnormal operation” as the earliest of the following:

(a) when the failed equipment is repaired and brought back into normal operation;

(b) when the operator initiates a shut down of the waste combustion activity, as described in the application or as agreed in writing with the Environment Agency;

(c) when a period of four hours has elapsed from the start of the “WID abnormal operation”;

(d) when, in any calendar year, an aggregated period of 60 hours “WID abnormal operation” has been reached for a given incineration line.

2.3.12 Bottom ash and APC residues shall not be mixed.

2.4 Improvement programme

2.4.1 The operator shall complete the improvements specified in schedule 1 table S1.3 by the date specified in that table unless otherwise agreed in writing by the Environment Agency.

2.4.2 Except in the case of an improvement which consists only of a submission to the Environment Agency, the operator shall notify the Environment Agency within 14 days of completion of each improvement.

2.5 Pre-operational conditions

2.5.1 The activities shall not be brought into operation until the measures specified in schedule 1 table S1.4 have been completed.

3 Emissions and monitoring

3.1 Emissions to water, air or land

3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1 and S3.2 except in "WID abnormal operation", when there shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1(a) and S3.2.

3.1.2 The limits given in schedule 3 shall not be exceeded.

3.1.3 Wastes produced at the site shall, as a minimum, be sampled and analysed in accordance with schedule 3 table S3.4. Additional samples shall be taken and tested and appropriate action taken, whenever:

(a) disposal or recovery routes change; or

(b) it is suspected that the nature or composition of the waste has changed such that the route currently selected may no longer be appropriate.

3.2 Emissions of substances not controlled by emission limits

3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

3.2.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan;

(b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

3.3 Monitoring

3.3.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring specified in the following tables in schedule 3 to this permit:

(a) point source emissions specified in tables S3.1, S3.1(a) and S3.2;

(b) process monitoring specified in table S3.3;

(c) residue quality in table S3.4.

3.3.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

3.3.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.3.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate) unless otherwise agreed in writing by the Environment Agency. Newly installed CEMs, or CEMs replacing existing CEMs, shall have MCERTS certification and have an MCERTS certified range which is not greater than 1.5 times the daily emission limit value (ELV) specified in schedule 3 table S3.1. The CEM shall also be able to measure instantaneous values over the ranges which are to be expected during all operating conditions. If it is necessary to use more than one range setting of the CEM to achieve this requirement, the CEM shall be verified for monitoring supplementary, higher ranges.

3.3.4 The provisions for monitoring shall meet the requirements of BS EN 15259. Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1, S3.1(a), S3.2 and S3.3 unless otherwise agreed in writing by the Environment Agency.

3.3.5 Where Continuous Emission Monitors are installed to comply with the monitoring requirements in schedule 3 table S3.1; the Continuous Emission Monitors shall be used such that;

(a) the values of the 95% confidence intervals of a single measured result at the daily emission limit value shall not exceed the following percentages:

- Carbon monoxide 10%
- Sulphur dioxide 20%
- Oxides of nitrogen (NO & NO_2 expressed as NO_2) 20%
- Particulate matter 30%
- Total organic carbon (TOC) 30%
- Hydrogen chloride 40%

(b) valid half-hourly average values shall be determined within the effective operating time (excluding the start-up and shut-down periods) from the measured values after having subtracted the value of the confidence intervals in condition 3.3.5 (a);

(c) where it is necessary to calibrate or maintain the monitor and this means that data are not available for a complete half-hour period, the half-hourly average or 10-minute average shall in any case be considered valid if measurements are available for a minimum of 20 minutes or 7 minutes during the half-hour or 10-minute period respectively. The number of half-hourly or 10-minute averages so validated shall not exceed 5 or 15 respectively per day;

(d) daily average values shall be determined as the average of all the valid half-hourly average or 10-minute average values within a calendar day. The daily average value shall be considered valid if no more than five half-hourly average*)* or 15 10-minute average values in any day have been determined not to be valid;

(e) no more than ten daily average values per year shall be determined not to be valid.

3.4 Odour

3.4.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.4.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an odour management plan;

(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.5 Noise and vibration

3.5.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.5.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan;

(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

4 Information

4.1 Records

4.1.1 All records required to be made by this permit shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and

(d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:

(i) off-site environmental effects; and

(ii) matters which affect the condition of the land and groundwater.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.

4.2 Reporting

4.2.1 The operator shall send all reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.

4.2.2 Report or reports on the performance of the activities over the previous year shall be submitted to the Environment Agency by 31 January (or other date agreed in writing by the Environment Agency) each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data;

(b) the annual production /treatment data set out in schedule 4 table S4.2;

(c) the performance parameters set out in schedule 4 table S4.3 using the forms specified in table S4.4 of that schedule; and

(d) the functioning and monitoring of the incineration plant in a format agreed with the Environment Agency. The report shall, as a minimum requirement (as required by Article 12(2) of the Waste Incineration Directive) give an account of the running of the process and the emissions into air and water compared with the emission standards in the WID.

4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:

(a) in respect of the parameters and emission points specified in schedule 4 table S4.1;

(b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.4 ; and

(c) giving the information from such results and assessments as may be required by the forms specified in those tables.

4.2.4 The operator shall, unless notice under this condition has been served within the preceding four years, submit to the Environment Agency, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.

4.2.5 Within 1 month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter.

4.3 Notifications

4.3.1 The Environment Agency shall be notified without delay following the detection of:

(a) any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution;

(b) the breach of a limit specified in the permit; or

(c) any significant adverse environmental effects.

4.3.2 Any information provided under condition 4.3.1 shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

4.3.3 Where the Environment Agency has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform the Environment Agency when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this information to the Environment Agency at least 14 days before the date the monitoring is to be undertaken.

4.3.4 The Environment Agency shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

(a) any change in the operator's trading name, registered name or registered office address; and

(b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

(a) any change in the operator's name or address; and

(b) any steps taken with a view to the dissolution of the operator.

4.3.5 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) the Environment Agency shall be notified at least 14 days before making the change; and

(b) the notification shall contain a description of the proposed change in operation.

4.3.6 The Environment Agency shall be given at least 14 days notice before implementation of any part of the site closure plan.

4.4 Interpretation

4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "without delay", in which case it may be provided by telephone.

Waste Incineration Plant Schedules

Schedule 1 - Operations

Table S1.1 activities		
Activity listed in Schedule 1 of the EP Regulations	**Description of specified activity**	**Limits of specified activity**
S5.1 A1 (c)	The incineration of non-hazardous waste in a 2 stream incineration plant with a capacity of 1 tonne per hour or more.	From receipt of waste to emission of exhaust gas and transfer off-site of waste arising. Waste types and quantities as specified in Table S2.2 of this permit.
Directly Associated Activities		
Electricity Generation	Generation of electrical power using a steam turbine from energy recovered from the flue gases.	
Standby electrical generators	For providing emergency electrical power to the plant in the event of supply interruption.	

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application EPR/SP3239FU	Operating techniques described in the Supporting Information: Section 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10 and 3.	26/03/2012
Responses to Schedule 5 Notice issued on 22/06/2012	Response to Questions: 2 (Energy Efficiency); 4 (Discharge to Surface Water); 5 (Fugitive Emissions); 6, 7 & 8 (Odour); 9 & 10 (Monitoring); 11 (Acid Gas Abatement); 12, 13, 14 & 15 (Raw Materials); 16 & 17 (Fuel Charging); 18 & 19 (Boiler Design); 22 (Subsurface storage).	20/07/2012 & 25/07/2012
Additional information	All Parts - Clarification on use of low NOx burners and dosing method for activated carbon and acid gas reagent.	30/07/2012
Additional information	All Parts – Additional information relating to Noise	14/09/2012
Additional information	All Parts – Additional information on waste acceptance; and surface water drainage plans.	19/10/2012

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1	The Operator shall submit a written report to the Environment Agency on the implementation of its Environmental Management System and the progress made in the accreditation of the system by an external body or if appropriate submit a schedule by which the EMS will be subject to accreditation.	Within 12 months of the date on which waste is first burnt.

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC2	The Operator shall submit a written proposal to the Environment Agency to carry out tests to determine the size distribution of the particulate matter in the exhaust gas emissions to air from emission point A1 and A2, identifying the fractions within the PM_{10}, $PM_{2.5}$ and $PM_{1.0}$ ranges. The proposal shall include a timetable for approval by the Environment Agency to carry out such tests and produce a report on the results. On receipt of written agreement by the Environment Agency to the proposal and the timetable, the Operator shall carry out the tests and submit to the Environment Agency a report on the results.	Within 6 months of the completion of commissioning.
IC3	The Operator shall submit a written report to the Environment Agency on the commissioning of the installation. The report shall summarise the environmental performance of the plant as installed against the design parameters set out in the Application. The report shall also include a review of the performance of the facility against the conditions of this permit and details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions.	Within 4 months of the completion of commissioning.
IC4	The Operator shall carry out checks to verify the residence time, minimum temperature and oxygen content of the exhaust gases in the furnace whilst operating under the anticipated most unfavourable operating conditions. The results shall be submitted in writing to the Environment Agency.	Within 4 months of the completion of commissioning.
IC5	The Operator shall submit a written report to the Environment Agency describing the performance and optimisation of the flue gas abatement systems. The report shall provide details of: (i) combustion settings and the operation of the Selective Non Catalytic Reduction (SNCR) system to minimise oxides of nitrogen (NO_x) emissions within the emission limit values described in this permit with the minimisation of ammonia and nitrous oxide emissions. This shall include an assessment of the level of NO_x and N_2O emissions that can be achieved under optimum operating conditions. (ii) the optimisation (including dosing rates of lime and activated carbon) for the control of acid gases, mercury and dioxins and furans.	Within 4 months of the completion of commissioning.

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC6	The Operator shall submit a written summary report to the Agency to confirm by the results of calibration and verification testing that the performance of Continuous Emission Monitors for parameters as specified in Table S3.1 and Table S3.1(a) complies with the requirements of BS EN 14181, specifically the requirements of QAL1, QAL2 and QAL3.	Initial calibration report to be submitted to the Agency within 3 months of completion of commissioning. Full summary evidence compliance report to be submitted within 18 months of commissioning.
IC7	The Operator shall carry out a review of the noise impact of the installation at sensitive receptors, once the plant is fully operational in its first year of operation. The scope of the review shall be agreed with the Environment Agency and shall compare the actual noise emissions from the installation and their impact with those predicted in the report submitted in response to Pre-Operational condition PO8. The review shall include appropriate measurements to verify any modelling work undertaken and establish whether any of the noise emissions have a tonal quality (both during daytime and night-time operation) likely to give rise to nuisance or complaint. A report on the review shall be provided to the Environment Agency.	Within 12 months of the date in which waste is first burnt.

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
PO1	Prior to the commencement of commissioning, the Operator shall send a summary of the site Environment Management System (EMS) to the Environment Agency and make available for inspection all documents and procedures which form part of the EMS. The EMS shall be developed in line with the requirements set out in Section 1 of How to comply with your environmental permit – Getting the basics right. The documents and procedures set out in the EMS shall form the written management system referenced in condition 1.1.1 (a) of the permit.
PO2	Prior to the commencement of commissioning, the Operator shall send a report to the Environment Agency which will contain a comprehensive review of the options available for utilising the heat generated by the waste incineration process in order to ensure that it is recovered as far as practicable. The review shall detail any identified proposals for improving the recovery and utilisation of waste heat and shall provide a timetable for their implementation.
PO3	Prior to the commencement of commissioning, the Operator shall submit to the Environment Agency for approval a protocol for the sampling and testing of incinerator bottom ash for the purposes of assessing its hazard status. Sampling and testing shall be carried out in accordance with the protocol as approved.

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
PO4	Prior to the commencement of commissioning; the Operator shall provide a written commissioning plan, including timelines for completion, for approval by the Environment Agency. The commissioning plan shall include the expected emissions to the environment during the different stages of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the Environment Agency in the event that actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved.
PO5	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. The procedure shall be implemented in accordance with the written approval from the Agency.
PO6	Prior to the commencement of commissioning, the Operator shall submit to the Environment Agency a drawing showing the location of the surface water drainage, foul drainage and process water drainage. The drawing shall also show the location of the retention basins, penstock valves, oil/petrol interceptors, and final discharge point into the Fryston Beck.

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
P07	Unless otherwise agreed in writing by the Agency, the Operator shall submit by 31st March 2013 a written report to the Environment Agency for approval containing an assessment of the risk to groundwater from the fuel bunker, ash bunker and recycled water pit. The assessment shall include, but not be limited to: o Details of the location, design, structure and materials of construction (including permeability to water and resistance to chemical attack) of the fuel bunker, ash bunker and recycled water pit, as well as construction methods. This shall include calculation of the depth of the base of each structure below ground level and depth of surrounding groundwater levels. o Clear identification of the nature of potential polluting liquids that will be present within the structures, including estimates of the likely concentrations of pollutants (supported by chemical analysis) and likely volumes of the liquids that will be present during normal operations, and at maximum capacity. The subsequent level of liquid in relation to the surrounding groundwater regime should be calculated. o Assessment of the likely risk of pollutants contained within the structures being released into the surrounding groundwater. This should consider all risks which could result in loss of containment, including accidental damage and long term degradation. o Assessment of the potential impact on groundwater quality and the quality of water bodies that are in hydraulic continuity in the event of an uncontrolled release of the liquids stored within the structures. o Proposals for further mitigation measures as deemed necessary by the assessment. o Proposals for any groundwater monitoring identified as deemed necessary by the assessment together with associated groundwater action plans. The Operator shall construct the structures in accordance with the Agency's written approval and undertake any measures approved in writing by the Agency to the time scales included in the approval.

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
P08	Prior to commencement of commissioning, the Operator shall submit to the Environment Agency for approval a report in writing that assesses the potential of noise generated at the installation to cause an unacceptable impact at the surrounding receptors. The report should include the following: ▪ Confirmation of the relevant receptors. ▪ A list of activities that are a significant source of noise. ▪ Noise modelling to assess the potential of the site activities to cause a noise nuisance at off site receptors. Concurrent activities should be considered. The assessment shall be undertaken in accordance with the procedures given in BS4142: 1997 (Rating industrial noise affecting mixed residential and industrial areas) and BS7445: 2003 (Description and measurement of environmental noise) unless otherwise agreed with the Agency. ▪ Details of noise management measures to include those already described, together with details of further measures as deemed necessary by the noise assessment. Including justification for the choice of further measures based on costs and benefits. ▪ Details of any monitoring identified as necessary for any receptor, together with associated noise action plans. The operator shall undertake any measures approved in writing by the Agency to the timescales indicated in the approval.
PO9	After completion of the furnace design and at least three calendar months before any furnace operation; the operator shall submit a written report to the Agency of the details of the computational fluid dynamic (CFD) modelling. The report shall demonstrate whether the design combustion conditions comply with the residence time and temperature requirements as defined by the Waste Incineration Directive.

Schedule 2 - Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	**Specification**
Fuel Oil	< 0.1% sulphur content

Table S2.2 Permitted waste types and quantities for incineration plant	
Maximum quantity	Maximum total throughput = 675,000 tonnes per annum
Waste code	**Description**
02	**WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING.**
02 01	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing**
02 01 03	Plant-tissue waste
02 01 04	Waste plastics (except packaging)
02 01 07	Wastes from forestry
02 02	**Wastes from the preparation and processing of meat, fish and other foods of animal origin**
02 02 03	Materials unsuitable for human consumption or processing
02 05	**Wastes from the dairy products industry**
02 05 01	Materials unsuitable for human consumption or processing
02 06	**Wastes from the baking and confectionary industry**
02 06 01	Materials unsuitable for human consumption or processing
02 07	**Wastes from the production of alcoholic and non alcoholic beverages**
02 07 01	Wastes from washing, cleaning and mechanical reduction of raw materials
03	**WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD**
03 01	**Wastes from wood processing and the production of panels and furniture**
03 01 01	Waste bark and cork
03 01 05	Sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04
04	**WASTES FROM THE LEATHER, FUR AND TEXTILE INDUSTRIES**
04 02	**wastes from the textile industry**
04 02 15	Wastes from finishing other than those mentioned in 04 02 14
04 02 21	wastes from unprocessed textile fibres
04 02 22	wastes from processed textile fibres
15	**WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED**
15 01	**packaging (including separately collected municipal packaging waste)**
15 01 01	paper and cardboard packaging
15 01 02	plastic packaging
15 01 05	composite packaging
15 01 06	mixed packaging
15 01 09	textile packaging

Table S2.2 Permitted waste types and quantities for incineration plant	
Maximum quantity	Maximum total throughput = 675,000 tonnes per annum
Waste code	**Description**
15 02	**absorbents, filter materials, wiping cloths and protective clothing**
15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02
16	**Wastes not otherwise specified in the list**
16 01	**End of life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end of life vehicles and vehicles maintenance (except 13, 14, 16 06 and 16 08)**
16 01 03	End-of-life tyres
16 01 19	Plastic
17	**CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)**
17 02	**wood, glass and plastic**
17 02 01	wood
17 02 03	plastic
17 09	**other construction and demolition wastes**
17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03
19	**WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE**
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**
19 02 03	premixed wastes composed only of non-hazardous wastes
19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09
19 05	**wastes from aerobic treatment of solid wastes**
19 05 01	non-composted fraction of municipal and similar wastes
19 05 02	non-composted fraction of animal and vegetable waste
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 01	paper and cardboard
19 12 04	plastic and rubber
19 12 07	wood other than that mentioned in 19 12 06
19 12 08	textiles
19 12 10	combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
20	**MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS**
20 01	**separately collected fractions (except 15 01)**
20 01 01	paper and cardboard
20 01 08	biodegradable kitchen and canteen waste
20 01 10	clothes
20 01 11	textiles
20 01 25	edible oil and fat
20 01 38	Wood other than those mentioned in 20 01 37
20 01 39	Plastics

Schedule 3 – Emissions and monitoring

Table S3.1 Point source emissions to air – emission limits and monitoring requirements

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard(s) or method(s)
A1 & A2 as shown on drawing 1053-032 (rev A4) dated 19/10/2012	Particulate matter	Main stack	30 mg/m^3	½-hr average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Particulate matter		10 mg/m^3	daily average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Total Organic Carbon (TOC)		20 mg/m^3	½-hr average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Total Organic Carbon (TOC)		10 mg/m^3	daily average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Hydrogen chloride		60 mg/m^3	½-hr average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Hydrogen chloride		10 mg/m^3	daily average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Hydrogen fluoride		2 mg/m^3	periodic over minimum 1-hour period	Quarterly in first year. Then Bi-annual	BS ISO 15713
	Carbon monoxide		100 mg/m^3	½-hr average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Carbon monoxide		50 mg/m^3	daily average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Sulphur dioxide		200 mg/m^3	½-hr average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Sulphur dioxide		50 mg/m^3	daily average	Continuous measurement	BS EN 14181

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard(s) or method(s)**
	Oxides of nitrogen (NO and NO_2 expressed as NO_2)		400 mg/m^3	½-hr average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Oxides of nitrogen (NO and NO_2 expressed as NO_2)		200 mg/m^3	daily average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Cadmium & thallium and their compounds (total)		0.05 mg/m^3	periodic over minimum 30 minute, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS EN 14385
	Mercury and its compounds		0.05 mg/m^3	periodic over minimum 30 minute, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS EN 13211
	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)		0.5 mg/m^3	periodic over minimum 30 minute, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS EN 14385
	Ammonia (NH_3)		No limit set	daily average	Continuous measurement	BS EN 14181 BS EN 15267-3
	Nitrous oxide (N_2O)		No limit set	periodic over minimum 1-hour period	For periodic measurement, quarterly in the first year of operation, then bi-annual	BS EN ISO 21258
	Dioxins / furans (I-TEQ)		0.1 ng/m^3	periodic over minimum 6 hours, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS EN 1948 Parts 1, 2 and 3
	Dioxins / furans (WHO-TEQ Humans / Mammals)		No limit set	periodic over minimum 6 hours, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS EN 1948 Parts 1, 2 and 3
	Dioxins / furans (WHO-TEQ Fish)		No limit set	periodic over minimum 6 hours, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS EN 1948 Parts 1, 2 and 3

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard(s) or method(s)**
	Dioxins / furans (WHO-TEQ Birds)		No limit set	periodic over minimum 6 hours, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS EN 1948 Parts 1, 2 and 3
	Dioxin-like PCBs (WHO-TEQ Humans / Mammals)		No limit set	periodic over minimum 6 hours, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS EN 1948-4
	Dioxin-like PCBs (WHO-TEQ Fish)		No limit set	periodic over minimum 6 hours, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS EN 1948-4
	Dioxin-like PCBs (WHO-TEQ Birds)		No limit set	periodic over minimum 6 hours, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS EN 1948-4
	Specific individual poly-cyclic aromatic hydrocarbons (PAHs), as specified in Schedule 6.		No limit set	periodic over minimum 6 hours, maximum 8 hour period	Quarterly in first year. Then Bi-annual	BS ISO 11338 Parts 1 and 2.
A3 & A4 Exhaust emission from standby generators as shown on drawing 1053-032 (rev A4) dated 19/10/2012	No parameters set	Exhaust emissions from Standby generators	No limit set	-	-	-

Table S3.1(a) Point source emissions to air during abnormal operation of incineration plant – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A1 & A2 as shown on drawing 1053-032 (rev A4) dated 19/10/2012	Particulate matter	Main stack	150 mg/m^3	½-hr average	Continuous measurement	BS EN 15267-3 during abatement plant failure
	Total Organic Carbon (TOC)		20 mg/m^3	½-hr average	Continuous measurement	BS EN 15267-3 during abatement plant failure
	Carbon monoxide		100 mg/m^3	½-hr average	Continuous measurement	BS EN 15267-3 during abatement plant failure

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
W1 and W2 – discharge point to Fryston Beck as shown on drawing 1053-032 (rev A4) dated 19/10/2012	No parameters set	Uncontaminated surface water	None Set	-	-	-

Table S3.3 Process monitoring requirements				
Location or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Location close to the Combustion Chamber inner wall or as identified and justified in Application.	Temperature (° C)	Continuous	Traceable to national standards	As agreed in writing with the Agency.
A1 & A2 as shown on drawing 1053-032 (rev A4) dated 19/10/2012	Exhaust gas temperature	Continuous	Traceable to national standards	As agreed in writing with the Agency.
	Exhaust gas pressure	Continuous	Traceable to national standards	As agreed in writing with the Agency.
	Exhaust gas oxygen content	Continuous	BS EN 15267-3 BS EN 14181	
	Exhaust gas water vapour content	Continuous	BS EN 15267-3 BS EN 14181	Unless gas is dried before analysis of emissions.

Table S3.4 Residue quality					
Emission point reference or source or description of point of measurement	**Parameter**	**Limit**	**Monitoring frequency**	**Monitoring standard or method ***	**Other specifications**
Bottom Ash	TOC	<3%	Monthly in the first year of operation. Then Quarterly	Environment Agency ash sampling protocol.	
Bottom Ash	Metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds, dioxins/furans and dioxin-like PCBs.		Monthly in the first year of operation. Then Quarterly	Sampling and analysis as per Environment Agency ash sampling protocol.	
Bottom Ash	Total soluble fraction and metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) soluble fractions		Before use of a new disposal or recycling route	Sampling and analysis as per Environment Agency ash sampling protocol.	
APC Residues	Metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds, dioxins/furans and dioxin-like PCBs.		Monthly in the first year of operation. Then Quarterly	Sampling and analysis as per Environment Agency ash sampling protocol.	
APC Residues	Total soluble fraction and metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) soluble fractions		Before use of a new disposal or recycling route	Sampling and analysis as per Environment Agency ash sampling protocol.	

* Or other equivalent standard as agreed in writing with the Environment Agency.

Schedule 4 - Reporting

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data

Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Emissions to air Parameters as required by condition 3.3.1	A1, A2	Quarterly	1 Jan, 1 Apr, 1 Jul and 1 Oct
TOC Parameters as required by condition 3.3.1	Bottom Ash	Quarterly (but monthly for the first year of operation)	1 Jan, 1 Apr, 1 Jul and 1 Oct
Metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds, dioxins/furans and dioxin-like PCBs Parameters as required by condition 3.3.1	Bottom Ash	Quarterly (but monthly for the first year of operation)	1 Jan, 1 Apr, 1 Jul and 1 Oct
Total soluble fraction and metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) soluble fractions Parameters as required by condition 3.3.1	Bottom Ash	Before use of a new disposal or recycling route	
Metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds, dioxins/furans and dioxin-like PCBs Parameters as required by condition 3.3.1	APC Residues	Quarterly (but monthly for the first year of operation)	1 Jan, 1 Apr, 1 Jul and 1 Oct
Total soluble fraction and metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) soluble fractions Parameters as required by condition 3.3.1	APC Residues	Before use of a new disposal or recycling route	
Functioning and monitoring of the incineration plant as required by condition 4.2.2		Annually	1 Jan

Table S4.2: Annual production/treatment	
Parameter	**Units**
Total Municipal Waste and RDF Incinerated	tonnes
Total Commercial Waste Incinerated	tonnes
Electrical energy produced	KWhrs
Electrical energy exported	KWhrs
Electrical energy used on installation	KWhrs
Waste heat utilised by the installation	KWhrs
Waste heat exported from the installation	KWhrs

Table S4.3 Performance parameters		
Parameter	**Frequency of assessment**	**Units**
Electrical energy exported, imported and used at the installation	Quarterly	KWhrs / tonne of waste incinerated
Fuel oil consumption	Quarterly	Kgs / tonne of waste incinerated
Mass of Bottom Ash produced	Quarterly	Kgs / tonne of waste incinerated
Mass of APC residues produced	Quarterly	Kgs / tonne of waste incinerated
Mass of Other solid residues produced	Quarterly	Kgs / tonne of waste incinerated
Ammonia consumption	Quarterly	Kgs / tonne of waste incinerated
Activated Carbon consumption	Quarterly	Kgs / tonne of waste incinerated
Lime consumption	Quarterly	Kgs / tonne of waste incinerated
Water consumption	Quarterly	m^3 / tonne of waste incinerated
Periods of WID abnormal operation	Quarterly	Number of occasions and cumulative hours for current calendar year for each line.

Table S4.4 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Air	Form air 1-8 or other form as agreed in writing by the Environment Agency	30/11/2012
Residues	Form residues1 or other form as agreed in writing by the Environment Agency	30/11/2012
Energy usage	Form energy 1 or other form as agreed in writing by the Environment Agency	30/11/2012
Other performance indicators	Form performance 1 or other form as agreed in writing by the Environment Agency	30/11/2012

Schedule 5 - Notification

These pages outline the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	**EPR/SP3239FU**
Name of operator	**Ferrybridge MFE Limited**
Location of Facility	**Ferrybridge Energy from Waste Facility**
Time and date of the detection	

(a) Notification requirements for any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution	
To be notified within 24 hours of detection	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	**Notification period**

(c) Notification requirements for the detection of any significant adverse environmental effect	
To be notified within 24 hours of detection	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B - to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of Ferrybridge MFE Limited

Schedule 6 - Interpretation

"abatement equipment" means that equipment dedicated to the removal of polluting substances from releases from the installation to air or water media.

"accident" means an accident that may result in pollution.

"APC residues" means air pollution control residues

"application" means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

"authorised officer" means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

"bi-annual" means twice per year with at least five months between tests;

"bottom ash" means ash falling through the grate and transported by the grate

"CEM" Continuous emission monitor

"CEN" means Commité Européen de Normalisation

"daily average" for releases of substances to air means the average of valid half-hourly averages over a calendar day

"*dioxin and furans*" means polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans.

"disposal" means any of the operations provided for in Annex IIA to Directive 2008/98/EC of the Waste Frameword Directive.

"EP Regulations" means The Environmental Permitting (England and Wales) Regulations SI 2010 No.675 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

"emissions of substances not controlled by emission limits" means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission or background concentration limit**.**.

"groundwater" means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

"hazardous property" has the meaning given in Schedule 3 of the Hazardous Waste (England and Wales) Regulations 2005 No.894 and the Hazardous Waste (Wales) Regulations 2005 No. 1806 (W.138).

"incineration line" means all of the incineration equipment related to a common discharge to air location.

"ISO" means International Standards Organisation.

"LOI" means loss on ignition a technique used to determine the combustible material by heating the ash residue to a high temperature

"MCERTS" means the Environment Agency's Monitoring Certification Scheme.

"PAH" means Poly-cyclic aromatic hydrocarbon, and comprises Anthanthrene, Benzo[a]anthracene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[b]naph(2,1-d)thiophene, Benzo[c]phenanthrene, Benzo[ghi]perylene, Benzo[a]pyrene, Cholanthrene, Chrysene, Cyclopenta[c,d]pyrene, Dibenzo[ah]anthracene, Dibenzo[a,i]pyrene Fluoranthene, Indo[1,2,3-cd]pyrene, Naphthalene

"PCB" means *Polychlorinated Biphenyl. Dioxin-like PCBs are the non-ortho and mono-ortho PCBs listed in the table below.*

"quarter" means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

"quarterly" for reporting/sampling means after/during each 3 month period, January to March; April to June; July to September and October to December and, when sampling, with at least 2 months between each sampling date.

"recovery" means any of the operations provided for in Annex IIB to Directive 2008/98/EC of the Waste Framework Directive.

"*shut down"* is any period where the plant is being returned to a non-operational state as described in the application or agreed in writing with the Environment Agency.

"start up" is any period, where the plant has been non-operational, after igniting the auxiliary burner until waste has been fed to the plant in sufficient quantity to cover the grate and to initiate steady-state conditions.

"TOC" means *Total Organic Carbon.* In respect of releases to air, this means the gaseous and vaporous organic substances, expressed as TOC.

"Waste code" means the six digit code referable to a type of waste in accordance with the List of Wastes (England)Regulations 2005, or List of Wastes (Wales) Regulations 2005, as appropriate, and in relation to hazardous waste, includes the asterisk.

"Waste Incineration Directive" means Directive 2000/76/EC on the incineration of waste (O.J. L 332, 28.12.2000)

"WFD" means Waste Framework Directive (Directive 2008/98/EC of the European Parliament and Council).

"WID abnormal operation" means any technically unavoidable stoppages, disturbances, or failures of the abatement plant or the measurement devices other than continuous emission monitors for releases to air of particulates, TOC and/or CO during which the concentrations in the discharges into air and the purified waste water of the regulated substances may exceed the normal emission limit values.

"year" means calendar year ending 31 December.

Where a minimum limit is set for any emission parameter, for example pH, reference to exceeding the limit shall mean that the parameter shall not be less than that limit.

Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

(a) in relation to emissions from combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 3% dry for liquid and gaseous fuels, 6% dry for solid fuels; and/or

(b) in relation to emissions from non-combustion sources, the concentration at a temperature of 273K and at a pressure of 101.3 kPa, with no correction for water vapour content.

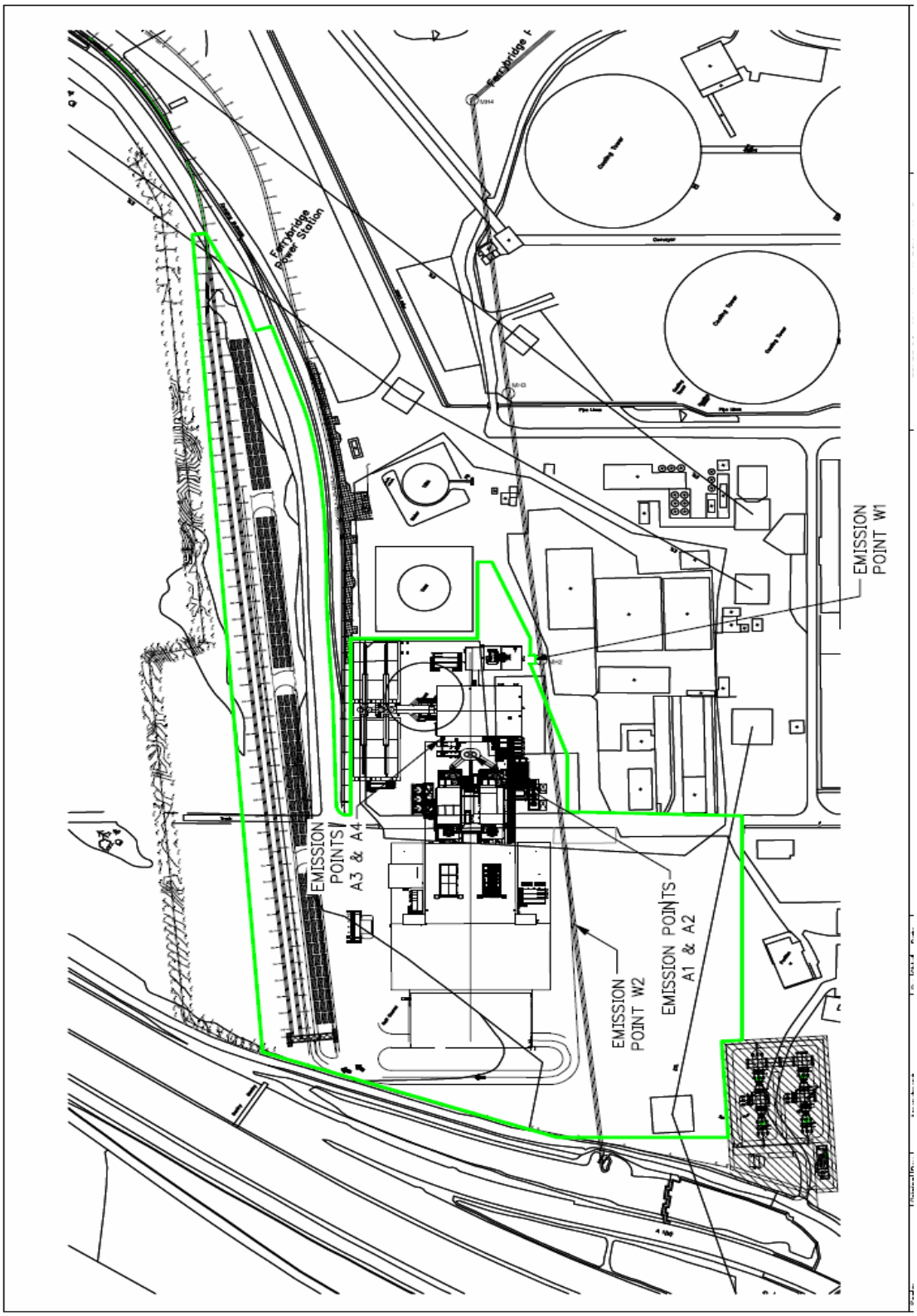
(c) in relation to gases from incineration and co-incineration plants other than those burning waste oil, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 11% dry.

For dioxins/furans and dioxin-like PCBs the determination of the toxic equivalence concentration (I-TEQ, & WHO-TEQ for dioxins/furans, WHO-TEQ for dioxin-like PCBs) stated as a release limit and/ or reporting requirement, the mass concentrations of the following congeners have to be multiplied with their respective toxic equivalence factors before summing. When reporting on measurements of dioxins/furans and dioxin-like PCBs, the toxic equivalence concentrations should be reported as a range based on: all congeners less than the detection limit assumed to be zero as a minimum, and all congeners less than the detection limit assumed to be at the detection limit as a maximum.

TEF schemes for dioxins and furans				
Congener	***I-TEF***	***WHO-TEF***		
	1990	**2005**	**1997/8**	
		Humans / Mammals	***Fish***	***Birds***
Dioxins				
2,3,7,8-TCDD	*1*	*1*	*1*	*1*
1,2,3,7,8-PeCDD	*0.5*	*1*	*1*	*1*
1,2,3,4,7,8-HxCDD	*0.1*	*0.1*	*0.5*	*0.05*
1,2,3,6,7,8-HxCDD	*0.1*	*0.1*	*0.01*	*0.01*
1,2,3,7,8,9-HxCDD	*0.1*	*0.1*	*0.01*	*0.1*
1,2,3,4,6,7,8-HpCDD	*0.01*	*0.01*	*0.001*	*<0.001*
OCDD	*0.001*	*0.0003*	*-*	*-*
Furans				
2,3,7,8-TCDF	*0.1*	*0.1*	*0.05*	*1*
1,2,3,7,8-PeCDF	*0.05*	*0.03*	*0.05*	*0.1*
2,3,4,7,8-PeCDF	*0.5*	*0.3*	*0.5*	*1*
1,2,3,4,7,8-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
1,2,3,7,8,9-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
1,2,3,6,7,8-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
2,3,4,6,7,8-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
1,2,3,4,6,7,8_HpCDF	*0.01*	*0.01*	*0.01*	*0.01*
1,2,3,4,7,8,9-HpCDF	*0.01*	*0.01*	*0.01*	*0.01*
OCDF	*0.001*	*0.0003*	*0.0001*	*0.0001*

TEF schemes for dioxin-like PCBs			
Congener	***WHO-TEF***		
	2005	**1997/8**	
	Humans / mammals	***Fish***	***Birds***
Non-ortho PCBs			
3,4,4',5-TCB (81)	*0.0001*	*0.0005*	*0.1*
3,3',4,4'-TCB (77)	*0.0003*	*0.0001*	*0.05*
3,3',4,4',5 - PeCB (126)	*0.1*	*0.005*	*0.1*
3,3',4,4',5,5'-HxCB(169)	*0.03*	*0.00005*	*0.001*
Mono-ortho PCBs			
2,3,3',4,4'-PeCB (105)	*0.00003*	*<0.000005*	*0.0001*
2,3,4,4',5-PeCB (114)	*0.00003*	*<0.000005*	*0.0001*
2,3',4,4',5-PeCB (118)	*0.00003*	*<0.000005*	*0.00001*
2',3,4,4',5-PeCB (123)	*0.00003*	*<0.000005*	*0.00001*
2,3,3',4,4',5-HxCB (156)	*0.00003*	*<0.000005*	*0.0001*
2,3,3',4,4',5'-HxCB (157)	*0.00003*	*<0.000005*	*0.0001*
2,3',4,4',5,5'-HxCB (167)	*0.00003*	*<0.000005*	*0.00001*
2,3,3',4,4',5,5'-HpCB (189)	*0.00003*	*<0.000005*	*0.00001*

Schedule 7 - Site plan



END OF PERMIT

Appendix G

Full review against the NSW EfW PS

Section	Page ref	NSW EfW Policy Criteria	Arup comments on updated PDB (Project Definition Brief)	Arup comments on RTS (Response to Submissions) report	Arup comments on BAT (Best Available Techniques) memo	Arup comments on MRA feedstock review	Criterion met (Y/N)
1 Introduction	1	Facilities proposing to recover energy from waste will need to **meet current international best practice techniques**, particularly with respect to: • **process design and control** • **emission control equipment** design and control **emission monitoring with real-time feedback** to the controls of the process	The technology for the facility is described as a moving grate system with water and air cooled grate bars, with an air cooled condenser for exhaust cooling and SNCR flue gas treatment designed to achieve EU IED and NSW limits (page 9 of the PDB). Section 3.2.3 states that emissions will be monitored continuously be an automated system and reported in accordance with NSW EPA protocols (page 34).	*'There is no change to the technology proposed to be implemented in the EfW facility from that presented and assessed in the amended EIS'* (page 6 RTS report).	The addendum to the BAT memo from Ramboll (dated 19th Sept 2017) states no changes are required to the original BAT memo from 18th February 2016. The original BAT memo evaluates the proposal in relation to BREF criteria. A review of the BAT memo indicates no major or obvious issues with the and that broadly speaking the proposal meets the NSW EfW criteria. It should be noted there is a new draft published BAT – the proposal may be considered a new		Yes

Section	Page ref	NSW EfW Policy Criteria	Arup comments on updated PDB (Project Definition Brief)	Arup comments on RTS (Response to Submissions) report	Arup comments on BAT (Best Available Techniques) memo	Arup comments on MRA feedstock review	Criterion met (Y/N)
					or transition facility under this.		
2 Energy recovery framework and scope	4	As proposals progress from the concept to detailed development assessment stage, proponents should engage in a genuine dialogue with the community and ensure that planning consent and other approval authorities are provided with accurate and reliable information.		Section 7.17 provides overview of community consultation to date. This appears adequate, although comments under the TOR review should be noted. Proponent should commit to continuing consultation during design, construction and commissioning and provide approximate details/timeline for this – not much information is provided on this other than the ongoing 1800 community line and project email. Previous reports included in the amended EIS such as 'ongoing community consultation and communications strategy' are not referred to.			Yes
		The operators of an energy from waste facility will need to be 'good neighbours' – particularly if near a	Ongoing community engagement is not	There is a lack of a future plan to actively engage and	Ongoing community engagement is not	Ongoing community engagement is not	No

Section	Page ref	NSW EfW Policy Criteria	Arup comments on updated PDB (Project Definition Brief)	Arup comments on RTS (Response to Submissions) report	Arup comments on BAT (Best Available Techniques) memo	Arup comments on MRA feedstock review	Criterion met (Y/N)
		residential setting but also where there are workers in other facilities. This would apply to waste deliveries and operating hours, but most importantly with respect to readily available information about emissions and resource recovery outcomes.	described in the report. Section 4.3 details truck movements, but doesn't mention deliveries relative to operating hours.	communicate with the community through all stages of the proposal including operation. Appendix J (waste management report) to the Amended EIS stated adherence to the 'good neighbour' principal in Section 8.3 – however lack of detail on this in other documentation.	described in the report.	described in the report.	
3 Eligible waste fuels	5	The following wastes are categorised by the EPA as eligible waste fuels: 1. biomass from agriculture 2. forestry and sawmilling residues 3. uncontaminated wood waste 4. recovered waste oil 5. organic residues from virgin paper pulp activities 6. landfill gas and biogas 7. source-separated green waste (used only in processes to produce char) 8. tyres (used only in approved cement kilns).				The Proponent's proposed fuel feedstock mix does not meet the eligible waste fuel requirements. Therefore the fuel needs to meet the requirement for an energy recovery facility, see Section 4. below.	See Section 4 below
4 Energy recovery facilities Technical criteria	6	Any facility proposing to thermally treat a waste or waste-derived material that is **not a listed eligible waste fuel** (Section 3) must **meet the requirements to be an energy recovery facility**.			It appears the proposed facility generally will fulfil most of the 68 BAT requirements.		Yes

Section	Page ref	NSW EfW Policy Criteria	Arup comments on updated PDB (Project Definition Brief)	Arup comments on RTS (Response to Submissions) report	Arup comments on BAT (Best Available Techniques) memo	Arup comments on MRA feedstock review	Criterion met (Y/N)
		Energy recovery facilities refer to facilities that **thermally treat waste-derived materials that fall outside of the low-risk '*eligible waste fuels*'.** These facilities must therefore **demonstrate** that they will be **using current international best practice techniques**, particularly with respect to: • **process design** and control • **emission control equipment** design and control • **emission monitoring with real-time feedback** to the controls of the process • **arrangements for the receipt of waste management of residues** from the energy recovery process.			It should be noted there is a new draft published BAT – the proposal may be considered a new or transition facility under this.		
		Energy recovery facilities must **use technologies that are proven**, **well understood** and **capable of handling the expected variability and type of waste feedstock**. This must be **demonstrated through reference to fully operational plants** using the **same technologies** and **treating like**	Eight reference facilities are presented (table 13). Seven of these are the same facilities presented in previous reports, with an additional reference facility TIRME Mallorca included.	Reference facilities are not discussed in this report.	Reference facilities are not discussed in this report.	Reference facilities are not discussed in this report.	Yes

Section	Page ref	NSW EfW Policy Criteria	Arup comments on updated PDB (Project Definition Brief)	Arup comments on RTS (Response to Submissions) report	Arup comments on BAT (Best Available Techniques) memo	Arup comments on MRA feedstock review	Criterion met (Y/N)
		waste streams in other **similar jurisdictions**.	Page 15 presents the fuel mix, and tables 11 and 12 present chemical composition comparisons between the proposed facility and the reference facilities. Refer to section 4 of the main Arup merit review.				
	6	The **gas resulting from the process should be raised**, after the last injection of combustion air, in a **controlled and homogenous fashion** and even under the most unfavourable conditions to a **minimum temperature of 850°C for at least 2 seconds** (as measured near the inner wall or at another representative point of the combustion chamber).	Section 5.4 states that *'the furnace and secondary combustion chamber shall comply with the 2s retention time and 850 degrees C temperature requirement of the IED and be equipped with auxiliary burners.'* This indicates compliance with this criterion.				Yes
		If a waste has a **content of more than 1% of halogenated organic substances**, expressed as chlorine,		Updated information cited in Section 6.6.2 presents audit data of the			Yes

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		the **temperature should be raised to 1100°C for at least 2 seconds** after the last injection of air.		five design fuel mix waste streams, and argues that the chlorine content will be less than 1% as all streams have a content of less than 1% - floc waste has the highest chlorine content at 0.6%. Section 6.6.3 details homogenisation measures for mixing waste. The above appears to indicate the provision for 1,100°C for 2 seconds is not required			
		The process and air emissions from the facility must satisfy **at a minimum** the requirements of the **Group 6 emission standards** within the Protection of the Environment Operations (Clean Air) Regulation 2010	Page 56 states the facility will meet IED emission limits. These are generally more stringent than Group 6 emission standards.				Yes
	7	**There must be continuous measurements of NOx, CO, particles (total), total organic compounds, HCl, HF and SO2**. This data must be made available to the EPA in real-time graphical publication and a weekly summary	Section 6.7.1 indicates compliance with this criterion.				Yes

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		of continuous monitoring data and compliance with emissions limits published on the internet. The continuous measurement of HF may be omitted if treatment stages for HCl are used which ensure that the emission limit value for HCl is not being exceeded.					
		There must be **continuous measurements** of the following **operational parameters**: **temperature** at a representative point in the combustion chamber; **concentration of oxygen**; **pressure and temperature in the stack**; and **water vapour content** of the exhaust gas.	Section 6.7.1 indicates compliance with this criterion.				Yes
	7	As part of the environment protection licence conditions of any energy recovery facilities, the EPA will require operators to undertake proof of performance (POP) trials to demonstrate compliance with air emissions standards. Following successful POP trials, there must be at least two measurements per year of heavy metals, polycyclic aromatic hydrocarbons, and chlorinated dioxins and furans. One measurement at least every three months shall be carried out for the first 12 months of operation. If and when appropriate measurement	POP is not discussed in this report.	Section 6.5 – still provided in Appendix LL to amended EIS.			Yes

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		techniques are available, continuous monitoring of these pollutants will be required.					
	7	The **total organic carbon** (TOC) or **loss on ignition** (LOI) content of the **slag and bottom ashes must not be greater than 3% or 5%,** respectively, of the dry weight of the material.	Table 5.12 includes these requirements as design data. Assuming this is complied with, this requirement will be met.				Yes
	7	**Waste feed interlocks are required** to prevent waste from being fed to the facility when the required temperature has not been reached either at start-up or during operation.		RTS makes reference in Section 7.4.4. Also amended EIS (table 30) indicated compliance with this criterion.			Yes
	7	The **net energy produced** from thermally treating that waste, **including the energy used in applying best practice techniques**, **must therefore be positive**.	Table 9 indicates compliance with this criterion.	No reference made to this criterion.			Yes
	7	To meet the **thermal efficiency criteria**, facilities must **demonstrate that at least 25%** of the energy generated from the thermal treatment of the material **will be captured as electricity** (or an equivalent level of recovery for facilities generating heat alone).	Table 9 indicates compliance with this criterion.	No reference made to this criterion.			Yes
	7	Energy recovery facilities must also **demonstrate that any heat generated** by the thermal processing	Section 7.5 states that the proposed facility will be				Yes

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		of waste is **recovered as far as practicable**, including **use of waste heat for steam or electricity generation** or for **process heating of combined heat and power schemes**.	configured to export heat (up to 20MWth per turbine). Section 7.1 states that low pressure steam will be used internally in the facility. This requirement should be met by the facility.				
	7	The policy statement's objectives in setting resource recovery criteria are to: • **promote the source separation of waste** where **technically and economically achievable** • drive the use of **best practice material recovery processes** • ensure **only the residual from bona-fide resource recovery operations are eligible** for use as a feedstock for an energy recovery facility.				See section 4 of the main Arup merit review.	No
	8	Energy recovery facilities **may only receive feedstock from "authorised" waste facilities or collection systems** that meet the criteria outlined in **Table 1**.				See section 4 of the main Arup merit review.	No.