

## Attachment-4-3-4-R and D Activity Capacity Calcs

### D01 - Deposit into or on to land (e.g. landfill, etc.)

**Table 1: D01 Capacity Calculations**

Capacity		
	m3	Details
Non-Hazardous Landfill	5,000,000	Design capacity of landfill
Hazardous Landfill	1,980,000	Design capacity of landfill
Existing MSW Landfill	(5,040,000)	Design capacity of landfill
Void Space Used	(4,352,315)	From latest surveyed quantity in Sept 2018
Existing MSW Landfill (void capacity remaining)	687,685	
<b>TOTAL</b>	<b>7,667,685</b>	

This IED Licence application includes for the continuation or acceptance of pre-treated municipal waste to the MSW Landfill until the end of the current permission for the facility, which is 2028. The applicant acknowledges the European and National policy as well as the waste management industry to move away from landfilling towards a Circular Economy and is cognisant of the State's obligations under the Waste Framework Directive (2008/98/EC), i.e. *"Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass by 2020 and the Landfill Directive (1999/31/EC), i.e. Biodegradable municipal waste going to landfills must be reduced to 35% of the total quantity (by weight) biodegradable municipal waste produced in 1995"*.

The applicant is also keenly aware of the preference for reuse and recovery of waste over disposal in accordance with the EU waste hierarchy and has established organic waste recovery facilities to maximise the reuse potential of organic wastes. Bord na Móna's Advanced Environmental Solutions (AES) business also provides a high-quality waste collection service to both domestic and commercial customers ensuring maximum source segregation of waste materials with a view to minimising the residual waste quantities going to landfill.

However, it is still a reality that some quantity of residual MSW will require disposal to landfill and the existing Drehid facility is one of only five landfills in the country receiving municipal residual waste <sup>1</sup>. As noted in this EPA Current Situation Release, *"Landfill capacity was at a critical point in 2016 and the acceptance capacity at three landfills was increased as a short-term measure"*. The ongoing

<sup>1</sup> EPA, Current Situation – EPA Release 31 January 2018 (EPA website accessed on 16 August 2018)

provision of MSW landfill capacity to serve the Greater Dublin region is imperative to ensuring Ireland's self-sufficiency and reducing the quantities of residual waste exported from the State.

The need for the provision of new non-hazardous and hazardous landfill capacity at the site is outlined in detail in Section 2.2.1 of the Proposed Development EIAR. In terms of providing capacity for the landfilling of non-hazardous and hazardous ash from waste incineration activities, it is noted that the vast majority of fly ash/gas treatment ash generated at the two operational waste incinerators in the country, Indaver in Duleek, Co. Meath and Dublin Waste to Energy in Poolbeg, Dublin 4 was exported to Europe in 2017. The provision of facilities at Drehid for the landfilling of this waste in Ireland will enable the country to move towards being more self-sufficient in the management of these waste streams and not be overly reliant on the export markets.

The available volume capacity in the proposed non-hazardous and hazardous landfills is 5,000,000 m<sup>3</sup> and 1,980,000 m<sup>3</sup>, respectively, based on the landfill design provided.

The existing MSW landfill had a design volume capacity of 5,040,000 m<sup>3</sup> and based on the latest survey of the infilled waste body (September 2018), there is 637,685 m<sup>3</sup> of this capacity remaining. Therefore, the total available landfill capacity is 7,667,685 m<sup>3</sup>.

**Table 2: D01 Maximum Quantity Calculations**

Maximum Quantity		
	TPA	Details
Non-Hazardous Landfill	250,000	Proposed quantity from EIAR
Hazardous Landfill	85,000	Proposed quantity from EIAR
Existing MSW Landfill	120,000	Existing Permitted
<b>TOTAL</b>	<b>455,000</b>	

In accordance with the planning application submitted for the new landfill infrastructure, it is proposed that the maximum quantity of waste to be accepted for disposal to the non-hazardous landfill will be 250,000 TPA and to the hazardous landfill will be 85,000 TPA. In accordance with the current planning permission for the existing facility (ABP Ref. PL09.PA0004), it is proposed to continue acceptance of 120,000 TPA of waste to the MSW landfill.

**D13 - Blending or mixing prior to submission to any of the operations number D1 to D12**

**Table 3: D13 Capacity Calculations**

<b>Capacity</b>		
	<b>tonnes/day</b>	<b>Details</b>
Ash Solidification	284	Average capacity of the plant allowing for annual intake of 85,000 tonnes of fly ash and FGTR @ 6 days per week, 50 weeks per year.
IBA Maturation Facility	834	Average capacity of the plant allowing for annual intake of 250,000 tonnes of IBA @ 6 days per week, 50 weeks per year.
IBA Metal Recovery	784	Average capacity of the plant allowing for annual intake of 235,294 tonnes of IBA @ 6 days per week, 50 weeks per year. (c. 6% will be lost from the IBA incoming in evaporation during maturation process)
Non-hazardous C&D waste including soil and stones	833	Pre-treatment of incoming non-hazardous C&D. Capacity based on maximum intake of 250,000 TPA of non-hazardous waste @ 6 days per week, 50 weeks per year.
<b>TOTAL</b>	<b>2,735</b>	

The above waste activities are pre-treatment activities prior to disposal of non-hazardous and hazardous waste in landfill. Accordingly, the above quantities are included in the disposal to landfill quantities outlined in Table 1 above (with the exception of c. 62 tonnes/day of metals which will be recovered from the IBA material and removed off-site for recycling and suitable stone material which can be screened from incoming soil and reused on-site).

The above capacity values are the typical daily processing capacity in each facility based on the maximum permitted intake volumes of waste to landfill.

This licence Application is being sought for the acceptance of up to 85,000 TPA of suitable waste for disposal to the hazardous landfill (as per Table 2). It is currently estimated that up to 50,620 TPA of this waste quantity will be in the form of fly ash and FGTR, however approval is being sought for the acceptance of up to 85,000 TPA of hazardous incinerator ash in the event that this quantity of the material becomes available. This incoming waste will be transferred into storage silos to allow for blending with cement and liquids to form a chemical and physical encapsulation of the leachable components. The ash solidification process is a widely-used method which includes all processes that physically and hydraulically encapsulate residues and produces the most satisfactory results in terms of environmental performance (compliance with criteria/long term behaviour) and cost. The solidification process is used in various facilities across Europe including at Indaver's facility at

Antwerp in Belgium which the project team visited during the design process). The process creates a stabilised granular material is a proven methodology in the solidification of hazardous incineration ash for disposal to landfill. The provision of the solidification plant at the Drehid WMF is a key component in being able to landfill the material and provide a solution to hazardous ash waste management in Ireland.

This licence application is being sought for the acceptance of up to 250,000 TPA of suitable waste material for disposal to the non-hazardous landfill (as per Table 2). It is currently anticipated that up to 200,000 TPA of this waste quantity will be in the form of IBA which require pre-treatment in the maturation facility and the metals recovery facility. However, approval is being sought for the acceptance of up to 250,000 TPA of IBA in the event that this quantity of the material becomes available. The maturation facility will be of significant scale to allow for up to eight weeks storage of IBA allowing for sufficient reduction in moisture content and pH. Currently, IBA generated at Indaver's waste-to-energy facility in Co. Meath is screened on-site at the Indaver facility to remove metals, however this screening may take place at the Drehid facility in future, depending on agreement. The Dublin Waste-to-Energy facility in Poolbeg does not have capacity to screen IBA for metals on-site so this would also take place at the Drehid facility. The proposed plant to be installed at Drehid will have capacity to treat up to 120 tonnes/hr (1,380 tonnes/day) of IBA for metals removal.

In the case of the IBA metal recovery process, the proposed plant will enable the removal of recyclable metal components from the incoming IBA which will be transferred off-site to suitable metal recovery facilities. There is typically 7 – 10% ferrous and non-ferrous metals contained in IBA following the incineration process and the removal of the metallic fraction from the incoming IBA will reduce the overall quantity of material requiring landfilling. In this way, the removal of metals from the waste supports recycling of the metal in favour of disposal in accordance with the EU Waste Hierarchy.

It is proposed to accept non-hazardous C&D waste including soil and stone for disposal in the non-hazardous landfill. The quantity of non-hazardous C&D accepted will depend on the quantity of IBA available in the market such that the total intake of waste to the non-hazardous landfill does not exceed 250,000 TPA. Accordingly, approval is sought for the acceptance of 250,000 TPA of non-hazardous C&D in the event that no IBA material is available.

Where appropriate, incoming non-hazardous C&D including soils and stone will be screened to remove suitable material for engineering purposes. This will minimise the requirement to import virgin materials to the site for engineering purposes.

**Table 4: D13 Maximum Quantity Calculations**

Maximum Quantity		
	TPA	Details
Ash Solidification	85,000	Maximum quantity of fly ash and FGTR to be accepted at the facility
IBA Maturation	250,000	Maximum quantity of IBA to be accepted at the facility
IBA Metal Recovery	250,000	Maximum quantity of IBA to be accepted at the facility
Non-hazardous C&D including soil and stone	250,000	Maximum quantity of non-hazardous C&D to be accepted at the facility
<b>TOTAL</b>	<b>835,000</b>	

As above, it is currently anticipated that up to 50,620 TPA of waste incoming to the hazardous landfill will be in the form of fly ash and FGTR. However, approval is being sought for acceptance of 85,000 TPA of hazardous incinerator ash in the event that additional incineration capacity is developed and this material becomes available.

Similarly, it is currently anticipated that up to 200,000 TPA of waste incoming to the non-hazardous landfill will be IBA material. However, approval is being sought for acceptance of 250,000 TPA of IBA in the event that additional incineration capacity is developed and this material becomes available.

**R03 - Recycling/Reclamation of organic substances (including composting)**

**Table 5: R03 Capacity Calculations**

Capacity		
	tonnes/day	Details
Compost Facility	300	Average capacity of the plant allowing for annual intake of 90,000 tonnes of biodegradable material @ 6 days per week, 50 weeks per year.
<b>TOTAL</b>	<b>300</b>	

The compost facility will be extended to allow for the acceptance of up to 90,000 TPA of suitable biodegradable waste. The facility has the capacity to process 300 tonnes/day of suitable material.

The existing composting plant provides important infrastructure and treatment facilities for the management of organic waste materials and helps to reduce the biodegradable content of residual MSW prior to landfilling in accordance with the requirements of the Landfill Directive (1999/31/EC). The provision of organic waste treatment facilities such as the existing composting facility at Drehid has contributed towards Ireland achieving the target set out in the Landfill Directive. The proposed extension of the existing composting facility and increasing the capacity of the plant from 25,000 TPA to 90,000 TPA will further contribute to reducing the quantities of biodegradable waste going to landfill. As outlined in Section 2.2.1 of the EIAR, the justification for the proposed changes to the volume of waste to be accepted at the composting facility is the ongoing requirement to divert bio-waste from landfill, as provided for in E.U. and National policy, and is supported by the recently adopted Eastern Midlands Regional Waste Management Plan, in which Policy E.17 states that *“The waste plan supports the development of at least 75,000 tonnes of additional biological treatment capacity in the region for the treatment of bio-wastes (food waste and green waste) primarily from the region to ensure there is adequate active and competitive treatment in the market.”*

**Table 6: R03 Maximum Quantity Calculations**

Maximum Quantity		
	TPA	Details
Composting Facility Extension	45,000	Proposed new facility
Increased Existing Compost Facility Capacity	20,000	Additional capacity available in existing facility
Existing Compost Facility	25,000	Existing capacity
<b>TOTAL</b>	<b>90,000</b>	

The compost facility will be extended to allow for the acceptance of up to 90,000 TPA of suitable biodegradable waste.

Clause 3 and Schedule 1 of the *Waste Management (Food Waste) Regulations 2009* do not apply to the Drehid WMF in respect of the generation of food waste. Nonetheless, any food waste generated by employees at the facility is segregated from recyclable materials and residual waste and stored separately. When full, waste containers are transferred to the composting facility.

## R05 - Inorganic substance recycling/reclamation

Table 7: R05 Capacity Calculations

Capacity		
	tonnes/day	Details
Engineering materials for use in landfill	400	Acceptance of up to 120,000 TPA of recovered engineering materials to use in temporary roads, turning areas, tipping areas and cover in the landfill. 6 days/week, 50 weeks per year.
<b>TOTAL</b>	<b>400</b>	

The operation of the MSW Landfill requires the laying of temporary haul roads, turning areas and tipping areas on the landfill waste body to allow incoming trucks to access the active tipping face. In addition, engineering materials are required for use as daily and intermediate cover. The following estimates of daily engineering material requirements for the MSW Landfill have been determined from current operations:

- Daily cover (typical working face of area of c. 25m x 6m and 2.5m depth requiring c. 0.4m daily cover depth on surface and three sides) – 97 m<sup>3</sup>
- Intermediate cover – 75 m<sup>3</sup>
- Haul road construction and maintenance – 105 m<sup>3</sup>
- Turning area construction and maintenance – 220m<sup>3</sup>
- Material surrounding gas collection pipework – 40 m<sup>3</sup>

From the above list, the total quantity of engineered materials required for the MSW Landfill on a daily basis is approx. 537 m<sup>3</sup> (which is equivalent to approx. 750 tonne based on an average density for cover material of 1.4 tonne/m<sup>3</sup>). A portion of this requirement can be fulfilled by the biostabilised compost facility output which is mainly used in intermediate and daily cover. However, the compost facility output is not suitable for construction of haul roads and turning areas for HGVs on the waste body and therefore it is required to import suitable engineered material for recovery including C&D wastes, soil and glass.

The hazardous and non-hazardous landfills will not require the import of engineering materials for road and turning area construction as the main waste types proposed for acceptance and disposal in the landfill (i.e. C&D waste including soil and stone and ash) will be suitable to use for this purpose.

Suitable material placed on top of the final cap plastic liner are considered engineering materials for landfill construction purposes and are not included in the above calculation of engineering materials for operational purposes.

**Table 8: R05 Maximum Quantity Calculations**

Maximum Quantity		
	TPA	Details
Engineering materials for use in landfill	120,000	Maximum quantity of engineering materials to be accepted at the facility.
<b>TOTAL</b>	<b>120,000</b>	

As above, approval is being sought for the import of 120,000 TPA of engineering materials for operational purposes at the Drehid WMF.

**R13 – Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where the waste is produced)**

**Table 9: R13 Capacity Calculations**

Capacity		
	tonnes	Details
Temporary storage of inert engineering materials for use in landfills	60,000	Temporary storage of inert engineering materials for use in landfills.
<b>TOTAL</b>	<b>60,000</b>	

It is proposed to allocate an area to the east of the non-hazardous landfill as an inert material storage area as shown on Drawing No. 8108-2010. This area will be used for storage of inert materials for the engineering purposes at the landfill. The engineering materials used at the landfill may be sourced from recovered waste material, therefore approval is sought for the temporary storage of inert engineering materials in this area prior to placement on the landfills. It is proposed that a maximum quantity of recovered waste to be stored in this location will be 60,000 tonnes. This estimate is based on current engineering material requirements at the existing facility.

**Table 10: R13 Maximum Quantity Calculations**

<b>Maximum Quantity</b>		
	<b>TPA</b>	<b>Details</b>
Temporary storage of inert engineering materials for use in landfills.	120,000	Maximum annual quantity of inert engineering materials to be accepted at the facility.
<b>TOTAL</b>	<b>120,000</b>	

It is estimated that approx. 120,000 TPA of inert engineering materials will be required to be accepted at the facility. It is noted that this quantity of engineering material is the same material as proposed for acceptance at the facility in Table 8 above. Therefore, the total quantity of recovered engineering material proposed for acceptance at the facility is 120,000 TPA.

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