



AUGHINISH ALUMINA LIMITED

(Registered in Ireland No.59982)

3rd April 2020
Environmental Licensing Programme
Office of Environmental Sustainability,
Environmental Protection Agency,
Johnstown Castle Estate,
Co. Wexford

Re: P0035-07 – Response to Request for Further Information from the EPA dated 13th March 2020

Dear Mr. O'Seasáin,

I refer to your letter of 13th March 2020 requesting further information regarding our licence review application received by the Agency on 30th April 2019.

Please find included in Attachment 1 the An Bord Pleanála (ABP) grant of planning as well as a copy of the planning inspector's report.

An amendment Order was made to the planning by ABP, which is included in Attachment 2. As detailed in the Order, ABP corrected the wording of condition number 3 to limit blasting to between April and September and also updated the wording of the development description in the order to reference the extraction of 374,000 cubic metres of rock.

Please find included in Attachment 3 a quantitative assessment, carried out by Byrne Ó'Cléirigh, to assess any impact of the excess contribution of TOC and COD over that of the associate BAT AEL on the local receiving water environment.

An updated non-technical summary for the licence review application is included in Attachment 4.

Regards,

A handwritten signature in blue ink, appearing to read 'Rory O'Dwyer'.

Rory O'Dwyer

Senior Environmental Engineer

Aughinish Alumina Limited, Aughinish Island, Askeaton, Co Limerick, V94 V8F7 – Ireland

Tel. +353 (0)61 604000 – Fax +353(0)61 604242 – www.rusal.com

DIRECTORS: D A Clancy, C Kelleher, M Samoylov, A Shylak, O. Smirnova, O Stasev, K Strunnikov

Reg. in Ireland No.59982. Reg. Office: Aughinish Island, Askeaton, Co Limerick, Ireland

ATTACHMENT 1

An Bord Pleanála Grant of Planning Permission

An Bord Pleanála Inspectors Report

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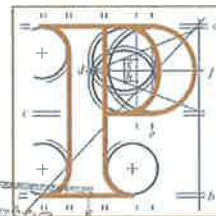
DIRECTORS: D A Clancy, C Kelleher, M Samoylov, A Shylak, O. Smirnova, O Stasev, K Strunnikov

Reg. in Ireland No.59982. Reg. Office: Aughinish Island, Askeaton, Co Limerick, Ireland

Our Ref: ABP-301011-18

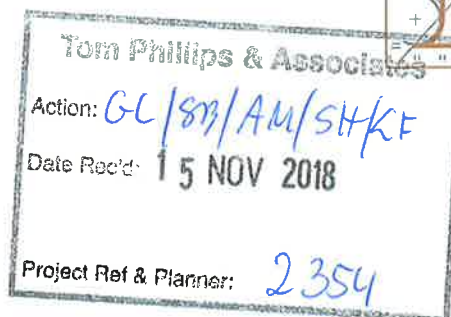
PA Reg Ref: 17714

Your Ref: Aughinish Alumina Ltd



An
Bord
Pleanála

Tom Phillips and Associates
80 Harcourt Street
Dublin 2



14 NOV 2018

Re: Ten-year permission for development on site adjoining Aughinish Alumina Ltd plant, provision of a Borrow Pit with an extraction area of c. 4.5 hectares to extract c. 374.000 of rock. Aughinish East, Aughinish West, Island Mac Teige, Glenbane West, Morgan North and Fawnamore at or adjacent to Aughinish Island, Askeaton, Co. Limerick.

Dear Sir / Madam

An order has been made by An Bord Pleanála determining the above-mentioned appeal under the Planning and Development Acts 2000 to 2018. A copy of the order is enclosed.

In accordance with section 146(5) of the Planning and Development Act 2000, as amended, the Board will make available for inspection and purchase at its offices the documents relating to any matter falling to be determined by it, within 3 days following the making of its decision. The documents referred to shall be made available for a period of 5 years, beginning on the day that they are required to be made available. In addition, the Board will also make available the Inspector's Report, the Board Direction and Board Order in respect of the matter on the Board's website (www.pleanala.ie). This information is normally made available on the list of decided cases on the website on the Wednesday following the week in which the decision is made.

The Public Access Service for the purpose of inspection/purchase of file documentation is available on weekdays from 9.15am to 5.30pm (including lunchtime) except on public holidays and other days on which the office of the Board is closed.

In cases where a grant of (full) planning permission is notified by the Board, it is policy to include a copy of the Department of the Environment and Local Government's Leaflet PL11 - Guide to the Building Control System and a copy of the Health and Safety Authority's leaflet Safety and Health on Construction Projects -The Role of Clients with the notification. These leaflets are issued at the request of the above bodies.

Teil
Glao Áitiúil
Facs
Láithreán Gréasáin
Ríomhphost

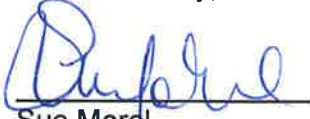
Tel (01) 858 8100
LoCall 1890 275 175
Fax (01) 872 2684
Website www.pleanala.ie
Email bord@pleanala.ie

64 Sráid Maoilbhríde
Baile Átha Cliath 1
D01 V902

64 Marlborough Street
Dublin 1
D01 V902

A further enclosure contains information in relation to challenges by way of judicial review to the validity of a decision of An Bord Pleanála under the provisions of the Planning and Development Act, 2000, as amended.

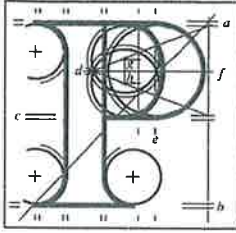
Yours faithfully,



Sue Morel
Executive Officer

Encls. BP100LN

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An
Bord
Pleanála

Board Order
ABP-301011-18

Planning and Development Acts 2000 to 2018

Planning Authority: Limerick City and County Council

Planning Register Reference Number: 17/714

Appeal by Cappagh Farmers Support Group care of Pat Geoghegan of Boolaglass, Askeaton, County Limerick against the decision made on the 31st day of January, 2018 by Limerick City and County Council to grant subject to conditions a permission to Aughinish Alumina Limited care of Tom Phillips and Associates of 80 Harcourt Street, Dublin in accordance with plans and particulars lodged with the said Council:

Proposed Development: A ten-year permission for development on a site of circa seven hectares located adjoining the existing Aughinish Alumina Limited plant for the provision of a Borrow Pit with an extraction area of circa 4.5 hectares to extract circa 374 cubic metres of rock over a ten-year period. The extraction area is sought up to a maximum depth of circa 8.5 metres O.D., with extraction to occur between April and September each year. The proposed development includes the demolition of a contractors shed and all ancillary site development, areas of stockpiling, landscaping and boundary treatment works above and below ground, including restoration of the extraction area. Aughinish Alumina Limited carries out an activity requiring an Industrial Pollution Prevention and Control Licence (now replaced by an

Industrial Emissions Licence – Licence Register Number P0035-06). The development and operation of the proposed Borrow Pit is not a licensable activity. An Environmental Impact Statement (EIS) will be submitted to the planning authority with the application, all at Aughinish East, Aughinish West, Island Mac Teige, Glenbane West, Morgan North and Fawnamore at or adjacent to Aughinish Island, Askeaton, County Limerick.

Decision

GRANT permission for the above proposed development in accordance with the said plans and particulars based on the reasons and considerations under and subject to the conditions set out below.

Matters Considered

In making its decision, the Board had regard to those matters to which, by virtue of the Planning and Development Acts and Regulations made thereunder, it was required to have regard. Such matters included any submissions and observations received by it in accordance with statutory provisions.

Reasons and Considerations

In coming to its decision, the Board had regard to the following:

- (a) the planning history of the site,

- (b) the established industrial operation on the larger landholding and the location of the site within the landholding,
- (c) the nature, purpose, scale and form of the proposed development and its location relative to nearby sensitive receptors,
- (d) the provisions of the Limerick County Development Plan 2010 - 2016, as extended, and the Strategic Integrated Framework Plan for the Shannon Estuary, 2013 - 2020,
- (e) the requirement to obtain an Industrial Emission Licence for the overall installation at the site, which includes the application site, from the Environmental Protection Agency,
- (f) the written submissions made in respect of the planning application and appeal, and
- (g) the report and recommendations of the Inspector,

and considered that, subject to compliance with the conditions set out below, the proposed development would not seriously injure the amenities of the area or of property in the vicinity, would comply with the provisions of the Development Plan and would not be prejudicial to public health. The proposed development would, therefore be in accordance with the proper planning and sustainable development of the area.

Conditions

1. The development shall be carried out and completed in accordance with the plans and particulars lodged with the application as amended by the further details and particulars submitted on the 29th day of November, 2017 except as may otherwise be required in order to comply with the following conditions. Where such conditions require details to be agreed with the planning authority, the developer shall agree such details in writing with the planning authority prior to commencement of development and the development shall be carried out and completed in accordance with the agreed particulars.

Reason: In the interest of clarity.

2. All environmental mitigation measures outlined in the environmental impact assessment report (as set out in sections 5.7, 7.5, 8.6, 9.5, 10.5, 11.5, 12.6, 13.6 and 14.5 and 15.5) shall be implemented in full. Compliance with, and effectiveness of mitigation measures, shall be demonstrated in an annual report of compliance to the planning authority. The planning authority shall make the annual report available for public inspection.

Reason: In the interest of environmental protection.

3. Blasting shall only take place outside of the period between April to September in any year.

Reason: In the interest of clarity and to limit the extraction and blasting to the periods specified in the application.

4. All proposed screening measures, including improvements to boundaries and the provision of any fencing and berms, shall be completed prior to commencement of extraction on site.

Reason: In the interest of visual amenity.

5. Construction and demolition waste shall be managed in accordance with a construction waste and demolition management plan, which shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development. This plan shall be prepared in accordance with the "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects", published by the Department of the Environment, Heritage and Local Government in July 2006.

Reason: In the interest of sustainable waste management.

6. The developer shall pay to the planning authority a financial contribution in respect of public infrastructure and facilities benefiting development in the area of the planning authority that is provided or intended to be provided by or on behalf of the authority in accordance with the terms of the Development Contribution Scheme made under section 48 of the Planning and Development Act 2000, as amended. The contribution shall be paid prior to commencement of development or in such phased payments as the planning authority may facilitate and shall be subject to any applicable indexation provisions of the Scheme at the time of payment. Details of the application of the terms of the Scheme shall be agreed between the planning authority and the developer or, in default of such agreement, the matter shall be referred to An Bord Pleanála to determine the proper application of the terms of the Scheme.



Reason: It is a requirement of the Planning and Development Act 2000, as amended, that a condition requiring a contribution in accordance with the Development Contribution Scheme made under section 48 of the Act be applied to the permission.




Stephen Bohan

**Member of An Bord Pleanála
duly authorised to authenticate
the seal of the Board.**

Dated this 17th day of November 2018.

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19. How long should it take to get a Disability Access Certificate/ Revised Disability Access Certificate?

Normally two months, but this may be extended by written agreement between the applicant and the building control authority, e.g. when the authority seeks further information on your application. Both certificates may be granted with or without conditions, or refused.

20. Can I appeal if I am refused a Disability Access Certificate/ Revised Disability Access Certificate?

Yes. An applicant for either certificate can appeal to An Bord Pleanála against a refusal within one month of the decision (details of the appeal fee are available from your local authority or An Bord Pleanála).

21. Do the Regulations have specific requirements for access for people with disabilities?

Yes. Part M of the Regulations aims to ensure that buildings other than dwellings are accessible and usable by people with disabilities. From 1 January 2001 all new dwellings must be visitable by people with disabilities. The requirements cover the access and use of buildings, provision of sanitary facilities, audience or spectator facilities.

Technical Guidance Document M 2000 - Access for People with Disabilities provides guidance on the provision of:

- ◆ at least one entrance accessible to wheelchair users;
- ◆ an internal layout which allows disabled people to circulate freely;
- ◆ a passenger lift in buildings above a certain size;
- ◆ a proportion of hotel guest bedrooms suitable for disabled people;
- ◆ wheelchair spaces in theatres, cinemas, concert halls and sports stadiums; and
- ◆ facilities for people with hearing impairments in theatres, cinemas, concert halls and places of religious worship.

Part M of the Regulations is currently under review and an updated Part M/TGD-M will be published in 2010

The law governing Building Regulations and procedures is primarily set out in the Building Control Acts, 1990, and 2007, the Building Regulations, 1997-2009 and the Building Control Regulations, 1997-2009. These may be purchased from the Government Publications Sales Office, Sun Alliance House, Molesworth Street, Dublin 2 (Phone 01-6476995/4).

This leaflet is a simple guide to understanding the building control system, which applies to the design and construction of new buildings, extensions and material alterations to and certain changes of use of existing buildings.

The leaflet is intended as a practical guide. It is not a definitive legal interpretation of building control law. For more information, you should consult your local building control authority.

1. What are the Building Regulations 1997-2009?

Building Regulations are a set of legal requirements for the design and construction of new buildings, extensions and material alterations to and certain changes of use of existing buildings.

Building Regulations provide for, in relation to buildings, the health, safety and welfare of people, conservation of fuel and energy, and access for people with disabilities. The Regulations can be downloaded from the Department's website www.environ.ie

The Consolidated Regulations came into force on 1 July, 1998, and replace the Building Regulations, 1991 (as amended).

2. How are the Regulations framed?

The Regulations comprise a set of legal requirements, expressed in simple functional statements.

Structure	Part A
Fire Safety	Part B
Site Preparation and Resistance to Moisture	Part C
Materials and Workmanship	Part D
Sound	Part E
Ventilation	Part F
Hygiene	Part G
Drainage & Waste Water Disposal	Part H
Heat Producing Appliances	Part J
Stairways, Ladders, Ramps and Guards	Part K
Conservation of Fuel and Energy	Part L
Access for People with Disabilities	Part M

Technical guidance on how to comply with these requirements are set out in the twelve separate Technical Guidance Documents (TGD's), which deal with each of the above areas. Amended TGD's can be downloaded from the Department's website www.environ.ie

The Regulations and related TGD's were amended as follows:

Parts M and D—2000; Part B—2006 ; Part G—2008; Part F— 2002 & 2009; Part L (Dwellings) - 2007 ; Part L (Non—Dwellings) - 2008
TGD C—2004 & 2008

3. How do they affect me?

If you are having construction work carried out, the work must comply with Regulations. The Regulations do not apply to works consisting of repairs or renewal (as defined in the Regulations) except to any repair or renewal likely to affect the structural integrity of the building or building element being repaired or renewed.

Part L Regulations apply to renewal works to existing buildings involving the replacement of external doors, windows and rooflights. (S.I. 259 of 2008)

4. What if I fail to comply?

The primary responsibility for compliance rests with designers, builders and building owners. Building control authorities have powers to inspect design documents and buildings, as well as powers of enforcement and prosecution where breaches of the Regulations occur. There are heavy penalties, including fines and imprisonment, for breaches of the Regulations. In addition, when it comes to selling your property, you may have difficulties if you cannot satisfy the purchaser's solicitor that the requirements of the Regulations have been met.

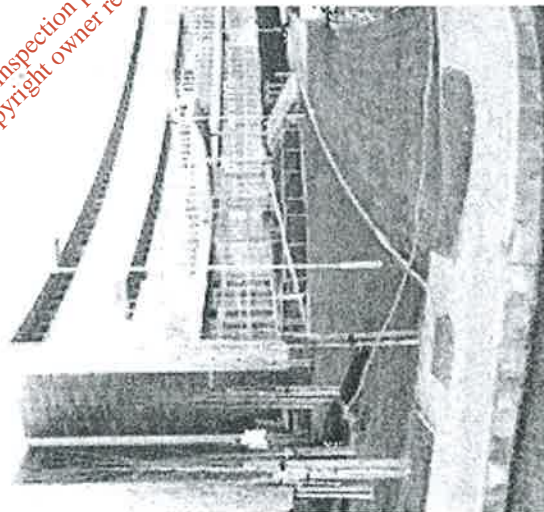
5. What control arrangements are in place?

The Building Control Regulations, 1997-2009 supplement the basic system of enforcement referred to in Question 4 above.

Seven important control arrangements are provided:

- ◆ Commencement Notice
- ◆ Fire Safety Certificate
- ◆ Revised Fire Safety Certificate
- ◆ 7 Day Notice
- ◆ Regularisation Certificate
- ◆ Disability Access Certificate
- ◆ Revised Disability Access Certificate

PL. 11 - Guide to the Building Control System



Building Standards Section,
Department of Environment, Heritage and Local Government, Custom House,
Dublin 1.
Lo Call 1890 20 20 21 or 01 888 2000
www.environ.ie

May 2010

6. What is a Commencement Notice?

A Commencement Notice is a notification to a building control authority that a person intends to carry out either works or a material change of use to which the Building Regulations apply.

The notice must be given to the authority not more than 28 days and not less than 14 days before commencement of works or a material change of use.

The notice must be accompanied by a Commencement Notice Fee, based on the number of buildings (details available from your local building control authority). Copies of a Commencement Notice can also be obtained from the building control authority.

Commencement Notices are required for the following:

- ◆ the erection of a building;
 - ◆ a material alteration or extension of a building;
 - ◆ a material change of use of a building;
 - ◆ works in connection with the material alteration (excluding minor works) of a shop, office or industrial building.
- A Commencement Notice is not required:
- ◆ for works or a change of use which are exempted development under the planning code, and for which a Fire Safety Certificate is not required; or
 - ◆ where a 7 Day Notice has been submitted.

Information on exempted development is given in other leaflets in this series, including PL. 5 - Doing Work about the House, PL. 6 - Agricultural and Farm Development, and PL. 7 - Planning for the Business Person.

7. What is a Fire Safety Certificate?

A certificate granted by a building control authority certifies that the building or works, if constructed in accordance with the plans, documents and information submitted to the authority, would comply with the requirements of Part B of the Second Schedule to the Building Regulations, 1997-2009.

8. Do I need a Fire Safety Certificate?

With the exception of houses and certain agricultural buildings, a Fire Safety Certificate is required for all new buildings (including apartments and flats), as well as material changes of use and certain alterations and extensions to buildings. A Fire Safety Certificate must be obtained before work starts.

9. What is a revised Fire Safety Certificate?

A certificate granted by a building control authority which is required where:

- ◆ an application for a Fire Safety Certificate is made before grant of planning permission, if required by the subsequent permission, or
- ◆ where significant revision is made to the design or works of a building for which a Fire Safety Certificate has already been granted.

10. Where do I get a Fire Safety Certificate/ Revised Fire Safety Certificate?

You should apply to the local building control authority for either certificate, before you commence work or where significant revision is made to the design or works of a building for which a Fire Safety Certificate has already been granted. Application forms are available from the authority and should be submitted together with –

- ◆ plans, calculations and specifications for the works or building;
- ◆ details of the nature and extent of the proposed use and, where appropriate, of the existing use of the building;
- ◆ the appropriate fee, based on floor area (details available from your local authority).

Any application not including the above can be rejected by the authority as invalid.

11. How long should it take to get a Fire Safety Certificate/ Revised Fire Safety Certificate?

Normally two months, but this may be extended by written agreement between the applicant and the building control authority, e.g. when the authority seeks further information on your application. Both certificates may be granted with or without conditions, or refused.

12. Can I appeal if I am refused a Fire Safety Certificate/ Revised Fire Safety Certificate?

Yes. An applicant for a certificate can appeal to An Bord Pleanála against a refusal within one month of the decision (details of the appeal fee are available from your local authority or An Bord Pleanála).

13. What is a 7 Day Notice?

A 7 Day Notice is a notification to a building control authority that a person intends to commence work on the construction of a building before grant of the relevant Fire Safety Certificate.

A 7 Day Notice must be submitted not less than 7 days in advance of the commencement of works. The notice must be accompanied by:-

- ◆ a valid application for a Fire Safety Certificate from the applicant in the form specified for that purpose in the Third Schedule and accompanied by such plans and particulars as required under paragraphs (a) and (b) of article 13(2) of the Regulations.
- ◆ a 7 Day Notice Statutory Declaration in the form specified for that purpose in the Third Schedule, and
- ◆ such fee as may from time to time be prescribed for that purpose in Part V.

You must also require a Commencement Notice as well as a 7 Day Notice?

No. A Commencement Notice will not be required in respect of buildings where a 7 Day Notice has been submitted.

14. What is a Regularisation Certificate?

A certificate granted by a building control authority where a building has been commenced or completed without a Fire Safety Certificate, where such a certificate is required and certifies that the building work is in compliance with Part B of the Second Schedule to the Building Regulations 1997 to 2009.

The application must be accompanied by:-

- (i) drawings of the relevant works as they have been commenced or constructed, so as to enable the building control authority to assess whether the said works, as commenced or as constructed in accordance with the said drawings,

documents and information submitted, will comply or are in compliance, as appropriate, with the requirements of Part B of the Second Schedule to the Building Regulations,

(ii) a Statutory Declaration from the applicant in the form specified for that purpose in the Third Schedule, and

(iii) such fee as may from time to time be prescribed for that purpose in Part V.

15. What is a Disability Access Certificate?

A certificate granted by a building control authority which certifies compliance, at design stage of non-domestic buildings and apartment blocks, with the requirements of Part M of the Second Schedule to the Building Regulations 1997 to 2009.

16. What is a Revised Disability Access Certificate?

A revised Disability Access Certificate (DAC) is a certificate granted by a building control authority in respect of works where significant revision is made to the design or works of a building for which a DAC has already been granted.

17. Do I need a Disability Access Certificate?

With the exception of houses and certain agricultural buildings, a Disability Access Certificate is required for all new non-domestic buildings (including apartments and flats), material alterations and extensions to buildings and certain changes of use.

18. Where do I get a Disability Access Certificate/ Revised Disability Access Certificate?

You should apply to the local building control authority for either certificate, before you commence work or where significant revision is made to the design or works of a building for which an Disability Access Certificate has already been granted.

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Safety and Health on Construction Projects

The Role of Clients

A summary of the client's role under the Safety, Health and Welfare at Work (Construction) Regulations, 2006

Who is a 'Client'?

The Safety, Health and Welfare at Work (Construction) Regulations, 2006 interprets 'client' as a person for whom a project is carried out, in the course or furtherance of a trade, business or undertaking, or who undertakes a project directly in the course or furtherance of such trade, business or undertaking;

You are not a client if you are having construction work done on your own domestic dwelling e.g. an extension on to your kitchen, or you are building your own house.

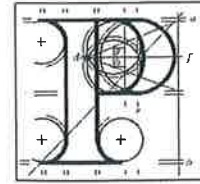
You are a client if the extension onto your own domestic dwelling is in the course or furtherance of a trade, business or undertaking, or who undertakes a project directly in the course or furtherance of such trade, business or undertaking, e.g. if you are building on an office.

What are the duties of a Client?

The Client must for every project:

- appoint, in writing before design work starts, a competent and adequately resourced project supervisor for the design process (PSDP).
In order to be competent the PSDP must have adequate training, knowledge, experience to carry out the project the PSDP must have adequate resources available to carry out the project in a safe manner;
- appoint, in writing before construction begins, a competent and adequately resourced project supervisor for the construction stage (PSCS). In order to be competent the PSCS must have adequate training, knowledge, experience and resources;
- be satisfied that each designer and contractor appointed has adequate training, knowledge, experience and resources for the work to be performed;
- co-operate with the project supervisor and supply necessary information;
- keep and make available the safety file for the completed structure. The safety file contains information on the completed structure that will be required for future maintenance or renovation (The client must keep the file in a secure place, either on the premises to which it relates or held centrally, and if the client wishes, it may be stored electronically or on microfiche.);
- provide a copy of the safety and health plan prepared by the PSDP to every person tendering for the project. The safety plan documents show how health and safety on the project will be managed to project completion.
- notify the Authority of the appointment of the PSDP where construction is likely to take more than 500 persons days or 30 working days.

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Judicial Review Notice

Judicial review of An Bord Pleanála decisions under the provisions of the Planning and Development Act 2000 (as amended)

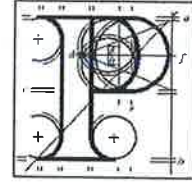
A person wishing to challenge the validity of a Board decision may do so by way of judicial review only. Sections 50, 50A and 50B of the Planning and Development Act 2000 (as substituted by section 13 of the Planning and Development (Strategic Infrastructure) Act 2006, as amended/substituted by sections 32 and 33 of the Planning and Development (Amendment) Act 2010 and as amended by sections 20 and 21 of the Environment (Miscellaneous Provisions) Act 2011) contain provisions in relation to challenges to the validity of a decision of the Board.

The validity of a decision taken by the Board may only be questioned by making an application for judicial review under Order 84 of The Rules of the Superior Courts (S.I. No. 15 of 1986). Sub-section 50(6) of the Planning and Development Act 2000 requires that subject to any extension to the time period which may be allowed by the High Court in accordance with subsection 50(8), any application for judicial review must be made within 8 weeks of the decision of the Board. It should be noted that any challenge taken under section 50 may question only the validity of the decision and the Courts do not adjudicate on the merits of the development from the perspectives of the proper planning and sustainable development of the area and/or effects on the environment. Section 50A states that leave for judicial review shall not be granted unless the Court is satisfied that there are substantial grounds for contending that the decision is invalid or ought to be quashed and that the applicant has a sufficient interest in the matter which is the subject of the application or in cases involving environmental impact assessment is a body complying with specified criteria.

Section 50B contains provisions in relation to the cost of judicial review proceedings in the High Court relating to specified types of development (including proceedings relating to decisions or actions pursuant to a law of the state that gives effect to the public participation and access to justice provisions of Council Directive 85/337/EEC i.e. the EIA Directive and to the provisions of Directive 2001/12/EC i.e. Directive on the assessment of the effects on the environment of certain plans and programmes). The general provision contained in section 50B is that in such cases each party shall bear its own costs. The Court however may award costs against any party in specified circumstances. There is also provision for the Court to award the costs of proceedings or a portion of such costs to an applicant against a respondent or notice party where relief is obtained to the extent that the action or omission of the respondent or notice party contributed to the relief being obtained.

General information on judicial review procedures is contained on the following website, www.citizensinformation.ie.

Disclaimer: The above is intended for information purposes. It does not purport to be a legally binding interpretation of the relevant provisions and it would be advisable for persons contemplating legal action to seek legal advice. Modified 30/11/2011



Fógra faoi Athbhreithniú Breithiúnach

Athbhreithniú breithiúnach ar chinneadh a rinne An Bord Pleanála faoi fhorálacha an Achta um Pleanáil agus Forbairt, 2000 (arna leasú)

Nuair is mian le duine agóid dhlíthiúil a chur in aghaidh cinnidh an Bhoird caithfear é sin a dhéanamh trí athbhreithniú breithiúnach amháin. Tá na forálacha chun agóid dhlíthiúil a chur in aghaidh cinnidh an Bhoird le fáil in ailt 50, 50A agus 50B san Acht um Pleanáil agus Forbairt, 2000 (arna ionadú le halt 13 den Acht um Pleanáil agus Forbairt (Bonneagar Straitéiseach) 2006, le halt 32 agus 33 den Acht um Pleanáil agus Forbairt (leasú), 2010 agus le halt 20 agus 21 den Acht Comhshaoil (Forálacha Ilghnéitheacha), 2011.)

Ní féidir ceistiú a dhéanamh in aghaidh cinnidh an Bhoird ach amháin trí iarratas ar athbhreithniú breithiúnach faoi Ordú 84 de Rialacha na nUaschúirteanna (I.R. Uimhir 15 de 1986). Faoi réir fho-alt 50(6) den Acht um Pleanáil agus Forbairt, 2000 déanfar iarratas ar chead chun iarratas a dhéanamh ar athbhreithniú breithiúnach laistigh den tréimhse 8 seachtain den dáta a rinne an Bord an cinneadh nó laistigh d'aon síneadh ama a cheadaíonn an Ard-Chúirt faoi fho-alt 50(8). Tabhair faoi deara nuair atá athbhreithniú breithiúnach i gceist faoi alt 50 nach féidir ach bailíocht an chinnidh a cheistiú agus ní thugann an Chúirt aon chinneadh faoi fhiúntas na forbartha ó thaobh príonsabail pleanála cuí nó forbairt inchothaithe na háite nó éifeachtaí ar an timpeallacht. Tá sé leagtha síos in alt 50 nach ndeonófar cead d'athbhreithniú breithiúnach muna bhfuil an Chúirt sásta go bhfuil forais shubstantiúla ann chun argóint a dhéanamh go bhfuil an cinneadh neamhbhailí nó gur ceart é a neamhniú agus go bhfuil suim shásúil ag an iarratasóir leis an ábhar i gceist san iarratas nó i gcásanna a bhaineann le measúnacht tionchair timpeallachta gur eagraíocht í an t-iarratasóir a chomhlíonann coiníollacha áirithe.

Tá forálacha in alt 50B mar gheall ar chostais maidir le himeachtaí san Ard-Chúirt i dtaobh athbhreithniú breithiúnach i gcásanna áirithe (lena n-áirítear imeachtaí faoi chinntí nó gníomhartha de bhun dlí de chuid an Stáit lena dtugtar éifeacht do na forálacha faoi rannpháirtíocht an phobail agus rochtain ar an gceartas atá leagtha amach i dTreoir 85/337/CEE i.e. an Treoir faoi mheasúnacht tionchair timpeallachta agus na forálacha í dTreoir 2001/42/CE maidir le héifeachtaí pleananna agus clár áirithe ar an timpeallacht a mheasúnú). Is í an fhoráil ghinearálta in imeachtaí lena mbaineann alt 50B ná go n-íocfaidh gach páirtí a chostais féin. Is féidir leis an gCúirt costais a bhronnadh i gcoinne aon pháirtí i gcásanna áirithe. Chomh maith le sin tá forálacha i bhfeidhm ionas gur féidir leis an gCúirt iomlán a chostas nó cuid d'íobh a bhronnadh ar an iarratasóir, in aghaidh fhreagróra nó fhógrapáirtí i gcásanna ina bhfaightear faoiseamh mar gheall ar gníomhú nó neamhfheidhm an fhreagróra nó an fhógrapáirtí.

Tá eolas ginearálta faoi athbhreithniú breithiúnach le fáil ar an suíomh idirlín www.citizensinformation.ie.

Séanadh: Tá an t-eolas thuas tugtha mar threoirlíne. Ní éilítear gur léirmhíniú dlí faoi na forálacha ábhartha atá ann agus dá mbeadh sé ar intinn ag éinne cás dlí a thógáil in aghaidh an Bhoird bheadh sé inmholta comhairle dlí a fháil ar dtús. Athbhreithnithe 30/11/2011



An
Bord
Pleanála

Inspector's Report ABP 301011-18

Development	Borrow pit
Location	Aughinish East, Aughinish West, Island Mac Teighe, Glenbane West, Morgan North and Fawnamore, Aughinish Island, Askeaton, Co. Limerick
Planning Authority	Limerick City and County Council
Planning Authority Reg. Ref.	17/714
Applicant	Aughinish Alumina Ltd.
Type of Application	Permission
Planning Authority Decision	Grant subject to conditions
Type of Appeal	3 rd Party v. Grant
Appellant	Pat Geoghegan, Cappagh Farmers Support Group
Observer(s)	None
Date of Site Inspection	27/07/18
Inspector	Pauline Fitzpatrick

Contents

1.0 Site Location and Description	4
2.0 Proposed Development	4
3.0 Planning Authority Decision	5
3.1. Decision	5
3.2. Planning Authority Reports	6
3.3. Prescribed Bodies	8
3.4. Third Party Observations	9
4.0 Planning History.....	10
5.0 Policy Context.....	10
5.1. Development Plan.....	10
5.2. Natural Heritage Designations	11
6.0 The Appeal	12
6.1. Grounds of Appeal	12
6.2. Applicant Response	13
6.3. Planning Authority Response.....	18
6.4. Observations	18
6.5. Response to Applicant's Submission	18
6.6. Section 131 Notice	19
6.7. Environmental Protection Agency	19
7.0 Assessment.....	20
7.1. Nature, Extent and Purpose of Proposed Development.....	20
7.2. Principle of Development	21
7.3. Public Consultation	22
7.4. Noise	23

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7.5. Dust..... 24

7.6. Health and Safety..... 24

7.7. Miscellaneous Issues 26

7.8. Environmental Impact Assessment 27

7.9. Inter-relationship between Factors 34

7.10. Reasoned Conclusions of Significant Effects..... 34

7.11. Appropriate Assessment..... 35

8.0 Recommendation..... 38

9.0 Reasons and Considerations..... 38

10.0 Conditions 40

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1.0 Site Location and Description

Aughinish Island is located on the southern side of the Shannon Estuary approximately 8 kilometres north west of Askeaton and c.33 kilometres west of Limerick City. The village of Foynes is located approximately 2 kilometres further west of the site. The Limerick Foynes railway line runs to the south of the island, as does the N69 National Secondary Route between Limerick and Foynes.

The overall landholding is stated to be c.338 hectares. The northern portion of the site accommodates the Aughinish Alumina Processing Plant. The lands to the south-west accommodate the Bauxite Residual Disposal Area (BRDA) which accommodates residual or leftover bauxite associated with the processing plant in the production of alumina. The BRDA is surrounded by retaining perimeter stack walls constructed of rock fill. As the bauxite is continually deposited on site these stack walls are raised systematically in 2 metre stages and stepped back from the outer perimeter with each additional stage. There is a storm water pond and liquid waste pond to the north-east of the existing BRDA.

The application site which has a stated area of 7 hectares, is rectangular in shape located roughly in the centre of the overall landholding and comprises of largely disturbed ground with the southern section comprising the former borrow pit associated with the construction of the original plant. The northern section of the site is currently used as a compound for the landscaping contractor with a small ancillary building. There is a difference of approx. 9 metres in ground levels between the two sections of the site arising from the previous extraction works.

The lands immediately to the east are laid out as a nature trail/amenity area.

2.0 Proposed Development

The application was lodged with the planning authority on the 26/07/17 with further details submitted 29/11/17 following a further information request dated 18/09/17.

Within the 7 hectare site an extraction area of 4.5 hectares is proposed.

It is proposed to extract c. 374,000 m³ of rock to provide for ongoing construction of the BRDA over the lifetime of the permitted development and other associated works within the applicant's landholding.

It is to be extracted in 7 phases over a 10 year period. Extraction is to occur in a northerly direction from the former borrow pit.

The borrow pit is to be operational between April and September with blasting to occur 6-7 times per annum.

It is expected to extract c. 37,400m³ per annum. To allow for instances where there is an additional requirement for rock in any given year a maximum extraction rate of 45,000m³ is proposed. This could reduce the extraction period to 8.3 years.

Blasted rock is to be fed into a mobile crusher located on the borrow pit floor with crushed rock stockpiled within the existing former borrow pit area.

Extraction is to occur to an elevation of c.8.5 metres OD. Extraction will take place above the water table. Rainwater will be allowed to naturally infiltrate the ground surface with any surface runoff collected in a sump on the pit floor prior to the plant effluent treatment system.

A pumped water system is to be installed in relation to dust emissions. A mobile bowser will be used for dust suppression on haul roads and on stockpiles.

Operating hours are to be between 0800 and 1800 Monday to Friday.

The site is accessed from the internal road system within the landholding.

Restoration landscaping proposals include an allowance for the natural regeneration of vegetation in certain areas together with additional hedge and tree planting.

The application is accompanied by an Environmental Impact Assessment Report and Non-Technical Summary.

3.0 Planning Authority Decision

3.1. Decision

Grant subject to 10 conditions of note:

Condition 3: Permission for a 10 year period.

Condition 4: All mitigation measures proposed in the EIS received 26/07/17 and 02/11/17 (sic) to be implemented in full.

Condition 7: During construction measures to limit sediment runoff from the site shall be agreed in writing with the planning authority prior to commencement of development.

Condition 10: Submission of site specific waste management plan.

3.2. Planning Authority Reports

3.2.1. Planning Reports

The **1st Planning** report dated **18/09/17** includes AA Screening. Further information is required on whether the proposed development is a licensable activity and amendments to the sections in the EIAR on population and human health and interaction between factors having regard to the designation of the site as a Category A Site under the Extractive Waste Directive and its implications for the External Emergency Plan. Conditions relating to blasting and noise limits to be attached should permission be granted. The **2nd** report dated 31/01/18 following FI recommends a grant of permission subject to conditions.

A **supplementary** report dated **31/01/18** concludes that the necessary requirements in terms of procedural issues have been complied with.

The report from the **A/Senior Planner** notes that the assessment carried out by the planner contains a fair and reasonable assessment of the likely significant effects of the development on the environment. Having regard to the character of the landscape in the area and the previous use on site the proposal is considered acceptable subject to conditions.

3.2.2. Other Technical Reports

Executive Archaeologist states that there are no archaeological issues.

Assistant Engineer South Operational Division notes that no calculations have been provided that detail the volume of surface water that will be generated during storm events and the capacity of the plant effluent treatment system. A condition to be attached to provide such detail. A condition precluding discharge of surface water to surrounding watercourses until it has passed through the treatment plant

also recommended. The traffic generated by the proposal would be minimal. A condition requiring a construction management and delivery plan recommended.

Heritage Officer notes that the quarry will operate from April to September each year. This could have the advantage of avoiding any possible disturbance to the wintering wildfowl which would be a feature of the River Shannon and Fergus SPA and the Lower River Shannon SAC. There are two habitats of ecological interest outside the area of the application, namely Dry Calcareous Grassland and Hay Meadows. These will not be affected by the proposed development. The AA Screening conclusions are accepted. The site is outside the Natura 2000 sites and the possibility of contamination through groundwater is much reduced by the fact that extraction will take place above ground water level. It will also take place during the summer months which should mean less rainfall and hence less run off and percolation of rain water through to ground water. It will also be at the same level as previous extraction (to 8.5OD) which means that there will be limited opportunity for the creation of sumps which might hold soiled water which percolate down to ground water level. Conditions detailed should permission be granted.

Executive Engineer Environment Section recommends blast vibration monitoring. Should the PPV, pore pressure displacement/settlement measurements exceed the predicted levels outlined in the Golder Associates Blast Vibration Assessment then blasting operations should cease immediately and the Environment Services Section be contacted immediately. Monitoring to be carried out at 150m, 100m and 53 m distances from the BRDA and all results analysed and compared to the predicted levels prior to commencement of the blast sequence.

Executive Scientist Physical Development Directorate considers that noise from the proposed development will likely have a significant impact on noise sensitive locations. A refusal of permission is recommended. A subsequent report by Senior Executive Engineer states that with regard to noise, when looked at in isolation, the proposed quarry would raise the background noise levels above the point where complaints would be expected. However, when looked at in the context of the current ambient noise regime, the impact of the quarry would be marginal. What is of concern is that the current ambient noise levels of up of 57dB L_{Aeq} exceed those generally imposed by the EPA (55dB L_{Aeq}). Given the low background noise levels this is potentially a problem however this is an issue for the EPA IE licencing

process. If construction phase not covered by the IE licence then a condition should be attached limiting construction noise levels to not more than 5dB above background noise levels.

Environmental and Planning Services recommends a condition requiring submission of a site specific waste management plan for the recovery/disposal of all wastes arising from the demolition, refurbishment and/or construction related activities of the development.

A report from **Senior Executive Engineer, Planning and Environmental Services** dated **25/01/18** states the original risk assessment for the External Emergency Plan was carried out by Golder Associates in 2013 as part of the development of the EEP. It identified two 'Very Unlikely' failure scenarios ie. 1 in 10,000 year probability or less that could potentially result in the activation of the EEP. The EIAR in Appendix 11 identifies the borrow pit as a potential 3rd 'very unlikely' scenario. The EEP is due for review this year and it can take into account this 3rd scenario as part of that review. This, in itself, would not prohibit the granting of the application which, in accordance with the submission, would not increase the risks identified by Golder Associates and currently associated with the Bauxite Residue Disposal. There is no objection to a grant of permission in relation to the EEP.

3.3. Prescribed Bodies

Transport Infrastructure Ireland has no observations.

An Taisce considers that the EIAR is limited to the consideration of impact in the extraction area. There are significant concerns arising from the proposal including blasting in direct proximity to the BRDA. The potential impact on its stability and integrity has not been adequately addressed. There is also the wider issue of climate proofing in the ongoing expansion of capacity of waste deposition at the BRDA. Of particular concern is the potential for increased risk of concentrated periods of high rainfall with more extreme weather.

EPA notes that the proposed development is within the licensed boundary for Aughinish Alumina Ltd (IE Licence Register No. P0035-06). The licence may need to be reviewed or amended to accommodate the changes proposed. If and when any licence review application is received by the Agency all matters to do with emissions

to the environment from the activities proposed, the licence application documentation, and EIS will be considered and assessed by the Agency.

Gas Networks Ireland notes the gas transmission pipeline in the vicinity of the site. It has no comment or objection to the proposal. It recommends that should permission be granted a condition be attached requiring the applicant to contact same in advance of any site works.

HSE has no objection on public health grounds but recommends that consent should be subject to a robust emissions management plan and provision of an externally accredited Environmental Management Plan. The technical engineering expertise required for evaluating whether the BRDA infrastructure would be at risk is outside the scope of public health, but it would be highly relevant that this assessment is obtained by the Planning Authority to establish whether there are any implications for the existing BRDA External Emergency Plan whose development was coordinated by the Local Authority. No mention is made of Category A Site Designation under the Extractive Waste Directive and the implications for the External Emergency Plan. It is a significant omission from the Human Health section. A **2nd report** dated **16/01/18** following further information states that specialist technical engineering expertise required to assess this potential risk does not exist within the HSE and recommends that the planning authority obtains advice from an independent specialist source.

3.4. **Third Party Observations**

The submissions received by the planning authority raise issues relating to health and safety, environmental risk arising from vibration and impact on stabilisation of BRDA, details on chemical make up of embankment walls, absence of risk assessment, impacts on groundwater and gas pipeline, assessment of borrow pit under Section 261 and Section 261A, compliance with EIA Directive, impact on SAC, consideration of mitigation measures in AA Screening, adequacy of financial bond and adequacy of public consultation.

4.0 Planning History

The extensive planning history is set out in Appendix 1 of the Planning Report accompanying the application. Of note:

PL13.217976 (05/1836) – permission granted in January 2007 for increase in production of alumina to 1.95 million tonnes per annum, provision of BRDA c. 80 hectares in area, increase in height of existing and permitted BRDA c.104 hectares in area and other associated works.

5.0 Policy Context

5.1. Development Plan

5.1.1. *Strategic Integrated Framework Plan for the Shannon Estuary 2013-2020*

SIFP MRI 1.2.9 – to safeguard the role and function of Aughinish Alumina as a key driver of economic growth in the region, encouraging its sustainable growth, expansion and diversification to facilitate greater and more competitive trade potential.

5.1.2. *Limerick County Development Plan 2010-2016 (as extended)*

Objective ED 04 – Safeguard Strategic Development Locations along the Estuary

It is an objective of the Council to safeguard the Strategic Development Locations at Foynes Port, Foynes Island and Aughinish Island for the sustainable growth and development of marine related industry and industrial development at Askeaton.

Objective ED O26 – Mineral Extraction and Environmental Impacts

It is the objective of the Council to:

- (a) Minimise environmental and other impacts of mineral extraction through rigorous application of development management and enforcement requirements for quarry and other developments; and
- (b) In particular, to have regard to visual impacts, methods of extraction, noise levels, dust prevention, protection of rivers, lakes and other water sources, impacts on residential and other amenities, impacts on the road network

(particularly with regard to making good any damage to roads), road safety, phasing, re-instatement and landscaping of worked sites.

Objective ED 04 – Safeguard Strategic Development Locations along the Estuary

It is the objective of the Council to safeguard the Strategic Development Location at Foynes port, Foynes Island and Aughinish Island for the sustainable growth and development of marine related industry and industrial development at Askeaton.

All proposed developments shall be in accordance with regional and national priorities and the SEA Directive, Birds and Habitats Directive, Water Framework Directive, Shellfish Waters Directive, Floods Directive and EIA Directive.

Buffer zones shall be incorporated into proposals for development where necessary to preserve potentially valuable habitats, for example areas of the estuary, shallow bays and inlets, mudflats, lagoon, salt marsh and woodland habitat which occur at or surrounding Strategic Development Locations. The extent of such buffer distances shall be established in consultation with relevant statutory bodies. Detailed botanical, faunal and ornithological surveys shall be undertaken in relation to proposed development at these Strategic Development Locations to fully consider the potential effects of the development and inform how to best avoid significant ecological effects.

5.2. **Natural Heritage Designations**

Lower River Shannon SAC (site code 002165) c. 120 metres to the west (at nearest point).

River Shannon and River Fergus Estuaries SPA (site code 004077) c. 200 metres to the west (at nearest point).

6.0 The Appeal

6.1. Grounds of Appeal

The 3rd Party appeal by Pat Geoghegan Cappagh Farmers Support Group can be summarised as follows:

- Proper public consultation was not carried out. This contravenes Articles 6(3) and 6(4) of the Aarhus Convention.
- The purpose of the proposal is so as to secure additional rock to be used to increase the height of the embankment walls of BRDA 1 and BRDA 2 to store more waste. The applicant could source the material from the quarry across the road.
- Noise levels at the facility already exceed the limit applied by the EPA. A further increase in noise levels would have a serious negative impact on local residents.
- The External Emergency Plan in respect of the storage of 40 million tonnes of waste has not been adequately considered.
- There are negative environmental and human health impacts from rock blasting with vibration, noise and fly rock.
- There has been no assessment of the impact on blasting in close proximity to the BRDA and whether such disturbance would result in dust emissions from the waste or the breaching of the embankment. The proposal could have an effect on the integrity of the BRDA
- The applicant is not completely sure if there is a risk to the BRDA. The local authority should have sought independent specialist advice. The precautionary principle should have been applied.
- The fact that the site is in close proximity to BRDA is a significant omission from the human health section of the EIAR. No consideration was given to cumulative impacts.
- The local authority has failed to take into account the potential dangers to the gas pipe from blasting.

- No consideration has been given to plant failure or human error in terms of failure scenario.
- This operation would require a full IE Licence review.
- The real purpose of the rock extraction is so as screen the existing mud ponds from public view and that the borrow pit will be used in the future as a mud pond.
- Future development such as reopening of the Foynes – Limerick railway line could be compromised. The local authority was vague in addressing this issue.
- The waste should be disposed of off site.
- The impact of blasting, dust, PM22, PM25 and fly rock on designated sites have not been adequately assessed.
- There is conflicting information in the application as to whether key habitats would be affected.
- The local authority should have required a financial bond to cover costs arising from potential environmental disaster.
- There is a conflict of interest between the applicant and the planning authority.

6.2. Applicant Response

The submission by Tom Phillips and Associates on behalf of the applicant, which is accompanied by supporting documents in appendices refers. It is stated that a number of issues raised in the appeal do not relate to the proposed borrow pit. The submission can be summarised as follows:

6.2.1. Public Participation

- The applicant carried out public consultation as detailed in Chapter 6 of the EIAR.

6.2.2. Noise (report by AWN Consulting)

- Noise emissions from the facility do not exceed/breach the EPA licence limits. The noise limits outlined in the site's licence relate to specific noise emissions

from the facility alone ie. not the total noise level, including other sources of noise not associated with the site.

- Section 10.6 of the EIAR states that with consideration of current site noise emissions and predicted noise emission values associated with the proposed borrow pit the cumulative noise emissions are expected to remain comfortably within the IE Licence noise criteria at all nearby noise sensitive locations.

6.2.3. Vibration (report by Golder Associates)

- The potential impact of the proposal on the existing BRDA is assessed in the EIAR, specifically Chapter 11 dealing with noise and vibration and Appendix 11.2 dealing with Blast Vibration Assessment.
- The Golder Report 'Borrow Pit: Phase 1 BRDA Blast Vibration Assessment' deals with an assessment of the ground vibrations from blasting at the borrow pit assuming a Maximum Instantaneous Charge (MIC) of 35kg.
- The EIAR clearly assessed the impact of the proposal on the adjoining BRDA. It had regard to blasting which has previously been carried out at the overall facility.
- Section 8 of the Golder report lists the recommendations for supporting the blast design for the proposed Borrow Pit. Estimated set back distances from blasts to limit the PPV to 5mm/s, assuming a maximum instantaneous explosive charge weight of 35kg (MIC) are:
 - (i) 53 m. to the BRDA embankment, and
 - (ii) 50 m. at the end of the life of the borrow pit to the GNI gas transmission pipeline.
- Blast vibration monitoring at various locations within the BRDA is recommended.
- The effect of blasting within the footprint of the borrow pit was evaluated and found to pose a very unlikely risk to the stability of the adjacent BRDA. The intensity of ground vibrations due to the blasting expressed as peak particle velocity (PPV) was calculated based on the type and size of blast and characteristics of the area. This was then calibrated with previous blasting

conducted in the area during the construction of the Phase 2 BRDA. The stability analyses undertaken found that the calculated PPV, for the blast analysed would not cause instability of the BRDA. The stability analysis consisted of a pseudo-static analysis which evaluated the stability based on the blast vibration, and a post blast analysis which evaluated the stability due to the increase in pore pressure within the red mud.

- The initial Phase 1 Blasting is proposed to be conducted at a distance of approx. 150 metres from the BRDA at the eastern extent of the face of the borrow pit. Vibration and monitoring data from the initial and subsequent blasts will be used to calibrate the PPV prediction model further and assess any impacts to the BRDA prior to progressing to blast the faces closest to the BRDA. As the borrow pit develops the blasting operations will progress further away from the BRDA.
- The Craggs to Aughinish 300mm diameter steel transmission gas pipe was installed in 2004 along the northern extent of the borrow pit footprint. The gas main is located approx. 340m from the proposed Phase 1 Blasts for the borrow pit at their nearest points. 6 years of blasting data will be available prior to the start of the Phase 1 Blasting, which will start at approx. 100 m from the gas main, at which stage the distance from the BRDA will be approx. 400 m.

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Consultation has been had with Gas Networks Ireland. Blasting may take place within 400m of the pipelines with the consent of GNI and a limit of 75mm/s PPV on the ground surface above the pipeline shall be applicable before a stress analysis of the pipe is required. It is proposed to limit the threshold to 55mm/s to allow for a margin of error.

6.2.4. Human Health/External Emergency Plan

- The proposed development has had regard to the External Emergency Plan and is not considered to impact on the implementation of the plan and, as a result, the local population.

6.2.5. Failure Scenario

- The comments regarding BRDA storage are not relevant to the proposed development.
- The incident referred to in Hungary, namely the failure of Reservoir No.10 of the Ajka Tailings Pond at Magyar Aluminium Art Plant in 2010 where a containment wall failed leading to the significant spillage of run mud into the environment, is not relevant to the overall facility at Aughinish given the different tailings management operations and the construction methods undertaken for the containment areas.

6.2.6. Industrial Emissions Licence

- At the time of the lodgement of the applicant it was considered that the operation of the borrow pit was not required to form part of the licensable activities at the overall landholding. Following a request for further information the EPA in a response states that the excavation of rockfill is not a licensable activity and does not require an industrial emissions licence in its own right, however it considers that the proposed borrow pit development is a directly associated activity within the licensable boundary consequently it is considered that the operation of the proposed development would require a full licence review. It is clear that the applicant addressed the licensing issue during the course of the application and was assessed by the planning authority in its determination of the application.

6.2.7. Impact on Natura 2000 Sites (report by Ecology Ireland Ltd.)

- There were no resting places (eg. otter holt, bat roost) recorded within the application area. Therefore, there is no requirement for application for derogation licences.
- Blasting will only occur outside of the over-wintering period when the key qualifying avian interests of the River Shannon and River Fergus Estuaries SPA will not be present in significant numbers in the wider area.
- The low level of blasting occurring over a 5 month summer period is unlikely to have significant adverse impact on bird species of the designated sites overall.

- There is no suitable habitat for breeding Cormorant within or adjacent to the proposed development boundary and it is highly unlikely that the infrequent blasting will be a source of any significant disturbance of the species during the breeding season.
- Extractions works will take place during daylight hours, minimising disturbance to roosting birds and mammals and birds active in the nocturnal/crepuscular period.
- Bird species are likely to be already somewhat tolerant of ongoing noise in view of the existing industrial activities and other activities in the area.
- There appears to some confusion on the sections of the report describing the in situ and potential ex situ impacts of the project. There is no disagreement or conflict.

6.2.8. Other Issues

- The crushed rock will be stockpiled to the southern end of the proposed borrow pit at the excavated level and will not be stockpiled to protrude above the adjoining ground level. The proposed development will not obscure the public view of any features at the existing facility.
- There are significant environmental and health and safety benefits to sourcing the rock within the site. Removing trucks from the roads will reduce the carbon footprint of the quarrying operation and reduce potential traffic accidents.
- The EIAR has regard to the cumulative effects of the proposed development with other existing and/or approved projects in the area. The applicant's overall landholding extends to c.338 hectares relating to the entirety of Aughinish Island. It is therefore considered that no 3rd parties could propose development that could have a cumulative effect with the proposed development within this landholding. Notwithstanding the applicant is not aware of any such projects in the wider area.
- The southern edge of the application site is located a minimum of c.1.5km to the north of the rail link between Foynes and Limerick. The proposal will not impact on its future operation.

- It is not considered that the development is of such a large scale or nature which requires significant restoration that merits the provision of a financial bond. The Board is requested to have regard to the planning authority's decision and not include a bond.
- The claims of conflict of interest are refuted.

6.3. Planning Authority Response

None received.

6.4. Observations

None

6.5. Response to Applicant's Submission

The applicant's response to the 3rd party appeal was circulated to the relevant parties for comment.

The response from the appellant, which reiterates a number of the points made in its appeal submission, can be summarised as follows:

- The pre-consultation process was flawed.
- Noise emissions are currently being breached and will be breached further if blasting is allowed.
- The response on vibration by Golder Associates is not accompanied by the report that was referenced (Charlie et al 1987).
- The response confirms the concerns about the dangers of rock blasting.
- 100% confidence, only, should be required in terms of blasting. Probability is not sufficient.
- There are further equations in relation to the primary factors influencing ground-shock amplitude and frequency of ground motion than those cited.
- Without knowing the extent of the damage to sections of the original embankment in BRDA which has been happening over decades shows how

reckless the application is. The Board should request documents and maps of repairs carried out and where further weaknesses and damage are located.

- Other examples of breaches have arisen in China.
- The proposal is a larger scale development that will require significant restoration. This merits the provision of a financial bond should the embankments of the BRDA be breached.

6.6. **Section 131 Notice**

On the basis that the proposal may have impact on nature conservation certain prescribed bodies were invited to make a submission/observation of the appeal. No responses received.

6.7. **Environmental Protection Agency**

The most recent licence pertaining to the Aughinish Alumina Ltd. was issued 24/07/14. Ref. P0035-06

The licence may need to be reviewed or amended to accommodate the changes proposed in planning application.

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7.0 Assessment

I consider that the issues arising in the case can be summarised as follows:

- Nature, extent and purpose of proposed development
- Principle of Development
- Public Consultation
- Noise
- Dust
- Health and Safety
- Miscellaneous Issues
- Environmental Impact Assessment
- Appropriate Assessment

7.1. Nature, Extent and Purpose of Proposed Development

- 7.1.1. As per the public notices and the details provided in the application and supporting documentation, including the EIAR, the applicant is seeking a 10 year permission for a borrow pit of c. 4.5 hectares within an application site of c.7 hectares so as to extract approx. 374,000m³ of rock to a maximum depth of c.8.5m OD with associated crushing and stockpiling of aggregate. Extraction is to occur between April and September each year. Ancillary works include the demolition of an existing contractor's shed.
- 7.1.2. The purpose of the rock is to provide for ongoing works associated with the Bauxite Residual Deposit Area (BRDA) located to the south-west of the application site within the applicant's landholding
- 7.1.3. I consider that the nature and extent of the proposed development for which permission is being sought has been adequately described.
- 7.1.4. The appellant has raised concerns about the potential future use of the site. The nature and extent of the development before the Board for adjudication is as described above. Any further proposal would be subject to a separate planning application and assessment.

7.2. Principle of Development

- 7.2.1. The application site is situated roughly in the centre of a substantial and long established industrial site. It is to the south of the main processing plant and to the north-east of the BRDA. With a stated area of c. 7 hectares it constitutes a small percentage of the over landholding of 338 hectares. The nearest dwelling is c.1km to the east of the site.
- 7.2.2. As noted above the purpose of the borrow pit is to provide rock for the ongoing works associated with the BRDA. Permission was granted on appeal in 2007 under PL13.217976 for a further BRDA to the south of the existing BRDA in addition to an increase in the height of existing and permitted BRDA to 32 m OD. The said permission also permitted the increase in production at the plant to 1.95 million tonnes per annum. The current store of rock on the site which is used in the ongoing construction and maintenance works associated with the BRDA is due to be exhausted in the immediate term. The proposed borrow pit is to be worked in 7 phases from south to north to a depth of c.8.5 metres and is to be operational between April and September with blasting anticipated 6/7 times per annum.
- 7.2.3. The proposal, will seek to ensure a level of self-sufficiency in terms of aggregate supply and will prevent the need to source the necessary material for the BRDA from an external source and, thus, reduce the potential impacts arising from additional vehicular movements.
- 7.2.4. The proposal, which would assist in ensuring there is sufficient aggregate to allow for the continuing development of Aughinish Alumina in accordance with the permission under ref. PL13.217976 would, therefore, be considered to aid in safeguarding the role and function of the industry as a key driver of economic growth in the region and encouraging its sustainable growth, expansion and diversification as set out in objective SIFP MRI of the Strategic Integrated Framework Plan for the Shannon Estuary 2013-2020. It will also advance the policies and objectives as set out in the Limerick County Development Plan 2010-2016, as extended, which seek to safeguard strategic development locations and promote economic and industrial development of the Shannon estuary. Therefore, I consider that the proposed development is consistent, in principle, with the said policies and objectives, subject

to satisfactory conclusions in respect of environmental effects and the other matters raised in the appeal.

- 7.2.5. Objective ED 026 and Section 10.8.1 of the County Development Plan sets out the requirements in terms mineral extraction and environmental impacts and I propose to address same in the sections below.

7.3. Public Consultation

- 7.3.1. The Aarhus Convention establishes a number of rights of the public with regard to the environment, including the right to participate in environmental decision making for projects falling within Annex 1 of the Convention or other projects likely to have a significant effect on the environment. Included in Annex 1 are installations for the production of non-ferrous crude metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes.
- 7.3.2. The European Union's EIA Directive embodies the requirements of the Aarhus Convention. Specifically, Article 6(2) requires that the public are informed of certain matters early in decision making procedures to ensure effective public participation. Article 6(4) states that the public shall be given early and effective opportunities to participate in environmental decision making procedures and shall be entitled to express comments and opinions before the decision on the request for development consent is taken. Within the planning system, these requirements are reflected in the statutory responsibilities for public notices and consultation set out in the Planning and Development Act 2000 (as amended) and Regulations 2001 (as amended).
- 7.3.3. I note that based on the information on file, the applicant has fulfilled its statutory requirements in terms of advertisement. In addition, I note Section 6 of the EIAR sets out the consultation undertaken by the applicant, both with statutory bodies and the public, prior to the lodgement of the application.
- 7.3.4. The public have had the opportunity to make submissions on the application to the planning authority. On foot of the decision the option to appeal has been availed of. Further, all matters raised are now before the Board and can be considered by it prior to making its decision. I consider, therefore, that the requirements of the

Aarhus Convention, EIA Directive and national legislation have been met in respect of public consultation.

7.4. Noise

- 7.4.1. The Aughinish Alumina Plan is subject of an IE Licence under reg. no. P0035-06. By way of condition 6.16 it is required to carry out annual noise monitoring. The results of the 2016 monitoring are used to define the baseline noise environment for the subject site, a copy of which is included in Appendix 11.1 of the EIAR. As noted measurements were conducted at 9 locations at the site boundary and at 5 nearby noise sensitive locations, the nearest being NSL2 and NSL5 c 1km to the southeast of the site boundary. I note that the daytime L_{Ar} (30 minute) 55dB, evening time L_{Ar} (30 minute) 50dB and night time L_{Aeq} (30 minute) 45dB limits were not exceeded at any of the sensitive receptors due to facility related sound.
- 7.4.2. The range of activities during both the initial and operational phases of the quarrying operation which have the potential to generate noise are set out in section 11.4, most notably blasting activities, crushing of rock and rock breaking. Table 11.6 outlines typical plant items and associated noise levels that are anticipated at the nearest noise sensitive location to site works with a total operational noise of the site calculated to be 49 dB $L_{Aeq, 1hr}$ which is within the daytime operational noise criterion of 55dB $L_{Ar, T}$.
- 7.4.3. The cited mitigation measures as set out in 11.5 reflect industry best practice including use of sound reduction equipment to the rock breaking tools and acoustic screen between compressor or generator and noise sensitive areas.
- 7.4.4. Blasting is anticipated to be required every 15 days during the operational period between April and September which equates to 6 to 7 blasts per year. Air overpressure is to be controlled at source by attention to blast design with the operator to prepare a method statement. Monitoring of air overpressure levels are also to be undertaken. Again, the mitigation measures detailed would be seen as industry best practice including advance notification to nearby residents.
- 7.4.5. I consider that sufficient information has been provided in support of the application to corroborate the assertion that the proposed quarrying activity would not give rise to significant impacts in terms of noise both in isolation and cumulatively with the

existing industrial operation. As noted above any permission granted by the Board will be subject to a review of the Industrial Emissions Licence which will control noise emissions.

7.5. Dust

- 7.5.1. Results of dust deposition monitoring at 24 locations within the overall site from January 2011 to August 2016 are provided in Table 9.3 of the EIAR. The average dustfall levels measured were within the TA Luft limit value of 350mg/(m²*day) with a maximum annual average of 117 mg/(m²*day). The closest gauge to the site is DG13 which has an average concentration of 37 mg/(m²*day). This is used as the background level for the area. It is predicted that the proposed development would increase ambient dust deposition levels by a maximum of 4.96 mg/(m²*day). Thus, the overall ambient concentrations would remain materially lower than the TA Luft Limit Value.
- 7.5.2. PM_{2.5} is also predicted to be significantly lower than the limit value of 25 ug/m³. Based on a background PM_{2.5} concentration of 10.5ug/m³ in the vicinity of the site the annual PM_{2.5} concentration including the extraction works peaks at 11.48 ug/m³
- 7.5.3. The measures to be employed at the site in terms of dust minimisation as set out in section 10.5 and Appendix 10.3 of the EIAR are comparable to those found in other quarry development and represent industry best practice.
- 7.5.4. I consider that sufficient information has been provided in support of the application to corroborate the assertion that the proposed quarrying activity would not give rise to significant impacts in terms of dust both in isolation and cumulatively with the existing industrial operation. As noted above any permission granted by the Board will be subject to a review of the Industrial Emissions Licence which will control air emissions.

7.6. Health and Safety

- 7.6.1. The appellant in its submission raises concerns about the potential impact of blasting on the embankments of the BRDA and issues of health and safety.

- 7.6.2. The application is accompanied by a report by Golder Associates titled *Borrow Pit: Phase 1 BRDA Blast Vibration Assessment*. Regard is had to previous blasting and vibration data pertaining to the site during the construction of the Phase 2 BRDA. The response to the grounds of appeal further expand on this issue. The effect of blasting within the footprint of the borrow pit was evaluated and it is concluded that it would pose a very unlikely risk to the stability of the adjacent BRDA. The intensity of ground vibrations due to the blasting expressed as peak particle velocity (PPV) was calculated based on the type and size of blast and characteristics of the area. This was then calibrated with previous blasting conducted in the area during the construction of the Phase 2 BRDA. The stability analyses undertaken found that the calculated PPV, for the blast analysed would not cause instability of the BRDA. The stability analysis consisted of a pseudo-static analysis which evaluated the stability based on the blast vibration, and a post blast analysis which evaluated the stability due to the increase in pore pressure within the red mud.
- 7.6.3. The initial Phase 1 Blasting is proposed to be conducted at a distance of approx. 150 metres from the BRDA at the eastern extent of the face of the borrow pit. Vibration and monitoring data from the initial and subsequent blasts will be used to calibrate the PPV prediction model further and assess any impacts to the BRDA prior to progressing to blast the faces closest to the BRDA. As the borrow pit develops the blasting operations will progress further away from the BRDA.
- 7.6.4. The said report also addresses the issue of blasting on the Gas Networks Ireland 300mm diameter transmission gas pipeline that runs to the north of the site. The applicant has engaged with the Gas Networks Ireland with a series of technical recommendations for blasting in addition to a monitoring regime detailed. Further detail in support of these conclusions are set out in the applicant's response to the grounds of appeal.
- 7.6.5. I consider that sufficient detail has been provided by the applicant to support its assertion that the blasting required can be carried out without giving rise to concerns about the stability of the BRDA or impact on the gas transmission pipeline. Further, blasting will be controlled and monitored under the terms of a revised IE Licence.
- 7.6.6. I note that there are a range of conditions attached to the IE licence pertaining to monitoring of the physical structure of the BRDA, and the operation and control of

the area. Condition 9 of the licence addresses Accident Prevention and Emergency Response in which an Internal Emergency Plan is required and that on at least an annual basis the operator is required to consult with the Local Authority and the Principal Response Agencies in relation to any information that may be required by them regarding external emergency planning for major accidents at the BRDA. The licensee is obliged to meet the requirements of the conditions of the licence.

7.6.7. The plant operates a safety management system which will also incorporate operations within the borrow pit and is accredited to International Safety Rating System (ISRS). The issue of the Category A Designation of the site under the Extractive Waste Directive and the implications for the External Emergency Plan (EEP) in place since 2013 as a requirement of the Directive was raised in the planning authority's further information request. The said plan is consequent to the EPA license issued in 2012 which designated the BRDA as a Category A Facility. The applicant in response to the 3rd party appeal states that it is fully aware of the EEP and has considered the proposed development as part of the plan. The said plan is developed and approved by Limerick County Council. It is stated that the borrow pit is outside the boundary of the Specified Area referenced in the EEP. The Senior Executive Engineer, Planning and Environmental Services in his assessment of the applicant notes that the EEP is due for review this year and that the borrow pit can be taken into account.

7.6.8. In conclusion, I consider that sufficient information has been provided with the application to support the assertion that the proposed development can be carried out without giving rise to health and safety concerns.

7.7. Miscellaneous Issues

7.7.1. The appellant asserts the veracity of the decision made by the planning authority due to an alleged conflict of interest. This is not a matter for comment at this juncture save to note that the application is now before the Board for assessment de novo.

7.7.2. In view of the separation distance between the site and the Limerick – Foynes railway line to the south (1.5km) I would not anticipate that the proposal would have any impact on same as to preclude it's reopening.

7.7.3. The appellant considers that a financial bond should be required to cover a potential environmental incident should the proposed development result in a breach of the BRDA. I note that the matter of environmental liabilities is a condition of the IE licence.

7.8. Environmental Impact Assessment

7.8.1. Introduction

This application has been submitted after 16th May 2017, the date for transposition of Directive 2014/52/EU amending the 2011 EIA Directive. At the time of preparing my report the Directive has not been transposed into Irish legislation. Circular Letter 1/2017 issued by the Department of Housing, Planning, Community and Local Government (DHPCLG) sets out the transitional arrangements in advance of the commencement of the transposing legislation. In this regard, it is stated that Article 3 of Directive 2014/52/EU provides that where an application for planning permission or other development consent requiring Environmental Impact Assessment has been submitted on or after the 16th May 2017, the relevant provisions of Directive 2014/52/EU, which is deemed to have been applied since the 16th May 2017, is relevant. Accordingly, it is proposed to apply the requirements of Directive 2014/52/EU

The application for the proposed development is accompanied by an environmental impact assessment report. It:

- Describes the project and provides information on the site, design, size and particular features of the proposed development,
- Describes the likely significant effects of the project on the environment
- Describes the features of the project and/or measures envisaged to avoid, prevent, reduce, and if possible, remedy significant impacts,
- Provides a description of the main alternatives studied, and an indication of the main reasons for the choice of alternative put forward, taking into account environmental effects, and
- Includes a non-technical summary of the above information.

The requirements of Article 3(2) include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned. The EIAR does not directly address this issue. However, I do not consider that the proposed development, in itself, is particularly vulnerable to natural disaster (eg. the site is not vulnerable to flooding and is not situated in an earthquake zone etc.) triggering the requirement for additional information under Article 5(1)(f).

Section 1.6 of the EIAR sets out the competencies of experts who prepared the Report. Competencies are reasonable and consistent with the technical requirements of the EIAR.

I am satisfied that the information contained in the submitted EIAR complies with article 94 of the Planning and Development Regulations 2000, as amended, and the provisions of Article 5 of the EIA Directive 2014.

In accordance with the requirements under Article 3(1)(a) to (e) of the EIA Directive, my assessment of the environmental effects of the development is set out below. It is based on my examination of the information provided by the applicant, including the EIAR, the further information submitted to the planning authority and the submissions made in the course of the application and appeal. Summaries of the submissions made by the applicant, prescribed bodies and the reports of the planning authority have been set out in sections 3 and 6 of this report.

In assessing the impact of the proposed development regard must be had to the fact that the site is within a larger site for which an IE Licence pertains, and which may require to be amended as a consequence of the proposed development. Matters pertaining to ground and surface water, air noise and vibration would be regulated by the EPA under a review of the said licence. The Board may, in respect of any licensable activity decide to refuse to grant planning permission where it considers the activity to be unacceptable on environmental grounds.

7.8.2. Reasonable Alternatives Studied

Chapter 4 of the EIAR refers. The existing stockpile of rock within the confines of the landholding is due to run out post 2017. The proposal would reduce the

dependence on rock sourced from commercial quarries. It is also stated that as result of Section 261 and Section 261A a large number of quarries in the country do not have the requisite permission and particulars in place.

Whilst reference is made to the alternatives within the landholding no details of same are provided. The fundamental alternative comprises the option of sourcing the necessary aggregate externally which could have material implications in terms of traffic in particular.

Notwithstanding the absence of details of the alternative locations and layouts I consider that the location of the site within the applicant's landholding is a reasonable proposal having regard to purpose of the material to be sourced.

7.8.3. **Population and Human Health**

Chapter 5 of the EIAR refers. Issues arising in terms of air, noise and water are also relevant in terms of human health which are addressed in other chapters of the EIAR. I have considered the relevant sections and the written submissions made in relation to this matter.

The existing industrial operation at Aughinish Alumina employs in the region of 450 persons in addition to 180 maintenance and installation contractors with further indirect employment for local service industries. The proposed borrow pit will assist in ensuring the availability of the material required for the BRDA which is an integral part of the industrial operation. The applicant proposes to subcontract the operation of the borrow pit to an appropriately experienced operator for the blasting, crushing and stockpiling of materials and it is anticipated that it will provide for a further 5 persons employed part time.

Chapter 10 of the EIAR deals with the emissions to air and Chapter 11 with noise and vibration arising from the site activities including blasting. I note that the nearest dwelling is c. 1km from the site. As discussed in sections 7.4 and 7.5 above and having regard to the applicant's assessment of likely emissions arising from the proposed development, the predicted modest increases relative to the existing industrial operation, I have accepted that the proposed development is unlikely to give rise to any significant effects on air quality to the detriment of human health.

Further, the proposal may require a review of the IE licence and consequent monitoring to ensure compliance,

With regard to the vulnerability of the project to risks of major accidents/disasters, I have stated that I do not consider that the proposed development, in itself, is particularly vulnerable to natural disaster. Consequently, I do not consider that the proposed development poses a substantial risk to population or human health in this regard.

The issue of the impact on blasting on the stability and integrity of the BRDA is addressed in section 7.6 above. I consider that sufficient detail has been provided by the applicant to support its assertion that the blasting required can be carried out without giving rise to concerns about the stability of the BRDA or negative impact on the gas transmission pipeline and consequent potential impacts on human health. Further, blasting will be controlled and monitored under the terms of a revised IE Licence.

Chapter 9 of the EIAR deals with impact on water. The development proposes the extraction above the water table to a depth of 8.5m OD. The site is roughly in the centre of the Aughinish Alumina site with no surface water features in the vicinity. The main potential polluting impacts associated with the development are the introduction of hydrocarbons to the underlying groundwater. No discharges to surface water are proposed. Under IE licence discharges to both surface and ground water are controlled and monitored. Having regard to these measures significant impact on water quality (surface or ground) and consequentially on human health are unlikely.

Having regard to the matters discussed above I am satisfied that impacts that are predicted to arise in respect of population and human health can be avoided, managed and mitigated by the measures which form part of the proposed development, the proposed mitigation measures and through suitable conditions. I am satisfied, therefore, that the proposed development would not have any unacceptable direct, indirect or cumulative impacts on population or human health.

7.8.4. Biodiversity

I have considered the written submissions made in relation to biodiversity in addition to Chapter 7 of the EIAR. There is an overlap with the Appropriate Assessment Screening as set out in section 7.10 below.

The site is in the centre of the large industrial site, to the south of the main processing plant and to the south-east of the BRDA. It comprises an area of disturbed ground, the southern section comprising the original borrow pit and the northern section currently used as a compound for the landscaping contractor.

The botanical and habitat surveys undertaken did not identify any species protected under the Flora (Protection) Order (1999) as amended (2015), listed in Annex II of IV of the EU Habitats Directive (92/43/EEC) or listed in the Irish Red Data Book either in or in the vicinity of the site. Habitats within the site are considered to be of low to moderate ecological value overall. No fauna of conservation concern was recorded within the site and it is considered to be of low ecological value for mammal species in general. The minor disturbance and displacement effects anticipated for the local non-volant mammals are of minor importance in relation to the wider ecology on Aughinish Island.

In terms of cumulative impacts the nature and extent of the proposal is relatively minor in the context of the overall industrial operation. There will be no significant change to the potential sources of disturbance to local flora and fauna. I also have regard to the fact that a review of the IE Licence may be required which will set emission limits in respect of water, air and noise and the requirement to monitor emissions to ensure compliance with the limit values. I would therefore accept the conclusion that it is unlikely that there will be any significant cumulative impacts upon flora, habitats and fauna arising from the proposed development. The mitigation measures as set out in Section 7.5 are reflective of best practice measures and are acceptable.

I am satisfied that potential impacts that are predicted to arise in respect of biodiversity can be avoided, managed and mitigated by the measures which form part of the proposed development, the proposed mitigation measures and through suitable conditions. I am, therefore, satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative impacts on biodiversity.

7.8.5. Lands, Soil, Water, Air and Climate

I have considered the written submissions made in relation to land, soils, water, air and climate in addition to chapters 8, 9 10 and 11 of the EIAR

Extraction of limestone by blasting and excavators is a permanent and irreversible impact. However, the application site, in itself, is a relatively small area and this permanent loss is unlikely to be significant in terms of the overall reserve. In terms of cumulative impacts the quarrying operation within an overall industrial landholding of 330 hectares is considered to be small.

The top soil etc. to be removed is to be retained and used for landscaping.

Mitigation measures incorporate a number of best practice measures to ensure that surface water and groundwater does not become contaminated by pollutants.

Potential impacts on surface and ground water have been considered under Population and Human Health above. For the reasons stated I have concluded that significant impacts on surface and groundwater are unlikely to arise.

Likely emissions to air have been considered in sections 7.4 and 7.5 above and again under human health. For the reasons stated I have concluded that significant emissions to air (by way of noise, vibration and dust) are unlikely to arise. Any permission granted by the Board will be subject to an IE Licence review which will control emissions to air for prescribed parameters.

In terms of climate the quarry activity the emissions of greenhouse gases to the atmosphere, primarily from the operation of plant and vehicles, would not be significant in the context of the emissions arising from the activities on the larger site.

Having regard to the above, I am satisfied that potential impacts that are predicted to arise in respect of land, soils, water, air and climate can be avoided, managed and mitigated by the measures which form part of the proposed development, the proposed mitigation measures and through suitable conditions. I am, therefore, satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative impacts on land, soils, water, air and climate.

7.8.6. **Material Assets, cultural heritage and Landscape**

I have considered the written submissions made in relation to material assets and landscape in addition to Chapters 13 & 15 of the EIAR which address traffic and transportation and waste management, chapter 13 which addresses landscape and chapter 14 which addresses cultural heritage.

The issue of the potential impact on utilities and specifically the gas transmission pipeline is considered in the EIAR. I have considered this matter in Section 7.6 above. The proposed development will take place within an existing serviced site, with no requirement for additional electrical or utility infrastructure, connection to the public water supply or foul drainage and no implications for ownership or access to the site.

As the site is within the applicant's landholding and the aggregate to be used for the ongoing construction works with the associated BRDA the proposal will have no material impact on the vehicular movements generated by the overall facility save for that generated by a small additional number of employees. The internal road network, only, is to be used. The proposal would offset the requirement to source the necessary aggregate from external sources.

The proposed borrow pit will not result in any changes from the current position with regard to waste management at the facility. The waste management system currently in place at the facility will continue to accommodate any residual waste that may arise.

Cultural Heritage - The site comprises an area of disturbed ground roughly in the centre of the overall landholding. There are no archaeological, architectural or cultural sites in the vicinity. The conclusion that the proposal would have no adverse impacts is accepted.

Landscape - The site is located roughly in the centre of the large industrial site dominated by the processing plant and BRDA. The proposed development will not be evident in views from outside of the site notably when travelling on the N69 towards Foynes. The proposal would not give rise to any perceptible visual impact and will not alter the landscape.

Having regard to the above, I am satisfied that the issues of material assets, cultural heritage and landscape have been appropriately address in terms of the application

and the information submitted by the applicant and that no significant adverse effects are likely to arise.

7.9. **Inter-relationship between Factors**

I have considered all the written submissions made in relation to impacts on inter-relationship between factors, in addition to those specifically identified in Chapter 16 of the EIAR.

In my assessment of each environmental topic I have considered the likelihood of significant effects arising as a consequence of interrelationships between factors. Most interactions e.g. noise on human health, are addressed under individual topic headings. Given the generally modest impacts which are predicted to occur, having regard to the nature of the proposed development I am satisfied that such effects can be avoided, managed and mitigated by measures which form part of the proposed development, mitigation measures and suitable conditions. I do not foresee any likelihood of any of these interrelationships giving rise to significant effects on the environment. There is, therefore, nothing to prevent the granting of permission on the grounds of interaction between factors.

7.10. **Reasoned Conclusions of Significant Effects**

Having regard to the examination of the environmental information contained above and in particular to the EIAR and information provided during the course of the assessment of the application and the appeal including submissions from prescribed bodies and the appellant it is considered that the main significant direct and indirect effects of the proposal development on the environment are as follows:

Emissions to Air – the proposed development would give rise to dust, noise and vibration arising from the extraction process. However significant impacts will be avoided by the incorporation of industry best practice measures into operational procedures. The applicant will also be required to seek a review of the Industrial Emissions Licence which will specify emission limits for all relevant parameters and to operate the proposed development in accordance with same. Monitoring of compliance with emission limit values will fall to the EPA.

I am therefore satisfied that the proposed development would not have any unacceptable direct or indirect effects on the environment.

7.11. **Appropriate Assessment**

A Screening Report in support of the Appropriate Assessment Process accompanies the application.

Project Description and Site Characteristics

The site and proposed development are as described in sections 1 and 2 above.

Relevant Natura 2000 Sites, Qualifying Interests and Conservations objectives

The site is not located within any designated site.

There are 6 no. Natura 2000 sites within 15km of the site.

1. Lower River Shannon SAC – c.120 metres to the east
2. River Shannon and River Fergus Estuaries SPA - c. 180 metres to the east
3. Barrigone SAC c. 1.91km to the south east
4. Stacks to Mullaghareirk Mts. West Limerick Hills and Mt Eagle SPA c. 10km to the south-west
5. Askeaton Fen Complex SAC – c. 9km to the south east
6. Curraghchase Woods SAC – c.12km to the south east.

The qualifying interests for the sites are set out in Table 2.1 of the screening report. Detailed conservation objectives have been prepared for all but Barrigone SAC and Stacks to Mullaghareirk Mts. West Limerick Hills and Mt Eagle SPA details of which are available of www.npws.ie. The overall aim is to maintain or restore favourable conservations status of habitats and species of community interest.

Assessment of Likely Effects

As the site is not within a designated site no direct impacts will arise. I also note that there are no Annex 1 Habitats listed under the EU Habitats Directive present within the site.

In view of the qualifying interest of the Stacks to Stacks to Mullaghareirk Mts. West Limerick Hills and Mt Eagle SPA, namely Hen Harrier, the intervening distance, the

lack of suitable habitat and no potential direct or indirect hydrological link no impacts on this designated site are anticipated.

In view of the qualifying interests of Askeaton Fen Complex SAC, the separation distance and no potential direct or indirect hydrological link no impacts on this designated site are anticipated.

There are no habitats relating to the conservation objectives of Barrigone SAC present within the site and no suitable food plant for the Marsh Fritillary documented. In view of the qualifying interests, the separation distance and no potential direct or indirect hydrological link no impacts on this designated site are anticipated.

Curraghchase Woods SAC is designated for the protection of qualifying woodland habitats and Lesser Horseshoe Bat. There is limited foraging potential for the bat. In view of the qualifying interests, the separation distance and no potential direct or indirect hydrological link no impacts on this designated site are anticipated.

Indirect habitat loss or deterioration of the Lower Shannon SAC and River Shannon and River Fergus Estuaries SPA could occur from the effects of run off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination.

There are no watercourses at or near the site connecting with/discharging to the designated sites therefore there is no hydrological link. Indirect loss of habitat through impacts such as increased siltation, nutrient release etc. can be ruled out. There will no requirement for a water supply or foul drainage. Site staff will use the existing facilities available at the Aughinish Alumina facility. There is an existing surface water and storm water runoff system within the overall Aughinish Alumina site. All waste/foul waste within the overall facility is treated prior to discharge to the Shannon Estuary. Both are monitored and controlled in compliance with the schedule and conditions of the IE licence.

There is a potential for an indirect hydrological link between the proposed development site groundwater discharge via springs to the Shannon estuary and Poularone Creek. Quarrying is to be maintained above the water table in addition to procedures which are considered to be an integral component of such a quarrying activity and which represent best practice in terms of groundwater protection no significant impact on groundwater is anticipated.

Activities associated with the proposed development have the potential to disturb and/or displace faunal species of the said designated sites through increased disturbance such as noise.

In terms of the Lower River Shannon SAC the only faunal qualifying interest is the Otter. There are no sightings or signs recorded of Otter within or adjacent to the proposed. The location within an existing industrial operation, away from the shoreline and absence of watercourses in this part of the site decreases the likelihood that the area is frequented by Otters. Therefore, it is not considered that the proposed development will have any significant impact on Otters in the wider area.

The River Shannon and River Fergus Estuaries SPA is designated for the protection of overwintering bird species. Given the site size, existing habitats and location within an industrial complex, the overall low level of wintering bird activity recorded at the site and availability of more expansive and suitable habitat locally there is no potential for adverse impacts on the faunal species of the designated site as a result of loss of habitats at the site.

Blasting has the potential to cause disturbance to the qualifying interests of the SPA. The restriction of extraction including blasting to the period between April and September is an integral component of the proposed development and is included in the nature and extent of the development as given in the public notices for which permission is being sought. Blasting will, therefore, occur outside the overwintering period for the qualifying interests. Blasting will be at low levels approx. every 15 days. In the context of the existing industrial operation on the site there is no predicted significant impacts anticipated as a result of noise.

Emissions to air including dust and noise are not anticipated to be significant. They are subject of the IE licence which will be reviewed as a consequence of the proposed development.

In terms of cumulative impacts I have regard to the industrial character of the area and the existing industrial operation. I am not aware of any other large planned or permitted development in the vicinity.

Screening Statement and Conclusions

In conclusion having regard to the foregoing, it is reasonable to conclude on the basis of the information on the file, which I consider adequate in order to issue a screening determination, that the proposed development, individually and in combination with other plans or projects would not be likely to have a significant effect on any European Site and in particular site codes 002165 and 004077 in view of the sites' Conservation Objectives and a Stage 2 Appropriate Assessment (and submission of a NIS) is not therefore required.

8.0 Recommendation

8.1. I recommend that permission for the above described development be granted for the following reasons and considerations subject to conditions.

9.0 Reasons and Considerations

In coming to its decision, the Board had regard to the following:

- (a) the planning history of the site
- (b) the established industrial operation on the larger landholding and the location of the site within the landholding.
- (c) the nature, purpose, scale and form of the proposed development and its location relative to nearby sensitive receptors.
- (d) the provisions of the Limerick County Development Plan 2010-2016, as extended, and the Strategic Integrated Framework Plan for the Shannon Estuary, 2013-2020.
- (e) the requirement to obtain an Industrial Emission Licence for the overall installation at the site which includes the application site from the Environmental Protection Agency,
- (f) the written submissions made in respect of the planning application and appeal, and
- (g) the report and recommendations of the Inspector

it is considered that, subject to compliance with the conditions set out below, the proposed development would not seriously injure the amenities of the area or property in the vicinity and would not be prejudicial to public health. The proposed development would, therefore be in accordance with the proper planning and sustainable development of the area.

Appropriate Assessment

The Board completed an Appropriate Assessment Screening exercise in relation to the potential effects of the proposed development on designated European Sites, taking into account the nature, scale and location of the proposed development and emissions arising from it, the Screening Report submitted with the application, the Inspector's report and submissions on file. The Board adopted the report of the Inspector and agreed with the screening assessment and conclusion carried out in the Inspector's report that by itself or in combination with other development in the vicinity, the proposed development would not be likely to have a significant effect on the Lower River Shannon SAC (site code 002165) and River Shannon and River Fergus Estuaries SPA (site code 004077) or any other European site in view of the sites' conservation objectives, and that a Stage 2 Appropriate Assessment is not, therefore, required.

Environmental Impact Assessment

The Board completed an environmental impact assessment of the proposed development, taking into account:

- (a) the nature, scale and extent of the proposed development;
- (b) the environmental impact assessment report and associated documentation submitted in support of the application;
- (c) the submissions from the Planning Authority, the appellant and prescribed bodies in the course of the application and appeal
- (d) the Inspector's report.

The Board considered that the environmental impact assessment report, supported by the documentation submitted by the developer, adequately identifies and describes adequately the direct, indirect, secondary and cumulative effects of the proposed development on the environment.

The Board agreed with the examination, set out in the Inspector's report, of the information contained in the environmental impact assessment report and associated documentation submitted by the developer and submissions made in the course of the planning application.

The Board considered that the main significant direct and indirect effects of the proposed development on the environment are, and will be mitigated, as follows:

Emissions to air including dust, noise and vibration. Significant impacts will be avoided by the incorporation of best practice measures into operational procedures. The applicant will also be required to seek a review of the Industrial Emissions Licence which will specify emission limits for all relevant parameters and to operate the proposed development in accordance with same. Monitoring of compliance with emission limit values will fall to the EPA.

The Board completed an environmental impact assessment in relation to the proposed development and concluded that, subject to the implementation of the mitigation measures referred to above, and other measures set out in the environmental impact assessment report (sections 5.7, 7.5, 8.6, 9.5, 10.5, 11.5, 12.6, 13.6 and 14.5 and 15.5) and, subject to compliance with the conditions set out below, the effects on the environment of the proposed development, by itself and in combination with other development in the vicinity, would be acceptable. In doing so, the Board adopted the report and conclusions of the Inspector.

10.0 Conditions

1. The development shall be carried out and completed in accordance with the plans and particulars lodged with the application as amended by the further details and particulars submitted on the 29th day of November 2017 except as may otherwise be required in order to comply with the following conditions. Where such conditions require details to be agreed with the planning authority, the developer shall agree such details in writing with the planning authority prior to commencement of development and the development shall be carried out and completed in accordance with the

agreed particulars.

Reason: In the interest of clarity.

2. All environmental mitigation measures outlined in the environmental impact assessment report (as set out in sections 5.7, 7.5, 8.6, 9.5, 10.5, 11.5, 12.6, 13.6 and 14.5 and 15.5) shall be implemented in full. Compliance with, and effectiveness of mitigation measures, shall be demonstrated in an annual report of compliance to the planning authority. The planning authority shall make the annual report available for public inspection.

Reason: In the interest of environmental protection.

3. All proposed screening measures, including improvements to boundaries and the provision of any fencing and berms, shall be completed prior to commencement of extraction on site.

Reason: In the interest of visual amenity.

4. Construction and demolition waste shall be managed in accordance with a construction waste and demolition management plan, which shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development. This plan shall be prepared in accordance with the "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects", published by the Department of the Environment, Heritage and Local Government in July 2006.

Reason: In the interest of sustainable waste management.

5. The developer shall pay to the planning authority a financial contribution in respect of public infrastructure and facilities benefiting development in the area of the planning authority that is provided or intended to be provided by or on behalf of the authority in accordance with the terms of the Development Contribution Scheme made under section 48 of the Planning and Development Act 2000, as amended. The contribution shall be paid prior to commencement of development or in such phased payments as the planning authority may facilitate and shall be subject to any applicable

indexation provisions of the Scheme at the time of payment. Details of the application of the terms of the Scheme shall be agreed between the planning authority and the developer or, in default of such agreement, the matter shall be referred to An Bord Pleanála to determine the proper application of the terms of the Scheme.

Reason: It is a requirement of the Planning and Development Act 2000, as amended, that a condition requiring a contribution in accordance with the Development Contribution Scheme made under section 48 of the Act be applied to the permission.

Pauline Fitzpatrick
Senior Planning Inspector

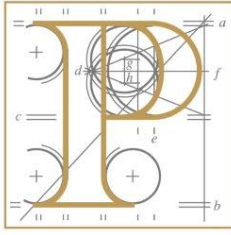
August, 2018

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ATTACHMENT 2

An Bord Pleanála Amendment of Board Order

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Planning and Development Acts 2000 to 2018

Amendment of Board Order

Planning Authority: Limerick City and County Council

Planning Register Reference Number: 17/714

Development Concerned: A ten-year permission for development on a site of circa seven hectares located adjoining the existing Aughinish Alumina Limited plant for the provision of a Borrow Pit with an extraction area of circa 4.5 hectares to extract circa 374,000 cubic metres of rock over a ten-year period. The extraction area is sought up to a maximum depth of circa 8.5 metres O.D., with extraction to occur between April and September each year. The proposed development includes the demolition of a contractors shed and all ancillary site development, areas of stockpiling, landscaping and boundary treatment works above and below ground, including restoration of the extraction area. Aughinish Alumina Limited carries out an activity requiring an Industrial Pollution Prevention and Control Licence (now replaced by an Industrial Emissions Licence – Licence Register Number P0035-06). The development and operation of the proposed Borrow Pit is not a licensable activity. An Environmental Impact Statement (EIS) will be submitted to the planning authority with the application, at Aughinish East, Aughinish West, Island Mac Teige, Glenbane West, Morgan North and Fawnamore at or adjacent to Aughinish Island, Askeaton, County Limerick.

WHEREAS the Board made a decision to grant permission subject to conditions, in relation to the above-mentioned development by order dated the 13th day of November, 2018:

AND WHEREAS it has come to the attention of the Board that a clerical error occurred in the wording of condition number 3 and in the development description of the Order, as amended above (374 cubic metres now reads 374,000 cubic metres).

AND WHEREAS the Board considered that the correction of the above-mentioned error would not result in a material alteration of the terms of the development,

AND WHEREAS having regard to the nature of the issue involved, the Board decided not to invite submissions in relation to the matter from persons who had made submissions or observations in relation to the appeal the subject of this amendment,

NOW THEREFORE in accordance with section 146A(1) of the Planning and Development Act 2000, as amended, the Board hereby amends the above-mentioned decision so that condition number 3 of its order and the reason therefor shall be as follows:

3. Blasting shall not take place outside of the period between April to September in any year.

Reason: In the interest of clarity and to limit the extraction and blasting to the periods specified in the application.

Stephen Bohan
Member of An Bord Pleanála
duly authorised to authenticate
the seal of the Board.

Dated this day of 2019.

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ATTACHMENT 3

Assimilative Capacity Assessment of Effluent Discharge from Aughinish Alumina by Byrne
Ó Cléirigh

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Assimilative Capacity Assessment of Effluent Discharge from Aughinish Alumina

Prepared for

Aughinish Alumina

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Ref: 532-20X0035 R0

1 April 2020

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Contents

1	INTRODUCTION	1
2	SITE DESCRIPTION	1
2.1	Overview	1
2.2	Production Activity	1
2.3	Emissions to Water	2
2.3.1	Overview	2
2.3.2	Process Effluent	2
2.4	Emissions Monitoring	3
2.4.1	Overview	3
2.4.2	Monitoring Results	4
2.4.3	Additional Monitoring	4
3	RECEIVING ENVIRONMENT	5
3.1	Overview	5
3.2	Hydrodynamics	5
3.3	Aquatic Environment	6
3.4	Marine Chemistry	7
3.5	Water Column Quality	9
3.6	Surface Water Quality	9
3.7	Ambient Monitoring	11
4	ASSIMILATIVE CAPACITY MODEL	13
5	ASSESSMENT LEVELS	14
5.1	Overview	14
5.2	Environmental Objectives (Surface Water) Regulations	14
5.3	Water Framework Directive	14
5.4	EPA Parameters of Water Quality	15
5.5	Ambient Monitoring Data	15
5.5.1	EPA Monitoring	15
5.5.2	AAL Monitoring	15
5.6	Summary	15
6	ASSESSMENT	16
6.1	Overview	16
6.2	Input Data	16
6.3	AAL Discharge	17
6.4	Discharge at BAT AEL Limits	19
7	CONCLUSIONS	20

1 INTRODUCTION

In April 2019, Aughinish Alumina Ltd (AAL) applied to the Environmental Protection Agency (EPA) for a review of its Industrial Emissions Licence (register no. P0035-06), which included the application of the *Commission Implementing Decision on the BREF on common waste water and waste gas treatment / management systems in the chemical sector* (Decision 2016/902).

AAL has assessed the characteristics of its treated effluent, which is discharged to the Shannon Estuary via licensed emission point W1-1, and has determined that it is not technically or economically feasible to treat the effluent to achieve the BAT associated emission level (BAT AEL) for total organic carbon (TOC) or chemical oxygen demand (COD). As part of its application, AAL submitted an application for a derogation from the BAT-AEL for TOC and COD.

In March 2020, the EPA issued a request for further information, which included the following:

Demonstrate, through quantitative environmental assessment, the impact of the “excess” contribution of TOC and COD over that of the relevant BAT Associated Emission Level (Commission Implementing Decision (EU) 2016/902), on the local receiving water environment.

At the request of AAL, Byrne Ó Cléirigh (BÓC) has conducted an assessment of the assimilative capacity of the Shannon Estuary in the context of the discharge of treated effluent from AAL’s licensed emission point W1-1, to demonstrate quantitatively that the discharge to the estuary is not environmentally significant.

2 SITE DESCRIPTION

2.1 Overview

AAL is Europe’s largest alumina refinery, producing approximately 30% of the EU’s alumina. The facility was constructed at a cost of approximately \$1 billion and commenced operations in 1983, initially operating at a throughput of approximately 800,000 tonnes per annum. Since then, AAL has invested a further \$733 million as part of its modernisation, environmental protection and efficiency programme, and it currently operates at approximately 1.9 million tonnes per annum.

2.2 Production Activity

AAL extracts alumina from bauxite ore using the Bayer process, comprising four principal stages:

1. Digestion of the bauxite ore, during which the ore is ground and mixed with a sodium hydroxide solution to form a slurry, with the digestion taking place at high pressure and temperature.
2. Clarification of the liquor stream from the digestion process, with the stream containing the alumina in solution.
3. Precipitation of alumina hydrate from the clarified stream.
4. Calcination (removal of chemically bound water) of the alumina trihydrate ($\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$) to produce the finished alumina product.

2.3 Emissions to Water

2.3.1 Overview

There are seven licensed emissions to surface water at AAL:

- 5 no. storm water discharge points (designated as SS1 to SS5), which discharge storm water from the non-process areas via silt traps to the Shannon Estuary
- Emission point W1-1, which discharges treated process effluent from the effluent treatment plant to the Shannon Estuary
- The sanitary effluent discharge point, which discharges treated sanitary effluent from the sanitary effluent treatment plant to the industrial effluent discharge pipeline at a point upstream of the final discharge at W1-1.

2.3.2 Process Effluent

Process effluent and potentially contaminated storm water from higher risk areas of the site is collected in the process effluent drainage system and are treated in the site's effluent treatment plant. The effluent streams that are collected across the site comprise:

1. Storm water collected on the BRDA (over an area of 180 hectares), which may be contaminated by dilute residual sodium aluminate in the bauxite residue. In addition to the storm water that is collected on the BRDA, the sprinkler water (which forms part of AAL's dust management / control system) is collected and treated in the process effluent treatment system.
2. Storm water collected on the roadways and buildings within the process areas of the plant may be contaminated with process streams and therefore it is also treated in the process effluent treatment plant. The storm water in these areas is collected in the process area surface drainage system, which feeds the east and west surface water collection ponds. The water from the ponds is then transferred to the process effluent treatment system.
3. Storm water collected in the process bunds may be contaminated; it is either absorbed into the process or is collected in the process area surface drainage system (see no. (2)).
4. Groundwater recovered via the groundwater wells and from the estuarine stream recovery systems is recovered into the process effluent storage ponds and treated in the process effluent treatment plant.
5. Other streams that contribute to the process effluent include:
 - cooling tower bleed, which comprises concentrated steam condensate from the regenerative condenser system that feeds fresh make up steam to the central cooling towers
 - surplus process condensate from the process, which may be contaminated with traces of sodium aluminate and organics extracted from the bauxite
6. Backwash streams generated from the potable water treatment plant (which produces high quality treated water for steam generation) may contain precipitated hardness and therefore this stream undergoes clarification via the process effluent treatment system.

The typical contribution from each of the effluent streams treated in the plant is shown in Table 1, although the total volume (flow) to the plant depends on the level of rainfall and therefore the total flow can typically vary from 745 m³/h to 1,250 m³/h.

Table 1: Approximate process effluent volumes to AAL treatment plant

Stream	Flow (m ³ /h)	TOC (mg/l)	pH (pH units)
Leachate from BRDA & rainwater runoff	290	160	13
Storm water from roads & buildings in process area, and contaminated condensate & groundwater	120	150	13
Central cooling tower bleed	30	60	12
Surplus process condensate	200	30	11
Water treatment plant backwash	60	30	11
Wastewater from Limerick City & County Council water treatment plant	45	-	7
Total	745	123	-

The results from AAL's effluent monitoring programme show that the typical volume of effluent discharged via emission point W1-1 (and treated in the effluent plant) is in the order of 4.85 million cubic metres per annum.

2.4 Emissions Monitoring

2.4.1 Overview

AAL monitors the discharges of treated effluent via W1-1 in accordance with Conditions 5 and 6, and Schedule C.2.2 of its licence, which requires monitoring for the licensed parameters set out in Table 2, together with monitoring for a selection of additional parameters.

Table 2: Monitoring requirement for emissions to water

Parameter	Monitoring frequency
Flow	Continuous
pH	Continuous
Temperature	Continuous
Biochemical oxygen demand	Quarterly
Suspended solids	Weekly
Soda	Weekly
Aluminium	Quarterly
Oils, fats & grease	Quarterly
Toxicity	Bi-Annually
Heavy metals	Bi-Annually
Effluent screen	Bi-annually

2.4.2 Monitoring Results

Table 3 shows the results from AAL's monitoring programme from 2018, as set out in the application for the licence review and the application for the derogation.

Table 3: Summary of monitoring of treated process effluent (2018)

Parameter	Concentration (mg/l, unless otherwise stated)		Load (kg, unless otherwise stated)	
	Annual average	Licence limit	Annual total	Licence limit
Volume (flow)	-	-	4,646,808 m ³	10,950,000 m ³
pH	7.5 – 7.7 pH units	6 – 9 pH units	-	-
Biochemical oxygen demand	100.5	-	292,083	861,400
Suspended solids	12.5	50	54,296	547,500
Soda	3,248	-	15,338,185	-
Aluminium	3.8	-	17,812	-
Oils, fats & grease	< 1	15	4,657	164,250
Heavy metals	Arsenic	0.055	253.9	-
	Cadmium	0.001	3.5	-
	Chromium	0.005	20.9	-
	Copper	0.005	22.3	-
	Mercury	0.002	9.3	-
	Nickel	0.005	23.2	-
	Lead	0.001	3.3	-
	Zinc	0.054	250.9	-
	Titanium	0.024	111.5	-
	Iron	0.103	478.6	-
	Magnesium	0.487	-	2,261

2.4.3 Additional Monitoring

In preparation for the submission of the licence application, AAL undertook monitoring of additional parameters (TOC and COD) in the treated effluent discharged from the effluent plant between April and September 2018, the results of which are summarised in Table 4.

Table 4: Additional effluent monitoring

Parameter	Units	Range	Average
Total organic carbon	mg/l	64.9 – 153.3	124.3
Chemical oxygen demand	mg/l	164 – 440	352.3

The results show a COD:TOC ratio of approximately 2.8:1.

3 RECEIVING ENVIRONMENT

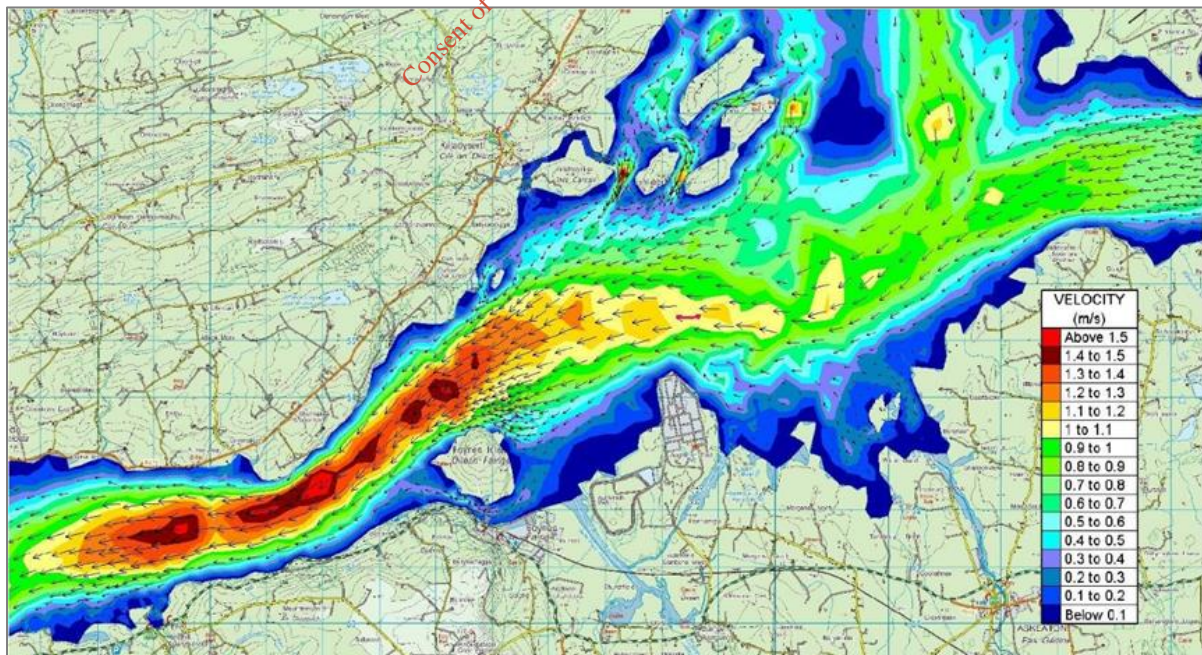
3.1 Overview

AAL’s IE licence permits it to discharge treated effluent from its treatment plants to the Lower Shannon Estuary via licensed emission point W1-1. The Lower Shannon Estuary is designated as a transitional water (IE_SH_060_0300) and extends from (approximately) Shannon Airport / Ballinvoher Point in the east, to (approximately) Aylevarroo Point / Carrig Island in the west. The estuary to the west of Aylevarroo Point / Carrig Island is designated as a coastal water body and extends to the mouth of Shannon at Loop Head / Kerry Head.

3.2 Hydrodynamics

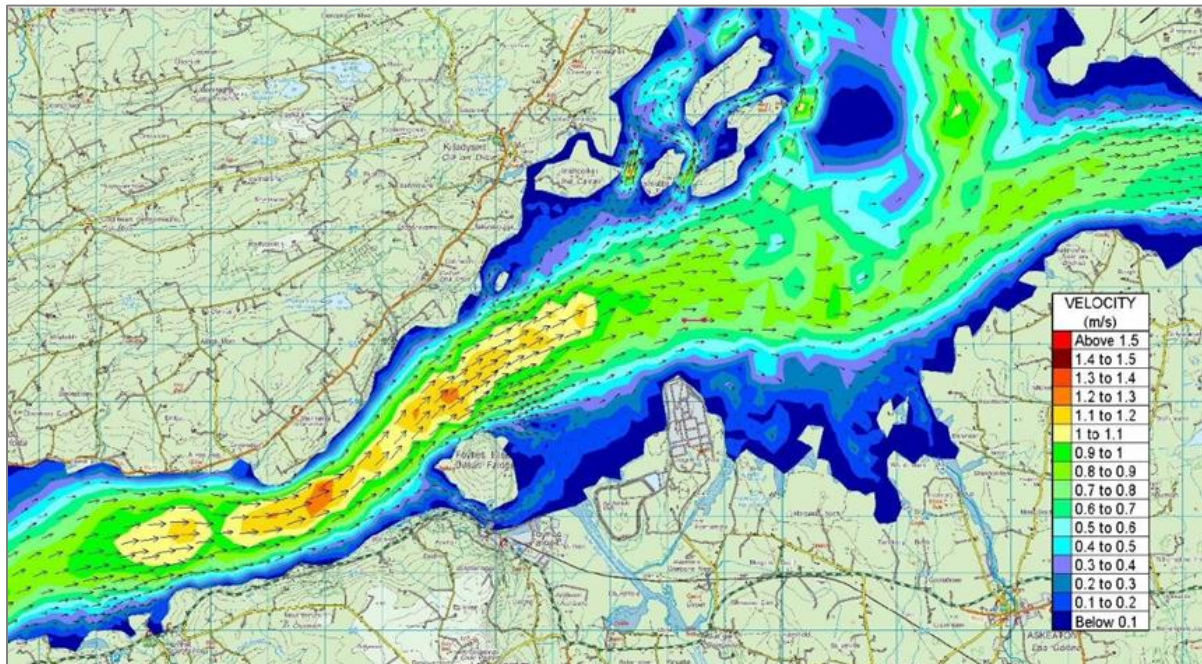
The hydrodynamics of the Shannon have been examined¹, with the analysis concluding that increased current flows are expected close to the centre of the estuary channel, as shown on the outputs from the hydrodynamic model for peak ebb and flood tides in the vicinity of the AAL jetty in Figure 1 and Figure 2.

Figure 1: Peak current flows during spring tide mid ebb



¹ Sediment Transport Modelling of Proposed Maintenance Dredging of the Outer and Inner Berths at the Aughinish Marine Terminal, Shannon Estuary, Hydro Environmental Limited, February 2016

Figure 2: Peak current flows during spring tide mid flood



The hydrodynamic model, which was developed (in part) to assess the transport of sediment from dredging at AAL's jetty, concluded that the dredged material is easily suspended and transported away with the tidal velocities on both spring and neap tides, and that due to the higher ebbing (outgoing) velocities the sediment plume travels further westward than eastward.

3.3 Aquatic Environment

The aquatic environment in the vicinity of AAL's discharge to the Shannon Estuary has been examined by AAL's ecological consultant² and the potential impacts on aquatic habitats and species have been assessed. As part of this assessment, the zone of potential impact to the marine sector has been examined to a radius of 3 km from the jetty (the nominal location of the licensed emission point).

The area surrounding the jetty falls within the Annex I qualifying interests of large shallow inlets and bays (EU habitat code 1160) and estuaries (code 1130). Large parts of the southern shoreline are designated as mudflats and sandflats not covered by seawater at low tide (code 1140), while a reef (code 1170) is recorded at the base of the main channel approximately 3 km west of the jetty. The waters within the Shannon are also designated for the Annex II species common bottlenose dolphin (*Tursiops truncatus*).

Figure 3 shows the habitats in the vicinity of the AAL jetty. The assessment also identified the marine mammals that may be present in the vicinity of the jetty (bottlenose dolphin, European otter, harbour seal, and grey seal).

² The assessment was for a separate project.

3.4 Marine Chemistry

The background environmental chemistry of the sediments surrounding the AAL jetty was recorded at three locations in 2016 as part of a dredging application³, with the samples analysed for both organic (including total organic carbon) and inorganic parameters. A further six locations were sampled in 2018, including samples at the licensed discharge point, and 3 km downstream and 2 km upstream from the discharge point.

TOC is an important source of food for benthic fauna in surface sediments, although an overabundance may lead to reductions in species richness and abundance due to oxygen depletion. The TOC level in the sediment varied between 0.27% and 1.00%, with the locations downstream from the jetty showing lower TOC levels (0.27% to 0.31%), attributable to the stronger currents downstream. Previous sampling at the jetty indicated marginally higher levels of TOC than in the most recent study (2018). Table 5 shows the results for TOC from the 2018 and 2016 data.

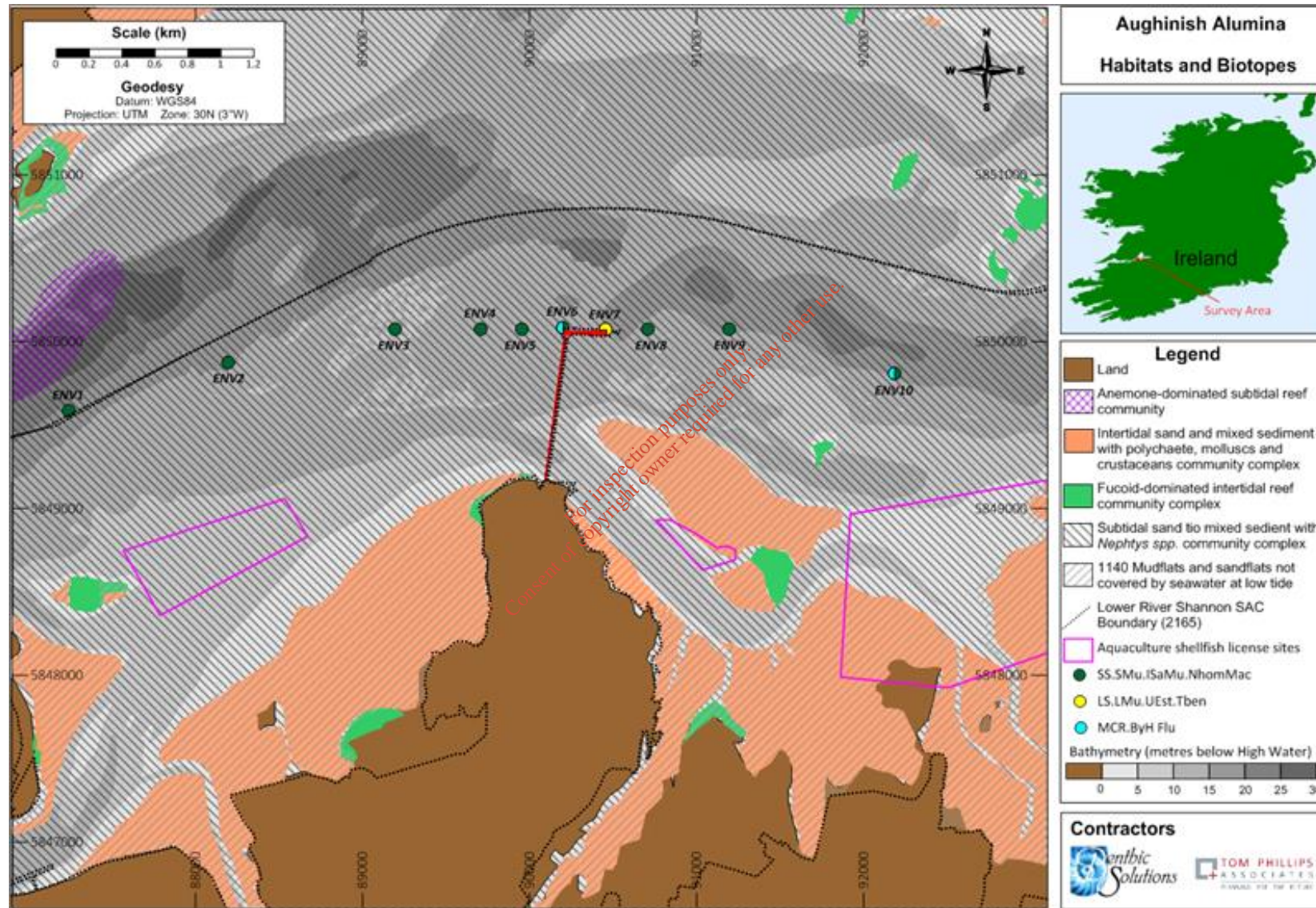
Table 5: Sediment Organic Chemistry

Year	Location	Total Organic Carbon %
2018	ENV1 (downstream)	0.27
2018	ENV3	0.31
2018	ENV5	1.00
2018	ENV6	0.96
2018	ENV7	0.90
2018	ENV10 (upstream)	0.83
2018	2018 mean	0.71
2016	ST 2	1.08
2016	ST 3	1.61

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³ AAL operates under a Dumping at Sea Permit (Register No. S0026-01).

Figure 3: Lower River Shannon SAC and Habitats in the vicinity of the AAL Jetty



3.5 Water Column Quality

The structure of the water column has also been surveyed² at three locations along the estuary for conductivity (salinity), temperature, pressure (depth), dissolved oxygen, pH and turbidity. The three survey locations were:

- ENV01, approximately 3 km downstream from the jetty
- ENV06, at the jetty
- ENV10, approximately 2 km upstream from the jetty

The water profiles for all three locations were generally consistent showing only small differences, except for salinity and, to a lesser extent, turbidity. The general water profile indicated that the water temperature ranged from approximately 11°C to 11.5°C. The dissolved oxygen profile showed no notable differences between locations ENV1 (downstream) and ENV10 (upstream). However, higher readings of dissolved oxygen were recorded in the surface water layers at location ENV06, which may relate to photosynthetic processes from plankton close to the surface.

The turbidity data showed generally consistent data between all three locations, with higher turbidity generally recorded towards the lower water layers, attributed to suspended particulate matter on the riverbed and tidal driven turbidity. The results compare closely with previous data from a survey in November 2015. Overall, the assessment noted that the water quality (and turbidity) data confirms that the Shannon Estuary is susceptible to maintaining high total suspended solids loads throughout the year. The pH profile showed very little variation with water depth, ranging from 7.97 at the surface to a pH of 8.04 in the lower water layers of all three locations. The results are summarised in Table 6.

Table 6: Summary of water quality

Parameter	ENV10 (upstream)	ENV06 (jetty)	ENV01 (downstream)
Depth (m)	-1.1 to -23.6	-1.4 to -14.1	-1.1 to -29.0
Temperature (°C)	11.0 – 11.5	11.2 – 11.3	11.1 – 11.3
Salinity (PSU)	19.2 – 22.9	19.2 – 19.9	19.4 – 21.6
Turbidity (NTU)	24.2 – 116.0	48.0 – 72.3	46.1 – 78.6
Dissolved oxygen (%)	95.3 – 96.1	94.5 – 106.7	95.2 – 97.6
pH (pH units)	7.97 – 8.04	7.97 – 8.04	7.97 – 8.04

3.6 Surface Water Quality

The EPA's latest report on surface water quality – *Water Quality in Ireland 2013-2018* – was published in 2019. This notes that overall, there has been a 4.4% net decline in the quality of surface water bodies since 2010-2015. It noted that transitional water bodies are the worst performing water category with only 38% in good or high ecological status and the remaining 62% in moderate, poor or bad status. In this period however, the ecological performance of the Lower Shannon Estuary improved from *moderate* to *good* status. This is consistent with the 2010 report on the Lower Shannon Estuary under the Water Framework Directive (WFD), the outputs of which are summarised in Table 7.

Table 7: Waterbody Status of Lower Shannon Estuary⁴

Ref.	Element	Result
DIN	Dissolved Inorganic Nitrogen status	Good
MRP	Molybdate Reactive Phosphorus status	Good
DO	Dissolved oxygen as per cent saturation status	High
BOD	Biochemical Oxygen Demand (5-days) status	High
PHY	Macroalgae - phytobiomass status	High
FIS	Fish status	High
MOR	Morphology status	Good
SP	Specific Pollutant Status	Fail ^{Note 1}
PAS	Overall protected area status	At least good
ES	Ecological Status	Moderate
CS	Chemical Status	Fail ^{Note 1}

Note 1: See the corresponding entry in Table 8 for water quality status data since 2010.

The WFD report also identifies the risks and point pressures that waterbodies are exposed to, and the overall risk result for the body. The Lower Shannon Estuary is classified as *not at risk* from abstraction, *probably at risk* from dangerous substances and overall marine direct impacts, *at risk* from (municipal) wastewater treatment plants, and *not at risk* from combined sewer overflows, IPPC (IPC or IEL) facilities, or Section 4s licensed facilities (facilities with trade effluent licences). The overall risk from point sources is classified as *at risk* based on the worst case for (municipal) wastewater treatment plants. The history of the ecological and chemical status of the Lower Shannon Estuary is summarised in Table 8.

Table 8: History of ecological and chemical status of the Lower Shannon Estuary⁵

Parameter	2013-2018	2010 – 2015	2010 – 2012	2007 – 2009
Ecological Status or Potential	Good	Moderate	Good	Moderate
Biological Status or Potential	Good	Moderate	Good	Good
Phytoplankton Status or Potential	High	High	High	High
Invertebrate Status or Potential	Good	Good	High	-
Fish Status or Potential	Good	Moderate	Good	Good
Hydromorphological Conditions	Good	Good	Good	Good
Supporting Chemistry Conditions	Good	Good	High	High
General Conditions	Good	Good	High	High
Oxygenation Conditions	High	High	High	High

⁴ Extracted from *Full Report for Waterbody Lower Shannon Estuary*, July 2010, from www.wfdireland.ie

⁵ From the EPA catchments website:

https://www.catchments.ie/data/#/waterbody/IE_SH_060_0300?k=6epuac

Parameter	2013-2018	2010 – 2015	2010 – 2012	2007 – 2009
Dissolved Oxygen (% Sat)	High	High	High	High
Other determinand for oxygenation conditions	High	High	High	High
Nutrient Conditions	Good	Good	High	Good
Other determinand for nutrient conditions	High	High	Good	Good
Phosphorous Conditions	Good	Good	High	High
Orthophosphate	Good	Good	High	High
Specific Pollutant Conditions	Pass	Pass	-	-
Chemical Surface Water Status	Good	Good	-	-

The EPA has also published two *Indicators Reports* on water quality – one for 2016 (*Water Quality in 2016 – An Indicators Report*) and one for 2017 (*Water Quality in 2017 – An Indicators Report*). The aim of these reports is to provide an indication of the current water quality, an indication of recent changes and, where possible, an indication of longer-term trends.

In the context of the environment in the vicinity of AAL, the *Indicators Reports* note that:

- 2016:
 - The overall number of river water bodies at satisfactory (high or good) quality declined in eight catchments (Foyle, Lough Swilly, Donagh–Moville, Liffey & Dublin Bay, Nore, Laune–Maine–Dingle Bay, Shannon Estuary North and Moy & Killala Bay)
- 2017
 - Of the 95 estuaries and coastal water bodies assessed for phosphorus, only one (Maugue Estuary, Co. Limerick) exceeded the relevant winter threshold compared to three in the 2010–2012 period.
 - The number of river water bodies at satisfactory quality (high or good) declined in 16 catchments, most notably in the Suir, Upper Shannon and Shannon Estuary South

Overall, the *Indicator Reports* provide a useful summary of water quality in Ireland in 2016 and 2017, and do not indicate that the quality of the receiving environment in the vicinity of AAL is being adversely affected by AAL’s activities.

3.7 Ambient Monitoring

In April 2018, AAL engaged Aquafact to conduct ambient monitoring of the Shannon Estuary upstream and downstream of the discharge point W1-1 (during three tide levels and at three water depths, yielding nine data points, for which the average value is shown in Table 9). The ambient monitoring was repeated in March 2019, with the results from both monitoring rounds summarised in Table 9.

Table 9: Ambient Monitoring in Shannon Estuary

Parameter		Units	500 m upstream		500 m downstream		1 km downstream	
			2018	2019	2018	2019	2018	2019
Biological oxygen demand		mg/l	< 2.03	< 1.0	< 2.0	< 1.0	< 2.0	< 1.0
Total organic carbon		mg/l	4.03	5.48	4.13	5.10	3.95	5.01
Chemical oxygen demand		mg/l	96.11	343.4	97.22	445.7	97.22	480.9
Total nitrogen		mg/l	2.22	2.40	3.78	2.51	3.00	2.69
Total inorganic nitrogen		mg/l	1.32	1.59	1.82	1.57	1.11	1.56
Total phosphorous		mg/l	0.061	0.100	0.058	0.089	0.055	0.085
Heavy metals	Arsenic	µg/l	2.67	85.9	2.33	92.0	3.56	88.6
	Cadmium	µg/l	<1	85.9	<1	92.2	<1	88.7
	Chromium	µg/l	7.56	85.7	6.11	91.9	6.78	88.3
	Copper	µg/l	15.11	64.8	11.67	82.0	14.67	78.4
	Mercury	µg/l	1.02	< 0.03	0.34	< 0.03	0.36	< 0.03
	Nickel	µg/l	15.33	85.2	11.33	91.78	11.78	88.2
	Lead	µg/l	8.67	85.2	8.67	91.8	7.89	88.1
	Zinc	µg/l	226.9	42.2	208.1	48.8	235.6	45.1

The results from the ambient monitoring for the majority of the parameters, including total organic carbon, indicate that there is little difference between the quality of the Shannon Estuary upstream and downstream of AAL's discharge point. While the concentrations of total organic carbon, chemical oxygen demand, total nitrogen and total inorganic nitrogen are marginally higher downstream than upstream, the concentrations of the other parameters (total phosphorous and the heavy metals) decrease between the upstream and downstream monitoring locations. Overall, both the 2018⁶ and 2019⁷ reports on the ambient monitoring concluded that:

This survey showed no increase in background levels for any of the parameters analysed due to the discharge at Aughinish Alumina, as results showed similar variations upstream and downstream of the discharge.

The sampling locations upstream and downstream from the discharge point were outside the effluent plume discharge zones. Therefore, the results in Table 9 can be considered to be the ambient concentrations in the Shannon Estuary upstream and downstream of AAL.

⁶ Baseline Water Characterisation Survey Aughinish, Shannon Estuary, AQUAFAC International Services Ltd, April 2018 (JN1477)

⁷ Baseline Water Characterisation Survey Aughinish, Shannon Estuary, AQUAFAC International Services Ltd, March 2019 (JN1526)

4 ASSIMILATIVE CAPACITY MODEL

In August 2011, the EPA published guidance to support the review of licences as part of the application of the *European Communities Environmental Objectives (Surface Water) Regulations, 2009*, namely *EO Regulations Review – Simple Assimilative capacity model for transitional waters*. The simple model set out in the guidance provides an estimate for the concentration of a particular discharge parameter in a receiving transitional waterbody (a waterbody which has both freshwater and saltwater inputs, such as the Lower Shannon Estuary).

The methodology used to carry out the assessment is as follows:

1. Estimate the flow of dilution water in the receiving water body (Q_D), in this case in the Shannon Estuary at AAL's discharge point.
2. Estimate the background concentration of the parameter in the receiving water body (C_B), in this case TOC (and COD) in the Shannon Estuary.
3. Calculate the resultant concentration of the parameter in the receiving water body.
4. Compare the resultant concentration of the parameter in the receiving water body against a relevant environmental assessment level.

The flow of available dilution water (Q_D) is calculated as follows:

$$Q_D = \frac{(Q_E + Q_F) \cdot S_O}{(S_O - S)}$$

where:

- Q_D dilution water (m^3/s)
- Q_E flow rate of licensed discharge (m^3/s)
- Q_F flow rate of (incoming) freshwater inputs (m^3/s)
- S_O salinity in open water (psu⁸)
- S salinity in vicinity of the discharge (psu)

The concentration downstream (C) is calculated as follows:

$$C = C_B + \left(\frac{(C_E - C_B)}{1 + \left(\frac{Q_D}{Q_L}\right)} \right)$$

where:

- C resultant concentration (mg/l)
- C_B background concentrations (mg/l)
- C_E concentration in effluent (mg/l)
- Q_D dilution water (m^3/s)
- Q_L maximum flow of the discharge substance (m^3/s)

⁸ Practical Salinity Unit

5 ASSESSMENT LEVELS

5.1 Overview

To assess the significance, or otherwise, of the resultant concentration of the discharge parameter (TOC and COD) in the receiving water body requires an appropriate environmental assessment level or water quality indicator. In the case of TOC (and COD) in the Lower Shannon Estuary, the following sources of such assessment levels / quality indicators have been considered:

- Environmental Objectives (Surface Water) Regulations
- Water Framework Directive
- EPA Parameters of Water Quality
- Surface water monitoring carried out by both the EPA and AAL

5.2 Environmental Objectives (Surface Water) Regulations

The *Environmental Objectives (Surface Water) Regulations*, as amended, set out the measures for the protection of surface water bodies (lakes, rivers, transitional and coastal waters) whose status is determined to be high or good. The Shannon Estuary has a *good* status in the vicinity of AAL's licensed discharge point.

The Regulations also set standards for several parameters, including BOD, pH, temperature and nutrients, specific pollutants, and priority (hazardous) substances. However, the Regulations do not set any standards for TOC (or COD) and therefore do not provide an environmental assessment level against which the resultant concentration in the Shannon Estuary can be assessed.

5.3 Water Framework Directive

The *Water Framework Directive* (WFD) is the primary directive that sets out water quality objectives and common metrics for assessing and reporting on the quality of freshwater in Europe. These assessments are undertaken on a six-yearly cycle, with the outcomes reported by each country in their respective River Basin Management Plans.

The EPA has established Water Framework Directive (WFD) status classifications based on the WFD monitoring programme, which are based on samples and surveys targeting a variety of parameters including biological, physico-chemical, chemical and hydromorphological elements. The WFD classification scheme for water quality includes five status classes: high, good, moderate, poor and bad. Assessment of quality is based on the extent of deviation from the reference conditions, with *good* status meaning that there is a *slight* deviation, *moderate* status meaning a *moderate* deviation.

The Shannon Estuary is included in these assessments and achieved a *good* status in the WFD Status 2013-2018 assessment. However, the assessment does not include quantitative data (for TOC or COD) against which the resultant concentration in the receiving water from AAL's discharge can be assessed.

5.4 EPA Parameters of Water Quality

In 2001, the EPA published *Parameters of Water Quality – Interpretation and Standards*. The aim of the handbook was to distil the principal facts and figures on approximately 100 individual or group pollutants, and to set out the most relevant facts concerning each parameter, such as the limits (either advisory or mandatory) which either scientific or medical opinion or legislative bodies considered applicable. As such, the handbook presented a comprehensive set of all concentration levels specified in either Irish or EU legislation (at the time).

While the handbook covered a wide range of parameters, including total organic carbon, it did not provide guidance on quantitative environmental assessment levels for TOC and therefore there are no environmental assessment levels against which the resultant concentration in the Shannon Estuary can be assessed.

5.5 Ambient Monitoring Data

5.5.1 EPA Monitoring

The EPA monitors bathing water quality periodically; the closest beach to AAL that has been assessed is Cappagh Pier, Kilrush (IESHBWC060_0000_0100), which is located approximately 30 km downstream of W1-1. The current classification (2018) is *excellent water quality*.

The EPA also carries out ambient monitoring of surface water bodies, including rivers, lakes, transitional water bodies and coastal water bodies. However, while the quality of these water bodies has been assessed by the EPA and classified accordingly, there is no available data on the ambient / background concentrations of TOC or COD in the Lower Shannon Estuary.

5.5.2 AAL Monitoring

As noted in Section 3.7, in April 2018 AAL engaged Aquafact to conduct ambient monitoring of the Shannon Estuary upstream and downstream of the discharge point W1-1 during three tide levels and at three water depths. The ambient monitoring was repeated in March 2019. The results from both monitoring rounds for TOC are shown in Table 10.

Table 10: AAL Ambient Monitoring for TOC (mg/l)

Parameter	2018	2019	Average
500 m upstream	4.03	5.48	4.76
500 m downstream	4.13	5.1	4.62
1 km downstream	3.95	5.01	4.48
Average	4.04	5.20	4.62
Range	3.95 - 4.13	5.01 - 5.48	4.48 - 4.76

5.6 Summary

In the absence of suitable specific environmental assessment levels, the results from the assimilative capacity model for TOC have been assessed against the known ambient background concentrations, with a range from 3.95 mg/l to 5.48 mg/l, and an average ambient concentration of 4.62 mg/l.

6 ASSESSMENT

6.1 Overview

The simple assimilative capacity model for transitional waters estimates, for a given discharge parameter, the resultant concentration in the receiving waterbody. For this assimilative capacity assessment, the following have been considered:

1. The concentration of TOC (and COD) in the receiving water from AAL's current discharge of effluent under conditions giving rise to 'low', 'medium' and 'high' concentrations. For example, a lower discharge flow rate, a higher TOC discharge concentration, and a lower assumed background concentration represents the 'worst-case' discharge conditions, compared to higher discharge flow rate, a lower TOC discharge concentration, and a higher assumed background concentration.
2. The resultant concentration of TOC from AAL's discharge *if it were to achieve the BAT AEL* – this provides an assessment of the 'excess' contribution of TOC and COD over that of the relevant BAT Associated Emission Level as requested by the EPA.

6.2 Input Data

The input data to the assimilative capacity model is summarised in Table 11. In the case of the flow rate of the receiving water body (the Lower Shannon Estuary) and the salinity of the open water (the coastal water body into which the Lower Shannon Estuary discharges), there is an absence of definitive guidance on the appropriate data sources.

We have conservatively estimated the flow rate of the Lower Shannon Estuary based on the sum of the long-term average flow rates of the main rivers flowing into the estuary (the Shannon itself, the Fergus, the Maguire and the Deel), yielding a conservative (low) flow rate of 252.67 m³/s.

For the open water salinity, the EPA's guidance⁹ indicates that a value of 33 psu may be appropriate for a coastal water body, which is within the broader range of 30 to 40 psu advised by the Marine Irish Digital Atlas¹⁰ and is close to the guidance in the EPA's *Parameters of Water Quality* of 35 psu. The *National Eutrophication Assessment Report under the Common Procedure Ireland - Final Report on the Second Application of the Comprehensive Procedure March 2008*, which was compiled by the EPA and the Marine Institute under the *OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic* notes that:

The landward boundary of a transitional water body (estuarine) was defined as the upper tidal (either freshwater or saltwater) limit, with the outer boundary, in the majority of cases, being defined by a surface salinity value of 30.0 PSU (Practical salinity Unit).

⁹ European Communities Environmental Objectives (Surface Water) Regulations, 2009, namely EO Regulations Review – Simple Assimilative capacity model for transitional waters

¹⁰ <http://mida.ucc.ie/pages/information/phys/oceanography/physicalWaterProperties/details.htm>

Table 11: Assimilative Capacity Model Inputs and Results

Parameter	Description	Data source
Q _E	flow rate of licensed discharge	EPA licence P0035-06 & AAL effluent monitoring
Q _F	flow rate of (incoming) freshwater inputs	The sum of the long-term average flow rates for the main rivers flowing into the estuary from the EPA's hydrometric monitoring stations ¹¹ : <ul style="list-style-type: none"> • Shannon (208.96 m³/s) • Fergus (19 m³/s) • Maguire (17.35 m³/s) • Deel (7.36 m³/s)
S _o	salinity in open water	<ul style="list-style-type: none"> • EPA / Marine Institute (30 psu) • EPA guidance on assimilative capacity model (33 psu) • EPA parameters of water quality (35 psu)
S	salinity in vicinity of the discharge	AAL ambient monitoring (see Table 6)
Q _L	maximum flow of the discharged substance	EPA licence P0035-06
C _B	background concentrations	AAL ambient monitoring (see Table 9)
C _E	effluent concentrations	AAL effluent discharge monitoring (see Table 4)

6.3 AAL Discharge

Table 13 shows the resultant concentration of TOC in the receiving water (the Lower Shannon Estuary) attributable to the discharge from AAL under three sets of conditions, as summarised in Table 12.

Table 12: Relative values for variable parameters in assimilative capacity model

Parameter	Low	Medium	High
Flow rate of licensed discharge	Low	Medium	High
Salinity of open water	Low	Medium	High
Salinity of water in vicinity of licensed discharge	High	Medium	Low
Background concentration	Low	Medium	High
Concentration in effluent discharge	Low	Medium	High

¹¹ SFPC Maintenance Dredging Application - Appropriate Assessment, IBE0215.00 / August 2011

Table 13: Simple Assimilative Capacity Model for TOC

-	Model Inputs	Unit	Low	Medium	High
Q _E	Flow rate of licensed discharge	m ³ /h	750	1,000	1,250
	Flow rate of licensed discharge	m ³ /s	0.21	0.28	0.35
Q _F	Flow rate of the receiving water	m ³ /s	252.67	252.67	252.67
S _o	Salinity of the open water	psu	30	33	35
S	Salinity of the water in the vicinity of licensed discharge	psu	22.90	20.37	19.20
C _B	Background concentration	mg/l	3.95	4.62	5.48
C _E	Maximum effluent discharge concentration	mg/l	64.90	124.30	153.30
C	Concentration in receiving water	mg/l	3.96	4.67	5.57
	Change relative to background	mg/l	+0.01	+0.05	+0.09
	% change relative to background	%	+0.30%	+1.09%	+1.67%

The results from the model show that the contribution of total organic carbon discharged from AAL is in the order of 0.30% to 1.67% of the ambient background concentration. However, this does not take into account that the background concentration used as the environmental assessment level already accounts for the contribution from AAL.

The simple assimilative model for COD shows a similarly low contribution from AAL, summarised in Table 14.

Table 14: Simple Assimilative Capacity Model for COD

-	Model Inputs	Unit	Concentration in receiving water		
			Low	Medium	High
Q _E	Flow rate of licensed discharge	m ³ /h	750	1,000	1,250
	Flow rate of licensed discharge	m ³ /s	0.21	0.28	0.35
Q _F	Flow rate of the receiving water	m ³ /s	252.67	252.67	252.67
S _o	Salinity of the open water	psu	30	33	35
S	Salinity of the water in the vicinity of licensed discharge	psu	22.90	20.37	19.20
C _B	Background concentration	mg/l	96.11	260.09	480.90
C _E	Maximum effluent discharge concentration	mg/l	164.0	352.3	440.0
C	Concentration in receiving water	mg/l	96.12	260.13	480.87
	Change relative to background	mg/l	+0.01	+0.04	-0.03
	% change relative to background	%	+0.01%	+0.01%	-0.01%

6.4 Discharge at BAT AEL Limits

As requested by the EPA, the ‘excess’ contribution of TOC and COD over the corresponding BAT Associated Emission Levels has also been examined, to compare the current discharge against the discharge if AAL were to achieve the BAT AEL¹².

In this case, the input parameters are the same as those from Table 13 and Table 14 for TOC and COD, respectively, with the exception of the *maximum effluent discharge concentrations* which have been set at the BAT AEL (33 mg/l for TOC and 100 mg/l for COD). The results are shown in Table 15 for TOC and Table 16 for COD.

Table 15: Simple Assimilative Capacity Model for TOC – at BAT AEL

-	Model Inputs	Unit	Concentration in receiving water		
			Low	Medium	High
Q _E	Flow rate of licensed discharge	m ³ /h	750	1,000	1,250
	Flow rate of licensed discharge	m ³ /s	0.21	0.28	0.35
Q _F	Flow rate of the receiving water	m ³ /s	252.67	252.67	252.67
S _o	Salinity of the open water	psu	30	33	35
S	Salinity of the water in the vicinity of licensed discharge	psu	22.96	20.37	19.20
C _B	Background concentration	mg/l	3.95	4.62	5.48
C _E	Maximum effluent discharge concentration	mg/l	33.0	33.0	33.0
C	Concentration at BAT AEL	mg/l	3.96	4.63	5.50
	Concentration with derogation	mg/l	3.96	4.67	5.57
	‘Excess’ (relative to concentration at BAT AEL)	mg/l	0.01 (+0.16%)	0.04 (+0.83%)	0.07 (+1.35%)

¹² The Application for Derogation from BAT-AELs for Emissions of Total Organic Carbon & Chemical Oxygen Demand to Water submitted in support of the application for a review of the IE licence concluded that it is not technically or economically feasible to treat the effluent to achieve the BAT associated emission level (BAT AEL) for total organic carbon (TOC) or chemical oxygen demand (COD) set out in the Commission Implementing Decision on the BREF on common waste water and waste gas treatment / management systems in the chemical sector.

Table 16: Simple Assimilative Capacity Model for COD – at BAT AEL

-	Model Inputs	Unit	Concentration in receiving water		
			Low	Medium	High
Q _E	Flow rate of licensed discharge	m ³ /h	750	1,000	1,250
	Flow rate of licensed discharge	m ³ /s	0.21	0.28	0.35
Q _F	Flow rate of the receiving water	m ³ /s	252.67	252.67	252.67
S _o	Salinity of the open water	psu	30	33	35
S	Salinity of the water in the vicinity of licensed discharge	psu	22.90	20.37	19.20
C _B	Background concentration	mg/l	96.11	260.09	480.90
C _E	Maximum effluent discharge concentration	mg/l	100.0	100.0	100.0
C	Concentration <i>at BAT AEL</i>	mg/l	96.11	260.02	480.66
	Concentration <i>with derogation</i>	mg/l	96.12	260.13	480.87
	'Excess' (relative to concentration at BAT AEL)	mg/l	0.01 (+0.01%)	0.11 (+0.04%)	0.21 (+0.04%)

In both cases, the results show that the 'excess' concentrations of TOC and COD *with the derogation* above the BAT AEL limits are not significant (ranging from an 'excess' of 0.01% to 1.35%). As noted in Section 6.3, this does not take into account that the background concentration used as the environmental assessment level already accounts for the contribution from AAL.

7 CONCLUSIONS

The results of the assimilative capacity assessment demonstrate that the impact of the discharges to the Shannon Estuary from discharge point W1-1 with the derogation is not significant. The results show that the difference in the concentrations of both TOC and COD in the receiving water are not significant between the application of the BAT AEL to the discharge, and if the derogation were to be granted. The difference between the two – the 'excess' discharge – is negligible compared to the existing background concentrations of the two parameters in the Lower Shannon Estuary.

In our opinion, this assessment supports the Application for Derogation from BAT-AELs for Emissions of Total Organic Carbon & Chemical Oxygen Demand to Water, which showed that the available data on the water quality indicates that the quality of the receiving environment – the Lower Shannon Estuary – is not adversely impacted by the discharge from AAL, and that there is little difference in the quality of water upstream and downstream from the licensed emission point.

* * * * *

ATTACHMENT 4

Updated Non-Technical Summary

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Section 1.2 Non-Technical Summary

Contents

1. Business Overview	2
2. Operating Hours.....	6
3. Proposed Changes.....	6
4. Relevant Classes of Activity.....	9
5. Requirement for EIAR/EIS	9
6. Relevant BAT Conclusions/Decisions, Guidance Documents and BREF Documents	10
7. Applicable Legislation	10
8. Description of How Emission Levels Have Been Determined	10
9. Derogation Sought	11
10. Description of the Facility with Measures to Avoid/Reduce Adverse Impacts on the Environment	12
11. Description of Raw Materials, Fuels and Energy Produced or Utilised	13
12. Sources of Emissions	13
13. Environmental Site Conditions.....	15
14. Nature and Extent of Proposed and Existing Emissions	16
15. Assessment of Effects of Emissions on the Environment as a Whole	19
16. Technology to Prevent, Eliminate or Reduce/Abate Emissions.....	20
17. Description of Wastes	21
18. Description of Implementation of Waste Hierarchy.....	23
19. Preventative Measures Taken Against Pollution, In Particular through Application of BAT	25
20. Measures Taken Under Abnormal Operating Conditions.....	26
21. Measures to be Taken Following Cessation of Activities	27
22. Measures Planned to Monitor Emissions to the Environment.....	27
23. Measures to Comply with an Environmental Quality Standard	30
24. Measures to Comply with Council Directive 80/68/EEC and 2006/118/EC Relating to Groundwater Protection.....	31
25. Measures Taken to Minimise Pollution over Long Distances or Outside the Territory of Ireland	31
26. Main Alternatives to Proposed Technology, Techniques and Measures	31
27. Likely Effects for Those Changes which Required an EIAR	33

1. Business Overview

Aughinish Alumina Limited (AAL) is the EU's largest alumina refinery, producing 30% of the EU's alumina. This manufacturing industry has been in the Mid-West of Ireland for over 30 years, and invests heavily in a modernisation, environmental protection and efficiency programme.

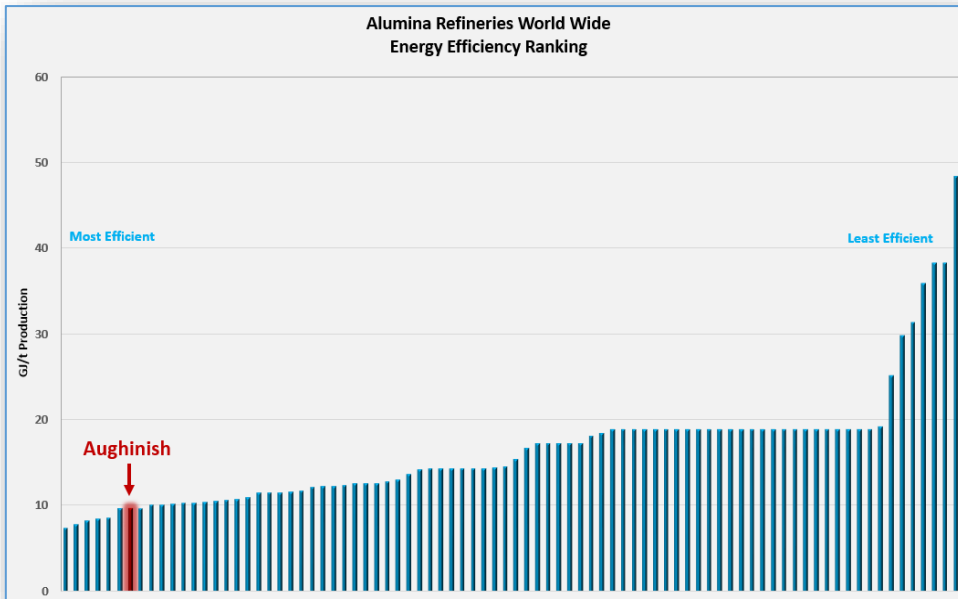
AAL is considered a benchmark alumina refinery worldwide for its organisational, labour and energy efficiencies. The plant cost US\$1bn to construct and a further US\$733m has been spent upgrading it, including the provision of a 165MW Natural Gas fired Combined Heat and Power (CHP) facility in 2005. In 2014 two new 150tph gas fired boilers were built to replace the original heavy fuel oil boilers. In 2017 Aughinish Alumina took delivery of a new US\$30M bauxite unloader, manufactured within the EU. All of these large capital programmes are managed within the site in Ireland. A summary of recent capital investment towards environmental protection is tabulated below.

Year	Improvement	Cost €	Justification
2006	Installation of CHP plant	104M	65% steam requirements/100% in-house electricity requirements. 50kt reduction in CO ₂ emissions versus electricity from National grid and steam from gas boilers.
2010 – 2012	Conversion of calciners from HFO to gas	7.4M	Reduction of CO ₂ and SOx emissions
2013	Mud farming equipment for mud neutralisation	1M	To comply with Condition 8.4.18/8.4.19 of IE Licence
2014	Installation of 2 gas boilers	16M	Led to 100% conversion to gas combustion. Elimination of SOx emissions. Reduction of CO ₂ and NOx emissions
2014	Additional effluent discharge capacity	2M	Sized for storms
2016	Conversion of HFO storage tank and bund for caustic storage	1.5M	Installation of leak detection, new floor and fully lined bund for protection of groundwater
Annual	BRDA side slope rehabilitation program	300,000 p.a.	reduction of visual impact by softening/greening BRDA side slopes/contours including via new techniques such as hydro seeding
Annual	BRDA screening program	200,000 p.a.	Trees, shrubs, general flora addition
Annual	Groundwater improvement program	300,000 p.a.	Additional recovery wells, lining of drains, bund extensions for protection of groundwater
2017	Installation of new drain to west pond	400,000	Installation of new stainless steel lines drain to replace existing drain for protection of groundwater

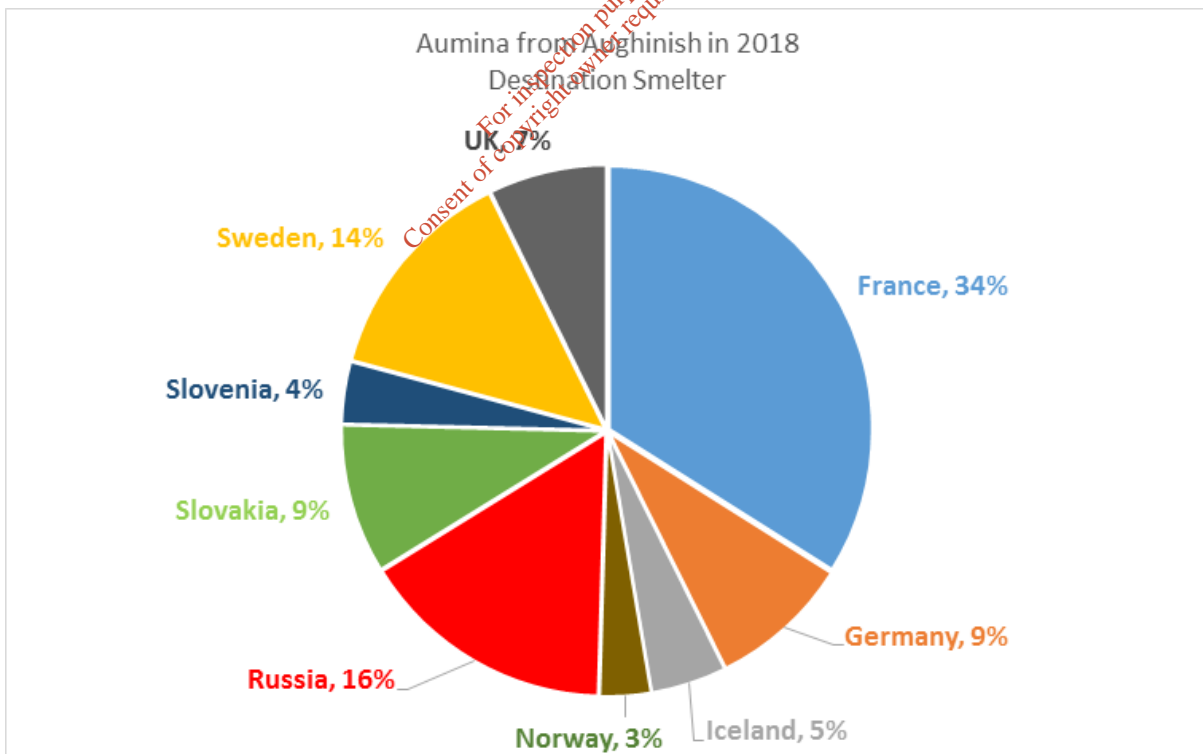
Year	Improvement	Cost €	Justification
2018	Installation of Deep Cone Thickener	6.5M	Maximising the recovery of caustic soda for re-use in the alumina extraction process
2018	Gravel replacement program	300,000	Upgrade of gravel areas, on the basis of risk assessment, to hardstanding towards groundwater protection (Year 1 of new annual program)
2019	Gravel replacement program	700,000	Upgrade of gravel areas, on the basis of risk assessment, to hardstanding towards groundwater protection (Year 2 of new annual program)
Annual	Asset life extension	5M p.a.	This program identifies degradation and to prioritise assets or infrastructure for intervention. Prioritisation based upon safety, environment and production impact. Includes all infrastructure such as tanks and pipelines.
2018	Bund level protection - Instrumentation upgrade	40,000	14 additional bund level sensors and associated infrastructure

Involved in this industry in the Mid-West are 470 permanent employees and 220 contractors. A total of €130m is spent in the Irish economy annually. The entire management team is Irish, living within the local community and AAL is a responsible employer in the rural region. The annual wage bill is €48m which is spent in the Mid-West region. Additionally, €85m is spent on Irish supplier purchases, a significant number of which are locally based.

AAL employs best management practices for the refinery operation to ensure we remain competitive and a viable operation. AAL is accredited to ISO 9001:2015 and ISO14001:2015 level and is a leader in implementation of Energy Management Systems achieving ISO 50001 accreditation in 2015. AAL is one of the most energy efficient alumina refineries worldwide, as indicated graphically below.



The alumina from AAL is delivered to customers as shown in the figure below. The largest destination by volume is France, where 34% of the output is shipped into two major smelters. The Dunkirk aluminium smelter in France is the largest of its kind in the EU and alumina from AAL represents 90% of its feedstock. The Kubal smelter in Sweden is completely dependent on alumina from AAL.



The EU has significant concerns for the provision of a number of key raw materials that are essential to the continued economic development of the Union. Aluminium/alumina are amongst these key

materials. World production of alumina during 2017 was approximately 126 million tonnes. Of this, 6 million tonnes was produced in the EU, but 8 million tonnes consumed. The situation for aluminium is that over 9 million tonnes is consumed with 7 million tonnes produced within the EU. The linkage between aluminium and alumina is simple – two tonnes of alumina are required to produce one tonne of aluminium. In summary, the EU is undersupplied in terms of alumina and aluminium – materials it has classified as key strategic raw materials.

The underlying narrative is the rapid development of the Chinese economy in the past ten years and that country's demand for raw materials. From as little as 2 million tonnes per annum of aluminium production in 2000, China now produces over 35 million tonnes per annum or over 50% of global aluminium production. It is a similar story for alumina. This phenomenal growth has been delivered with minimal environmental regulation or consideration compared to the strictly enforced EU environmental licensing regime in Ireland.

Decommissioning and Residuals Management Plan

Condition 12.2 of the Industrial Emissions Licence covers the Financial Provision (FP) for the Decommissioning and Residuals Management Plan (Closure and Aftercare Plan) for the entire site. Condition 12.3.3 states that this FP shall be maintained in an amount always sufficient to underwrite the activities identified in the Aftercare Plan. AAL had costed this Aftercare Plan at €27.9m. In 2018, this was updated by PM Group and approved by the Agency at a costing of €24,635,776.

Financial charges and provisions are set out in Condition 12 of the current IE Licence. AAL is fully compliant with the requirements of Condition 12. For the BRDA, there is a secure fund (backed by a Parent Company Guarantee) building over time to the required amount. For the Processing site, there is a separate Parent Company Guarantee for the required amount. All associated documentation has already been submitted to the Agency.

Environmental Liability Risk Assessment (ELRA) Insurance

The revised version of the ELRA has been prepared to incorporate changes to the site, plus including the costing of risks as requested by the EPA for quantification. The ELRA considered all potential risks to the environment including surface water, ground and groundwater, atmosphere, land, flora, fauna and human health as per the Agency Guidance.

The ELRA identified no high level risks and all risks identified were in the medium to low level risk category. The mitigation measures implemented onsite are deemed adequate to manage the environmental risks satisfactorily.

The cost to address and remediate the current worst case scenario cost for an unknown environmental liability relating to the site is estimated in the current ELRA as being €1,226,078 and is related to a mobile road tanker containing HFO or Diesel experiencing catastrophic failure due to a collision.

The current position regarding financial provision is outlined in Section 9 of this Licence application.

2. Operating Hours

AAL operates continuously 24 hours a day, 365 days a year with the exception of an annual plant shutdown which is required for maintenance of that equipment which must be available during plant operation. This is typically a 48 hour annual shutdown.

3. Proposed Changes

This application requests permission for the following changes. Refer to Section 1.1 of this application for further information.

1. Operation of a limestone borrow pit.

The proposed Borrow Pit is a development which has been granted planning permission from An Bord Pleanála (Ref. 301011-18) (following appeal of a Limerick City and County Council notification to grant permission (Ref 17/714)). The proposed borrow pit has an extraction area of circa 4.5 hectares to extract 374,000 m³ of limestone rock over a 10 year period for provision of rock over the lifetime of the permitted BRDA. This rock is required for construction of embankment walls at the Licenced BRDA facility.

AAL had a limited store of rock on site which was used in the ongoing construction and maintenance works associated with the BRDA on site. This existing stockpile of rock was fully depleted in 2017.

The extraction area is sought to a maximum depth of 8.5m O.D., at which depth there is no interaction with groundwater. Extraction will occur between April and September each year.

The proposed development is below the threshold of development of a type that requires a mandatory Environmental Impact Assessment Report (EIAR). However, it was considered appropriate that an EIAR be prepared given the nature and size of the proposed development and the location at Aughinish Island. In addition, given the proximity to the River Shannon and River Fergus Estuaries and the Lower River Shannon, protected Natura 2000 sites, an Appropriate Assessment Screening is also submitted. Refer to Section 6 of this Licence application.

Further to the submission of the licence review application in April 2019, the EPA requested, following their AA screening determination, that a Natura Impact Statement should be submitted as further information. It was requested that the NIS consider all emissions from the site. This has been submitted to the Agency.

The southern part of the application site comprises a former Borrow Pit area which was previously associated with the construction of the original plant. The extraction works within this former Borrow Pit area were completed in 1982 and it has since been left to regenerate naturally.

Refer to Section 1.1 of this application for further details.

2. Increase in calciner NO_x ELV from 100 mg/m³ to 150 mg/m³

An increase in emission limit value (ELV) for NO_x emissions from each of the 3 calciners (gas fired) is being sought.

An ELV of 100 mg/m³ for calciner NO_x emissions (gas fired) was added to IE Licence P0035-06. This followed an assessment by AWN Consulting who completed air dispersion modelling to confirm that a calciner NO_x emissions of 100 mg/m³ when the calciners were fired on natural gas would not lead to an exceedance of ambient air quality standards.

AAL subsequently submitted an objection (at the PD stage of IE Licence P0035-06), requesting an increase in the ELV from 100 mg/m³ to 150 mg/m³. This was due to concerns that while the average NOx emitted by the calciners is below 100 mg/m³, it is not possible to ensure that each calciner emits less than 100 mg/m³. This is due to fundamental differences in calciner burner systems (compared to boiler burner systems). Data provided in Section 1.1 of this application shows that when manual monitoring for NOx is completed over 30 minute basis the emissions, while not exceeding the ELV, are close to the ELV. Since Q4 2015, 60 minute monitoring has been carried out for which twice the ELV (200 mg/m³) applies.

The EPA's report of the Technical Committee (July 2014) stated that an ELV of 150 mg/m³ would be consistent with BAT, however a full assessment of the predicted impacts would be required to allow for the increase. Therefore, AAL subsequently engaged AWN to complete a modelling assessment of the predicted impacts of an emissions limit of 150 mg/m³.

The air dispersion modelling clearly indicates that an ELV of 150 mg/m³ would not lead to an exceedance of the ambient air quality standards. In fact, an ELV of 350 mg/m³ does not lead to an exceedance of the ambient air quality standards.

Refer to Section 7 of this Licence application for further details.

3. Derogation from Commission Implementing Decision 2016/902 for Common Waste Water and Waste Gas in the Chemical Sector

An assessment of application of BAT-AEL's for waste water treatment has been completed, refer to BAT 12 in Section 4.7 of this Licence application. In summary, based on the guidance set out in the BAT conclusions and in the BREF, it is considered that:

- BAT AEL for heavy metals are not applicable as the source of Heavy Metals in the wastewater stream is attributable to the bauxite ore raw material.
- BAT AEL for Total Phosphorous is not applicable as AAL does not produce phosphorous or phosphorous-containing compounds, these substances are not added to the effluent during treatment, and AAL does not utilise biological waste water treatment for the treatment of process effluent.
- BAT AEL for Total Nitrogen is not applicable as AAL does not utilise biological waste water treatment for the treatment of process effluent.
- BAT AEL, annual average of 35 mg/l applies for Total Suspended Solids in addition to the existing weekly average ELV of 50 mg/l.

A derogation is being sought from the TOC BAT AEL under the provisions of Article 15 (4) of the Industrial Emissions Directive and Section 86A (6) of the Protection of the Environment Act. Refer to BAT 12 in Section 4.7 of this Licence application and section 9 of this non-technical summary.

4. Update of IE Licence to reflect approved submission since date of issue of existing IE Licence

An update to the relevant IE Licence conditions is sought to reflect the Agencies approval of those submissions which have been approved since granting of IE Licence P0035-06 in July 2014, as tabulated below.

Description	Licensee Return No.	IE Licence Condition
Gas boiler opacity	LR011838	Schedule B.1, Schedule C.1.2

Description	Licensee Return No.	IE Licence Condition
Gas boiler test programme	LR011843	Condition 6.1.4
Open drain assessment	LR012602	Condition 3.11
Gas boilers start up and shutdown	LR012907	Condition 3.17
Storm water trigger levels	LR014610	Condition 6.14.2
Monitoring BRDA surface water	LR014928	Schedule C.2.3
CHP gas oil testing	LR015024	Condition 3.15
Reduction in air monitoring	LR022351	Condition 5.8
Reduction in noise monitoring	LR025757	Condition 4.5, Schedule C.5
Soil monitoring	LR030336	Schedule C.6

5. Noise Monitoring

It is proposed to complete noise monitoring annually at the 5 No. noise sensitive locations, at which noise limits apply. It is proposed to discontinue monitoring noise at the 9 No. site boundary locations, at which noise limits do not apply. Refer to Section 7.5 of this Licence application for further detail.

6. HFO boiler emissions monitoring

It is proposed that quarterly monitoring for Oxides of Sulphur (as SO₂) and annual monitoring for PM₁₀ and PM_{2.5} on HFO boiler stack emissions are removed from the current licence as the frequency and length of HFO boiler run-time does not allow enough time for mobilisation to carry out such monitoring. Refer to Section 7.4 of this Licence application for further detail.

7. Proposal to provide additional ambient air PM_{2.5} and PM₁₀ monitoring

Monitoring of particulate matter below 2.5µm (PM_{2.5}) and below 10µm (PM₁₀) is currently carried out at 5 locations (2 on-site and 3 off-site) by AAL. The monitoring is carried out using Osiris Continuous Air Sampling Monitors, the results of which are reported in the AER.

In 2018, an additional Osiris was installed at a location in Fawnamore. It is proposed that results from this ambient air monitoring station are reported to the EPA on an annual basis in the AER.

8. Corrections required to IE Licence

Approval is sought for amendments to the IE Licence P0035-06 for those conditions which are no longer applicable, have been fully implemented or were previously included in error, as tabulated below.

IE Licence Condition No.	Nature of change requested	Reason for request to amend/remove
Condition 3.16	Change of wording	Remove the wording 'development of compensatory habitat due to sea wall alignment' as the sea wall will not and has not been re-aligned
Condition 5.11	Remove condition	NERP no longer applicable
Condition 5.12	Remove condition	NERP no longer applicable
Condition 6.1	Remove condition	Fully implemented for gas boilers
Condition 6.4	Change of wording	Specify exclusion for HFO boilers due to their status as back up plant (refer to LR 014952)

IE Licence Condition No.	Nature of change requested	Reason for request to amend/remove
Condition 6.10	Change of wording	Drains are now included in integrity testing programme. Change wording to reflect this
Condition 6.11	Remove condition	Incorporate integrity testing of drains into Condition 6.10
Condition 6.15.2	Remove condition	Groundwater assessment report completed and approved by the Agency
Condition 8.4.16	Remove condition	All recommendations fully implemented
Condition 8.4.17	Remove condition	All recommendations fully implemented
Condition 8.12	Remove condition	Land spreading is no longer occurring on site
Schedule B.1	Remove ELV	Gas boilers cannot fire on HFO, they are single fuel plant. Therefore remove Oxides of sulphur ELV.
Schedule C.1.2	Remove Note 1 and monitoring frequency	Gas boilers cannot fire on HFO, they are single fuel plant. Therefore remove requirement to monitor for Oxides of sulphur and dust. Remove note 1.
Schedule C.4	Update waste class	Remove sanitary sludge as this is now disposed of offsite

4. Relevant Classes of Activity

The existing Classes of Activity remain applicable, as per IE Licence P0035-06, which are:

- Class 5.13 (e) The production of inorganic chemicals such as non-metals, metal oxides or other inorganic compounds such as calcium carbide, silicon, silicon carbide
- Class 2.1 Combustion of fuels in installations with a total rated thermal input of 50 MW or more
- Class 11.1 The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required

5. Requirement for EIAR/EIS

The proposed borrow pit is a development which has been granted planning permission from An Bord Pleanála (Ref. 301011-18) (following appeal of a Limerick City and County Council notification to grant permission (Ref 17/714)). While the proposed development is below the threshold of development of a type that requires a mandatory EIAR, it was considered appropriate that an EIAR be prepared given the nature and size of the proposed development and the location at Aughinish Island. In addition, given the proximity to River Shannon and River Fergus Estuaries and the Lower River Shannon, protected Natura 2000 sites, an Appropriate Assessment Screening was also submitted.

Further to the submission of the licence review application in April 2019, the EPA requested, following their AA screening determination, that a Natura Impact Statement should be submitted as further information. It was requested that the NIS consider all emissions from the site. This has been submitted to the Agency.

The EIAR covered the following aspects: site location and context, description of the proposed development, examination of alternatives, statutory and public health, population and human health,

biodiversity, soils and geology, hydrology and hydrogeology, air quality and climatic factors and finally noise and vibration.

Refer to Section 6.3 of this Licence application for link to the relevant planning documents.

6. Relevant BAT Conclusions/Decisions, Guidance Documents and BREF Documents

Those BAT guidance documents, Commission Implementing Decisions and BREF documents which are applicable to AAL are as follows:

Document type	Year of Issue	Title
Commission Implementing Decision (CID)	2017	CID for Large Combustion Plant
Commission Implementing Decision	2016	CID for Common Wastewater and Waste Gas Treatment in the Chemical Sector
Commission Implementing Decision	2017	CID for the Non Ferrous Metals Industry
Reference Document on Best Available Techniques (BREF)	2009	BREF for Energy Efficiency
Reference Document on Best Available Techniques (BREF)	2006	BREF on Emissions from Storage
Reference Document on Best Available Techniques (BREF)	2001	BREF on Industrial Cooling Systems
Reference Document on Best Available Techniques (BREF)	2006	BREF on Economics and Cross Media Effects
Reference Document on Best Available Techniques (BREF)	2003	BREF on General Principles of Monitoring
Reference Document on Best Available Techniques (BREF)	2018	BREF on Management of Waste from Extractive Industries
Reference Document on Best Available Techniques (BREF)	2007	BREF on Large Volume Inorganic Chemicals, Solids and Other Industry
BAT Guidance note	2008	General Inorganic and Alumina Sector

7. Applicable Legislation

The applicable legislation is as follows, refer to Section 4.5 for further details:

1. Industrial Emissions Directive (2010/75/EU)
2. Extractive Waste Directive (2006/21/EC)
3. Waste Framework Directive (2008/98/EC)
4. Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.
5. Regulation(EC) No 842/2006 on certain fluorinated greenhouse gases

8. Description of How Emission Levels Have Been Determined

Emission levels have been determined as follows:

1. Current Licence Limits as determined by the Agency
2. Reference to relevant Commission Implementing Decisions
3. Reference to relevant Reference Documents on Best Available Techniques

4. Reference to BAT Guidance notes
5. EPA Guidance documents including Environmental Management in the Extractive Industry

9. Derogation Sought

Derogation from Commission Implementing Decision 2016/902 for Common Waste Water and Waste Gas in the Chemical Sector

An assessment of application of BAT-AEL's for waste water treatment has been completed, refer to BAT 12 in Section 4.7 of this Licence application. In summary, based on the guidance set out in the BAT conclusions and in the BREF, it is considered that:

- BAT AELs for heavy metals are not applicable as the source of Heavy Metals in the wastewater stream is attributable to the bauxite ore raw material.
- BAT AEL for Total Phosphorous is not applicable as AAL does not produce phosphorous or phosphorous-containing compounds, these substances are not added to the effluent during treatment, and AAL does not utilise biological waste water treatment for the treatment of process effluent.
- BAT AEL for Total Nitrogen is not applicable as AAL does not utilise biological waste water treatment for the treatment of process effluent.
- BAT AEL, annual average of 35 mg/l applies for Total Suspended Solids in addition to the existing weekly average ELV of 50 mg/l.

A derogation is being sought from the TOC BAT AEL under the provisions of Article 15 (4) of the Industrial Emissions Directive and Section 86A (6) of the Protection of the Environment Act. Refer to BAT 12 in Section 4.7 of this Licence application.

An assessment of the excess emission of TOC and COD above the BAT AEL has been carried out by independent consultant Byrne Ó Cléirigh. This assessment is a quantitative assimilative capacity assessment to assess the impact of the excess contribution of TOC and COD over that of the relevant BAT Associated Emission Level (Commission Implementing Decision (EU) 2016/902), on the local receiving water environment. The results of the assimilative capacity assessment demonstrate that the impact of the discharges to the Shannon Estuary from discharge point W1-1 with the derogation is not significant. The results show that the difference in the concentrations of both TOC and COD in the receiving water are not significant between the application of the BAT AEL to the discharge and if the derogation were to be granted. The difference between the two – the 'excess' discharge – is negligible compared to the existing background concentrations of the two parameters in the Lower Shannon Estuary.

Regarding monitoring frequency the following is proposed as outlined in Section 7.2 of this Licence application:

Parameter	Existing Monitoring Frequency	Proposed Monitoring Frequency
Total Suspended Solids	Weekly	Weekly
TOC	N/A	Quarterly
Heavy Metals	Bi-annual	Bi-annual

10. Description of the Facility with Measures to Avoid/Reduce Adverse Impacts on the Environment

Refer to Section 9.1 of the application for further detail.

A summary of measures taken to avoid/reduce adverse impacts on the environment are:

1. EMS in place which is certified to ISO14001:2015 environment standard
2. QMS which is certified to ISO9001:2015 quality standard
3. Energy Efficiency management system which is certified to ISO50001:2011
4. Safety management system in place which is certified to ISRS Advanced Level 8
5. Plant wide site rules in place to ensure safety of operation and people
6. Extensive training program and associated annual training needs analysis evaluation for all employees
7. Documented procedures ensure that operations are carried out in a consistent and safe manner
8. Emergency response procedures in place to effectively manage potential emergency situations including a Major Accident Prevention Policy for the Category A BRDA facility.
9. Emergency response drills in place which test the emergency procedures at a prescribed frequency. Learnings are used to update the emergency response procedures where required
10. Inventory of emergency response equipment is maintained onsite. In addition, AAL are members of the Shannon Estuary Anti-Pollution Team
11. 24 hour security and emergency response team presence onsite
12. Fire and rescue service onsite at all times and procedures in place for external assistance if required
13. All storage vessels, drums and containers are fully contained within impervious bunds
14. All process areas are bunded
15. Over 370 structures (tanks, drains, bunds, sumps, pipelines, ponds and sewer lines) are integrity tested on a 3 yearly basis and repaired as required
16. Dedicated process drainage system which are integrity tested with repairs carried out as required
17. Storm water drains equipped with stone filters and are visually inspected and maintained as required
18. Dedicated spillways and ponds which are both visually inspected and integrity tested with repairs carried out as required
19. Pipelines are inspected via visual means, pressure-testing and non-destructive testing methods as appropriate, which ensures integrity of piping systems
20. Oil interceptors, which are visually inspected and maintained, are installed to mitigate any potential minor spills during refuelling activities
21. Extensive environmental monitoring in accordance with IE Licence
22. Enclosed material handling equipment
23. Automated level controls, alarms and interlocks on tank and bund levels, as appropriate
24. Entire operation is monitored via DCS control system
25. Control room operators monitor the operation in dedicated control rooms
26. Fail safe control system allows for consistent controlled plant shutdown
27. Preventative maintenance system ensures equipment is fit for purpose
28. Asset life extension investment program to maintain asset integrity
29. Scheduled planned inspections of all plant and equipment
30. Multiple dust suppression systems including automated sprinkler system on the BRDA
31. Multiple emission abatement equipment including electrostatic precipitators on the calciners

32. Flood tidal defence system designed to protect the BRDA from a flood event
33. Multiple fire suppression systems installed
34. Waste management carried out in accordance with documented waste manual
35. Appropriate storage and handling of hazardous materials
36. ATEX zones in place as required for gas systems

11. Description of Raw Materials, Fuels and Energy Produced or Utilised

There is no change to the raw materials or fuel type used on site associated with this Licence application. Refer to Section 4.6.2 for complete details of raw materials, intermediates and products. In summary, the key raw materials are as follows:

1. Bauxite is supplied by shipment of which 420,000 tonnes can be stored onsite in the two bauxite storage sheds. The tonnage stored onsite is largely dependent on shipping schedule and weather. Approximately 4.7 million tonnes per annum of bauxite are consumed
2. Sodium Hydroxide (otherwise known as caustic soda) is a key raw material in the Bayer process which is used to extract alumina from the bauxite via dissolution in caustic at high temperature and pressure. Caustic soda (50%), delivered via shipment, is stored in two locations onsite, known as A38 and A23. The latter is a new storage area following conversion of a HFO storage tank for caustic storage which involved installation of a new tank floor, leak detection system and bund fully lined with an impermeable membrane.
3. No water is abstracted on-site as the water supply is from a public water treatment plant with a current approx. usage per annum of 5.3 million m³ per annum.
4. Lime, which is supplied from an Irish supplier, is delivered via truck for addition to the process to enhance productivity.
5. Sulphuric acid is delivered by shipment to an onsite bulk storage tank. 20ktonnes are consumed per annum with a storage capacity of 5.5 ktonnes.
6. A range of chemical additives are required for process efficiency such as flocculants, anti-foam, organic impurity stabiliser
7. A range of chemicals are used in the laboratory and workshops
8. A range of chemicals are used onsite for maintenance of equipment integrity such as anti-scaling agent, paints and biocide

The only intermediate product generated onsite is slaked lime which is generated from burnt lime and is added directly to the process following slaking. Approximately 400 ktonnes are consumed per annum.

Natural gas is now the primary fuel onsite, having replaced HFO in 2014 (HFO is now < 1% of fuel consumed). The annual usage rate is 630 million m³, delivered by pipeline to an above ground installation (AGI) which is controlled by Gas Networks Ireland from which gas supply to the site is metered. For full fuel (thermal energy) consumption details refer to Section 4.6.

Electricity is generated onsite in the Combined Heat and Power (CHP) plant. The total electricity generated onsite in 2018 was 1,296,085 MWH of which 376,285 MWH was consumed for the activity while the remainder was exported to the National Grid. Refer to Section 4.6 for further details.

12. Sources of Emissions

The primary emissions from the site are emissions to air, surface water, storm water and noise. Refer to Section 7 of the application for complete detail. An emissions summary is presented below. The changes to emissions requested as part of this application are referenced below. While there is an increase sought for NO_x ELV from calciners there will be no actual change in emissions or calciner operation. Vibration emission limits are proposed for operation of the borrow pit.

1. Air emissions

The main air emissions points are tabulated below.

Emission Point Ref.	Description	Pollutant Parameters
A1	HFO Boiler Stack	NOx, SO ₂ , Dust
A2	Calcliner Stack	NOx, Dust
A3-A	Gas Turbine 1	NOx, CO
A3-B	Gas Turbine 2	NOx, CO
A4-A	D Boiler	NOx, CO
A4-B	E Boiler	NOx, CO
5	Scrubber Exhaust Fan – Transfer Tower 4 & 5	Dust
6	Bauxite Crusher and Wobbler Feeder – Scrubber Exhaust Fan	Dust
8	Scrubber Exhaust Fan – Transfer Tower 3	Dust
11	Alumina Loader Dust Fan FA49AL03	Dust
12	Alumina Loader Dust Fan	Dust
13	A73 Boiler	NOx, SO ₂
14	A76 Boiler	NOx, SO ₂
15	A79 Boiler	NOx, SO ₂
16	Silo 1 – Exhaust Fan	Dust
17	Silo 2 – Exhaust Fan	Dust
18	Silo 3 – Exhaust Fan	Dust
19	Exhaust Fan between Silos 1 and 2	Dust

There are no new proposed main or minor emission points associated with this Licence application.

The HFO boilers, Emission pt. ref. No. A1, (A and C boilers as B boiler is decommissioned) are used only as back-up e.g. where a combustion plant is offline for maintenance. From January 2016 to December 2018 the HFO boilers have only operated for 658 hours. This has led to a reduction to practically zero of SOx emissions for the whole site.

The 2 gas boilers (Emission pt. ref. no. A4-A and A4-B) are in operation since 2014 in full compliance with the IE Licence for NOx and CO. There is no requirement for SOx and dust monitoring as the gas boilers are not dual fuel.

The gas turbines (Emission pt. ref. no. A3-A and A3-B) are in operation for more than 10 years and have operated in full compliance with Licence limits for NOx and CO.

The 3 calciners (Emission pt. ref. no. A2) emit through individual flues in a single stack and are in full compliance with the IE Licence for particulates and NOx. SOx is not required to be monitored when operated on gas which the calciners have been since 2012. An increase in ELV for NOx emissions is being sought from 100 mg/m³ to 150 mg/m³. Refer to section 1.1 of the application. Air dispersion modelling completed indicates no impact on air quality from the site air emissions at the current ELV and at the proposed ELV.

The 6 exhaust fans operate in compliance with the Licence limits for particulates.

2. Surface water emissions

All treated process effluent is discharged from the AAL site at a location adjacent to the marine terminal (otherwise known as the jetty) via the discharge point referred to as W1-1. The volume of treated process effluent discharged is largely dependent on rainfall.

The primary source of process effluent are:

1. Rainfall which collects on the Southern end of the site
2. Process condensate
3. Hosing water
4. Rainfall run-off from the BRDA
5. Boiler house effluent
6. In-house water treatment plant
7. Municipal water treatment plant return

All treated sanitary effluent is discharged at the same discharge location, W1-1, however this stream has different monitoring and compliance requirements to that for the treated process effluent. The source of sanitary effluent is the onsite sewage system.

W1-1 is the discharge location at the River Shannon Estuary.

Both treated process effluent and sanitary effluent are in full compliance with the IE Licence for all parameters.

3. Storm water emissions

There are two systems for collecting storm water onsite. The storm water which collects on the Southern part of the site (Process Area) is directed to the process effluent system for treatment and ultimately discharged at W1-1 (as described for surface water emissions above). The northern end of the site (Raw Materials Storage Area) collects storm water run-off (rainfall) which is discharged via drains directly to the Shannon Estuary at the shore line at 5 locations, namely SS1 – SS5 where SS denotes surface stream. These drains are equipped with stone filters or silt traps. Visual inspections of the surface stream drains are carried out weekly. Trigger levels have been established, in agreement with the Agency, for pH, soda and conductivity. The surface streams are in full compliance with the trigger limits.

4. Noise and vibration emissions

The site is located in a remote location. There are no significant noise emissions from the site. Annual noise monitoring is carried out by an independent 3rd party at 5 noise sensitive locations and 9 boundary locations as prescribed in the IE Licence. Daytime, evening time and night time noise limits are applied to the noise sensitive locations. Noise monitoring has consistently shown compliance with these limits.

There are currently no vibration emissions from the site. However, the proposed activity of the borrow pit will involve blasting and therefore vibration limits will apply, refer to Section 1.1 for further detail.

13. Environmental Site Conditions

The site condition is outlined in the baseline report that is submitted with this licence review application. The baseline report is the report that was submitted in 2014 as part of the licence application for the current licence in force, Golder Associates Ltd. Report 13514150608.501/A.0, June 2014.

Golder Associates Ltd. were commissioned by AAL to provide a technical memorandum outlining any changes since the production of the 2014 baseline report. This technical memorandum (18101143.TM02.A0) is included in this licence review application. The key changes between 2014 to present are summarised below:

- 2 gas boilers are now online, replacing the operational requirement for heavy fuel oil (HFO);
- HFO boilers are only used as standby and have operated for < 700 hrs in total since 01/01/2016
- HFO is no longer stored on Site in Area 23
- One former HFO tank in Area 23 has been converted to caustic storage, with associated bunding works
- Petrol is no longer stored onsite
- There are 3 new groundwater recovery wells East of Precipitation (Local 3)
- New lined drain adjacent to Area 65 installed as part of groundwater improvement program
- Drains are now tested as part of integrity testing schedule
- Installation of a second bauxite unloader at the port facility
- Installation of a deep cone thickener within existing mud separation area
- Asset Life Extension programme, including tank refurbishments, contributing to improved groundwater quality
- Mud farming now in place in the BRDA and achieving pH < 11.5
- Soil monitoring report submitted and approved by the Agency
- 6 reported environmental incidents (Category 1 – Minor) in 2014 – 2018

In summary, the main changes to the site relate to changes in operational systems as a result of conversion to natural gas boilers. As a result of this, the site uses and stores much less HFO. The site has converted one of the HFO tanks in A23 to caustic storage. The works associated with this included significant upgrades to the bunded area around the A23 storage tank, including lining and leak detection.

The site continues to mitigate the risk of caustic contamination from spills or leaks in the plant area by intercepting and recovering water from a number of Estuarine Streams, as well as other recovery wells. Three additional recovery wells have been added since the baseline report in 2014. This recovery programme is resulting in improvements to pH as compared to the reporting in 2014. Refer to Section 7 of this Licence application.

The site continues to make investment in environmental management with the ongoing Asset Life Extension. This ongoing work targets priorities for plant repair and replacement identified through groundwater monitoring and integrity testing. This has resulted in significant upgrades to the site including a replacement of the A65 drain to the West Pond with stainless steel lining.

Industrial mud farming in the BRDA has resulted in overall improvements to the waste stored in the BRDA. Through this process, the bauxite residue is carbonated and the overall pH is decreased to <11.5.

14. Nature and Extent of Proposed and Existing Emissions

1. Air emissions

There are no proposed changes to air emissions. The following provides a summary of existing emissions.

A and C HFO boilers (Emission pt. ref. No. A1) operated for just 658 hours in total for the period 2016-2018. The average SO₂ 48 hour average for A and C boiler in the period July 2014 – December 2018 was 780 mg/m³ against an ELV of 1700 mg/m³. The average NO_x 48 hour average for A and C boiler in the period July 2014 – December 2018 was 330 mg/m³ against an ELV of 750 mg/m³. There is no proposed change to emissions from the HFO boilers.

The 3 calciners (Emission pt. ref. no. A2) which operate continuously (with the exception of maintenance periods) emit through individual flues in a common stack. A summary of emissions from the calciners are tabulated below for the period from July 2014 to December 2018, all compliant.

Licence Parameter	Average Value (mg/Nm ³) Calciner 1 / 2 / 3	Licence Limit (mg/Nm ³)
Particulates (Continuous Daily)	11 / 14 / 16	50
Particulates (Continuous Max Hourly)	15 / 18 / 24	100 (hourly mean)
Particulates (Manual Quarterly)	8 / 18 / 20	50
Nitrogen Oxides (Manual Quarterly)	65 / 85 / 70	200 (60 minute mean)

The 2 gas turbines (Emission pt. ref. no. A3-A and A3-B) operate continuously (with the exception of maintenance periods) and emit through 2 separate stacks. A summary of emissions from the gas turbines are tabulated below for the period from July 2014 to December 2018, all compliant.

Licence Parameter	Average Value (mg/Nm ³) GT1 / GT2	Licence Limit (mg/Nm ³)
NO _x (Continuous Daily)	33 / 26	75
NO _x (Continuous Max Hourly)	38 / 32	150
CO (Continuous Daily)	3 / 4	110
CO (Continuous Max Hourly)	6 / 7	200

The 2 gas boilers (Emission pt. ref. no. A4-A and A4-B) which operate continuously (with the exception of maintenance periods) emit through 2 separate stacks. A summary of emissions from the gas boilers are tabulated below for the period from July 2014 to December 2018, all compliant.

Licence Parameter	Average Value (mg/Nm ³) D Boiler / E Boiler	Licence Limit (mg/Nm ³)
NO _x (Continuous Daily)	71 / 69	110
NO _x (Continuous Max Hourly)	77 / 74	200
CO (Continuous Daily)	17 / 8	110
CO (Continuous Max Hourly)	27 / 17	200

A summary of emissions for the 6 dust collection units (Emission pt. ref. no. 6, 12, 16, 17, 18 and 19) is tabulated below for the period from July 2014 to December 2018. Particulates are monitored biannually at these locations.

Emission Point Ref. No.	Particulates (mg/m ³)					
	6	12	16	17	18	19
Q3 2014	8	19	14	20	19	24
Q4 2014	8	18	19	15	18	16
Q2 2015	13	21	23	21	19	18
Q4 2015	6	21	41	7	14	22

Emission Point Ref. No.	Particulates (mg/m ³)					
	6	12	16	17	18	19
Q1 2016	4	5	15	39	9	16
Q3 2016	11	-	8	4	3	-
Q4 2016	-	18	-	-	-	4
Q1 2017	-	28	-	-	-	-
Q2 2017	14	-	8	9	4	3
Q3 2017	-	19	8	31	14	4
Q4 2017	2	-	-	-	-	-
Q1 2018	-	-	-	-	-	-
Q2 2018	38	13	18	48	2	2
Q3 2018	-	-	12	3	18	33
Q4 2018	4	2	-	-	-	-

2. Surface water emissions

There is no proposed change to surface water emissions. The following Table provides a summary of existing emissions to the Licenced discharge point W1-1 for the period July 2014 to December 2018, fully compliant.

Licence Parameter	Average Value	Licence Limit
Daily Flow (Volume) (m ³)	13,578	30,000
Hourly Flow (Volume) (m ³)	875	1,250
pH (Max)	7.8	6 – 9
pH (Min)	7.5	6 – 9
Toxicity – Tisbe battagliai (TU)	2.2	5
Toxicity – Microtox (TU)	1.4	5
BOD (kg/day)	723	2,360
Suspended Solids (mg/l)	13	50
Oils, fats and greases (mg/l)	1	15

A summary of emissions of sanitary effluent to the Licenced discharge point W1-1 is tabulated below for the period July 2014 to December 2018, fully compliant.

Licence Parameter	Average Value	Licence Limit
Daily Flow (Volume) (m ³)	60	240
Hourly Flow (Volume) (m ³)	8	10
pH (Max)	7.3	9
pH (Min)	7	6
BOD (kg/day)	5.9	25
Suspended Solids (mg/l)	4	35

3. Storm water emissions

There are no proposed changes to storm water emissions. The following table provides a summary of existing emissions from the 5 surface streams (SS1, SS2, SS3, SS4 and SS5) for the period from July 2014 to December 2018. Trigger levels have been established and agreed with the Agency, as shown below. These trigger levels apply to discharges unaffected by saline intrusion. Sampling is undertaken at low tide, when possible, to avoid saline intrusion.

Parameter	SS1	SS2	SS3	SS4	SS5	Trigger Warning Level	Trigger Action Level
pH	8.4	8.3	8.3	8.2	8.3	≤ 6.5 ≥ 9	≤ 6 ≥ 9.5
Conductivity (µS/cm)	184	191	194	152	422	> 2000	> 2500
Soda (g/l)	0.02	0.01	0.01	0.02	0.05	> 1.5	> 2

4. Noise and vibration emissions

Annual noise monitoring is carried out at 9 boundary locations and 5 noise sensitive locations, which consistently confirms compliance with the noise limits (day, evening and night time limits) prescribed in the IE Licence.

Vibration limits are proposed, associated with the operation of the borrow pit. These proposed limits, which are in accordance with the EPA Guidance documents including Environmental Management in the Extractive Industry, are as follows:

Parameter	Proposed Emission Limit Value (ELV)
Ground-borne Vibration	12 mm/s PPV
Air overpressure	125 dB

It is proposed that extraction and associated blasting operations will occur over a 10 year period, with the Borrow Pit operational between April and September, with blasting occurring up to 7 times within this period (per year). The Applicant will employ specialist blast contractors to design and carry out each blast in the Borrow Pit. All blasts at the site are subject to a specific design, which is carried out in accordance with the relevant design standards, which establish best practice and safety, and has regard to the built environment.

Noise emissions from rock breaking subsequent to blasting will be covered by the noise limits proposed in the table above at the NSLs. Rock breaking will not present a vibration impact. There are currently no emissions associated with vibration.

Refer to Section 1.1 for further information.

15. Assessment of Effects of Emissions on the Environment as a Whole

Environmental Impact Assessment (EIA) is the process of examining the anticipated environmental effects of a proposed project - from consideration of environmental aspects at design stage, through consultation and preparation of an Environmental Impact Assessment Report (EIAR). An EIAR is a report or statement of the effects, if any, which the proposed project, if carried out, would have on the environment.

An EIAR has been submitted with this application for the proposed borrow pit. Cumulative impacts are assessed in the EIAR. Refer to section 6 of this Licence application for further details.

16. Technology to Prevent, Eliminate or Reduce/Abate Emissions

There are no abatement systems associated with the proposed changes.

Existing techniques for emissions abatement are summarised as follows:

1. Air emissions

Emission Source	Emission Pt. Ref.	Abatement Techniques
HFO boilers (A and C)	A1	<ol style="list-style-type: none"> DCS/BMS control system Low NOx burners Low sulphur HFO
Gas boilers	A4-A & A4-B	<ol style="list-style-type: none"> Natural gas is clean fuel source Dry low NOx burners DCS/BMS control system
Gas turbine 1 & 2	A3-A and A3-B	<ol style="list-style-type: none"> Natural gas is clean fuel source Dry low NOx burners DCS/BMS control system Water/steam addition when operating on gasoil
Calciners	A2	<ol style="list-style-type: none"> Electrostatic precipitators DCS control system
Wet scrubber	5, 6 and 8	<ol style="list-style-type: none"> General extraction
General extraction	11, 12, 16, 17, 18 and 19	<ol style="list-style-type: none"> Dry fabric bag filters
Boilers for building heating	13, 14 and 15	<ol style="list-style-type: none"> Gas oil with <0.2% sulphur

Fugitive air emissions are abated as follows:

- Automated sprinkler system which wets entire BRDA in 4 hours
- Screening of BRDA with vegetation
- Sprinkler system for alumina hydrate storage pad
- Enclosed storage of bauxite and alumina
- Enclosed conveying systems and transfer points
- Minimal transfer points
- Road cleaning
- Application of dust bind on roadways as required

2. Surface water emissions

Process effluent is slightly alkaline containing traces of sodium aluminate and sodium carbonate. It is collected in ponds and from there pumped to the Effluent Neutralisation and Clarification area. Concentrated sulphuric acid is employed to neutralise the dilute sodium aluminate and this generates a fine aluminium hydroxide (Al (OH)₃) precipitate. The resulting water stream containing up to 5,000 mg/l suspended aluminium hydroxide precipitate is flocculated using an anionic flocculant and then clarified in a large diameter raked gravity settler. The overflow stream containing <30 mg/l suspended solids reports to the Liquid Waste Pond where it is used as dust control sprinkling water or discharged to the river as neutralised effluent. The underflow sludge from the effluent clarifier is recycled back into the acid neutralisation tank to seed and densify the fresh precipitate. On a daily basis a portion of this sludge is transferred to the Alumina production process to keep the recycling sludge inventory in the effluent neutralisation unit in balance. At the target recycling rate of ~20:1 the sludge density

can be controlled at 15-20% solids but normal practice is to operate at a lower recycle rate to keep the sludge odour free.

Sanitary effluent from all buildings is transferred to a sanitary treatment system via underground sewers. There are a number of sewage lifting stations which pump the effluent from low areas in the plant. On arrival at the treatment plant, the effluent enters the influent tank where the larger particles are broken down in a comminutor pump. From there it is pumped into the aerator which mixes the organisms which live in the activated sludge with the raw sewage. Through aerobic digestion, the bacterial organisms convert the organic waste to carbon dioxide, etc. and an aerator is provided to ensure an adequate supply of oxygen is available to the organisms. On leaving the aerator chamber, the activated sludge particles coagulate and settle out from the waste water in the clarifier. The clear supernatant overflows via a serrated edge into the effluent tank from where it is pumped to the Shannon via surface water emission point W1-1. The clarifier underflow (activated sludge) is removed on a weekly basis by an approved contractor for transfer to a licenced treatment plant.

3. Storm water emissions

Storm water drains which discharge to 5 monitoring locations are fitted with interceptors and silt traps. Refer to Section 7.2 of this Licence application for further information.

4. Noise emissions

The following BAT techniques are applied to control noise emissions:

- Standard commercial cooling towers are utilised which are low noise emitting equipment
- Heavy duty construction of the plant achieves noise prevention by suitable construction as confirmed by absence of noise complaints and compliant annual noise survey completed by a 3rd party.
- Operational measures are taken to reduce noise emissions. For example, each boiler system has its own DCS /BMS computerised control system. This ensures optimum boiler energy performance, maximum combustion safety and optimum emissions control. This includes during periods of start-up and shutdown.
- Silencers are installed on steam relief valves.
- Acoustic enclosures are installed around blowers and compressors.
- Noise limits are specified at equipment design stage.
- Noise suppression equipment is installed in the CHP plant.
- Vibration is controlled via bellows installed between equipment and pipework and anti-vibration supports installed e.g. on air handling units.

17. Description of Wastes

No waste is accepted from external sources other than alum sludge transferred by pipeline from the nearby Limerick County Council Water Treatment Plant. Those waste streams generated and disposed of onsite are tabulated below.

AAL produces in the region of 18,000t per annum of saltcake from a side stream of 6% of the main refinery liquor stream through an evaporation and salting out process (organics control process). The saltcake is deliquored on belt filters and trucked to a dedicated storage cell in the BRDA. The Saltcake is classified as hazardous. The production of saltcake via this organics control process is required to manage the balance or concentration of organic compounds in the process liquor. These organics come from trace humic materials in bauxite.

An enhanced caustic recovery process has been developed that will avoid the generation of saltcake through a process modification of the existing organics control process. This enhanced caustic

recovery is achieved via an additional step in the existing organics control process which avoids any filtration step or production of solid waste. Therefore, once implemented (approximately year 2021) no saltcake will be produced for disposal. There are no environmental emissions associated with this process modification. Refer to Licensee Return LR039399 of February 2019 for further details of this proposed process.

* Saltcake will no longer be generated once the proposed enhanced caustic recovery is operational.

Waste stream	LOW Code	Description	Tonnes generated per annum (2018)
Saltcake*	01 03 07	Deposited in engineered cell in the BRDA	15,008
Sand	01 03 06	Deposited in the BRDA	99,093
Red mud	01 03 09	Also known as farmed bauxite residue, deposited in the BRDA	1,359,653
Lime grits	01 03 99	Deposited in the BRDA	5455
Process Wastes	01 03 99	Sand, scales, tank cleanout sludges – deposited in the BRDA	14,369
Flue stack residue	16 11 04	Deposited in the BRDA	132

Those waste streams generated on site and disposed of offsite are tabulated below.

Waste stream	LOW Code	Disposal/Recovery code	Tonnes generated per annum (2018)
Aerosol Cans	15 01 11	R4	6.00
Asbestos	17 06 01	D1	0.9
Batteries	26 06 01	R4	0.50
Scale/Fibreglass	26 05 07	D1	1.7
Mixed wastes	15 02 02	D1	0.4
Cardboard	20 01 01	R3	20.4
Chemical Waste	16 05 06	R1	22.00
Clinical Waste	18 01 03	D9	0.068
Copper	17 04 01	R4	2.0
Fluorescent Bulbs	20 01 21	R4	4
General Waste	20 03 01	D1	163.4
Mercury Liquid	06 04 04	R4	0.001
Metal Containers (empty IBC's & drums)	15 01 04	R4	9.5
Oil Filters	16 01 07	R11	0.10
Oily Rags / Oil Dry	13 08 99	D10	5.6
Paper/Documents	20 01 01	R3	0.2
Plastic containers (clean empty IBC's & drums)	20 01 39	R3	44.4
Plastic containers (contaminated empty IBC's & drums)	15 01 10	R3	77.0
Printer Toner Cartridges	20 01 36	R4	0.16
Sanitary Effluent Sludge	19 08 05	D8	466.5

Waste stream	LOW Code	Disposal/Recovery code	Tonnes generated per annum (2018)
Steel & Aluminium & Nickel Scrap Metal	17 04 07	R4	875.7
Timber Reels (used)	20 01 38	R11	5.5
Used Hosing & Belting (Rubber)	19 12 04	R11	36.6
Vegetable Oils & Greases	20 01 25	R3	1.7
Waste Electrical & Electronic Equipment (WEEE)	16 02 14	R4	0.001
Waste Food	02 03 99	R3	7.1
Wood - recycling	20 01 38	R3	83.5
Wood - landfill	20 01 38	D1	14.8
Waste lubricating oils	13 02 08	R9	8.1
Waste lubricating oils	13 02 05	R9	21.5
Other fuels	13 07 03	R9	4.6
Contaminated packaging (oil)	15 01 10	R9	1.4
XRay Fixer Replenisher	09 01 04	R4	1.1
XRay Film	09 01 07	R4	0.12

Refer to section 8.1 of this application.

18. Description of Implementation of Waste Hierarchy

As required by Industrial Emissions Licence P003506, AAL has developed a Waste Management Manual which outlines waste management procedures applied at AAL and are intended to ensure effective waste management. Local, legal and environmental requirements, available treatment and disposal options and specific waste streams have been accounted for. The manual provides details for the following aspects of waste management: types of waste generated, list of licensed waste disposal contractors, waste control forms for particular waste streams and waste management procedures.

Waste prevention is not possible due to the nature of the Bayer process. However, the following are measures taken to minimise waste generated:

- A. Bauxite residue is the principal extractive waste arising from the Bayer process for production of alumina from bauxite. However, AAL processes the highest grade bauxite available globally. This is the most significant determinant of the waste factor (t waste / t alumina). In addition, AAL also employs triple digestion to maximise alumina recovery which in turns minimises waste factor.
- B. AAL employs closed loop cooling water systems for precipitation cooling. This cooling water is itself cooled via direct air contact in a cooling tower. This is environmentally preferable to use of once through river water which would result in a heat load onto the river.
- C. Chemical additives are added to the process to reduce process scaling of equipment. This reduces the volume of process scale to be disposed of in the BRDA
- D. Saltcake is an existing waste stream which is a product of an organic impurities removal process. Saltcake is currently being disposed of on-site in a dedicated, lined cell within the BRDA. Saltcake is considered to be a hazardous waste. An enhanced caustic recovery process has been developed that will avoid the generation of saltcake through a process modification of the existing organics control process. This enhanced caustic recovery is achieved via an additional step in the existing organics control process which avoids any filtration step or production of solid waste. Therefore, once implemented (approximately year 2021) no

saltcake will be produced for disposal. There are no environmental emissions associated with this process modification.

Waste is re-used where possible, as follows:

- A. Approximately 5% of the bauxite residue after alumina extraction reports as a granular material (150-1000µm) and is termed process sand. This material is removed from the process, washed and trucked to the BRDA for construction of internal roadways within the BRDA.
- B. The plant is designed to collect all waste water streams in one area, recycle them to the appropriate process area to substitute for fresh water addition or process them via the licensed effluent treatment and disposal system. The use of recycled water for washing, flocculent dilution, cleaning-acid dilution, dust suppression (sprinkler system) and hosing is standard practice.
- C. Waste oil from certain equipment is applied as lubricant for other equipment.
- D. Waste construction rubble, generated onsite, is used for road construction in the BRDA.
- E. Burnt limestone is slaked onsite, via conventional water slaking, to generate slaked lime which is a key additive to the Bayer process for impurities control and extraction efficiency. There is a fraction which is rejected after the slaking process as stones and grits. These limestone grits (LoW code 10 13 04) are trucked to the BRDA for construction of internal roadways.
- F. Calciner refractory waste is used for the construction of internal roadways in the BRDA.
- G. Since 2014, AAL has been involved in National and European projects focussing on potential valorisation of the bauxite residue.
- H. Nationally, AAL has been involved in a project named Al-Source, which was funded by the Irish Environment Protection Agency (EPA). The main objective was to demonstrate the value content in Irish bauxite residue via both re-use and recovery techniques.
- I. AAL is actively participating in many European projects to develop technology to re-use bauxite residue and extract base and critical metals, such as EIT Raw Materials and RECOVER and Removal.

Waste is recycled where possible, as follows:

- A. The industrial effluent sludge from waste water treatment plant is recycled to the alumina process.
- B. Batteries, copper, fluorescent bulbs, mercury liquid, metal containers (IBC's and drums), printer toner cartridges, steel and aluminium scrap metal, waste electrical and electronic equipment are recycled off-site for metals recovery.
- C. Cardboard, paper, vegetable oils and greases, waste food and wood are recycled off-site for organic substances.
- D. Plastic containers and waste oil are recycled off-site for oil refining.

Chemical waste is recovered offsite for energy recovery.

Disposal of waste cannot be prevented due to the nature of the Bayer process. Bauxite residue is the principal extractive waste arising from the Bayer process. Bauxite residue undergoes numerous stages of washing and filtration prior to discharge to the BRDA (a Category A facility under the Extractive Waste Directive (2006/21/EC)). The operation of the BRDA is one of the key enablers in the sustainability of AAL. The deposition method employed is dry stacking of washed, filtered mud which is pumped by positive displacement pumps to the BRDA at 58% solids. Partial neutralisation of the mud by atmospheric carbonation through mud farming produces a mud with pH<11.5 which is non-hazardous (LoW code 01 03 09) and is suitable for remediation and revegetation. In addition the farming process increases the percent solids to 70-75%. The BRDA has been designed and is operated

to ensure the long-term stability of the residue. This methodology of bauxite residue treatment and disposal is considered Best Available Technology, as per the BREF for Management of Waste from Extractive Industries (2018).

NOTE: Section 4.3 of the Licence Application for Waste Activities has not been completed for waste treatment (which could potentially apply to carbonation of bauxite residue) since this section is not applicable to the BRDA as it applies to Landfills. It is the Extractive Waste Directive and not the Landfill Directive which is applicable to the BRDA.

In addition to bauxite residue, it has been approved by the EPA that the following wastes can be disposed of in the BRDA: cooling tower packing and process waste which includes scale, sludge, reject sand and unusable hydrate and alumina.

Waste is segregated where possible, as follows:

- A. Process water is segregated from uncontaminated rainwater and other uncontaminated water releases.
- B. Sanitary effluent is segregated from process effluent for treatment by an on-site licenced waste treatment facility.
- C. The following waste is segregated onsite to allow for recycling, recovery or disposal offsite: batteries, cardboard, timber, aerosol cans, asbestos, canteen waste, clinical waste, fluorescent light tubes, plastic drums and containers, hazardous material, radioactive sources, oil filters, oily rags, plastic, rubber, printer cartridges and scrap metal.

Refer to Section 8.1 of this application.

19. Preventative Measures Taken Against Pollution, In Particular through Application of BAT

Compliance with BAT is assessed within the application (Section 4.7) in the context of the following documents which demonstrates that all preventative measures are taken against pollution within the existing facility and within the design of the proposed changes:

Document type	Year of Issue	Title
Commission Implementing Decision (CID)	2017	CID for Large Combustion Plant
Commission Implementing Decision	2016	CID for Common Wastewater and Waste Gas Treatment in the Chemical Sector
Commission Implementing Decision	2017	CID for the Non Ferrous Metals Industry
Reference Document on Best Available Techniques (BREF)	2009	BREF for Energy Efficiency
Reference Document on Best Available Techniques (BREF)	2006	BREF on Emissions from Storage
Reference Document on Best Available Techniques (BREF)	2001	BREF on Industrial Cooling Systems
Reference Document on Best Available Techniques (BREF)	2006	BREF on Economics and Cross Media Effects
Reference Document on Best Available Techniques (BREF)	2003	BREF on General Principles of Monitoring
Reference Document on Best Available Techniques (BREF)	2016	BREF for Management of Waste from Extractive Industries

Document type	Year of Issue	Title
Reference Document on Best Available Techniques (BREF)	2007	BREF on Large Volume Inorganic Chemicals, Solids and Other Industry
BAT Guidance note	2008	General Inorganic and Alumina Sector

20. Measures Taken Under Abnormal Operating Conditions

Potential emissions are emissions that are not active under normal operation, as outlined in Section 7.4.2 of this application. Measures are in place to prevent such conditions, as outlined below. Such conditions do not occur given these mitigation measures.

Abnormal condition	Mitigation measures
Failure of digester back pressure control valve leading to steam entrained with process chemicals	<ol style="list-style-type: none"> 1. Non-destructive testing program 2. Extensive digestion wear program 3. Preventative maintenance
Failure of pressure control system leading to steam entrained with process chemicals in flash tanks	<ol style="list-style-type: none"> 1. Non-destructive testing program 2. Preventative maintenance
Fire in CHP plant	Fire protection system installed
Gas leak from CHP plant	Protection measures are in place to prevent gas release. For example (1) The GNI AGI is secured and maintained by GNI, emergency shut off v/v is tested every 6 mths and area is ATEX rated (2) The AAL AGI is secured, emergency shutdown v/v's operated manually from control room and area is ATEX rated. The CHP plant and pressure reducing station also have similar controls in place.
Over-pressure CHP steam safety release leading to steam release	Automatic trip point based on pressure which is integrated into control logic
Failure of gas pressure reduction gas system leading to natural gas release	Protection measures are in place to prevent gas release. For example (1) The GNI AGI is secured and maintained by GNI, emergency shut off v/v tested every 6 mths and area ATEX rated (2) The AAL AGI is secured, emergency shutdown v/v's operated manually from control room and area is ATEX rated. The CHP plant and pressure reducing station also have similar controls in place.
Failure of calciner and gas safety vents leading to release of natural gas	Protection measures are in place to prevent gas release. For example (1) The GNI AGI is secured and maintained by GNI, emergency shut off v/v tested every 6 mths and area ATEX rated (2) The AAL AGI is secured, emergency shutdown v/v's operated manually from control room and area is ATEX rated. The CHP plant and pressure reducing station also have similar controls in place.

Start up and shutdown conditions are defined in standard work methods for the calciners and combustion plant. These methods are designed to ensure optimum emissions control during start up and shut down.

Additional measures are summarised in Part 10 of this non-technical summary.

21. Measures to be Taken Following Cessation of Activities

A detailed and fully costed Closure, Restoration and Aftercare Management Plan (CRAMP) was agreed with the Agency in 2014. In 2018, the CRAMP and associated closure costs were reviewed and updated by the PM Group in accordance with the EPA 2014 guidance document '*Guidance on Assessing and Costing Environmental Liabilities*'. This was subsequently approved by the Agency in June 2018.

In addition, a separate CRAMP has been submitted with this application to reflect the impact of the proposed changes on the closure plan and associated costs.

The objective of the CRAMP is to ensure no long term risks of environmental pollution post closure.

Refer to Section 9.1 of this application for the detailed CRAMP and associated costs.

Financial provisions have been put in place and agreed with the Agency for the costs associated with closure and aftercare of the site.

22. Measures Planned to Monitor Emissions to the Environment

The proposed changes to monitoring are as follows:

A. Borrow pit

It is proposed that noise and vibration monitoring during blasting will be conducted at the nearest noise sensitive receptors, i.e. NSL2 and NSL5, as well as an additional location NV1 (Walsh residence, for vibration only). In terms of frequency, monitoring is proposed specifically for each blasting event, for which there will only be one each time blasting is to occur. Blasting will occur approximately 6 to 7 times per year between the months of April and September.

B. Noise monitoring

It is proposed to complete noise monitoring annually at the 5 No. noise sensitive locations, at which noise limits apply. It is proposed to discontinue monitoring noise at the 9 No. site boundary locations, at which noise limits do not apply. Refer to Section 1.1 of this Licence application for further details.

C. HFO boiler emissions monitoring

It is proposed that quarterly monitoring for Oxides of Sulphur (as SO₂) and annual monitoring for PM₁₀ and PM_{2.5} are removed from the current licence as the frequency and length of HFO boiler run-time does not allow enough time for mobilisation to carry out such monitoring. The low run-time renders HFO combustion emissions insignificant.

D. Additional PM₁₀ and PM_{2.5} ambient air monitoring

Monitoring of particulate matter below 2.5µm (PM_{2.5}) and below 10µm (PM₁₀) is currently carried out at 5 locations (2 on-site and 3 off-site) by AAL. The monitoring is carried out using Osiris Continuous Air Sampling Monitors, the results of which are reported in the AER.

In 2018, an additional Osiris was installed at a location in Fawnamore. It is proposed that results from this ambient air monitoring station are reported to the EPA on an annual basis in the AER.

Existing monitoring is summarised as follows:

1. Air

Emission Source	Emission Pt.	Control parameter	Monitoring Frequency	Monitoring Method
HFO boiler stack	A1	Opacity PM ₁₀ and PM _{2.5}	Continuous Annually	Opacity monitor Isokinetic sampler
		NOx	Continuous	Flue gas analyser
		SOx	Continuous Quarterly manual	Flue gas analyser Flue gas analyser
Calciner stack	A2	Particulates	Quarterly	Isokinetic/gravimetric
			Continuous	Scattered light monitor
		NOx	Quarterly	Electrochemical cell
Gas Turbines	A3-A, A3-B	NOx	Continuous	Flue gas analyser
		Carbon monoxide	Continuous	Flue gas analyser
Gas boilers	A4-A, A4-B	NOx	Continuous	Flue gas analyser
		Carbon monoxide	Continuous	Flue gas analyser
Wet scrubber	5, 6 and 8	Particulates	Bi-annually	Gravimetric
General extraction	11, 12, 16, 17, 18 and 19	Particulates	Bi-annually	Gravimetric

Ambient SO₂ monitoring is carried out via SO₂ diffusion tubes at 2 locations offsite (Foynes and Ballysteen).

Fugitive air emissions (particulates) are monitored via dust deposition gauges and continuous particulates monitors. There are 35 dust deposition gauges located both onsite (no. 30) and offsite (no. 5) which are monitored monthly. Dust deposition monitoring is carried out using the Bergerhoff dust deposition method with dust deposition reported in mg/m²/day. In addition, ambient dust monitoring (PM₁₀ and PM_{2.5}) using continuous Osiris particulate monitors is carried out at 5 locations (2 no. onsite and 3 no. offsite).

2. Water

Treated effluent (which is a waste water to surface water emission), sanitary effluent and storm water are monitored as tabulated below. In addition to aluminium, those metals which are monitored for are: arsenic, cadmium, chromium, copper, iron, lead, magnesium, mercury, nickel, titanium and zinc.

Parameter	Treated effluent	Sanitary effluent	Storm water
Volume	Continuous	Continuous	N/A
Temperature	Continuous	N/A	N/A
pH	Continuous	Continuous	1/month
Conductivity	N/A	N/A	1/month
BOD	4/year	4/year	N/A
Suspended solids	1/week	1/week	N/A
Soda	1/week	N/A	1/month

Parameter	Treated effluent	Sanitary effluent	Storm water
Oils, fats and greases	4/year	N/A	N/A
Organics	2/year	N/A	N/A
Toxicity	2/year	N/A	N/A
Aluminium	4/year	N/A	N/A
Other metals	2/year	N/A	N/A

Groundwater is monitored as tabulated below. Those metals analysed for are: aluminium, arsenic, cadmium, chromium, copper, iron, lead, magnesium, mercury, nickel, titanium and zinc. The organics monitored for are those associated with fuel.

Parameter	Plant observation wells	Observation wells at the BRDA	Estuarine streams	Boreholes	South pond wells	North pond wells
pH	4/year	4/year	4/year	N/A	4/year	4/year
Level	4/year	4/year	N/A	N/A	4/year	4/year
Total alkalinity	4/year	4/year	N/A	N/A	4/year	4/year
Conductivity	4/year	4/year	4/year	N/A	4/year	4/year
Chloride	4/year	4/year	N/A	N/A	4/year	4/year
Fluoride	4/year	4/year	N/A	N/A	4/year	4/year
Soda	4/year	4/year	4/year	N/A	4/year	4/year
Sulphate	4/year	4/year	N/A	N/A	4/year	4/year
Metals	2/year	2/year	4/year (Al only)	N/A	2/year	2/year
Organics	N/A	N/A	N/A	1/year	N/A	N/A

There are a number of other surface water monitoring points in the area of the BRDA, as below.

Parameter	Mangan's Lough	OPW channel	Phase 2 West Robertstown Gate	Toe Drains 1, 2 and 3	Boreholes 4 and 5
pH	1/month	1/month	1/month	1/month	1/month
Conductivity	1/month	1/month	1/month	1/month	1/month
Soda	1/month	1/month	1/month	1/month	1/month

3. Noise Emissions

Noise emissions are monitored annually by an independent external contractor at 5 specified noise sensitive locations. Refer to Section 7.5 of this Licence application for further details.

4. Waste

Waste is monitored as tabulated below. Those metals analysed for are: aluminium, arsenic, cadmium, chromium, copper, iron, lead, magnesium, mercury, nickel, titanium and zinc. Once the proposed enhanced caustic recovery process is incorporated into the existing organics control process the salt cake waste class will no longer be produced and therefore will not be required to be monitored.

Parameter	Farmed bauxite residue	Saltcake	Sand	BRDA Leachate
pH	4/year	4/year	4/year	4/year
Dry matter	4/year	4/year	4/year	4/year
Total alkalinity	4/year	4/year	4/year	4/year
Chloride	4/year	4/year	4/year	4/year
Fluoride	4/year	4/year	4/year	4/year
Soda	4/year	4/year	4/year	4/year
Metals	4/year	4/year	4/year	4/year

5. Soil

Soil monitoring is carried out every 5 years, as per Licence requirement at soil monitoring locations agreed by the Agency. Those parameters which are monitored for are: pH, total sulphate, metals, sodium and organics associated with HFO, petrol and gas oil.

6. BRDA

Monitoring of the BRDA is carried out as follows:

Location	Parameter	Frequency
BRDA embankment	Phreatic surface	4/year
	Hydrostatic pore pressure	4/year
BRDA embankment wall	Standard walk-over condition and stability checks	1/day
	Settlement / movement	4/year
	Annual review	1/year
	Independent review	1/2 years
	Formal 'Safety Evaluation of Existing Dam (SEED)' audit	1/15 years
BRDA and residue	Volume of residue disposed	Continuous
	Tonnage of residue disposed	1/month
	Used capacity	1/year
	Remaining capacity	1/year
BRDA perimeter interceptor channel	Water level	Weekly
	Quantity of seepage loss from BRDA	1/month

23. Measures to Comply with an Environmental Quality Standard

AAL has been certified to an environmental standard, ISO14001 since the year 2000 and is currently certified to ISO14001:2015 since 2017.

In addition to ISO14001 environment standard, AAL is also certified to the following management standards:

- A. ISO9001: 2015 Quality standard (certified to ISO9001 since 1995)
- B. ISO50001: 2011 Energy standards (certified since 2016)
- C. International Safety Rating System (ISRS) Advanced Level 8 (certified to Level 8 since 2002)

An EMS/QMS Manual provides an overview of the Environmental Management System (EMS). This manual outlines the approach taken to address the elements/subjects of the standard. Refer to Section 9 of this Licence application for the EMS/QMS Manual which describes how AAL complies with the environmental and quality standards.

24. Measures to Comply with Council Directive 80/68/EEC and 2006/118/EC Relating to Groundwater Protection

Measures employed at the AAL site to protect groundwater include an extensive bunding regime, where all process areas are fully bunded in accordance with licence conditions and EPA guidance. All bunds, tanks, open process drains, sumps, pipelines, ponds and sewer lines are integrity tested every 3 years in accordance with the requirements of the IE licence. The site also provides large storage ponds and spillways to allow for remote bunding of process areas with large volume storage. Ponds and spillways are all checked for integrity as part of the integrity testing schedule. Process drainage systems are visually inspected on a regular basis by each Local.

AAL continues to mitigate the risk of groundwater contamination by intercepting and recovering water from a number of Estuarine Streams, as well as other recovery wells on site. Three additional recovery wells have been installed in recent years to the east of the site as part of the groundwater improvement programme. The wells report to the East Pond to join the plant process effluent stream, which ultimately goes for treatment at the site wastewater treatment plant in Area 34. This recovery programme has resulted in pH improvements since the site baseline report which was developed in 2014.

AAL continues to make investment in environmental management by targeting priorities for plant repair and replacement identified through groundwater monitoring and integrity testing. This has resulted in significant upgrades to the site including the replacement of the A65 drain to the West Pond. This included the provision of a new stainless steel lined reinforced concrete drain, which cost in excess of €400,000. Protecting and improving the groundwater environment is a high priority for AAL.

25. Measures Taken to Minimise Pollution over Long Distances or Outside the Territory of Ireland

There are no measures required as emission of pollutants (apart from CO₂) to air from AAL are not significant and pollution over long distances has not been substantiated.

26. Main Alternatives to Proposed Technology, Techniques and Measures

1. Operation of a borrow pit.

AAL estimates that there is a requirement for c. 374,000 m³ of rock to provide for ongoing works associated with the BRDA over the lifetime of the permitted development. The importation of rock from external commercial quarries to the AAL site to facilitate the construction of the BRDA is already permitted (under Limerick County Council Reg. Ref. 05/1836; An Bord Pleanála Ref. PL13.217976). The proposed development seeks to extract rock from within the confines of the AAL landholding to reduce the dependence of the construction of the BRDA on rock sourced from commercial quarries in the local area. The extracted rock from the proposed development will be used within the confines of the AAL landholding and will not be transported off site.

The “do nothing” alternative would involve the importation of c. 374,000 m³ of rock, as permitted, to provide for the construction of the BRDA. This may have an adverse impact on the local area

through additional movements of Heavy Good's Vehicles (HGV's) on the local road network used to import rock.

There are no predicted residual impacts once mitigation measures have been successfully applied and as such alternative mitigation is not considered necessary.

2. Increase in calciner NOx ELV from 100 mg/m³ to 150 mg/m³

An increase in emission limit value (ELV) for NOx emissions from each of the 3 calciners (gas fired) is being sought.

The alternative is to retain the existing ELV of 100 mg/m³.

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27. Likely Effects for Those Changes which Required an EIAR

EIAR for Borrow Pit

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
Population and Human Health	Positive knock-on effects for indirect employment in the local community.	Whilst the proposed development will not lead to an increase in the number of workers employed directly, it will further support the development of the overall AAL facility and help to secure jobs at the facility in the long-term. Furthermore, the proposed development will ensure that the facility continues to provide positive knock-on effects for indirect employment in the local community.	Not applicable
Biodiversity (Flora and Fauna)	The loss of vegetated areas at the proposed extraction area is likely to negatively affect the general bird assemblage through reduced feeding, nesting and roosting opportunities within the operational borrow pit.	The vegetated areas in question are of moderate to low value for birds overall (small areas of dry meadow and grassy verge (GS2), scrub (WS1) and immature woodland (WS2)), and similar habitats are widely represented in the surrounding area so that many of the displaced or disturbed birds may disperse to use alternative sites in the wider area. However, removal of vegetation during the bird breeding season would have the potential to cause losses of species nesting within or adjacent to the proposed borrow pit area.	The vegetation removal at the borrow pit site will be undertaken outside of the bird breeding season (March 1st to August 31st inclusive). The area will be walked in the period directly before vegetation removal to minimise the risk of disturbance or mortality of resting mammals e.g. Irish Hare.
Biodiversity (Flora and Fauna)	Without mitigation, the removal of vegetation and rock extraction at the proposed borrow pit there	The lack of watercourses within or directly adjacent to the proposed borrow pit makes it unlikely that there are suitable breeding sites	Any pooled water in the borrow pit site should be checked in the period of February-March to record the presence of any breeding Frogs. If

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
	<p>would be potential for losses of Frogs and their spawn within the application boundary.</p>	<p>for Frogs at the site. However, during extraction there is the potential for pooled water to occur in parts of the active borrow pit, or storage areas and it is likely that there will be occasions during the operational phase when suitable breeding pools for Frogs may occur at the site.</p>	<p>spawn and/or tadpoles are present in an area that may be disturbed by the scheduled summer season blasting and operation of the borrow pit then Frogs, spawn and tadpoles should be translocated (under licence)</p>
<p>Biodiversity (Flora and Fauna)</p>	<p>The loss of scrub, immature woodland and grassland habitat during the operation of the borrow pit would be predicted to decrease the attractiveness of the area for foraging bats.</p> <p>Due to the nature, distribution and/or extent of habitats and botanical species present, operation of the proposed borrow pit will lead to a slight negative impact on existing habitats and plant species present.</p> <p>The removal of habitat to facilitate the proposed borrow pit development will result in some reduced feeding and refuge opportunities for mammal species.</p>	<p>The proposed development site lacks linear habitat features and mature trees that would be used by commuting and foraging bats. The extraction phase activities have very limited potential to disturb or displace the bats that forage at the site or commute through the site.</p> <p>Mammals will not be affected in significant numbers given the relatively small area in question and its current low value for mammals. Similar grassland and scrub-type habitats are widely represented in the surrounding landscape so that affected mammals may move into alternative sites within the wider area.</p>	<p>The boundary berm will be planted with native hedgerow species (e.g. Whitethorn, Crataegus monogyna) to provide some cover and foraging opportunities for mammals and breeding birds and connectivity and commuting features for any bat species occurring in the area.</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
Biodiversity (Flora and Fauna)	<p>The will be some additional human activity/vehicular noise during the operational phases of the proposed development</p> <p>Site lighting has the potential to attract certain bat species and displace others and floodlighting can be a significant source of disturbance for all nocturnal mammal species.</p>	Will lead to a slight increase in human activity/vehicular noise levels at the site.	Construction operations will take place during the hours of daylight to minimise disturbances to faunal species active in the nocturnal/crepuscular period.
Biodiversity (Flora and Fauna)	Any deep excavations or pooled water within the extraction area has the potential to cause a hazard or barrier to movement for mammals that are crossing this part of the AAL site.	Hazard or barrier to movement for mammals that are crossing this part of the AAL site.	Any deep excavations or areas of pooled water will be assessed to either provide escape ramps for fauna or adequate mammal-proof fencing of a minimum of 1.2m in height. Any temporary excavations will be checked on a daily basis during working periods to minimise the risk of animals becoming trapped. To allow mammals to commute across the active borrow pit site openings of 200mm will be provided in the boundary fence at intervals of 100-200m along the fenced area.
Biodiversity (Flora and Fauna)	Quarry cliffs are known as one of the preferred nesting habitat for Peregrines, where an increasing use of quarries by nesting Peregrines in Ireland has been noticed in recent decades (see Moore et al. 1997). The Peregrine Falcon may avail of the roosting or breeding habitat that is	There are a number of potential impacts on birds, including those that arise through habitat loss or degradation and disturbance. Due to the low value of the proposed extraction area for birds in general, potential impacts on birds arising from operations associated with the proposed development are considered as slightly negative in the short to medium term	The rock-face will be checked for the presence of breeding birds, including Peregrine Falcons in advance of all planned summer blasting events. If breeding birds are present in the areas scheduled for blasting, advice will be sought from a suitably qualified ecologist and/or the National Parks & Wildlife Service. In the event that a breeding Peregrine Falcon pair are present at the site and nesting activity is

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
	created through the operational phase.		identified, no blasting will be allowed to occur within 150m of the nest's location during the period of March 15th to May 31st (inclusive). An exception to these restrictions will be allowed in the event that a nesting attempt fails and the nesting adults do not retry another breeding attempt within this period; blasting activity can then resume as normal without these restrictions. No particular restrictions on operations will be required outside of the Peregrine's nesting period.
Biodiversity (Flora and Fauna)	Loss of existing vegetation and habitats.	Operations associated with the proposed extraction of limestone will result in the removal/loss of unmanaged Dry meadow and grassy verge (GS2), immature woodland (WS2) and Scrub (WS1). Overburden will be stockpiled for post-extraction restoration works. Loss of Dry meadow and grassy verge (GS2), Scrub (WS1), Immature woodland (WS2); habitats of moderate ecological value, will have a slight short to medium term negative impact on semi-natural habitat at the site. Given that semi-natural habitats present are transitional in nature and have developed as a result of previous disturbance activity including rubble/spoil deposition, Grassland (GS2) and Scrub (WS1) habitats are likely to re-establish in new areas over time.	The landscaping restoration plan will be implemented following the end of extraction operations.
Soils and Geology	The main impact on the geology will be the removal of the underlying limestone for use as	Geo-hazards - Proposed design on the Site incorporates extraction of limestone from the Site area. Geotechnical assessments will be	Mobile plant will refuel at the Site's designated refuelling areas (on the main Aughinish site);

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
	<p>an aggregate in ongoing construction and maintenance activities on the Aughinish site, to a depth which will be above the existing groundwater level.</p>	<p>conducted during extraction life. – Small adverse impact.</p> <p>Geological Heritage - Will not have an effect on heritage locality as not an unusual geological unit – negligible impact</p> <p>Economic Geology - The proposed extension will facilitate the extraction of limestone at the Site - Major Beneficial impact</p> <p>Agricultural Soils - No agricultural ground - negligible impact</p> <p>Made Ground - Topsoil and overburden/glacial till removed will be reused in the ongoing and phased restoration of the Site. Initially overburden stripped will be used in the creation of screening berms for the proposed development. Measures will be put in place to avoid pollution to groundwater from activities. – Small adverse impact.</p>	<p>Static plant or tracked excavators will refuel over a drip tray with an absorbent mat. These practices will have little or no effect on glacial till/overburden or bedrock material;</p> <p>All processing plant and/or mobile plant on the Application Site will be regularly maintained, and where plant is damaged or leaking, it will be fixed or replaced immediately;</p> <p>Top-soil and overburden will only be removed in favourable environmental conditions;</p> <p>Re-handling of the topsoil will be kept to a minimum to preserve the integrity of the material;</p> <p>Groundwater monitoring and sampling of existing boreholes will continue to be undertaken on a regular basis;</p> <p>No excavation shall take place below 8.5 m OD;</p> <p>Regular geotechnical assessments of face conditions will be conducted; and</p> <p>Presence of a qualified Health and Safety person in conjunction with specially trained blasting personnel will ensure compliance with relevant safety and statutory legislation,</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
			including industry best practices and Aughinish's own internal procedures.
Water	Topsoil and overburden removal	The topsoil and overburden stripped will be used to construct screening berms along the perimeter of the Site	Adoption of the existing Environmental Management System (EMS) and other procedures (including Health and Safety) for the Aughinish Site;
Water	Mechanical handling of materials. Processing of materials is proposed on the Site in the form of crushing (and screening) using a mobile crusher.	Extraction by blasting, primary crushing by mobile crusher, haulage of aggregate and restoration of the areas extracted will be the activities at the proposed borrow area extension.	No excavation shall take place below 8.5 m OD on the Application Site; All soil / overburden stockpiles shall be covered (i.e. vegetated) to minimise the risk of rain / wind erosion;
Water	The main potential polluting impacts associated with the proposed development are the introduction of hydrocarbons to the underlying groundwater.	Given the level of activity proposed at the Site, as long as mobile plant (and any other machinery brought on site) is properly maintained it is considered very unlikely that hydrocarbon pollution will become an issue at the Site.	Restoration of topsoil and overburden will be carried out on a <i>'phased-basis'</i> to reduce the vulnerability of the bedrock aquifer to possible contamination; Mobile plant will use the existing concrete apron at the current Site garage for refuelling. Semi-static plant (i.e. mobile crusher) or tracked excavators will refuel in-situ over a drip tray with an absorbent mat; Any processing plant and / or mobile plant on the Application Site shall be regularly maintained, and where plant is damaged or leaking it will be fixed or replaced immediately,

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
		For inspection purposes only. Consent of copyright owner required for any other use.	<p>as part of the ongoing operational management of the borrow area to reduce the risk of leaks;</p> <p>No storage of hydrocarbons will take place on the Application Site;</p> <p>An emergency spill kit (including absorbers) will be available for use in the event of an accidental spill on the floor of the borrow area;</p> <p>Water monitoring will continue to be undertaken using the monitoring boreholes, to ensure that no pollution of groundwater is occurring.</p> <p>The planning of the extraction and continuing good housekeeping during operations, by adhering to best extraction practices within the borrow area, will mitigate against potential impacts on the surrounding environment.</p>
Air Quality and Climatic Factors	Construction dust has the potential to cause local impacts through dust nuisance at the nearest sensitive receptors.	Construction activities such as excavation, earth moving and backfilling may generate quantities of dust, particularly in dry and windy weather conditions.	<p>Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.</p> <p>Furthermore, any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
		<p><i>For inspection purposes only. Consent of copyright owner required for any other use.</i></p>	<p>Vehicles exiting the main AAL site boundary shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.</p> <p>Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 25 kph, and on hard surfaced roads as site management dictates.</p> <p>Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust.</p> <p>Public roads outside the AAL site will be regularly inspected for cleanliness, and cleaned as necessary.</p> <p>Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p>During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
			inspected to ensure no potential for dust emissions.
Air Quality and Climatic Factors	There is the potential for a number of greenhouse gas emissions to the atmosphere during the demolition and construction phases of the development.	Greenhouse gas emitting sources such as construction vehicles, mobile electricity generators etc., have been considered and these may give rise to CO ₂ and NO ₂ emissions. However, due to the nature of activities CO ₂ and NO ₂ emissions will have an imperceptible, impact on climate.	Some site-specific mitigation measures can be implemented during the construction phase of the proposed development to ensure emissions are reduced further. In particular the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.
Air Quality and Climatic Factors	The impact of the proposed borrow is to increase ambient dust deposition level by a maximum of 4.9 mg/(m ² *day)	This is 1.4% of the TA Luft Limit Value of 350 mg/ (m ² *day) and has a reversible and negligible impact.	Speeds on all unpaved onsite roads are restricted to 25 km/hr
Air Quality and Climatic Factors	The impact of the proposed borrow pit is to increase ambient annual mean PM ₁₀ concentrations at the worst-case sensitive receptor location by 0.07 µg/m ³ .	This equates to significantly less than 1% of the annual PM ₁₀ limit value of 40 µg/m ³ and has a reversible and negligible impact.	Speeds on all paved onsite roads are restricted to 30 km/hr Use of watering during crushing/screening to increase moisture content and reduce dust generation potential
Air Quality and Climatic Factors	The impact of the proposed borrow pit is to increase ambient annual PM _{2.5} concentrations at the worst-case sensitive receptor by 0.02 µg/m ³ .	This equates to less than 1% of the annual limit value of 25 µg/m ³ and has a reversible and negligible impact.	Internal haul roads are watered twice daily on dry days Mitigation measures in relation to vehicle-derived pollutants from the HGV's and other vehicles have focused generally on improvements in both engine technology and fuel quality.

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
Air Quality and Climatic Factors	There is the potential for a number of greenhouse gas emissions to atmosphere from the proposed borrow pit plant and trucks.	Borrow Pit vehicles, generators etc., may give rise to CO ₂ and NO ₂ emissions. However, due to the size and nature of the activities at the proposed borrow pit, the CO ₂ and NO ₂ emissions will have a negligible impact on climate. Greenhouse gas emissions, as a result of the Borrow Pit, are imperceptible in terms of Ireland's obligations under the Kyoto 2020 Commitment	No site specific measures proposed. National measures and EU legislation promote reduction of climate impacts due to vehicles and machinery.
Noise and Vibration	During the construction phase, the range of activities with potential to generate noise and Vibration emissions to off-site sensitive receptors will include site preparation works, construction of the proposed earth bund at the development boundary, internal road construction and erection of any temporary buildings/compounds that may be required.	Potential to generate noise and vibration emissions to off-site sensitive receptors <i>For inspection purposes only. Consent of copyright owner required for any other use.</i>	<p>Whilst construction noise and vibration impacts are expected to be minimal and well within the criteria set out in this document, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure emissions to external noise sensitive locations are not significant.</p> <p>The mitigation measures are:</p> <ul style="list-style-type: none"> Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted Establishing channels of communication between the contractor/developer, Local Authority and residents; Appointing a site representative responsible for matters relating to noise and vibration; Monitoring levels of noise during critical periods and at sensitive locations;

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
			<p>Maintaining site access roads even so as to mitigate the potential for vibration from lorries. Selection of plant with low inherent potential for generation of noise and/ or vibration</p> <p>Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include: Erection of barriers as necessary around items such as generators or high duty compressors; Situate any noisy plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.</p>
Noise and Vibration	During the operational phase, the potential significant sources of noise and vibration are those associated with rock removal (i.e. blasting activities, crushing of rock and any other rock breaking that may be required), as well as vehicular movement to, from and within the site.	Potential to generate noise and vibration emissions to off-site sensitive receptors	<p>The same general noise and vibration mitigation measures outlined in relation to the construction phase are proposed in order to control operational phase noise and vibration emissions. If rock breaking is employed, the following are examples of measures that will be considered in order to mitigate noise emissions from these activities:</p> <p>Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency. Ensure any leaks in air lines are sealed. Use a dampened bit to eliminate ringing. Erect acoustic screen between compressor or generator and noise sensitive area. When</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
		<p style="color: red; text-align: center; transform: rotate(-45deg); font-style: italic;">For inspection purposes only. Consent of copyright owner required for any other use.</p>	<p>possible, line of sight between top of machine and reception point needs to be obscured. Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation.</p> <p>A method statement will be produced by the developer to ensure that the noise, vibration and air overpressure impacts of blasting operations are minimised. Monitoring of air overpressure levels will be carried out at a position representative of the nearest residential dwellings during blasts to ensure that acceptable levels are not exceeded.</p> <p>Other practical methods to reduce air overpressure are set out below.</p> <p>Restriction of hours within which blasting can be conducted (e.g. 08.00 to 18.00 hours Monday to Friday).</p> <p>A public information campaign undertaken before any work and blasting starts (e.g. 24-hour written notification).</p> <p>The firing of blasts at similar times to reduce the 'startle' effect.</p> <p>On-going circulars informing people of the progress of the works.</p> <p>The implementation of an onsite documented complaints procedure.</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
		<p style="color: red; text-align: center; transform: rotate(-45deg); font-style: italic;">For inspection purposes only. Consent of copyright owner required for any other use.</p>	<p>The use of independent monitoring by external bodies for verification of results.</p> <p>Ensuring appropriate burden to avoid over or under confinement of the charge.</p> <p>Trial blasts to assist in blast designs and identify potential zones of influence.</p> <p>Specific to blasting, the following mitigation measures will be employed in order to control vibration impact during blasts:</p> <p>Restriction of hours within which blasting can be conducted (e.g. 08.00 to 18.00 hours Monday to Friday).</p> <p>A public information campaign undertaken before any work and blasting starts (e.g. 24-hour written notification).</p> <p>Trial blasts will be undertaken to obtain scaled distance analysis;</p> <p>Ensuring appropriate burden to avoid over or under confinement of the charge;</p> <p>Accurate setting out and drilling;</p> <p>Appropriate charging;</p> <p>Appropriate stemming with appropriate material such as sized gravel or stone chipping;</p> <p>Delay detonation to ensure small maximum instantaneous charges;</p> <p>Decked charges and in-hole delays;</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
			<p>Blast monitoring to enable adjustment of subsequent charges;</p> <p>Good blast design to maximise efficiency and reduce vibration;</p> <p>Avoid using exposed detonating cord on the surface.</p>
<p>Landscape and Visual Impact</p>	<p>Potential landscape and visual impacts arising from the proposed development include direct and indirect impacts. Direct impacts, in general, will include excavation of soil and rock from the site, and may also include visibility of exposed excavation faces and the proposed perimeter berms and planting from beyond the site. Indirect impacts, in general, may include temporary or short-term visibility of construction activity on the site.</p> <p>It is noted that the majority of the development including excavation, crushing, stockpiling and haulage activities, will occur at the reduced level of the former and proposed borrow pit. The presence of extractive activity and extraction related vehicles at the existing ground level will be</p>	<p>Direct landscape impacts are considered to be moderate, neutral and permanent.</p> <p style="color: red; transform: rotate(-45deg); font-size: small;">Consent of copyright owner required for any other use. For inspection purposes only.</p>	<p>The proposed scheme incorporates inherent mitigation as the majority of construction activity, as well as the final development, is at a reduced level relative to the existing ambient ground levels, and therefore will be self-screening by its nature.</p> <p>The proposed development includes the early stage establishment of planted perimeter berms that will serve to mitigate at-grade construction activity, and also to provide a longer term integration within the immediate and wider landscape context. The planted perimeter berms will also provide early stage screening from the portion of the nature trail that extends from the former borrow pit and where the tow borrow pits will join.</p> <p>Construction activity will be both at-grade and also at the reduced level of the borrow pit. At-grade construction will be temporary as topsoil is stripped and perimeter berms are formed. The early establishment of berms and proposed planting will mitigate subsequent temporary at-</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
	<p>limited to the initial soil stripping of the site and establishment of the perimeter berms, and temporarily in preparation of sequential phases for excavation.</p>	<p style="color: red; text-align: center; transform: rotate(-45deg); font-style: italic;">Consent of copyright owner required for any other use. For inspection purposes only.</p>	<p>grade activity as new phases of the development are prepared for excavation. Activity at the reduced level of the borrow pit has inherent mitigation by virtue of being at the lower level of the borrow pit. For the most part, this activity will not visible from beyond the development site itself.</p> <p>Upon cessation of extraction activity, a landscape restoration plan will be implemented so as to enhance the landscape and ecological value of the resulting borrow pit.</p> <p>Soil pockets will be established at the toe of the excavations, and localised areas of the base level of the borrow pit will be filled with topsoil. These areas will be planted with native species including Willow, Alder, Birch Hawthorn and Blackthorn. Additionally, dry calcareous type grass will naturally establish over much of the rest of the borrow pit base.</p>
<p>Traffic and Transportation</p>	<p>In the 'Do Something' scenario rock will be sourced from the borrow pit within the AAL site. As a result, heavy vehicle traffic volumes will be reduced in comparison to the 'Do Nothing' scenario. Light vehicle trips will however increase slightly, as staff would be expected to travel to</p>	<p>No material impact upon the operation of the local road network</p>	<p>As the proposed development will have no material impact upon the operation of the local road network, no mitigation measures are proposed.</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
	the site to carry out quarry related tasks at the borrow pit.		
Archaeological, Architectural & Cultural Heritage	Due to the disturbed nature of the proposed development area no adverse impacts are predicted upon the archaeological, architectural or cultural heritage resource during the construction and operation of the proposed development.	N/A	N/A
Waste Management	There is no construction required for the proposed Borrow Pit as it is merely the extraction of the existing rock resource and as such there will no associated waste management impacts. Any waste generated during the demolition of the contractors shed will be dealt with through a licenced waste facility.	N/A	N/A - However, appropriate security and signage should be erected around the entrance to and along the boundaries of the area in order to deter and prevent illegal fly-tipping of waste materials by third parties and any illegal dumping of any nature on the site.
Waste Management	The proposed Borrow Pit will not result in any changes from the current position with regard to waste management at the AAL facility.	<p>The waste management system currently in place at AAL will continue to accommodate any residual waste that may arise as a result of the proposed works and it will also continue to address any wastes generated in the production process at the site.</p> <p>The waste arising from the proposed development when fully operational will not have an adverse impact on the environment.</p>	<p>All waste arising will be handled according to the existing waste management procedures at AAL. These procedures outline the methodologies for the handling, segregation, storage and disposal of all wastes that will arise during the proposed development. The procedures should as a minimum ensure that activities at the proposed site are carried out in such a manner so that</p> <p>1. Minimal waste will be generated</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
		<p style="color: red; text-align: center; transform: rotate(-45deg); font-style: italic;">Consent of copyright owner required for any other use. For inspection purposes only.</p>	<p>2. Maximum recycling/reuse of waste will be ensured</p> <p>3. All waste will be handled and contained in a safe manner</p> <p>4. All disposal of waste off-site will be carried out by a licensed contractor and will present no risk to the environment.</p> <p>All waste generated on site will be removed to the existing segregated facility within the Applicants landholding, as detailed below:</p> <ol style="list-style-type: none"> 1. Waste oils / greases / paints (to be contained within an impermeable structure) 2. Wood 3. Plastics 4. Glass 5. Cardboard / Paper 6. Domestic refuse 7. Metal 8. Contaminated soil (generated by oil spills etc.) 9. Waste aggregate materials segregated into different size categories <p>All segregated wastes will be reused where possible or sent for reuse or recycling by a suitable contractor. Licenced waste contractors for the site will be employed to ensure that waste materials which cannot be reused or</p>

Environmental Factor	Likely effects identified	Brief description of effect	Mitigation measures proposed to control effects
			recycled at AAL are collected and correctly recovered or disposed of to a licensed waste facility.

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