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NORTHERN IRELAND LANDFILL CAPACITY REPORT

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1 Introduction

WDR & RT Taggart have been appointed by Mid Ulster District Council to undertake a study into future landfill capacity in Northern Ireland.

Northern Ireland has seen a change in the management of waste over the past 15 years, moving from landfill disposal of waste to the recycling and composting of appropriate wastes with a large volume of the residual waste sent for processing and energy recovery.

Even with the waste treatment and processing solutions currently delivered and proposed by the private and public sector it is acknowledged that there will still be the need for non-hazardous landfill capacity in Northern Ireland to deal with material that cannot be recovered.

The purpose of this report is to look at the existing landfill capacity in Northern Ireland and assess the potential future capacity requirements.

2 Scope of the Study

The scope of this study is to assess:

1. Current landfill capacity;
2. The latest reported volume of waste landfilled;
3. Northern Ireland future landfill capacity looking at a number of scenarios such as the early closure of Local Authority owned sites, the potential implementation of the arc21 EfW facility (Beacon), potential waste growth and statutory recycling targets;
4. Identification of potential sites for development; and
5. Ranking of potential development sites based on a series of criteria.

3 Policy Context

3.1 Introduction

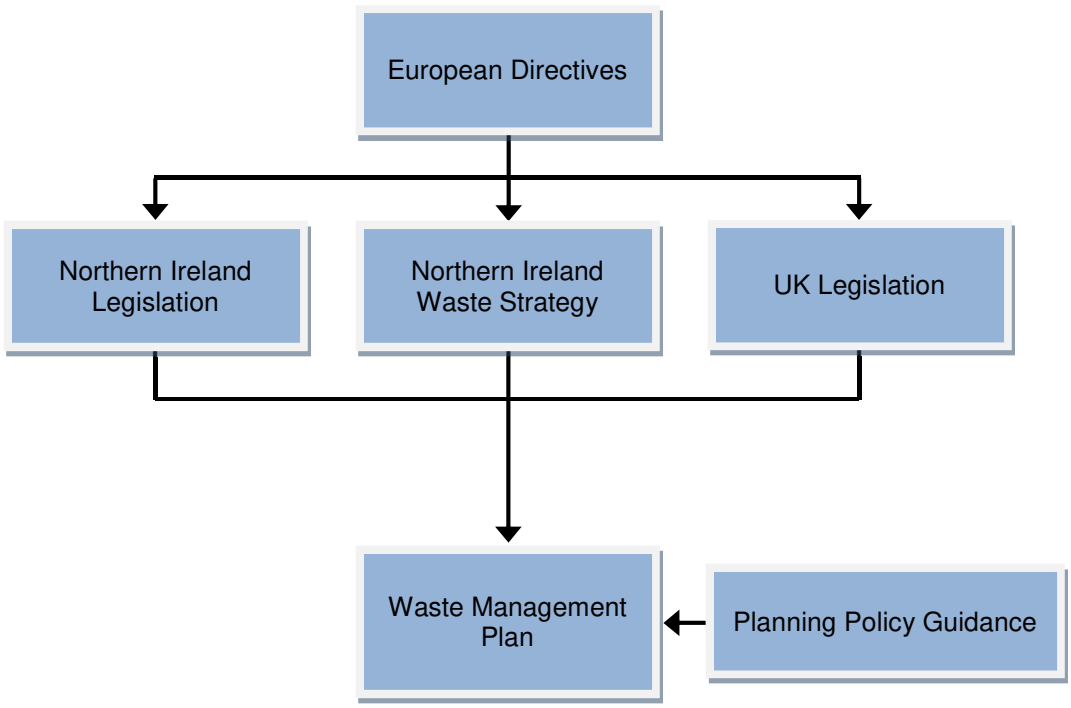
Current and future waste management activities are influenced by the legislative and policy framework in Northern Ireland. This includes EU waste policy which aims to reduce the environmental and health impacts of waste and improve resource efficiency. The majority of waste policy and guidance is based on EU Directives which are then translated into National legislation and policy within certain timescales.

Waste legislation in Northern Ireland is implemented in three levels, comprised of European Union Directives, UK wide legislation and Northern Ireland specific legislation and policy (Northern Ireland Orders, Regulations and national planning guidelines). In Northern Ireland, EU Directives are implemented through primary and secondary legislation. Primary legislation includes Orders and Acts and secondary legislation includes Regulations and planning guidelines.

This Section provides an overview of current and anticipated waste policy and legislative measures in order to identify and understand the key issues that need to be taken into account when assessing landfill capacity requirements.

The overall place and strategic influence of EU policy in the legislative and policy framework in Northern Ireland is set out in Figure 3.1 below.

Figure 3.1 Legislative and Policy Framework



It should be stressed that this Section provides a simple overview of waste policy and legislation. It is not exhaustive, and does not detail every piece of legislation or every policy measure.

3.2 Current EU Waste Policy and Legislation

The EU gives strong direction to its member states on waste issues and much of UK and NI waste policy and guidance is based on EU legislation. EU waste policy and legislation had an

initial focus in putting in place measures to manage and control waste and this led to the adoption of the Waste Framework Directive (75/442/EEC) in 1975. This, together with the Hazardous Waste Directive, which was also originally adopted in 1975, and the Waste Shipment Regulation (Regulation (EEC) 259/93) put in place the regulatory framework for waste. These pieces of legislation define waste, and other fundamental concepts including licensing, and put in place controls for the handling and movement of waste, to prevent damage to the environment or human health.

Recycling, re-use and energy recovery, in preference to the disposal of waste came with the 1996 Waste Strategy Communication from the European Commission which:

- Reinforced the Waste Hierarchy.
- Re-affirmed the 'polluter pays' principle for waste; and
- Developed the concept of Priority Waste Streams.

The Thematic Strategy on the Prevention and Recycling of Waste is one of the seven thematic strategies programmed by the Sixth Community Environmental Action Programme which was adopted by the European Commission on 21 December 2005. The Strategy confirmed the need to shift direction in order to meet the challenges of the future in delivering a sustainable approach to waste and resource management. The Strategy noted the need to assess the existing definitions of recovery and disposal, the need for a generally applicable definition of recycling and a debate on the definition of waste.

Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste established the legislative framework for the handling of waste. It defines key concepts such as waste, recovery and disposal and puts in place the essential requirements for an establishment of waste management operations to have a permit or to be registered and placed an obligation for member States to prepare waste management plans. Furthermore is also established principles such as an obligation to handle waste in a way that does not have negative impacts on the environment or human health, an encouragement to apply the waste hierarchy and, in accordance with the polluter-pays principle, a requirement that the costs of disposing of waste must be borne by the holder of waste, by previous holders or by the producers of the product from which the waste came.

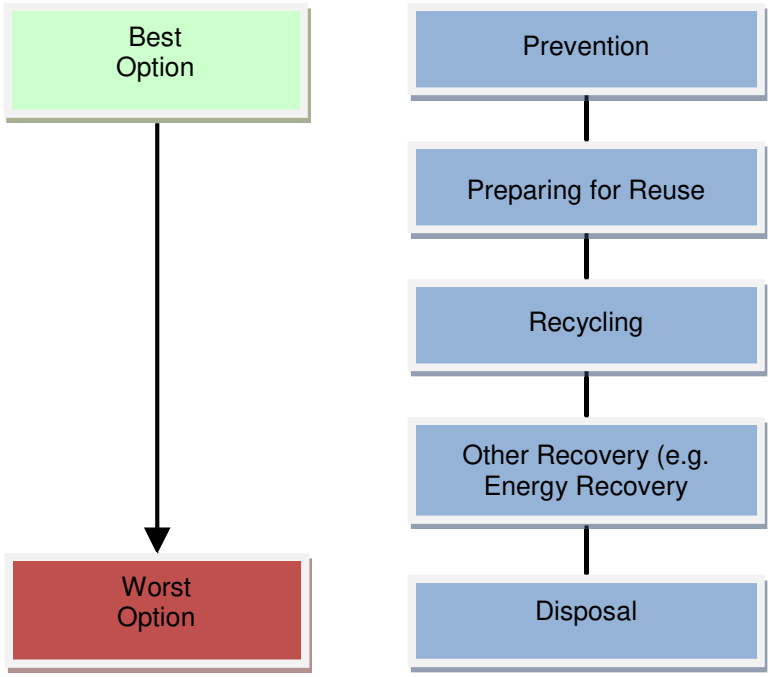
The outcome of the Thematic Strategy on the Prevention and Recycling of Waste resulted in the revision of the Waste Framework Directive.

3.2.1 Revised Waste Framework Directive (WFD)

The Waste Framework Directive (2008/98/EC) is the overarching legislative framework and is of particular significance to the study. It provides a foundation for sustainable waste management practice and defines waste. This Directive, which was adopted on the 19th November 2008, sets out measures to minimise the negative effects of the generation and management of wastes on human health and the environment and aims to reduce the use of resources. This Directive also repealed the directive on Waste Disposal (75/439/EEC).

A key component of the revised WFD is the new Waste Hierarchy, the primary purpose of which is to, minimise adverse environmental effects from waste and to increase resource efficiency in waste management and policy. Article 4 of the WFD sets out the new Waste Hierarchy as a priority order for waste management, as set out in Figure 3.2 below.

Figure 3.2 Waste Management Hierarchy



Waste prevention is set out as the most favourable option even though it is not technically a waste measure, as it occurs before a material becomes waste. However, the reduction of waste through reuse or other policy initiatives is a key objective of turning waste into a resource. Preparing for Reuse has also been included in the new Waste Hierarchy above Recycling with the aim of also improving resource efficiency.

When applying the Waste Hierarchy the WFD states that measures should be taken to encourage the options that deliver the best overall environmental outcomes.

In order to move towards a recycling society with a high level of resource efficiency the revised WFD also implements new targets for the reuse and recycling of materials.

- To achieve a recycling rate of 50% (including preparing for reuse) of household waste by 2020.
- To achieve a recovery rate of 70% (including preparing for reuse, recycling and other materials recovery) for all non-hazardous construction and demolition waste by 2020.

The revised WFD also specifies the requirement for waste management plans and strategies to be established which set out the current waste management situation, as well as the measures to be taken to improve reuse, recycling, recovery and disposal of waste.

The requirements of the revised WFD have been transposed into Northern Ireland legislation through the Waste Regulations (Northern Ireland) 2011.

3.2.2 Landfill Directive

The aim of the Landfill Directive (99/31/EC) is to provide measures, procedures and guidance to prevent or reduce as far as possible the negative effects on the environment from landfill waste. This is to be implemented through changing the way waste is disposed and progress up the waste management hierarchy achieved, through the minimisation of waste being sent to landfill.

Key objectives of the Landfill Directive include:

- The categorisation of landfills as inert, non-hazardous and hazardous;
- Ban on the co-disposal of hazardous and non-hazardous waste;
- Ban on the disposal of tyres;
- Ban on the landfill of certain types of hazardous wastes such as clinical or infectious;
- Standard waste acceptance procedures, which include the treatment of waste prior to landfilling;
- Operating permits, including the provisions for closure and aftercare;
- Technical standards for the lining and capping of landfills;
- Practice pre-treatment of waste going to landfill; and
- Reduction in the amount of biodegradable waste sent to landfill.

The requirements of this Directive are implemented in Northern Ireland through the Landfill (Northern Ireland) Regulations, 2003 SR 297 (as amended) and the Landfill (Amendment) Regulations (Northern Ireland), 2011 SR 101.

3.2.3 Industrial Emissions Directive

The Industrial Emissions Directive (2010/75/EC) recasts seven existing EU Directives including the Waste Incineration Directive, the Integrated Pollution Prevention and Control (IPPC) Directive, Solvents Directive and Large Combustion Plants Directive.

The Directive aims to improve the interaction between the seven Directives that it will replace, as well as strengthening the provisions in them.

The current legislative framework uses the concept of "best available techniques" (BAT) for dealing with potential pollution. Under this, the conditions in each installation's permit have to be based upon the application of BAT relevant to the industry sector concerned.

The Directive gives more emphasis to BAT requirements and some activities become newly subject to IPPC, but the framework of the existing Directives as currently implemented in the UK remain otherwise mostly unchanged.

The Directive was implemented into UK law in January 2013 and is implemented in Northern Ireland through the Pollution, Prevention and Control (Industrial Emissions) Regulations (Northern Ireland), 2012.

3.2.4 Transfrontier Shipment of Waste Regulations

The Transfrontier Shipment of Waste Regulations 2007 as amended by the Transfrontier Shipment of Waste (Amendment) Regulations 2008 set out procedures for the movement of all waste materials within and outside the EU.

They are made in accordance with and deal with the enforcement of Regulation (EC) 1013/2006 on shipments of waste, which sets out details for the supervision and control of shipments of waste.

3.2.5 Environmental Impact Assessment Directive

The Environmental Impact Assessment Directive (85/337/EC), as amended by Directive 97/11/EC, concerns the impact of the development on the environment prior to the granting of planning permission for a proposed development.

This Directive is implemented in Northern Ireland through the Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999.

3.2.6 Environmental Liability Directive

The Environmental Liability Directive (2004/35/EC) aims to establish a framework of environmental liability based on the 'polluter-pays' principle, in order to prevent and remedy environmental damage.

This Directive applies to:

- Environmental damage, or the threat of any damage, from any of the following occupational activities;
  - operation of installations under Directive 96/61/EC, on integrated pollution prevention and control,
  - waste management operations,
  - discharges into inland surface waters,
  - discharges into groundwater,
  - discharge or injection of pollutants into surface water or groundwater,
  - water abstraction and impoundment of water,
  - manufacture, use, storage, processing, filling, release and transport of dangerous substances or preparations, plant protection products or biocidal products,
  - transport of dangerous or polluting goods,
  - operation of installations under Directive 84/360/EEC, on air pollution from industrial plants,
  - any contained use or deliberate release of genetically modified organisms,
  - transboundary shipments of waste,
- operation of storage sites in accordance with Directive 2009/31/EC, on the geological storage of carbon dioxide; and
- damage, or the threat of any damage, to protected species and natural habitats caused by any occupational activities not listed above.

The Directive is implemented in Northern Ireland through the Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009 SR2009/252.

3.3 EU Thematic Strategies

Thematic Strategies have been developed to reorganise the legislation concerning the environment with an aim of simplifying the complex legislative package. Seven separate strategies have been developed. These strategies focus on key environmental impacts, three of which are relevant to waste management in Northern Ireland.

3.3.1 Thematic Strategy on the Prevention and Recycling of Waste

This strategy is concerned with the environmental impact of emissions from poorly managed waste and inefficient consumption and production patterns. Additionally the Strategy intends to encourage more recycling within Member States.

A report from the Commission to the European parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Thematic Strategy on the Prevention and Recycling of Waste was completed in 2011. This Communication reviewed progress towards achieving the Strategy's objectives.

This communication concluded that the Strategy has played an important role in guiding policy development and that significant progress has been achieved on a number of fronts, particularly in the improvement and simplification of legislation, the establishment and diffusion of key concepts such as the waste hierarchy and life-cycle thinking, on setting focus on waste prevention, on coordination of efforts to improve knowledge, and on setting new European collection and recycling targets.

3.4 National and Local Policy and Legislative Context

3.4.1 Introduction

The framework within which waste facilities are developed is provided by specific legislative and policy measures which include:

- Waste Legislation - including UK legislation and Northern Ireland Orders and Regulations.
- Waste Management Strategy - setting out government's policy for the management of waste. Associated guidance provides clarification and information on aspects of waste management policy, and its implementation.
- Land Use Planning - Strategies, Area Plans and Planning Policy Statements.

It is the framework that implements the requirements of EU policy and Directives, as set out in above, at the regional level. This section therefore provides an overview of waste policy and legislation in place in Northern Ireland to consider those issues relevant to the study.

Waste legislation is a complicated issue, and this section seeks to provide a simple overview, summarising the key relevant legislative provisions of the main pieces of legislation.

3.4.2 Waste Management Policy

Northern Ireland Waste Management Strategy: Delivering Resource Efficiency

The Strategy is a revision of the current Northern Ireland Waste Management Strategy: Towards Resource Management which was published in March 2006 and set the strategic direction for waste management in Northern Ireland at the time.

The Strategy moves the emphasis of waste management in Northern Ireland from resource management (with landfill diversion as the key driver) to resource efficiency, that is, using resources in the most effective way while minimising the impact of their use on the environment. This Strategy has a renewed focus on waste prevention (including reuse), preparing for reuse and recycling in accordance with the waste hierarchy, as set out in Figure 3.2.

The key principles of the Strategy are:

- Waste Hierarchy – indicates the relative priority of the different methods of managing waste.
- Life Cycle Approach – to take into account the overall impacts that an approach or service will have throughout its whole life, that is, from cradle to grave.
- Polluter Pays Principle – means that waste generators should pay the costs of providing services to manage their wastes.
- Proximity Principle – emphasises the need to treat or dispose of waste as close as practicable to the point of generation, the minimise the environmental impact of waste transportation
- Integration of Waste Streams – encouraging the development of waste management solutions that encompass all waste.

In agreement with the European Commission the definition of municipal waste in Northern Ireland has been broadened and this is reflected in the revised Strategy. The definition now includes waste from all households and all wastes of similar nature and composition to households, including commercial wastes, whoever collects it. Previously, the definition only included wastes which were collected by Councils and these are now defined as Local Authority Collected Municipal Waste. These revised definitions are set out below.

- Municipal Waste – waste from households and other waste which is similar in nature to waste from a household. This includes Commercial and Industrial waste which is similar in nature to waste from a household.
- Local Authority Collected Municipal Waste – waste that is collected by, or on behalf of, a Council

The targets set out in the Strategy include:

Household Waste

- To achieve a recycling rate of 50% (including preparing for reuse) of household waste by 2020.
- To achieve a recycling rate of 45% (including preparing for reuse) of household waste by 2015 (Programme for Government Target).
- To achieve a recycling rate of 60% (including preparing for reuse) of Local Authority Collected Municipal Waste)

3.4.3 Waste Management Legislation

Primary Legislation

Waste and Contaminated Land (Northern Ireland) Order, 1997 SI 2778 (including Amendments)

This Order was enacted into Northern Ireland legislation in March 1998 and largely incorporates European Waste Framework Directive 75/442/EEC and Amendments. The aim of the Order is to set out provisions relating to waste on land, the collection and disposal of waste, land contamination by pollution, the controlled use, supply or storage of prescribed substances and articles and the obtaining of information on potentially hazardous substances. The Order enacts provisions relating to the effective management of wastes including Duty of Care Regulations, Registration of Carriers, Waste Management Licensing, Hazardous Waste and Producer Responsibility.

The Order also included the requirement for a Waste Management Strategy to be developed for the recovery and disposal of waste in Northern Ireland, along with a Waste Management Plan to be prepared for each Council including appropriate arrangements for managing controlled waste arisings.

The Waste and Emissions Trading Act, 2003

The main aim of this Act is to meet European Landfill Directive objectives and develop a system for the disposal of biodegradable waste, including biodegradable municipal waste. Within this Act, Government have been allocated landfill allowances to distribute to waste disposal authorities on a yearly basis. Landfill allowances can be bought, traded or sold to allow targets to be met. The DAERA NI determine how much biodegradable municipal waste can be sent to landfill and it is the responsibility of the allocating authority to ensure that these levels are not exceeded.

Secondary Legislation

The Waste Regulations (Northern Ireland) 2011 SR 127

These Regulations came into effect in April 2011, and implement the revised Waste Framework Directive. The Regulations apply the waste hierarchy as a priority order in waste prevention and management policy:

- Prevention;
- Preparing for re-use;
- Recycling;
- Other recovery (e.g. energy recovery); and
- Disposal.

The provisions relating to:

- The Waste Hierarchy, came into force on 8 October 2011; and
- The separate collection of at least paper, metal, plastic and glass will come into force on 1 January 2015.

These Regulations implement Directive 2008/98/EC, on waste (the revised Waste Framework Directive), in order to help achieve its overall objectives of:

- Protecting the environment and human health;
- Reducing waste and encouraging it to be used as a substitute for other non-renewable resources;
- Making sure the EU becomes a recycling society by applying the principles of:
  - Self-sufficiency,
  - Polluter pays, and
  - Proximity.

The Landfill Allowance Scheme (Amendment) Regulations (Northern Ireland) 2011

The Northern Ireland Landfill Allowances Scheme (NILAS) came into force on 1st April 2005 and applies to Northern Ireland only. They supplement the Waste and Emissions Trading Act, 2003 by making detailed provisions for the allocation, borrowing, transfer and monitoring of landfill allowances allocated to Councils.

The Landfill Allowances Scheme (Amendment) (Northern Ireland) Regulations, 2005 came into force on 1st March 2006 and provide an amendment to the Landfill Allowances Scheme whereby the level of penalty to which a Council is liable for failing to meet the landfill diversion targets is reduced from £200 per tonne, as specified in the Waste and Emissions Trading Act, 2003 to £150 per tonne.

The Landfill Allowances Scheme (Amendment) Regulations (Northern Ireland) 2009, No. 46 came into operation on 1 April 2009, amend the NILAS 2004 Regulations by reducing from 71% to 64% by weight (rounded up to the nearest tonne), the assumed amount of biodegradable municipal waste in an amount of collected municipal waste.

It should be noted that Defra has been in discussions with the European Commission in regard to changing the way in which the UK meets its landfill allowance targets. As a result of this, a consultation was issued in March 2010 with the aim of addressing the implications of changing the approach adopted by the UK in meeting the diversion targets. Key to this was a change in the way in which municipal waste is classified with plans proposed to broaden this definition to include most notably commercial or industrial wastes not collected by or in control of Councils. The implication of this was a significant increase in the amount of waste classified as municipal waste.

This would subsequently require a change to the targets for diverting BMW from landfill, although it has been stated that the Authority allowances will not be affected for the portion of the waste formally defined as municipal. In order to achieve this, there was a need for the UK to review the way in which obligations have been reported. It would appear that the current preferred option would be to measure the BMW content of the waste at the point at which it is landfilled, based on the tonnages of the waste and the European Waste Catalogue Codes to which the waste pertains.

In addition, consideration has been afforded to changing the approach adopted by the UK in meeting the targets. The proposals for this include additional landfill restrictions as well as using the statutory recycling targets and waste prevention plans within the revised Waste Framework Directive as drivers for change.

The Landfill Allowances Scheme (Amendment) Regulations (Northern Ireland) SR 2011/373 amend the Landfill Allowances Scheme (Northern Ireland) Regulations 2004 by providing for the use of the term “local authority collected municipal waste”. The term “local authority collected municipal waste” was introduced to the Waste and Emissions Trading Act 2003 (c.33) (the “2003 Act”) by the Waste and Emissions Trading Act 2003 (Amendment) Regulations 2011 (S.I.2011 No.2499). The term is used in provisions relating to the setting up and operation of landfill allowance schemes and is distinguished from the use of the term “municipal waste” to describe the waste that must be diverted from landfills under Article 5(2) of Council Directive 1999/31/EC on the landfill of waste.

It is the Department’s view that NILAS will, in the short term at least, maintain an important role in contributing to reductions in BMW to landfill in line with the new EU landfill diversion targets.

Waste Management Licensing Regulations (Northern Ireland), 2003 and Amendments

The Waste Management Licensing Regulations (Northern Ireland) 2003, which came into operation on 19th December 2003, implement the waste licensing requirements of the Waste and Contaminated Land Order. Northern Ireland Environment Agency is directly responsible for the implementation of these Regulations.

Under the 1997 Order, licenses will be required to authorise:

- The deposit of controlled waste in, or on, land;
- The disposal and treatment (including recovery) of controlled waste; and
- The use of certain mobile plant to control or treat controlled waste.

All facilities must be covered by a licence unless they hold Pollution Prevention and Control (PPC) permits (as is the case for incinerators and landfills) or they hold a registered exemption from licensing.

Transfrontier Shipment of Waste Regulations, 2007 SI 1711 (as amended)

These Regulations enforce Regulation (EC) No 1013/2006 of the European Parliament and of the Council on shipments of waste.

These Regulations:

- Set out the competent authorities for the purposes of the Community Regulation.
- Requires the Secretary of State to implement a waste management plan that contains his policies on the bringing into, or dispatch from, the United Kingdom of waste for disposal.
- Requires the Secretary of State to consult on that plan and requires the competent authorities of dispatch and destination to object to shipments of waste that do not comply with that plan.
- Creates a number of offences in relation to the shipping of waste which breach and/or fail to comply with the requirements of the Community Regulation in relation to management of shipments such as shipments of waste to or from the United Kingdom to or from other member States, to exports of waste to and from the United Kingdom to third countries, to the transit of waste through the United Kingdom to and from third countries.
- Sets out the fees that will apply in Northern Ireland. Regulation 47 provides for competent authorities to recover the costs of take-back under Articles 22 and 24 of the Community Regulation.
- Sets out the procedure applicable to the application for an approval of a financial guarantee or equivalent insurance.

- Provides that the Regulations must be enforced by the competent authorities and sets out the enforcement powers of competent authorities, authorised persons and officers of Revenue and Customs.

The Controlled Waste Regulations (Northern Ireland), 2002 (as amended)

These Regulations came into force on the 27 August 2002 and apply to Northern Ireland only. They allow Regulations to be made for the treatment of waste of any description and are made in accordance with the Waste and Contaminated Land (Northern Ireland) Order. The Regulations provide definitions of the wastes to be classified under household waste, commercial and industrial waste as well as classifying the types of household waste for which a collection charge may be made by Councils.

Pollution, Prevention and Control Regulations (Northern Ireland), 2003 SR46

The Pollution, Prevention and Control Regulations (Northern Ireland), 2003 establishes a regulatory system that employs an integrated approach to controlling the environmental aspects of industrial activities such as energy generation, metals, minerals, waste management of chemicals, textile treatment, food production and intensive farming. This system is designed to protect the environment as a whole through a single permitting process by promoting the use of clean technology using Best Available Techniques (BAT). These regulations were amended in 2004 and 2007 to include additional activities.

It should be noted that these regulations will be revoked and replaced on 14th January 2014 by the Pollution, Prevention and Control (Industrial Emissions) Regulations (Northern Ireland), 2012. These are discussed in further detail below.

Pollution, Prevention and Control (Industrial Emissions) Regulations (Northern Ireland) SR 2012 / 453

These new Regulations came into force in January 2013. They implement Directive 2010/75/EU on industrial emissions (integrated pollution, prevention and control) and incorporates a number of other EU measures on industrial pollution (including those on waste incineration, large combustion plant and solvent emissions). These new regulations will revoke the current Pollution, Prevention and Control Regulations (Northern Ireland), 2003 on 7th January 2014.

In particular, the regulations will require those facilities that recover, or undertake a mix of disposal and recovery of non-hazardous waste with a capacity exceeding 75 tonnes per day involving one or more of the following activities to operate under a Pollution Prevention and Control permit. With regard to waste management, these activities include:

- Biological treatment;
- Pre-treatment of waste for incineration or co-incineration;
- Treatment of slags and ashes; and
- Treatment in shredders of metal waste, including waste electrical and electronic equipment and end-of-life vehicles and their components.

Landfill Tax Regulations, 1996 and Amendments

The Landfill Tax Regulations outline various administrative procedures which relate to the operation of the landfill tax system, specifically the registration of those organisations that intend to make disposals covered by the tax and the payment of tax.

These Regulations came into force on 1st May 2004 and apply to England, Wales and Northern Ireland. They amend the Landfill Tax Regulations, 1996 by increasing the maximum credit that landfill site operators may claim against their annual landfill tax liability.

The Landfill Tax (Amendment) Regulations 2009 which come into force on 1st September 2009 revoke Part of the Landfill Tax Regulations 1996 which relates to temporary disposals of material on a landfill site and introduce a new requirement to give information and keep records in relation to information areas. Material on a landfill site which is not going to be disposed of as waste must be deposited in an information area until the Commissioners clarify the taxable status of the material.

The Landfill Tax (Prescribed Landfill Site Activities) Order 2009, which comes into force on 1st September 2009, prescribes certain activities which take place on a landfill site for the purposes of the Finance Act. The effect of this is that the prescribed activities will be treated as disposals and will be subject to landfill tax. Three of the activities are the use of material to create or maintain temporary hard standing, the use of material to create or maintain a temporary screening bund and the use of material to create or maintain a temporary haul road. The Regulation provides for landfill tax to be re-credited when material has been used in one of these three ways and is subsequently used for site restoration.

3.5 Waste Management Plans

3.5.1 Waste Management Plans

The aim of the current 3 Waste Management Plans are to develop a waste management system that meets the region's needs and contributes to economic and sustainable development. The defined objectives of the Plans are as follows:

1. To develop treatment facilities and / or let contracts to meet the needs of the individual regions.
2. To minimise the amount of waste produced within the region.
3. To maximise resource efficiency.
4. To minimise environmental impacts.
5. To ensure, as a minimum, that the identified facilities and services are in place in time to enable district councils to meet their statutory targets and obligations.
6. To encourage regional self-sufficiency, as far as practicable and economical, within the Regions.
7. To ensure that the actions and measures identified in the Plan are:
    a. Deliverable, with respect to timescales for implementation; and
    b. Practical, building upon existing services and facilities within the region.
8. To identify and manage risks (financial, planning and contractual) in a systematic manner, to ensure that risks lie with those parties' best placed to manage them effectively.
9. To adopt a regional approach to the sharing of targets to ensure that Northern Ireland as a whole is able to meet its targets, with individual action and targets agreed for each Council, taking into account demographic factors, including spread of population and associated costs for the provision of services.

3.6 Planning Policy

3.6.1 Shaping Our Future- Regional Development Strategy for Northern Ireland 2035

Shaping Our Future: The Regional Development Strategy for Northern Ireland (RDS 2035 'Building a Better Future') was published in March 2012 and informs the spatial aspects of all other strategies. It complements the Sustainable Development Strategy and highlights the contribution that recycling more waste and recovering energy from it can make to a reduction in carbon footprint and Greenhouse Gas Emissions (GHG).

The Strategy recognises that managing our waste is a significant part of how we treat our environment and highlights the need to manage waste sustainably. This will be achieved by applying both the waste hierarchy, introduced by the Waste Framework Directive, and the proximity principle when developing treatment or disposal facilities in order to minimise the environmental impacts of waste transport.

3.6.2 Northern Ireland Sustainable Development Strategy

The Northern Ireland Sustainable Development Strategy ('Everyone's Involved') was adopted by the Northern Ireland Executive in May 2010. The Strategy sets out the principles and

strategic objectives to ensure socially responsible economic development while protecting the resource base and the environment for future generations.

The six strategic objectives of the strategy are:

- Building a dynamic, innovating economy that delivers the prosperity required to tackle disadvantage and lift communities out of poverty;
- Strengthening society such that it is more tolerant, inclusive and stable and permits positive progress in quality of life for everyone;
- Driving sustainable, long term investment in key infrastructure to support economic and social development;
- Striking an appropriate balance between the responsible use and protection of natural resources in support of a better quality of life and a better quality environment;
- Ensuring reliable, affordable and sustainable energy provision and reducing our carbon footprint; and
- Ensuring the existence of a policy environment which ensures the overall advancement of sustainable development in and beyond government.

4 Review of Existing Landfill Capacity

4.1 Assessment of Active Sites in Northern Ireland

WDR & RT Taggart have extensive knowledge of the waste industry in Northern Ireland. This has been gained through our involvement in the majority of municipal and commercial and industrial waste infrastructure in Northern Ireland.

Using this knowledge backed up by the NIEA public register of PPC Permitted sites we have developed a list of active and recently closed landfill sites. The status of landfill sites in Northern Ireland is identified in Table 4.1.

Table 4.1 Status of Northern Ireland Landfill Sites

Landfill	Operator	Status
Drummee	Fermanagh and Omagh District Council	Active
Craigmore	Coleraine Skip Hire and Recycling	Active
Cottonmount	Biffa	Active
Aughrim	Clearway	Active
Mullaghglass	Alpha Resource Management	Active
Magheraglass	Mid Ulster District Council	Closed April 2017
Lisbane	Quinn Environmental Ltd	Permit suspended. Closure Plan submitted for restoration
Craigahulliar	Causeway Coast and Glen Borough Council	Active
Drumanakelly	Newry Mourne and Down District Council	Closed 2016
Tullyvar	Mid Ulster District Council	Scheduled for early closure April – June 2018
Ballymacombs	Mid Ulster District Council	Scheduled to close 2020
Crosshill	Eastwoods	Active

4.2 Assessment of Capacities and Input Rates

In order to undertake an assessment of the current remaining landfill capacities, waste input rates and total tonnage of waste landfilled in Northern Ireland, WDR & RT Taggart lodged an Environmental Information Request with NIEA.

This Environmental Information Request included:

1. Reported remaining landfill capacities from the Annual Reports submitted in January 2017;
2. Tonnage landfilled in each site during 2016; and
3. Total tonnage landfilled in Northern Ireland during 2016.

A summary of this information is presented in Table 4.2.

Table 4.2 Reported Landfill Capacities 2016

Landfill	Landfilled 2016 (t)	Remaining Capacity (t)
Drummee	16,453	37,522 (159,232)[1]
Craigmore	173,184	476,455[2]
Cottonmount	62,422	3,119,234
Aughrim	47,496	2,218,250
Mullaghglass	191,976	402,983
Magheraglass	41,127	0
Lisbane	0	0
Craigahulliar	77,261	226,728
Drumanakelly	6,481	0
Tullyvar	51,607	62,175[3]
Ballymacombs	0	18,560
Crosshill	26,410	485,590
Total	**694,417**	**7,047,497 (7,169,207)***

1 Drummee landfill capacity with the latest lift of steep wall lining. It is estimated that the site would have a capacity of 159,232 if filled in line with approved pre-settlement contours.

2 Based on 1.3t/m^3

3 Based on site data

As can be seen from Table 4.2 at the start of 2017 there was approximately 7.0m tonnes of landfill capacity in Northern Ireland. The majority of this landfill capacity is held in two sites by two private sector operators, Cottonmount Landfill and Aughrim Landfill. This capacity has the potential to rise to 7.2m tonnes of waste if Drummee is filled in line with pre-settlement contours.

Table 4.2 also highlights the current trend in the Local Authority owned and operated landfill sites going through a phase of early closure, with both Magheraglass and Drumanakelly receiving their last waste inputs in 2017 and 2016 respectively. This trend is further outlined by the early closure of Aughnagun 2015 and the proposed early closure/mothballing of Tullyvar in 2018.

It is evident that there is a declining capacity in Local Authority owned landfills sites as well as a decline in overall operators.

5 Northern Ireland Future Landfill Capacity

In order to determine landfill capacity in Northern Ireland WDR & RT Taggart considered it necessary to look at this in two stages. The first is current filling rates up to 2020. This allows

an assessment of when current sites will reach capacity and close as well as allowing an assessment of landfill rates prior to the Statutory recycling target of 50% by 2020.

The second step is an assessment of landfill capacity required post the 50% recycling target up to 2030. This assessment allows a prediction as to when landfill capacity in Northern Ireland will reach a deficit.

Finally a sensitivity analysis has been completed on the post 2020 scenario. This sensitivity analysis assesses the impact a 60% recycling rate as well as the impact of the arc21 energy from waste (EfW) (the Beacon Project) coming on line.

5.1 Assessment of Landfill Capacity 2017 – 2020

In order to calculate the future landfill capacity in Northern Ireland it was considered an important task to calculate when Local Authority and Privately owned landfill capacity would run out based on current landfilling rates.

In order to complete this assessment it was predicted that waste landfilled would increase year on year by 2%. This assumption is based on the waste growth figure reported through WasteDataFlow for the years 2013/14, 2014/15 and 2015/16. Table 5.1 highlights the Local Authority Collected Municipal Waste (LACMW) arisings and percentage growth rate for the above years.

Table 5.1 Reported LACMW Figures and Growth Rate

	2013/14	2014/15	2015/16	Average
Northern Ireland LACMW	924,412	951,423	969,157	
% Growth Rate	1.2	2.9	1.9	2.0

The 2% waste growth figure was applied to an assessment of the waste landfilled at each site outlined in Table 4.2 as well as the reported total Northern Ireland landfill figure for 2016.

Based on the figures reported for LACMW landfilled (WasteDataFlow) and the total tonnage of waste landfilled (NIEA), it has been possible to calculate the tonnage of waste landfilled that is not LACMW. It has been assumed that this difference is associated with commercial and industrial (C&I) waste.

Table 5.2 LACMW and C&I Waste Tonnages

Waste Type	Tonnage Landfilled
LACMW	390,256
Commercial and Industrial	304,161*
Total	694,417

*Assumed C&I waste landfilled due to difference between overall landfill rate and LACMW landfilled

The assumed and modelled overall landfill tonnage including both LACMW and C&I waste is presented in Table 5.3.

Table 5.3 Predicted Landfill Tonnages

Total Landfilled	2016	2017	2018	2019	2020
	694,417*	708,305	722,471	736,921	751,659

*Actual reported figured to NIEA

An assessment was completed based on the above assumptions of waste growth, commercial and industrial waste and LACMW arisings landfilled and the total tonnage of waste landfilled. The waste input rates in 2016 plus a 2% waste growth were assumed for the waste input rates to each landfill. The outcome of this assessment and the predicted years for closure for each landfill up to 2020 is presented in Table 5.4.

Table 5.4 Predicted Landfill Rates to 2020

Landfill	2016 Capacity	2016 Landfilled	Year of Filling				Remaining Capacity for 2021
			2017	2018	2019	2020	
Drummee	159,232	16,453	16,782	17,118	17,460	17,809	90,063
Craigmore*	476,455	173,184	176,648	180,181	119,626		0
Cottonmount	3,119,234	62,422	63,670	64,943	66,242	67,567	2,856,811
Mullaghglass	402,983	191,976	195,815	199,731	7,436		0
Aughrim	2,218,250	47,496	48,446	49,415	50,403	51,411	2,018,575
Craigahulliar	226,728	77,261	78,806	80,382	67,539		0
Tullyvar	62,175	51,607	48,633	13,542			0
Ballymacombs	18,560		0	0	18,560		0
Crosshill	485,590	26,410	26,938	27,477	28,026	28,587	374,562

*Craigmore capacity based on 1.3t/m^3

** Tullyvar based on current site information

As each site closes there will be the need to direct waste to other active landfill sites. Based on the waste flow model and Table 5.4 it is possible to predict the tonnage of waste that will have to be diverted to other sites each year.

The additional waste requiring landfill capacity each year and a total capacity requirement by 2020 is presented in Table 5.5.

Table 5.5 Additional Waste Requiring Landfill Capacity

2017	2018	2019	2020	Total Capacity Required (t)
52,567	89,682	361,628	586,285	1,090,162

From the assessment outlined in Table 5.4 by 2020 it is anticipated that all Local Authority owned landfill sites with be closed / mothballed, with the exception of Drummee.

Post 2020 the only sites with remaining active landfill capacity will be:

- Drummee;
- Cottonmount;
- Aughrim; and
- Crosshill.

Based on the modelled assumptions, Drummee will have limited capacity, circa 90,000 tonnes. It should also be noted that Crosshill's planning and PPC Permit limits the waste acceptance to wastes excluding domestic, household and food wastes. The PPC Permit for the site does not permit EWC Code 20 03 01 Mixed Municipal Waste.

Based on the assessment of capacity at the end of 2020 there would be an estimated circa 4.2m tonnes of capacity. This capacity figure does not take account of the potential 650,000 tonnes (650,000m^3 @1.0t/m^3) of capacity if Phase 4 at Tullyvar was developed (Density value based on the infilling of fines from mechanical processing of residual waste post 2020). The future capacity in Phase 4 of Tullyvar is further considered in Section 6 and 7 of this report.

Post 2020 landfill capacity is summarised in Table 5.6.

Table 5.6 Post 2020 Landfill Capacity

Item	Capacity (t)
Remaining Capacity	4,249,850

As outlined above the capacity post 2020 will be held in 4 sites. Drummee has limited capacity post 2020. Crosshill is not permitted to directly accept domestic/household waste. This results in the majority of the landfill capacity being held in 2 private sector sites, Aughrim and Cottonmount.

It has been estimated based on current fill rates that Aughrim and Cottonmount will have circa 2m and 2.8m tonnes of capacity respectively, post 2020. This figure does not take account of the additional 1m tonnes of waste that will require landfill capacity between 2017 and 2020 due to the closure of landfill sites.

If an assumption was made that this waste was landfilled in Cottonmount, then post 2020 the capacity of the Cottonmount landfill would be reduced to circa 1.8m tonnes.

It is considered that as the majority of landfill capacity will be held by 2 sites this may have the potential to increase landfill gates fees for those parties looking to dispose of waste in landfill. A summary of the estimated landfill capacity post 2020 is provided in Table 5.7.

Table 5.7 Summary of Estimated Landfill Capacity Post 2020

Landfill	Remaining Capacity Post 2020 (t)
Drummee	90,063
Cottonmount	2,856,811
Aughrim	2,018,575
Crosshill	374,562
Total	**5,340,011**
Additional Capacity Required due to Waste Diverted from Closed Sites	1,090,162
Revised Estimated Capacity	**4,249,850**

5.2 Assessment of Landfill Capacity Post 2020

5.2.1 Impact of 50% Recycling Rate

The main impact on post 2020 landfill capacity will be the volume of residual waste to be landfilled. If Local Authorities were to achieve the 50% Statutory Recycling Rate this would have a knock on effect on the total residual waste generated.

A model was created to estimate the potential LACMW generation between 2020 and 2030. This model takes account of the current generation of LACMW and applies a 2% waste growth up to 2030. The model also applies the current Northern Ireland recycling rate up to 2020 with statutory 50% recycling rate applied post 2020. Table 5.8 outlines the predicted LACMW and residual waste up to 2030.

Table 5.8 Predicted LACMW and Residual Waste

Year	Predicted LACMW (t)	Predicted Residual (t)
2016/17*	988,540	575,330
2017/18*	1,008,311	586,837
2018/19*	1,028,477	598,574
2019/20**	1,049,047	524,523
2020/21**	1,070,028	535,014
2021/22**	1,091,428	545,714
2022/23**	1,113,257	556,628
2023/24**	1,135,522	567,761
2024/25**	1,158,232	579,116
2025/26**	1,181,397	590,698
2026/27**	1,205,025	602,512
2027/28**	1,229,125	614,563
2028/29**	1,253,708	626,854
2029/30**	1,278,782	639,391

*Current Northern Ireland Recycling Rate 41.8%

**Statutory 50% recycling rate

5.2.2 Assumption of all LACMW Post 2020 Pre-Treated

In order to derive a prediction of landfill capacity requirements post 2020, an assumption has been made that all LACMW is sent for pre-treatment. This is due to the closure of all but 1 Council owned landfill site. Using the WasteDataFlow reported figures for 2015/16 it is evident that 35% of LACMW sent for pre-treatment is not suitable for energy recovery and is currently landfilled.

A model was therefore created to assess the tonnage of waste to be landfilled post 2020 if all LACMW was pre-treated in MRF's with a 35% to landfill rate. The outcome of this model is presented in Table 5.9.

Table 5.9 Prediction of Landfill Tonnages if all LACMW is Pre-Treated

Year	Predicted Residual (t)	Predicted Landfill (t)
2020/21	535,014	187,255
2021/22	545,714	191,000
2022/23	556,628	194,820
2023/24	567,761	198,716
2024/25	579,116	202,691
2025/26	590,698	206,744
2026/27	602,512	210,879
2027/28	614,563	215,097
2028/29	626,854	219,399
2029/30	639,391	223,787

5.2.3 Estimation of C&I Waste Landfilled

Landfill capacity requirements cannot be viewed just in the context of what will be required for LACMW. C&I waste also represents a significant source of waste requiring landfill capacity. The published information on the Northern Ireland quantity of C&I waste is very limited, however this is believed to be similar in quantity to the tonnage of LACMW.

In order to calculate the tonnage of C&I waste an Environmental Information Request was lodged with NIEA. This Environmental Information Request sought details on the total volume of waste landfilled in 2016.

A known tonnage of LACMW waste was landfilled in 2015/16 (WasteDataFlow). The known tonnage of LACMW landfilled was subtracted from the total tonnage of waste landfilled. The difference in landfill figures was then assumed to be C&I waste.

The above calculation allowed a ratio of LACMW to C&I waste landfilled to be assumed. It has been assumed that 77.9% of the tonnage of LACMW landfilled will equate to the tonnage of C&I waste landfilled.

The above calculation for C&I waste, as well as a 2% waste growth, was applied to calculate the tonnage of waste up to 2030.

The summary of the C&I waste landfilled up to 2030 is presented in Table 5.10.

Table 5.10 Prediction of C&I Waste Landfilled

Year	Estimated C&I Waste Landfilled (t)
2015/16	304,161
2016/17	310,244
2017/18	316,449
2018/19	322,778
2019/20	329,233
2020/21	335,818
2021/22	342,534
2022/23	349,385
2023/24	356,373
2024/25	363,500
2025/26	370,770
2026/27	378,186
2027/28	385,749
2028/29	393,464
2029/30	401,334

5.2.4 Review of Capacity up to 2030

Taking into consideration the assumptions outlined in Sections 5.2.1 to 5.2.3 of this report, it is possible to estimate the landfill capacity requirements year on year from 2020 to 2030. Table 5.11 summaries the annual and total landfill capacity requirements for both LACMW and C&I waste between 2020 and 2030.

Table 5.11 LACMW and C&I Landfill Capacity Requirements

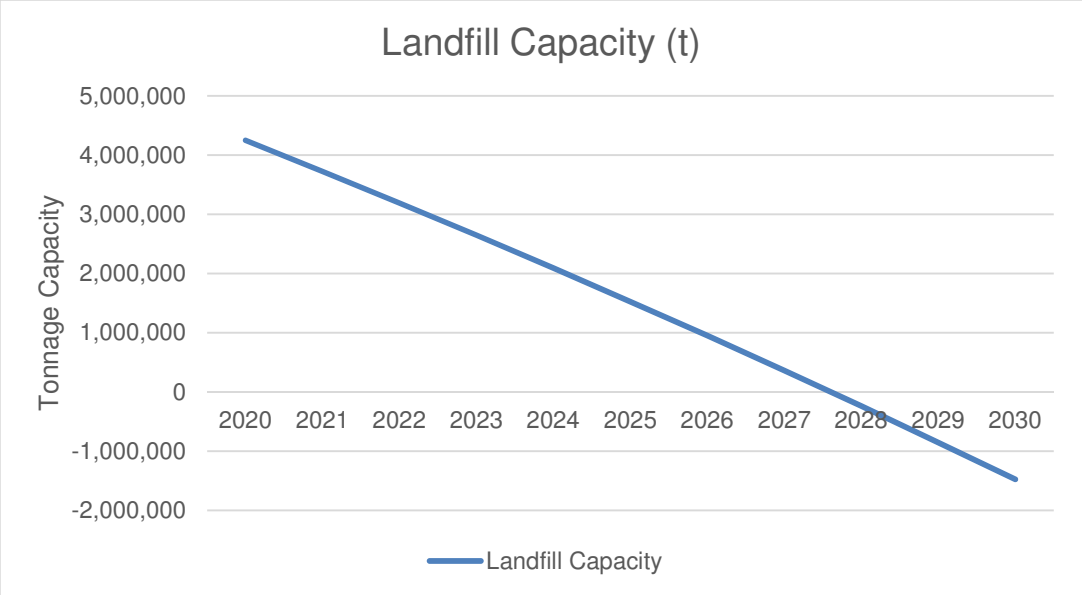
Year	LACMW Landfill (t)	C&I Waste Landfill (t)	Total Landfill Requirement (t)
2020/21	187,255	335,818	523,073
2021/22	191,000	342,534	533,534
2022/23	194,820	349,385	544,205
2023/24	198,716	356,373	555,089
2024/25	202,691	363,500	566,191
2025/26	206,744	370,770	577,515
2026/27	210,879	378,186	589,065
2027/28	215,097	385,749	600,846
2028/29	219,399	393,464	612,863
2029/30	223,787	401,334	625,121
Total	**2,050,388**	**3,677,115**	**5,727,503**

Using the figures presented in Table 5.11 it is possible to calculate the declining landfill capacity and when a deficit in landfill capacity occurs. The predicted declining landfill capacity is presented in Table 5.12 and Figure 5.1.

Table 5.12 Declining Landfill Capacity

Year	Landfill Capacity (t)
2020	4,249,850
2021	3,726,777
2022	3,193,242
2023	2,649,037
2024	2,093,948
2025	1,527,757
2026	950,242
2027	361,177
2028	-239,670
2029	-852,533
2030	-1,477,654

Figure 5.1 Declining Landfill Capacity



As can be seen from Table 5.12 and Figure 5.1 it is predicted that there will be a deficit in landfill capacity by 2028.

5.3 Impact of arc21 EfW on Post 2020 Landfill Capacity

arc21 is the waste management group covering 6 Local Authorities in the east of Northern Ireland. arc21 is currently in a procurement process looking to deliver a Mechanical Biological Treatment facility and an incinerator with energy recovery at Hightown Quarry, Newtownabbey.

On 13th September 2017 the Department for Infrastructure granted planning permission for the development.

The implementation of the arc21 EfW will result in no LACMW to landfill due to the proposals including incineration and an incinerator bottom ash processing plant.

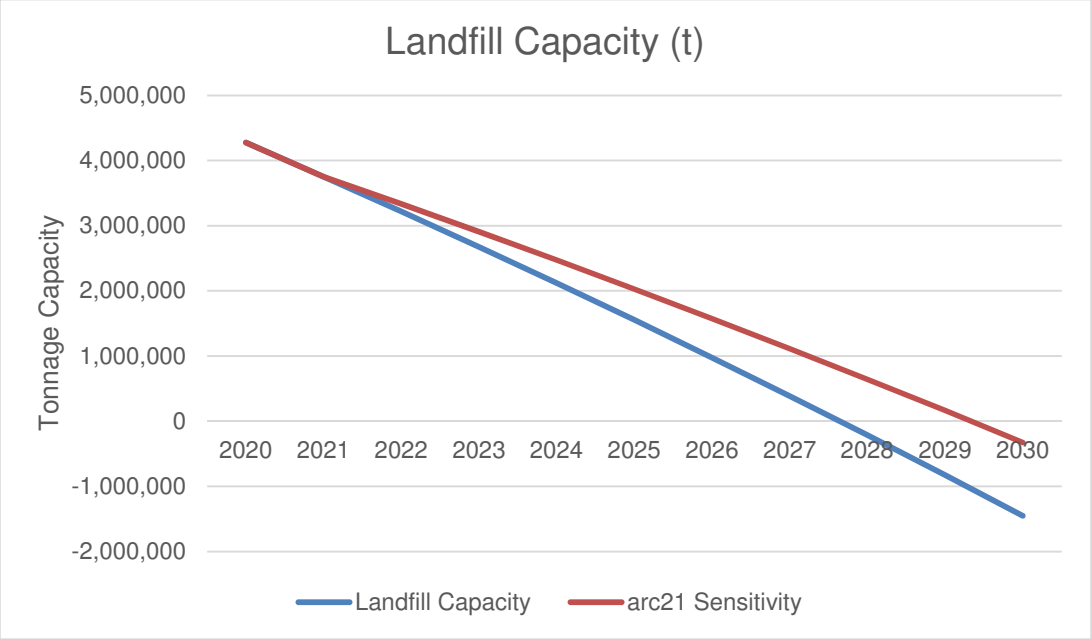
Therefore, in order to run a sensitivity analysis on the landfill capacity up to 2030 the model was run excluding the predicted arc21 LACMW that would be sent to landfill. This impact was modelled from the financial year 2021/22 based on the assumption that the procurement reaches financial close in 2018 with a 3 year construction and commissioning phase.

The impact that the arc21 EfW facility has on landfill capacity is presented in Table 5.13 and Figure 5.2.

Table 5.13 Impact of arc21 EfW on Landfill Capacity

Year	Landfill Capacity arc21 Sensitivity
2020	4,249,850
2021	3,726,776
2022	3,308,586
2023	2,882,032
2024	2,446,948
2025	2,003,161
2026	1,550,499
2027	1,088,783
2028	617,833
2029	137,464
2030	-352,512

Figure 5.2 Impact of arc21 EfW on Landfill Capacity



As can be seen from Table 5.13 and Figure 5.2 under the arc21 sensitivity there will be a predicted deficit in landfill capacity by 2030.

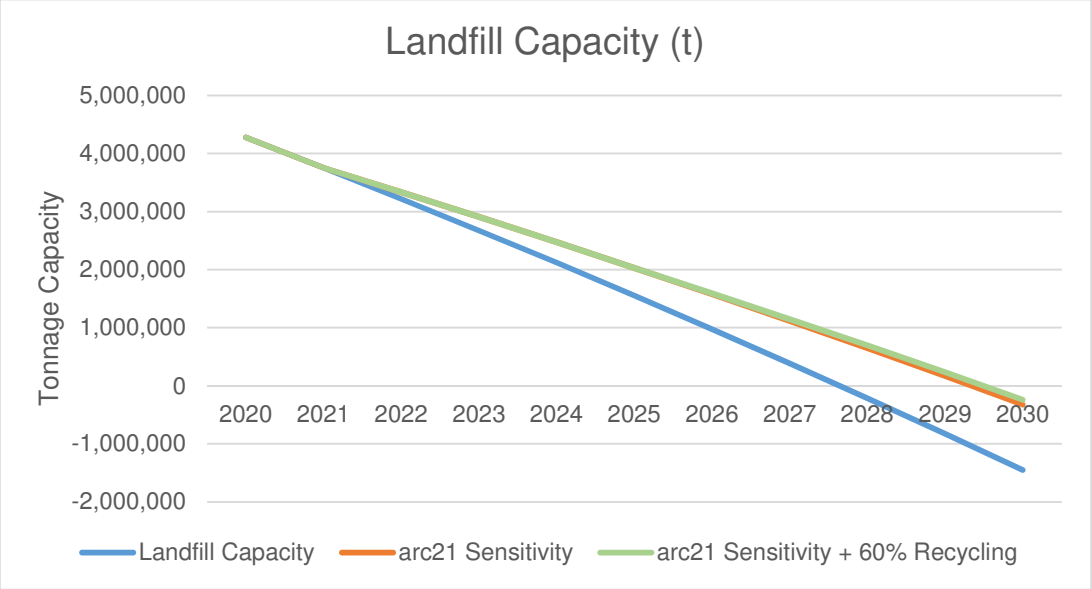
5.4 Impact of arc21 EfW and 60% Recycling on Post 2020 Landfill Capacity

A further sensitivity on landfill capacity was assessed. This sensitivity included the implementation of the arc21 EfW facility and Local Authorities reaching a 60% recycling rate in 2025. The impact that the arc21 EfW facility and a 60% recycling rate in 2025 has on landfill capacity is presented in Table 5.14 and Figure 5.3.

Table 5.14 Impact of arc21 EfW & 60% Recycling Rate on Landfill Capacity

Year	Landfill Capacity arc21 & 60% Recycling Sensitivity
2020	4,249,850
2021	3,726,777
2022	3,308,586
2023	2,882,033
2024	2,446,948
2025	2,003,161
2026	1,566,877
2027	1,121,867
2028	667,958
2029	204,970
2030	-267,278

Figure 5.3 Impact of arc21 EfW & 60% Recycling on Landfill Capacity



As can be seen from Table 5.14 and Figure 5.3 the implementation of a 60% recycling rate in 2025 has a minimal impact on landfill capacity in 2030.

6 Identification of Potential Development Sites

As highlighted in Section 5 of this report, post 2020 there will be limited competition in the landfill market with the majority of landfill capacity held between two privately owned sites, Aughrim and Cottonmount. Limited capacity will be held in Drummee post 2020 (circa 90,000 tonnes) with circa 111,000 tonnes available at Crosshill which is not permitted to accept domestic/household waste.

Post 2020 it is predicted that there will be a deficit in landfill capacity by 2028.

Given the potential lack of competition in the landfill market post 2020 it is considered that landfill gate fees will rise.

An assessment has been created of potential sites that could be developed post 2020 to provide additional capacity and prevent a lack of competition in the landfill market. Of the list below only 1 Local Authority site was considered due to the potential void and the consents that are currently in place.

1. Greater capacity developed at Craigmore Landfill, this will require a planning application and a variation to the PPC Permit;
2. Develop Phase 4 at Tullyvar;

3. Cam Road, Macosquin, development of the landfill site;
4. Ladyhill Quarry, Antrim, try and reinstate previous planning permission and PPC Permit for the non-hazardous landfill;

A high level assessment has been completed of the above options and is presented in Section 7 of this report.

7 Ranking of Proposed Development Sites

In order to provide a ranking of the most viable option for the development of future landfill capacity a pro's and cons assessment of the options identified in Section 6 of this report was undertaken.

This pros and cons assessment is presented in Tables 7.1 to 7.4.

Table 7.1 Assessment of Additional Void at Craigmore

Pro's	Cons
▪ Existing infrastructure such as leachate treatment plant, landfill gas engines, weighbridge and offices. ▪ Staff already employed at the site. ▪ Established landfill site, therefore landfill principle established in the area. ▪ Extension required to existing planning permission and PPC Permit considered easier than getting authorisation for a new landfill. ▪ Potential for significant void to be created. ▪ Adjacent MRF, therefore potential for waste to be pre-treated prior to landfilling.	▪ May face local objection to extension as residents may have the opinion that the site is due to close, extended perceived impact on residential receptors. ▪ Expense associated with planning and PPC Permit applications, including the necessary public consultation process.

Table 7.2 Assessment of Additional Void at Tullyvar

Pro's	Cons
▪ Existing planning permission and PPC Permit for the development of Phase 4. ▪ Existing infrastructure such as leachate treatment plant, landfill gas engine, weighbridge and offices. ▪ Established grid connection for landfill gas engine. ▪ Established landfill site, therefore landfill principle established in the area. ▪ Significant void circa 650,000m^3. Based on a density of 1t/m^3 could represent a capacity of 650,000t. ▪ Well established wetlands for leachate treatment and discharge to surface water. ▪ Council owned site therefore security in gates fees.	▪ May face local objection to continued operation as residents may have the opinion that the site is due to close, extended impact on residential receptors. ▪ CQA Plan to be submitted to NIEA detailing the design of Phase 4. ▪ Wetlands not designed to take leachate from Phase 4.

*Density of 1t/m3 assumed based on the majority of waste infilled being MRF fines.

Table 7.3 Assessment of Additional Void at Cam Road

Pro's	Cons
▪ Planning permission expiry 14th April 2016, however NIEA have released an update on landfill capacity in which they state the site has planning permission. ▪ Significant void circa 1.25m m^3. Based on a density of 1t/m^3 could represent a capacity of 1.25m t. ▪ Conversation with NIEA outlines that baseline monitoring is being completed at present prior to a PPC Permit application being lodged. ▪ Close proximity to existing waste management facilities.	▪ Uncertainty in the capital development costs. ▪ May face local objection as residents may believe the site will not be developed due to the former developer going into administration (B Mullan and Sons Ltd). ▪ All infrastructure such as leachate treatment plant, landfill gas engine, weighbridge and offices would have to be constructed prior to waste acceptance. Significant capital expenditure prior to revenue generation. ▪ Uncertainty in ability to get a grid connection for a landfill gas engine.

*Density of 1t/m3 assumed based on the majority of waste infilled being MRF fines.

Table 7.4 Assessment of Additional Void at Ladyhill

Pro's	Cons
▪ Significant void circa 3.2m m^3. Based on a density of 1t/m^3 could represent a capacity of 3.2m t.	▪ Planning permission is believed to have expired. A new planning application would be required. ▪ PPC Permit has been revoked. A new PPC Permit application would be required. ▪ May face local objection as residents may believe the site will not be developed due to expiration of planning. ▪ All infrastructure such as leachate treatment plant, landfill gas engine, weighbridge and offices would have to be constructed prior to waste acceptance. Significant capital expenditure prior to revenue generation. ▪ Void is based on the steep wall of the quarry. Expensive steep wall lining system required. ▪ Road improvements required to widen Ladyhill Road to 6m in width. Expensive capital works. ▪ Uncertainty in ability to get a grid connection for a landfill gas engine.

*Density of 1t/m3 assumed based on the majority of waste infilled being MRF fines.

7.1 Final Ranking of Sites

Following the above high level pros and cons assessment it is considered that the ranking of most viable future landfill capacity would be as follows:

Table 7.5 Ranking of Sites

Ranking	Site	Comments
1st	Tullyvar Landfill Site	▪ Existing Planning Permission ▪ Existing PPC Permit ▪ Site Infrastructure in place ▪ Council control over landfill gate fees
2nd	Craigmore Landfill Site	▪ Existing landfill ▪ Existing infrastructure ▪ Potential higher success of planning application due to existing established land use ▪ Proximity to an existing MRF for pre-treatment of waste
3rd	Cam Road Landfill Site	▪ Reported that planning permission is still active ▪ Large void ▪ All infrastructure would have to be developed ▪ Development of a new landfill site in a new area
4th	Ladyhill Landfill Site	▪ May be difficult to re-establish planning permission ▪ Expensive lining works required ▪ Large capital expenditure required for road upgrade

8 Conclusions

It is acknowledged that there will still be the need for non-hazardous landfill capacity in Northern Ireland to deal with material that cannot be recovered.

The waste hierarchy implemented through the Revised Waste Framework Directive and the Northern Ireland Waste Management Strategy places the following priority in waste management:

- Prevention;
- Preparing for re-use;
- Recycling;
- Other recovery (e.g. energy recovery); and
- Disposal.

However, it is accepted that landfill disposal is a key element of the waste management mix to deal with waste that cannot be recycled or disposed with energy recovery.

A waste flow model was created to assess the landfill capacity up to 2020 based on the current filling of landfill sites and a 2% waste growth. This waste flow model identified that post 2020 the majority of landfill capacity will be held by 2 sites. Therefore, this may have the potential to increase landfill gates fees for those parties looking to dispose of waste in landfill.

The outcome of landfill capacity post 2020 is summarised in Table 8.1.

Table 8.1 Summary of Estimated Landfill Capacity Post 2020

Landfill	Remaining Capacity Post 2020 (t)
Drummee	90,063
Cottonmount	2,856,811
Aughrim	2,018,575
Crosshill	374,562
Total	**5,340,011**
Additional Capacity Required due to Waste Diverted from Closed Sites	1,090,162
Revised Estimated Capacity	**4,249,850**

A model was created to estimate the potential LACMW generated between 2020 and 2030. This model took into account a 2% waste growth up to 2030. In order to derive a prediction of

landfill capacity requirements post 2020, an assumption has been made that all LACMW is sent for pre-treatment, as all but 1 Local Authority landfill site will be closed. Using the WasteDataFlow reported figures for 2015/16 it is evident that 35% of LACMW sent for pre-treatment is not suitable for energy recovery and is currently landfilled. A calculation of C&I waste was also completed to estimate the required landfill volume for this waste stream. This calculation outlined that 77.9% of the tonnage of LACMW landfilled will equate to the tonnage of C&I waste landfilled.

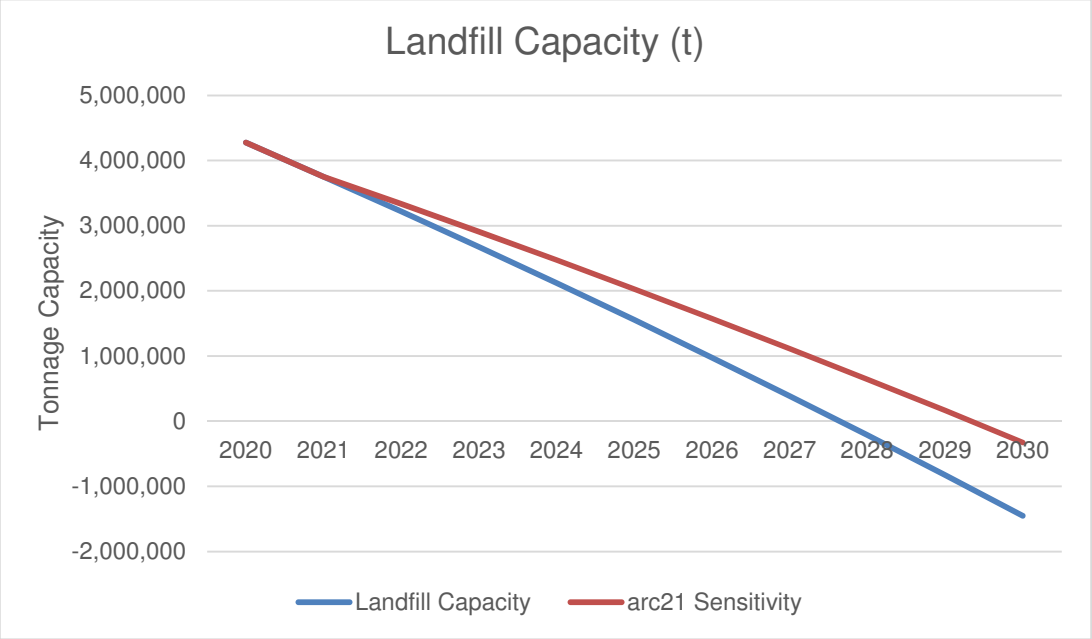
Using the above inputs to a waste flow model the 2020 to 2030 landfill capacity requirements have been estimated. The landfill capacity requirements are presented in Table 8.2 and Figure 8.1.

A sensitivity analysis was applied to the landfill capacity requirements in terms of the development and operation of the arc21 EfW facility. The impact of this sensitivity is presented in Table 8.2 and Figure 8.1.

Table 8.2 Declining Landfill Capacity Assessment

Year	Landfill Capacity (t)	Landfill Capacity arc21 Sensitivity (t)
2020	4,249,850	4,249,850
2021	3,726,777	3,726,776
2022	3,193,242	3,308,586
2023	2,649,037	2,882,032
2024	2,093,948	2,446,948
2025	1,527,757	2,003,161
2026	950,242	1,550,499
2027	361,177	1,088,783
2028	-239,670	617,833
2029	-852,533	137,464
2030	-1,477,654	-352,512

Figure 8.1 Declining Landfill Capacity



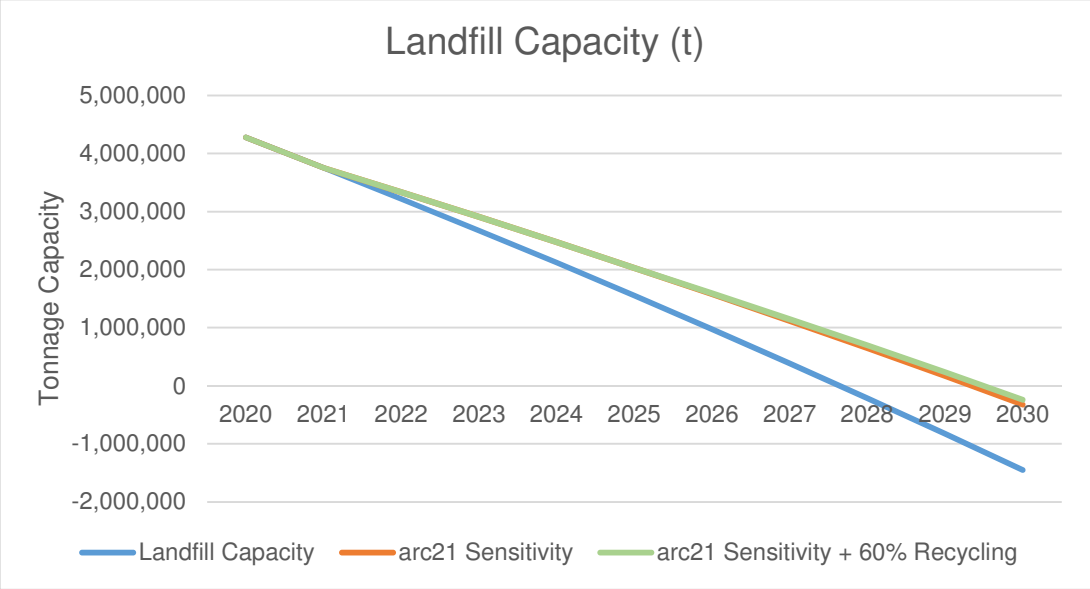
As can be seen from Table 8.1, 8.2 and Figure 8.1 there is a landfill deficit in 2028 and 2030 under the pre-treatment and arc21 sensitised models respectively.

A further sensitivity on landfill capacity was assessed. This sensitivity included the implementation of the arc21 EfW facility and Local Authorities reaching a 60% recycling rate in 2025.

Table 8.3 Impact of arc21 EfW & 60% Recycling Rate on Landfill Capacity

Year	Landfill Capacity arc21 & 60% Recycling Sensitivity
2020	4,249,850
2021	3,726,777
2022	3,308,586
2023	2,882,033
2024	2,446,948
2025	2,003,161
2026	1,566,877
2027	1,121,867
2028	667,958
2029	204,970
2030	-267,278

Figure 8.2 Impact of arc21 EfW & 60% Recycling on Landfill Capacity



As can be seen from Table 8.3 and Figure 8.2 the implementation of a 60% recycling rate in 2025 has a minimal impact on landfill capacity in 2030.

Given the potential lack of competition in the landfill market post 2020 it is considered that landfill gate fees will rise.

A study of the most viable future landfill capacity was completed using a high level pros and cons assessment. This assessment considered that the ranking of most viable future landfill capacity would be as follows:

1. Tullyvar Landfill Site – due to the existing Planning Permission and PPC Permit with site infrastructure in place. This option could also offer Councils control over landfill gate fees.
2. Craigmore Landfill Site - additional capacity developed at Craigmore may be viable due to the existing land use therefore improving the success of any planning application. Existing infrastructure exists at the site in the form of a leachate treatment plant and landfill gas engines. The site also includes a MRF for the pre-treatment of waste prior to landfilling.
3. Cam Road Landfill Site – it is reported that planning permission is still active for the site with the site having a significant void capacity. However, all infrastructure would need to be developed at this site.
4. Ladyhill Landfill Site – it is considered that it would be difficult to re-establish planning permission for the site. The development of the site would include expensive lining works due to steep wall of the quarry. A large capital expenditure would also be required to upgrade the road to the site.

If landfill gates fees were to rise due to only a small number of operators in the market, it is our view that competition in the market would develop. This is demonstrated by NIEA reporting that a planning application for additional landfill capacity at Craigmore is being considered, with a PPC Permit application potentially being prepared for Cam Road.

In order to protect Local Authorities from the potential rise in landfill gates fees it is considered that the most viable option for future landfill capacity would the remaining capacity at Tullyvar Landfill Site.

It is recommended that a bi-annual review of landfill gates fees is undertaken to assess the landfill market and any potential risks associated with landfill gate fee increases.