EIA Report for Development for Further Replacement of Fossil Fuels with Alternative Fuels and Alternative Raw Materials

VOLUME 2 – MAIN REPORT

BSM
Est. 1968
Brady Shipman Martin
Built. Environment.

Contents

1 Introduction

1.1 Introduction

Irish Cement Limited (ICL) is applying to An Bord Pleanála (ABP) for a ten year planning permission for development for the further replacement of fossil fuels with alternative fuels and for the use of alternative raw materials at their Cement Works in Platin, County Meath. Platin Cement Works already has permission for the use of up to 120,000 tonnes per annum of alternative fuels and the additional fossil fuel replacement will be achieved, progressively over time, by expanding the quantity and range of alternative fuels used at the Cement Works. The application also seeks permission to introduce alternative raw materials to the cement production process and when combined, seeks permission for an additional 480,000 tonnes of alternative fuels and alternative raw materials per annum.

A number of new buildings and structures will be provided within the existing Cement Works for the receiving, storage, handling and introduction of the alternative fuels and alternative raw materials. No processing of fuels will take place on site and no residues will arise from this development. The application site, which extends to 22.5 hectares is located within the footprint of the existing Cement Works.

The activity is regulated under the terms of an Industrial Emissions (IE) license (No. P0030-04) issued and monitored by the Environmental Protection Agency (EPA). This licence limits and controls emissions from the Cement Works. The proposed changes will necessitate an application to the EPA to review the current IE license.

1.2 The Applicant

Irish Cement Limited (ICL) is the leading supplier of cement in Ireland where it has operated for over seventy seven years. The company, which maintains its headquarters at Platin County Meath, is part of the CRH Group, one of the world's leading building materials companies with its global head office in Dublin. ICL supplies cement products to both the domestic construction market and also exports cement products to markets in Europe.

Irish Cement operates two cement production facilities, one located at Platin, County Meath and a second at Castlemungret, County Limerick. The company is a major contributor to Ireland's economy with over 200 people employed directly, and additionally supports an estimated seven hundred indirect jobs.

The history of Irish Cement extends back over 77 years and during that time the company has continuously invested in new technology and processes to improve the sustainability of their operations. The most recent sustainability projects involved the installation of energy efficient equipment; the manufacture of eco-efficient CEM II cement; and the replacement of a portion of fossil fuels at Platin with up to 120,000 tonnes per annum of alternative fuels. In addition, Irish Cement recently received planning permission to produce up to 25% of the electrical energy needs of the Platin facility by harnessing waste heat arising on site (refer Meath County Council (MCC) Planning Ref.: LB150279).

As the company's operations have consistently developed to satisfy market demands, Irish Cement continues to invest in improved environmental performance across all of its operations. The company has adopted the International Quality Standard ISO 9001 which it uses to actively improve its quality management system. The company's cement products are independently certified by NSAI and carry the 'CE' marking. The company has also adopted ISO 14001 which is an internationally accredited environmental management system (EMS). The company's EMS has also been independently certified as complying with ISO 14001.

This on-going investment is critically important for enhancing the quality, competitiveness and capacity of cement production to meet the demand of both home and export markets. At Platin, this has seen an investment of over €200 million in recent years, with the provision of a new highly efficient Kiln (Kiln 3) in 2008; and the part replacement of fossil fuels with more environmentally sustainable alternative fuels produced from residual waste to a defined specification in Ireland (refer MCC Planning Refs.: SA/803066, as varied by SA120301).

Today, in addition to supplying a range of special cementitious products for specific customer requirements, Irish Cement produces a range of cements to Irish and International Standard Specifications, including:

Normal Cement (both in Bulk & Bagged form – CEM II/A-L): is high-quality general purpose 'eco-efficient' cement suitable for most applications. The product has been specifically designed to reduce the carbon intensity of cement production and is certified to BES 6001 for responsible sourcing and sustainability.

Rapid Hardening Portland Cement (CEM I): (RHPC) is special purpose cement used in concrete to achieve a higher rate of early strength development, when compared to Normal Cement. This cement is also and is certified to BES 6001 for responsible sourcing and sustainability.

Sulfate-resisting Portland Cement: (SRPC) is special purpose cement used where sulfates are present.

1.3 Planning Context and Background to Proposed Development

1.3.1 Strategic Infrastructure Development

The provisions of section 37A of the Planning and Development Act 2000, as amended ("the 2000 Act"), require an application for permission in respect of development to facilitate the further use of up to an additional 480,000 of alternative fuels and use of alternative raw materials to be made directly to An Bord Pleanála ('the Board') under Section 37E, in circumstances where the Board has determined that the Proposed Development would be strategic infrastructure within the meaning of section 37A of the Planning and Development Act 2000, as amended.

An Bord Pleanála has notified Irish Cement Ltd. and Meath County Council (the planning authority) that development to facilitate further replacement of fossil fuels with alternative fuels and the use of alternative raw materials is of a class specified in the Seventh Schedule to the Act and falls within one of the paragraphs of section 37A (2) as detailed in Appendix 1.1. Accordingly, the application for permission is being made directly to the Board.

The 2000 Act details that pre-application consultations with the Board shall form part of the process leading to the Board's determination that an application for permission should be made directly to the Board. In compliance with this and in preparation of the planning application and this EIA Report, Irish Cement Ltd. and Brady Shipman Martin engaged in a number of pre-application consultation meetings, between August 2016 and May 2017.

1.3.2 Duration of Planning Permission

Irish Cement Ltd. is taking a strategic long-term view of their fossil fuel replacement programme at Platin Cement Works. The introduction of any new alternative fuel to the cement works requires that Irish Cement obtains appropriate planning permission; receives the necessary consent from the EPA; sources the appropriate alternative fuel (which must meet specified requirements); and provides the associated site handling and fuel introduction infrastructure. In addition, the company must enter an extended and gradual fuel introduction programme, which is monitored by the EPA in line with the requirements of the facility's IE Licence. For these reasons, it can take many years to successfully introduce a new alternative fuel to the Cement Works, and therefore, it is critical that a long-term and flexible approach be facilitated for the use of alternative fuels. Therefore it is considered appropriate that a ten year permission is sought for the development which is seen as essential to the proper and sustainable planning of the facility as a whole.

1.3.3 Environmental Impact Assessment Report

The Environmental Impact Assessment Report (EIA Report) has been prepared by Brady Shipman Martin, with specialist input from other consultants, on behalf of Irish Cement Ltd. As noted in Department Circular PL 1/2017[1], the EIA Report follows the requirements of EIA Directive (2014/52/EU) and has had regard to original EIA Directive

[1] Circular Letter PL 1/2017. Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on Administrative Provisions in Advance of Transposition. (Department of Housing, Planning, Community and Local Government, 2017)

(85/337/EC), as amended by Council Directives 97/11/EC; 2003/4/EC; and 2009/31/EC – as codified in Directive 2011/92/EU).

The purpose of the EIA Directive is to ensure that projects likely to have significant effects on the environment are subject to a comprehensive assessment of environmental effects prior to development consent being given. The EIA Directive is transposed into the Irish land-use planning consent system by way of the Planning & Development Act 2000 (as amended) and the Planning & Development Regulations 2001 (as amended).

The EIA Report has been prepared with regard to requirements of EIA Directive (2014/52/EU) and the following principal EIA Guidance documents have been consulted in the preparation of this EIA Report. Other documentation reviewed in the preparation of this EIA Report are noted in the individual chapters, as appropriate.

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effect of certain public and private projects on the environment.
- Circular Letter PL 1/2017. Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on Administrative Provisions in Advance of Transposition. (Department of Housing, Planning, Community and Local Government, 2017).
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems: Key Issues Consultation Paper. (Department of Housing, Planning, Community and Local Government, 2017).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003)
- Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002)
- Revised (Consultation Draft) Advice Notes for preparing Environmental Impact Statements (EPA 2015).
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2017)
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoECLG, 2013)

1.4 Reason for the Proposed Development

The cement industry in Europe has used alternative fuels for more than 30 years to directly replace conventional fossil fuels, to conserve non-renewable resources, and to reduce emissions to the environment. The utilisation of wastes in the cement industry, principally as alternative fuels, but also as alternative raw materials, is also compatible with the general principles of waste management. In addition, the importance of the use of wastes both as alternative fuels and as an alternative raw materials is specifically noted in the European Commission JRC Reference Report on Best Available Techniques (BAT) for the Production of Cement, Lime and Magnesium Oxide[2] (*prepared under the Industrial Emissions Directive 2010/75/EC*).

Many of the same alternative fuels used around Europe like SRF, waste oils, tyres, solvents and sewage sludges are also available locally in Ireland. With this application, Irish Cement Ltd. wishes to plan a programme of further replacement of fossil fuels with alternative fuels to both Kiln 2 and Kiln 3 so as to build on the success achieved to date and to further enhance the sustainability of the operations at Platin.

Currently, Platin Cement Works has planning permission and an Industrial Emissions (IE) Licence to use up to a combined maximum of 120,000 tonnes per annum of three alternative fuels, *i.e.* Solid Recovered Fuels (SRF), Chipped Used Tyres and Meat and Bone Meal (MBM). During 2016, Platin Cement Works reached its permitted maximum limit of 120,000 tonnes for the use alternative fuels in Kiln 3. However, the works also required the importation of over 61,500 tonnes of imported fossil fuel in order to meet the fuel demand for cement production. These figures relate to 2016 fuel requirements, where Kiln 3 is operating below maximum output and where Kiln 2 is currently not operational. With demand growing and the use of alternative fuels currently restricted, the need for an increasing fuel requirement can only be met by increased importation of fossil fuels.

[2] http://eippcb.jrc.ec.europa.eu/reference/BREF/CLM_Published_def.pdf

If Platin Cement Works were to run at full output, it is estimated that c.220,000 tonnes of imported fossil fuel would be required on top of the existing permitted quantity of 120,000 tonnes of alternative fuels. Therefore, this existing limit on the use of alternative fuels places a significant restriction on the ability of the Cement Works to use lower carbon alternative fuels to both reduce its use of imported fossil fuels and to maintain and enhance the sustainability of its operations at Platin.

Enhanced sustainability with alternative fuels will not only reduce dependency on imported fossil fuels and reduce CO_2 emissions but will also benefit the wider community benefits through the provision of an effective and energy efficient alternative to landfill or export for residual wastes. In addition, the proposed use of alternative fuels and alternative raw materials will also serve to underpin the competiveness and efficiency of the operations in Platin.

1.5 Platin Cement Works and Site for Proposed Development

Platin Cement Works is located southwest of the junction between the R152 Drogheda to Kilmoon Cross Regional Road and Platin County Road CR311, circa 0.75km southwest of Junction 8 (Drogheda South) on the M1 Dublin Belfast Motorway – refer to Figure 1.1.

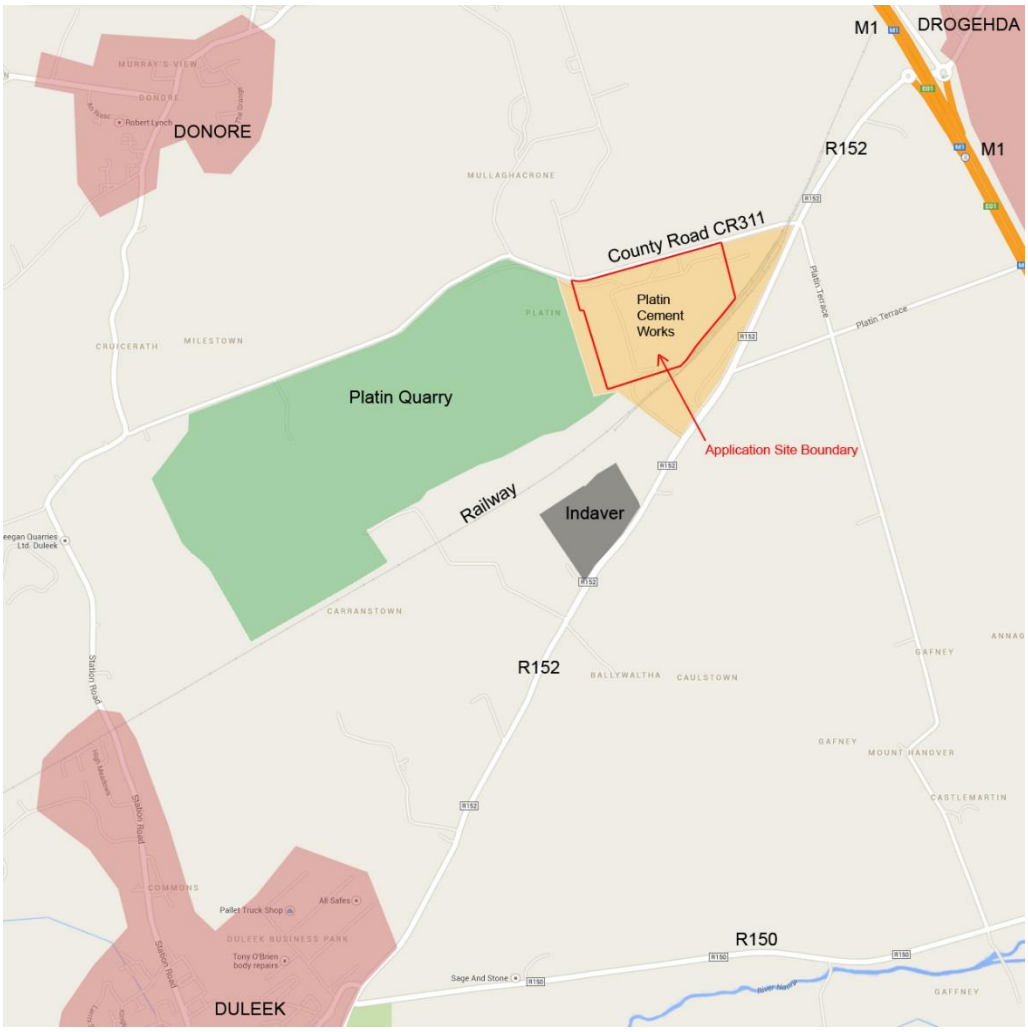


Figure 1.1 Platin Cement Works and Site Context

The Cement Works extends to circa 40 hectares and limestone – the primary raw material used in the cement-making process at the facility – is extracted from Irish Cement's adjoining quarry. The Cement Works is divided in two by the Drogheda-Navan railway, with the main cement production area located north/northwest of the railway and with the cement dispatch / output area, ESB Sub-station and Irish Cement offices located to the south/southeast. The application area for the Proposed Development extends to circa 22.5 hectares located within the main cement works area to north/northwest of the railway – refer to Figure 1.1.

The cement works at Platin includes two cement kilns, namely Kiln 2 and Kiln 3. In early 2015, permission was granted for the demolition of the previously decommissioned Kiln 1 (refer MCC Planning Ref.: LB 140961). Kiln 2 is currently not operational.

1.6 Outline of Proposed Development

The Proposed Development will allow Platin Cement Works to further replace fossil fuel use and to use alternative raw materials to replace a portion of traditional raw materials used in the manufacture of cement. Subject to their availability, providing flexibility for a gradual increase in the quantity and range of alternative fuels used over time will significantly reduce reliance on imported fossil fuels. The application also seeks to use alternative raw materials for the cement-making process.

In total the Proposed Development will allow for the use of an additional 480,000 tonnes per annum of alternative fuels and for the use of alternative raw materials, which when taken with existing permitted alternative fuel use, gives flexibility for a combined overall maximum annual total of 600,000 tonnes per annum. In the scenario where maximum fossil fuel replacement is achieved, a small quantity of fossil fuel – c.10,000 tonnes per annum – will continue to be used for the initial firing of kilns (*i.e.* at start-up, or after maintenance stops) or as buffer fuel stock.

Irish Cement proposes to introduce a range of lower carbon alternative fuel types to the cement manufacturing process that are regarded as suitable for alternative fuel usage under the EPA licensing regulations. These alternative fuels can be characterised into broad categories of material:

- fine solids* (*e.g.* SRF, chipped timber, shredded plastics);
- coarse solids (*e.g.* shredded wood, rubber, dry filter cakes);
- 'free-flowing' solids (e.g. secondary liquid fuels (SLF), waste oils, sludge);
- pumpable fluids (*e.g.* solvents, distillation residues) and
- Whole Tyres

* *Fine solids, in the form of SRF, are already in use as an alternative fuel in Kiln 3 at Platin Cement Works.*

Development of the proposed list of alternative fuels has been informed by consultation with Swiss and German Environmental guidelines for their respective cement industries and by consulting existing permissions for the use of alternative fuels by another cement manufacturing facility in Ireland.

The Proposed Development also seeks permission to allow for the introduction of alternative raw materials. These materials – mainly mineral wastes – will replace a proportion of traditional raw materials used in cement production. The quantity of proposed alternative raw materials is accommodated within the additional 480,000 tonnes per annum of alternative fuels and alternative raw materials sought.

As noted, a gradual fuel replacement strategy is proposed in order to phase out the current reliance on imported fossil fuels. This strategy, which is supported the Environmental Protection Agency, envisages short, medium and longer-term investments that would be developed in line with planning and IE licence requirements. This long-term strategic approach to alternative fuels is seen as being beneficial for a number of reasons, in that it:

- avoids the requirement for multiple planning applications for sequential increases in alternative fuel / new structures use over time;
- allows for a complete and full environmental assessment of the activity;
- allows for a more streamlined approach to environmental licencing (IE Directive) – an approach that is strongly supported by the EPA;
- allows for long-term investment planning in the cement works;
- provides confidence and support to market development; and
- underpins current and envisaged employment.

1.7 Proposed Buildings and Structures

The Proposed Development will require the provision of a number of additional buildings and structures, to be delivered on a gradual basis in line with the progressive introduction of alternative fuels over time. All of these buildings and structures are located within and around the existing developed footprint of the cement facility. The development will also provide for associated conveyers, conveyor support structures, short extensions to existing roads, hard-standing around proposed buildings and additional landscape planting, refer to Figure 1.2. The Proposed Development is described in detail in Chapter 3 of this EIA Report.

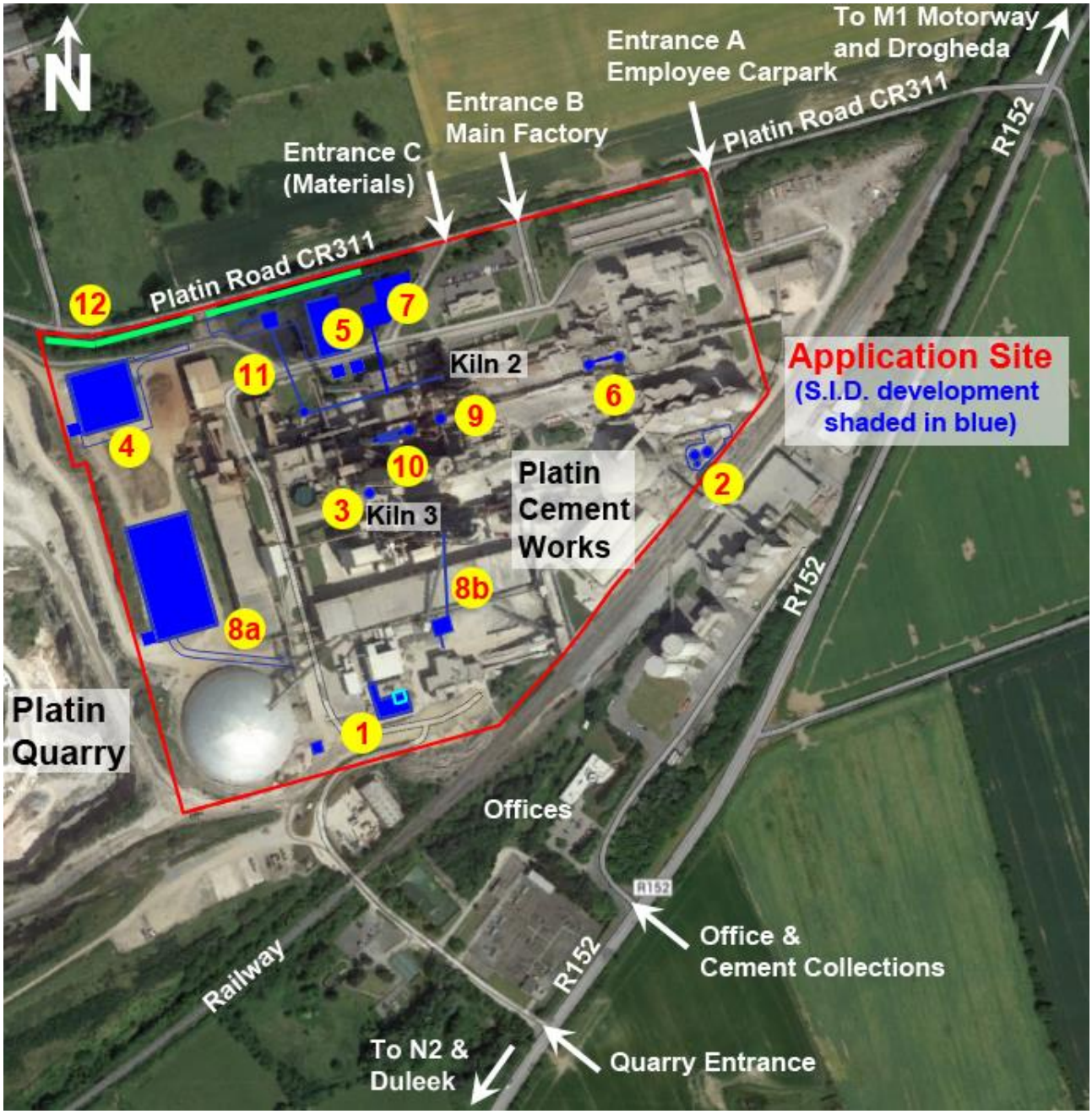


Figure 1.2 Application Site outlined in Red. Proposed Development shaded in blue.

1.8 Scoping and Consultation

In June 2016, Irish Cement Ltd. initiated pre-application consultations with An Bord Pleanála under Section 37B of the Planning and Development Act 2000, as amended (refer to An Bord Pleanála File Ref: 17.PC0221). During the course of these consultations, the proposed application was discussed at four meetings held on 26th July 2016, the

15th November 2016, the 21st December 2016 and 21st March 2017. Details of the consultations are available on the Board's website (http://www.pleanala.ie)

An Bord Pleanála formally responded to Irish Cement Ltd. on the 8th May 2017 indicating that the Proposed Development would be strategic infrastructure, within the meaning of Section 37(A) of the Planning & Development Act 2000, as amended (refer to An Bord Pleanála letter in Appendix 1.1). Consequently, this application is made directly to An Bord Pleanála in accordance with the requirements of Section 37E of the Planning and Development Act 2000, as amended.

1.8.1 Scoping Consultations

Scoping is the process of determining the content and extent of topics to be covered in the Environmental Impact Assessment. In this regard, a scoping letter outlining details of the Proposed Development and inviting comment on the Proposed Development and scope of the environmental assessment was circulated, by email and/or post, to the relevant authorities on the 10th February, 2017.

A copy of the scoping consultation letter together with a list of the stakeholders contacted, and a copy of responses received are provided in Appendix 1.2. Responses were received from the following bodies:

Irish Water

Irish Water responded on the 23rd February 2017 providing general advice that should be considered within the scope of the EIS (EIA Report) where relevant. As there is no connection to the public water supply or foul water network in Platin and no connection is required for the Proposed Development, aspects relating to water services are not relevant to the proposed application. However, any water considerations relevant to the proposed application are comprehensively considered in Chapter 7 Water & Hydrology of the EIA Report.

Health Service Executive (HSE)

The scoping response from the HSE provide a list of documents to be considered in the preparation of the EIS (EIA Report) and recommended the consideration of the new draft guidelines. The Environmental Health Service (EHS) made the following recommendations for consideration of inclusion in EIA:

- Discharges from the site to surface and ground water, both during construction and subsequent operation. The EIA should consider the protection of ground and surface water during the use of construction machinery, storage of chemicals and fuels and protection from silting and Petro-chemical contamination due to run off from the site during construction.
- Emissions to air, particularly dust, during the construction phase. The EIA should identify a construction dust minimization plan that incorporates current good practice in this area.
- The EIA should consider any effects from the additional storage capacity required for the increased use of the intended fuels, including an assessment on any potential effects from odour and noise and effects from increased traffic movements. The EIA should identify if separate storage and/or segregation is required.
- Noise and vibration during construction and operation should be assessed. The EHS considers the significance of noise effects are due to the change in the noise environment and not a comparison against an absolute noise level.

In accordance with the relevant guidelines and recommendations of the EHS, these considerations have been assessed in detail in the relevant chapters of the EIA Report.

Transport Infrastructure Ireland (TII)

TII responded with a list of recommendations and general guidance for the preparation of the EIS (EIA Report). These recommendations were as follows:

- Consultation should be had with relevant Local Authority/National Roads Design office with regard to locations of existing and future national road schemes including but not limited to the Leinster Orbital Route.

- TII would be specifically concerned as to potential impacts the development would have on the national road network and junctions in the proximity of the development.
- The developer should assess visual impacts from existing national roads.
- The developer should have regard to any EIS and all conditions and/or modifications imposed by An Bord Pleanála regrading road schemes in the area. The developer should in particular have regard to any potential cumulative impact.
- The developer should have regard to the TII publications
- The developer should have regard to TII's Environmental Assessment and Construction Guidelines, including the Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes
- The EIS should consider the Environmental Noise Regulations 2006 (SI140 of 2006 and in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers
- It would be important that, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network.
- The designers are asked to consult TII publications to determine whether Road Safety Audit is required. In the interests of maintaining the safety and standard of the national road network, the EIS should identify the methods/techniques proposed for any works traversing/in proximity to the road network.
- In relation to haul route identification, the applicant should clearly identify haul routes proposed and fully assess the network to be traversed. Separate structure approvals/permits and other licences may be required in connection with the proposal haul route and all structures on the haul route should be checked by the applicant and developer to confirm their capacity to accommodate any abnormal load proposed.

In accordance with the relevant guidelines and recommendations of the TII, these considerations have been assessed in detail in Chapter 12 Traffic and Transportation of the EIA Report.

In addition to the above scoping consultations, on-going consultations have also taken place on a regular basis with a number of statutory consultees dating back to February 2015. These are detailed in Table 1.1 below.

Table 1.1: Additional Meetings with Statutory Consultees

Consultations	Dates of Consultations
Meath County Council: Planning, Environment, Roads and Conservation Departments/Sections	17th February 2015
	10th April 2015
	11th February 2016
	14th June 2016
	7th June 2016
	24th August 2016
Environmental Protection Agency	19th February 2015
	11th February 2016
	7th December 2016
Eastern - Midlands Regional Waste Authority	3rd October 2016
Louth County Council	21st December 2016

1.8.2 Consultation Stakeholder Engagement

In recognising the importance of community engagement, consultations on the proposed further replacement of fossil fuels with lower carbon alternatives and the use of alternative raw materials have been on-going since 2015. As part of this engagement, Irish Cement consulted with its employees, elected representatives, general public and interested parties regarding its plans for development.

In 2015, following initial discussions with employees and elected representatives, Irish Cement Limited distributed copies of an Information Booklet on the Proposed Development to local residents together with a letter providing

further information on the Proposed Development and offering an invitation to attend a Project Information Day at Platin Cement Works. Where dates did not suit, an opportunity was also offered for members of the public or for other interested parties to arrange a separate meeting. The Public Information days were held over three days in October 2015.

During the preparation of the current application, Irish Cement Limited carried out further consultations with elected representatives, neighbours, the general public and interested parties. An updated Information Booklet and letter was issued to neighbours and local residents and to those who had previously made submissions to the initial planning application to Meath County Council. Public Information Days were held for a further three days between Thursday 2nd March 2017 and Saturday, 4th March 2017. Notification of these Public Information Days was published in advance in two local papers, the Drogheda Independent and the Meath Chronicle and broadcast on LMFM local radio station. A copy of the Information Booklet issued to the local residents and interested parties is provided in Appendix 1.3. A copy of the newspaper notice advertising the Public Information Days is also included in Appendix 1.4.

A total of 27 visitors attended the Public Information Day over the course of the three days. The main topics discussed on these visits were traffic, emissions, health, landscaping and contributions by Irish Cement Limited to community projects.

Following the completion of these Information Days, Irish Cement Limited continued to be available for additional meetings with interested parties to discuss the Proposed Development.

1.8.3 Consultation undertaken as part of previous application to Meath County Council

As previously outlined, in November 2015, Irish Cement lodged a broadly similar planning application with Meath County Council. As the application progressed through the planning system, a total of 37 observations were lodged, a number of which supported the proposed application. A number of concerns were also raised in the submissions, the principal points of which can be summarized as follows:

- Concerns regarding roads and/or traffic
- Establishment of Community Fund
- Quantity of waste and specification of fuels
- Health-related concerns and concerns relating to Air Quality and emissions
- Nature of Public Consultation
- Potential effect on Brú na Bóinne and Tourism
- Strategic Infrastructure Development
- Other points

The principal issues were raised primarily by members of the public and in response to this, further clarification on these particular issues were provided in a Further Information Response lodged to Meath County Council. The submissions lodged for the previous application have informed the current application and the principal issues raised have been comprehensively responded to within the relevant sections of the EIA Report to address concerns previously held by the public.

1.9 EIA Report Project Team Responsibilities

The contributors responsible for completion of the EIA Report for the Proposed Development are listed in Table 1.2. Further details regarding project team members are outlined below.

Contributor	Principal Staff Involved	EIA Report Input
Brady Shipman Martin Canal House, Canal Road,	**Thomas Burns** B.Agr.Sc. (Land.), Dip. EIA. Mgmt., MILI.	EIA Report Project Manager, Co-ordination and editing. Scoping and Consultation EIA Chapter 1 Introduction;

Contributor	Principal Staff Involved	EIA Report Input
Dublin 6	**Pauline Byrne** MRUP, BSc Mgmt. Dip. Marketing Tech. MIPI MRTPI **Sorcha Turnbull**, BSc Spatial Planning, Dip EIA & SEA Mgmt., MIPI MRTPI **Linda O'Grady** B.Arts, MPLAN MIPI. **Matthew Hague** C.Env MCIEEM, Consultant Ecologist	Chapter 2 Policy Background; Chapter 3 Project Description; Chapter 4 Section 4.1: Population; Chapter 10 Landscape and Visual; Chapter 13 Material Assets; Chapter 15 Interaction of the Foregoing. Chapter 5 Biodiversity (Flora and Fauna);
Arup, 50 Ringsend Road, Dublin 4	**Jaime Bevin** (BSc (Tech), MSc (Hons), CEng **Cormac McKenna** BEng MSc Environmental Engineering **Sinead Whyte** MSc (atmospheric physics) BSc, CIWEM **Conor McGrath** BAI Civil, Structural and Environmental Engineering **Janet Lynch** BE CEng MEI CIWM **Don Menzies** BE, BComm, BL, PhD DipLegalStudies, DipIntArb CEng,CEnv	Chapter 6 Land, Soils and Geology and Hydrogeology; Chapter 7 Water; Chapter 8 Air & Climate; Chapter 9 Noise & Vibration; Chapter 12 Traffic and Transportation; Chapter 13 Waste Management Appendix 4.1 Human Health Risk Assessment
Dr. Martin Hogan Corporate Health Ireland (Cork)	**Dr. Martin Hogan** MB. BCh BAO, Dip. Child Health, Dip. Obstetrics	Chapter 4 Section 4.2: Human Health
Dr. Charles Mount Archaeology and Cultural Heritage	**Dr. Charles Mount** MA Archaeology, PhD Archaeology, Dip. EIA & SEA Mgmt.	Chapter 11 Cultural Heritage

1.10 References

Environmental Protection Agency (2003). 'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements'. EPA, Wexford.

Environmental Protection Agency (2002). 'Guidelines on Information to be contained in Environmental Impact Statements. EPA, Wexford.

Environmental Protection Agency (2017). 'Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports.' EPA, Wexford.

Environmental Protection Agency (2015) 'Consultation Draft Revised Advice Notes for preparing Environmental Impact Statements.' EPA, Wexford.

Department of the Environment, Community and Local Government (2013) 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (DoECLG, 2013)

Department of Housing, Planning, Community and Local Government, (2017) Circular Letter PL 1/2017. Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on Administrative Provisions in Advance of Transposition.

European Commission Joint Research Centre Reference Report (2013) 'Best Available Techniques (BAT) for the Production of Cement, Lime and Magnesium Oxide (prepared under the Industrial Emissions Directive 2010/75/EC)' Luxembourg.

European Parliament legislative resolution of 12 March 2014 on the proposal for a directive of the European Parliament and of the Council amending Directive 2011/92/EU of the assessment of the effects of certain public and private projects on the environment

2 Background, Policy and Legislation

2.1 Background

Irish Cement Ltd. (ICL) is the leading supplier of cement in Ireland where it has operated for over seventy seven years. The company operates two cement production facilities: one at Platin, County Meath and a second at Castlemungret, County Limerick. The company is a major contributor to Ireland's economy and directly employs over 200 people as well as over an estimated seven hundred indirect jobs.

As a company, ICL is consistently evolving to satisfy market requirements and continually investing in improved environmental performance across all of its operations. The company works to the International Quality Standard ISO 9001 which it uses to actively improve its quality management system. The company's cement products are independently certified by NSAI and carry the 'CE' marking. Irish Cement also works to ISO 14001 which is an internationally accredited environmental management system (EMS). The company's EMS is independently certified as complying with ISO 14001 on an annual basis.

The history of Irish Cement extends back over 77 years and at Platin extends back to the opening of the Cement Works with Kiln 1 in 1972. Kiln 2 was added in 1977. In the intervening period the company has continuously invested in new technology and processes to improve the efficiency and sustainability of their operations. Some of the more recent projects at Platin have involved: the installation of energy efficient equipment; the manufacture of eco-efficient CEM II cement; the commissioning of a new highly efficient €200 million kiln (Kiln No.3); and since 2011, the replacement of a portion of imported fossil fuel use at Platin with up to 120,000 tonnes per annum (t/a) of alternative fuels sourced within Ireland. In 2016 the use of 119,965 tonnes of alternatives fuels reduced Carbon Dioxide (CO_2) emissions by over 64,500 tonnes.

Today, the Cement Works is one of the most energy efficient cement plants in Europe and it supplies cement products across the country and exports to Britain and to mainland Europe.

Platin Cement Works is regulated under the terms of an Industrial Emissions (IE) licence (No. P0030-04) issued by the Environmental Protection Agency (EPA) which limits and controls emissions from the facility. In January 2017 the EPA published notification of its intention to review the current IE licences for all cement plants in Ireland, including Platin Cement Works, to ensure *'compliance with the requirements of the European Commission decision on Best Available Techniques (BAT) conclusions applicable to the production of cement (Commissions Implementing Decision 2013/163/EU)*[1]. The BAT C Review for Platin Cement Works is referenced under IE Licence No. P0030-05.

The Proposed Development that is the subject of this planning application will require a further review of the IE licence.

2.1.1 Use of Alternative Fuels at Platin Cement Works and the Background to the Proposed Development

ICL first received the necessary planning and licence permission for the use of alternative fuels in Kiln 3 in 2009 (*Meath Planning Reg. Ref. No.: SA803066, as amended by Ref. No.: SA120301 of 2012*). Since 2011 alternative fuels have been gradually introduced to Kiln 3 of the cement manufacturing process at Platin and in 2016 the Cement Works reached its maximum permitted use of alternative fuels. Over 61,000 tonnes of imported petcoke was also used in the cement manufacturing process to meet growing market demands. No permission exists for the use of alternative fuels in the second cement kiln (No. 2) at Platin Cement Works.

The use of alternative fuels in cement kilns is known as 'co-processing' in that it involves the recycling of materials and the recovery of energy, two processes which occur in parallel inside the kiln. In this way, the introduction of alternative fuels into Irish Cement's operations also facilitates recycling in Ireland by providing a guaranteed, energy

[1] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0163&from=EN

efficient and cost-effective outlet for existing residual waste materials that would otherwise go to landfill or to waste export. The use of alternative fuels contributes to improved resource efficiency by reducing the use of primary resources as well as reducing the need for disposal options such as landfill.

At present the use of alternative fuels at Platin Cement Works is restricted both in terms of overall quantity (120,000t/a) and range of materials (i.*e.* to Solid Recovered Fuels; Chipped used Tyres and/or Meat and Bone Meal). In addition, the use of alternative fuels is only permitted in Kiln 3, and in 2016 the use of c.120,000t/a of alternative fuels only provided for c.45% fossil fuel substitution and savings of over 61,000 tonnes of CO_2 emissions. However, these existing restrictions in the use of alternative fuels increase the requirement for importation of fossil fuel and prevents further improvements in plant efficiencies; and further savings in CO_2 emissions.

The Proposed Development will allow for up to 85% substitution of all fossil fuel use (in both kilns) with an increased quantity and range of lower carbon alternative fuels and will also allow for the introduction of alternative raw materials. Therefore, and subject to the availability of appropriate materials, the objective of the Proposed Development is to allow for a progressive phasing out over time of virtually all fossil fuel use at Platin Cement Works. In total, the Proposed Development will allow for the use of up to an additional 480,000t/a of alternative fuels, including alternative raw materials. This Proposed Development has the potential to further improve the competitiveness and sustainability of the Cement Works and will further reduce CO_2 emissions by up to a significant 314,000 tonnes per annum.

2.1.2 European Trends in Cement Contribution

For more than 30 years, the cement industry in Europe has used alternative fuels and has steadily increased the quantities in use. In 2016, the average fossil fuel replacement rate around cement plants in Europe was 41%, with some countries achieving much higher levels. In Germany for example, the average replacement rate is 62%; however at times, some cement plants have achieved 100% fossil fuel replacement. A wide range of different types of alternative fuels are used in Germany, including tyres, oils, paper pulp, plastics, animal meal, solid recovered fuel (SRF) / refuse derived fuel (RDF), wood, secondary liquid fuels (SLF), sewage sludge *etc*. Many of these same alternative fuels used around Europe, for example tyres, solvents, sewage sludge, are also widely available in Ireland.

The replacement of fossil fuels with suitable alternative fuels and use of alternative raw materials is now standard practice throughout the European cement industry. In many European countries, the cement industry is considered an essential component of national waste infrastructure, enhancing resource recovery and recycling. Local cement industries in Switzerland, Germany and Sweden have actively contributed to the achievement of zero or near-zero landfill rates with consequent high levels of recycling, energy recovery and composting.

In Ireland, the recently published Regional Waste Management Plans (RWMP) recognise the increasingly significant role of cement plants in using waste for thermal recovery stating it is the policy that:

> *"The local authorities of the region support self-sufficiency and the development of indigenous infrastructure for the thermal recovery of residual municipal wastes in response to legislative and policy requirements. The preference is to support the development of competitive, environmentally and energy efficient thermal recovery facilities in Ireland, including the replacement of fossil fuels by co-combustion in industrial furnaces or cement kilns, and ultimately to minimise the exporting of residual municipal waste resources over the plan period."* (Section 4.3, page 32 of Eastern Midlands RWMP).

2.2 Planning History of Platin Cement Works

Cement Limited (subsequently renamed Irish Cement Ltd.) was founded as a public company in 1936. After initially operating a cement production plant in Drogheda, Irish Cement (ICL) obtained planning permission in 1969 from Meath County Council (MCC) to build Phase 1 of a new cement plant at Platin, near Duleek (MCC Plan Ref: P69/106). Planning permission for Phase 2 was granted in February 1974 (MCC Plan Ref: P73/1740). Following the construction of the Cement Works at Platin, production at the older Drogheda Cement Works was gradually phased

out. In the intervening years, the Cement Works at Platin has been expanded and upgraded under a number of planning permissions. The more recent planning permissions at Platin Cement Works are outlined in further detail in Table 2.1.

ICL also owns and operates a limestone quarry immediately west of the Cement Works and of the application site. This quarry provides the primary raw material – limestone – for the production of cement and cement products at the cement plant. Over the years, the quarry has also received planning permission for various extensions, *i.e.* under MCC Plan 94/925 (in 1995); MCC Plan Ref: 98/187 (in 1998); MCC Plan Ref: 01/4136 (in 2001); MCC Plan Ref: SA/30267 (in 2003); and most recently in 2015 (MCC Plan Ref: SA/130769 & ABP PL17.243795).

Table 2.1: Recent Planning Applications/Decisions at Platin Cement Works.

MCC Planning Reg. Ref. No.:	Description of Proposed Development	Decision & Date
SA50448	Planning application to extend the existing Platin Cement Works by provision of a limestone store, transport conveyors and transfer station, raw mill building, raw materials store, preheater tower and stack, kiln and filter grate cooler and filter, coal mill building, clinker storage silo and cement mill building.	Granted with Conditions by the Planning Authority. May 2006.
SA70102	Planning application for modifications to two buildings previously granted permission as part of the development of Platin Cement works (Reg. Ref. SA50448, date 16/06/06). The proposed variations brought about during the detailed design phase of the project are (1)Engineering Building: relocation (18 metres north-east-wards), increase in height from 49.97 metre to 54.39 metres AOD, increase in gross floor area (by approx. 835sq.m), internal re-arrangement and (2) Office Building: relocation (50 metres westwards), increase in gross floor area (by approx.30sq.m). Both buildings are proposed for within the existing Platin Cement Works complex, but have not as yet been constructed.	Granted with Conditions by the Planning Authority. April 2007.
SA803066	Planning application to reduce carbon emissions associated with clinker manufacture at the site through the use of lower carbon alternative fuels. The development consisted of the substitution of a proportion of the petroleum coke fuel used at the plant to produce cement clinker with solid recovered fuels (SRFs), chipped used tyres and meat and bone meal. It was proposed to utilise up to a maximum of 120,000 tonnes per annum or 25 percent substitution of total fuel use at Platin at maximum clinker production capacity. To facilitate the on-site storage and handling of the materials, the construction of a number of on-site storage facilities were also proposed. An Environmental Impact Statement accompanied the planning application.	Granted with Conditions by the Planning Authority. February 2009.
SA901910	Planning application to modify the development previously granted under Pl. Ref. SA803066 *(see above)* through the extension of the works to approximately 0.64 hectares arising from further detailed design through the reorientation of the main Solid Recovered Fuel (SRF) store & the redesign of the SRF delivery area.	Granted with Conditions by the Planning Authority. February 2010.
SA120301	Planning application for a variation to planning permission granted under SA803066 (*see above*) at Platin Cement Works. The application sought to allow for the co-firing of up to 120,000 tonnes per annum of solid recovered fuels. No change was proposed to the existing permitted maximum total of 120,000 tonnes per annum for all alternative fuels used. Likewise, no change was proposed to the existing	Granted with Conditions by the Planning Authority. June 2012.

MCC Planning Reg. Ref. No.:	Description of Proposed Development	Decision & Date
	permitted maximum quantities of 40,000 tonnes per annum for meat and bone meal or 30,000 tonnes per annum for chipped used tyres.	
LB140961	Planning application for the demolition of the previously decommissioned Kiln 1, its associated preheater tower and related structures.	Granted with Conditions by the Planning Authority. December 2014
LB140962	Planning application for the installation of a storage bay, intake hopper, conveyors, a 24.2m high stack and an electrical switch room all for the drying of granulated blast-furnace slag.	Granted with Conditions by the Planning Authority. December 2014.
LB150279	Planning application for the installation of a waste heat recovery facility on Kiln 3 of the cement works. The development included the fitting of two heat exchangers to Kiln 3 and the provision of cooling towers, a turbine/generator building and associated ancillary plant.	Granted with Conditions by the Planning Authority. May 2015.
LB150375	Planning application for the installation of a Flue Dust Portland Cement Silo at Kiln 3 in Platin Cement Works.	Granted with Conditions by the Planning Authority. June 2015.
LB151288	Planning Application for 10 year permission for the further progressive replacement of fossil fuels with lower carbon alternative fuels and to allow for the use of alternative raw materials in their Cement Works. The planning authority ultimately considered that the development 'may come within the criteria as set out in the Seventh Schedule of the Planning and Development Act 2000-2015' and as such, it may not have jurisdiction to determine the application. The applicant was referred to An Bord Pleanála in accordance with Section 37B of the Planning and Development Act 2000, as amended. The current application is broadly similar to this application made to Meath County Council.	No jurisdiction. May 2016.

2.3 Policy & Legislation

This section sets out the general and regional planning context at European, national, regional and local levels with relevance to the Proposed Development.

2.3.1 European Legislation and Policy Context

2.1.1.1 7th Environmental Action Programme 2013

The 7th Environmental Action Programme ("7th EAP") (European Commission 2014) provides for guidance of European environment policy until 2020. The Action Programme contains the following aims:

- Turn waste into a resource based on strict application of the waste hierarchy.
- Limit energy recovery to non-recyclable materials.

- Phase out landfilling of recyclable or recoverable waste.
- Ensure high quality recycling where the use of recycled material does not lead to overall adverse environmental or human health effects.
- Manage hazardous waste so as to minimise significant adverse effects on human health and the environment.
- Remove barriers facing recycling activities in the European Union internal market and review existing prevention, re-use, recycling, recovery and landfill diversion targets so as to move towards a lifecycle-driven 'circular' economy, with a cascading use of resources and residual waste that is close to zero.

The European Commission is now working on creating a circular economy. In a circular economy, the value of the materials and energy used in products in the value chain is retained for as long as possible while waste and resource use are minimised. This provides consumers with more durable and innovative products that save money and increase quality of life. The circular economy requires action at all stages of the life cycle of products: from the extraction of raw materials, through material and product design, production, distribution and consumption of goods, repair, remanufacturing and re-use schemes, to waste management and recycling. The EU proposed framework for the delivery of a circular economy was published on the 2nd December 2015. The principles of the Circular Economy focusing in particular on transitioning from a waste management economy to a green circular economy and increasing the value recovery and recirculation of resources are also detailed in Ireland's Regional Waste Plans.

The Proposed Development supports the objectives of the 7th EAP by diverting non-recyclable resources from landfill, whilst also recovering valuable energy. Thermal recovery also supports high-quality recycling by treating potentially polluted and complex waste, thereby keeping harmful substances out of the Circular Economy.

2.3.1.1 Industrial Emissions Directive 2010/75/EU

The Industrial Emissions Directive (IED) is a recast of seven existing pieces of legislation including the Waste Incineration Directive and its aim is to achieve significant benefits to the environment and human health by reducing harmful industrial emissions across the EU, in particular through better application of Best Available Techniques. The IED is the successor of the IPPC Directive and sets out to minimise pollution from various industrial sources throughout the European Union. Operators of industrial installations operating activities covered by Annex I of the IED are required to obtain an integrated permit from the relevant authorities in the EU countries. The IED is based on several principles, namely an integrated approach, best available techniques, flexibility, inspections and public participation.

- The IED was transposed into Irish Law by the following Regulations;
- European Union (Industrial Emissions) Regulations 2013 S.I. 138 of 2013
- Environmental Protection Agency (Industrial Emissions) (Licensing) Regulations 2013 S.I. 137 of 2013
- European Union (Waste Incineration Plants & Waste Co-incineration Plants) Regulations 2013 SI. 148 of 2013
- European Union (Large Combustion Plants) Regulations 2012 S.I. 566 of 2012 European Union (Installations and Activities using Organic Solvents) Regulations 2012. S.I. 565 of 2012.

Platin Cement Works operates under this directive and is licensed and monitored by the Environmental Protection Agency (EPA) under IE Licence P0030-04. In January 2017 the EPA published notification of its intention to review the current IE licences for all cement plants in Ireland, including Platin Cement Works, to ensure *'compliance with the requirements of the European Commission decision on Best Available Techniques (BAT) conclusions applicable to the production of cement (Commissions Implementing Decision 2013/163/EU)*[2]. The BAT C Review for Platin Cement Works is referenced under IE Licence No. P0030-05.

The Proposed Development that is the subject of this planning application will require a further review of the IE licence.

[2] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0163&from=EN

2.3.1.2 Waste Framework Directive 2008/98/EC

The Waste Framework Directive (2008/98/EC) sets out measures to progressively divert and reduce the amount of biodegradable municipal waste sent to landfill by 2016. The Directive incorporates the provisions of previous separate directives on waste oils and hazardous wastes and provides the overall structure for an effective and safe waste management regime in Europe and was transposed into Irish law in 2011. The Directive specifies the priorities for waste management as follows:

- Prevention
- Preparing for Re-Use
- Recycling
- Other Recovery (e.g. Energy Recovery)
- Disposal

It also alters the impression of waste as an unwanted burden to become a valued resource in Europe, for example, incineration will be considered a recovery operation provided it meets certain energy efficiency standards. The Directive introduces the concepts of "self-sufficiency and proximity" which requires Member States "to take appropriate measures, in cooperation with other Member States where this is necessary or advisable, to establish an integrated and adequate network of waste disposal installations and of installations for the recovery of mixed municipal waste collected from private households, including where such collection also covers such waste from other producers, taking into account best available techniques."

While the Directive does not require each Member States to "possess the full range of final recovery facilities within that Member State", its intention is that Member States should, on the whole and excepting for "certain types of waste", be in a position to appropriately manage waste generated within their own country.

Ireland has implemented the Waste Framework Directive 2008 through the European Communities (Waste Directive) Regulations 2011 (SI 126/2011).

2.3.1.3 Emissions Trading Scheme Directive

The EU Emissions Trading Scheme (EU ETS) is a policy introduced across the EU to tackle emissions of carbon dioxide and other greenhouse gases, in an effort to combat the serious threat of climate change. The scheme works on a "Cap and Trade" basis and allowances adding up to the cap are provided to the companies regulated by the scheme. The companies are required to measure and report their carbon emissions and to hand in one allowance for each tonne they release. The number of allowances allocated to each installation for any given period is determined on the basis of the National Allocation Plan. The threshold for the production of cement clinker in rotary kilns in Ireland is 500 tonnes per day.

At present the use of alternative fuels can result in the savings of over 64,000 t/a of CO_2 emissions. The Proposed Development will allow for increased use of alternative fuels in substitution of imported fossil fuel, and for use of alternative raw materials, which will have the potential for savings of up to an additional 314,000 t/a of CO_2 emissions per year, thereby improving the effectiveness of the Emission Trading Policy in Ireland.

2.3.1.4 Renewable Energy Directive (2001/77/EC)

The Renewable Energy Directive (2001/77/EC) obliges EU Member States to set national indicative targets for the amount of gross electricity consumption to be supplied from renewable sources by 2010. Because thermal treatment of municipal waste with energy recovery is considered a renewable energy source, this Directive provides an additional incentive to divert waste from landfill.

2.3.1.5 European Council Decision on List of Wastes (LOW)

This decision established a list of codes – known as a List of Wastes (LOW) used to classify all wastes. A distinction is made between hazardous and non-hazardous wastes and the list has been designed to provide a consistent waste

classification system across the EU. The formal list of European Waste Catalogue (EWC) codes is contained in the decision. Member States use the list of codes to record the types of wastes handled and managed.

The Proposed Development will allow for an increased quantity and range of materials, including hazardous and non-hazardous wastes, which may be used as alternative fuels and/or alternative raw materials. The LOW codes for the proposed alternative fuels and alternative raw materials included in Appendix 3.5.

2.3.2 National Legislation & Policy Context

National Policy as set out in documents such as the Sustainable Development – A Strategy for Ireland (1997) and the National Spatial Strategy for Ireland, 2002-2020, soon to be replaced by the National Planning Framework, promote the concepts of proper planning and sustainable development, balanced regional development and sustainable practices. Sustainable Development – A Strategy for Ireland makes a number of references to the use of cleaner technologies and production techniques and, in common with the National Spatial Strategy, to the importance of reducing emissions to air from industrial processes as well as reducing the reliance on finite natural resources. In terms of the National Spatial Strategy for Ireland, the cement works at Platin falls within the Dublin and Mid East Regions and within an area that is considered to have 'strategic rural assets within a metropolitan hinterland'. In this context the Cement Works already provides for critical rural employment and the Proposed Development will promote significant opportunities for further indirect employment in the sourcing, preparation and supply, to a defined specification, of a wide range of alternative fuels and alternative raw materials. In addition, a number of other key documents are considered relevant to the Proposed Development.

2.3.2.1 Waste Management Act 1996

The primary legislative platform for waste is provided by the Waste Management Act 1996 and the Protection of the Environment Act 2003.

The main objectives of the Waste Management Act 1996 are:

- To deliver a more effective organisation of public authority functions in relation to waste management involving new or redefined roles for the Minister, the EPA and local authorities by defining the roles and responsibilities of each;
- Enable measures designed to improve performance in relation to the prevention and recovery of waste; and
- Provide a comprehensive regulatory framework for the application of higher environmental standards, in response to EU and national requirements.

The National Hazardous Waste management Plan is a statutory document prepared by the Environmental Protection Agency (EPA). In 2014, the EPA published the third National Hazardous Waste Management Plan. It sets out the priorities to be pursued over the six year lifetime of the Plan to improve the management of hazardous waste in Ireland.

Priority objectives of the revised Plan are:

1. To prevent and reduce the generation of hazardous waste by industry and society generally.
2. To maximize the collection of hazardous waste with a view to reducing the environmental and health effects of any unregulated waste.
3. To strive for increased self-sufficiency in the management of hazardous waste and to minimize hazardous waste export.

To minimize the environmental, health, social and economic effects of hazardous waste generation and management.'

Waste is classified as hazardous when it displays one or more of the hazardous properties listed in the Second Schedule of the Waste Management Act as amended (e.g. explosive, oxidizing, flammable, irritant, harmful, toxic

etc.) In 2011 studies on waste showed Hazardous waste was mainly exported to a number of EU countries (United Kingdom, Belgium, Germany and France) for treatment in 2011.

It is the objective of the plan to move towards increased self-sufficiency and minimise exports where it is strategically/environmentally advisable, and technically and economically feasible. If Ireland were to become self-sufficient, suitable hazardous waste treatment options would be required. The proposed application for the expansion of alternative fuels would serve to support and address the existing need to become self-sufficient in the management of hazardous waste.

2.3.2.2 A Resource Opportunity – Waste Management in Ireland – 2012

The most recent policy document was produced in July 2012 and outlines the measures through which Ireland will make "the further progress necessary to become a recycling society, with a clear focus on resource efficiency and the virtual elimination of landfilling of municipal waste". A range of policy measures are outlined in relation to the elements of the waste hierarchy i.e. prevention, reuse, recycling, recovery and disposal that concentrate on the supporting legislative and market environment in relation to the waste industry. It is acknowledged that "Ireland requires an adequate network of quality waste treatment facilities" and that a review of waste infrastructure in Ireland is being undertaken by the EPA that will examine the "capacity for managing municipal waste in conformity with the principles of proximity and self-sufficiency". It is further identified that progress in achieving the various remaining targets in relation to the diversion of biodegradable waste from landfill, in particular, "is crucially dependent on the development of a network of recycling and recovery infrastructure across a range of technologies to ensure competitive and effective provision." In the context of recovery, the use of solid recovered fuel in kilns is identified and it is identified that "development of appropriate treatment requirements and quality standards for the production of fuels from waste will be examined in order to assist in the acceptance and marketability of such fuels". Regarding disposal, policy direction is "towards the virtual elimination of landfilling of municipal waste" and "the elimination of landfill within the next decade" while the intention to consider the banning of certain materials to landfill is mooted within the policy document.

The development of the proposed facility will be part of the network of recycling and recovery infrastructure that has been identified as being crucially required to manage waste in adherence with the principles of proximity and self-sufficiency.

2.3.3 Regional Policy Context

2.3.3.1 Regional Planning Guidelines for the Greater Dublin Area 2010-2022

In supporting sustainable economic growth, one of the strategic recommendations of the Regional Planning Guidelines for the Greater Dublin Area 2010-2022 (RPG), is ER4, which seeks to '*Support entrepreneurship and enterprise at appropriate locations which incorporate best practices in reducing greenhouse gas emissions and which endorse responsible environmental and social practices*' (Section 3.8 of RPG). Likewise, under Climate Change and Regional Policy (Section 1.7 of RPG), reducing greenhouse gases is part of current climate change policy at a European and National level.

Section 6 of the RPG considers Waste Management and acknowledges that preservation of the environment and conservation of diminishing natural resources are key principles inherent within the concept of sustainable development (Section 6.7, page 138). The guidelines also state that waste management policy needs to develop a greater range of choice in terms of waste treatment solutions, including commercial energy recovery options. Strategic Policy PIP5 of the RPG's (Section 6.7.1, page 139) seeks *'To ensure, from environmental, business and public health needs, that waste management remains a priority for local authorities and waste management regions in continuing to invest in promoting and facilitating reuse and recycling by residential and commercial sources and that high standard options for treatment and final disposal of waste are available within the Greater Dublin Area.'*

These considerations are particularly relevant to the Proposed Development at Platin Cement Works. Irish Cement has already made significant inroads in terms of its existing use of alternative fuels, which has seen the replacement, at times, of up to 50% of fossil fuel use in Kiln 3 with a consequent reduction in CO_2 emissions. Furthermore, the recent permission for a waste heat recovery facility has the potential to reduce CO_2 emissions by 23,000 tonnes per annum and to substitute up to 25% of existing electrical demand with electrical energy produced on site from waste heat.

In terms of the Proposed Development, it is noteworthy that the planned further replacement of fossil fuels with alternative fuels and the use of alternative raw materials will support recycling and recovery of materials that would otherwise go to landfill or export; could reduce the requirement for imported fossil fuel use at Platin by up to 210,000 tonnes per annum; and has the potential to further reduce CO_2 emissions by up to a significant 230,000 tonnes per annum.

2.3.3.2 Waste Policy: Eastern Midlands Region Waste Management Plan 2015-2021

The Eastern Midlands Regional Waste Management Plan (EMRWMP) provides a framework for waste management for the next six years and sets out a range of policies and actions in order to meet the specified mandatory and performance targets. The EMRWMP seeks to assist and support the community and local business to develop resource efficiency and waste prevention initiatives. The Plan comprises a framework for the prevention and management of wastes in a safe and sustainable manner and importantly, acknowledges the use of waste for thermal recovery in cement kilns as taking on an increasingly significant role in the recycling and recovery of waste as a fuel to generate energy.

Specifically, in relation to Residual and Biowaste Exports (Section 4.3, page 32) the Eastern Midlands Regional Waste Management Plan states that the local authorities of the region support self-sufficiency and the development of indigenous infrastructure for the thermal recovery of residual municipal wastes in response to legislative and policy requirements. The preference is to support the development of competitive, environmentally and energy efficient thermal recovery facilities in Ireland, including the replacement of fossil fuels by co-combustion in industrial furnaces or cement kilns, and ultimately to minimise the exporting of residual municipal waste resources over the plan period.

This is supported by Policy A4 of the EMRWMP which states:

> *'Aim to improve regional and national self-sufficiency of waste management infrastructure for the reprocessing and recovery of particular waste streams, such as mixed municipal waste, in accordance with the proximity principle. The future application of any national economic or policy instrument to achieve this policy shall be supported.' (Section 4.3, Page 34)*

It is considered that the Proposed Development, which seeks permission for the co-combustion of up to an additional 480,000 tonnes per annum of alternative fuels and the use of alternative raw materials is fully supported by the Regional Waste Management Plan and that the development can make a significant contribution towards minimising the export of residual waste over the plan period.

Section 16.4.3 of the EMRWMP notes there has been a significant shift away from landfill in the region (and nationally) and it is the intention of the Plan to follow European and National policy and continue to move away from landfill.

Section 16.4.5 of the EMRWMP address Recovery – Thermal Recovery. Co-incineration in cement kilns is a recognised component of this activity. The plan notes (page 170) that '*cement kilns accept solid recovered fuel (SRF) and refuse-derived fuel (RDF) type wastes that are generated from municipal and construction sources, as well as other wastes such as meat and bone meal, chipped tyres and high calorific fuels. These alternative fuels replace the use of fossil fuels in the cement production process*.'

The Plan also proposes a '*national thermal recovery capacity need of 300,000 tonnes*' as referenced in policy E15a of the Plan (refer to Plate 2.1).

E15a. The waste plan supports the development of up to 300,000 tonnes of additional thermal recovery capacity for the treatment of non-hazardous wastes nationally to ensure there is adequate active and competitive treatment in the market and the State's self sufficiency requirements for the recovery of municipal waste are met. This capacity is a national treatment need and is not specific to the region. The extent of capacity determined reflects the predicted needs of the residual waste market to 2030 at the time of preparing the waste plan. Authorisations above this threshold will only be granted if the applicant justifies and verifies the need for the capacity, and the authorities are satisfied it complies with national and regional waste policies and does not pose a risk to future recycling targets. All proposed sites for thermal recovery must comply with the environmental protection criteria set out in the plan.

Plate 2.1 Policy E15A of the Regional Waste Management Plan

As set out in Table 16.7 of the Plan, the 300,000 tonnes per annum of required thermal recovery capacity takes account of all permitted tonnages to date, including existing permissions in 3 cement plants; as well as in the existing Waste to Energy Facility at Carranstown and the Waste to Energy Facility at Poolbeg.

In January 2016, Indaver Ireland Limited lodged a planning application with An Bord Pleanála (ABP) for a further Resource Recovery Centre (Waste to Energy) at Ringaskiddy, County Cork (ABP Case Ref.: PL04.PA0045). If permitted the proposed development would have capacity for up to 200,000 tonnes / annum of household waste. This application was granted by Cork County Council and is currently under appeal to An Bord Pleanála.

In March 2017 Irish Cement Ltd. received permission for the use of up to 90,000 tonnes per annum of alternative fuels in its Limerick Cement Factory. The development allows for the use of up to 30,000 tonnes per annum of SRF. This permission is under appeal to An Bord Pleanála (ABP Case Ref.: PL91.248285).

Therefore, the national requirement for 300,000 tonnes per annum of thermal recovery capacity for SRF is still fully available.

While the proposed development will allow for the use of a wide range of alternative fuels, the SRF component of the proposed alternative fuel use will be limited to an additional 100,000t/a (*i.e.* a total 220,000t/a in combination with existing 120,000t/a of permitted SRF use). This will ensure that the Proposed Development maintains compliance with Policy E15a of the Eastern Midlands Region Waste Management Plan 2015-2021, which '*supports the development of up to 300,000 tonnes of additional thermal capacity for the treatment of non-hazardous wastes nationally to ensure there is adequate active and competitive treatment in the market and the State's self-sufficiency requirements for the recovery of municipal waste are met*.'

In addition Policy E16 of the Regional Waste Management Plan supports the development of up to 50,000 tonnes per annum of additional thermal recovery capacity for the treatment of hazardous wastes nationally. Where such materials are available and meet the required specification, the proposed development at Platin Cement Works will also have capacity to use potentially hazardous wastes as alternative fuels and/or as alternative raw materials.

The Eastern Midlands Regional Waste Management Plan sets out environmental protection criteria in Chapter 16 (Section 16.5), to guide project developers, operators and competent authorities in considering the environment early in the planning process. The Proposed Development has been considered against these criteria in Table 2.2 and found to be fully compliant.

The Proposed Development addresses all of the requirements of the environmental criteria of Eastern Midlands Regional Management Plan and is consistent and fully in accordance with the Plan as a whole.

Table 2.2: Compliance with Environmental Criteria Section 16.5 of EMRWMP 2015-2021

** Note: Criteria have numbered in this table for ease of reference.*

Ref.*	Environmental Criteria (from EMRWMP)	Response in terms of assessment of the application
General Environment		
1.1	Avoid, as far as possible, siting waste infrastructure or related infrastructure in areas protected for landscape and visual amenity, geological heritage and/or cultural heritage value. Where it is unavoidable, an impact assessment should be carried out by a suitably qualified practitioner and appropriate mitigation and/or alternatives must be provided.	The Proposed Development is located within the developed footprint of an existing Cement Works at Platin. There is no effect on areas protected for landscape and visual amenity, geological heritage and/or cultural heritage value. Full details are provided in other chapters of this EIA Report.
1.2	Avoid siting waste infrastructure or related infrastructure in proposed Natural Heritage Areas (pNHAs), Natural Heritage Areas (NHAs), Statutory Nature Reserves, Refuges for Fauna and Annex I Habitats occurring outside European designated sites;	The Proposed Development is located within the developed footprint of an existing Cement Works. The development is not sited within proposed Natural Heritage Areas (pNHAs), Natural Heritage Areas (NHAs), Statutory Nature Reserves, or Refuges for Fauna and Annex I Habitats occurring outside European designated sites. Full details are provided in Chapter 5 Biodiversity (Flora and Fauna) of this EIA Report.
1.3	To prevent the spread of Invasive Alien Species (IAS), where waste material is transported from one location to another, an IAS survey of source and receptor sites will be conducted by a suitably qualified person. If IAS are found, preventative measures will be implemented to prevent the onward spread of the plant/animal material including: employment of good site hygiene practices for the movement of materials into, out of and around the site; ensuring that imported soil is free of seeds and rhizomes of key invasive plant species; adherence to any national codes of practice relating to prevention of the spread of IAS (including both Ireland and Northern Ireland Codes of Practice)	No unprocessed wastes will be delivered to the Cement Works and no further processing of alternative fuels will take place on-site or at the Cement Works. All alternative fuels – be they waste-derived or not – will be prepared off-site, by contract with suppliers, to a required specification, which will ensure that the material meets the requirements of the cement works as a suitable material for the replacement of fossil fuel. Alternatives fuels will be delivered in sealed containers and / or tankers, from where depending on the nature of the alternative fuel, they will be transferred to purposed-designed enclosed buildings, silos or tanks. From here the alternative fuels will be transferred or pumped directly from the proposed handling buildings, silos or tanks to the Cement Kiln, where the material is entirely combusted at temperatures exceeding 1400°C. As such, there is no risk in terms of the potential spread of alien invasive species.
1.4	In order to protect habitats which, by virtue of their linear and continuous structure (e.g. rivers and their banks) or their contribution as stepping stones (e.g. ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species, these features will be protected as far as possible from loss or disruption through good site layout and design;	The Proposed Development is located within the developed footprint of an existing Cement Works. The development has no adverse effect on habitats or species. Full details are provided in Chapter 5 Biodiversity (Flora and Fauna) of this EIA Report.
1.5	To protect river habitats and water quality, ensure that no development, including clearance and storage of materials, takes place within a minimum distance of 15 m measured from each bank of any river, stream or watercourse;	The Proposed Development is located within the developed footprint of an existing Cement Works. There is no effect on river habitats or water quality. Full details are provided in Chapter 5 Biodiversity (Flora and Fauna) & Chapter 7 Water and Hydrology of this EIA Report.

Ref.*	Environmental Criteria (from EMRWMP)	Response in terms of assessment of the application
1.6	Ensure that a Sustainable Drainage System (SuDS) is applied to any development and that site-specific solutions to surface water drainage systems are developed, which meet the requirements of the Water Framework Directive and associated River Basin Management Plans;	The Proposed Development is located within an existing Cement Works with an established drainage network licenced and monitored by the EPA. Drainage related to the Proposed Development will be accommodated within with the existing network.
1.7	Avoid development of waste management infrastructure in flood risk areas. Reference should be made to the Planning System and Flood Risk Management for Planning Authorities (DECLG/OPW, 2009), the National Flood Hazard Mapping (OPW) and the relevant Flood Risk Management Plan (FRMP);	The Proposed Development is located within the existing built environment of Platin Cement Works. The site is not prone to flooding as noted in Chapter 7 of this EIA Report.
1.8	Ensure that riparian buffer zones (minimum of 15 m) are created between all watercourses and any development to mitigate against flood risk. The extent of these buffer zones shall be determined in consultation with a qualified ecologist and following a Flood Risk Assessment. Any hard landscaping proposals shall be located outside of these buffer zones;	The Proposed Development is located within the existing built environment of Platin Cement Works. There is no effect on riparian buffer zones and no development in or near 15m of watercourses. For details see Chapter 5 Biodiversity (Flora and Fauna) & Chapter 7 Water and Hydrology of this EIA Report.
1.9	Avoid geologically unsuitable areas including karst where practicable, and areas susceptible to subsidence or landslides. Due consideration should be given to the primary water source of the area and the degree of surface water/groundwater interaction;	There are no karst features in the area and there is no effect on local water sources and or ground water. For details see Chapter 6 Land, Soils, Geology and Hydrogeology of this EIA Report.
1.10	If there is an airport within 13 km of the proposed waste facility, the airport shall be consulted at an early stage of planning.	The site at Platin Cement Works is located in excess of 13km from Dublin Airport. The Proposed Development is located within the existing built environment of Platin Cement Works and poses no risk to air traffic movements.
1.11	Impact from a transport perspective will be assessed including road access, network, safety and traffic patterns to and from the proposed facility in accordance with road design guidelines and/or relevant LA guidelines in relation to roads; and	The Proposed Development will not have significant impacts on the road network. A traffic impact assessment has been prepared and is provided in Chapter 12 of this EIA Report.
1.12	There are existing, closed or uncommenced landfills which could be used for alternative waste activities as they are considered brownfield sites; also, suitably zoned, other brownfield sites could be used for alternative waste activities. Sites that offer opportunities to integrate differing aspects of waste processing will be preferred choices. This will ensure maximum efficiency of waste processing.	Not Applicable. The Proposed Development is located within the existing built environment of Platin Cement Works.
European Sites		
2.1	Avoid siting new waste infrastructure or related infrastructure in European Sites, including Special Protection Areas (SACs) and Special Protection Areas (SPAs);	The Proposed Development is located within the existing built environment of Platin Cement Works and no aspect or related infrastructure is to be sited in a European Site.
2.2	Undertake Appropriate Assessment Screening for all waste-related activities requiring development	A Natura Impact Statement (NIS) has been prepared and is included with the planning application

Ref.*	Environmental Criteria (from EMRWMP)	Response in terms of assessment of the application
	consent, e.g. new infrastructure, expansions and upgrades of existing infrastructure and activities, waste authorisation applications, licence reviews (CoR, WFP, and Licences).	
2.3	Where a significant effect on a European Site, either alone or in combination with other plans or projects, is identified, or where there is uncertainty with regard to effects, the competent authority will seek a Natura Impact Statement to inform an AA. In so doing, the implications for any European Site in light of the site's Conservation Objectives shall be considered.	This is a decision for the competent authority. A Natura Impact Statement (NIS) has been prepared and is included with the planning application. The findings of the NIS is that *'the project will result in any impact on the integrity or Qualifying Interests/Special Conservation Interests of any relevant European site, either on their own or in-combination with other plans or projects, in light of their conservation objectives.'*
2.4	For upgrades, expansion, enlargements and reviews related to existing waste activities and infrastructure, the competent authority will seek an evidence base to show that the existing operations are not negatively impacting on a European Site, alone or in combination with other plans and projects, with particular focus on avoiding the deterioration of natural habitats and the habitats of species as well as the disturbance of species for which the area has been designated.	The existing site is a cement manufacturing activity and the Proposed Development will not negatively effect a European Site or on other natural habitats or species. See response to Criteria 2.3 above also.
2.5	Avoid damage to features of the landscape which, by virtue of their linear and continuous structure or their function as stepping stones, are essential for the migration, dispersal or genetic exchange of wild species.	The Proposed Development is located within the developed footprint of an existing Cement Works. There is no negative effect to features of the landscape. Full details are provided in Chapter 5 Biodiversity (Flora and Fauna) of this EIA Report.

2.3.4 County Policy Context

This section sets out the principle policies of the Meath County Development Plan 2013-2019.

Platin Cement Works is located within a predominantly rural area and as such the lands are not subject to a specific landuse zoning objective. Nevertheless the manufacturing industry and associated extractive landuses are long-term established uses on these lands dating back to the early 1970s.

The Meath CDP 2013-2019 recognises the contribution of rural employment to the continued and sustainable growth of the economy. ED Pol 6 on Economic Development encourages rural enterprise generally, especially those activities that are resource dependent, including energy production, extractive industry, small scale industry and tourism in a sustainable manner and at appropriate locations.

Rural Employment is further supported in the CDP by ED POL 19 and ED POL 20 and ED POL 21 which state:

ED POL 19: 'To recognise the contribution of rural employment to the overall growth of the economy and to promote this growth by encouraging rural enterprise and diversification generally and to promote certain types of rural enterprise, especially those activities which are rural resource dependent, including renewable energy production, food production / processing and the extractive industries.'

ED POL 20 : 'To normally permit development proposals for the expansion of existing authorised industrial or business enterprises in the countryside where the resultant development does not negatively impact on the character and amenity

of the surrounding area. In all instances, it should be demonstrated that the proposal would not generate traffic of a type and amount inappropriate for the standard of the access roads. This policy shall not apply to the National Road Network.'

ED POL 21: 'To permit development proposals for industrial or business enterprises in the countryside where generally the following criteria are met:

I. *the proposed use has locational requirements that can more readily be accommodated in a rural location than an urban setting and this has been demonstrated to the satisfaction of Meath County Council;*

II. *the development will enhance the strength of the local rural economy;*

III. *the resultant development is of a size and scale which remains appropriate and which does not negatively impact on the character and amenity of the surrounding area;*

IV. *the proposal demonstrates that it has taken into account traffic, public health, environmental and amenity considerations;*

V. *the proposal is in accordance with the policies, requirements and guidance contained in this plan;*

VI. *it is demonstrated to the satisfaction of Meath County Council that the proposal would not generate traffic of a type and amount inappropriate for the character of the access roads or would require improvements which would affect the character of these roads. This policy shall not apply to the National Road Network.'*

The Proposed Development is located within the footprint of the existing Cement Works and has been subject to a full Environmental Impact Assessment to assess any potential effects on traffic, public health, environmental and amenity considerations and other environmental factors. The Proposed Development operates in accordance with the policies, requirements and guidance contained in this plan and will serve to enhance the strength of the local rural economy, thereby fulfilling the criteria outlined in ED POL 21 of the Meath CDP.

Section 8.1.9 of the Plan on Energy and Communications notes that the '*two cement plants* (i.e. Platin and Kinnegad) *in the County have the ability to use waste streams in their manufacturing processes*. (Page 198)' The Plan support initiatives for limiting greenhouses gases through Policies such as EC POL 2 and EC POL 4 (page 199).

Section 10.12 of the Plan on Extractive Industry and Buildings Materials Production recognizes the variety of natural resources such as building raw materials available and their potential to underpin construction output and provide and provide employment and economic growth in the local and regional economy. Consequently, RD Pol 23 supports the extractive industry where it would not unduly compromise the environmental quality of the county and where detailed rehabilitation proposals are provided.

In terms of the Proposed Development, which will allow for the use of an additional 480,000 tonnes of alternative fuels and for the use of alternative raw materials, it will support recycling and recovery of waste materials that would otherwise go to landfill or waste export and the development will also reduce CO_2 emissions by up to a significant 314,000 tonnes per annum.

2.4 Conclusion

As outlined above, the proposed application has the benefit of a comprehensive range of relevant European, National and Regional legislation, policy and guidance from which it has sought guidance.

The Proposed Development wishes to further expand and replace fossil fuels with the use of alternative fuels and to allow for the use of alternative raw materials for the production of cement at Platin Cement Works. While total fossil fuel replacement is an objective, the working target for fossil fuel replacement for Platin is more likely to be somewhere over 85%. In this regard, waste and planning policy at a European, National and Regional level is supportive of the use of alternative fuels as the application addresses a number of sustainability and waste policy objectives whilst addressing both emissions and waste policies at a European and National level. The wider benefits of the Proposed Development are:

- Potential for significant reduction in CO_2 emissions.
- Reduction in dependence on imported fossil fuels / finite resources.
- Diversion of waste materials from landfill or export.
- Maximising the recovery of energy from the alternative fuel material. All the energy is used directly in the kiln for clinker production. It also maximizes the recovery of the non-combustible part of the alternative fuel material, as the inorganic part substitute's raw material requirements in the cement product.
- Ability to obtain greater quantity of fuel from what is available and suitable on the national market as opposed to imported fossil fuels.
- An increase in the competitiveness of the cement product at a National and European level.
- Increased opportunity for additional indirect employment in the sourcing, preparation and supply of alternative fuels and raw materials of a defined specification to Platin Cement Works.

2.5 References

Meath County Council (2013) Meath County Development Plan 2013-2019. http://www.meath.ie/CountyCouncil/Publications/PlanningPublications/MeathCountyDevelopmentPlan2013-2019/

Eastern Midlands Waste Region (2015) Eastern-Midlands Waste Management Plan http://emwr.ie/download-the-eastern-midlands-regional-waste-management-plan

Mid-East Regional Authority (2010) Regional Planning Guidelines for the Greater Dublin Area 2010-2022. http://emra.ie/dubh/wp-content/uploads/2015/02/Greater-Dublin-Area-Regional-Planning-Guidelines-2010-2022-Volume-I.pdf

Waste Management Act (1996) https://www.epa.ie/pubs/legislation/waste/licpermit/EPA_waste_management_act_1996.pdf

The European List of Waste – European Commission: http://ec.europa.eu/environment/waste/framework/list.htm

Directive 2008/98/EC on waste (Waste Framework Directive) http://ec.europa.eu/environment/waste/framework/

The Industrial Emissions Directive 2010/75/EU http://ec.europa.eu/environment/industry/stationary/ied/legislation.htm

Environment Action Programme to 2020; 7th Environmental Action Programme 2013

http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013D1386

The EU Emissions Trading Scheme Directive (EU ETS) https://ec.europa.eu/clima/policies/ets_en#Main_legislation

3 Description of the Proposed Development

3.1 Introduction

This chapter provides a description of the proposed development by Irish Cement Limited (ICL) at Platin Cement Works, County Meath and of the alternative scenarios considered in the selection of the proposed development.

Irish Cement is applying to An Bord Pleanála for a ten year planning permission for development for further replacement of fossil fuels with lower carbon alternative fuels and for the use of alternative raw materials at Platin Cement Works, County Meath. Extant permissions already allow for the use of up to 120,000 tonnes per annum of a limited range of alternative fuels in Kiln 3. However, the proposed development seeks the flexibility to replace virtually all existing use of imported fossil fuels (*i.e.* up to 85% replacement) and for the use of alternative fuels in replacing a portion of traditional raw materials used in the manufacture of cement. In total this requires an additional 480,000 tonnes per annum of alternative fuels and alternative raw materials for both Kiln 2 and Kiln 3.

The proposed development is for the use of an additional 480,000 tonnes per annum of alternative fuels and alternative raw materials. This will reduce existing reliance on imported fossil fuel and will reduce CO_2 emissions by up to an additional 314,000 tonnes per annum, thereby improving the overall operational competitiveness and environmental sustainability of the Cement Works as a whole.

The application site, which extends to 22.5 hectares, is centrally located within Platin Cement Works. The Cement Works, which extend to circa 40 hectares, is located off the R152 Drogheda - Kilmoon Cross Regional Road, approximately 750m southwest of Junction 8 (Drogheda South) on the M1 Dublin Belfast Motorway. Platin limestone quarry is located directly west of the Cement Works and provides the primary raw material used in the manufacture of cement.

Platin Cement Works is regulated under the Industrial Emissions (IE) Directive and operates in accordance with IE Licence No. P0030-04, which is issued and monitored by the Environmental Protection Agency (EPA).

In January 2017 the EPA, as part of a coordinated European programme, published notification of its intention to review the current IE licences for all cement plants in Ireland, including Platin Cement Works, to ensure *'compliance with the requirements of the European Commission decision on Best Available Techniques (BAT) conclusions applicable to the production of cement (Commissions Implementing Decision 2013/163/EU)*[1]. The BAT C Review for Platin Cement Works is referenced under IE Licence No. P0030-05.

The proposed development described in this planning application will require a further review of the IE licence.

3.2 History of Platin Cement Works

Up until 1938, virtually all requirement for cement in Ireland was served by importation. In 1936 the Irish Government established Cement Ltd. (later to become Irish Cement Ltd. (ICL)) in order to provide a stable and secure home industry capable of meeting the increasing demand for cement in Ireland. In 1938, Cement Ltd. commenced production in two new cement plants one in Limerick and a second in Drogheda.

In 1972 ICL moved its cement production from Drogheda to its current location at Platin, County Meath, where a new plant was constructed adjacent to a significant reserve of limestone, the primary raw material used in manufacture of cement. The original facility at Platin included a single kiln (No.1), a second cement kiln (No.2) was added in 1977 and a further major upgrade was completed in 2008 with the construction of the third kiln (No.3). This latter kiln is amongst the most energy efficient of its kind anywhere in Europe. Kiln No.1, the original kiln at

[1] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0163&from=EN

Platin, was decommissioned in 2008 following commissioning of Kiln 3. In 2015 permission was granted for the demolition of Kiln 1 (refer *Meath County Council (MCC) Planning Ref. No.: LB140961*).

Development of the adjoining limestone quarry has progressed in tandem with the development of the Cement Works, with quarry extensions granted by Meath County Council (MCC), and where appealed, by An Bord Pleanála (ABP) in 1998 (*MCC Planning Ref. No.: 98187*); 2001 (*MCC Planning Ref. No.: 014136 & ABP Ref. No.: 17.125322*); 2003 (*MCC Planning Ref. No.: SA30267*); and 2014 (*MCC Planning Ref. No.: SA130769 & ABP PL.17.243795*).

In 2015, Irish Cement received planning permission for the installation of a Waste Heat Recovery Facility, which when operational, could produce up to 7.5MW of electricity; reduce existing electrical demands by up to 25%, and reduce existing CO_2 emissions by up to 23,000 tonnes per annum (*refer to MCC Planning Ref.: LB150279*).

Today, Platin Cement Works is the largest cement manufacturing facility in Ireland and is one of the most energy efficient cement plants in Europe. The Cement Works uses both fossil fuels and alternative fuels and produce a range of cement products, which it supplies across the country and exports to Britain and Europe. With the exception of annual maintenance shut downs, the Cement Works operate 24 hours per day and 7 days per week year round.

An annotated view of Platin Cement Works is provided on Plate 3.1.

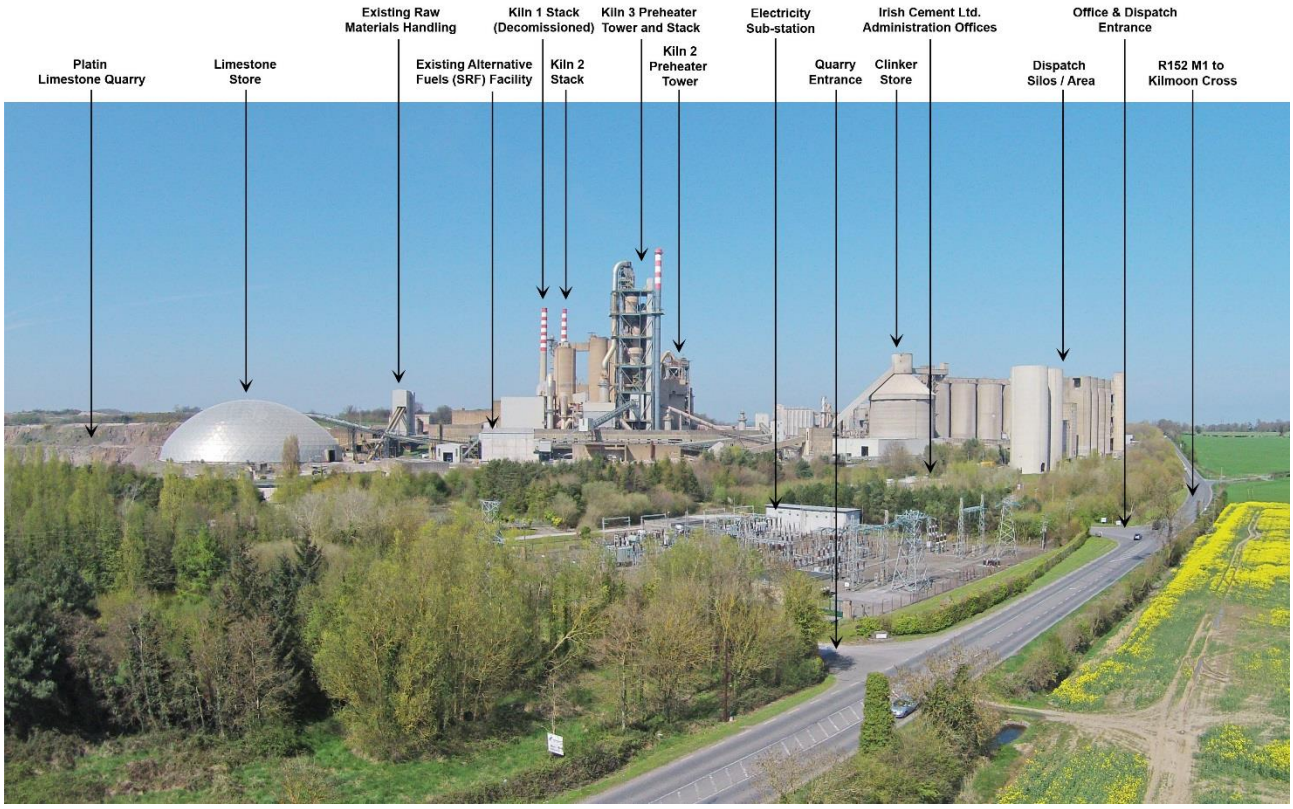


Plate 3.1 Annotated Photograph of Platin Cement Works (elevated view from south)

3.3 Platin Cement Works and the Manufacture of Cement

Cement, when combined with fine aggregates/sand, coarse aggregates, air and water, is the key ingredient used in the manufacture of concrete, the world's most widely used building material. There are 4 cement plants in Ireland, two of which are owned and operated by ICL at Limerick and at Platin. The other two plants are located near Kinnegad, County Meath (Lagan Cement Limited) and at Ballyconnell (Quinn Cement Limited) County Cavan.

3.3.1 Cement Manufacture at Platin Cement Works

Cement is produced in a regulated process that includes continuous monitoring, quality control and testing through all stages of its manufacture. A diagrammatic view of a typical cement plant / cement manufacture process is provided at Figure 3.1, which includes the following:

PREPARATION: Limestone, which is extracted from the adjoining quarry (label 1), is the main **raw material** used in the manufacture of cement. Clay overburden, also from the quarry, together with shale and small quantities of bauxite and iron ore are also used as raw materials in the manufacture of cement in site. The raw materials are crushed, ground and homogenised in a quality controlled and tested manner to produce a blend called **raw meal** (labels 2 to 6).

CLINKER PRODUCTION: As raw meal is introduced to the **kiln pre-heater tower** and **rotary kiln,** fuels are directly introduced and combusted at flame temperatures exceeding 2,000°C in order to **melt** the raw meal. These very high temperatures ensure total combustion of the fuels and drive a chemical transformation (known as **calcination**) that converts the raw meal to **clinker at a temperature of 1,450°C** (labels 9 to 11). Hot gas from the kiln mixes directly with the incoming powdered raw meal, preheating it as it approaches the kiln, and then the gas exits through a **cooling tower** and **bag filter** prior to discharge via the **kiln stack** (labels 7 and 8).

FINISHING AND DISPATCH: Once cooled, the clinker is stored prior to final blending and milling to produce **cement**, which is dispatched either in bags or in bulk (labels 12 to 15).

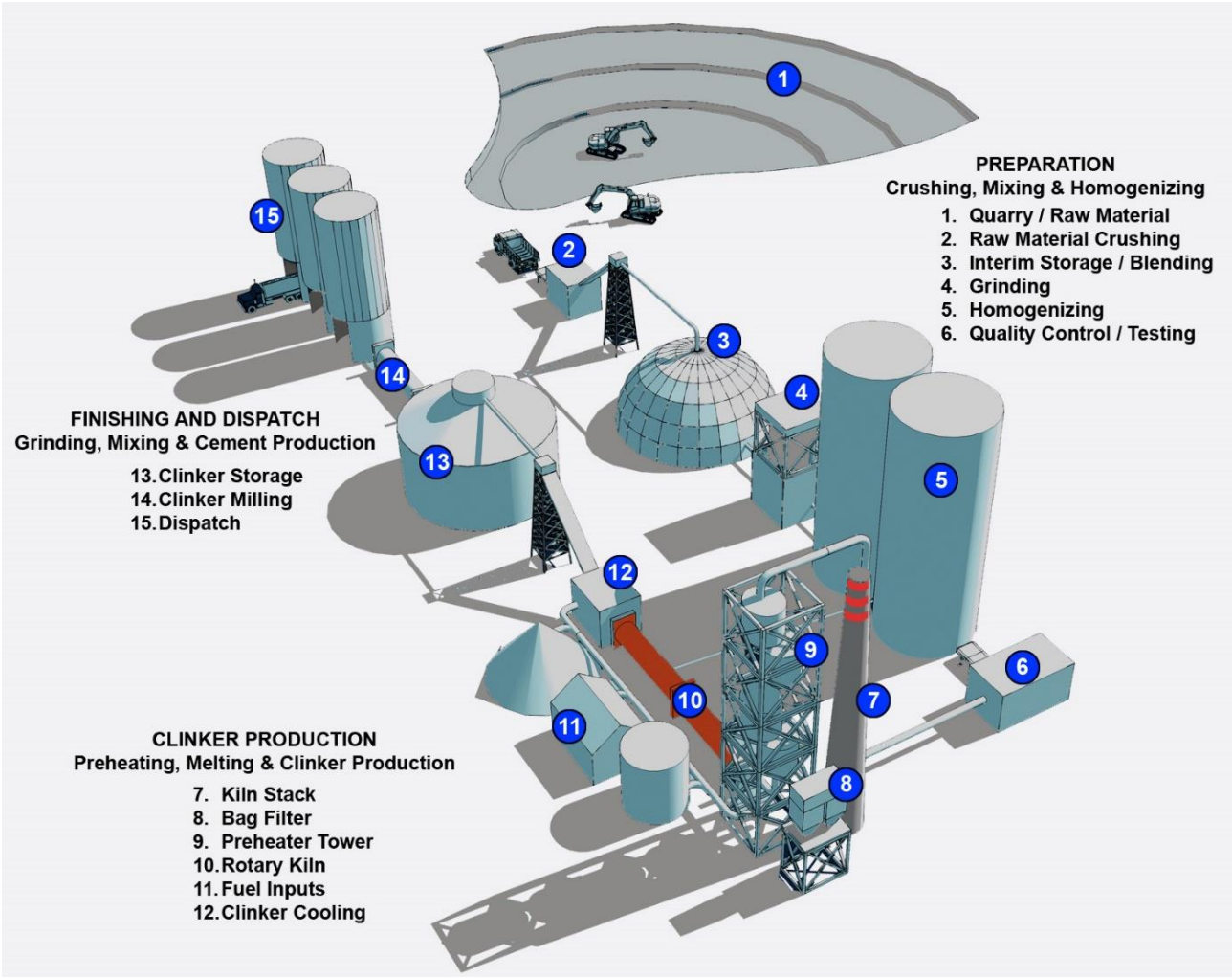


Figure 3.1 Diagrammatic View of a Typical Cement Plant/Cement Manufacture Process

3.3.2 Fuel use in Cement Manufacture

A typical illustration of a preheater tower and rotary cement kiln arrangement such as that at Platin is shown in Figure 3.2 and Plate 3.2.

As raw meal flows down through the pre-heater, fuel, including alternative fuels, is introduced (*i.e.* at the back-end of the kiln) to begin heating the raw meal up to c.450°C/500°C. From there the heated raw meal enters the refractory lined kiln, which is a slowly rotating tube steel set at a shallow angle that allows the raw meal to progress slowly through a very high temperature environment. The high temperature environment, which is maintained through the further introduction of fuel, including alternative fuels, at the front end of the kiln, gradually increases the heat of the raw meal up to the critical temperature of c.1,450°C at which the calcining transformation occurs and clinker is produced.

This is a highly monitored, quality controlled and tested process. Quality control is critical to each stage of cement manufacture and on-site laboratories are linked to a central control facility that operates round the clock testing regimes for the raw materials, fuels and final products. Platin Cement Works also includes a Research and Development laboratory that is involved in on-going product research and development.

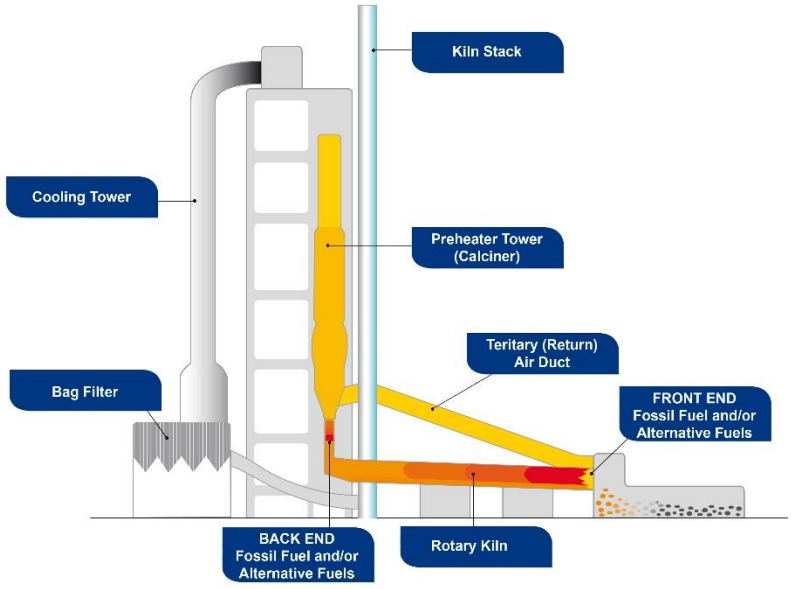


Figure 3.2 Diagrammatic View of a Preheater Tower and Rotary Cement Kiln

Plate 3.2 Photo of Preheater tower and Kiln 3 at Platin

3.4 Fuel use at Platin Cement Works and Cement Plants in Ireland

Fossil fuels have traditionally been used to fire the cement kilns in Platin. Petcoke is the principal fossil fuel used, however coal has been used in the past and could be used again in the future. Fossil fuels are imported by ship usually via Dublin Port, and delivered on a regular basis to on-site bulk storage at Platin Cement Works – refer to Figure 3.3.

The use of lower carbon alternative fuels (as an alternative fuel to fossil fuel), including those classified as non-hazardous and hazardous wastes, has been an integral part of cement manufacture in Europe since the 1980s. In 2016, the average fossil fuel replacement rate in cement plants around Europe was 41%, with a replacement rate of up to 62% in Germany[2]. At times, some European cement plants have achieved 100% fossil fuel replacement. A

[2] http://www.cembureau.be/sites/default/files/documents/EcofysReport_MarketOpportunitiesCoprocessing_2016-07-08.pdf

wide range of alternative fuel types are used across Europe, including tyres, oils, paper pulp, plastics, animal meal, solid recovered fuel (SRF), refuse derived fuel (RDF), wood, secondary liquid fuels (SLF), and sewage sludge.

Alternative fuels are already in use at 3 of the 4 existing cement plants in Ireland, including at Platin Cement Works where permission exists for the use of up to 120,000 tonnes of alternative fuels per annum. The ICL plant in Limerick has recently been granted planning permission by Limerick City and County Council (*LC&CC Planning Ref. No.: 16/345*) for the use of up to 90,000 tonnes per annum of alternative fuels and alternative raw materials permitting the use of up to 114 potential alternative fuels or alternative raw materials by 'List of Waste' (LOW) codes. This permission is currently under appeal to An Bord Pleanála (*ABP Ref. No.: PL91.248285*).

3.4.1 Alternative Fuel use at Platin Cement Works

In 2009, Irish Cement Limited (ICL) received permission for the use of up to 120,000 tonnes per annum of lower carbon alternative fuels in Kiln 3 in Platin Cement Works (*refer MCC Planning Ref. No.: SA803066, as amended by MCC Planning Ref. No.: SA120301*). In 2011 ICL began a programme of progressive introduction of locally sourced alternative fuels to the Cement Works and by 2014 had achieved, at times, up to 50% fossil fuel replacement in Kiln 3. There is no permission for the use of alternative fuels in Kiln 2 at Platin Cement Works.

During 2016, the maximum permitted quantity of 120,000 tonnes of alternative fuels was used in Platin Cement Works with the balance fuel used being petcoke. The existing permitted use of alternative fuels at Platin Cement Works resulted in a saving of over 64,500 tonnes of CO_2 emissions during 2016.

Extant permission exists for the use of Solid Recovered Fuel (SRF), Meat & Bone Meal and/or Chipped Used Tyres. Currently SRF, which is produced off-site to an agreed specification by the waste industry, is the only alternative fuel used in Platin Cement Works. The SRF is produced from residual waste materials following extraction of recyclable and commercially valuable components and is delivered to site as a ready to use fuel and handled in a purpose-built facility (refer to Figure 3.3) from where the fuel is fed directly to Kiln 3.

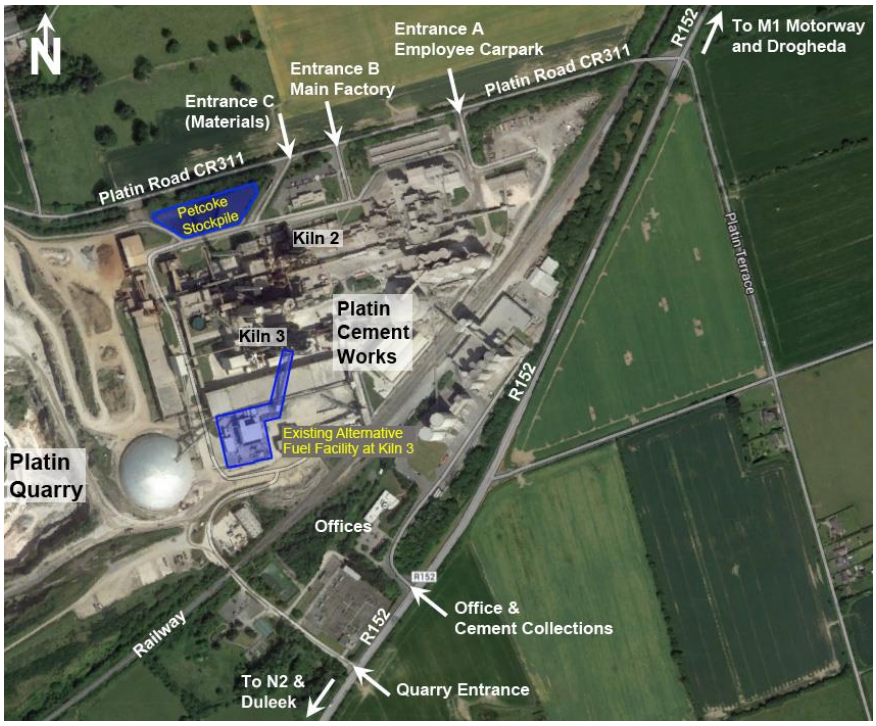


Figure 3.3 Existing Fuel Use in Platin Cement Works Showing existing Petcoke storage area to north and existing Alternative Fuels Facility to south of Kiln 3

The use of alternative fuels in cement kilns is known as '**co-processing**' in that it involves both the recycling of materials and the recovery of energy from the fuel inside the kiln. The introduction of SRF into Irish Cement's operations has facilitated recycling in Ireland by providing a guaranteed, energy efficient and cost-effective outlet for existing residual waste materials that would otherwise go to landfill or waste export.

The use of low carbon alternative fuels also provides for significant saving in CO_2 emissions. As previously noted, in 2016 Platin Cement Works reached its maximum permitted limit for alternative fuels, using 119,965 tonnes of SRF. This replaced the use of c.53,500 tonnes of imported fossil fuel and resulted in a saving of over 64,500 tonnes of CO_2 emissions.

3.5 Need for the Proposed Development

During 2016, Platin Cement Works reached its permitted maximum limit of 120,000 tonnes for the use alternative fuels in Kiln 3. However, the works also required over 61,500 tonnes of imported fossil fuel in order to meet the fuel demand for cement production. These figures relate to 2016 fuel requirements, where Kiln 3 is operating below maximum output and where Kiln 2 is currently not operational. With demand growing for cement from the construction sector, and the use of alternative fuels currently restricted, the need for an increasing fuel requirement can only be met by increased importation of fossil fuels.

If Platin Cement Works were to run at full output, it is estimated that c.220,000 tonnes of imported fossil fuel would be required on top of the existing permitted quantity of 120,000 tonnes of alternative fuels. Therefore, this existing limit on the use of alternative fuels places a significant restriction on the ability of the Cement Works to use lower carbon alternative fuels to both reduce use of imported fossil fuels and to maintain and enhance the long-term viability of its operations at Platin.

3.5.1 Proposed Alternative Fuel and Alternative Raw Material use at Platin Cement Works

The proposed development will allow Platin Cement Works to further replace fossil fuel use and to use alternative raw materials to replace a proportion of traditional raw materials used in the manufacture of cement. Subject to their availability, providing flexibility for a gradual increase in the quantity and range of alternative fuels used over time will significantly reduce reliance on imported fossil fuels. The application also seeks to use alternative raw materials for the cement-making process.

In total the proposed development will allow for the use of an additional 480,000 tonnes per annum of alternative fuels and for the use of alternative raw materials, which when taken with existing permitted alternative fuel use, gives flexibility for a combined overall maximum annual total of 600,000 tonnes per annum. In the scenario where maximum fossil fuel replacement is achieved, a small quantity of fossil fuel – c.10,000 tonnes per annum – will continue to be used for the initial firing of kilns (*i.e.* at start-up, or after maintenance stops) or as buffer fuel stock.

In 2016, the average fossil fuel replacement rate around cement plants in Europe was 41%, with some countries achieving much higher levels. In Germany for example, the average replacement rate is 62%; however at times, some cement plants have achieved 100% fossil fuel replacement. A wide range of different types of alternative fuels are used in Germany, including tyres, oils, paper pulp, plastics, animal meal, solid recovered fuel (SRF) / refuse derived fuel (RDF), wood, secondary liquid fuels (SLF), sewage sludge *etc*.

In Ireland, the recently published Regional Waste Management Plans (RWMP) recognise the increasingly significant role of cement plants in using waste for thermal recovery stating it is the policy that:

> *"The local authorities of the region support self-sufficiency and the development of indigenous infrastructure for the thermal recovery of residual municipal wastes in response to legislative and policy requirements. The preference is to support the development of competitive, environmentally and energy efficient thermal recovery facilities in Ireland, including the replacement of fossil fuels by co-combustion in industrial furnaces or cement kilns, and ultimately to minimise the exporting of residual municipal waste resources over the plan period."* (Section 4.3, page 32 of Eastern Midlands RWMP).

With the recent success of the use of alternative fuels in Platin Cement Works, and following other cement companies in Ireland and in Europe, ICL wishes to maximise flexibility in terms of the quantity and range of alternative fuels that may potentially be used at its Cement Works in Platin.

Platin Cement Works has a maximum annual production capacity of 2.8 million tonnes of cement. At the working target for fossil fuel replacement of circa 85%, this production would require the use of up to 480,000 tonnes per annum of alternative fuels, or an additional 360,000 tonnes over the existing 120,000 tonnes permitted per annum. There will continue to be an on-going requirement for a small quantity of fossil fuel use (c.10,000 tonnes / annum) for initial firing of kilns (*i.e.* at start-up, or after maintenance stops) and as buffer to the availability of suitable alternative fuels. In the scenario where suitable alternative fuels are either limited in availability or not available, Platin Cement Works will revert to use of fossil fuel to balance fuel requirements.

The proposed development will also allow for the introduction of alternative raw materials to the cement production process. Certain materials possess properties that are required in cement manufacture, as well as being a suitable source of alternative fuel. Examples of these materials include water treatment sludge, which contains aluminium; or soils and stones, which contain minerals necessary for the production of cement. Depending on availability, it is considered that up to 120,000 tonnes of alternative raw materials – (or circa 7% of current raw material use) could be used at Platin Cement Works. The quantity of alternative raw materials to be used is included within the additional 480,000 tonnes per annum of alternative fuels and alternative raw materials sought in the application.

Therefore, the proposed development will allow for the use of an additional 480,000 tonnes per annum of alternative fuels and alternative raw materials, which taken together with the existing permitted use of alternative fuels, will provide for an optional combined overall maximum annual total of 600,000 tonnes of alternative fuels and alternative raw materials.

A 10 year permission is being sought as the move towards reducing fossil fuel use will only be realised through a gradual and progressive expansion in the quantity and range of alternative fuels to be accepted in both Kiln 2 and Kiln 3. Therefore, the reduction in fossil fuel use will also be a gradual process, realised over time and dependent on availability of suitable alternative fuels.

3.6 Detailed Description of the Proposed Development

Irish Cement is applying to An Bord Pleanála for a ten year planning permission for development for further replacement of fossil fuels with lower carbon alternative fuels and for the use of alternative raw materials at Platin Cement Works, County Meath. Extant permissions already allow for the use of up to 120,000 tonnes per annum of a limited range of alternative fuels in Kiln 3. However, the proposed development seeks the flexibility to replace virtually all existing use of imported fossil fuels (*i.e.* up to 85% replacement) and for the introduction of alternative raw materials in replacing a portion of traditional raw materials used in the manufacture of cement. In total this requires an additional 480,000 tonnes per annum of alternative fuels and alternative raw materials for both Kiln 2 and Kiln 3.

Following research on guidance by the Environmental Authorities in Switzerland and Germany, a range of materials have been selected as suitable for use as alternative fuels by cement plants. These materials include both non-hazardous and hazardous materials. The cement industry has been using these materials throughout Europe for more than 35 years and many of these materials are already licensed for use by the Environmental Protection Agency (EPA) for cement production in Ireland.

3.6.1 Proposed Alternative Fuels

Irish Cement proposes to introduce a range of lower carbon alternative fuel types to the cement manufacturing process that are regarded as suitable for alternative fuel usage under the EPA licensing regulations. These alternative fuels can be characterised into broad categories of material:

- Fine Solids: Fine materials, like existing SRF, typically sized 10-50mm (*e.g.* chipped timber, shredded plastics). These materials will delivered to site ready for use and off-loaded from trucks into enclosed bays

from where they will be pneumatically conveyed to the kiln system, similar to the existing SRF handling and feeding system installed on Kiln 3.

- **Coarse Solids:** Materials typically of 30-120mm particle size will be prepared off site to a defined specification before delivery to site (*e.g.* shredded wood, rubber, dry filter cakes). These materials will be delivered to site and off-loaded from trucks into bays inside enclosed buildings and thereafter transferred to the kiln feeding system using screw feeders and/or overhead cranes.
- **Free-flowing Solids:** Some fuels will be free-flowing solids or powders that will be off-loaded into sealed silos (*e.g.* SRF pellets, sewage sludge pellets). The fuels will be pneumatically conveyed from the storage silos to the kiln burners via enclosed pipelines.
- **Pumpable Fluids:** Fluid type materials (*e.g.* secondary liquid fuels (SLF), waste oils, secondary liquid fuels (SLF), distillation residues, paint sludge) that will be delivered by tanker and offloaded using pumps into on site storage tanks located within bunded compounds. These fluid fuels will be pumped to the kiln bunkers via enclosed pipelines.
- **Whole Tyres:** Whole tyres can be introduced to Kiln 2 using a dedicated sorting and elevation and weighing system to feed a single tyre at a time through a double flap feeding point on the preheater tower.

Due to the nature and source of the proposed alternative fuels, the materials are considered wastes and as such are identified in the EPA's Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-hazardous[3] (June 2015). While the majority are not hazardous, some potential fuel materials are categorised as hazardous waste. Some materials such as secondary liquid fuels (SLF) and waste oils are flammable. In other cases, materials on the list may contain flammable components, such as soil containing trace levels of diesel and petrol from fuel spills, cloths and filters or sawdust containing solvent or paint residues. In some cases, packaging containing residues may qualify as being hazardous but will still be suitable for use in the cement kilns. These materials can be processed effectively in the kilns because of the high temperatures which ensures complete destruction and no increase in emissions from the site. These and similar materials are currently used throughout Europe to replace fossil fuels in cement kilns. All materials are subjected to testing to ensure they meet the agreed specifications and prior to any new material being introduced a test programme must be agreed with the EPA. A full schedule of the proposed materials with their LOW codes is provided in Appendix 3.5.

Experienced and licensed waste management contractors will produce and deliver the alternative fuels to a defined specification for use at Platin Cement Works. Therefore, fuels delivered to site must be in compliance with the relevant specification and be 'ready to use'. The fuels will be conveyed directly from their storage and handling locations and then through appropriate feeders to be combusted in the kilns. No processing, other than 'unpacking' or de-baling of the fuels, will take place on site and likewise no additional residues will arise from their use or from this development.

3.6.2 Eastern-Midlands Region Waste Management Plan and the use of SRF

The existing permission for alternative fuels at Platin Cement Works allows for the use of up to 120,000 tonnes per annum of solid recovered fuels (SRF). Section 16.4.5 of the Eastern Midlands Region Waste Management Plan 2015-2021 (page 170) notes that '*cement kilns accept solid recovered fuel (SRF) and refuse-derived fuel (RDF) type wastes that are generated from municipal and construction sources, as well as other wastes such as meat and bone meal, chipped tyres and high calorific fuels. These alternative fuels replace the use of fossil fuels in the cement*

[3] Based on:

- Commission Decision of 18 December 2014, amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European parliament and of the Council (2014/955/EEC) [referred to hereafter as 'The List of Waste (LoW)'].
- Commission Regulation (EU) No 1357/2014 of 18 December 2014, replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives.

production process.' The Plan also proposes a '*national thermal recovery capacity need of 300,000 tonnes*' as referenced in policy E15a of the Plan (refer to Plate 3.3).

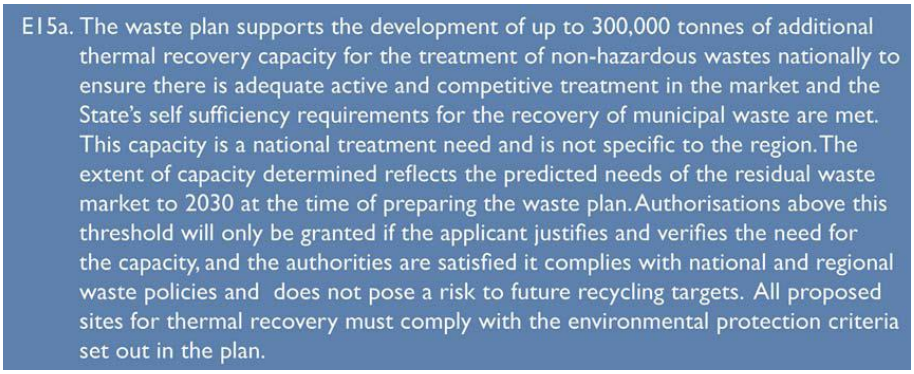

E15a. The waste plan supports the development of up to 300,000 tonnes of additional thermal recovery capacity for the treatment of non-hazardous wastes nationally to ensure there is adequate active and competitive treatment in the market and the State's self sufficiency requirements for the recovery of municipal waste are met. This capacity is a national treatment need and is not specific to the region. The extent of capacity determined reflects the predicted needs of the residual waste market to 2030 at the time of preparing the waste plan. Authorisations above this threshold will only be granted if the applicant justifies and verifies the need for the capacity, and the authorities are satisfied it complies with national and regional waste policies and does not pose a risk to future recycling targets. All proposed sites for thermal recovery must comply with the environmental protection criteria set out in the plan.

Plate 3.3 Policy E15A of the Regional Waste Management Plan

As set out in Table 16.7 of the Plan, the 300,000 tonnes per annum of required thermal recovery capacity takes account of all permitted tonnages to date, including existing permissions in 3 cement plants; as well as in the existing Waste to Energy Facility at Carranstown and in the Waste to Energy Facility at Poolbeg.

In January 2016, Indaver Ireland Limited lodged a planning application with An Bord Pleanála (ABP) for a further Resource Recovery Centre (Waste to Energy) at Ringaskiddy, County Cork (ABP Case Ref.: PL04.PA0045). If permitted the proposed development would have capacity for up to 200,000 tonnes / annum of household waste. This application was granted by Cork County Council and is currently under appeal to An Bord Pleanála.

In March 2017 ICL received permission for the use of up to 90,000 tonnes per annum of alternative fuels in its Limerick Cement Factory. The development allows for the use of up to 30,000 tonnes per annum of SRF. This permission is under appeal to An Bord Pleanála.

While the national requirement for 300,000 tonnes per annum of thermal recovery capacity for SRF is still available, the proposed development at Platin Cement Works has limited the use of SRF as an alternative fuel to an additional 100,000 tonnes per annum – or to 220,000 tonnes per annum combined with the existing 120,000 tonnes / annuma of permitted use. Therefore, this proposed use of up to an additional 100,000 tonnes per annum of municipal-derived waste (or SRF) as an alternative fuel in Platin Cement Works is fully consistent with the Eastern-Midlands Regional Waste Management Plan 2015-2021.

Compliance with the environmental protection criteria as noted in Policy E15a of the Eastern-Midlands Regional Waste Management Plan is detailed further in Chapter 2 of this EIA Report.

3.6.3 Proposed Alternative Raw Materials

The application also seeks permission to introduce up to 120,000 tonnes per annum of alternative raw materials to the cement production process. This includes materials such as alum filter cake, soils and stones, dusts *etc.* that will be stored within an enclosed purpose-built Raw Materials Building. These materials, which will replace a proportion of the traditional raw materials, and are accommodated within the additional 480,000 tonnes per annum figure sought for the further use of alternative fuels and for use of alternative raw materials.

3.6.4 Proposed Development and Programming

The development will require the provision of a number of buildings, silos, and associated conveyors and structures, *etc*. for the receiving, handling and introduction of the alternative fuels and raw materials to the cement plant. The buildings and structures will be provided on a gradual phased basis in line with the progressive introduction of new fuels, and consequently, a ten year permission is sought for the overall development.

The development requires the demolition of one existing firewater retention tank associated with the existing alternative fuel handling facility for Fine Solids (SRF) at Kiln 3. Prior to demolition of the existing tank, a replacement firewater retention tank is to be constructed a short distance to the west of the current location.

While some flexibility is required to take account of market availability of particular fuels and licensing approval with the EPA, the following provides a description of the buildings, structures and fuels that are proposed in the short-term (0 to 4 years), medium-term (3 to 7 years) and longer-term (6 to 10 years) within the overall timeframe of the ten year permission. Some overlap of timing is allowed for in the definition of short, medium and longer-term to facilitate construction, sourcing of alternative fuel and approval of test programmes by the EPA.

All of the buildings, structures and associated developments vary in size; however, they are generally of low elevation when viewed against the existing nature and scale of development at the Cement Works and all are located within or adjoin the existing developed footprint of the Cement Works. The proposed structures will comprise a mixture of exposed cast concrete, steelwork and corrugated sheeting. These structures will be in-keeping with the existing character of the Plant.

While proposed new buildings and structures are outlined below, it should be noted that up to 120,000 tonnes per annum of permitted alternative fuels (SRF) are already in use in Kiln 3 at Platin Cement Works. These fuels are handled within an existing purpose built facility (refer to Figure 3.3), which also has the in-built ability to begin introducing additional SRF in Kiln 3 without further adaption.

Table 3.1 Proposed Structures

Details of Proposed Structures (with reference to location as indicated on Figure 3.4)	Approximate Overall Building Dimensions (LxWxH)(m) Silo Dimensions (HxDia)(m)	Proposed External Treatment of Walls/Roof
Short-Term Structures		
1. Fine Solids Building for Kiln 3 (As an extension to existing Fine Solids (SRF) building)	Building c.17m x 29m x 16m	Exposed cast concrete, steelwork & metal corrugated cladding
Fire-water Retention Tank (*i.e.* relocation of existing tank, which is to be demolished)	Concrete tank c.17m x 10.6m x 2.5m on concrete pad c. 18.6m x 11.6m	Exposed cast concrete & steelwork
2. Proposed Pumpable Fluids Tanks for Kilns 2 and 3	2 no. Tanks c.9m x 8.24m dia. 1no. Tank c.9m x 5m dia.	Exposed cast concrete, steelwork and metal corrugated cladding
Bunded Area surrounding tanks	420sq.m enclosed by 2m high wall	Exposed cast concrete and steelwork
Tanker off-loading area	Concrete yard of c.23m x 10m, with 25m3 underground storage sump. Enclosed by 2.5m security fence	Exposed cast concrete, & steelwork
3. Proposed 'Free Flowing' Solids Silos for Kiln 3	2 no. silos c.26m x 5.5m dia.	Steel silos/tanks and steelwork
Bunded Area	9.2m x 15.1m x 4m	Exposed cast concrete & steelwork
4. Alternative Raw Materials Building for Kilns 2 & Kiln 3	Building c.53.7m x 53m x 14.3m	Exposed cast concrete, steelwork & metal corrugated cladding
Fire-water Retention Tank	13.6m x 10.6m x 2.5m on concrete pad c. 14.6m x 11.6m	Exposed cast concrete & steelwork

Details of Proposed Structures (with reference to location as indicated on Figure 3.4)	Approximate Overall Building Dimensions (LxWxH)(m) Silo Dimensions (HxDia)(m)	Proposed External Treatment of Walls/Roof
Medium-Term Structures		
5. Proposed general Fine Solids Building for back end of Kiln 2	Building c.26m x 49.5m x 8m	Exposed cast concrete, steelwork & metal corrugated cladding
Fire-water Retention Tank	Concrete tank c.9.6m x 9.6m x 2.5m on concrete pad c.10.6m x11.6m	Exposed cast concrete & steelwork
6. Proposed 'selected' Fine Solids fuel introduction / metering structures for front end of Kiln 2	Building c.7.5m x 6m x 26.7m 2 no. truck off-loading stations c.4m x 7.5m x 5.5m and c.35m length of conveyor	Exposed cast concrete, steelwork & metal corrugated cladding
Longer-Term Structures		
7. Tyre Storage and Handling Area	835sqm with 3m high wall	Exposed cast concrete.
Tyre Intake Station and Conveyor	c.18m x 16m x 30m plus c. 57m proposed conveyor.	Exposed cast concrete, steelwork & metal corrugated cladding
Transfer Station and Conveyor	c.8.5m x 5.5m plus c 55.3m proposed conveyor	Exposed cast concrete, steelwork & metal corrugated cladding
Fire-water Retention Tank	Concrete tank c.9.6m x 9.6m x 2.5m on concrete pad c. 10.6m x 11.6m	Exposed cast concrete & steelwork
8a. Proposed Coarse Solids handling building for Kiln 2 & 3	Building c.97.5m x 50m x 12.15m	Exposed cast concrete, steelwork & metal corrugated cladding
Fire-water Retention Tank	13.6m x 10.6m x 2.5m on concrete pad c. 14.6m x 11.6m	Exposed cast concrete & steelwork
8b. Conveying Building and Conveyors for Kiln 3	c.18m x 16m x 30.5m plus c.83m of proposed conveyor	Exposed cast concrete, steelwork & metal corrugated cladding
9. Proposed Free-flowing Solids for Kiln 2.	2no. silos c.26m x 5.5m dia.	Steel silos/tanks & steelwork
Bunded Area	9.2m x 15.1m with 4m high wall	Exposed cast concrete & steelwork
10. Bypass Filter for Kiln 2	c.9m x 15m x 24m, with cooling tower to c.46m x 5.6m dia.	Steel, steelwork & ductwork
Proposed Coarse Solids for Kiln 2 (*makes use of same building as provided under Item 7a above*.)	Makes use of same building as provided for under Item 8a above.	Exposed cast concrete, steelwork & metal corrugated cladding.
11. Truck off-loading / elevator / buffer building for Kiln 2	c.16m x 18m x 30.5m	Exposed cast concrete, steelwork & metal corrugated cladding.
Transfer Station	c.8.5m x 5.5m x 38.5m plus c.200m of proposed conveyor	Exposed cast concrete, steelwork & metal corrugated cladding

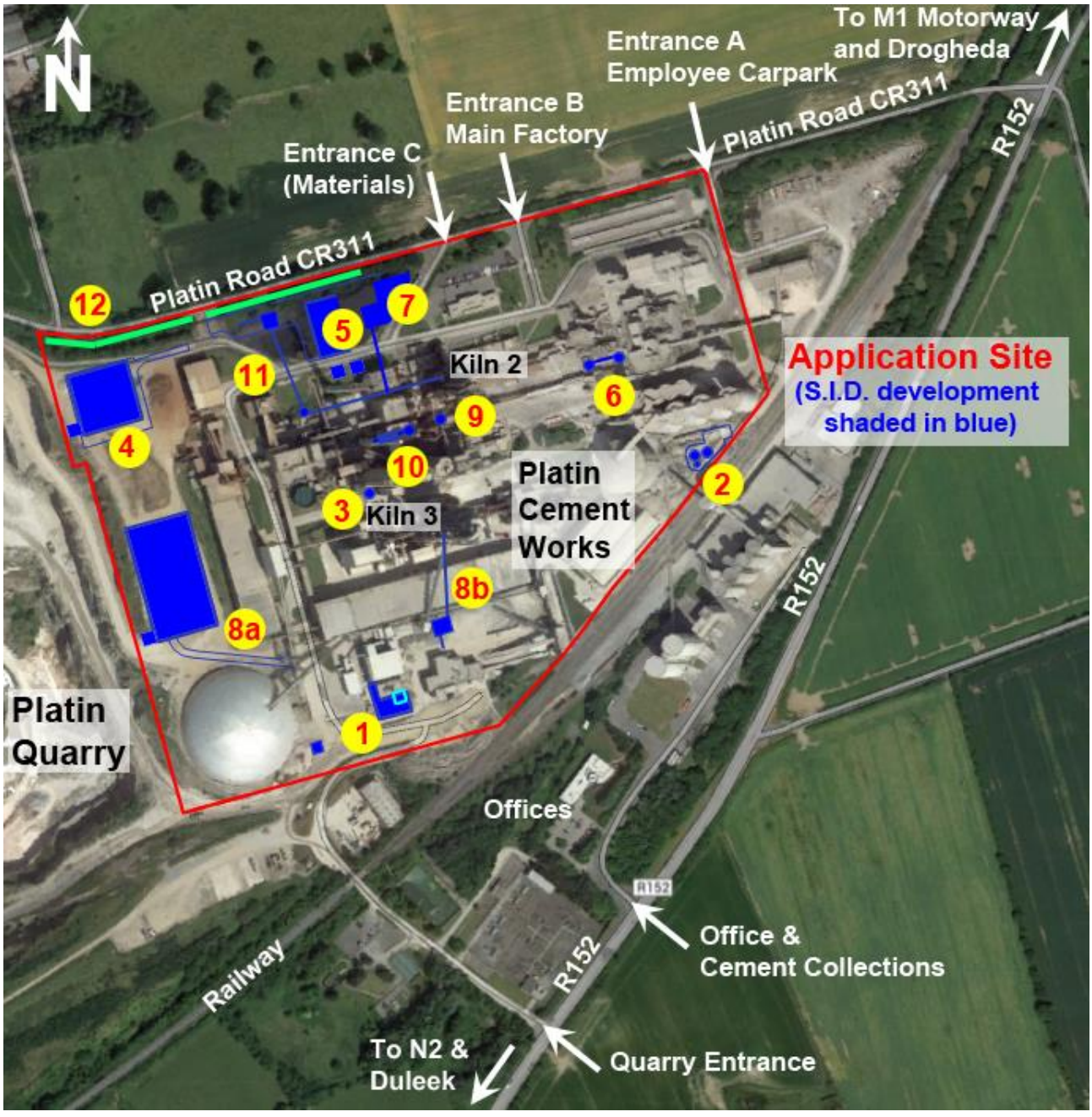


Figure 3.4 Location of Proposed Structures / Works

3.6.4.1 Firewater, Emergencies and Environmental Queries and Complaints

A full firewater risk assessment has been carried out of potentially contaminated firewater arising from fires at Platin Cement Works, Co Meath and is included at Appendix 3.1 of the EIA Report. The risk assessment followed the methodology set out in the EPA's Draft Guidance Note to Industry on Requirements for the Establishment of Fire-Water Retention Facilities.

One existing firewater pond which is associated with the already permitted on-site facility for the handling and introduction of alternative fuels will need to be removed to facilitate a proposed extension to the building. A new replacement firewater pond will be constructed and commissioned prior to removal of the existing facility.

In accordance with the Industrial Emissions Licence for the facility, Platin Cement Works maintains and operates an Emergency Response Procedures Plan and an Environmental Queries and Complaints Policy. Copies of these are included at Appendix 3.2 and Appendix 3.3 respectively of the EIA Report.

3.6.4.2 Construction

Construction access will be Entrance C on Platin Road CR311 (refer to Figure 3.4). Insofar as practicable, construction vehicles will be directed to use the M1 to arrive to and depart from the site. However, there may be a need for some traffic to arrive at the site from other routes. Further details on the construction access strategy will be prepared by the contractor for the works and included in a construction traffic management plan which will be prepared prior to the commencement of the works.

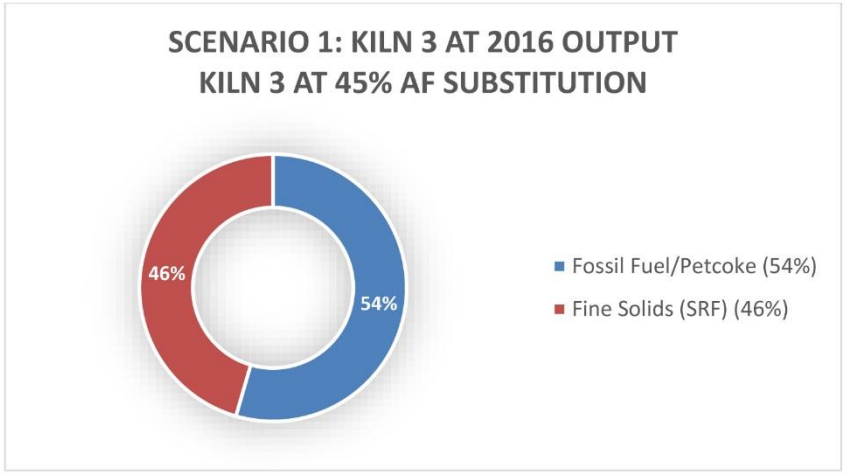
A temporary construction compound will be required for each phase of construction. This compound will be located within the Platin Cement Works site. The compound will be decommissioned and reinstated to its original condition at the end of the construction period.

Construction of the proposed development is further detailed in the Construction and Environmental Management (CEMP) included at Appendix 3.4.

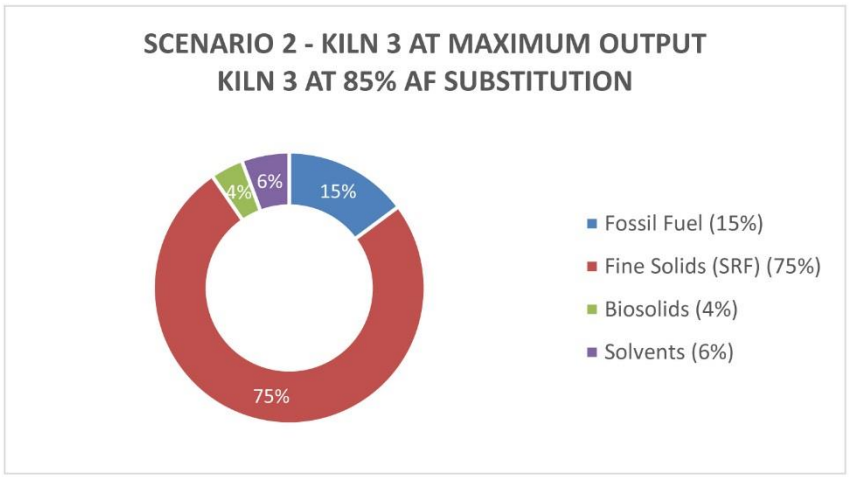
3.7 Potential Scenarios for proposed use of Alternative Fuels

While it is an objective to use alternative fuels to maximise the replacement of fossil fuel use (*i.e.* up to 85%) at Platin Cement Works this will be dependent on the availability of suitable alternative fuels. Therefore, the proposed development is seeking permission for maximum optional flexibility in the quantity and range of potential alternative fuels to be used. A full schedule of the potential alternative fuels, and alternative raw materials, is provided at Appendix 3.5. In the scenario where suitable alternative fuels are either limited in availability or not available, Platin Cement Works will revert to use of fossil fuel to balance fuel requirements.

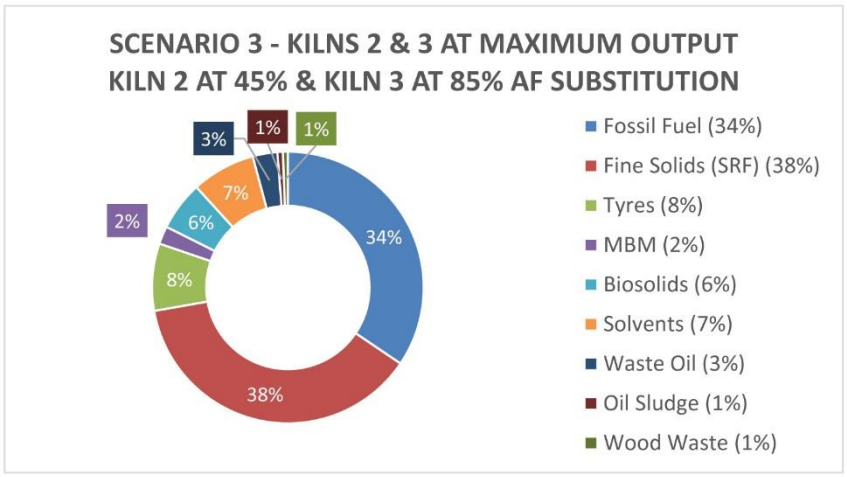
Therefore, the future use of alternative fuels at the Cement Works will involve a degree of fluctuation between various alternative fuels and between alternative fuels and fossil fuel. While exact alternative fuel use patterns cannot be predicted at this stage a number of potential scenarios have been developed and are presented in Figure 3.5. These scenarios begin with **Scenario 1**: the actual position in 2016, which indicated that the maximum permitted use of alternative fuels (i.e. 120,000 tonnes) gave approximately 45% fossil fuel substitution in Kiln 3 and provided CO_2 savings of over 64,500 tonnes. Kiln 2 did not operate during 2016. **Scenarios 2 and 3** present potential interim positions, while **Scenario 4** is indicative of the target objective for the proposed development providing for c. 85% fossil fuel replacement in 2 fully operational kilns with a resultant potential maximum CO2 saving of over 314,000 tonnes per annum. **Scenario 5** is indicative of the situation where the availability of suitable alternative fuels does not meet actual fuel requirements, and hence the Cement Works would revert to increased use of fossil fuel with a consequent fall off in in potential CO_2 savings and in the fossil fuel replacement rate (*e.g.* 60% in Kiln 2 and 80% in Kiln in this scenario).



CO2 Saving 64,530 t/a

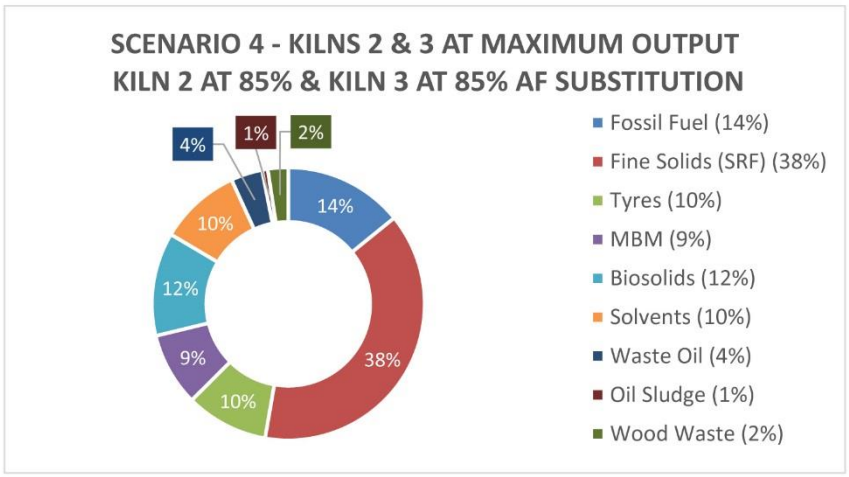


CO2 Saving 141,472 t/a

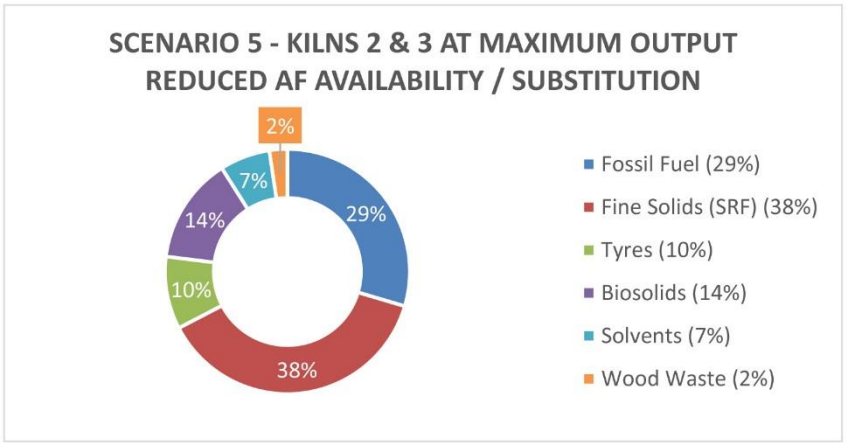


CO2 Saving 192,354 t/a

Figure 3.5: Potential Scenarios – wit consequent CO_2 savings – for the future use of Alternative Fuels at Platin Cement Works



CO2 Saving 314,340 t/a



CO2 Saving 158,018 t/a

Figure 3.5 (contd.): Potential Scenarios – wit consequent CO_2 savings – for the future use of Alternative Fuels at Platin Cement Works

3.8 Overview of Environmental Effects

A full assessment of the likely environmental effects of the proposed development is provided in this EIA Report.

However, in summary, the proposed development will have a positive impact on underpinning existing direct employment and will increase the opportunities for further indirect employment in the off-site sourcing, preparation and delivery of alternative fuels and materials to Platin Cement Works. The proposed development will not give rise to any change in the existing cement making process.

In terms of reducing waste, the proposed development will have a positive impact in diverting materials that would otherwise go to landfill or waste export, to the Cement Works, where they would be recovered and reused as alternative fuels and/or alternative raw materials. The use of these alternative fuels will also reduce the use of primary resources, *e.g.* by offsetting the requirement for up to c.210,000 tonnes per annum of imported fossil fuels. Likewise in terms of effect on climate, the proposed development could reduce potential CO_2 production at Platin Cement Works by a significant c.314,000 tonnes per annum.

While the proposed development would result in very minor changes to traffic, it would not have any significant impact on human health, biodiversity (flora & fauna), land, soils, geology & hydrogeology, water & hydrology air quality, noise & vibration, traffic, material assets, or on cultural heritage or the landscape & visual environment.

3.9 Alternatives Considered

In discussing alternative scenarios it is important to note that consideration of alternative development locations or sites was found to be neither realistic nor practicable. Platin Cement Works is an established operational cement

manufacturing facility, which already has permission for alternative fuel development and use. The Cement Works has an established workforce, is ideally located, and is well-positioned in terms of reserves of raw material, infrastructure and the markets that it services. Therefore, the consideration of alternatives needs to be set within the parameters of existing Cement Works site.

Therefore the following realistic and practicable alternative scenarios are considered:

1. 'Do-nothing' Alternative: Maintain the existing limit for alternative fuels at the permitted maximum of 120,000 tonnes per annum. Therefore, increased demand for cement production would be increasingly reliant on further importation of fossil fuels with up to c.220,000 tonnes per annum of fossil fuel required to meet the requirements of the Cement Works at full production. There is no allowance in this option for the use of alternative raw materials in the cement manufacturing process. The use of alternative fuels in the do-nothing (existing) scenario provides for CO_2 savings of c.64,500 tonnes per annum.

2. 'Do-Something' Intermediate Replacement Alternative: Increase the existing limit for use of alternative fuels from the existing permitted 120,000 tonnes per annum to allow for up to c.45% replacement of fossil fuel requirements based on maximum cement production. This would require up to c.230,000 tonnes of alternative fuels (or an additional 110,000 tonnes per annum over existing permitted use). Up to 60,000 tonnes per annum of Alternative raw materials may also be used giving an overall annual maximum limit of 300,000 tonnes. The balance of requirement for fuel would revert to increased fossil fuel use, with up to c.130,000 tonnes of fossil fuel per annum needed to meet the requirements of the Cement Works at full production. This do-something alternative provides for CO_2 savings of up to c.115,500 tonnes per annum.

3. 'Do Maximum' Replacement Alternative: Increase the limit for use of alternative fuels to the maximum required to allow for virtual full fossil fuel replacement (c.85%) at full cement production, *i.e.* up to an additional 480,000 tonnes per annum of a wide range of alternative fuels and alternative raw materials over existing permitted use of 120,000 tonnes per annum of a limited range of alternative fuels. A quantity of c.10,000 tonnes per annum of fossil fuel would continue to be required for initial firing of the kilns after start-ups *etc*. This do-maximum alternative provides for CO_2 savings of up to c.314,000 tonnes per annum.

Table 3.2 below presents the findings of the environmental assessment into the fossil fuel replacement alternative scenarios considered. For the most part there is little environmental difference between the alternatives considered. Alternative 1 does not require any further construction. The provision of buildings and structures associated with Alternatives 2 and 3 has potential for minor construction-stage impacts on soils, water, visual, traffic and waste aspects. However, for the majority of environmental aspects, *e.g.* noise and vibration, air quality, water discharge, as well as for human health *etc*. no adverse impact will arise as all options must comply with the limits and controls set out and monitored by the EPA in the Industrial Emissions Licence for the Cement Works (Licence Reg. No.: P0030-04).

During the operation stage, there is a change in the character of fuel deliveries associated with Alternatives 2 and 3. An increase in the use of alternative fuels replaces a requirement for fossil fuel use and therefore, there is an offset in fuel deliveries and hence traffic. Given the greater bulk of some alternative fuels and the variety in calorific value between individual alternative fuels (*e.g.* 15 to 27 MJ/kg) and that of Petcoke (31MJ/kg) a greater tonnage of alternative fuels as opposed to fossil fuel is required for any given level of cement production. However the potential impact on traffic is much reduced by offsetting, in that fossil fuel is bulk delivered (i.e. in batches of 30,000 to 50,000 tonnes) and stored on site with traffic peaks over a number of weeks, whereas alternative fuels are delivered in a 'just in time' use pattern with on-site storage limited to a number of days used only. Therefore, the use of alternative fuels has the effect of reducing or removing peak deliveries associated with fossil fuels in lieu of a more dispersed and consistent traffic pattern.

Alternative 2 and more particularly Alternative 3 provides for significantly greater savings in CO_2 emissions than Alternative 1 ('Do-nothing' Alternative) and as such, Alternative 1 is the least preferable. Alternative 3 is the most

beneficial and preferable in terms of providing for significant savings in CO_2 emissions and for reductions in the use of non-renewable natural resources.

Alternative 3 is also considered to be preferable in terms of the overall proper planning and sustainable development of the area in that it provides for the maximum opportunity for recycling and recovery of waste materials that would otherwise be diverted to landfill or to export.

Table 3.2 Assessment of Environmental Impacts of Alternative Options

Environmental Aspects	Alternative 1 Do-Nothing	Alternative 2 Do-Something	Alternative 3 Do-Maximum
Population	Neutral / No change	Potential Slight Positive (Increase in indirect employment)	Potential Moderate Positive (Increase in indirect employment)
Human Health	Neutral / No change	No change / Imperceptible	No change / Imperceptible
Biodiversity (Flora and Fauna)	Neutral / No change	Neutral / No change (No flora & fauna will be impacted by development)	Neutral / No change (No flora & fauna will be impacted by development)
Land, Soils, Geology and Hydrogeology	Neutral / No change	Slight negative (construction phase)	Slight negative (construction phase only)
Water & Hydrology	Neutral / No change (Discharges to water must comply with IE Licence)	Neutral / No change (Discharges to water must comply with IE Licence)	Neutral / No change (Discharges to water must comply with IE Licence)
Air Quality	Neutral / No change (Emissions must comply with IE Licence)	Neutral / No change (Emissions must comply with IE Licence)	Neutral – No change (Emissions must comply with IE Licence)
Climate	Neutral / No change[1] (CO_2 emission savings up to c. 64,500 tonnes per annum)	Moderate positive (CO_2 emission savings up to c. 115,500 tonnes per annum)	Significant positive (CO_2 emission savings by up to c.314,000 tonnes per annum)
Noise and Vibration	Neutral / No change (must comply with IE Licence)	Neutral / No change (must comply with IE Licence)	Neutral / No change (must comply with IE Licence)
Landscape & Visual	Neutral / No change	Slight / Imperceptible	Slight / Imperceptible
Cultural Heritage	Neutral / No change	Neutral / No change (No impact on cultural heritage)	Neutral / No change (No impact on cultural heritage)
Traffic	Neutral / No change	Neutral / Slight Impact (There is sufficient road capacity and changes are minimal)	Neutral / Slight Impact (There is sufficient road capacity and changes are minimal)
Material Assets	Neutral / No change[1]	Moderate reduction in use of non-renewable natural resources (fossil fuel and alternative raw materials)	Significant reduction in use of non-renewable natural resources (fossil fuel and alternative raw materials)
Interactions	Neutral / No change	Neutral / No change	Neutral / No change
Overall Assessment	Neutral / No change[1]	Moderate positive	Significant positive

[1] (Climate, Material Assets and Overall Assessment) While the 'Do-nothing Alternative' does not give rise to any change in terms of climate, it also means that the positive impacts associated with additional savings in CO_2 emissions and in the use of natural resources in Alternatives 2 and 3 are not realised.

The range and type of alternative fuel could also be limited or restricted, however, this is considered unnecessary, as all proposed alternative fuels are entirely utilised in firing the kilns and in the cement manufacturing and therefore, no residual wastes would arise and no environmental impacts occur.

In addition, a continuous supply of fuel is required and these materials must be available within the market. Therefore, should certain alternative fuels become scarce or unavailable, Platin Cement Works must continue to be able to adjust the fuel type used in the production process according to what is readily available. This flexibility has a secondary effect of responding to the evolving waste types produced from domestic and industry sources.

A further benefit arising from the use of various materials is their chemical composition and hence their potential alternative raw material value. Certain materials hold other properties required in the production of cement, *e.g.* calcium carbonate, alumina or silica, which reduce the need for mined material in the cement making process. Parts of these materials not used as alternative raw material can be used as alternative fuel.

The selection of fuel types and their approval for use in the Cement Works will also be monitored and licensed by the EPA. Therefore, the proposed development will require a review of the existing IE licence to allow the introduction of new fuels.

For these reasons Alternative 3 the 'Do Maximum Fossil Fuel Replacement' option, with the use of a wide range of materials as alternative fuels and alternative raw materials was selected as the preferred option for the overall proper planning and sustainable development of the area and this alternative forms the basis of the proposed development.

4 Population and Human Health

In this chapter, potential effects on population are considered under Section 4.1 while potential effects on human health are considered under Section 4.2.

4.1 Population

4.1.1 Introduction

This chapter of the EIA Report considers the potential effects of the Proposed Development on human beings, living, working and visiting in the vicinity of Platin Cement Works and the application site. The chapter details with the potential direct and indirect effects of the Proposed Development with regard to principal socio-economic indicators, including population, employment, tourism and residential amenity.

An acknowledged consideration in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct or indirect effects arising from the construction and operation of development. Ultimately, a development will impinge on human beings to some extent, either directly or indirectly, and either positively or negatively. The key issues examined in this section of the chapter includes the extent of effect on the population, employment, residential amenity and economic activity.

Other aspects of potential direct and indirect effects on human beings are also considered in the other chapters of this EIA Report. Of particular relevance are assessments prepared in:

- Chapter 7 Water and Hydrology
- Chapter 8 Air Quality and Climate
- Chapter 9 Noise and Vibration
- Chapter 10 Landscape and Visual
- Chapter 12 Traffic

4.1.2 Methodology

The baseline condition in relation to the human environment in the area of the development location has been assessed by means of a desk-based study to assess the available information in relation to the population in the area of the Proposed Development, current levels of housing, residential amenity, employment levels and the baseline in relation to land use tourism.

Information for population data has been sourced from the Central Statistics Office (CSO). MyPlan.ie and from other literature, including the County Development Plan, pertinent to the area. Population and employment characteristics of the area has been sourced where available, from the most recent 2016 census data; the Census of Ireland 2011; and from the CSO website, www.cso.ie. Census information is divided into State, Provincial, County, major Town and District Electoral Division (DED) level. The latter Electoral Division levels and closest towns are considered the most relevant for this application.

4.1.3 Existing Environment

The Cement Works within which the Proposed Development is located in the townland of Platin, circa 2.5km northeast of Duleek, County Meath and circa 1.5km southeast of Donore Village. Drogheda Town is located approximately 1.75km northeast of the Cement Works. The land surrounding the Cement Works is primarily agricultural but also includes industrial uses. Indaver Waste to Energy Facility is located south of the Cement Works, while Platin Limestone quarry is immediately west of the Cement Works. A number of other quarries, including Roadstone's quarry at Mullaghcrone, are also located to the north and west of the Irish Cement quarry at Platin.

4.1.3.1 Demography

In order to extrapolate conclusions about the population and other statistics in the vicinity of the Proposed Development, the study area for this chapter is defined in terms of the District Electoral Divisions (DEDs) of Duleek and St Mary's. The Proposed Development is located in the DED of St. Mary's, close to the boundary of the DED of Duleek (See Figure 4.1).

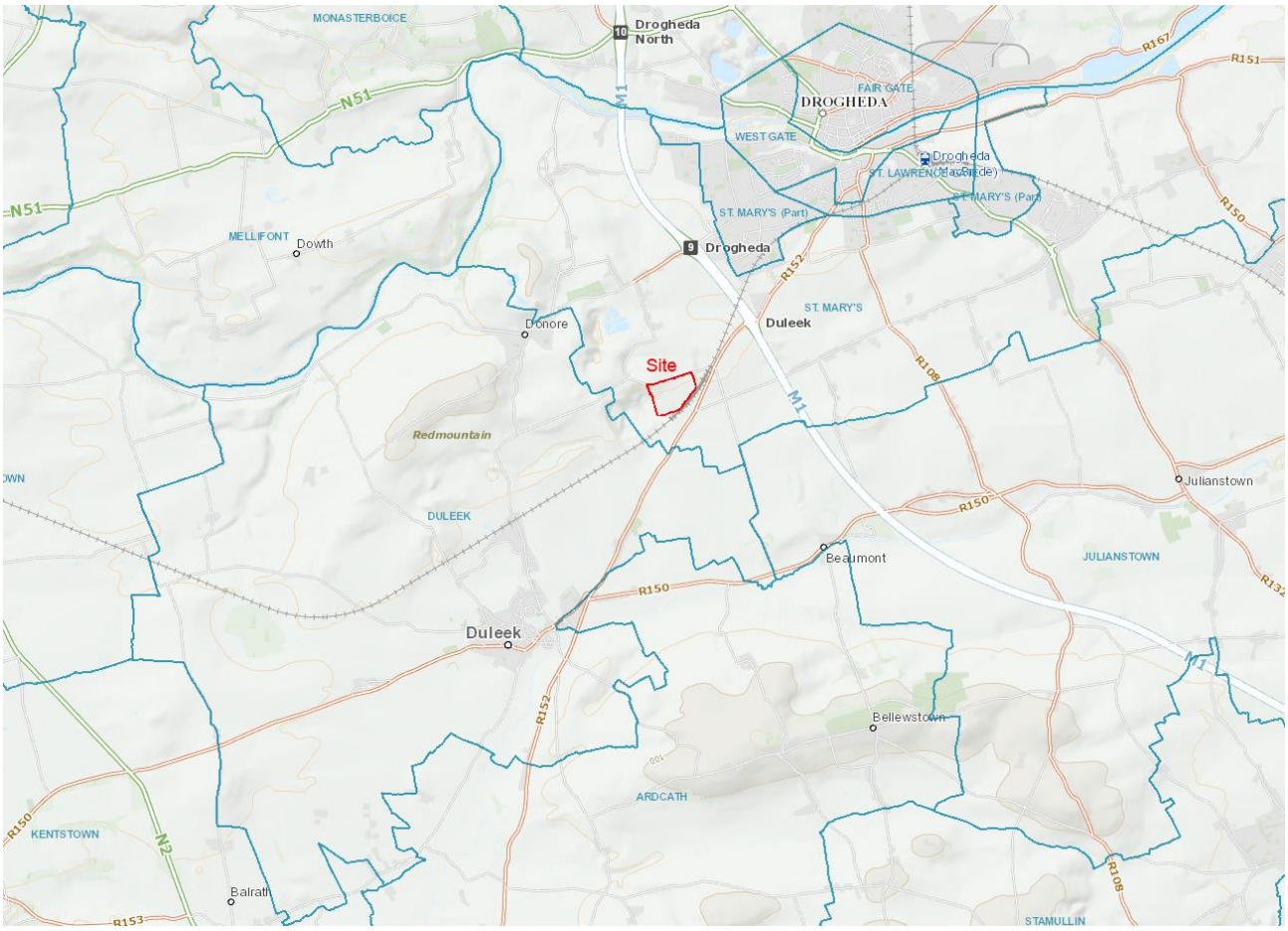


Figure 4.1 Location of Electoral Divisions (DEDs) of Duleek and St Mary's

In the five years between the 2011 and the 2016 Census, preliminary census data on the population of the Republic of Ireland summarises a growth of 3.7%. During this time, the population of County Meath grew by 5.9% to 194,942 persons.

Though population results for 2016 are available for provinces, counties and cities and electoral divisions, studies on age and economic activity have not yet been released. Therefore, for the purpose of the establishing the current baseline, 2011 population data is used.

The Cement Works and the site of the Proposed Development is located between the electoral divisions (ED) of Duleek and St. Mary's. In 2016, the population of Duleek ED was 5,554 people while the population of St. Mary's ED was 11,967 bringing the overall population within the two electoral districts to 17,521. The population of both Duleek and St. Mary's has continued to grow rapidly in recent years.

The demographic trends for the two relevant ED's for the 5-year period between 2011 and 2016 are provided in Table 4.1.1 below. The total population for these two ED's show an increase of 9% over the inter-censal period from 2011-2016.

Table 4.1.1: Population of District Electoral Divisions

	2011	2016	2011-2016	Actual Population Change
Duleek	5,177	5,554	7.3%	377
St. Mary's (part of)	10,769	11,967	11.1%	1,198
Total Pop.	**15,946**	**17,521**	**+ 9%**	**1,575**

4.1.3.2 Population and Age

As 2016 data on the age breakdown of counties and towns have not yet been released, data is derived from the information extracted from the 2011 census. In 2011, there were 38,578 persons in living in Drogheda and 3,988 persons living in Duleek, the closest towns to the Proposed Development. Table 4.1.2 shows the breakdown and percentage breakdown of the population in Duleek and Drogheda based on their age range group during the 2011 Census against the County and State average. This figure is further broken down into percentages of the population within these age ranges.

Table 4.1.2: Duleek and Drogheda Population Categorisation by Age

Age Range (years)		Duleek Town 2011 (no. of people and %)	Drogheda 2011 (no. of people and %)	Meath 2011 (no. of people and %)	State 2011 (no. of people and %)
No. and Percentage of Population Aged					
	0-4	480 *(12.04%)*	3,542 *(9.18%)*	17,502 *(9.5%)*	356,329 *(7.77%)*
	5-24	1,068 *(26.8%)*	10,217 *(26.5%)*	49,936 *(27.11%)*	1,486,530 *(32.4%)*
	25-44	1, 520 *(38.11%)*	13,369 *(34.65%)*	60,923 *(33%)*	1,450,140 *(31.6%)*
	45-64	664 *(16.65%)*	7,714 *(20%)*	39,452 *(21.42%)*	1,042,879 *(22.7%)*
	65-74	183 *(4.59%)*	2,247 *(5.82%)*	9,876 *(5.36%)*	304,828 *(6.64%)*
	75 years and over	73 *(1.83%)*	1,489 *(3.86%)*	6,446 *(3.5%)*	230,565 *(5.02%)*
Total		**3,988**	**38,578**	**184,135**	**4,588,252**

As evident from Table 4.1.2, the largest portion of the population range between 25 to 44 years in the towns of Duleek and Drogheda. 1.83% of the population in Duleek are over 75 years whilst 3.86% percent of the Drogheda population are over 75. This is lower than the State average of 5.02% of over 75 years old. Children ranging from 0-4 years in the town of Duleek comprise 12% of the population whilst the same age group comprises 9.18% of the Drogheda population. This is higher than the State average of 8%.

4.1.3.3 Landuse, Settlement and Residential Amenity

Platin Cement Works is located in a primarily agricultural environment, circa 1.5km southwest of the edge of Drogheda, over 2km northeast of Duleek, and circa 1.5km southeast of Donore Village. While the majority of people reside in these towns, residential development is also commonplace within the surrounding countryside. Ten residential properties lie within 500m of the application site and all of these are over 250m from the site. A further 29 residential properties lie between 0.5km and 1.0km of the site boundary. The nearest school, Scoil Cholmcille Primary School, is located 1.2km southeast of the site boundary (Refer to Figure 4.2). Other schools are located over 1.5km from the site at Donore, Duleek and Drogheda. Indaver Waste to Energy Facility is located south of the Cement Works, while Platin Limestone quarry is immediately west of the Cement Works. A number of other quarries, including Roadstone's quarry at Mullaghcrone, are also located to the north and west of the Irish Cement quarry.

The Cement Works has existed on the Platin site since the early 1970s and is the largest industrial facility in the area. Over 130 people are employed in the Works, associated offices and adjoining quarry, however, this number can increase significantly to over 300 during annual maintenance periods.

The majority of the population as expressed within the DED's (noted above) live within towns, especially Drogheda and Duleek. Around the Cement Works, residential property is well dispersed and distant from the application site – refer to Figure 4.2.

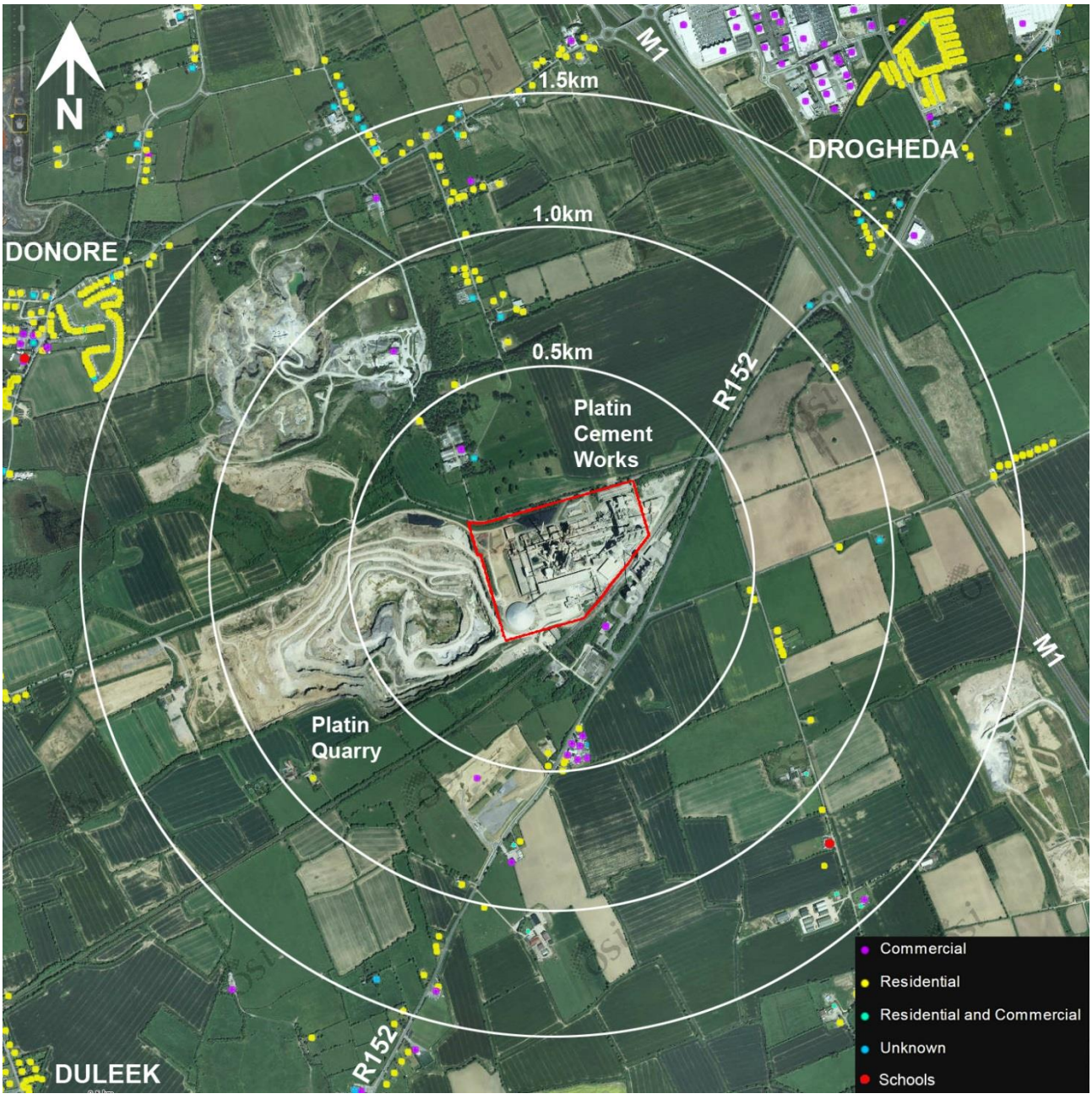


Figure 4.2 Application Site and surrounding Residential and Other Properties

4.1.3.4 Economic Activity & Employment

The labour force consists of those who are able to work, *i.e.* those who are aged 15+, out of full-time education and who are not performing duties that prevent them from working. As 2016 data on the labour force in Ireland has not yet been released, data is derived from the information extracted from the 2011 census. In 2011, there were 2,232,203 persons in the labour force in Ireland. Table 4.1.3 shows the percentage of the total population aged 15+ who were in the labour force during the 2011 Census. This figure is further broken down into the percentages that were at work or unemployed. It also shows the percentage of the total population aged 15+ who were not in the labour force, *i.e.* those who were students, retired, unable to work or performing home duties.

Table 4.1.3 Economic Status of the Total Population Aged 15+ in 2016 (Source: CSO)

	Status	State	County	Duleek DED	St. Mary's DED
% of population aged 15+ who are in the labor force		**61.9%**	**65.8%**	**66%**	**69%**
% of which are:	At work	81.0%	82%	78 %	83.8%
	Unemployed	17.5%	16.7%	21.1%	15.4%
% of population aged 15+ who are not in the labour force		**38.1%**	**34.2%**	**34%**	**31%**
% of which are:	Student	29.7%	29.3%	23.8%	28.3%
	Home duties	24.7%	30%	33.5%	31.5%
	Retired	33.2%	29.7%	26.1%	29.9%
	Unable to work	11.4%	10.3%	15.75%	9.5%
	Other	1.0%	354	0.7%	0.79%

When assessing the percentage of people in the labour force, it is noted that between sixty-six and sixty-nine percent of the population in the electoral districts of Duleek and St. Mary's respectively are in the labour force. This reflects the high number of people of a working profile living within the area. Comparing figures (refer to Table 4.1.3) shows that the surrounding environs of the Proposed Development site have a greater percentage of a working or seeking work population than the overall state average.

The principal employment status of the population in St. Mary's DED is higher than that of Duleek DED. This is likely to be as a result of the proximity of St. Mary's DED population to the environs of Drogheda Town where there is greater access to employment. The employment status of the population in St. Mary's is also higher than that recorded at a State and County level. St. Mary's DED is within commuting distance of a number of significant employment centres such as Drogheda, Navan and Dublin which, together with Platin Cement Works, are likely to account for much of the employment opportunities for local residents.

The principal employment status of the population in Duleek DED is almost six percent lower than that recorded at St. Mary's DED and the percentage of unemployment is also higher than unemployment statistics at a County and State level. This reflects conclusions from studies such as Teagasc's *'Economic Performance of Towns in Ireland'* that suggest the highest unemployment areas have occurred further away from economic hubs in recent years.

Irish Cement currently employs c.130 people directly in Platin with as many hundred people indirectly employed in supporting activities and industries and in annual maintenance works contracts. Some of these indirect positions are already in the area of alternative fuels, in the sourcing, preparation and supply of such fuels in line with existing planning permission for alternative fuel use at Platin.

Community liaison and engagement activities at Irish Cement have been a feature of company's presence in the greater Drogheda area for over 75 years. At present, as part of its Corporate Social Responsibility (CSR), Irish Cement financially contributes both directly and indirectly to the community annually through a broad range of sponsorships and support schemes, ranging from sports clubs to schools, to charities. In addition, multiple spin-off societal benefits arise from direct and indirect local employment, the use of local port facilities for exports, etc.

4.1.3.5 Tourism

In 2015, Meath's tourism industry enjoyed visits from 134,000 overseas tourists contributing 44 million to the local economy. The main tourist attractions in the wider area include the UNESCO World Heritage Site at Brú na Boinne (circa 4km northwest of Platin) and the associated Visitors Centre west of Donore (circa 4km of Platin). The Battle of the Boyne Visitors Centre at Oldbridge is located c.4.5km of Platin. The River Boyne comes with c. 3km of Platin at its closest point near Staleen, Donore and the wider River Boyne landscape is promoted as part of the Boyne Valley Scenic Drive (refer to Figure 4.3), which takes in Drogheda as well as the local towns of Duleek and Donore.

A full assessment of the potential impact of the proposed development on the UNESCO World Heritage Site at Brú na Bóinne and surrounding areas is carried out under Chapter 10 (Landscape and Visual) and Chapter 11 (Cultural Heritage) of the EIA Report.

Figure 4.3 Boyne Valley Drive

4.1.4 Predicted Effects

The population in the vicinity of the Proposed Development has been assessed in terms of settlements, land use, residential amenity, economic activity and tourism.

The Proposed Development will require further sourcing, preparation and supply of increased quantities of alternative fuels and alternative raw materials, to defined specifications on a consistent basis. This requirement will be sourced via external contractors who will supply the fuels/raw material on an 'as required basis' to Platin Cement Works. This requirement for a regular and consistent supply of alternative fuels and alternative raw materials will have a positive effect in terms of additional indirect employment and on the local socio-economic environment.

In addition, the Proposed Development will help improve the competitiveness of the Cement Works as a whole and underpin both existing and on-going direct and indirect employment at the facility.

4.1.4.1 'Do Nothing' Effect

If a 'Do Nothing Approach' is adopted, the competiveness and efficiency of the operations in Platin may be increasingly compromised due to its inability to compete with its European competitors, thereby potentially negatively impacting its long-term business performance and employment.

4.1.4.2 Socio-Economic Effects

The Proposed Development has the potential to increase the level of indirect employment associated with Platin Cement Works and to unpin existing employment through improving the overall competitiveness of the facility. This would have a positive socio-economic effect.

4.1.4.3 Tourism & Visual Effects

The potential visual effects of the Proposed Development are fully assessed fully in Chapter 10 of this EIA Report. The existing Cement Works and site for the Proposed Development lie outside of the core area and outside of the buffer area surrounding the UNESCO World Heritage Area of Brú na Bóinne.

The assessment include a series of Photomontages of the Proposed Development prepared from surrounding areas, including from the World Heritage sites of Newgrange, Knowth and Dowth. All of the Photomontages, which are included at Appendix 10.1, Volume 3 of the EIA Report, indicate the very limited or imperceptible visual effect of the Proposed Development.

The Proposed Development will have no visual effect from the core area of the UNESCO World Heritage Area of Brú na Bóinne, Carranstown Henge or from any of its best known sites. Furthermore, as the components of the Proposed Development are integrated into the existing structures, there is little or no visual expression or visual effect from any location outside of the existing Cement Works site.

The Proposed Development will not result in any negative visual effects on Tourism.

4.1.4.4 Land Use, Settlement and Residential Amenity Effects

4.1.4.4.1 Odour

All alternative fuels, be they waste-derived or not, will be prepared off-site to a required specification, which will ensure that the material meets the requirements of the Cement Works as a suitable alternative to fossil fuel. No untreated mixed wastes will be delivered to the Cement Factory and no processing of alternative fuels (or wastes) will take place at the Cement Factory.

Contracts for supply of alternative fuels will be on the basis of 'just-in-time' deliveries. As such there are no proposals for long-term storage of alternative fuels at the Cement Works. For most alternative fuels this will mean storage of no more than 3 or 4 days requirement. The only exception will be for used tyres where up to 12 – 14 days storage is possible.

Given the approach involved: *i.e.* off-site preparation of alternative fuels to required specification; enclosed delivery, primarily for 'just-in-time' use; handling within purpose-designed buildings, silos and tanks and direct feed to the kiln; no odour issues will arise.

Alternative fuels, including waste-derived alternative fuels, has been in use at Platin Cement Works since 2011 and c.120,000 tonnes of Solid Recovered Fuel (SRF) was used in 2016. Experience from this over the last 5 years shows that no odour issues arise from the use of the alternative fuels.

4.1.4.4.2 Vermin

An existing vermin/vector control management plan is in place, which has been developed by a specialist control contractor, for the existing Cement Works. This management plan will also apply to the construction and operation stages of the Proposed Development. The objective of implementing the vermin/vector control management plan is to ensure that any existing on-site vermin or vectors are eradicated or are maintained at negligible levels throughout the construction works and throughout the operational stages, and that all practicable steps are taken to prevent new or displaced vermin issues arising during the construction works. The vermin/vector control management plan will be implemented from the commencement of the construction works and will be maintained during the course of the works.

4.1.4.4.3 Traffic

Effects arising from traffic can be divided into traffic effects during construction stages which tend to be short term and traffic effects during operational stages which tend to be long term. A full assessment of traffic and transport effects are presented in Chapter 12 of this EIA Report. The percentage increase in traffic, which is 2.4% for the short-term construction stage and 2% for the operational stage, will have no negative effect on surrounding road network or the operation of the existing access points.

4.1.5 Cumulative Effects

Platin Cement Works is an existing established facility that has been operational since the early 1970's. Taking into account the Proposed Development and its surrounding environment, no cumulative effects are anticipated from the introduction of the Proposed Development at operational or construction stages.

4.1.6 Mitigation Measures

No specific mitigation measures are required in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, where required, mitigation measures in relation to air emissions, noise, traffic *etc*. are identified in their respective chapters in this EIA Report.

4.1.7 Residual Effects

It is considered that the Proposed Development will have a positive residual effect on population and socio-economic aspects improving the competitiveness of the facility as a whole; supporting on-going investment and underpinning both existing and future employment.

4.1.8 Monitoring

No monitoring is required in relation to population and socio-economic for the Proposed Development.

4.2 Human Health

4.2.1 Introduction

A human health risk assessment is the process to estimate the nature and probability of adverse health effects in humans as a result of the proposed development.

The assessment has had regard to the findings of other chapters of this EIA Report, in particular to:

- Chapter 3 Description of the Proposed Development
- Section 4.1 Population (of Chapter 4)
- Chapter 7 Water and Hydrology
- Chapter 8 Air Quality and Climate
- Chapter 9 Noise and Vibration
- Chapter 12 Traffic

In addition a standalone Human Health Risk Assessment has also been carried out for the assessment of potential future emissions of PCDDS/Fs (i.e. polychlorinated dibenzodioxins, polychlorinated dibenzofurans and dioxin-like polychlorinated biphenyls) from the Cement Works. This is included at Appendix 4.1 to the EIA Report.

Platin Works is an existing cement manufacturing facility operating on this site since 1972. The proposed development relates to further replacement of fossil fuels used in the cement manufacturing process. At present Platin Cement Works uses both fossil fuel and up to 120,000 tonnes per annum (t/a) of alternative fuels with the latter replacing a portion of fossil fuel use. The Proposed Development involves the provision of buildings, structures and plant *etc*. for further replacement of fossil fuel with up to an additional 355,000 tonnes per annum of alternative fuels and for the use of alternative raw materials. In total the 10 year permission will allow for the overall use of up to 600,000 t/a of alternative fuels and alternative raw materials. This overall figure is inclusive of the existing permitted use of 120,000 t/a of alternative fuels. A detailed description of the existing and proposed fuel scenarios at Platin Cement Works is provided in Chapter 3 of the EIA Report.

A description of the baseline local population, including its demographics, is provided in Section 4.1 of Chapter 4 of the EIA Report.

This assessment is focused on potential human health effects related to potential emissions, during the construction phase and the operational phase. However it is acknowledged that people may experience annoyance or other disturbance *e.g.* from temporary effects of the construction phase. Annoyance or other similar disturbance is not in itself a health effect, and it is also noted that the proposed development is not a greenfield development but is set within the context of an existing cement manufacturing facility with long-established operations. Residents are accustomed to living in the environment of a cement plant and a change of fuel is unlikely to be perceptible in terms of noise or other disturbances during the operational phase. It is unlikely that annoyance on a temporary basis that might occur during construction could lead to adverse health effects.

4.2.2 Methodology

The methodology used in the assessment has had regard to that provided by the US Environmental Protection Agency (US EPA) in their Human Health Risk Assessment process[1]. The assessment has also had regard to the Irish Environmental Protection Agency (EPA) Consultation Draft of Advice Notes for Preparing Environmental Impact Statements[2] (EPA, 2015). The Irish EPA has general guidelines on Human Health Risk Assessment however the US guidelines benefit from being more specific and as a result more user-friendly. Nevertheless there are entirely in keeping with those recommended by the Irish EPA.

[1] https://www.epa.gov/risk/human-health-risk-assessment

[2] https://www.epa.ie/pubs/consultation/reviewofdrafteisguidelinesadvicenotes/Draft%20Advice%20Notes%20for%20preparing%20an%20EIS.pdf

The assessment methodology advised by the US EPA follows a 4-step process:

Step 1 – Hazard Identification

Examines whether an agent has the potential to cause harm to humans and if so, under what circumstances. The assessment includes a literature review outlining the findings of relevant medical findings/publications related to the proposed development and its potential effects.

Step 2 – Dose-Response Assessment

Examines the relationship between exposure and effects.

Step 3 – Exposure Assessment

Examines what is known about the frequency, timing, and levels of contact with an agent.

Step 4 – Risk Characterisation

Examines how well the data support conclusions about the nature and extent of the risk from exposure to environmental agents.

4.2.2.1 Definition of Terms

The following terms are used in the assessment.

Agent
A chemical or factor in the environment to which humans are exposed that may cause adverse health effects

Vulnerable / Vulnerable Groups
An individual or group of individuals who, by nature of their age, health status or other factors is/are more prone to developing adverse health effects

Robust
Strong and Healthy

Health Based Standard
The dosage of an agent scientifically determined to protect against human health effects

Threshold
The dosage of an agent below which there is no adverse health effect

PM_{10}
Particulate matter of diameter less than 10µm

$PM_{2.5}$
Particulate matter of diameter less than 2.5µm

4.2.2.2 Health Based Standards

Health based standards by their nature are set to protect against human health effects. The level at which the standard is set is chosen to protect the vulnerable, not the robust. They have an in-built measure of significance in that they are set at levels where there will be no significant health effects. An example is Air Quality Standards. They do not necessarily exclude each and every effect. An individual may notice a short-term slight irritation from exposure to an agent slightly below the Air Quality Standards but fundamentally the individual's health status would not change. The choice of the relevant standard and the reasons for this choice are explained in the relevant sections below.

4.2.2.3 Identification of Vulnerable Groups (Sensitivity)

While every human being should be considered a sensitive receptor clearly the vulnerable are the most sensitive.

Children, particularly younger children, for example constitute a vulnerable group. Older people constitute a very vulnerable group. Older people in general have greater sensitivity to air pollution and potential effects on the respiratory system and cardiovascular system. There are many reasons for this including the possible presence of other medical conditions such as respiratory or cardiovascular disease. Some subtle changes in the environment have the potential to have an adverse effect that would not be experienced by a younger more resilient person. There are other vulnerable groups also, for example, the disabled or psychologically ill.

4.2.2.4 Significance of Health Effects

Medicine as in all science uses the concept of statistical significance – that is putting a value on confidence in the data. Confidence measures of 95% or even 99% are commonly used to measure the levels of certainty that any changes are not due to chance alone.

This is a valid approach for the study of the effects on a population or in large studies but is not possible in the assessment of a significant effect on human health in a project such as this. It does not, for example, absolutely exclude a response in an individual. This may be best explained with an example. Low levels of noise emissions, be it from a factory or a road, may be such that the vast majority of the population do not notice or do not care about them. An individual however, may find them annoying even when other people in exactly the same location do not.

Given the extent of variability in human response it is not possible to identify all possible individual effects. However, significance of effects on populations is more readily predicted.

The significance criteria used in the assessment as adapted from the Irish EPA Guidelines, are set out in Table 4.2.1.

Table 4.2.1 Criteria Used in the Assessment of Human Health Effects

Effect Level	Significance Criteria
Imperceptible	No significant human health impacts are apparent. An example is no measureable effect attributable to the Proposed Development.
Slight	A small impact on individual reported symptoms but no change in health status can be attributed to the proposed development. An example is a temporary increase in symptoms in an individual but no change in the severity of the underlying condition or treatment required.
Moderate	A moderate impact on health status of individuals but no change in morbidity or mortality can be attributed to the proposed development. An example is an individual increasing their use of a treatment attributable to the development but no change in underlying condition.
Significant	A proposed development has the potential to impact on individual health status. An example is an individual's condition becoming measurably more severe as a result of the proposed development.
Very Significant	A proposed development has the potential to impact on the health status of groups. An example is a group of individuals' condition becoming measurably more severe as a result of the proposed development.
Profound	A proposed development has the potential to impact on the health status of communities. An example is a measurable increase in the incidence or severity of a condition in a community.

4.2.3 Existing Environment

Platin Cement Works is located in a rural, primarily agricultural environment, circa 1.5km southwest of the edge of Drogheda, over 2km northeast of Duleek, and circa 1.5km southeast of Donore Village in County Meath. While the majority of people reside in these towns, residential development is also dispersed throughout the surrounding countryside. Ten residential properties lie within 500m of the application site and all of these are over 250m from the site. A further 29 residential properties lie between 0.5km and 1.0km of the site boundary. The nearest school, Scoil Cholmcille Primary School, is located 1.2km southeast of the site boundary (Refer to Figure 4.1). Other schools

are located over 1.5km from the site at Donore, Duleek and Drogheda. Other landuses include quarries and various business and commercial activities, as well as other industries including the Indaver Waste to Energy Facility at Carranstown.

The Cement Works has existed on the Platin site since the early 1970s and is the largest industrial facility in the area. Over 130 people are employed in the Works, associated offices and adjoining quarry, however, this number can increase significantly to over 300 during annual maintenance periods.

A review of Section 4.1.3 of the EIA Report shows that the demography of the local population (2011 CSO data) indicates that in terms of younger people (0 – 4years), Drogheda (c.9.2%) and Duleek (c.12%) both are above the State average (7.8%). The data also indicates that in terms of older people (over 75 years) Drogheda (c.3.86%) and Duleek (c.1.8%) both are below the State average (c.5%). Details of the local demography and population are provided in Section 4.1 of this Chapter.

The existing condition in relation to other aspects of the environment is set out within the specific chapters of the EIA Report, including Water and Hydrology (Chapter 7), Air Quality and Climate (Chapter 8), Noise and Vibration (Chapter 9) etc.

4.2.4 Characteristics of the Proposed Development

Platin Works is an existing long-established cement manufacturing facility. The existing works uses both fossil fuel (petcoke) and alternative fuels. The use of alternative fuels is at present limited by previous planning permissions to 120,000 tonnes per annum (t/a) (*refer Meath County Council Planning Ref. No.: SA803066, as amended by MCC Planning Ref. No.: SA120301*).

The proposed development relates to an expansion in the range and quantity of alternative fuels to be used and to the use of a portion of alternative raw materials in the cement manufacturing process. Therefore, the Proposed Development involves the provision of buildings, structures and plant *etc*. for further replacement of fossil fuel with up to an additional 355,000 t/a of alternative fuels and for the use of up to 125,000 t/a of alternative raw materials. In total, the 10 year permission allows for the overall use up to 600,000 t/a of alternative fuels and alternative raw materials. This overall figure is inclusive of the existing permitted use of 120,000 t/a of alternative fuels. A detailed description of the existing and proposed fuel scenarios at Platin Cement Works is provided in Chapter 3 of the EIA Report.

Specific details in relation to potential emissions are considered in detail in specific chapters of the EIA Report. A description of existing and future emissions to water, air and noise are detailed in Chapters 7, 8 and 9 respectively. Other aspects such as changes to traffic, waste arising, and potential interactions are detailed in Chapters 12, 14 and 15 respectively.

4.2.5 Assessment of Potential Effects

4.2.5.1 Hazard Identification

A Cement Works has existed at Platin since 1972 and the operation of the facility is licensed and monitored and enforced by the EPA in line with the requirements of the Industrial Emissions Directive (2010/75/EU) through Industrial Emissions Licence No. P0030-04. It is noted that the IE licences for all cement plants in Ireland, including Platin, are also currently under review by the EPA in order to ensure compliance with the requirements of the European Commission decision on Best Available Techniques (BAT) Conclusions[3] as applicable to the production of cement (Commissions Implementing Decision 2013/163/EU[4]). It is expected that this BAT Review will be completed in the summer of 2017.

[3] http://eippcb.jrc.ec.europa.eu/reference/BREF/CLM_30042013_DEF.pdf
[4] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0163&from=EN

Chapters 7, 8 and 9 of this EIA Report provide detailed information on the existing and predicted emissions in relation to Water & Hydrology; Air Quality & Climate, including dust; and on Noise & Vibration respectively.

What is of potential relevance to human health are emissions to air, including Particulate Matter (PM) such as PM_{10} and $PM_{2.5}$ as well as other potential air pollutants such as NO_2, SO_2 and dioxins *etc.* and therefore these are assessed under Dose-Response (refer to Section 4.2.5.2). Other aspects of relevance include potential emissions to water / groundwater and noise.

4.2.5.1.1 Literature Review

The proposed development relates to an expansion in the use of alternative fuels and the use of alternative raw materials and therefore the literature review has sought to identify reports and scientific studies on health effects related to the use of alternative fuels in cement plants. Specifically the literature review focused on studies which assessed health for individuals living near cement factories which are using or switching to alternative fuels. The exercise involved specific reviews and searches as follows:

- PubMed[5] An online resource which comprises over 26 million citations for peer-reviewed biomedical literature from MEDLINE (the U.S. National Library of Medicine® (NLM)), life science journals, and online books.
- Review of health-related literature references contained in medical, science, cement and alternative fuels-related publications (*e.g.* from Alternative Energy Sources in Cement Manufacture – A Systematic Review of the Body of Knowledge[6]).
- Internet searches performed on Google.

Articles identified and reviewed are listed in Table 4.2.2 and following comments are noted.

In overall terms the studies found little or no change in human health risk associated with switching to or using alternative fuels.

Most of the papers identified below have been published since the turn of the century. This makes sense as the use of alternative fuels in many instances is a relatively recent occurrence.

In 2004 the paper by Abad et Al concluded that the addition of used tyres or meat meals as a secondary fuel had no effect on PCDD/PCDF emission levels of cement kilns. A somewhat different conclusion was made in the 2008 paper by Conessa et al (Ref. No.13 in Table 4.2.2) which suggested slightly higher emissions of dioxins with the use of tyres but this article did point out that the emissions were within the permitted emission limits for the facility.

A 2011 study by Rovira et al, **Use of sewage sludge as secondary fuel in a cement plant: human health risks** (Ref. No. 6 Table 4.2.2) looked at impacts of the use of alternative fuels on the emissions of dioxins, in this case, arising from the use of sludge instead of fossil fuels. While this study focused solely on the use of sludge as an alternative fuel, they found few differences before and after the transition to use of alternative fuels. This was a follow-up from the previously published 2009 study (Ref. No. 9 Table 4.2.2) by the same authors, which had the same conclusions. Rovira was also involved in the three further papers published in 2015 and 2016 (Ref. Nos 3, 4, 5 in Table 4.2.2 below). These reported on studies performed after a cement plant changed fuels to alternative fuels. These studies reported generalised decrease in environmental levels of metals and dioxins. They also postulated potential improvements in human health as a result of this.

An Australian paper published by Richards (Ref. No.1 Table 4.2.2) in 2017 showed equally positive results when it stated:

The findings showed waste co-incineration during cement operations does reduce health-critical congeners of dioxins and dl-PCBs whilst providing the necessary energy and calcination needs.

[5] https://www.ncbi.nlm.nih.gov/pubmed/
[6] http://nbs.net/wp-content/uploads/NBS-Systematic-Review-Cement-Manufacturing.pdf

Another paper published by Nadal in 2009 **Cost-benefit analysis of using sewage sludge as alternative fuel in a cement plant: a case study** (Ref. No. 9 Table 4.2.2) looked at the potential effects of using sludge as an alternative fuel found it beneficial in terms of greenhouse gas emissions, with no additional health risks for the population derived from PCDD/F and metal emissions.

The Environmental Agency in the UK (UK EA) have published a number of documents on the cement industry and the use of alternative fuels referred to as 'substitute fuels' in their reports. In a 2005 publication **Measuring Environmental Performance – Sector report for the Cement Industry** (Ref. No. 15 Table 4.2.2), they state:

> 'The Health Protection Agency (HPA) has also produced a position statement on the public health consequences of the use of substitute fuels in cement kilns (HPA, 2004). The statement concludes that the HPA is "*unaware of any evidence that burning substitute fuel has caused adverse health effects.*"' (page 16)

A subsequent 2008 publication by the UK EA **Using science to create a better place – The use of substitute fuels in the UK cement and lime industries** (Ref. No. 14 Table 4.2.2) carried out a comprehensive review of the use of substitute fuels (SFs) in cement kilns. They made the following statement:

> *'An impact assessment considered air quality, health risk assessment (HRA), odour, greenhouse gases (GHGs), energy efficiency and waste arising from SF burning in cement kilns. Emissions data, assessments (using Environment Agency methodology), ambient monitoring data and dispersion modelling results were reviewed to address air quality. The report concludes that long-term and short-term pollutant concentrations arising from cement kilns are small fractions of air quality strategy objectives, irrespective of whether conventional fuels or SFs are burnt. Odour has so far not been an issue for SF usage. Emissions of GHGs, principally CO2, were calculated for a preheater kiln and showed that the use of biofuels (meat and bone meal, processed sewage pellets and refuse-derived fuel) reduces CO2 emissions. Generally, the use of SFs does not produce more waste.*
>
> *Information from HRAs, health impact assessments and other studies was reviewed to help determine our HRA. Under normal operation, there would be a negligible risk to human health from the use of any of the SFs' (pages 2 & 3)*

The UK Committee on Medical Effects of Air Pollutants (COMEAP) issued a number of statements on the use of substitute fuels in cement kilns. In regard to substitute fuels, their 2009 **Statement on the use of substitute fuels in cement kilns (2)** (Ref. No. 11 Table 4.2.2), noted that:

> *"no changes in stack emissions were likely to occur that would be of significance for human health"*

A systematic review of the body of knowledge in relation to **Alternative Energy Sources in Cement Manufacture** (Ref. No. 7 Table 4.2.2) was performed in 2011 by Network for Business Sustainability. Whilst this review was very broad and covered matters not only human health, they did conclude:

> *"A switch to alternative fuels could reduce the impact of plants on the environment, communities, and human health as well as bring about economic benefits."*

In summary there appears to be little or no published evidence of adverse outcomes to the health of people living around cement facilities using or switching to alternative fuels. Indeed on the balance of published evidence there may be beneficial outcomes in terms of emissions with the potential to affect human health.

Table 4.2.2 References for Literature Review

Item	Literature Reference
1.	**Dioxin-like pcb emissions from cement kilns during the use of alternative fuels.** (2017, Richards G, Agranovski IE) (https://www.ncbi.nlm.nih.gov/pubmed/27839925)

Item	Literature Reference
2.	**Air emission from the co-combustion of alternative derived fuels within cement plants: Gaseous pollutants.** (2015, Richards G, Agranovski IE) (https://www.ncbi.nlm.nih.gov/pubmed/25947054)
3.	**Size-distribution of airborne polycyclic aromatic hydrocarbons and other organic source markers in the surroundings of a cement plant powered with alternative fuels.** (2016, Sánchez-Soberón F, van Drooge BL, Rovira J, Grimalt JO, Nadal M, Domingo JL, Schuhmacher M) (https://www.ncbi.nlm.nih.gov/pubmed/26859698)
4.	**Alternative Fuel Implementation in a Cement Plant: Human Health Risks and Economical Valuation.** (2016, Rovira J, Nadal M, Schuhmacher M, Domingo JL) (https://www.ncbi.nlm.nih.gov/pubmed/27558466)
5.	**Environmental levels of PCDD/Fs and metals around a cement plant in Catalonia, Spain, before and after alternative fuel implementation. Assessment of human health risks.** (2014, Rovira J, Nadal M, Schuhmacher M, Domingo JL) (https://www.ncbi.nlm.nih.gov/pubmed/24704963)
6.	**Use of sewage sludge as secondary fuel in a cement plant: human health risks.** (2011, Rovira J, Mari M, Nadal M, Schuhmacher M, Domingo JL) (https://www.ncbi.nlm.nih.gov/pubmed/20817299)
7.	**Alternative Energy Sources in Cement Manufacture – A Systematic Review of the Body of Knowledge.** (2011, Network for Business Sustainability, Albino V, Dangelico RM, Natalicchio A, Yazan DM) (http://nbs.net/wp-content/uploads/NBS-Systematic-Review-Cement-Manufacturing.pdf)
8.	**Partial replacement of fossil fuel in a cement plant: risk assessment for the population living in the neighborhood.** (2010, Rovira J, Mari M, Nadal M, Schuhmacher M, Domingo JL) (https://www.ncbi.nlm.nih.gov/pubmed/20709362)
9.	**Cost-benefit analysis of using sewage sludge as alternative fuel in a cement plant: a case study.** (2009, Nadal M, Schuhmacher M, Domingo JL) (https://www.ncbi.nlm.nih.gov/pubmed/19002731)
10.	**Environmental monitoring of PCDD/Fs and metals in the vicinity of a cement plant after using sewage sludge as a secondary fuel.** (2009, Schuhmacher M, Nadal M, Domingo JL) (https://www.ncbi.nlm.nih.gov/pubmed/19150726)
11.	**Statement on the use of substitute fuels in cement kilns (2)** (2009, COMEAP: Committee on the Medical Effects of Air Pollutants) (http://webarchive.nationalarchives.gov.uk/20140505104658/http://www.comeap.org.uk/images/stories/Documents/Statements/cement_kilns/Statement_substitute_fuels_cement_kilns_2009.pdf)
13.	**Organic and inorganic pollutants from cement kiln stack feeding alternative fuels** (2008, Conesa JA, Gálvez A, Mateos F, Martín-Gullón I, Font, R) (https://www.ncbi.nlm.nih.gov/pubmed/18374482)

Item	Literature Reference
14.	**Using science to create a better place: The use of substitute fuels in the UK cement and lime industries** (Environmental Agency 2008, Baird D, Horrocks S, Kirton J, Woodbridge R) (http://www.sciencedirect.com/science/article/pii/S0304389408002239)
15.	**Measuring Environmental Performance: Sector Report for the Cement Industry** (Environment Agency 2005) https://www.gov.uk/government/organisations/environment-agency
16.	**Polychlorinated dibenzo-p-dioxin/polychlorinated dibenzofuran releases into the atmosphere from the use of secondary fuels in cement kilns during clinker formation.** (2004, Abad E, Martínez K, Caixach J, Rivera J) (https://www.ncbi.nlm.nih.gov/pubmed/15487780)

4.2.5.2 Dose-Response

In simple terms the concept of dose response suggests that the greater the dose to which an individual is exposed the greater either the likelihood of a health response and/or the greater the severity of that response. Inbuilt to this concept is the principle of a threshold. The threshold is the level of an agent below which one would expect no adverse response. This is a concept on which many health based standards are based.

To illustrate this concept we can look at an air pollutant such as nitrogen dioxide or NO_2. As levels increase from zero, but remained below the threshold which is the Air Quality Standard, there is still no significant health effects. If however the levels continue to increase above the threshold there are an increasing number of people affected and the severity of that effect also increases. Just above the threshold only the vulnerable are likely to notice anything; but as the levels increase more and more people notice effects and indeed the severity becomes greater as levels continue to increase. This is the principle of dose response.

4.2.5.3 Exposure Assessment

Health based standards therefore rely on the dose response concept and try to identify by scientific means the threshold below which no significant health effects would occur. When standards are scientifically set by reliable and recognised or statutory agencies, they are a useful method in assessing the impact of any proposed change.

Health standards are not established based on the threshold to protect the robust who may be more resilient, but are primarily there to protect the vulnerable. They are to protect the elderly, the very young, and the ill and by extension thereby, the robust are not affected.

An example of such health standard are the EU Air Quality Standards. These are explained by the Irish EPA (http://www.epa.ie/air/quality/standards/) as follows:

> *In order to protect our health, vegetation and ecosystems, EU directives set down air quality standards in Ireland and the other member states for a wide variety of pollutants. These rules include how we should monitor, assess and manage ambient air quality.*
> *The European Commission set down the principles to this approach in 1996 with its Air Quality Framework Directive. Four "daughter" directives lay down limits for specific pollutants:*
>
> - *1st Daughter Directive: Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead*
> - *2nd Daughter Directive: Carbon monoxide and benzene*
> - *3rd Daughter Directive: Ozone*
> - *4th Daughter Directive: Polyaromatic hydrocarbons, arsenic, nickel, cadmium and mercury in ambient air*

With regards to particulate matter, for example, the standards relate to relatively smaller particles that is, for example, PM_{10}, which is particulate matter with a diameter of less than 10µm. The reason for this is that this size

of dust can be inhaled into the lungs and travel all the way to the alveoli, for which we use the term 'respirable'. Larger particles which are greater than 10µm but less than 30µm are potentially inhaled, that is enter the nose or mouth but do not enter the alveoli and are not respired. These are usually swallowed and do not have effects on the respiratory system.

Dust particles which are greater than 30µm are not inhalable so do not have an effect on human health and typically fall to the ground. The smaller particles can remain airborne. This is why visible dust on cars does not correlate with a health risk. It is only if the smaller particles are increased that human health issues may arise. In human health it is the dust which cannot be seen that has potential for health effects, while visible dust, while being a nuisance, and may require more frequent car washing, does not affect human health. Therefore when we are assessing the impact of particulate matter on health it is PM_{10} and smaller that is relevant.

4.2.5.4 Risk Characterisation

In the field of risk assessment, characterizing the nature and magnitude of human health or environmental risks is arguably the most important step in the analytical process. In this step, data on the dose-response relationship of an agent are integrated with estimates of the degree of exposure in a population to characterize the likelihood and severity of risk. In simple terms in a project such as this it involves comparing the predicted impacts of the change on air quality and comparing those predicted changes with the relevant health based standards. It can be assumed that provided the predicted changes do not result in an exceedances of the health based standards that there will be no significant risk.

4.2.5.5 Assessment of Effects of Proposed Development from Emissions to Air

A detailed air quality assessment is provided in Chapter 8 of the EIA Report. The standards used in the air quality assessment (refer to Section 8.2.2 & Table 8.1) include the *Air Quality Standards Regulations 2011*, which incorporate *European Commission Directive 2008/50/EC,* which has set limit values for the pollutants SO_2, NO_2, PM_{10}, benzene and CO. The C*ouncil Directive 2008/50/EC* combines the previous *Air Quality Framework Directive (96/62/EC)* and its subsequent daughter directives (including *1999/30/EC* and *2000/69/EC*). Provisions were also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. These are appropriate and robust standards. Compliance with air quality standards is monitored and implemented by the EPA through the IE licence for the Cement Works (IE Licence P0030-04).

The air quality assessment provides detailed information on existing (refer to Table 8.4) and proposed emission sources (refer to Table 8.5). Section 8.4 of Chapter 8 details the predicted effects and Tables 8.8 and 8.9 provide predicted ground level concentrations for the existing and proposed scenarios for PM_{10}, $PM_{2.5}$, NO_2, SO_2, and a wide range of other parameters, including various metals. Potential for cumulative effects are also considered at Section 8.4.4.

In reviewing Air Quality Standards, for example, slightly higher levels of oxides of nitrogen may have no effect on the vast majority of the population but it may be significant for subsections of the population, such as those with respiratory illnesses, the old and infirm. Hence, this assessment relies on Air Quality Standards to determine if any potential changes in levels of oxides of nitrogen as generated by this proposed development, would have an effect on human health. The assessment in Chapter 8 (of the EIA Report), concludes that residual impacts of the proposed development on air quality and climate result in a positive effect in terms of climate with reduced CO_2 emissions, and imperceptible effects on local air quality.

A specific human health risk assessment has also been carried out for PCDD/Fs (*i.e.* polychlorinated dibenzodioxins, polychlorinated dibenzofurans and dioxin-like polychlorinated biphenyls) and this is included in Appendix 4.1 to the EIA Report. The assessment notes that measurements taken at cement plants throughout Europe burning alternative fuels show that emissions generally, and in particular emissions of PCDD/Fs, are much lower than the Emission Limit Value (ELV) set out in the Industrial Emissions Directive (IED). Alternative fuels are currently used in

Platin Cement Works and monitoring over a number of years shows an average concentration of PCDD/Fs of 0.0033 ng/Nm³, which is 3.3% of the ELV. The assessment concludes (at Section 9) that:

> *'The findings of the assessment are that the intake of PCDD/Fs that could arise from potential emissions from Platin Cement Works at the location of highest concentration and deposition of dioxins is within the limit of 2 pg/kg bodyweight per day for the protection of human health based on WHO and UK guidance.*
>
> *This conclusion is considered robust on the basis of the worst case approach adopted and the hypothetical worst case exposure scenario considered in the assessment.*
>
> *The hypothetical worst case location is on the south-eastern site boundary adjacent to busy road (R152).'*

ELVs for PCDD/Fs are monitored under the existing IE Licence. The proposed development will necessitate a review of the IE Licence and the new IED licence will continue to require compliance with an ELV for PCDD/Fs.

Assessment of Effect

The human health effect for all receptors arising from potential emissions to air are assessed as being Imperceptible.

4.2.5.6 Assessment of Effects of Proposed Development from Noise Emissions

By comparing the predicted noise emissions as detailed in Chapter 9 (Noise & Vibration), with licenced noise limits, we can determine if any health effect is likely as a result.

As detailed in Table 9.2 of Chapter 9 of the EIA Report, the Cement Works operates within the noise standards detailed in the IE Licence. These limits are 55dB(A) $L_{Aeg(30\ minutes)}$ daytime and 45dB(A) $L_{Aeg(30minutes)}$ night-time. In addition, there shall be no clearly audible loud component or impulsive component in the noise emission from the activity of any noise-sensitive location. It is also noted in Chapter 9 (Section 9.4.3) that the EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) 2012 specifies the following noise limits:

- Daytime (07:00 to 19:00hrs) – 55dB $L_{Ar,T}$
- Evening (19:00 to 23:00hrs) – 50dB $L_{Ar,T}$
- Nighttime (23:00 to 07:00hrs) – 45dB $L_{Aeq,T}$

It is likely that these limits will also be applied to a new licence that will be issued for Plant Cement Works as part of an Industrial Emissions licence review and ICL will be obliged to ensure continued compliance with these limits.

Section 9.5.1 of Chapter 9 sets out the mitigation measures to be employed during construction phases and notes the application of BS 5228 (2009+A1:2014) *Code of practice for noise and vibration control on construction and open sites. Noise.* Mitigation of construction impact, including noise, is further detailed in the Construction and Environmental Management Plan (CEMP) (refer to Appendix 3.4 of the EIA Report). In addition any construction phase noise will only occur during daytime hours and will be temporary / short-term in nature. Therefore, with stated mitigation measures in place no negative impact will arise on human health from the construction stage.

The assessment for residual (construction or operational) noise effects (Section 9.6, Chapter 9 of the EIA Report) is that: '*no residual noise and vibration effects are predicted as a result of the proposed development as Platin Cement Works is obliged to continue to comply with noise limits specified in its Industrial Emissions licence*'.

Assessment of Effect

The human health effect for all receptors arising from noise are assessed as being Imperceptible.

4.2.5.7 Assessment of Effects of Proposed Development from Emissions to Water

The potential effects on water has been assessed in Chapters 6 and 7 of the EIA Report. Details of predicted effects on Water and Hydrology are described in Section 7.4 of Chapter 7 and any required mitigation measures are set

out in Section 7.5. The mitigation measures are associated with the construction stage only as the operation stage must comply with the requirements of the IE Licence.

This assessments as detailed in Chapters 6 and 7 of the EIA Report concluded that given the mitigation proposed, there will be no significant impact on water or ground water.

Assessment of Effect

Given that there will be no effect on water quality standards, the effects on human health from water are assessed as Imperceptible.

4.2.6 Mitigation Measures

No mitigation measures other than those detailed elsewhere in this EIA Report and associated appendices, or as required under the IE Licence, are required.

4.2.7 Residual Effects

The findings of the literature review and of the detailed assessments is that the proposed development, either during construction or operation, will not give rise to effects on human health.

4.2.8 Monitoring

The Cement Works operates in accordance with the requirements of its IE Licence and emissions will continue to be monitored by the Environmental protection Agency (EPA) under the requirements of this licence.

5 Biodiversity (Flora and Fauna)

5.1 Introduction

This chapter comprises an appraisal of the likely effects on biodiversity (flora and fauna) of proposed development for further replacement of fossil fuels with alternative fuels and for the use of alternative raw materials in Platin Cement Works County Meath. The proposed development is described in detail in Chapter 3 of this EIA Report. Platin Cement Works is licenced by the Environmental Protection Agency (EPA) under Industrial Emissions (IE) Licence Register Number P0030-04.

The potential for any effects on sites designated as European sites (Natura 2000 sites), under the EU Habitats and Birds Directives has also been appraised, and the results of that study are presented in a separate report (refer to the accompanying report: Provision of Information for an Appropriate Assessment).

5.2 Methodology

A comprehensive desk-based assessment was undertaken, and a site visit was undertaken on 18th July 2016. This was followed up by an additional site visit on 3rd April 2017. This Ecological Impact Assessment (EcIA) has been undertaken in accordance with the following publications:

- EPA Guidelines on the Information to be Contained in Environmental Impact Statements (2002);
- EPA Advice Notes of Current Practice (in the Preparation of Environmental Impact Statements) (2003);
- Environmental Protection Agency's (EPA) Revised Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (May 2017);
- EPA Revised (Consultation Draft) Advice Notes of Current Practice (in the Preparation of Environmental Impact Statements) (2015);
- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater and Coastal ('the CIEEM Guidelines, Second Edition') published by the Chartered Institute of Ecology and Environmental Management (CIEEM) in January 2016;
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2013).

The assessment has regard to the following directives and legislative instruments:

- Flora (Protection) Order 2015;
- The Planning and Development Acts (2000 and 2010, as amended);
- The Wildlife Act 1976 as amended by the Wildlife (Amendment) Act 2000;
- European Commission (EC) Habitats Directive 92/43/EEC;
- European Commission (EC) Birds Directive 2009/147/EC;
- European Communities (Birds and Natural Habitats) Regulations 2011 (SI no 477 of 2011).
- EIA Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014.

The assessment has regard to the following Policies and Plans:

- National Biodiversity Plan 2011 – 2016 (Department of Arts, Heritage and the Gaeltacht, 2011);
- Draft 3rd National Biodiversity Strategy and Action Plan v.2 2017 – 2021 (Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs;
- Meath County Development Plan 2013 – 2019.

Information was also collated from the sources listed below:

- Data on rare and protected plant and animal species contained in the following databases:
  - The National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs (www.NPWS.ie);
  - The National Biodiversity Data Centre (NDBC) (www.biodiversityireland.ie);
  - Birdwatch Ireland (www.birdwatchireland.ie);
  - Bat Conservation Ireland (www.batconservationireland.org).
- Recent aerial photography and photographs taken at the site;
- Recent ordnance survey mapping and aerial photography www.osi.ie;
- Information on water quality in the area available from www.epa.ie;
- Information on watercourses from www.catchments.ie;
- Information on soils, geology and hydrogeology in the area available from www.gsi.ie;
- Information on the status of EU protected habitats in Ireland (NPWS, 2013);
- Information on land-use zoning from the online mapping of the Department of Housing, Planning, Community and Local Government http://www.myplan.ie/en/index.html;
- Environmental Report prepared as part of an application to Meath County Council for a variation to existing planning permission (SA/803066) to allow for co-incineration of up to 120,000 tonnes per annum of solid recovered fuels (SRF). Brady Shipman Martin, 2012;
- Environmental Impact Statement prepared as part of an application to Meath County Council to extend its existing limestone quarry at Platin, Duleek, Co. Meath. Brady Shipman Martin, 2013.

The methodologies used to determine the value of ecological resources, to characterise impacts of proposed development and to assess the significance of effects and any residual effects are in accordance with the *NRA Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009). This methodology is consistent with *the Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater and Coastal* ('the CIEEM Guidelines, Second Edition') published by the Chartered Institute of Ecology and Environmental Management (CIEEM) in January 2016).

In ecological and environmental impact assessment, for the risk of an impact to occur there must be a 'source', such as a construction site; a 'receptor', such as a designated site for nature conservation; and a 'pathway' between the source and the receptor, such as a watercourse that links the construction site to the designated site. Although there may be a risk of an impact, it may not necessarily occur and if it does occur, the effect may not be significant.

In accordance with the NRA Guidelines, impact assessment is undertaken of sensitive ecological receptors (Key Ecological Receptors) within the Zone of Influence of the proposed development. According to the NRA Guidelines, the Zone of Influence is the "effect area" over which change resulting from the proposed development is likely to occur and the Key Ecological Receptors are defined as features of sufficient value as to be material in the decision-making process for which potential effects are likely. In the context of the Platin Cement Works, a Key Ecological Receptor is defined as any feature valued as follows:

- International Importance;
- National Importance;
- County Importance;
- Local Importance (Higher Value).

Features of local importance (Lower Value) and features of no ecological value are not considered to be Key Ecological Receptors.

5.3 Existing Environment

5.3.1 Outline of the Study Area and Receiving Environment

The study area comprises the application site as defined by the site boundary for the proposed development (see Figure 5.1), as well as the Cement Works and an appropriate distance surrounding the site. Any ecological receptors with the potential to be affected either directly or indirectly by the construction and operation of the proposed development (the Zone of Influence) are included. The Zone of Influence of the project is based on currently available information.

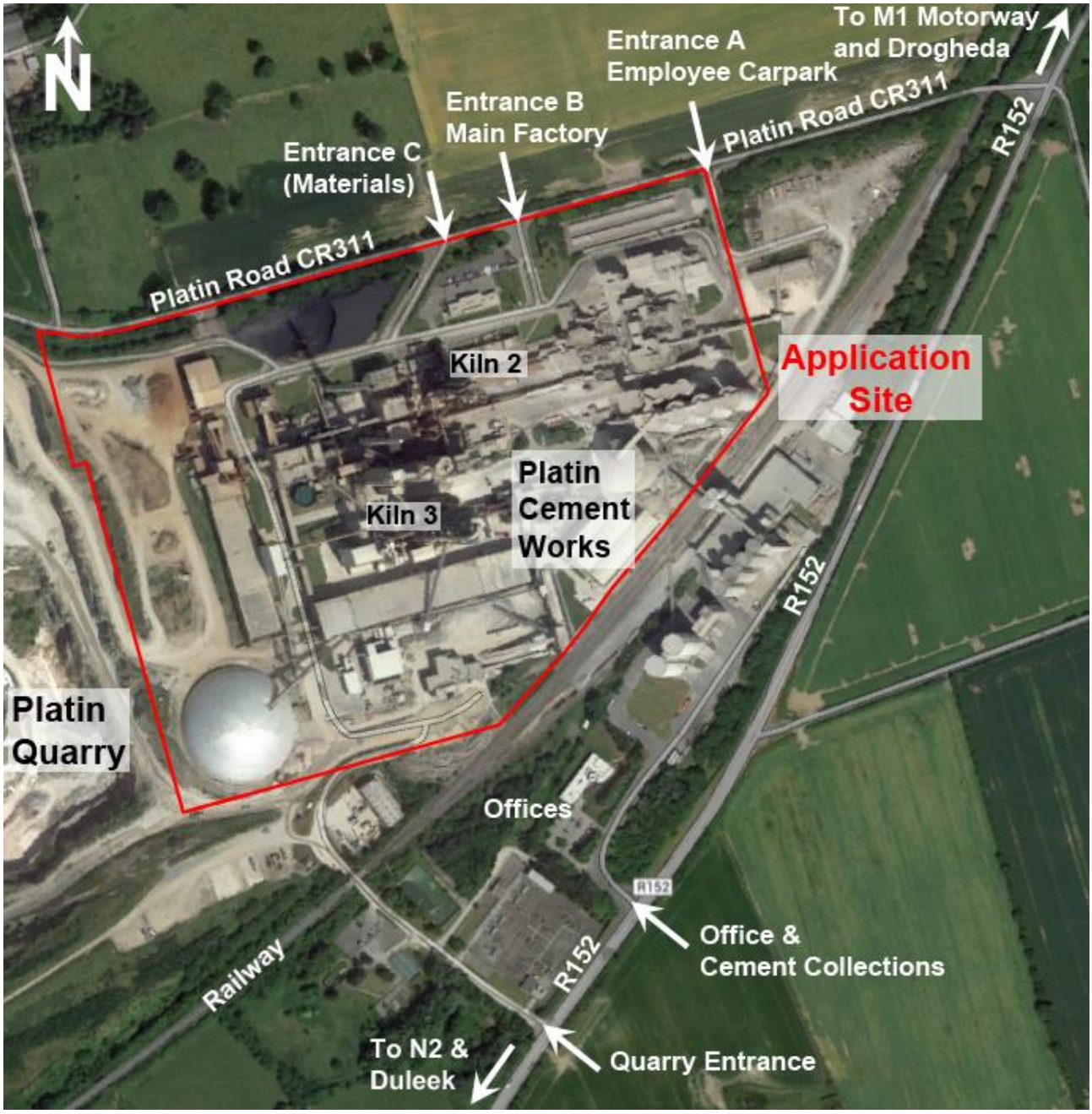


Figure 5.1 Platin Cement Works and Application Site

5.3.2 Designated Conservation Areas

No designated conservation areas occur within the area of the proposed development and no evidence of any species or habitats with links to European sites was recorded during the course of this ecological study. European sites (*i.e.* Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) that are located within 15km of the application site are indicated on Figure 5.2. European sites as well as other designated sites (*i.e.* proposed Natural Heritage Areas (pNHAs)) that are located within 5km of the application site are indicated on Figures 5.3 and 5.4 respectively.

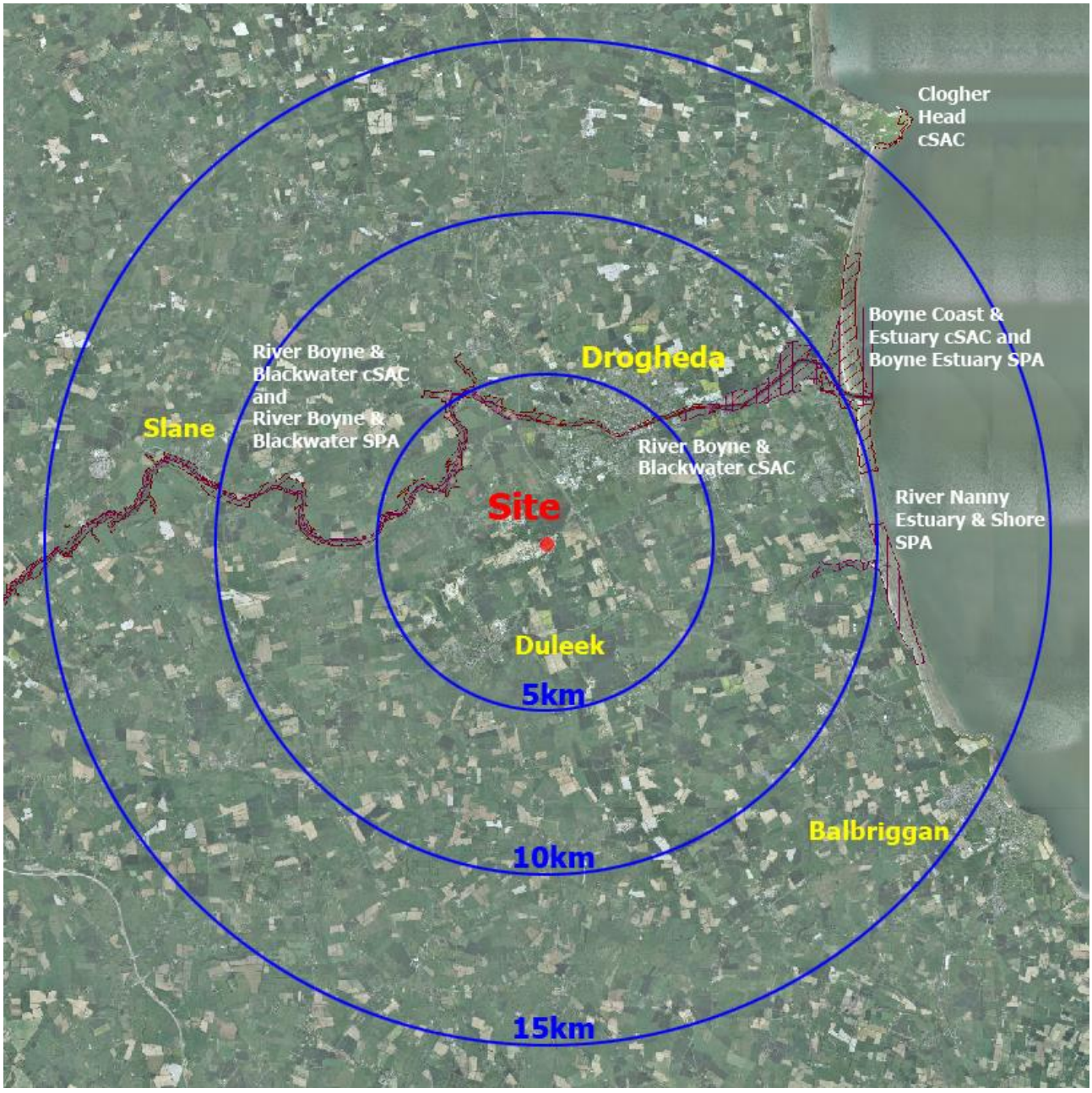


Figure 5.2 European Sites in relation to the Study Area/Application Site.

5.3.3 Relevant European Sites

Five European sites could potentially be affected by the proposals which are listed below:

Special Areas of Conservation:

- River Boyne and River Blackwater SAC (002299);
- Boyne Coast and Estuary SAC (001957);

Special Protection Areas:

- Boyne Estuary SPA (004080);
- River Boyne and River Blackwater SPA (004232);
- River Nanny Estuary and Shore SPA (004158).

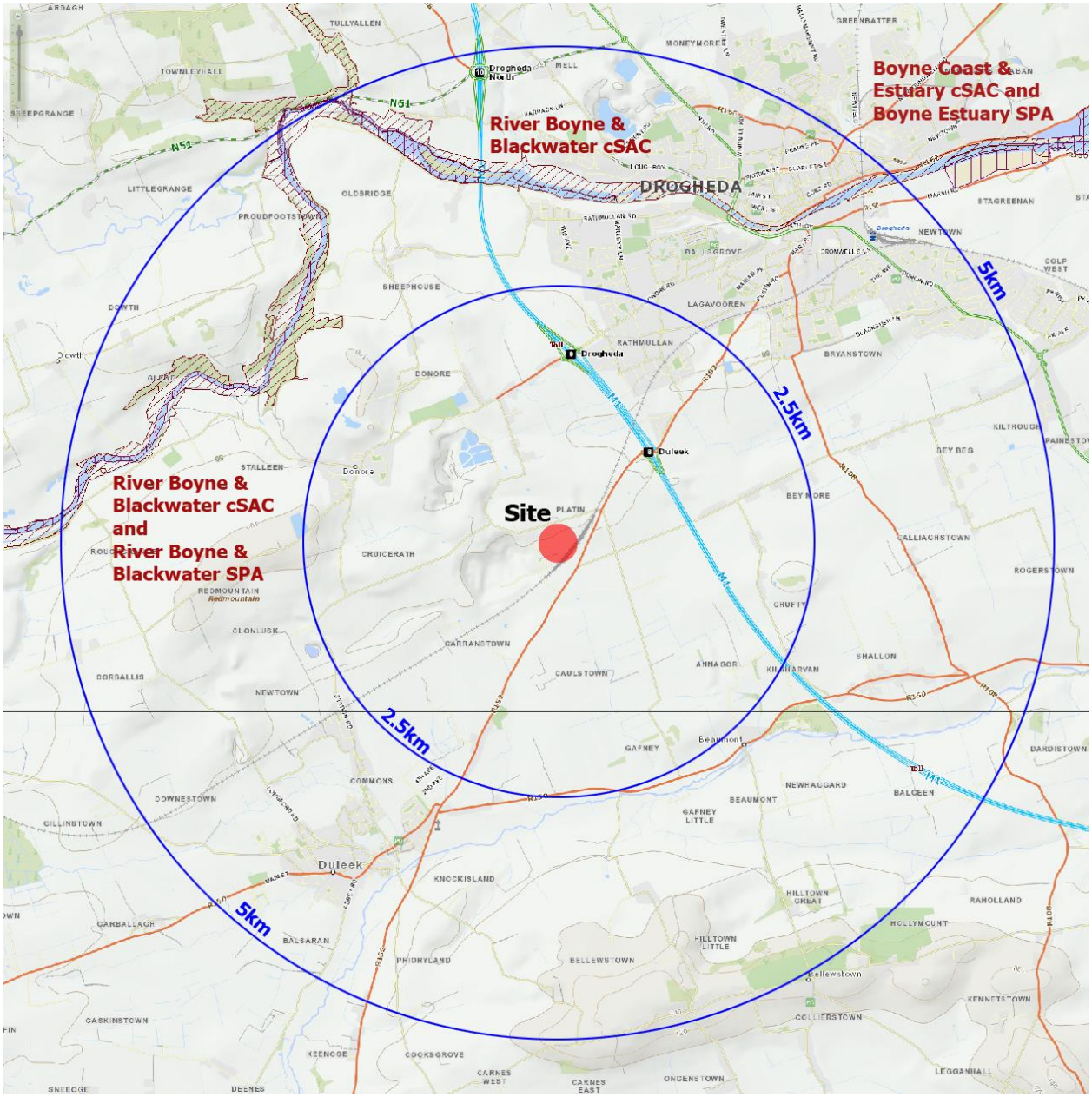


Figure 5.3 European Sites within 5km of the Study Area/Application Site.

The nearest of these sites is the River Boyne (designated in part, both as a SAC and an SPA), located approximately 3km to the northwest of the Cement Works. The site for the proposed development is located within the existing built environment of the cement works and immediately east of an associated limestone quarry. The site is separated from the nearest designated site by mixed-use agricultural land.

The potential for any effects on these sites and others from the proposed development site was considered. Full details of that study are presented in a separate report: *Provision of Information for an Appropriate Assessment*. The report concluded that there would be no likely significant effects on any European site as a result of the proposed development, either alone or in combination with other plans or projects.

5.3.4 Other Designated Conservation Areas (other than European Sites)

Eleven proposed Natural Heritage Areas (pNHAs) occur within 10km of Platin Cement Works. The majority are concurrent with the European site designations along the Boyne and the Boyne and Nanny Estuaries. Three proposed Natural Heritage Areas, not designated at European sites, are located southwest of Platin Cement Works. These are Duleek Commons (001578), Thomastown Bog (001593) and Balrath Woodlands (001579). One further pNHA site, Cromwell's Bush Fen (001576) is located some 7km south of the site.

Tributaries of the River Nanny located to the west of the site and existing quarry run-off discharges to the river under licence and after treatment. The River Nanny ultimately drains to the River Nanny Estuary and Shore SPA.

Figure 5.4 Proposed Natural Heritage Areas (pNHAs) within 5km of the Study Area/Application Site.

5.3.5 Rare and Protected Species

The National Parks and Wildlife Service (NPWS), Bat Conservation Ireland (BCI) and National Biodiversity Data Centre (NBDC) databases were consulted with regard to rare species (Curtis & McGough, 1988) and species protected under the Flora Protection Order (FPO, 2015). There are no known records of rare or protected plant or animal species within the immediate vicinity of the proposed development at Platin Cement Works.

5.3.6 Habitats, Flora and Fauna

Due to the heavily disturbed nature of the local environment within the curtilage of the operational plant, there are no areas of natural or semi-natural habitats present. Other than small pockets of ornamental shrubs and re-colonising bare ground, the footprint of the site is predominantly occupied by buildings, by material storage areas, and by hard-standing or bare ground between areas of operational plant.

The areas proposed for development are located within the existing developed core of the Cement Works. The roadside boundaries of the cement works, as well as the boundaries of the adjoining limestone quarry have been landscaped sensitively to provide dense belts of maturing woodland of mixed, primarily native, species such as ash, birch, willow, whitebeam, scots pine, wild cherry and rowan trees. Plantings also include chestnut and maple species, among others.

Due to the industrial nature of the site, no fauna occur regularly on the proposed development site, other than species such as feral pigeons that use the buildings for shelter.

5.3.7 Water

An ecological and sediment study of the River Nanny was conducted by Ecofact Environmental Consultants on behalf of Irish Cement Limited in August 2016 (refer to Appendix 5.1 to this EIA Report). This study focused on three sites upstream and three site downstream of the Platin outfall to the river.

The purpose of the Ecofact assessment was to look at the ecological quality and sediment characteristics of the River Nanny upstream and downstream of the outfall to ascertain if there were any significant differences that would be attributable to impacts from the discharge.

The results confirmed that macroinvertebrate communities, biological water quality and sediment characteristics in the River Nanny are not significantly different upstream and downstream of the existing Irish Cement discharge. In addition, organic compounds and heavy metals were not present in the sample of the discharge at a level considered harmful to the aquatic environment.

Overall, the combined discharge from the Platin facility was considered to be having a neutral impact on the aquatic ecology of local areas of the River Nanny and it is not significantly impacting on aquatic ecology, sediments or water quality parameters measured, within the River Nanny.

In addition, Platin Cement Works is compliant with the emission limit values for emission point SW-4 (River Nanny outfall) specified in the Industrial Emission Licence (Reg. No. P0030-04) (refer to Chapter 7.3.1.2 (Water and Hydrology) of the EIA Report).

The Office of Public Works (OPW) operates a number of gauging stations on the River Boyne. The lowest recorded flow at Trim station is 2.43m^3/s. As this station is located approximately 40km upstream form the Platin site, low flows can confidently be estimated as 2.43m^3/s or 200,000m^3/day.

The EPA conducts water quality assessment for both physical-chemical and biological water quality at various locations along the River Boyne. The most recent EPA survey of the Boyne took place in 2015 and indicated that water quality in the area nearest Obelisk Br was considered moderate.

5.3.8 Air

Currently, all emissions to air at Platin comply with Air Quality Standards (AQS), defined for the protection of human health and ecosystems (refer to Chapter 8 Air Quality of the EIA Report for full details). The emission limit values set out in the Industrial Emission Licence for Platin Cement Works, which are determined in European Regulations, ensure that facilities like Platin can operate without negatively effecting the Air Quality Standards.

5.3.9 Overall Evaluation of the Proposed Development Site

The proposed development site is not under any wildlife or conservation designation. Furthermore, no rare, threatened or legally protected plant species, as listed in the Irish Red Data Book, the Flora Protection Order, 2015 or the EU Habitats Directive, are known to occur within the site.

Neither the proposed development footprint nor its immediate surroundings contain any habitats of ecological value in accordance with the ecological resource valuations presented in the National Roads Authority *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009 (Rev. 2)).

5.4 Predicted Effects of the Proposed Development

5.4.1 Construction Phase Effects

The proposed development will involve the construction of a number of structures associated with the storage and conveying of the proposed alternative fuels and raw materials. No designated sites or habitats of any ecological value will be affected by this construction work. It is proposed to provide augmented under-planting along the already planted northern boundary of the site with the Platin County Road CR311. Species used will be native alder, birch, hawthorn, holly, and scots pine. This planting will help thicken the existing roadside planting.

All construction activities will be carried out within the catchment area of the site drainage system. All surface water from the site passes through balancing and settlement tanks and these are effective in removing suspended solids. In addition, oil interceptors and absorbent booms in the existing surface water treatment system are effective in removing any accidental spills of oils or other hydrocarbons. Regardless, surface construction activities pose a potential risk to watercourses as the site will be exposed to rainfall which has the potential to produce run-off. Surface water run-off from surface construction activities has the potential to become contaminated. Pollutants would pose a temporary risk to surface water quality for the duration of construction if not properly contained and managed. Suspended solids, which can include silt, affect surface water turbidity and are considered to be the greatest risk to surface water quality from construction activities. Suspended Solids can also reduce light penetration, visually impact the receiving water and damage the ecosystem. Full details of the potential effects on water are presented in Chapter 7 of this EIA Report.

Potential effects on air quality and ecological receptors arising at the construction phase are not expected to be significant. The proposed construction site is considered to be at a 'minor' scale. This category of site has the potential for significant soiling effects within 25m; PM_{10} effects within 10m; and vegetation effects within 10m of the site boundary if standard mitigation measures are in place. As no sensitive receptors are located within 25m of the areas of the proposed construction works, no significant effects due to construction activities are envisaged. Full details of the potential effects on air quality arising during construction are considered in the Air Quality Chapter of the EIA Report (Chapter 8).

5.4.2 Operational Phase Effects

5.4.2.1 Designated sites

As previously stated the potential for any impacts on European sites under the EU Habitats and Birds Directives (the provision of Information for Appropriate Assessment) was considered. Full results of that study are presented in a

separate report: Provision of Information for an Appropriate Assessment. The following paragraphs comprise a summary of the conclusions outlined in that report:

> *'This report concludes that it can be clearly demonstrated that no elements of the project will result in any significant effects on the integrity or Qualifying Interests/Special Conservation Interests of any European site, either on their own or in-combination with other plans or projects.*
>
> *It is considered that this NIS provides sufficient relevant information to allow the Competent Authority (An Bord Pleanála) to reach a determination that the proposed project will not affect the integrity of any of the identified European sites under Article 6 of the Habitats Directive (92/43/EEC).'*

In addition, no impacts are expected to arise at any other designated site, such as the pNHAs within 5km of the Platin Facility. This is due to the distance between the sites and Platin, and the reasons for which the sites are designated. For example, no changes to groundwater levels at Duleek Comnmons pNHA (site code 001578) are considered remotely likely as a result of the proposed development.

5.4.2.2 Habitats, Flora and Fauna including Rare and Protected Species

There are no significant potential operational effects predicted to occur within the site due to its pre-existing industrial character, and no habitats or species of any ecological value will be affected.

5.4.2.3 Water

As previously stated, a study by Ecofact Environmental Consultants in 2016 showed no evidence that the discharge from the Irish Cement Limited Platin facility is having any significant impact on the biological water quality of the downstream areas surveyed. There will be no significant change in the nature or quantity of runoff to surface waters as a result of the proposed development. The new buildings will generally be located on ground that is currently hard-standing. The runoff from the roofs of new buildings will be collected in a storm water drain which will be connected to the overall surface water drainage network. In addition, all of the new proposed fuel types shall be stored in appropriate buildings, tanks, silos etc. and within appropriately bunded and protected areas so as to prevent any possible run-off to surface waters.

There is no additional water required to cater for the increased use of alternative fuels and the use of alternative raw materials on site. There are no additional domestic effluent or treated process discharges due to the proposed development.

There will be therefore be no changes to the nature (either quantity or quality) of water abstracted, processed or discharged to the River Nanny as a result of the proposed development and therefore no other impacts on water are expected and Platin Cement Works will be required to continue to comply with surface water emission limit values outlined in the Industrial Emissions licence for the site.

In addition, the Firewater Risk Assessment (refer to Appendix 3.1 of the EIA Report) concludes that all bunds provided on-site are designed and constructed in line with industry best practice. Assessment of the environmental risk associated with these areas shows that the risk to the aquatic environment is low to medium. Therefore it is not considered that the risk warrants the provision of additional containment to that provided by the bunds.

5.4.2.4 Air

The Air Quality Impact Assessment (Chapter 8 of the EIA Report) included air dispersion modelling (AERMOD) of the predicted changes in the ambient air quality a direct consequence of the proposed development. Two scenarios were considered, an existing scenario (using the current site layout, volumetric flow rates and maximum emission limits as specified in the BAT Conclusion on the Production of Cement, Lime and Magnesium Oxide, 2013) and a proposed scenario (using the proposed site layout, the proposed increases in volumetric flow rates in Kiln 1, Kiln 3

and Cement Mill 1 and maximum emission limits as specified in the BAT Conclusion on the Production of Cement, Lime and Magnesium Oxide, 2013).

The effect on air quality is assessed by comparing the existing permitted ground level concentrations (GLCs) of pollutants from Platin Cement Works with those for the proposed scenario and the modelling predictions represent the most conservative or worst-case concentrations which could arise.

Full details of the existing and proposed scenarios as modelled are contained in Chapter 8 of the EIA Report, however, an assessment of nitrogen deposition at nearby ecological sensitive areas has been carried for the River Boyne and River Blackwater SAC, River Boyne Coast and Estuary SAC and pNHA, Duleek Commons pNHA and Laytown Dunes/Nanny Estuary pNHA. The highest predicted annual average concentration of NO_2 is 0.64 µg/m^3 and is predicted to occur at the River Boyne and River Blackwater River SAC.

Assuming a deposition velocity of 0.001 m/s the nitrogen deposition at River Boyne and River Blackwater River SAC is calculated based on the following:

- 1 µg/m^3 NO_2 = 0.1 kg N ha^{-1} yr^{-1}

This results in a total value of 0.06 kg N ha^{-1} yr^{-1}. This is significantly lower than the UNECE critical load for nitrogen of 5-10 Kg N ha^{-1} yr^{-1} for inland and surface water habitats, refer to Section 8.2.2.2 of the EIA Report.

The air quality modelling results contained in Chapter 8 of the EIA Report also confirm that a less than 1% increase in concentrations of PM_{10}, PM2.5 and SO_2 is predicted to occur due to the proposed development. It should be noted that the statutory Air Quality Standards (S.I. No. 180 of 2011 and S.I. No. 58 of 2009) contain limit values for the protection of vegetation for SO_2 and NO_x only, however the air quality modelling covers a full suite of potential pollutants.

The modelling exercise shows that the proposed development will not breach any of the relevant Air Quality Standards (AQS) that are assessed to monitor potential effects on human health or on ecosystems. The Air Quality Assessment also confirmed that the use of additional alternative fuels and alternative raw materials will result in a number of positive indirect effects on air quality and climate, for example the reduced use of natural raw materials and a reduced energy requirement for blasting and crushing.

5.4.3 Worst Case Scenario

There will be no significant effects on designated sites, habitats, flora or fauna as a result of the proposed development. Furthermore, there will be no significant changes to the nature or quantity of runoff to surface waters, nor will there be any significant effects on air quality, as a as a result of the proposed development.

Furthermore, the maximum ground level concentrations predicted for Platin Cement Works and for Indaver were assumed to be coincident, that is, to occur at the same location and at the same time. This is highly conservative and would rarely if ever be realised in practice.

5.4.4 Cumulative Effects

Indaver Ireland operates a Waste-to-Energy facility at Carranstown which is approximately 800m from Platin Cement Works.

A cumulative assessment for nitrogen deposition at the River Boyne and River Blackwater River SAC, including emissions from Indaver, is presented in Table 8.11 of the EIA Report. As a worst case scenario, the highest GLC predicted by Indaver has been used for the assessment, i.e. 0.85 µg/m^3. This equates to 0.08 kg N ha^{-1} yr^{-1}, resulting in a cumulative level of 0.145 kg N ha^{-1} yr^{-1}, significantly lower than the UNECE critical load for nitrogen of 5-10 Kg N ha-1 yr-1 for inland and surface water habitats.

No other potential cumulative effects on ecological receptors are expected to arise as a result of the proposed development for example effects on designated sites, habitats, species or water quality.

5.5 Mitigation Measures

All construction works will comply with the legislative requirements and best practice. A Construction Management Plan has been prepared and all works will comply with the requirements of this document. Other measures, including the full implementation of the Firewater Risk Assessment requirements (refer to Appendix 3.1, the Emergency Response Procedures (refer to Appendix 3.2) will ensure no effects arise on any ecological receptors as a result of the proposed development.

Other than the foregoing, no mitigation measures are required apart from those associated with air and water emission control and the IE Licence in general, as presented in Chapters 7 and 8 of this EIA Report.

5.6 Residual Effects

There will be no residual effect on any biodiversity or ecological receptors, either within the site itself or associated with any site designated for nature conservation as a result of the proposed development.

5.7 Monitoring

Emissions to the environmental will continue to be monitored by the EPA in accordance with the IE licence for the Cement Works. Otherwise no monitoring is required.

5.8 References

Council of the European Communities (1992). Council Directive of 21 May 1992 on The Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC). O. J. L 206/35, 22 July 1992

Department of Housing, Planning, Community and Local Government, (2017) Circular Letter PL 1/2017 Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on Administrative Provisions in Advance of Transposition.

Department of Housing, Planning, Community and Local Government, (2017) Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems: Key Issues Consultation Paper

DoEHLG (2010). Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, Rev. Feb 2010);

DoEHLG (2011). Actions for Biodiversity 2011 – 2016, Ireland's National Biodiversity Plan

Eastern River Basin District Management Plan 2010

Ecofact (2016), Aquatic Monitoring of the River Nanny near Duleek, County Meath

Environmental Protection Agency (2002). Guidelines on the Information to be contained in Environmental Impact Statements

Environmental Protection Agency (2003). Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)

Environmental Protection Agency's (EPA) Revised Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (May 2017);

Environmental Protection Agency (2015). Revised (Consultation Draft) Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)

European Commission (EC) (2000). Managing Natura 2000 sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC Environment Directorate-General, 2000)

European Commission (EC) (2001). Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission Environment Directorate-General)

European Commission (EC) (2015 (DRAFT). Managing Natura 2000 sites: The Provisions of Article 6 of the Habitats Directive 92/43/EEC. (Draft Guidance issued by the European Commission, April 2015)

European Communities (Birds and Natural Habitats) Regulations 2011 (SI No. 477 of 2011)

Fossitt, J. A. (2000). A Guide to Habitats in Ireland. The Heritage Council, Ireland

IEEM, 2006. Guidelines for Ecological Impact Assessment. Available at: https://www.cieem.net/data/files/Resource_Library/Technical_Guidance_Series/EcIA_Guidelines/TGSEcIA-EcIA_Guidelines-Terestrial_Freshwater_Coastal.pdf

Kelly, F.L., Matson, R., Connor, L., Feeney, R., Morrissey, E., Wogerbauer, C. and Rocks, K. 2012. Water Framework Directive Fish Stock Survey of Rivers in the Eastern River Basin District. Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin, Ireland;

National Roads Authority (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes

Planning and Development, Act 2000, as amended

6 Land, Soils, Geology and Hydrology

6.1 Introduction

This chapter describes the existing land, soils, geology and hydrogeology environment in the area of the proposed development and its immediate surroundings. It also describes the predicted land, soils, geology and hydrogeology impacts to could possibly arise.

An assessment is made of the predicted impacts associated with both the construction and operational phases of the development on these resources. Possible mitigation measures are put forward to reduce the impact of the proposed development and any residual impacts.

The site is licensed by the EPA to operate under P0030-04.

6.2 Methodology

This chapter has been prepared having regard to the Institute of Geologists of Ireland (IGI, 2013) Guidelines for the Preparation of Soil, Geology and Hydrogeology Chapters of Environmental Impact Statements.

6.2.1 Application of Methodology

The potential impact of the proposed development on the soils, geology and hydrogeology environment has been assessed by classifying the importance of the relevant attributes and quantifying the predicted magnitude of any impact on these attributes.

This impact assessment methodology is in accordance with the guidance outlined in 'Guidelines for the Preparation of Soil, Geology and Hydrogeology Chapters of Environmental Impact Statements' published by the IGI in 2013.

The document outlines a 13 step methodology which is divided across four distinct elements:

- Initial assessment
- Direct and indirect site investigation
- Mitigation measures, residual impacts and final impact assessment
- Completion of the Soils, Geological and Hydrogeological Sections of the EIA Report

The initial assessment of the site is outlined in Section 6.3 Existing Receiving Environment, and presents a description of the past and present uses of the site and other neighbouring sites. This section also describes the nature of the site based on both site specific and neighbouring site investigation data, obtained internally and from publically available sources.

Section 6.3.8 and the sub-sections therein contain discussion on the site specific data available for the site from the site specific investigation carried out in 1999. This, along with other sections from within Section 6.3 looks at the regional setting of the site and corresponds to the second element of the methodology, Direct and Indirect Site Investigation and Studies.

The outcome from examining this available data is our Conceptual Site Model (CSM) which is briefly outlined in Section 6.3.9. The CSM is a summary of geological and hydrogeological conditions at a site which considers the impact of the proposed development. Based on the derived CSM the Site is classified as a Type C environment based on the criteria outlined in the guidelines.

Section 6.4 outlines the characteristics of the proposed development and the following section (Section 6.5) lists the potential impacts associated with the development of the Site.

Section 6.6 outlines the "Avoidance, Remedial and Mitigation Measures" associated with the works.

6.2.2 Information Available

The existing soil, geology and hydrogeology conditions in the area of the proposed development have been interpreted from both desk study information and from project specific site investigation.

6.2.2.1 Publically Available Information

The public sources where information is obtained are as follows:

- Bedrock geology, Geological Survey of Ireland (GSI).
- Teagasc Subsoils Map, GSI.
- Draft bedrock aquifer map, GSI.
- Draft gravel aquifer map, GSI.
- Groundwater Recharge Map, GSI.
- Locations of Groundwater Wells and Springs, GSI.
- Drinking Water Protection Areas, GSI and EPA.
- Groundwater Vulnerability, GSI.
- Water Frame Work Directive (WFD) Groundwater Bodies (GWBs), GSI.
- Historical and Current Pits and Quarries, GSI.
- Aggregate Potential Mapping, GSI.
- Geological Heritage Area, GSI.
- Historical Maps, Ordnance Survey of Ireland (OSI).
- Waste Licence and Permits, Environmental Protection Agency (EPA).
- Integrated Pollution Control (IPC) and Industrial Emissions (IE) Licences, EPA.
- Illegal Dumping, Landfilling and Fly Tipping Sites.
- Natural Heritage Areas (NHA) and Proposed Natural Heritage Areas (pNHA), The National Parks and Wildlife Service (NPWS).
- Special Areas of Conservation, NPWS.
- Special Protection Areas (SPA), NPWS.
- Rainfall data, Met Éireann.

6.2.2.2 Site Specific Information

The following project specific Environmental and Geotechnical Site Investigations have been carried out.

- Arup (2014) Platin Quarry Extension Desk Study Report (Planning Ref.: Meath County Council SA130769 / An Bord Pleanála Ref.: PL17.243795).
- Irish Drilling Limited (2014) Ground Investigation for Platin Quarry Extension, Factual Report.
- Arup (2014a) Platin Quarry Extension Ground Investigation – Supporting Data for Irish Rail Response.
- Arup (2014b) Platin Quarry Extension Ground Investigation – Geotechnical Interpretative Report.
- Arup (2015) Ground Investigation and Environmental Sampling within Platin Cement Works.

6.3 Existing Environment

6.3.1 Site Location and Setting

The proposed development is located within Platin Cement Works approximately 4km to the southwest of Drogheda Town centre. Platin limestone quarry lies to the immediate west of the Cement Works. The Cement Works is surrounded primarily by agricultural land, with some residential dwellings and a waste-to-energy facility (operated by Indaver Ireland). The M1 Dublin-Belfast motorway is located approximately 1km to the east of the site and the site is accessed via the R152 which runs at the southern extent of the site.

The Cement Works consists of stone crushing equipment, roofed limestone, shale and gypsum stores, coal stockpiles, kilns, cement milling and bagging plants, cement storage silos and bulk discharge facilities, garage and bunded fuel stores, an ESB substation, offices blocks, parts stores and welfare facilities. The site is also divided by the Drogheda to Navan freight railway line, which services Tara Mines.

The ground within the cement works typically consists of made ground and glacial till over shallow bedrock. Topography across the Cement Works varies from approximately c.60m OD at the northern side of the site to c.40m OD at the ESB substation to the south of the cement works. Ground elevation around the edge of the limestone quarry ranges from c.65m to 40m OD (north to south) with the deepest area of the quarry at -20.0m OD.

6.3.2 Site History

The history of the site, as deduced from historical maps and aerial photographs (see Figures 6.1 to 6.2), data from previous desk studies and Irish Cement publications, indicates development of the site into cement works commenced in the early 1970's. Expansion of cement production and extension of the quarry has occurred steadily over the last 40 years.

Historical 25" (from 1897-1913) & 6" (from 1829-1841) mapping (see Figures 6.1 and 6.2) indicates that the site was agricultural land with the Drogheda-Navan railway line shown on both historic maps.

The cement produced at the Platin facility is transported from the site in bulk and bagged form, by road throughout Ireland and by sea for export from local ports.

6.3.3 Land

The site comprises part of the existing developed Cement Works and comprises areas of existing hard-standing, storage areas and adjoining areas, which have all be influenced by existing developments.

6.3.4 Regional Overview

The following regional review of geological and hydrogeological conditions covers a zone of 2 km from the site boundary, as recommended in the IGI guidelines.

6.3.4.1 Regional Soils and Subsoils

According to the GSI Unconsolidated Sediments Map, the overburden at the site is described as shale and sandstone till (see Figure 6.3). Teagasc Soils maps show the overburden to be fine loamy drift with limestones.

The subsoil comprises glacial till derived from sandstones, shales and limestones of the Carboniferous Period. Till is an unsorted sediment derived, transported and deposited during glaciation. Glacial till is composed of a heterogeneous mixture of clay, sand, gravel and boulders. The subsoil group occurring in the study area is Till, derived chiefly from Namurian sandstones and shale rocks.

6.3.4.2 Regional Bedrock Geology

The GSI Sheet 13 (Geology of Meath), 1:100,000 scale mapping indicates that the site is underlain by the Platin Formation for which the dominant rock types are limestone and shale (see Figure 6.4). In general, the limestones are pale grey, thickly bedded, fine to coarse-grained limestones with abundant fragments of crinoids and coral fossils (Crinoidal peloidal grainstone-packstone).

Borehole evidence from the Platin Quarry in Co. Meath also suggests karstic solution of fissures has developed within this limestone, as noted in an historic borehole (see Figure 6.4). The Rock Unit Group is called Dinantian Pure Bedded Limestones.

Depth to bedrock from existing ground level over the site varies from outcrop at the surface (see TP205, Arup (2015)) to 25.2m BGL (see BH03, Irish Drilling Ltd. (2014) on Figure 6.11). Within the main quarry excavation, shallow depths of overburden are visible on top of the bedrock at the quarry face.

6.3.4.3 Aggregate Potential

The Mineral Section of the GSI provides dataset of Aggregate Potential Mapping (APM) where identified sand, gravels and rock resources that are considered useful to be aggregates in the construction industries.

A number of existing active quarries were identified within 2km of the site from the GSI Datasets Public Viewer (2015) (see Figure 6.5); these are:

- Platin Quarry, immediately west of Platin Cement Works, operated by Irish Cement Ltd and supplying raw limestone for cement production to Platin Cement Works.
- Annagor Quarry, 1.2km southeast of Platin Cement Works, operated by Killsaran Concrete and producing 100,000 tonnes per year of fill materials and rock armour.
- Mullaghcrone Quarry, 0.7km north/northwest of Platin Cement Works, owned by Roadstone and produces high purity chippings for periclase plant and general purpose fines. GSI data indicates Premium Periclase Ltd operate at the site.
- Donore Quarry, 2.0km northwest of Platin Cement Works, is owned and operated by Irish Cement Limited. It produces shale as raw materials for supply to the Cement Works at Platin.
- The Bridesbush 1 Quarry, 2.2km west of Platin Cement Works, was also identified but is now closed; it was operated by Keegan Quarries Ltd and produced crushed fill materials.

The GSI Datasets Public Viewer indicates that there are no areas with production potential of aggregate within the 2km study area. The proposed development will not have an impact on aggregate potential in the area and will not be considered further in this assessment.

6.3.5 Surface Water Bodies

Regional groundwater flow is dominated by the presence of the River Nanny 2.2 km to the south of Platin Cement Works, and also by the River Boyne, approximately 3.5km to the northwest (see Figure 6.6). Historical 25" and 6" (see Figure 6.1) mapping was consulted to identify the location of any historic watercourses on or near the Site. No water courses were identified within the site (see Figure 6.6), however, a number were identified within 2km of the site.

- Cruicerath Stream was identified as flowing along the south-western boundary of the current Platin limestone quarry, southwards where it converges with the River Nanny.
- Platin Stream was identified to begin approximately 300m south of Platin Cement Works and flow southwards where it converges with the River Nanny.
- Crufty Stream was identified to begin approximately 900m south-east of Platin Cement Works and flow southwards where it converges with the River Nanny.
- Carranstown Stream was identified to begin approximately 800m south of the limestone quarry and flow southwards where it converges with the River Nanny.
- Stagrennan Stream was identified to begin approximately 1,200m east of Platin Cement Works and flows eastwards, converging with the River Boyne.

6.3.6 Regional Hydrogeology

The main aquifer type under the site is noted on GSI bedrock aquifer maps as being a regionally important karstified aquifer dominated by diffuse flow (R_{kd}) as shown on Figure 6.6.

These limestones have a moderate to good secondary permeability and the development of joints and fissures by solutional processes and the dolomitisation and decalcification have increased their ability to store greater

quantities. The permeability of the resulting solution features may have been reduced by later (Quaternary) infilling with sands, silts and clays.

GSI information indicates that the porosity at Platin Quarry is estimated as 10%. Evidence from pumping tests at Platin Quarry indicate that the transmissivity of the bedrock in this area is between 78 to 144m^2/d.

6.3.6.1 Groundwater Resources

The Geological Survey of Ireland has devised a system for classifying the aquifers in Ireland based on the hydrogeological characteristics, size and productivity of the groundwater resource into the National Draft Bedrock Aquifer Map. The three main classifications are Regionally Important Aquifers, Locally Important Aquifers and Poor Aquifers. Each of these types of aquifer is further subdivided and has a specific range of criteria associated with it such as the transmissivity (m²/day), productivity, yield and the potential for springs.

The bedrock aquifer beneath the site is classified as a "Regionally Important Aquifer". Regional groundwater flow is dominated by River Nanny Catchment to the south with flow towards this surface water body. To the north of the Mullaghcrone Quarry the groundwater flow is likely to be influenced by the River Boyne Catchment area.

The excavation of the quarry at Platin has provided a low point in the hydrogeological regime and deepening of the quarry to c.-20m OD has resulted in a change in the local ground water flow pattern. Groundwater up slope of the quarry which would have flowed towards the river Nanny, is instead drawn down towards the quarry sump from where it is pumped for discharge to the River Nanny.

The GSI and EPA have delineated certain areas nationwide as groundwater Source Protection Areas (SPAs) in order to provide protection for groundwater resources, in particular group water schemes and public water supplies. An SPA is delineated according to the hydrogeological characteristics of the aquifer, the pumping rate and the recharge in the area. Activities which may impact on groundwater are tightly controlled within the SPA. The nearest SPA is the Boyne River located approximately 3.0km northwest of Platin quarry (see Figure 6.7).

The GSI databases and maps were consulted to see if any records existed for wells in the area. According to GSI (2015a), there are a number of abstraction wells located within 2km of the Site (see Table 6.1 and Figure 6.8a, 6.8b and 6.8c) and they are primarily associated with quarrying activities in the area.

Table 6.1 Well List

GSI NAME	TYPE	EASTING	NORTHING	LOCATION ACCURACY	TOWNLAND	YIELD	YIELD (M3/DAY)
2927SEW036	Borehole	306,650	272,100	to 1km	PLATIN	Moderate	54.5
2927SEW107	Dug well	303,800	273,630	to 50m	OLDBRIDGE		
2927SEW037	Borehole	306,000	271,500	to 100m	PLATIN, DULEEK		
2927SEW042	Borehole	307,650	274,300	to 1km	DROGHEDA	Failure	
2927SEW043	Dug well	307,900	274,400	to 1km	DROGHEDA	Poor	28
2927SEW109	Dug well	303,670	273,650	to 50m	DOWTH		
2927SEW106	Dug well	303,870	273,620	to 50m	OLDBRIDGE		
2827SEW111	Borehole	306,020	272,510	to 200m	DONORE	Excellent	1091
2927SEW101	Dug well	304,190	274,360	to 50m	OLDBRIDGE		
2927SEW045	Borehole	305,200	274,500	to 1km	SHEEPHOUSE	Moderate	81.8
2927SEW047	Borehole	306,050	271,500	to 50m	PLATIN	Excellent	3600
2927SEW110	Borehole	306,010	272,580	to 200m	DONORE	Poor	21.8
2927SEW039	Borehole	306,650	271,850	to 1km	PLATIN	Good	164
2927SEW012	Borehole	307,100	274,400	to 1km	RATHMULLEN		
2927SEW038	Borehole	306,650	271,900	to 1km	PLATIN	Excellent	872.7

GSI NAME	TYPE	EASTING	NORTHING	LOCATION ACCURACY	TOWNLAND	YIELD	YIELD (M3/DAY)
2927SEW035	Borehole	306,650	272,050	to 1km	PLATIN		
2925NEW058	Dug well	305,510	268,990	to 100m	BELLEWSTOWN	Poor	3.3
2927SEW108	Dug well	303,720	273,640	to 50m	DOWTH		
2927SEW048	Borehole	305,900	271,350	to 50m	PLATIN	Excellent	3600
2927SEW001	Dug well	307,450	272,110	to 100m	BEYMORE		
2927SWW038	Dug well	303,000	272,000	to 2km		Poor	28
2927SEW003	Dug well	305,000	272,000	to 200m	DONORE		
2927SEW041	Borehole	306,300	273,350	to 1km	DROGHEDA	Poor	28

6.3.6.2 Groundwater Vulnerability

Aquifer or groundwater vulnerability is the ease with which the groundwater may be contaminated by human activity and depends upon the aquifer's intrinsic geological and hydrogeological characteristics. The vulnerability is determined by the permeability and the attenuation capacity of any overlying deposits. For example, bedrock with a thick, low permeability, clay-rich overburden is less vulnerable than bedrock with a thin, high permeability, gravelly overburden.

The vulnerability of the aquifer directly beneath the Site (Figure 6.9) is classified by the GSI as having a "high" to "extreme" vulnerability due to the absence of overburden cover and close proximity of the bedrock to the ground surface. Within an area of 2 km from the proposed development, the aquifer falls into the "extreme" vulnerability category to the west and north-east of the site, reducing to "moderate" to "low" south of the site.

6.3.7 Protected Features

6.3.7.1 Geological Heritage Areas

Geological Heritage Areas (GHA) are designated as part of the Irish Geological Heritage Programme; a partnership with the Geological Survey of Ireland (GSI) and the Department of Environment, Heritage and Local Government. The aim of the programme is to identify, document and protect the wealth of geological heritage in Ireland.

There are no GHA sites in the vicinity of the quarry listed in the online geological heritage dataset on the GSI web site, therefore GHAs will not be considered further as part of this assessment.

6.3.7.2 Groundwater Dependent Terrestrial Eco-systems

The National Parks and Wildlife Service (NPWS) online database was consulted to establish whether any ecologically protected sites which are dependent on groundwater exist in the vicinity. A full assessment of the ecological features at the site is outlined in Chapter 5 of the EIS, while this section will deal with those which may be influenced by changes in the groundwater regime.

No groundwater dependent ecologically protected sites were identified within a 2km radius of the site (see Figure 6.7).

Two protected sites, the Boyne River and the River Blackwater cSAC and SPA (i.e. candidate Special Area of Conservation and Special Protection Area). Dowth Wetland proposed Natural Heritage Area (pNHA) and Duleek Commons pNHA lie outside the 2km radius of the site.

6.3.8 Regional Potential for Contaminated Land

A review of the existing and historic, licenced and illegal, waste relevant activities from the EPA web site has been carried out to identify any potential contamination sources present in the area. This will allow the identification of any possibly contaminating activities near the site.

6.3.8.1 Waste Licences and Permits

The Environmental Protection Agency (EPA) has licensed waste related activities, including landfills, transfer stations, hazardous waste disposal, other significant waste disposal and recoveries activities, since 1996.

The National Waste Collection Permit Office (NWCPO) has been appointed to process and issue/review all Waste Collection Permit applications for all Waste Management Regions in Ireland.

According to the NWCPO records, there are five waste permits (of which 3 no. are current, one is historic and one is in application) have been issued within 2km radius of the proposed development; these are listed in Table 6.3 with locations shown on Figure 6.10.

Table 6.3 Active and 'In Application' Waste Licences

Waste Licence No.	Operator:	Type of Facility:	Approx. Distance from Site:	Licence Status:
W0167-01	Indaver Ireland Limited	Integrated Waste Management Facility	1.0km	Licensed Replaced by Reg No: W0167-02
W0167-02	Indaver Ireland Limited	Not stated	1.0km	Replaced by Reg No: W0167-03
W0167-03	Indaver Ireland Limited	11.2.0: Waste	1.0km	Licenced
W0278-01	Roadstone Ltd	Soil Recovery Facility (Mullaghcrone Quarry)	1.0km	Applied

6.3.8.2 Integrated Pollution Control (IPC) and Industrial Emission (IE) Licences

The EPA introduced the system of Integrated Pollution and Prevention Control licencing in 2004 to control the emissions, including air, water, waste and noise, from various industrial activities and also ensuring that the responsible sectors use the best available technology. Many of these have been replaced by Industrial Emissions (IE) Licenses over recent years. According to the EPA records, there is one IPC/IE licence (ceased), located within 2km radius of the proposed development; refer to Table 6.4 with the location shown on Figure 6.10. This licence refers to a permitted development, which has not been constructed. As outlined earlier, ICL is licenced to operate under Industrial Emissions licence number P0030-04.

Table 6.4: IPC/IE licences within the vicinity of Platin Cement Works

IE Licence No.	Operator:	Type of Facility:	Approx. Distance from Site:	Licence Status:
P0683-01	Scottish and Southern Energy plc	2.1.0: Energy	c.600m	Ceased

6.3.8.3 Illegal Landfills

The Office of Environmental Enforcement (OEE) of the EPA has been commissioned to deal with unauthorized waste activities in Ireland. According to the their publication the Nature and Extent of Unauthorised Waste Activities in 2005, illegal waste activities identified include illegal landfills, illegal landfills in Northern Ireland containing waste collected in the Republic, illegal exports of waste overseas, illegal waste shipments to Northern Ireland, backyard burning and fly-tipping. There is, however, none of the above unauthorised waste activities noted at or within a 2 km radius of the site.

6.3.8.4 Contamination in Surrounding Sites

Trial pits within the site show the presence of made ground which is most likely linked to the levelling and construction of the existing plant. The surrounding sites appear to be generally undeveloped agricultural land. Historic maps show this land use to have been consistent.

6.3.9 Site Specific Information

6.3.9.1 Stratigraphy

Based on recent (2015) trial pits carried out to depths of 1.7m BGL by Arup (Figure 6.11), the following ground summary and model within the cement works was compiled:

- Made ground was encountered in all exploratory holes to thicknesses ranging up to 1.7m BGL and typically comprised of clay or sandy clay, both containing angular stone fill, cobbles or boulders. The material was noted to be compacted and difficult to dig with a mini excavator.
- Bedrock was not encountered in the majority of the exploratory holes. However, a rock outcrop was noted alongside TP205 and at TP201 shallow bedrock was visible along the railway line at the eastern side of the site, where it was recorded at 0.2m to 0.6m BGL.

Based on the site investigation carried out by Irish Drilling Limited (2014) at the south-west extent of the Platin Limestone quarry (Figure 6.11) along the railway line (for future quarry expansion), the following ground model summary was compiled:

- A layer of topsoil was observed in all trial pits with thicknesses ranging between 0.4m and 0.8m BGL. This layer consisted of firm light brown slightly sandy gravelly clay. Gravel is fine and sub-angular.
- The topsoil was underlain by a series of alternating granular glacial sand and cohesive glacial till deposits. The sand layers were typically described as brown silty fine to medium sand with inclusions of gravel is sub-angular medium to coarse limestone gravel. Approximately 40% of these layers were not recovered in the rotary cores. The sand layers were interbedded with layers of glacial till described as brown slightly sandy gravelly clay.

A typical ground sequence (from BH03) is shown in Table 6.5:

Table 6.5: Summary of Ground Conditions based on BH03

Strata	Depth to top of strata (m BGL)	Thickness (m)
Topsoil	0.0	0.8
Glacial Sands and Gravels	0.8	4.2
Glacial Till (Clay)	5.0	1.4
Glacial Sands and Gravels 2	6.4	6.6
Glacial Till 2 (Clay)	13.0	0.5
Glacial Sands and Gravels 3	13.5	3.0
Brown thinly laminated Clay	16.5	0.6
Glacial Till 3 (Clay)	17.1	7.6
Weathered Limestone	24.7	-

6.3.9.2 Local Bedrock Geology

During the Arup (2015) investigation, rock outcrops were visible alongside TP205 and in TP201 and along the railway line at the southern side of the cement works, where bedrock was recorded at 0.2m/0.6m BGL.

From the Irish Drilling Limited (2014) ground investigation, weathered limestone was encountered in BH01, BH02, BH03 and BH05 at depths of between 5.8m and 24.7m BGL. The weathered limestone was described as very strong, thinly bedded grey fine to medium grained limestone although was recovered as angular medium to coarse gravel, cobble and boulder sized clasts with orange brown clay infill.

Non intact limestone bedrock, described as angular fine to medium limestone gravel with orange brown clay infill, was recovered in BH02 commencing at 19.9m BGL and intact limestone, described as very strong thinly bedded grey fine to medium grained Limestone, was recovered in BH04 commencing at a depth of 11.2m BGL.

Limestone bedrock is exposed extensively in the sides and base of the adjoining quarry.

6.3.9.3 Local Soils

Ground investigations indicate that glacial till deposits and made ground underlie the site.

6.3.9.4 Groundwater Regime

Dewatering has been ongoing at Platin quarry since the mid 1980's and monitoring of groundwater levels around the quarry has been in place since 2000 via a number of groundwater monitoring boreholes and monitored private wells (see Figure 6.8b). Dry working conditions are maintained by the use of water pumps which are located in the quarry sump. The level of the quarry floor is at approximately -20.0m OD. Approximately 17,500 m^3/day of water is discharged to the river Nanny at a licensed discharge point 2.5km to the south of the works; further details of the discharges can be found in Chapter 7, Water & Hydrology.

Dewatering has resulted in a cone of depression in the water table around the quarry with the groundwater level in the limestone beneath the application area being lowered in excess of 13 metres. Figure 6.8c shows the groundwater contour mapping from monitoring carried in July and October 2014. However, this reduction in the groundwater level in the bedrock has not impacted on the water table in the glacial overburden on the lands which has remained at between 1m and 2.5m below ground level over the 13 year monitoring period. Furthermore, the groundwater contouring shows the divide between the quarry and the River Nanny, indicating that dewatering is not drawing down water from the river.

The groundwater level was measured during the Irish Drilling Limited (2014) ground investigation at the south west of the site using standpipe installations in BH05 and BH06. The highest groundwater levels recorded in February 2014 were 1.8m and 2.1m BGL in BH05 and BH06, respectively.

6.3.9.5 Local Contamination - Soils

Twelve soil samples were taken from six locations around site that are representative of the geology underlying the site footprint. The locations of the sampling locations are shown in Figure 6.11. Soil sampling depths were selected to provide representative samples of made ground/overburden across the site.

The samples were tested for a wide range of contaminants chosen because they related to current and future activities carried out on site and would represent the most likely contaminants of concern which could be produced from the site.

In order to ascertain whether there may be any environmental risks posed from existing soil contamination on the Platin site, a risk assessment was undertaken by comparing all the soil chemical test results against the Generic Assessment Criteria (GACs) for commercial sites. These GACs are used to carry out an assessment of the likely environmental risk associated with ground contamination in a commercial/industrial setting.

In generating the GACs, the CLEA (Contaminated Land Exposure Assessment) v1.06 software has been used to determine the appropriate assessment of risks to human health from contaminated land. Constituent concentrations in soil samples are deemed 'potentially' significant where they exceed the GAC. GACs are used for initial screening of contaminant concentrations for the purpose of providing an initial indication of impacts at the site. Where appropriate, exceedances of the GACs should be followed by a site specific risk assessment.

Where GAC limit values have not been set for a parameter, Dutch Intervention Values (DIV) have been used.

Results:

A risk assessment was undertaken by comparing all the soil chemical test results against the Generic Assessment Criteria (GACs) for commercial sites. Results of the testing are summarised in Appendix 6.1 Table A2. All results comply with the assessment criteria.

6.3.9.6 Local Contamination - Groundwater

Ground water monitoring data is provided for the years 2000 to 2016. This data is presented in Table A1 in Appendix 6.1.

6.3.10 Conceptual Site Model (CSM)

The bedrock beneath is a regionally important karstified aquifer, locally confined by a variable thickness of glacial till. The aquifer is classified as "extremely" vulnerable at the location of the quarry. Regional flow in the bedrock and overburden around the quarry is towards the dewatering well within the quarry. Groundwater flow from north of the overburden mound (north of the quarry) is towards the Nanny River catchment.

Figure 6.12 shows a conceptual site model (CSM) for the site and the CSM is summarised in terms of the construction and operational phases in Tables 6.6 and Table 6.7, respectively.

Table 6.6: Construction Phase Source, Pathway & Receptor Conceptual Site Model

Source:	Pathway:	Receptor:	Comment:
Construction			
Spoil material from location of proposed new structures. Material will be either disposed of off-site or.	Leaching and migration through groundwater or surface runoff.	Site occupants, construction personnel, surrounding soil and groundwater	Further site specific environmental testing required at individual structure locations. Appropriate disposal of contaminated material.
Lowering of groundwater during construction activities and disposal of water.	Leaching and migration through groundwater or surface runoff.	Groundwater, bedrock aquifer and local water courses in the River Nanny Catchment.	N/A - No Risk, groundwater, pump well below required formation levels.
Spillages /leakages of fuel or chemicals stored on site caused by construction activities.	Leaching and migration through groundwater or surface runoff.	Site occupants, construction personnel, surrounding soil and groundwater.	Good housekeeping (daily site clean-ups, use of disposal bins, etc.) during construction, and the proper use, storage and disposal of substances will prevent soil contamination.

Table 6.7: Operational Phase Source, Pathway & Receptor Conceptual Site Model

Occurrences:	Source:	Pathway:	Receptor:	Comment:
Operational Phase:				
Increased Alternative Fuel Capacity	Fuel spillages during quarrying /mining works.	Leaching and migration through groundwater or surface runoff.	Site occupants, surrounding soil, groundwater and bedrock aquifer.	Fuel stored in enclosed hardstanding and /or bunded facilities. Refuelling to be carried out at specific locations only.
	Additional oil and fuel storage requirements.	Leaching and migration through groundwater or surface runoff.	Site occupants, surrounding soil, groundwater and bedrock aquifer.	No issues if correct procedures followed and suitable bunded facilities, as proposed, are used.

Occurrences:	Source:	Pathway:	Receptor:	Comment:
See Chapter 3 for details on possible Alternative Fuels contaminants.	Storage of new/additional alternative fuels possibly containing hazardous materials.	Leaching and migration through groundwater or surface runoff. Possible ingestion /contact with contaminated soils.	Site occupants, surrounding soil, groundwater and bedrock aquifer.	No issues if correctly stored and bunded, with run-off and leachate controlled.
Ammonia currently stored on site for use in Selective Non-Catalytic Reduction technology on the kilns.	Storage of ammonia required for cement production.	Leaching and migration through groundwater or surface runoff. Possible ingestion /contact with contaminated soils.	Site occupants, surrounding soil, groundwater and bedrock aquifer.	No issues if correctly stored and bunded, with run-off and leachate controlled.

6.3.10.1 Importance of Features

As part of our assessment of the receiving environment the importance of the following features has been ranked in line with the IGI Guidelines (based on NRA criteria) as shown in Table 6.8. No other features warranted an importance rating.

Table 6.8: Importance of Features

Feature	Importance	
	Ranking	Justification
Regionally important aquifer (karstified – diffuse)	High	The Site is underlain by a Regionally Important aquifer.
River Boyne	Very high	The River Boyne is part of a cSAC and SPA. It is a sensitive environmental receptor (although is located >2km from the quarry, and is within a separate river catchment area)

6.3.10.2 Environment Type

From the CSM presented in Section 6.3.9, the proposed development site could be categorised as a Type C environment as defined by IGI guidelines. The definition of this is:

- Type C: Man-made dynamic hydrogeological environments e.g. nearby groundwater abstractions, nearby quarrying or mining activities below the water table, nearby waste water discharges to ground, nearby geothermal systems.

6.4 Characteristics of the Proposed Development

ICL is applying for planning permission to allow for an increase in the use of alternative fuels (AF) and for alternative raw materials (ARM) to be used in the cement-clinker manufacturing process in Platin.

The following engineering works and activities, out of the list of Activities in the IGI guidelines, are envisaged to be carried out for the Proposed Development during the construction and operational phases:

- Earthworks, including minor excavation of materials above the water table;
- Provision of a range of buildings, structures, tanks and silos for the storage, handling and introduction of alternative fuels and alternative raw materials, some of which can be considered as hazardous materials.

6.4.1 Activities/Environment Matrix

The following assessments are required by the Activities/Environment Matrix in the IGI guidelines corresponding to the proposed development conditions:

- Environment Type: A man-made dynamic hydrogeological environment (Type C), and
- Activities: Earthworks, Storage/transmission of leachable or hazardous materials, Excavation of materials above the water table.

Table 6.9 outlines the required activities based on the environmental type and different activities which will be undertaken on site and the works which have been carried out to address those activities.

Table 6.9: Details of works required under the IGI Guidelines and how they have been undertaken on the Site

Work required under Activity and Type Class (based on IGI guidelines):	Details of Works completed on the Site:
Earthworks:	
Invasive site works to characterise nature, thickness, permeability and stratification of soils, subsoils	Arup (2015): 6 Nr. trial pits to 1.7m BGL for environmental sampling purposes. Irish Drilling Ltd. (2014): 7 Nr. boreholes and 5 nr. trial pits for quarry extension and railway stability checks, as well as other historical GI for the limestone dome and cement silos.
Works to determine the groundwater level, flow direction and gradient, e.g. monitoring in standpipes	Irish Drilling Ltd. (2014): 2 nr. standpipe installations to monitor ground water levels. Dewatering regime in quarry. Annual Environmental Report (AER) documents.
Works to establish groundwater/surface water interactions.	Dewatering regime in quarry. AER documents.
Identify location and abstraction rate of nearby groundwater abstractions	Dewatering regime in quarry. AER documents.
Storage/transmission of leachable or hazardous materials:	
Establish nature and quantity of leachable/hazardous materials	Arup (2015): 6 Nr. trial pits to 1.7m BGL for environmental sampling and testing
Site works to characterise nature, thickness, permeability and stratification of soils, subsoils and bedrock geology, i.e. trial pits and boreholes	See above Arup and Irish Drilling Ltd. investigations and historical GI.
Works to determine groundwater level, e.g. mapping, monitoring in standpipes	See above Irish Drilling Ltd investigation and historical GI. Dewatering regime in quarry. AER documents.
Measure or determine rate of groundwater flow / travel time	Dewatering regime in quarry. AER documents.
Excavation of materials above the water table:	
Site works to fully characterise the bedrock geology and in order to define the resource volume/weight according to the PERC Reporting Standard e.g. trenching, drilling, geophysics	See above Arup and Irish Drilling Ltd. investigations and historical GI.

6.5 Predicted Effects of the Proposed Development

6.5.1 Potential Impacts on Land, Soils, Subsoils and Bedrock

The land comprises existing developed or immediately adjoining areas which have been subject to influence of adjoining development located within the existing Cement Works.

Based on the surveys carried out to date on site, some contamination has been detected in the soils on site. Excavation for foundations across the site may encounter further areas of soil contamination.

The excavation and disposal of excavated soils may result in the generation of dust and also possible odours across the Site.

6.5.2 Potential Impacts Related to Contamination

Soil (predominantly made ground but some natural ground may be encountered) will be excavated as part of the preparatory works. This is likely to be restricted to the shallow subsoil and in most cases to made ground, although some locally deep services may exist requiring deeper excavations.

The testing criteria allow the likely disposal options for the soils to be determined. These are the Waste Acceptance Criteria (WAC) – for soils to be removed/disposed offsite. In accordance with the parameters for disposal of excavated material to landfill (European Council decision of 19 December 2002 pursuant to Article 16 and Annex II to Directive 1999/31/EC). This Council Decision sets limit values on waste for each landfill type based on total pollutant contents and leachate concentrations.

Disposal of excavated soils is controlled by the Landfill Directive (1999/31/EC) which outlines the acceptance limits for the different types of licenced landfill. The types of landfill fall into the following categories:

- Inert licenced landfill
- Non-Hazardous licenced landfill
- Hazardous licenced landfill

There are currently no hazardous landfills in Ireland. Should any excavated soil be found to contain hazardous substances, this material will be disposed of abroad in licenced waste facilities.

6.5.3 Potential Impacts on Hydrogeology

The proposed works will have no impact on the dewatering operations within the quarry.

Table 6.11: Impact Determination

Feature	Importance (Table C2/3)		Magnitude (Table C4/C5)		Significance
	Ranking	Justification	Ranking	Justification	Ranking
Regionally Important Aquifer	High		Negligible	Groundwater will not be impacted by the proposed development once the appropriate measures such as bunding and control of leachate and run-off are implemented.	Imperceptible
Platin Quarry	Very High	Large Existing Quarry	Negligible	Quarry will not be impacted by proposed development	Imperceptible
River Boyne (SAC/SPA)	Very high	Historic significance and home to a number of different habitats.	Negligible	River Boyne located > 2km from quarry. Groundwater flow is away from the River Boyne due to the dewatering of the quarry. River Boyne in different catchment area to quarry	Imperceptible

6.6 Mitigation Measures

The following sections will be transposed into the relevant sections of the Construction Environmental Management Plan for the works.

6.6.1 General Mitigation Measures

6.6.1.1 Construction Phase

SOIL CONST 1: Good housekeeping (daily site clean-ups, use of disposal bins, etc.) on the site project during construction, and the proper use, storage and disposal of these substances and their containers will prevent soil contamination.

SOIL CONST 2: For all activities involving the use of potential pollutants or hazardous materials, there will be a requirement to ensure that material such as, fuels, lubricants and hydraulic fluids will be carefully handled and stored to avoid spillages. Potential pollutants shall also be adequately secured against vandalism and will be provided with proper containment according to codes of practice. Any spillages will be immediately contained and contaminated soil removed from the Site and disposed of in a licenced waste facility.

6.6.1.2 Operational Phase

SOIL OP 1: During the operational phase, all of the new proposed fuel types shall be stored in appropriate buildings, tanks, silos *etc*. and within appropriately bunded and protected areas so as to prevent any possible run-off or leachate impacting the groundwater and soils beneath the site.

6.6.2 Remedial Measures

Any excavations will be for the construction of foundations or bunds and as such will not require remediation.

6.6.2.1 Construction Phase

SOIL CONST REM 1: Dust and odour suppression systems may be required during construction to manage any impacts. Haul roads will be wetted down during dry weather and road sweepers employed to ensure the surrounding roads are kept clean.

SOIL CONST REM 2: Appropriate foundation construction techniques will be adopted to comply with the requirements of statutory bodies in terms of noise, vibration, soil and groundwater contamination and disposal of contaminated material. Material not suitable for use as fill from excavation phases could be suitable for other uses. The re-use of this material will be optimized to the maximum within the cement manufacturing process and any excess material will be transported off site for disposal or recovery at appropriately licence or permitted sites.

SOIL CONST REM 3: Material derived from excavations that could be re-used as engineering fill would have to be shown to be suitable for such use and subject to appropriate control and testing according to the specifications. These excavated soil materials will be stockpiled in a correct way to minimise the effects of weathering. Care would be required in re-working this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere on the scheme shall be used for other projects where possible.

SOIL CONST REM 4: Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding. Run-off will be controlled through erosion and sediments control structures appropriate to minimise the water effects in outfall areas. Care will be taken to ensure that the bank surfaces are stable to minimise erosion.

SOIL CONST REM 5: Excavations in the made ground will be monitored by an appropriately qualified person to ensure that should a hotspot of contamination be encountered it is identified, segregated and disposed of appropriately as soon as possible.

SOIL CONST REM 6: Any identified hotspots shall be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross contaminate clean soils elsewhere on site.

SOIL CONST REM 7: Should contaminated groundwater be encountered during dewatering, groundwater treatment will be employed to ensure that the discharged groundwater fulfils the requirements of the discharge licence issued by the relevant local authority.

SOIL CONST REM 8: Water pollution will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for oil containers, wheel washers and dust suppression on site roads, and regular plant maintenance. The Construction Industry Research and Information Association, (CIRIA) provides guidance on the control and management of water pollution from construction sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al, 2001). A contingency plan for pollution emergencies will also be developed by the appointed contractor prior to work and regularly updated, which would identify the actions to be taken in the event of a pollution incident.

SOIL CONST REM 9: The CIRIA document recommends that a contingency plan for pollution emergencies will address the following:

- Containment measures
- Emergency discharge routes
- List of appropriate equipment and clean-up materials
- Maintenance schedule for equipment
- Details of trained staff, location, and provision for 24-hour cover
- Details of staff responsibilities
- Notification procedures to inform the relevant environmental protection authority
- Audit and review schedule
- Telephone numbers of statutory water undertakers and local water company
- List of specialist pollution clean-up companies and their telephone numbers.

6.7 Residual Effects

There will be no significant residual negative impacts on the land, soil, geological or hydrogeological environment. Specific mitigation measures are set out to ensure no potential risk on the River Boyne as shown in Table 6.12.

Table 6.12: Predicted Impacts of Proposed Development

Feature	Importance (Table C3)		Magnitude (Table C4/C5)		Significance
	Ranking	Justification	Ranking	Justification	Ranking
River Boyne and River Blackwater (cSAC/SPA)	Very high	Historical significance and home to a number of different habitats.	Negligible	Contaminants on site managed and stored appropriately leading to a negligible possibility of spills.	Imperceptible

6.8 Monitoring

Ongoing groundwater quality monitoring will continue to be carried out as part of the requirements of the IE Licence.

Any excavation will also be visually monitored during site clearance to ensure the stability of side slopes and to ensure that the soils excavated for disposal are consistent with the descriptions and classifications according to the waste acceptance criteria testing carried out as part of the site investigations.

6.9 Reinstatement

No reinstatement is required. The excavated space will be occupied by the proposed new buildings and infrastructure.

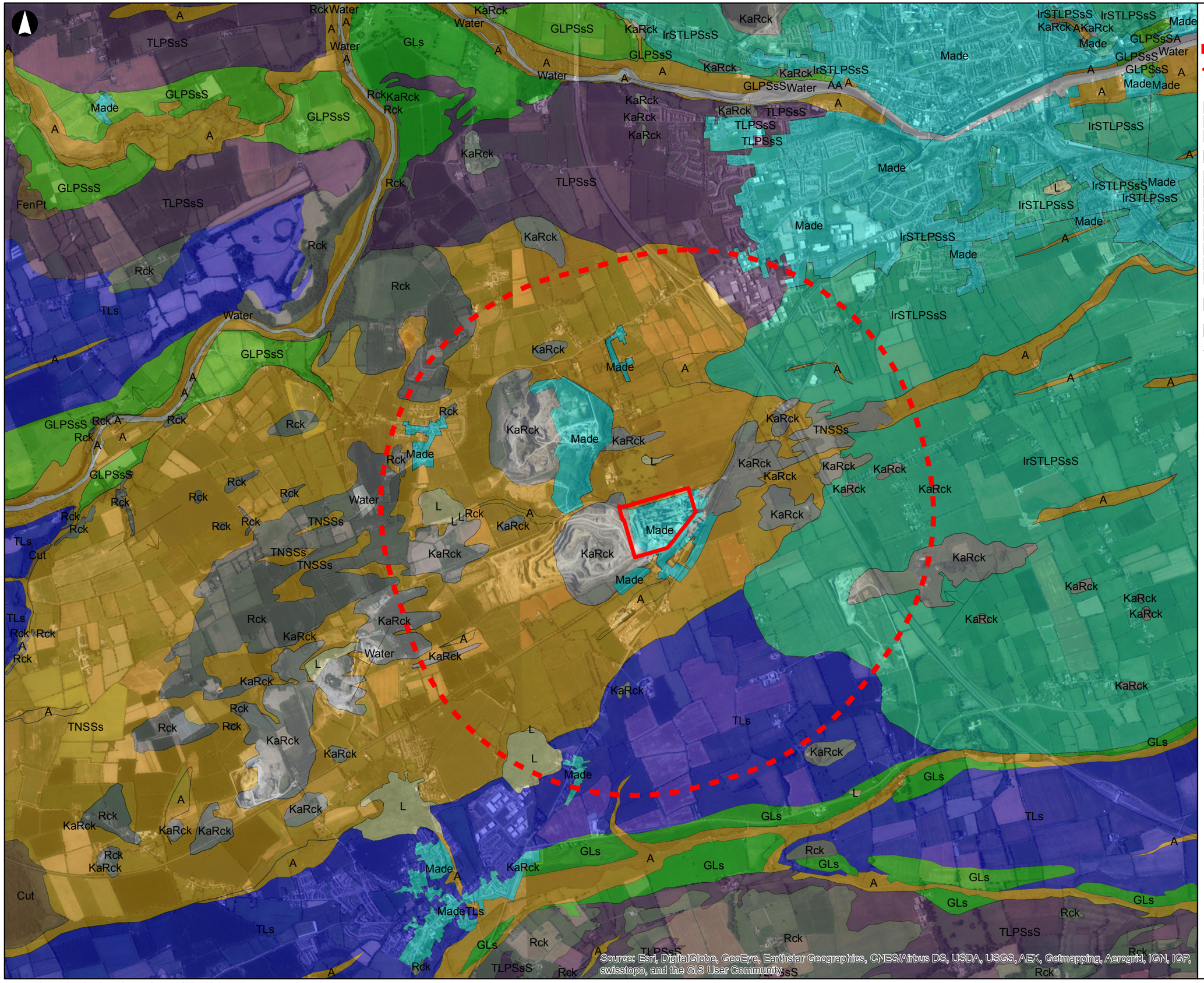
6.10 Cumulative impact

On-going groundwater quality monitoring carried out considers the cumulative impact of the Platin Cement Works and other developments.

6.11 References

- Arup (2014) Platin Quarry Extension Desk Study Report.
- Arup (2014a) Platin Quarry Extension Ground Investigation – Supporting Data for Irish Rail Response.
- Arup (2014b) Platin Quarry Extension Ground Investigation – Geotechnical Interpretative Report.
- Arup (2015) Ground Investigation and Environmental Sampling within Platin Cement Works
- Ecofact (2016) Aquatic Monitoring of the River Nanny near Duleek, Co. Meath. Integrated Pollution Control Licence Register Number P0030-04. Irish Cement Ltd.
- EPA (2005). The Nature and Extent of Unauthorised Waste Activity in Ireland. Environmental Protection Agency.
- EPA (2015). Platin Cement Works IPPC Licence P0030-04 documents http://www.epa.ie/terminalfour/ippc/ippc-view.jsp?regno=P0030-04#.VYmKEPlVhBc
- EPA (2015a). River Nanny Water Quality Survey http://www.epa.ie/QValue/webusers/HAResults.asp#NANNY
- GSI (2015), GSI Datasets Public Viewer. http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple
- GSI (2015a), GSI Groundwater Data Viewer. http://spatial.dcenr.gov.ie/GeologicalSurvey/Groundwater/index.html
- GSI (2015b), GSI Groundwater Data Viewer. http://spatial.dcenr.gov.ie/GeologicalSurvey/GeoTechnicalViewer/index.html
- Heritage Council (2015). Heritage Council - Map Viewer http://heritagemaps.biodiversityireland.ie/#/Map
- IGI (2013). Guidelines for the preparation of soils, geology and hydrogeology chapters of environmental impact statements. Institute of Geologists of Ireland.
- Irish Cement Ltd (2013). Celebrating 75 Years of Irish Cement 1938-2013.
- Irish Cement Ltd (2010). Platin Cement Works IPPC Licence Review Application P0030-04.
- Irish Drilling Limited (2014) Platin Quarry Extension Irish Site Investigation Factual Report.
- Mouchel Parkman (2007) Donnelly's Hollow Remediation Validation Report
- Ordinance Survey of Ireland - Aerial Photography of the study area dating from 1995, 2000 and 2005.
- Official Journal of the European Communities (1999). Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste. L182/1.
- Teagasc (2015). Teagasc Map Viewer http://gis.teagasc.ie/soils/map.php

A3



Legend

- 2km buffer
- Site Area

Drift Geology

- A - Alluvium
- FenPt - Fen peat
- Cut - Cut peat
- GLPSsS - Glaciofluvial sands & gravels
- GLs - Glaciofluvial sands & gravels
- IrSTLPSsS - Irish Sea Till
- KaRck - Karstified limestone at surface
- L - Lake sediments
- Made - Made Ground
- Rck - Rock
- Water
- TLs - Limestone Tills
- TLPSsS - Sandstone and shale till (Lower Palaeozoic)
- TNSSs - Shales and sandstones till (Namurian)
- Strike and Dip

Source:
Geological Survey of Ireland
Environmental Protection Agency

F1	2017-06-06	LM	EW	JB

Issue	Date	By	Chkd	Appd

Metres
0 250 500 1,000

ARUP

50 Ringsend Road,
Dublin 4

Client
Irish Cement Ltd.

Job Title
Drogheda Factory, Platin, Environmental Impact Assessment Report

Drift Geology

Scale at A3
1:30,000

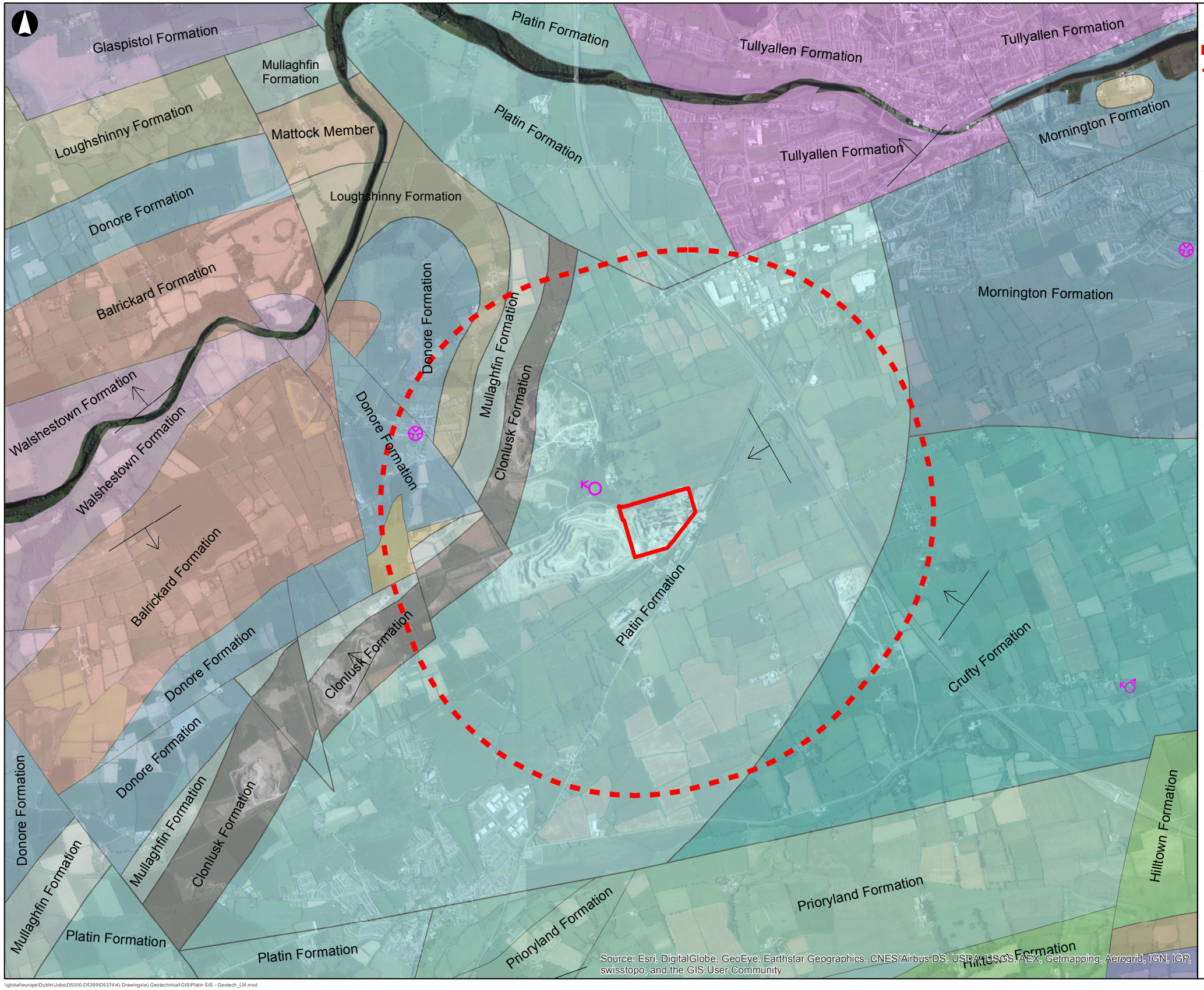
Job No	Drawing Status
325374-47	For Issue

Drawing No	Issue
Figure 6.1	F1

06/06/2017 13:53:20

\\globa\europe\Dublin\Jobs\D5300-D5399\D5374\4) Drawings\e) Geotechnical\GIS\Platin EIS - Geotech_LM.mxd

A3



Legend

- 2km buffer
- Site Area

Karst Features

- BOREHOLE
- ENCLOSED DEPRESSION
- SPRING
- Strike and Dip

Source:
Geological Survey of Ireland
Environmental Protection Agency

Issue	Date	By	Chkd	Appd
F1	2017-06-06	LM	EW	JB

Metres
0 250 500 1,000

ARUP

50 Ringsend Road,
Dublin 4

Client
Irish Cement Ltd.

Job Title
Drogheda Factory, Platin, Environmental Impact Statement

Bedrock Geology

Scale at A3
1:30,000

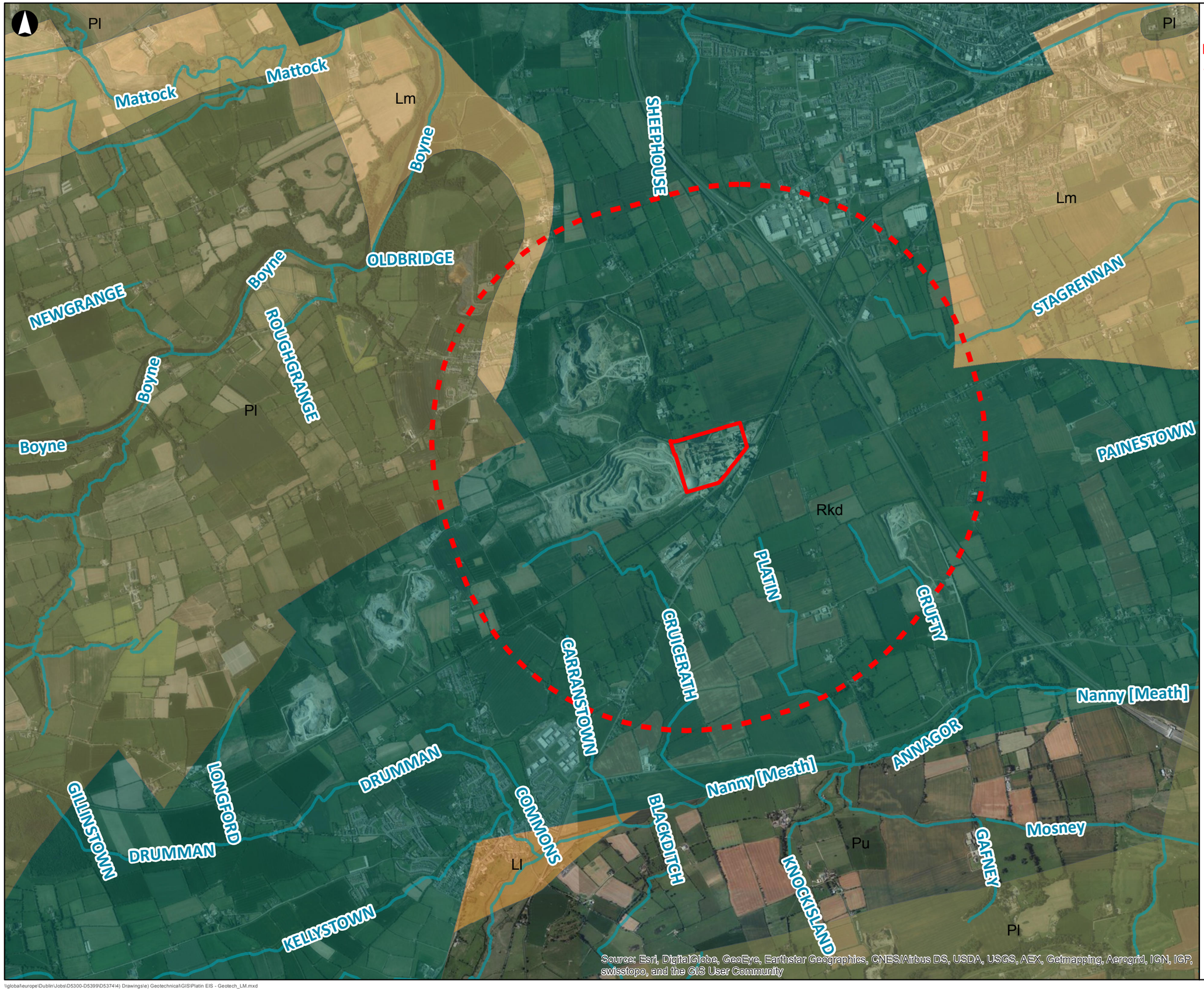
Job No	Drawing Status
325374-47	**For Issue**

Drawing No	Issue
Figure 6.2	**F1**

06/06/2017 13:55:27

\\global\europe\Dublin\Jobs\D5300-D5399\D5374\4) Drawings\e) Geotechnical\GIS\Platin EIS - Geotech_LM.mxd

A3



06/06/2017 13:58:04

Legend

- 2km buffer
- Site Area
- Rivers & Streams

Bedrock Aquifer Classification

- Ll - Locally Important Aquifer - Bedrock is moderately productive only in local zones
- Lm - Locally Important Aquifer - Bedrock is moderately productive
- Pl - Poor Aquifer - Bedrock is generally unproductive except for local zones
- Rkd - Regionally Important Aquifer - Karstified (diffuse)

Source:
Geological Survey of Ireland
Environmental Protection Agency

Issue	Date	By	Chkd	Appd
F1	2017-06-06	LM	EW	JB

Metres
0 250 500 1,000

ARUP

50 Ringsend Road,
Dublin 4

Client
Irish Cement Ltd.

Job Title
Drogheda Factory, Platin, Environmental Impact Statement

Bedrock Aquifer and Local Surface Water Features

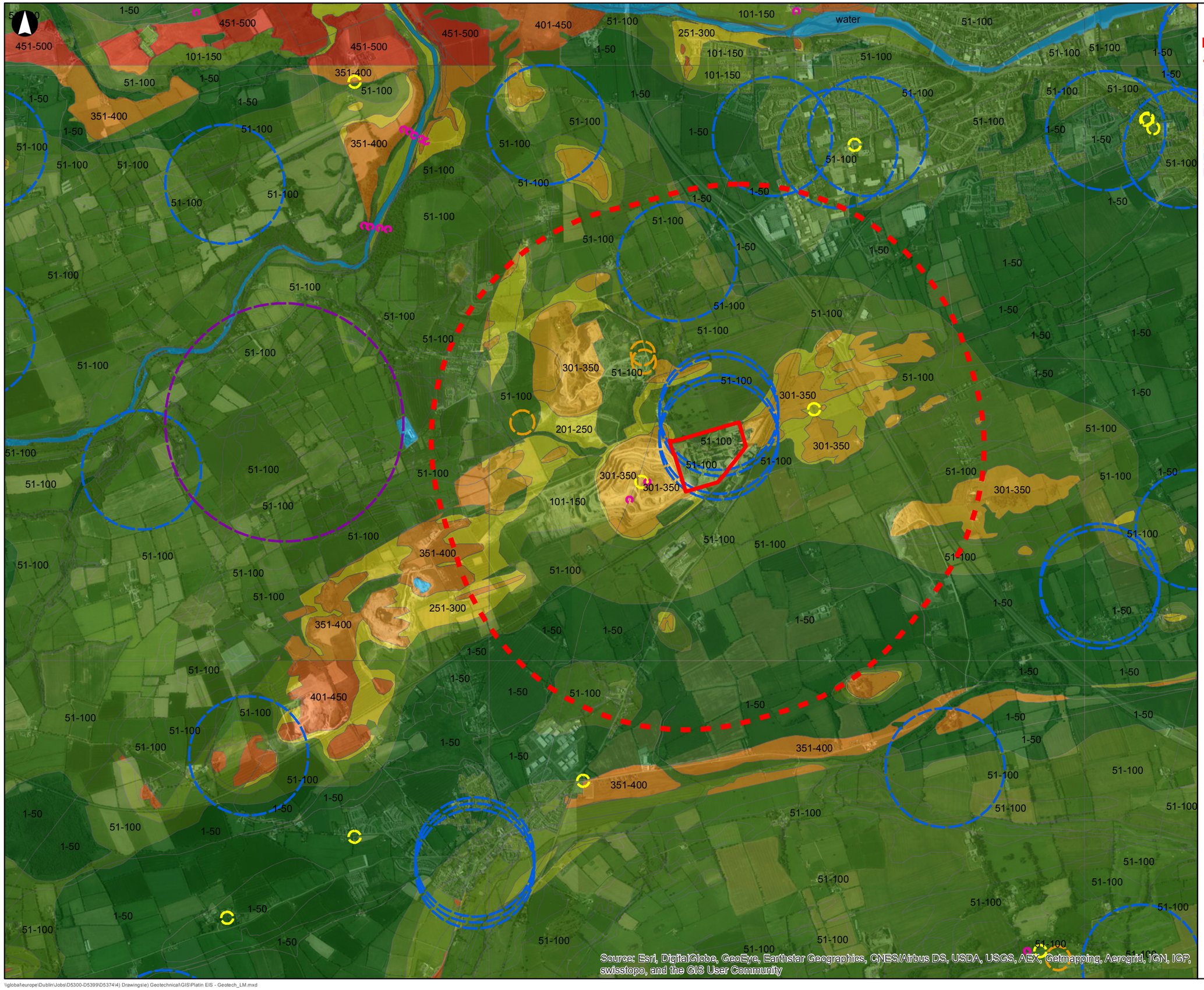
Scale at A3
1:30,000

Job No	Drawing Status
325374-47	For Issue

Drawing No	Issue
Figure 6.3	F1

\\global\europe\Dublin\Jobs\D5300-D5399\D53741\4) Drawings\e) Geotechnical\GIS\Platin EIS - Geotech_LM.mxd

A3



Legend

2km buffer

Site Area

Groundwater Abstraction Wells

Location Accuracy

- to 50m
- to 100m
- to 200m
- to 1km
- to 2km

Groundwater Recharge

Yield (mm/yr)

- 1-50
- 51-100
- 101-150
- 151-200
- 201-250
- 251-300
- 301-350
- 351-400
- 401-450
- 451-500
- water

Source:
Geological Survey of Ireland
Environmental Protection Agency

Issue	Date	By	Chkd	Appd
F1	2017-06-06	LM	EW	JB

Metres
0 250 500 1,000

ARUP

50 Ringsend Road,
Dublin 4

Client
Irish Cement Ltd.

Job Title
Drogheda Factory, Platin, Environmental Impact Statement

Groundwater Recharge and Groundwater Abstraction Wells

Scale at A3
1:30,000

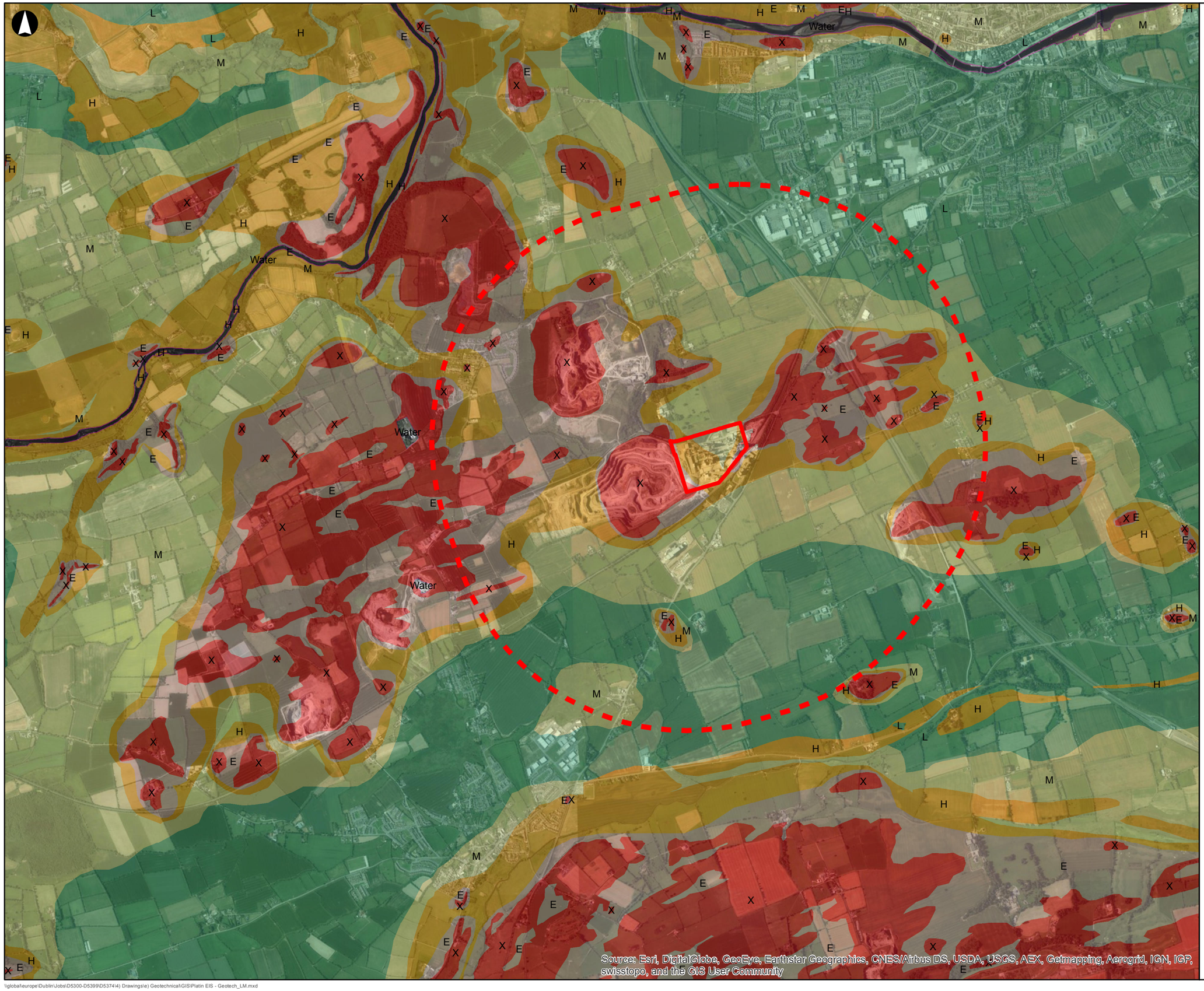
Job No	Drawing Status
325374-47	**For Issue**

Drawing No	Issue
Figure 6.4	**F1**

06/06/2017 14:01:06

\\globa\europe\Dublin\Jobs\D5300-D5399\D5374\4) Drawings\e) Geotechnical\GIS\Platin EIS - Geotech_LM.mxd

A3



Legend

- 2km buffer
- Site Area

Aquifer Vulnerability

- X - Rock at or near surface or Karst
- E - Extreme
- H - High
- M - Moderate
- L - Low
- Water

Source:
Geological Survey of Ireland
Environmental Protection Agency

F1	2017-06-06	LM	EW	JB

Issue	Date	By	Chkd	Appd

Metres
0 250 500 1,000

ARUP

50 Ringsend Road,
Dublin 4

Client

Irish Cement Ltd.

Job Title

Drogheda Factory, Platin, Environmental Impact Statement

Groundwater Vulnerability

Scale at A3

1:30,000

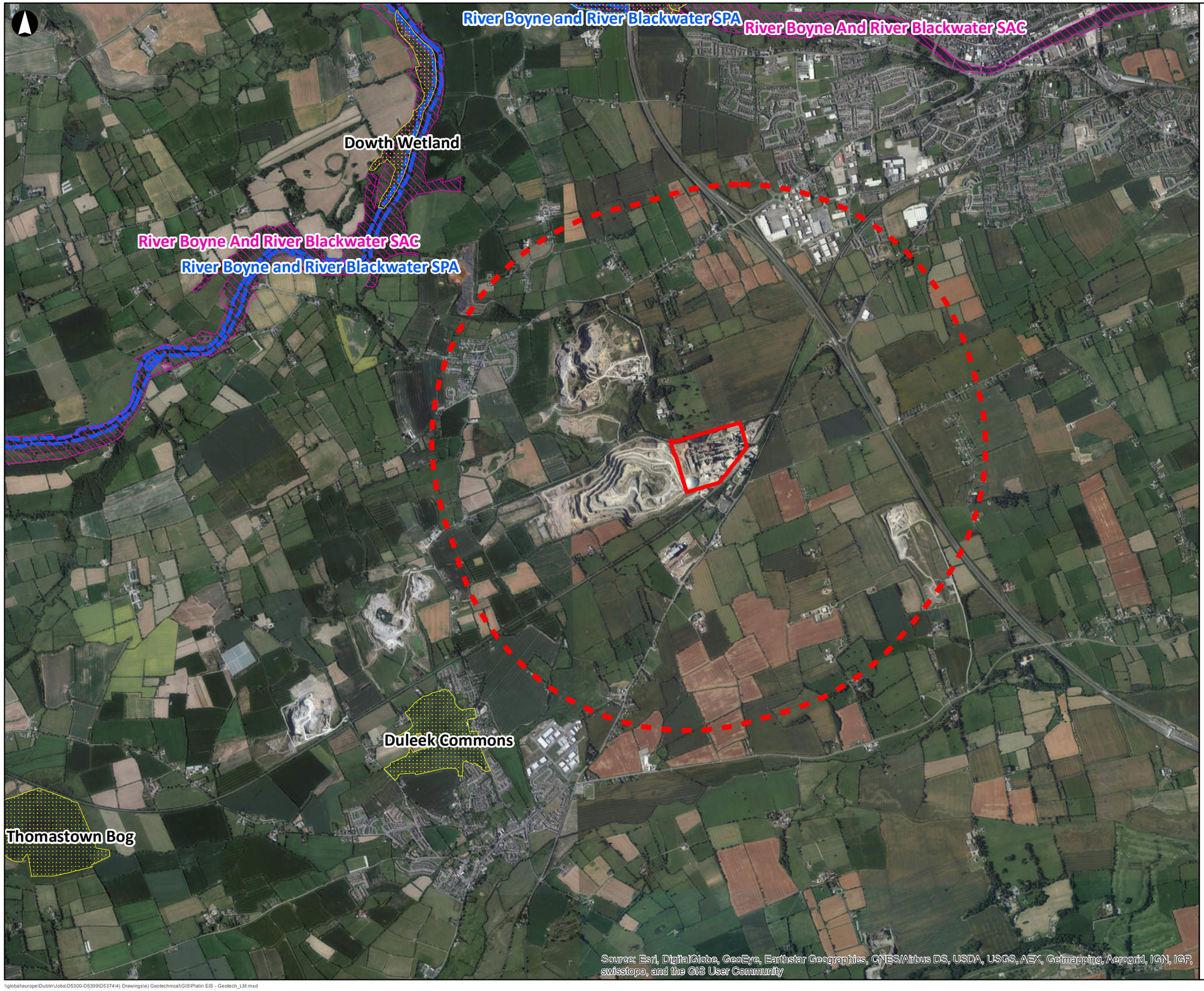
Job No	Drawing Status
325374-47	**For Issue**

Drawing No	Issue
Figure 6.5	**F1**

06/06/2017 14:02:57

\\global\europe\Dublin\Jobs\D5300-D5399\D53744\ Drawings\e) Geotechnical\GIS\Platin EIS - Geotech_LM.mxd

A3



06/06/2017 14:04:28

Legend

- 2km buffer
- Site Area
- Proposed Natural Heritage
- Special Area of
- Special Protection

Source:
Geological Survey of Ireland
Environmental Protection Agency

Issue	Date	By	Chkd	Appd
F1	2017-06-06	LM	EW	JB

Metres
0 250 500 1,000

ARUP

50 Ringsend Road,
Dublin 4

Client

Irish Cement Ltd.

Job Title

Drogheda Factory, Platin, Environmental Impact Statement

Protected Features in the Vicinity

Scale at A3

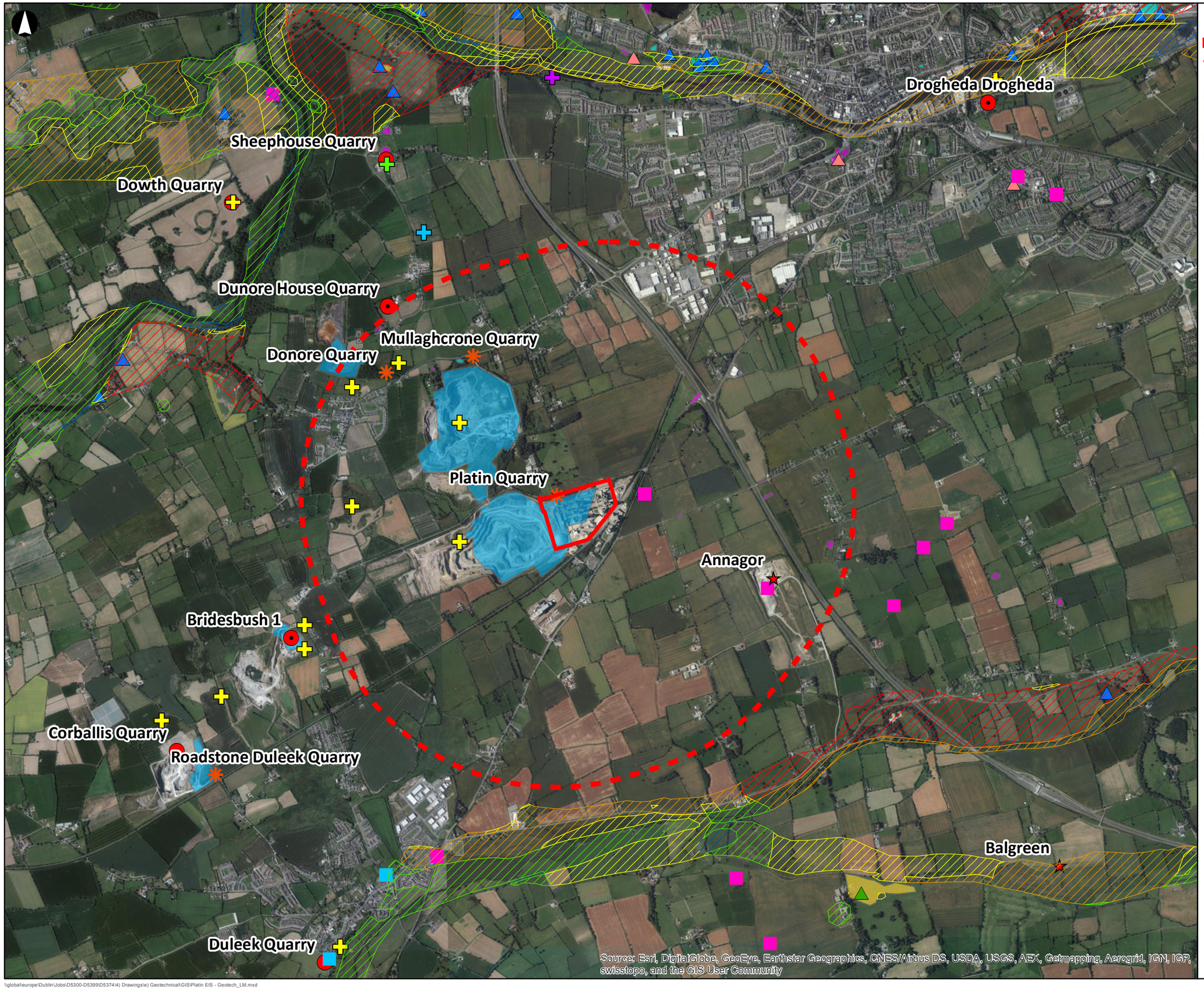
1:30,000

Job No	Drawing Status
325374-47	**For Issue**

Drawing No	Issue
Figure 6.6	**F1**

\\global\europe\Dublin\Jobs\D5300-D5399\D53744\ 4) Drawings\e) Geotechnical\GIS\Platin EIS - Geotech_LM.mxd

A3



Legend

2km buffer

Site Area

Granular Aggregate Potential

- Very high potential
- High potential
- Moderate potential
- Low potential
- Very low potential

Mineral Locations

Type

- dimension stone
- dolomite, (dolostone)
- limestone (in general)
- shale

Source:
Geological Survey of Ireland
Environmental Protection Agency

Issue	Date	By	Chkd	Appd
F1	2017-06-06	LM	EW	JB

Metres
0 250 500 1,000

ARUP

50 Ringsend Road,
Dublin 4

Client

Irish Cement Ltd.

Job Title

Drogheda Factory, Platin, Environmental Impact Statement

Active and Historic Pits and Quarries

Scale at A3

1:30,000

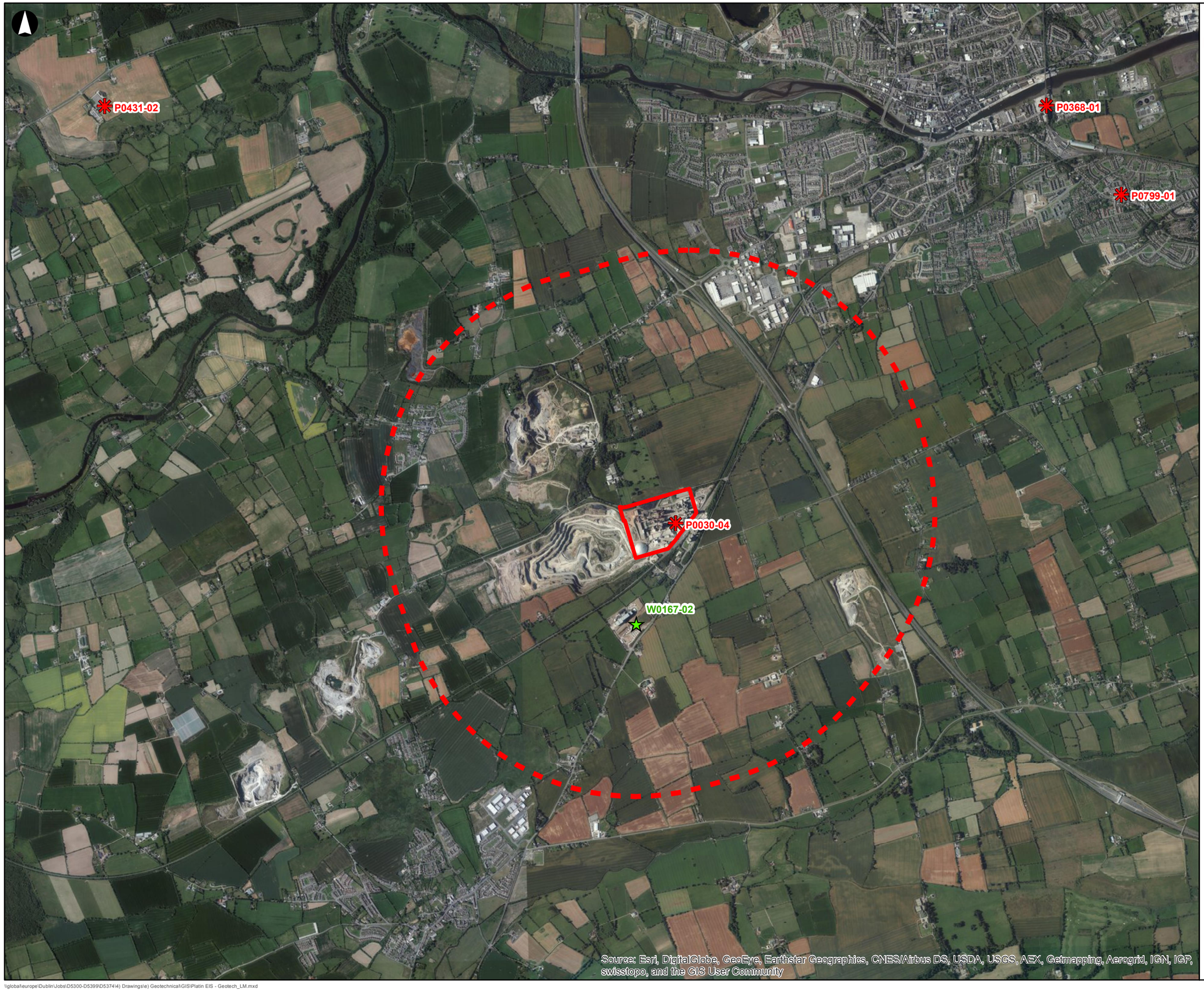
Job No	Drawing Status
325374-47	For Issue

Drawing No	Issue
Figure 6.7	F1

06/06/2017 14:06:45

\\global\europe\Dublin\Jobs\D5300-D5399\D5374\4) Drawings\e) Geotechnical\GIS\Platin EIS - Geotech_LM.mxd

A3



Legend

2km buffer

Site

Licensed Waste Facilities

Status

Licensed (Licence No.)

Licencsd IPPC Facilities

Status

Licensed (Licence No.)

Source:
Geological Survey of Ireland
Environmental Protection Agency

Issue	Date	By	Chkd	Appd
F1	2017-06-06	LM	EW	JB

Metres
0 250 500 1,000

ARUP

50 Ringsend Road,
Dublin 4

Client

Irish Cement Ltd.

Job Title

Drogheda Factory, Platin, Environmental Impact Statement

Locations of Licensed Sites

Scale at A3

1:30,000

Job No	Drawing Status
325374-47	**For Issue**

Drawing No	Issue
Figure 6.8	**F1**

06/06/2017 14:08:12

\\global\europe\Dublin\Jobs\D5300-D5399\D53741\4) Drawings\e) Geotechnical\GIS\Platin EIS - Geotech_LM.mxd

7 Water & Hydrology

7.1 Introduction

This chapter assesses the effects of the construction and operational phases of the proposed development on surface waters.

7.2 Methodology

This chapter has been completed in accordance with the applicable guidelines as described in the following sections.

7.2.1 Legislation and Guidance

The methodology used is based on the Guidelines on Information to be contained in Environmental Impact Statements (2002) and the Advice Notes on Current Practice in the preparation of Environmental Impact Statements (2003) and also has regard to the revised Consultation Draft Guidelines on Information to be contained in the Environmental Impact Statements (2015) and the Consultation Draft Advice Notes for Preparing Environmental Impact Statements (2015).

The EU Water Framework Directive 2000/60/EC came into force on 22 December 2000, and was transposed into Irish legislation by the European Communities (Water Policy) Regulations 2003 (SI 722 of 2003). This legislation provides a co-ordinated approach across Europe for all water policies, establishing a management structure for future water policy.

Key objectives of the Directive are to:

- Protect all waters, including rivers, lakes, groundwater, transitional and coastal waters.
- Achieve "good status" in all waters by 2015, and maintaining "high status" where the status already exists.
- Have water management programmes and strategies based on the whole River Basin Districts (RBD).

Earlier legislation includes:

- European Communities (Quality of Salmonid Waters) Regulations 1988 (SI 293 of 1988).
- Local Government (Water Pollution) Acts 1977 – 1990.
- Water Quality Standards for Phosphorus Regulations 1998 (SI 258 of 1998).

The implementation of the Water Framework Directive and its associated policies has necessitated the introduction of new regulations in Ireland including the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI 272 of 2009).

Under the Water Framework Directive, and the European Communities (Water Policy) Regulations 2003 (SI 722 of 2003), the water quality of River Basin Districts is assessed biologically, physically and chemically. Assessment using surveys is predominately conducted by the EPA and local authorities, and complemented by other government bodies including the Central Fisheries Board and the Marine Institute. Table 7.1 summarises the quality classes used to establish and monitor the condition of rivers and streams in Ireland.

Table 7.1: River and Stream Water Quality Classes (EPA, 2012)

Q Value[1]	WFD Status	Pollution Status	Condition[2]
Q5, Q4-5	High	Unpolluted	Satisfactory
Q4	Good	Unpolluted	Satisfactory
Q3-4	Moderate	Slightly polluted	Unsatisfactory
Q3, Q2-3	Poor	Moderately polluted	Unsatisfactory
Q2, Q1-2, Q1	Bad	Seriously polluted	Unsatisfactory
where:	Biotic indices or Quality (Q) value indicates specified groups of macro-invertebrates sensitivity to pollution, with:		

Q Value[1]		WFD Status	Pollution Status	Condition[2]
	Q5 =	Mostly pollution sensitive, a few to numerous less pollution sensitive, a few pollution tolerant, and no very pollution tolerant or most pollution tolerant macro-invertebrate species.		
	Q4 =	At least one pollution sensitive, few to numerous less pollution sensitive, numerous pollution tolerant, and a few or no very pollution tolerant or mostly tolerant macro-invertebrate species.		
	Q3 =	No pollution sensitive, few or no less pollution sensitive, dominant in pollution tolerant, a few to common in very pollution tolerant, and few or no most pollution tolerant macro-invertebrate species.		
	Q2 =	No pollution sensitive or less sensitive, few or no pollution tolerant, dominant in very pollution tolerant, and few to common in most pollution tolerant macro-invertebrate species.		
	Q1 =	No pollution sensitive, less sensitive, and pollution tolerant, a few to no very pollution tolerant, and dominant in most pollution tolerant macro-invertebrate species.		

Note 1: These values are based primarily on the relative proportions of pollution sensitive to tolerant macroinvertebrates resident at a river site.

Note 2: "Condition" refers to the likelihood of interference with beneficial or potential beneficial uses.

Existing pollution within the catchment of a river system has an impact on the quality of surface waters and this has been taken into account when characterising individual surface water systems in the following section. The existing adverse conditions are reflected in the EPA Q-Value, which describes the biological status of the watercourse. In general, lower Q-values in a watercourse are associated with higher levels of pollution. The Q-value reflects impacts from surface water run-off, including run-off from agricultural land which may contain nutrients and urban run-off from roads and buildings which may contain solids, hydrocarbons and heavy metals.

The potential for flooding due to the proposed development is also considered in relation to the existing situation.

7.3 Existing Environment

The following section describes the existing environment in terms of surface water, drainage systems and attenuation.

7.3.1 Surface Water

7.3.1.1 Introduction

Platin Cement Works is located in the catchment of the River Nanny close to the watershed with catchment of the River Boyne. The River Nanny drains approximately 250km² and rises in the east of County Meath before flowing through Duleek to discharge into the Irish Sea at Laytown. The River Boyne drains a catchment with an area of approximately 2,300 km², nearly 10 times that of the River Nanny. The River Boyne rises in counties Offaly and Kildare and drains most of County Meath before flowing through Drogheda to discharge into the Irish Sea at Mornington in County Meath.

Surface water and treated process water from Platin Cement Works, together with groundwater from the adjoining quarry are discharged to the River Nanny outlet via Industrial Emission (IE) licensed emission point SW-4 (refer to IE Licence Reg. No.: P0030-04). The combined discharge is comprised overwhelmingly of pumped groundwater from the adjoining quarry (approx. 81.9%) together with some surface and process water (approx. 18.0%), and a small quantity of treated wastewater (approx. 0.1%).

7.3.1.2 River Nanny

The Office of Public Works (OPW) operates a number of gauging stations on the River Nanny. The lowest recorded flow at Duleek D/S station is 0.04m³/s or 3,500m³/day.

The EPA conducts water quality assessment for both physical-chemical and biological water quality at various locations along the River Nanny. The monitoring stations in the vicinity of the proposed development are as follows (refer to Figure 7.1):

- (0400) Upstream Br. Duleek (X:305037 Y:268351)
- (0500) Br. NE of Bellewstown House (X:307307 Y:269147)
- (0600) Beaumont Bridge (X:308588 Y:269637)
- (0700) Br at Julianstown (X:313407 Y:270316)

The most recent EPA survey of the River Nanny took place in 2014 and this indicated that water quality at Beaumont Bridge was considered Poor (Q3). The record for other years' surveyed Q ratings are indicated in Table 7.2.

Table 7.2: River Nanny Biological Quality Ratings (EPA, 2014)

Biological Quality Rating (Q Value)								
Station	Year							
	1991	1996	1998	2001	2005	2008	2010	2014
0400	3	-	-	-	-	-	-	-
0500	3-4	3	3-4	3-4	3-4	3	3-4	3-4
0600	-	-	-	-	-	-	-	3
0700	3	3-4	3-4	3	3-4	3-4	3	3-4

An ecological and sediment study of the River Nanny was conducted by Ecofact Environmental Consultants on behalf of Irish Cement Limited in August 2016 (refer to Appendix 5.1 of this EIA Report). This study focused on three sites upstream and three site downstream of the Platin discharge outfall to the river. The purpose of the overall assessment was to look at the ecological quality and sediment characteristics of the River Nanny upstream and downstream of the discharge to ascertain if there were any significant differences that would be attributable to impacts from the discharge.

The results confirmed that macroinvertebrate communities, biological water quality and sediment characteristics in the River Nanny are not significantly different upstream and downstream of the Irish Cement outfall. In addition, organic compounds and heavy metals were not present in the sample of the discharge at a level considered harmful to the aquatic environment.

Overall, the combined discharge was considered to be having a neutral impact on the aquatic ecology of local areas of the River Nanny and it not significantly impacting on aquatic ecology, sediments or water quality parameters measured within the River Nanny.

In addition, Platin Cement Works is also compliant with the emission limit values for emission point SW-4 (River Nanny outfall) specified in Industrial Emission Licence Reg. No. P0030-04. Irish Cement Limited provides reports of analyses conducted at SW-4 to the EPA in the Annual Environmental Report. The monitoring results of licensed emission parameters to surface water are presented in Table 7.3 below for 2016.

Table 7.3 Surface water emissions monitoring results at SW-4 (refer to Figure 7.1)

Parameter	Emission Limit Value	2016 measured value
Flow rate	28,000m^3/day	14,720 m^3/day
Suspended solids	35mg/l	5.5 mg/l
BOD	2.6mg/l	<2 mg/l
Mineral oil	2mg/l	<2.5 µg/l
Lead and compounds (as Pb)	7.2mg/l	1 µg/l
Copper and compounds (as Cu)	30µg/l	2 µg/l
Zinc and compounds (as Zn)	100 µg/l	14µg/l
pH	6-9	7.5

Historical surface water monitoring data is provided in Table 1 of Appendix 7.2 to the EIA Report. This data shows ongoing compliance with limit values over time.

7.3.1.3 River Boyne

The Office of Public Works (OPW) operates a number of gauging stations on the River Boyne. The lowest recorded flow at Trim station is 2.43m^3/s. As this station is located approximately 40km upstream form the Platin site, low flows can confidently be estimated as 2.43m^3/s or 200,000m^3/day.

The EPA conducts water quality assessment for both physical-chemical and biological water quality at various locations along the River Boyne. The monitoring stations in the vicinity of the proposed development are as follows and as shown on Figure 7.1:

- (2100) Slane Br (X: 296414 Y: 273631)
- (2150) Ford S of Broc House (X: 300003 Y: 271834)
- (2200) Obelisk Br (X: 304510 Y: 276200)

The most recent EPA survey of the Boyne took place in 2015 and indicated that water quality in the area nearest the Obelisk Bridge was considered moderate. The previous eight years of survey Q (Quality) ratings are indicated in Table 7.4.

Table 7.4: River Boyne Biological Quality Ratings (EPA, 2015)

Biological Quality Rating (Q Value)								
Station	Year							
	2004	2005	2006	2007	2008	2009	2012	2015
2100	3-4	3-4	3-4	3-4	3-4	4	4	3-4
2150	-	-	3-4	-	-	4	4	-
2200	-	-	3-4	-	-	3-4	3-4	4

7.3.2 Flood Risk

A Flood Risk Assessment (FRA) has been carried out and is provided in Appendix 7.1 to the EIA Report.

In summary, the following is concluded:

- There is no historic record of flooding of the site.
- The risk of both fluvial to the site is very low. The risk of pluvial flooding to the site is also low.
- The risk of groundwater flooding is low due to an on-going groundwater pumping regime in the area.
- Access and egress routes to and from the site are unlikely to be compromised during flood events.
- The proposed development will not have any adverse impact on floodplain conveyance and storage and will not increase the risk of flooding in the surrounding area.

Based on the findings of this FRA and the application of the Flood Risk Management Guidelines, it is considered that the proposed development should be classed as a 'less vulnerable development'. As the site lies within Flood Zone C, a Justification Test is not required.

7.3.2.1 Platin Cement Works Drainage System and Attenuation

Discharge water from Platin, which in 2016 averaged 14,720m^3/day, is derived from 3 separate routes: Groundwater, Process and Storm-water runoff, and Treated Waste Water. The greatest quantity is Groundwater from the adjoining quarry, which does not require any treatment and is managed through continuous pumping from a deep well in the quarry floor. On-site domestic effluent, which is treated in an on-site wastewater treatment plant, comprises a very small input (c. 0.1% of total discharge).

Management of on-site process and storm water runoff consists of a water collection system which delivers both the process and storm water into storm balancing tanks followed by sedimentation/settlement tanks, both of which

are used to reduce the levels of suspended solids. Treated process and storm water run-off discharges from the sedimentation tank and confluences with deep well water from the quarry and treated domestic effluent to form the final discharge the outfall point into the River Nanny. This final outfall is labelled SW-4 in accordance with the Industrial Emissions licence (Reg. No. P0030-04). The River Nanny outfall is connected to the Cement Works via over 2,600m of 610mm diameter underground pipeline. The outfall pipe runs south from the Cement Works, under roads and agricultural land, and outfalls into the River Nanny just off the R150 Regional Road.

The locations of the oil interceptors are shown in Figure 7.1. The interceptor for the settlement tank is Class 2 while the dispatch interceptor and the garage interceptor is Class 1. Within the water drainage system there are numerous manholes that act as silt traps. In addition, the surface water treatment tanks use floating oil absorbent booms. The final discharge is monitored in accordance with Industrial Emissions Licence Register Number P0030-04. Full details of the frequency and method of monitoring are outlined in Table 7.5.

Table 7.5 Monitoring of Emission Parameters from SW-4

Parameter	Monitoring frequency	Technique
Outlet flow	Continuous	On-line flow meter with recorder
pH	Monthly	pH electrode
Suspended solids	Monthly	Gravimetric method
Biochemical oxygen demand	Monthly	Standard method
COD	Monthly	Standard method
Total copper	Bi-annually	Atomic absorption spectrometry
Total lead	Bi-annually	Atomic absorption spectrometry
Total zinc	Bi-annually	Atomic absorption spectrometry
Mineral oil	Monthly	Standard method
Conductivity	Weekly	Standard method
Visual inspection	Daily	Sample and examine for colour and odour
Screening for organic compounds and heavy metals	Annually	Standard methods
Toxicity	Annually	To be agreed by the Agency

7.4 Predicted Effects of the Proposed Development

7.4.1 Do-Nothing Scenario

In the do-nothing scenario, or the 'as existing scenario', the situation as outlined in Section 7.3 will remain in place. A study by Ecofact Environmental Consultants in 2016 (Refer to Appendix 5.1) showed no evidence that the discharge from Platin Cement Works is having any significant effect on the biological water quality of the downstream areas surveyed within the River Nanny.

7.4.2 Construction Phase

All construction activities will be carried out within the catchment area of the site drainage system. All surface water from the site passes through balancing and settlement tanks and these are effective in removing suspended solids. In addition, oil interceptors and absorbent booms in the existing surface water treatment system are effective in removing any accidental spills of oils or other hydrocarbons.

However, if not contained or managed, surface construction activities pose a potential risk to all watercourses as these sites will be exposed to rainfall which has the potential to produce run-off. Surface water run-off from surface construction activities also has potential to become contaminated. The main potential contaminants arising from surface construction activities include:

- Suspended solids: arising from ground disturbance and excavation;
- Hydrocarbons: accidental spillage from construction plant and storage depots;

- Faecal coliforms: contamination from coliforms can arise if there is inadequate containment and treatment of on-site toilet and washing facilities; and
- Concrete/ cementitious products: arising from construction materials.

These pollutants would pose a temporary risk to surface water quality for the duration of construction if not properly contained and managed. Suspended solids, which can include silt, affect surface water turbidity and are considered to be the greatest risk to surface water quality from construction activities. Suspended Solids can also reduce light penetration, visually impact the receiving water, and effect the ecosystem. Potential activities that could generate suspended solids include:

- Water removal from surface excavations as a result of rainfall or groundwater seepage;
- Runoff from exposed work areas and excavated material storage areas; and
- Washdown areas: The potential for washdown containing cement to increase the pH of water above a neutral range, that is typically pH 6 to 9, could pose a threat to aquatic species living in a watercourse.

Potential activities that could generate other pollutants listed above include:

- Inappropriate handling and storage;
- Leakage of temporary foul water services; and
- Solid (municipal) wastes entering the watercourses or drainage systems.

7.4.3 Operational Phase

As the majority of the proposed new structures are located within or around the existing developed footprint of the works, they will only give rise to minor additional rainwater runoff from the roofs of the proposed main structures and from storage areas as outlined below:

- Extended building for Fine Solids (existing SRF building) for Kiln 3
- 3 no. Tanks for Pumpable Fluids for Kiln 2 and Kiln 3
- 2 no. silos for Free-flowing Solids supplying Kiln 2
- 2 no. silos for Free-flowing Solids supplying Kiln 3
- Fine Solids building for Kiln 2
- Coarse Solids building for Kiln 2 and Kiln 3
- Whole tyre storage area.
- Alternative Raw Materials building
- Various handling, transfer and conveying buildings, structures and concrete standings

The total additional impermeable area from these buildings/structures will be c.1.9 ha. With an impermeable area of approximately 17.5 ha for the existing developed area of the full site this represents a minor increase of 10.1%. In general, the new buildings will be located on ground that is currently hard-standing so no significant change to the current drainage regime will occur.

The runoff from the roofs of the new buildings and structures will be collected in a storm water drain which will be connected to the overall existing surface water drainage network within the Cement Works.

The introduction of up to an additional 480,000 tonnes per annum of Alternative Fuels and Alternative Raw Materials will also include for eight additional fire water retention tanks and/or bunded facilities. One of the new tanks will replace an existing tank which is to be removed as part of the proposed development. Fire water retention tanks and bunded facilities are connected to the surface water drainage network. This drainage network has an open/shut valve which under normal circumstances is open to allow for the drainage of surface water. In the event of a fire, the drainage valve closes to allow for the retention of all potentially contaminated surface water. This water is then tested and approved for release; or treated on-site; or removed from the site for treatment, as required.

The following new firewater retention tanks / bunded facilities are proposed:

1. Relocated tank for existing Fine Solids (SRF) Facility for Kiln 3
2. Proposed Tank associated with Coarse Solids Facility
3. Proposed Tank associated with Alternative Raw Materials Facility
4. Proposed Tank associated with Fine Solids Facility for Kiln 2
5. Proposed Tank associated with Whole Tyres Facility
6. Pumpable Fluids Tanks for Kiln 2 and Kiln 3 are located within a bunded Facility
7. Silos for Free-flowing Solids for Kiln 2 are located within a bunded Facility
8. Silos for Free-flowing Solids for Kiln 3 are located within a bunded Facility

The purpose of these tanks / bunded facilities is to ensure that in the unlikely event of a fire, potentially contaminated firewater is isolated from the general surface water drainage network and retained within these tanks until it is tested; approved for release; treated on-site; or removed from the site for treatment, as required.

No additional water is required to cater for the increased use of alternative fuels and the use of alternative raw materials. Likewise there are no additional domestic effluent or treated process water discharges due to the proposed development.

Platin Cement Works will be required to continue to comply with surface water emission limit values outlined in its Industrial Emissions licence.

7.4.4 Worst Case Scenario

There will be no significant change in the nature or quantity of runoff to surface waters as a result of the proposed development. Proposed buildings will generally be located on ground that is currently hard-standing or existing storage areas. The runoff from the roofs of new buildings will be collected in a storm water drain which will be connected to the overall existing surface water drainage network.

All of the new proposed fuels / raw materials shall be stored in appropriate buildings, tanks, silos *etc*. and within appropriately bunded and protected areas so as to prevent any possible run-off to surface waters.

7.5 Mitigation Measures

7.5.1 Construction Phase

An outline Construction and Environmental Management Plan is included in Appendix 3.4 of the EIA Report. In addition, prior to construction the Contractor will be required to develop a specific Environmental Management Plan which will also incorporate the mitigation measures detailed below. These mitigation measures apply for the prevention of pollution to all waters during construction.

- Prepare an Emergency Response Plan detailing the procedures to be undertaken in the event of flooding, a spill of chemical, fuel or other hazardous wastes, a fire, or non-compliance incident. This plan will contain the following information:
  - Containment measures;
  - List of appropriate equipment and clean-up materials;
  - Maintenance schedule for equipment;
  - Details of trained staff, location, and provision for 24-hour cover;
  - Details of staff responsibilities;
  - Notification procedures to inform the relevant environmental authorities;
  - Audit and review schedule;
  - Telephone numbers of Meath County Council Drainage and Pollution Control Divisions; and
  - List of specialist pollution clean-up companies and their telephone numbers.

- Ensure site staff are trained in the implementation of the Emergency Response Plan and the use of any spill control equipment as necessary;
- Prepare method statements for the control, treatment and disposal of potentially contaminated surface water;
- Prepare a site plan showing the location of all surface water drainage lines and proposed infiltration areas/discharge to combined sewer. This shall include the location of all existing and proposed surface water protection measures, including monitoring points and treatment facilities;
- Ensure that all appropriate licences required for construction are obtained from the relevant authorities;
- The Contractor will comply with the following guidance documents:
  - CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001) and
  - CIRIA – Guideline Document C624 Development and Flood Risk - guidance for the construction industry (CIRIA, 2004).

7.5.2 Operational Phase

During the operational phase, the alternative fuels and alternative raw materials shall be stored in appropriate buildings, tanks, silos etc. and within appropriately bunded and protected areas so as to prevent any possible run-off to surface waters. No processing of materials will take place on site and alternative fuels will be delivered to site to defined specification ready for use.

7.5.3 Cumulative Effects

In relation to the cumulative effect of the proposed development with the existing development, the additional impermeable area from the proposed development will be c.1.9 ha. This represents a minor increase of 10.1% in building area across the site. In general, the new buildings will be located on ground that is currently hard-standing so no significant change to the current drainage regime will occur.

7.6 Residual Effects

7.6.1 Construction Stage

There will be no significant residual effect on water and hydrology as a result of the construction phase of the proposed development due to the provision of the mitigation measures outlined in Section 7.5.1.

7.6.2 Operation Stage

There will be no significant residual effect on water and hydrology as a result of the operational phase of the proposed development due to the provision of the mitigation measures outlined in Section 7.5.2. Monitoring will continue to be carried out in compliance with the requirements of the IE licence for the site to confirm this.

7.7 Monitoring

Discharges to water will continue to be monitored by the EPA in accordance with the IE licence for the Cement Works.

7.8 References

CIRIA (2001) Guideline Document C532 Control of Water Pollution from Construction Sites

CIRIA (2004) Guideline Document C624 Development and Flood Risk - Guidance for the construction industry.

Ecofact (2016) Aquatic Monitoring of the River Nanny near Duleek, County Meath

EPA (2002). Guidelines on the information to be contained in Environmental Impact Statements, Environmental Protection Agency, Co. Wexford, Ireland.

EPA (2003). Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), Environmental Protection Agency, Co. Wexford, Ireland.

EPA (2017). Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency, Co. Wexford, Ireland.

EPA (2015). Consultation Draft Advice Notes on Current Practice in the preparation of Environmental Impact Statements, Environmental Protection Agency, Co. Wexford, Ireland.

EPA, (2015). Environmental Monitoring River Quality Surveys: Biological Website

EPA, Irish Cement, Platin Works Industrial Emissions License Reg. No. P0030-04

EU Council Directive 2000/60/EC of 22 December 2000 establishing a new framework for Community action in the field of water policy (Water Framework Directive and associated Annexes including Directive 2007/60/EC on the assessment and management of flood risks). Government Publications, Dublin, Ireland.

European Communities (Quality of Salmonid Waters) Regulations 1988, (S.I. No. 293 of 1988). Government Publications, Dublin, Ireland.

European Communities (Water Policy) Regulations 2003 – 2005. (S.I. No. 722 of 2003). Government Publications, Dublin, Ireland.

European Communities (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, Luxembourg: Office for Official Publications of the European Communities.

http://www.epa.ie/QValue/webusers

Irish Cement (2016), Platin Works IPPC Licence No. P0030-04 Annual Environmental Report 2016

Local Government (Water Pollution) Act 1977. (S.I. No. 1 of 1977). Government Publications, Dublin, Ireland.

Local Government (Water Pollution) (Amendment) Act 1990. (S.I. No. 21 of 1990). Government Publications, Dublin, Ireland.

Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations 1998, (S.I. No. 258 of 1998). Government Publications, Dublin, Ireland.

Meath County Council (2013) Meath County Development Plan 2013-2019

A4

ARUP

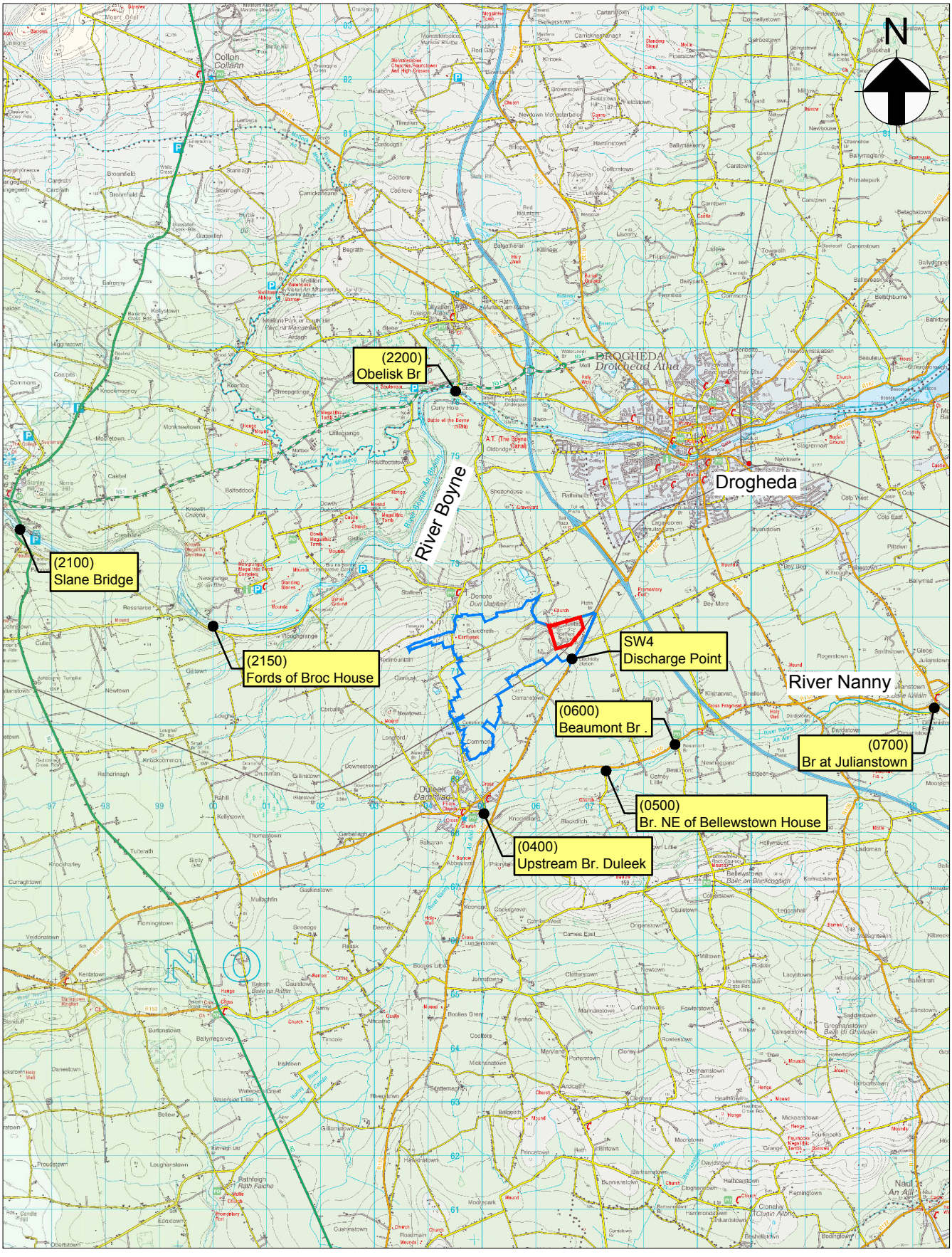
Arup, 50 Ringsend Road
Dublin 4
Tel +353(0)1 233 4455
www.arup.ie

Client Title
Irish Cement Ltd

Job Title
Irish Cement
Alternative Fuels
Facility

Figure: 7.1
EPA Monitoring Points

Scale at A4	NTS
Date	June 2017
Discipline	Environmental
Job No	325374-47
Drawing Status	Report
Drawing No	N2003
Issue	P3



\\dubnts03\Dublin_Jobs\D5300-D5399\D5374\4) Drawings\f) Environmental\47\N2003_325374-47_R3.dwg 7 Jun 2017 10:54:03

Do not scale

8 Air Quality and Climate

8.1 Introduction

Irish Cement Limited (ICL) is licensed by the Environmental Protection Agency (EPA) – Industrial Emissions (IE) Licence Register Number P0030-04 – to operate a cement manufacturing facility at Platin, Co. Meath. ICL is applying for permission for proposed development for further replacement of fossil fuel and for the use of alternative raw materials in the cement manufacturing process at Platin Cement Works. This assessment considers the effects of the proposed changes on the atmospheric environment.

In addition, an air quality impact assessment of the change in traffic volumes due to the development is considered. Construction impacts are also assessed.

This chapter also assesses the effect of the development on carbon emissions (greenhouse gases).

8.2 Methodology

8.2.1 Introduction

The effect on air quality is assessed by comparing the existing permitted ground level concentrations (GLCs) of pollutants from Platin Cement Works with those for the proposed scenario. The existing and proposed scenarios assume emissions at the emission limit values; the actual emissions are significantly lower than these values in reality. The existing and proposed scenarios are based on the new emission limit values likely to be applied by the Environmental Protection Agency (EPA) as part of the EPA's current review of Irish Cement's IE licence (Refer to EPA Licence Review Register No. P0030-05, www.epa.ie). This review incorporates emission limits outlined in BAT Conclusion on the Production of Cement, Lime and Magnesium Oxide, 2013. The proposed scenario also incorporates the proposed new building layout and related developments required to accommodate the proposed increased use of alternative fuels and the use of alternative raw materials at the Cement Works.

As described in Chapter 3 of this Environmental Impact Assessment Report (EIA Report), the proposed scenario also includes for an increase in the existing volumetric airflow rate limits from Kiln 2, Kiln 3 and Cement Mill 1.

Details of the two scenarios (existing and proposed) considered in this assessment, are outlined below.

The existing scenario includes:

- The maximum emission limit values as specified in the BAT Conclusion on the Production of Cement, Lime and Magnesium Oxide, 2013. This is based on the BAT review currently underway by the EPA;
- The current site layout: and
- The current permitted volumetric flowrates.

The proposed scenario includes:

- The maximum emission limit values as specified in the BAT Conclusion on the Production of Cement, Lime and Magnesium Oxide, 2013. This is based on the BAT review currently underway by the EPA;
- The proposed site layout (including the proposed buildings and developments outlined in Table 3.1in Chapter 3 of this EIA Report); and;
- The proposed increases in volumetric flowrates in Kiln 2, Kiln 3 and Cement Mill 1.

Emissions are modelled using Breeze AERMOD computer package (Version 16216r, released January 2017). This model is listed in the EPA guidelines as one of the advanced dispersion models in general use in Ireland. The model has USEPA regulatory status. The EPA guidelines advise the use of a graphical user interface software package in order to prepare an accurate input file for the model. The Breeze model used in this assessment provides such an interface.

Cumulative GLCs including the effect of emissions from Indaver's neighbouring waste to energy facility at Carranstown are also compared with the air quality standards and guideline limits for pollutant concentrations in ambient air.

This study has been completed in accordance with the Environmental Protection Agency (EPA) Guidance, Air Dispersion Modelling from Industrial Installations Guidance Note (AG4), 2010.

Potential effects due to construction activities and due to traffic accessing the site during the construction and operational phases are also considered.

The climate impact assessment considers the changes in carbon emissions arising from the proposed further replacement of fossil fuels with alternative fuels.

8.2.2 Air quality and climate standards and limit values

In order to reduce the risk to human health and the environment due to poor air quality, national and European statutory bodies have set limit values for a range of air pollutants in ambient air. These limit values or Air Quality Standards (AQS) are defined for the protection of human health and ecosystems. For other pollutants, air quality guidelines are recommended by the World Health Organisation (WHO, 2000) and the UK Environment Agency (UK EA, 2002, 2011).

It should be noted that the emission limit values set out in the Industrial Emission Licence for Platin Cement Works are determined in European Regulations to ensure that facilities like Platin can operate and Air Quality Standards can be complied with.

8.2.2.1 Statutory Air Quality Standards

The Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) transpose EU Directive 2008/50/EC into Irish law. The purpose of the 2011 regulations is to establish limit values and alert thresholds for concentrations of certain pollutants, to provide for the assessment of certain pollutants using methods and criteria common to other European Member States, to ensure that adequate information on certain pollutant concentrations is obtained and made publically available and to provide for the maintenance and improvement of ambient air quality where necessary.

The Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (SI 58 of 2009) provide limit values for Cadmium, Arsenic, Lead and Nickel.

The limit values established under both sets of regulations are included in Table 8.1.

Table 8.1 Air Quality Standards (AQS) from S.I. No. 180 of 2011 and S.I. No. 58 of 2009

Pollutant	Limit value for the protection of:	Averaging period	Limit value ($\mu g/m^3$)	Basis of application of limit value	Limit value attainment date
NO_2	Human Health	1-hour	200	≤18 exceedances p.a. (99.79 %ile)	1 January 2010
		Calendar year	40	Annual mean	1 January 2010
NO_x	Protection of vegetation	Calendar year	30	Annual mean	1 January 2010
PM_{10}	Human Health	24-hours	50	≤35 exceedances p.a. (90%ile)	1 January 2005

Pollutant	Limit value for the protection of:	Averaging period	Limit value (µg/m³)	Basis of application of limit value	Limit value attainment date
		Calendar year	40	Annual mean	1 January 2005
$PM_{2.5}$	Human Health	Calendar year	25	Annual mean	1 January 2015
SO_2	Human Health	One-hour	350	≤24 exceedances p.a. (99%ile)	1 January 2020
	Human Health	Calendar year	125	≤3 exceedances p.a. (90.41 %ile)	1 January 2020
	Protection of vegetation	Calendar year	20	Annual mean	1 January 2020
CO	human health	8-hour running mean	10,000	max. daily 8-hour mean	1 January 2005
Lead	Human Health	Calendar year	0.5	Annual mean	1 January 2010
As (arsenic)	Human health	Calendar year	0.006	Annual mean	31 December 2012
Cd (cadmium)	Human health	Calendar year	0.005	Annual mean	31 December 2012
Ni (nickel)	Human health	Calendar year	0.02	Annual mean	31 December 2012

8.2.2.2 Air Quality Guidelines

No National or European air quality standards currently exist for the following pollutants:

- Hydrogen chloride (HCl)
- Hydrogen fluoride (HF)
- Thallium
- Mercury
- Antimony and other heavy metals
- Dioxins and furans.

Relevant guidelines applied in this assessment are taken from guidance issued by the UK Environment Agency and the World Health Organisation, refer to Table 8.2. The table includes both short and long term environmental assessment levels (EALs) which are compared to the predicted one hour and annual concentrations respectively.

Currently no internationally recognised air quality standards are prescribed for dioxins in ambient air. The WHO guidance states that "concentrations of 0.3pg/m^3 or higher are indications of local emission sources that need to be identified and controlled". This is described as an "indicative value" and is referred to in this assessment.

Table 8.2: Air Quality Guidelines

Parameter	Limit value (µg/m³)	Averaging period	Source of Guideline
HCl	750	1 hour (Short term EAL)	UK EA (2011)
HF	16	Monthly (Long term EAL)	UK EA (2011)

HF	160	1 hour (Short term EAL)	UK EA (2011)
Tl (thallium)	1	Calendar year (Long term EAL)	UK EA (2002)
Tl (thallium)	30	1 hour (Short term EAL)	UK EA (2002)
Mercury	1	Calendar year	WHO (2000)
Sb (antimony)	5	Calendar year (Long term EAL)	UK EA (2011)
Sb (antimony)	150	1 hour (Short term EAL)	UK EA (2011)
Cr (chromium)	5	Calendar year (Long term EAL)	UK EA (2011)
Cr (chromium)	150	1 hour (Short term EAL)	UK EA (2011)
Co (cobalt)	0.2	Calendar year (Long term EAL)	UK EA (2002)
Cu (copper)	10 (dust and mist)	Calendar year (Long term EAL)	UK EA (2011)
Cu (copper)	200 (dust and mist)	1 hour (Short term EAL)	UK EA (2011)
Mn (manganese)	0.15	Calendar year (Long term EAL)	UK EA (2011)
Mn (manganese)	1,500	1 hour (Short term EAL)	UK EA (2011)
V (vanadium)	1	24 hours	UK EA (2011)
V (vanadium)	5	Calendar year (Long term EAL)	UK EA (2011)
V (vanadium)	1	1 hour (Short term EAL)	UK EA (2002)
Dioxins	0.0000003	Calendar year	WHO (2000) Indicative value
Ammonia	180 2,500	Long term EAL (annual average GLC) Short term EAL (1-hour average)	UK EA (2011)

Dust deposition monitoring on a quarterly basis is required by the Platin Cement Works Industrial Emission licence with a limit of 350mg/m^2/day set (based on a 30 day composite sample) at the site boundary.

The effect of the increased use of alternative fuels on sensitive ecological sites is also assessed. The closest protected site to Platin Cement Works is the Boyne River, Coast and Estuary SPA, cSAC and pNHA which is located approximately 2.5km to the north-west of the site. Predicted nitrogen deposition values are compared to the United Nations Economic Commission for Europe (UNECE) (2003) Critical Loads for Nitrogen for inland and surface water habitats of 5-10 kg(N)/ha/yr at the Boyne River, Coast and Estuary SPA, cSAC and pNHA.

8.2.3 Construction Phase Methodology

Dust emissions are likely to arise from the following activities:

- Demolition works
- Site earthworks
- Handling of construction materials
- Construction works
- Construction traffic movements

It is considered that the most appropriate guidance to use is the Transport Infrastructure Ireland (TII) document 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes', 2011 states that the risk from soiling due to construction works ranges from 25m to 100m and in relation to PM_{10}, the risk ranges from 10m to 25m depending on the scale of the construction activity.

As stated in the TII guidelines it is "very difficult to accurately quantify dust emissions arising from construction activities". "A semi quantitative approach is recommended to determine the likelihood of a significant effect, which should be combined with an assessment of the proposed mitigation measures". The semi-quantitative assessment methodology outlined in Table 8.3 is used to assess the effect of dust during the construction phase. This approach considers sensitive receptors in the vicinity of the construction site.

The TII guidance defines sensitive receptors as locations including residential housing, schools, hospitals, places of worship, sports centres and shopping areas, *i.e.* locations where members of the public are likely to congregate and be regularly present.

The guidance states that dust emissions from construction sites can lead to effects at nearby properties. The assessment criteria, taken from the TII guidance, are outlined in Table 8.3.

Table 8.3: Assessment criteria for the effects of dust emissions from construction activities with standard mitigation in place

Source		Potential distance for Significant Effects (Distance from Source)		
Scale	Description	Soiling	PM_{10}[a]	Vegetation Effects
Major	Large construction sites, with high use of haul routes	100 m	25 m	25 m
Moderate	Moderate sized construction sites, with moderate use of haul routes	50 m	15 m	15 m
Minor	Minor construction sites, with limited use of haul routes	25 m	10 m	10 m

[a] Significance based on the PM_{10} Limit Values specified in SI No. 180 of 2011, which allows 35 daily exceedances/year of 50 µg/m³

The effect of dust emissions during the construction phase is assessed by estimating the area over which there is a risk of significant effects, in line with the TII guidance.

In accordance with TII guidance, emissions from construction vehicles are assessed where construction traffic results in a significant (>10%) increase in AADT (annual average daily traffic) flows near sensitive receptors.

8.2.4 Dispersion modelling methodology

8.2.4.1 Introduction

The air dispersion modelling study has been carried out in accordance with the EPA AG4 guidelines. The EPA approved Breeze AERMOD computer package (Version 16216r, released January 2017) was used to predict the effect of emissions on ambient air quality.

Two scenarios are considered in this study, an existing scenario and proposed scenario.

The existing scenario includes:

- The maximum emission limit values as specified in the BAT Conclusion on the Production of Cement, Lime and Magnesium Oxide, 2013. This is based on the BAT review currently underway by the EPA;
- The current site layout; and
- The current permitted volumetric flowrates.

The proposed scenario includes:

- The maximum emission limit values as specified in the BAT Conclusion on the Production of Cement, Lime and Magnesium Oxide, 2013. This is based on the BAT review currently underway by the EPA;
- The proposed site layout (including the proposed buildings outlined in Table 3.1); and;
- The proposed increases in volumetric flowrates in Kiln 1, Kiln 3 and Cement Mill 1.

The modelling predictions represent the most conservative or worst-case concentrations which could arise. Several worst-case conditions are assumed to be coincident:

- Emission sources are operating at maximum flow rates;
- Emission sources are operating at maximum permitted emission concentrations, rather than average actual emission concentrations;
- Emission sources are operating for every hour of every day of the year;
- The assessment is based on the meteorological conditions that give rise to the maximum predicted concentration over a five year period; and
- Receptor location is that which experiences the maximum predicted concentration.

The model predictions are therefore extremely conservative, giving worst-case ground-level concentrations, which are very unlikely to be realised in practice.

In accordance with EPA guidelines, ground level concentrations are also predicted at 75% permitted flowrates.

Breeze AERMOD is a computer model that predicts the ground level concentration due to pollutant emissions from specified sources. The model requires information on:

- Neighbouring buildings;
- Receptor locations;
- Meteorological conditions;
- Conversion of NO_x to NO_2; and
- Emission sources.

The model was used to predict ground level concentrations over 1-hour, 8-hour 24-hour and annual averaging period and relevant percentiles.

8.2.4.2 Building Wake Effect

The length, width and height of buildings in the vicinity of the sources were taken into account in modelling. Building data was taken from information supplied by Irish Cement for the existing situation and for the proposed development. AERMOD includes a software utility called BPIP to calculate direction-specific building downwash factors using the relative positions and dimensions of sources and neighbouring buildings.

8.2.4.3 Receptor locations

For this modelling situation, two nested cartesian receptor grids were used. The first grid extends for 4km across the facility, with receptors at 100 metre intervals. The second grid extends for 20km across the facility, with receptors at 1km intervals.

Ground level concentrations are predicted at each receptor location. These receptors do not represent individual residences but would be representative of potential “worst-case” receptors. On-site receptors were excluded from the model.

Terrain elevations were obtained from Ordnance Survey Ireland.

The location of ecologically sensitive sites are also considered in the assessment.

8.2.4.4 Meteorological data

Meteorological data from 2010 to 2014 recorded by the Met Éireann station at Dublin Airport, Co Dublin was used. This data was adjusted for the land usage surrounding the site using the tool AERMET. The predominant land usage in the vicinity of the Irish Cement facility is agricultural. The meteorological data includes hourly values of wind speed, wind direction, atmospheric stability, ambient temperature and mixing heights.

8.2.4.5 Conversion of NO_x to NO_2

The EPA Guidance AG4 advises that detailed modelling of NO_2/NO_x chemistry should use the Plume Volume Molar Ratio Method (PVMRM) in AERMOD. This method takes account of the complex and reversible chemical reactions between the oxides of nitrogen, oxygen and ozone. The PVMRM uses both plume size and ozone (O_3) concentration to derive the amount of O_3 available for the reaction between NO and O_3. For a given NO_x emission rate and ambient ozone concentration, the NO_2/NO_x conversion ratio is primarily controlled by the volume of the plume. This method has been shown to give better agreement with monitoring data.

For the PVMRM calculation, the following assumptions are made, as advised by EPA guidance:

- Background ozone is 55.2µg/m^3 (average of Zone C monitoring from EPA long term data, refer to Section 8.3.1).
- NO_2/NO_x equilibrium ratio = 0.90.
- NO_2/NO_x in-stack ratio = 0.10.

8.2.4.6 Emission Sources

The emission source characteristics for the existing and proposed scenarios are outlined in Tables 8.4 and 8.5.

Directive 2010/75/EU sets an Emission Limit Value (ELV) for the sum of cadmium and thallium of 0.05mg/Nm^3. The air quality standard is set for cadmium only and a UK EAL is published for thallium, refer to Tables 8.1 and 8.2.

Within this limit value, the proportion of cadmium and thallium has been monitored in Kiln 3 (2016 data – only Kiln 3 was operational) emissions to be 27% and 73% respectively. Therefore cadmium is modelled at 27% of the ELV and thallium at 73% of the ELV. By modelling cadmium and thallium separately, the predicted concentrations can then be compared with the relevant AQS for each. The same methodology is applied for the sum of antimony and other metals.

Table 8.4 Existing Emissions Sources Data

Parameter	Raw Mill 1 Coal Mill 1	Kiln 2	Coal Mill 2	Cement Mill 1	Cement Mill 2	Cement Mill 3	Kiln 2 Grate Cooler	Kiln 3	Kiln 3 Grate Cooler (with Heat Recovery)	Cement Mill 4
Easting	306,520	306,490	306,599	306,806	306,791	306,761	306,722	306,603	306,707	306,802
Northing	271,754	271,801	271,737	271,834	271,840	271,881	271,867	271,675	271,707	271,928
Height (m)	98.01	103.04	48.09	28.64	34.82	26.35	30.43	123	35	39
Diameter (m)	2.38	3.7	1	0.704	1.9	1.988	3.55	3.75	3	2
Normalised flow rate (Nm^3/hr)	49,000	400,000	31,000	18,500	120,000	135,000	210,000	410,000	219,000	110,000
Efflux Velocity (m/s)	5.86	16.59	18.88	18.08	15.41	15.84	11.29	19.38	11.4	13.46
Temp (ºC)	118	121	81	101	85	85	250	108	90	105
NO_x concentration (mg/Nm^3) [1]	500	500	500	-	-	-	-	500	-	-
NO_x emission rate (g/s)	6.8	55.55	4.3	-	-	-	-	56.94	-	-
SO_2 concentration (mg/Nm^3)[1]	50	50	50	-	-	-	-	50	-	-
SO_2 emission rate (g/s)	0.68	5.56	0.43	-	-	-	-	5.69	-	-
PM_{10} concentration (mg/Nm^3) [2]	20	20	20	10	20	20	20	20	20	20
PM_{10} emission rate (g/s)	0.27	2.22	0.17	0.05	0.667	0.75	1.2	2.27	1.2	0.6
HCl concentration (mg/Nm^3)[1]	10	10	10	-	-	-	-	10	-	-
HCl emission rate (g/s)	0.14	1.11	0.09	-	-	-	-	1.14	-	-
HF concentration (mg/Nm^3)[1]	1	1	1	-	-	-	-	1	-	-

Parameter	Raw Mill 1 Coal Mill 1	Kiln 2	Coal Mill 2	Cement Mill 1	Cement Mill 2	Cement Mill 3	Kiln 2 Grate Cooler	Kiln 3	Kiln 3 Grate Cooler (with Heat Recovery)	Cement Mill 4
HF emission rate (g/s)	0.01	0.11	0.0086	-	-	-	-	0.11	-	-
Cd concentration (mg/Nm³)[1]	0.013	0.013	0.013	-	-	-	-	0.013	-	-
Cd emission rate (g/s)	0.0002	0.0014	0.0001	-	-	-	-	0.001	-	-
Tl concentration (mg/Nm³)[1]	0.037	0.037	0.037	-	-	-	-	0.037	-	-
Tl emission rate (g/s)	0.005	0.0041	0.003	-	-	-	-	0.0042	-	-
Hg concentration (mg/Nm³)[1]	0.05	0.05	0.05	-	-	-	-	0.05	-	-
Hg emission rate (g/s)	0.0007	0.0056	0.0004	-	-	-	-	0.0057	-	-
Sb concentration (mg/Nm³)[1]	0.001	0.001	0.001	-	-	-	-	0.001	-	-
Sb emission rate (g/s)	0.000014	0.001	8.6E-06	-	-	-	-	0.0001	-	-
As concentration (mg/Nm³)[1]	0.004	0.004	0.004	-	-	-	-	0.004	-	-
As emission rate (g/s)	0.0001	0.0004	3.4E-05	-	-	-	-	0.0005	-	-
Pb concentration (mg/Nm³)[1]	0.017	0.017	0.017	-	-	-	-	0.017	-	-
Pb emission rate (g/s)	0.0002	0.0019	0.0001	-	-	-	-	0.0019	-	-
Cr concentration (mg/Nm³)[1]	0.3	0.31	0.31	-	-	-	-	0.315	-	-
Cr emission rate (g/s)	0.0043	0.035	0.0027	- -	- -	- -	- -	0.036	- -	- -
Co concentration (mg/Nm³)[1]	0.001	0.001	0.001	-	-	-	-	0.001	-	-
Co emission rate (g/s)	0.000014	0.0001	8.611E-06	-	-	-	-	0.0001	-	-

Parameter	Raw Mill 1 Coal Mill 1	Kiln 2	Coal Mill 2	Cement Mill 1	Cement Mill 2	Cement Mill 3	Kiln 2 Grate Cooler	Kiln 3	Kiln 3 Grate Cooler (with Heat Recovery)	Cement Mill 4
Cu concentration (mg/Nm³)[1]	0.022	0.022	0.022	-	-	-	-	0.022	-	-
Cu emission rate (g/s)	0.0003	0.0024	0.0002	-	-	-	-	0.0025	-	-
Mn concentration (mg/Nm³)[1]	0.081	0.081	0.081	-	-	-	-	0.081	-	-
Mn emission rate (g/s)	0.0011	0.009	0.0007	-	-	-	-	0.0092	-	-
Ni concentration (mg/Nm³)[1]	0.049	0.049	0.049	-	-	-	-	0.049	-	-
Ni emission rate (g/s)	0.0007	0.0054	0.0004	-	-	-	-	0.0056	-	-
V concentration (mg/Nm³)[1]	0.009	0.009	0.009	-	-	-	-	0.009	-	-
V emission rate (g/s)	0.0001	0.001	0.0001	-	-	-	-	0.001	-	-
Dioxins and Furans concentration (mg/Nm³)[1]	1.00E-07	1.00E-07	1.00E-07	-	-	-	-	1.00E-07	-	-
Dioxins and Furans emission rate (g/s)	1.36E-09	1.1E-08	8.6E-10	-	-	-	-	1.14E-08	-	-
Carbon Monoxide concentration (mg/Nm³)	1,500	-	-	-	-	-	-	1,500	-	-
Carbon Monoxide emission rate (g/s)	20.4	-	-	-	-	-	-	170.8	-	-

[1] Emission limit values from Directive 2010/75/EU

[2] BAT Conclusion on the Production of Cement Lime and Magnesium, 2013 – maximum limit applied as a worst-case

Table 8.5 Proposed Emissions Sources Data

Parameter	Raw Mill 1 Coal Mill 1	Kiln 2	Coal Mill 2	Cement Mill 1	Cement Mill 2	Cement Mill 3	Kiln 2 Grate Cooler	Kiln 3	Kiln 3 Grate Cooler (with Heat Recovery)	Cement Mill 4
Easting	306,520	306,490	306,599	306,806	306,791	306,761	306,722	306,603	306,707	306,802
Northing	271,754	271,801	271,737	271,834	271,840	271,881	271,867	271,675	271,707	271,928
Height (m)	98.01	103.04	48.09	28.64	34.82	26.35	30.43	123	35	39
Diameter (m)	2.38	3.7	1	0.704	1.9	1.988	3.55	3.75	3	2
Normalised flow rate (Nm^3/hr)	49,000	650,000	31,000	35,000	120,000	135,000	210,000	650,000	219,000	110,000
Efflux Velocity (m/s)	5.86	26.96	18.88	34.2	15.41	15.84	11.29	30.7	11.4	13.46
Temp (ºC)	118	121	81	101	85	85	250	108	90	105
NO_x concentration (mg/Nm^3) [1]	500	500	500	-	-	-	-	500	-	-
NO_x emission rate (g/s)	6.8	90.27	4.3	-	-	-	-	90.27	-	-
SO_2 concentration (mg/Nm^3)[1]	50	50	50	-	-	-	-	50	-	-
SO_2 emission rate (g/s)	0.68	9.03	0.43	-	-	-	-	9	-	-
PM_{10} concentration (mg/Nm^3) [2]	20	20	20	10	20	20	20	20	20	20
PM_{10} emission rate (g/s)	0.27	3.6	0.17	0.1	0.667	0.75	1.2	3.6	1.2	0.6
HCl concentration (mg/Nm^3)[1]	10	10	10	-	-	-	-	10	-	-
HCl emission rate (g/s)	0.14	1.8	PbV0.09	-	-	-	-	1.8	-	-
HF concentration (mg/Nm^3)[1]	1	1	1	-	-	-	-	1	-	-

Parameter	Raw Mill 1 Coal Mill 1	Kiln 2	Coal Mill 2	Cement Mill 1	Cement Mill 2	Cement Mill 3	Kiln 2 Grate Cooler	Kiln 3	Kiln 3 Grate Cooler (with Heat Recovery)	Cement Mill 4
HF emission rate (g/s)	0.01	0.18	0.0086	-	-	-	-	0.18	-	-
Cd concentration (mg/Nm³)[1]	0.013	0.013	0.013	-	-	-	-	0.013	-	-
Cd emission rate (g/s)	0.0002	0.0023	0.0001	-	-	-	-	0.0023	-	-
Tl concentration (mg/Nm³)[1]	0.037	0.037	0.037	-	-	-	-	0.037	-	-
Tl emission rate (g/s)	0.0005	0.0067	0.0003	-	-	-	-	0.0067	-	-
Hg concentration (mg/Nm³)[1]	0.05	0.05	0.05	-	-	-	-	0.05	-	-
Hg emission rate (g/s)	0.0007	0.009	0.0004	-	-	-	-	0.009	-	-
Sb concentration (mg/Nm³)[1]	0.001	0.001	0.001	-	-	-	-	0.001	-	-
Sb emission rate (g/s)	0.000014	0.002	8.6E-06	-	-	-	-	0.0002	-	-
As concentration (mg/Nm³)[1]	0.004	0.004	0.004	-	-	-	-	0.004	-	-
As emission rate (g/s)	0.0001	0.0007	3.4E-05	-	-	-	-	0.0007	-	-
Pb concentration (mg/Nm³)[1]	0.017	0.017	0.017	-	-	-	-	0.017	-	-
Pb emission rate (g/s)	0.0002	0.0031	0.0001	-	-	-	-	0.0031	-	-
Cr concentration (mg/Nm³)[1]	0.3	0.31	0.31	-	-	-	-	0.315	-	-
Cr emission rate (g/s)	0.0043	0.057	0.0027	- -	- -	- -	- -	0.057	- -	- -
Co concentration (mg/Nm³)[1]	0.001	0.001	0.001	-	-	-	-	0.001	-	-
Co emission rate (g/s)	0.000014	0.0002	8.611E-06	-	-	-	-	0.0002	-	-

Parameter	Raw Mill 1 Coal Mill 1	Kiln 2	Coal Mill 2	Cement Mill 1	Cement Mill 2	Cement Mill 3	Kiln 2 Grate Cooler	Kiln 3	Kiln 3 Grate Cooler (with Heat Recovery)	Cement Mill 4
Cu concentration (mg/Nm³)[1]	0.022	0.022	0.022	-	-	-	-	0.022	-	-
Cu emission rate (g/s)	0.0003	0.004	0.0002	-	-	-	-	0.004	-	-
Mn concentration (mg/Nm³)[1]	0.081	0.081	0.081	-	-	-	-	0.081	-	-
Mn emission rate (g/s)	0.0011	0.0146	0.0007	-	-	-	-	0.0146	-	-
Ni concentration (mg/Nm³)[1]	0.049	0.049	0.049	-	-	-	-	0.049	-	-
Ni emission rate (g/s)	0.0007	0.0088	0.0004	-	-	-	-	0.0088	-	-
V concentration (mg/Nm³)[1]	0.009	0.009	0.009	-	-	-	-	0.009	-	-
V emission rate (g/s)	0.0001	0.0016	0.0001	-	-	-	-	0.0016	-	-
Dioxins and Furans concentration (mg/Nm³)[1]	1.00E-07	1.00E-07	1.00E-07	-	-	-	-	1.00E-07	-	-
Dioxins and Furans emission rate (g/s)	1.36E-09	1.8E-08	8.6E-10	-	-	-	-	1.8E-08	-	-
Carbon Monoxide concentration (mg/Nm³)	1,500	-	-	-	-	-	-	1,500	-	-
Carbon Monoxide emission rate (g/s)	20.4	-	-	-	-	-	-	270.8	-	-
Ammonia concentration (mg/Nm³)[2]	-	50	-	-	-	-	-	50	-	-
Ammonia emission rate (g/s)	-	9.03	-	-	-	-	-	9.03	-	-

[1] Emission limit values from Directive 2010/75/EU

[2] BAT Conclusion on the Production of Cement Lime and Magnesium, 2013– maximum limit applied as a worst-case

8.2.5 Operational Traffic Methodology

The TII Guidelines advise that an air quality impact assessment should be completed on road links where a greater than 5% change in flows occurs during the operational phase.

As outlined in Chapter 12, Traffic and Transportation, no local roads are predicted to experience increases of greater than 5% during the operational phase and therefore operational traffic effects are not required to be considered further.

8.2.6 Climate Assessment Methodology

While coal has previously been used and could be used again in the future, imported Petroleum Coke (petcoke), a carbon residue left after the oil refining process, is the main fossil fuel currently in use in Platin. The cement works are currently running below maximum output and in 2016 used 62,690 tonnes of petcoke fuel, as well as 119,965 tonnes of alternative fuels. It is expected that the full permitted quantity of 120,000 tonnes of alternative fuel as well as circa 80,000 tonnes of petcoke will be used in 2017. However, if the facility were to run a full capacity (*i.e.* Kiln 2 and Kiln 3 at full production), it is expected that circa 220,000 tonnes of petcoke would be required on top of the current permitted capacity of alternative fuels, which is currently limited to 120,000 tonnes/annum.

The proposed development will increase the quantity and range of alternative fuels (AF) so as to give Irish Cement the necessary flexibility to virtually replace all fossil fuel use at Platin Cement Works. However, even in such a maximum replacement scenario, c.10,000 tonnes of petcoke would continue to be required for initial firing of the kilns (startup after maintenance stops) or as buffer to the availability of suitable alternative fuels. The proposed development also seeks to introduce alternative raw materials (ARM) to the cement manufacturing process. In total, permission is being sought for an additional 480,000 tonnes of AR and ARM, which with the existing permitted use of 120,000 tonnes per annum of AF proposes an overall combined maximum of up to 600,000 tonnes per annum of AF and ARM.

For the purposes of the climate impact assessment, the plant running at maximum output under the existing scenario (220,000 tonnes of petcoke and 120,000 of AF per annum) is compared against the proposed maximum output scenario (10,000 tonnes of petcoke and 600,000 tonnes of AF & ARM per annum). As outlined in Chapter 3, a number of potential fuel use scenarios have been developed, however, Irish Cement's objective is to minimise the use of imported fossil fuel and thereby maximise the use of AF and ARM, as presented in Scenario 3 (refer to Chapter 3 of the EIA Report), which has Kiln 2 and Kiln 3 operating at maximum output. The other scenarios indicated show a reduced use of AF and therefore Scenario 3 is considered the most likely long-term option for this assessment.

The calculation of carbon emissions is based on the following:

- Heat value of all fuels and raw materials;
- Emission factors for each fuel and raw material;
- Amount of fuel or raw material used.

Based on the data provided in Table 8.6, the amount of CO_2 generated for the existing and proposed scenarios were calculated.

Table 8.6: Data used in carbon emission calculations

Scenario	Fuel/Material	Heat value (MJ/kg)	Emission Factor ($kgCO_2/GJ$)	Quantities used per annum (tonnes)
Existing	Alternative fuel (all assumed to be SRF)	14	53	120,000
	Petcoke	32.4	92	220,000
Proposed	Alternative fuel (weighted per kg of each proposed AF)	15	41	600,000
	Pet coke	32.4	92	10,000

8.3 Existing Environment

8.3.1 Air Quality

S.I. No. 180 of 2011 established a zoning system for areas of Ireland for air quality purposes. Zone C is defined as *other cities* [i.e. other than Dublin and Cork] *and large towns* and includes Drogheda and environs comprising of a number of Electoral Divisions (ED). While part of Platin Cement Works is located in Zone D (rural), it is also partly located in the ED of St Mary's which is listed as Zone C, and therefore this latter listing is considered as the background environment for this assessment as it is a more conservative value against which to assess the proposed development.

Levels of NO_2, NO_x, SO_2, PM_{10}, $PM_{2.5}$, benzene, mercury, lead, arsenic, cadmium and nickel measured by the EPA in Zone C in 2015, 2014 and 2013 (EPA, 2016, 2015 and 2014) were averaged to represent typical mean background levels, refer to Table 8.6. Where no Zone C data is available from the EPA, monitoring results for Zone B (Cork City) or Zone D (rural) were used. No EPA monitoring data is available for hydrogen chloride, hydrogen fluoride, thallium, antimony, chromium, cobalt, copper, manganese, vanadium, dioxins and furans and ammonia.

Table 8.7: EPA monitoring results for Zone C

Pollutant	Annual mean 2015	Annual mean 2014	Annual mean 2013	Average annual mean
NO_2	7.5 µg/m^3	5 µg/m^3	5 µg/m^3	5.8 µg/m^3
NO_x	11.5 µg/m^3	8 µg/m^3	9 µg/m^3	9.5 µg/m^3
SO_2	2.0 µg/m^3	3.5 µg/m^3	3 µg/m^3	2.9 µg/m^3
PM_{10}	15.0 µg/m^3	21µg/m^3	19µg/m^3	18.3 µg/m^3
$PM_{2.5}$	9.5 µg/m^3	12.0 µg/m^3	12µg/m^3	11.2 µg/m^3

Pollutant	Annual mean 2015	Annual mean 2014	Annual mean 2013	Average annual mean
Benzene	0.13 µg/m^3	0.09 µg/m^3	0.5[1]µg/m^3	0.2 µg/m^3
Lead	2.5 ng/m^3	1.8 ng/m^3	2.2[3] ng/m^3	2.2[3] ng/m^3
Arsenic	0.8ng/m^3	0.4ng/m^3	3.6[3] ng/m^3	1.6[3] ng/m^3
Cadmium	0.6 ng/m^3	0.2 ng/m^3	0.2[3] ng/m^3	0.3[3] ng/m^3
Nickel	0.9 ng/m^3	1.6 ng/m^3	1.3[3] ng/m^3	1.3[3] ng/m^3
Mercury	1.5[2,3] ng/m^3	1.4[2,3] ng/m^3	1.5[2,3] ng/m^3	1.4[2,3] ng/m^3

[1] EPA Zone B averages, as insufficient data or no data for Zone C
[2] EPA Zone D averages, as insufficient data or no data for Zone C
[3] Monthly levels

8.3.2 Climate

Platin Cement Works is permitted to emit carbon dioxide by the EPA under Greenhouse Gas Emissions Permit No IE-GHG043-10364. This permit is separate from the Industrial Emissions Licence. The permits allows CO_2 emissions from the following sources:

- Kiln 2
- Kiln 3
- Kiln 1 stand-by generator (now decommissioned)
- Kiln 2 stand-by generator
- Kiln 3 stand-by generator
- Cement mill stand-by furnace
- Acetylene – mobile welding

In April 2017, the EPA stated that participants in the EU Emissions Trading Scheme based in Ireland reported an increase of 5.4% in greenhouse gas emissions in 2016 than in 2015. This is compared to a decrease of approximately 2.7% across the EU. An increase of 6.8% was reported for the Cement industry. Data for 2013 demonstrates that despite being accounted for under two different systems, CO_2 from the cement industry represents just 3% of the aggregated total for Ireland.

Participants in the EU Emissions Trading Scheme in Ireland reported 17.73 Mtonnes CO_2 for 2016 in contrast to the 16.83 Mtonnes CO_2 in 2015.

8.4 Predicted Effects of the Proposed Development

8.4.1 Construction Phase

Based on the definitions provided in Table 8.3, the proposed construction site is considered to be at a 'minor' scale. This category of site has the potential for significant soiling effects within 25m; PM_{10} effects within 10m; and vegetation effects within 10m of the site boundary if standard mitigation measures are in place.

As no sensitive receptors are located within 25m of the areas of the proposed construction works, no significant effects due to construction activities are envisaged.

It should be noted that the development will likely occur over three construction stages; each likely to be of approximately 9 months duration.

8.4.2 Operational Phase

The use of additional alternative fuels and alternative raw materials will result in a number of positive indirect effects on air quality and climate, for example:

- reduced use of natural raw materials,
- reduced energy requirement for blasting and crushing

An assessment of the direct effects are considered below. The maximum predicted ground-level concentrations (GLCs) are presented in Table 8.8 for the existing and the proposed scenarios. The percentage change in pollutant concentrations is calculated relative to the air quality standards.

Definitions are outlined below for the terms used in Table 8.8;

- Environment - the baseline pollutant concentrations, as outlined in Table 8.7.
- PC (existing) - the process contribution (PC) from Platin Cement Works, as determined by the existing emission data, Table 8.4.
- PC (proposed) - the process contribution from Platin Cement Works, as determined by the proposed emission data, Table 8.5.
- Predicted increase relative to AQS - the percentage difference between PC existing + environment and PC proposed + environment, as a percentage of the Air Quality Standards.

Table 8.8 Predicted ground level concentrations for the existing and proposed scenarios

Parameter	Air Quality Standard (AQS) (µg/m³)	Environment (µg/m³)	PC (existing) (µg/m³)	PC (proposed) (µg/m³)	PC (existing) + Environment (µg/m³)	PC (proposed) + Environment (µg/m³)	PC (proposed) + Environment relative to AQS/limit (%)	Predicted increase relative to AQS/limit (%)
PM_{10}	40 (Annual)	18.3	2.82	2.9	21.12	21.2	53.0%	0.2
	50 (24-hour) (90.41st percentile)	18.3	8.04	8.1	26.34	26.4	52.8%	0.1
$PM_{2.5}$	25 (Annual)	11.2	2.0	2.0	13.2	13.2	51.9%	0.0
Nitrogen Dioxide	40 (Annual)	5.8	1.52	1.47	7.32	7.31	18.3%	0.0
	200 (99.79 percentile)	11.6[1]	24.45	26.4	36.06	36.07	18.0%	0.0
Nitrogen Oxides	30 (Annual)	9.5	5.26	5.31	14.76	14.81	49.4%	0.2
Sulphur Dioxide	20 (Annual)	2.9	0.53	0.53	3.43	3.43	17.2%	0.0
	125 (24-hour) (99.18th percentile)	2.9	3.51	3.6	6.41	6.5	5.2%	0.1
	350 (1-hour) (99.73rd percentile)	5.8[1]	8.2	8.2	14.01	14.01	4.0%	0.0
Hydrogen Chloride	20 (Annual)	-	0.11	0.106	0.11	0.106	<1%	0.0
	750 (1-hour)	-	2.12	2.13	2.12	2.13	<1%	0.0
Hydrogen Fluoride	1 (Annual)	-	0.01	0.01	0.01	0.01	1.0%	0.0
	160 (1-hour)	-	0.202	0.213	0.202	0.213	<1%	0.0
Cadmium	0.005 (Annual)	0.0003	0.00013	0.00013	0.00043	0.00043	8.6%	0.0
	1.5 (1-hour)	0.0006[1]	0.00341	0.00275	0.00296	0.00336	<1%	0.0
Thallium	1 (Annual)	-	0.00037	0.00037	0.00037	0.00037	<1%	0.0
	30 (1-hour)	-	0.008	0.0079	0.0094	0.0079	<1%	0.0
Mercury	1 (Annual)	0.0014	0.0005	0.0005	0.0019	0.0019	<1%	0.0
Antimony	5 (Annual)	-	0.00001	0.00001	0.00001	0.00001	<1%	0.0
	150 (1-hour)	-	0.0002	0.00024	0.0002	0.00024	<1%	0.0
Arsenic	0.006 (Annual)	0.0016	0.00004	0.00004	0.00164	0.00164	27.3%	0.0
	15 (1-hour)	0.0032[1]	0.0008	0.00087	0.00401	0.00407	<1%	0.0
Lead	0.5 (Annual)	0.0022	0.00017	0.00013	0.00237	0.00233	<1%	0.0
Chromium	5 (Annual)	-	0.00327	0.003	0.00327	0.00333	<1%	0.0
	150 (1 hour)	-	0.0638	0.0675	0.0638	0.0675	<1%	0.0
Cobalt	0.2 (Annual)	-	0.00001	0.00002	0.00001	0.00002	<1%	0.0
Copper	10 (Annual)	-	0.00023	0.00025	0.00023	0.0002	<1%	0.0

Parameter	Air Quality Standard (AQS) (µg/m³)	Environment (µg/m³)	PC (existing) (µg/m³)	PC (proposed) (µg/m³)	PC (existing) + Environment (µg/m³)	PC (proposed) + Environment (µg/m³)	PC (proposed) + Environment relative to AQS/limit (%)	Predicted increase relative to AQS/limit (%)
	200 (dust and mist)	-	0.0045	0.0047	0.0045	0.0052	<1%	0.0
Manganese	0.15 (Annual)	-	0.00084	0.00086	0.00084	0.00086	<1%	0.0
	1,500 (1-hour)	-	0.0164	0.017	0.0164	0.017	<1%	0.0
Nickel	0.02 (Annual)	0.0013	0.00051	0.0005	0.00181	0.0018	9.0%	-0.1
	300 (1 hour)	0.0026[1]	0.01	0.01	0.01261	0.01301	<1%	0.0
Vanadium	5 (Annual)	-	0.00012	0.00012	0.00012	0.00012	<1%	0.0
	1 (24-hour)	-	0.00091	0.00091	0.00091	0.00091	<1%	0.0
	1 (1-hour)	-	0.0024	0.0024	0.0024	0.0024	<1%	0.0
Dioxins	0.0000003 (Annual)	-	1.00E-09	1.00E-09	1.00E-09	1.00E-09	<1%	0.0
Carbon Monoxide	10,000 (8-hr average)	267	61.1	87.67	328.1	354.67	<1%	0.0
Ammonia	2,500 (1-hour)	-	10.25	10.25	10.25	10.25	<1%	0.4
	180 (Annual)	-	0.24	0.25	0.24	0.24	<1%	0.1

[1] Twice the annual mean background concentration (EPA guidance)

8.4.2.1 Particulate Matter (PM_{10} and $PM_{2.5}$)

The maximum GLC of PM_{10} is predicted to be 53.0% of the AQS for the annual mean. Of this, 45.8% is due to the background concentrations and 7.2% is potentially due to ICL. The predicted concentrations comply with the AQS.

The maximum 24-hour average GLC of PM_{10} is predicted to be 52.8% of the AQS for the 24-hour mean. Of this, 36.6% is due to the background concentration and 16.2% is potentially due to ICL. The predicted concentrations comply with the AQSs, refer to Figure 8.1 for isopleths showing the 90.41st percentile of 24-hr average concentrations

The maximum GLC of $PM_{2.5}$ is predicted to be 52.7% of the AQS for the annual mean. Of this, 44.8% is due to the background concentration and 7.9% is potentially due to ICL. The predicted concentrations comply with the AQS.

A less than 1% increase in ground level concentrations of PM_{10} and $PM_{2.5}$ is predicted to occur due to the increased flow rates associated with the proposed development.

8.4.2.2 Oxides of Nitrogen (NO_2 and NO_x)

The maximum GLC of NO_2 is predicted to be 18.3% of the AQS for the annual mean. Of this, 14.5% is due to the background concentration and 3.8% is potentially due to ICL. The predicted concentrations comply with the AQS.

The maximum GLC of NO_2 is predicted to be 18% of the AQS, for the 99.79th percentile of 1-hour mean values. Of this, 5.8% is due to the background concentration and 12.2% is potentially due to ICL, refer to Figure 8.2 for isopleths showing the 99.79st percentile of 1-hr average concentrations

The maximum GLC of NO_x is predicted to be 49.4% of the AQS for the annual mean for the protection of vegetation. Of this, 31.7% is due to the background concentration and 17.7% is potentially due to ICL. The predicted concentrations comply with the AQS.

No change in concentrations of NO_2 is predicted to occur due to the proposed development. A less than 1% increase in concentrations of NO_x is predicted to occur due to the proposed development.

8.4.2.3 Sulphur Dioxide (SO2)

The maximum GLC of SO_2 is predicted to be 17.2% of the AQS for the annual mean. Of this, 14.5% is due to the background concentration and 2.7% is potentially due to ICL. The predicted concentrations comply with the AQS.

The maximum GLC of SO_2 is predicted to be 5.2% of the AQS for the 99.18th percentile of 24-hour mean values. Of this, 2.3% is due to the background concentration and 2.9% is potentially due to ICL.

The maximum GLC of SO_2 is predicted to be 4% of the AQS for the 99.73rd percentile of 1-hour mean values. Of this, 1.7% is due to the background concentration and 2.3% is potentially due to ICL. The predicted concentrations comply with the AQS.

A less than 1% increase in concentrations of SO_2 is predicted to occur due to the proposed development.

8.4.2.4 Hydrogen Chloride (HCl)

The effect of HCl emissions is predicted to be <1% of the limit for the 1-hour mean and approximately 1% of the annual limit, including background concentrations.

A less than 1% increase in concentrations of HCl is predicted to occur due to the proposed development.

8.4.2.5 Hydrogen Fluoride (HF)

The effect of HF emissions is predicted to be <1% of the limit for the 1-hour mean and the annual mean.

A 1% increase in concentrations of HF is predicted to occur due to the proposed development.

8.4.2.6 Cadmium (Cd)

The effect of Cd emissions, including the background concentration, is predicted to be <1% for the 1-hour mean and <9% of the limit value for the annual mean; of this, 6% is due to the background concentration.

A less than 1% increase in concentrations of Cd is predicted to occur due to the proposed development.

8.4.2.7 Thallium (Tl)

The effect of Tl emissions is predicted to be <1% of the limit value for the annual mean and the hourly mean.

No change in concentrations of Tl is predicted to occur due to the proposed development.

8.4.2.8 Mercury (Hg)

The effect of Hg emissions, including the background concentration, is predicted to be <1% of the limit value for the annual mean.

No change in concentrations of Hg is predicted to occur due to the proposed development.

8.4.2.9 Antimony (Sb)

The effect of Sb emissions is predicted to be <1% of the limit value for the hourly mean and annual mean.

No change in concentrations of Sb is predicted to occur due to the proposed development.

8.4.2.10 Arsenic (As)

The effect of As emissions is predicted to be <1% of the limit for the 1-hour mean and 27% of the limit value for the annual mean; of this, <26% is due to the background concentration.

No change in concentrations of As is predicted to occur due to the proposed development.

8.4.2.11 Lead (Pb)

The effect of Pb emissions is predicted to be <2% of the AQS for the annual mean.

No change in concentrations of Pb is predicted to occur due to the proposed development.

8.4.2.12 Chromium (Cr)

The effect of Cr emissions is predicted to be <1% of the limit value for the annual mean and <1% of the limit value for the annual mean.

No change in concentrations of Cr is predicted to occur due to the proposed development.

8.4.2.13 Cobalt (Co)

The effect of Co emissions is predicted to be <1% of the limit value for the annual mean.

No change in concentrations of Co is predicted to occur due to the proposed development.

8.4.2.14 Copper (Cu)

The effect of Cu emissions is predicted to be <1% of the limit value for the annual mean and <1% of the limit value for the annual mean.

No change in concentrations of Cu is predicted to occur due to the proposed development.

8.4.2.15 Manganese (Mn)

The effect of Mn emissions is predicted to be <1% of the limit value for the annual mean and <1% of the 1-hour mean value.

No change in concentrations of Mn is predicted to occur due to the proposed development.

8.4.2.16 Nickel (Ni)

The effect of Ni emissions is predicted to be <1% of the 1-hour mean value and 9% of the limit value for the annual mean; of this, 6.5% is due to the background concentration.

A less than 1% decrease in concentrations of Ni is predicted to occur due to the proposed development.

8.4.2.17 Vanadium (V)

The effect of V emissions is predicted to be <1% of the limit value for the annual mean, 3% of the 24-hour mean value and <4% of the hourly mean.

A less than 1% increase in concentrations of V is predicted to occur due to the proposed development.

8.4.2.18 Dioxins and Furans

The effect of dioxin emissions is predicted to be < 1% of the WHO (2000) indicative value for the annual mean.

No change in concentrations of dioxins and furans is predicted to occur due to the proposed development.

8.4.2.19 Carbon Monoxide

The effect of CO emissions is predicted to be <4% of the 8-hour average; of this, <2% is due to the background concentration.

No change in concentrations of CO is predicted to occur due to the proposed development.

8.4.2.20 Ammonia

The effect of the ammonia emissions is predicted to be <1% of the limit value for the annual mean and <1% of the hourly mean.

8.4.3 Predicted Ground level concentrations based on 75% flow rates

In accordance with the EPA guidance document an assessment of the maximum licensed operations at 75% of maximum volume flow has been carried out.

Table 8.9 outlines the results of the assessment of highest predicted GLCs based on 75% of the proposed volumetric flow rates, refer to Table 8.5.

Definitions are outlined below for the terms used in Table 8.9;

- Environment - the baseline pollutant concentrations, as outlined in Table 8.7.
- PC (at 75% flowrate) - the process contribution from Platin Cement Works operating at 75% of the proposed flowrates outlined in Table 8.5.

All predicted concentrations show good compliance with air quality standards and relevant limit values when emissions are modelled at 75% of maximum flow rates.

Table 8.9 Predicted ground level concentrations based on 75% of the volumetric flowrates

Parameter	Air Quality Standard (µg/m³)	Environment (µg/m³)	PC (at 75% flowrate) (µg/m³)	PC (at 75% flowrate) + Environment (µg/m³)	Percentage of AQS/limit (%)
PM_{10}	40 (Annual)	18.3	2.57	20.87	52.2%
	50 (24-hour) (90.41st percentile)	18.3	7.04	25.34	50.7%
$PM_{2.5}$	25 (Annual)	11.2	2	13.2	52.8%
Nitrogen Dioxide	40 (Annual)	5.8	1.48	7.28	18.2%
	200 (99.79 percentile)	11.6[1]	23.69	35.3	17.7%
Nitrogen Oxides	30 (Annual)	9.5	4.46	13.96	46.5%
Sulphur Dioxide	20 (Annual)	2.9	0.45	3.35	16.8%
	125 (24-hour) (99.18th percentile)	2.9	3.2	6.1	4.9%
	350 (1-hour) (99.73rd percentile)	5.8[1]	7.3	13.11	3.7%
Hydrogen Chloride	20 (Annual)	-	0.084	0.084	<1%
	750 (1-hour)	-	2.07	2.07	<1%
Hydrogen Fluoride	1 (Annual)	-	0.009	0.009	<1%
	160 (1-hour)	-	0.207	0.207	<1%
Cadmium	0.005 (Annual)	0.0003	0.00013	0.00043	8.6%
	1.5 (1-hour)	0.0006[1]	0.00273	0.00334	<1%
Thallium	1 (Annual)	-	0.00041	0.00041	<1%
	30 (1-hour)	-	0.0086	0.0086	<1%
Mercury	1 (Annual)	0.0014	0.00042	0.00182	<1%
Antimony	5 (Annual)	-	0.00001	0.00001	<1%
	150 (1-hour)	-	0.00018	0.00018	<1%
Arsenic	0.006 (Annual)	0.0016	0.00004	0.00164	27.3%
	15 (1-hour)	0.0032[1]	0.00077	0.00398	<1%
Lead	0.5 (Annual)	0.0022	0.00014	0.00234	<1%
Chromium	5 (Annual)	-	0.0028	0.0028	<1%
	150 (1 hour)	-	0.0654	0.0654	<1%
Cobalt	0.2 (Annual)	-	0.00001	0.00001	<1%
Copper	10 (Annual)	-	0.00015	0.00015	<1%
	200 (dust and mist)	-	0.0046	0.0046	<1%
Manganese	0.15 (Annual)	-	0.0007	0.0007	<1%
	1,500 (1-hour)	-	0.0168	0.0168	<1%
Nickel	0.02 (Annual)	0.0013	0.00042	0.00172	8.6%
	300 (1 hour)	0.0026[1]	0.0101	0.01271	<1%
Vanadium	5 (Annual)	-	0.00013	0.00013	<1%
	1 (24-hour)	-	0.00108	0.00108	<1%
	1 (1-hour)	-	0.0027	0.0027	<1%
Dioxins	0.0000003 (Annual)	-	1.00E-09	0.000000001	<1%
Carbon Monoxide	10,000 (8-hr average)	267	75.3	342.3	<4%
Ammonia	2,500 (1-hour)	-	10.19	10.19	<1%
	180 (Annual)	-	0.21	0.21	<1%

[1] Twice the annual mean background concentration (EPA guidance)

8.4.4 Cumulative Effects

8.4.4.1 Introduction

Indaver Ireland operates a Waste-to-Energy facility at Carranstown the closest part of which is approximately 300m from Platin Cement Works site boundary.

The cumulative effect of this facility was assessed by considering the ambient air quality and the source contributions due to Platin and Indaver.

Information on emissions were obtained from the Indaver Carranstown Environmental Impact Statement, 2012 as part of the application to increase the capacity of the plant.

As per the EPA's Air Guidance Note (AG4) the impact area for the cumulative assessment is defined by the USEPA as a circular area with a radius extending from the source to the most distant point where dispersion modelling predicts a 'significant' ambient effect (5% of the AQS for criteria pollutants).

The guidance document suggests that a single limit of 100 tonnes/annum of any regulated pollutant from the existing installation be used as the threshold level for assessment. For each pollutant above that threshold, a limit of 25% of the AQS be used for assessing effects from the nearby installation, above which detailed modelling is required for assessing the cumulative effect.

Based on 2016 mass emission data, the only pollutant at ICL Platin that exceeds 100 tonnes/annum is NO_x.

The maximum ground level concentrations predicted for Platin Cement Works and for Indaver were assumed to be coincident, that is, to occur at the same location and at the same time. This is highly conservative and would rarely if ever be realised in practice.

8.4.4.2 Results

In Table 8.10, ground level concentrations from Indaver and PC (proposed), i.e. Platin Cement Works contribution + Indaver, including background levels (environment), are compared to Air Quality Standards.

Table 8.10: Cumulative Concentrations Compared to Air Quality Standards

Parameter	AQS ($\mu g/m^3$)	25% of AQS ($\mu g/m^3$)	Indaver contribution ($\mu g/m^3$)	Indaver contribution % of AQS ($\mu g/m^3$)	PC (proposed) + Environment + Indaver ($\mu g/m^3$)	PC (proposed) + Environment + Indaver relative to AQS (%)
NO_2 (annual)	40	10	0.85	2.1%	8.16	20.4%
NO_2 (1-hour)	200	50	27.19	13.6%	63.26	31.6%
NO_x (annual)	30	7.5	1.13	3.8%	15.93	53.1%

8.4.4.3 Discussion of Results

As outlined in Table 8.10, the Indaver facility does not contribute to more than 25% of the AQS for the three parameters presented. Therefore, no detailed modelling for the cumulative effect of the Indaver and Platin Cement Works facilities is required, in accordance with EPA guidance.

8.4.5 Assessment of ecologically sensitive sites

8.4.5.1 Assessment of nitrogen deposition

An assessment of nitrogen deposition at nearby ecological sensitive areas has been carried for the River Boyne and River Blackwater River cSAC, River Boyne Coast and Estuary cSAC and pNHA, Duleek Commons pNHA and Laytown

Dunes/Nanny Estuary pNHA. The highest predicted annual average concentration of NO_2 is 0.64 µg/m^3 and is predicted to occur at the River Boyne and River Blackwater River cSAC.

Assuming a deposition velocity of 0.001 m/s the nitrogen deposition at River Boyne and River Blackwater River cSAC is calculated based on the following:

1 µg/m^3 NO_2 = 0.1 kg N ha^{-1} yr^{-1}

This results in a total value of 0.06 kg N ha^{-1} yr^{-1}. This is significantly lower than the UNECE critical load for nitrogen of 5-10 Kg N ha^{-1} yr^{-1} for inland and surface water habitats, refer to Section 8.2.2.2.

A cumulative assessment for nitrogen deposition at the River Boyne and River Blackwater River cSAC, including emissions from Indaver, is presented in Table 8.11. As a worst case scenario, the highest GLC predicted by Indaver has been used for the assessment, i.e. 0.85 µg/m^3 (refer to Table 8.10). This equates to 0.08 kg N ha^{-1} yr^{-1}, resulting in a cumulative level of 0.145 kg N ha^{-1} yr^{-1}, significantly lower than the UNECE critical load for nitrogen of 5-10 Kg N ha^{-1} yr^{-1} for inland and surface water habitats.

8.4.6 Fugitive emissions

It is proposed to house all new fuels in silos or suitably scaled contained buildings. As a result no new significant fugitive emissions are likely due to the proposed development. Dust deposition monitoring on a quarterly basis is required by the Platin Cement Works Industrial Emission licence with a limit of 350mg/m^2/day set (based on a 30 day composite sample) at the site boundary. Platin Cement Works will be obliged to continue to comply with the limit set out in the licence.

8.4.7 Odour emissions

No untreated mixed wastes will be delivered to the Cement Works. All alternative fuels – be they waste-derived or not – will be prepared off-site to a required specification, which will ensure that the material meets the requirements of the Cement Works for a suitable alternative to fossil fuel. Delivery of the alternative fuels to the Cement Works will be subject to a declaration of conformity from the suppler and quality testing on arrival to ensure that it meets the required specification. Any deliveries found not in accordance with the required specification will not be accepted at the Cement Works and will be returned to the supplier. On-going quality testing with feedback to the supplier is important in order to maintain the required quality of all inputs including alternative fuels.

Contracts for supply of alternative fuels will be on the basis of 'just-in-time' deliveries. As such there are no proposals for long-term storage of alternative fuels at the Cement Works. For most alternative fuels this will mean storage of no more than 3 or 4 days requirement, and this is reflected in the size of the storage facilities that are proposed to be constructed. The only exception will be for used tyres where up to 12 – 14 days storage is possible, however, no odours will be generated by these tyres.

While whole tyres will be bulk stored in a purpose-built open storage yard, all other alternatives fuels will be delivered by means of sealed containers and / or tankers, from where depending on the nature of the alternative fuel, they will be transferred to purpose-designed enclosed buildings, silos or tanks. No processing of alternative fuels (or wastes) will take place at the Cement Works and the alternative fuels will be transferred or pumped directly from the proposed handling buildings, silos or tanks via enclosed pipes or conveyors directly to the Cement Kilns.

Therefore, given the approach involved: *i.e.* off-site preparation of alternative fuels to required specification; enclosed delivery, primarily for 'just-in-time' use; handling within purpose-designed building, silos and tanks and direct feed to the kiln; no odour issues are likely to arise off site.

The use of alternative fuels, including waste-derived alternative fuels, is permitted and common practice in 3 of 4 cement plants on the island of Ireland and has been used at Platin since 2011. In 2016 almost 120,000 tonnes of alternative fuel was used in replacement of a portion of imported fossil fuel at Platin Cement Works.

8.4.8 Climate impact assessment

Currently, Platin Cement Works is permitted to use up to 120,000 tonnes per year of alternative fuels. It is proposed that the total possible amount of alternative fuels and alternative raw materials would be increased to 600,000 tonnes per annum.

Based on the information provided in Table 8.5, the following CO_2 emissions are calculated for the existing and proposed scenarios:

- Existing: 740,000 tonnes/annum
- Proposed: 425,660 tonnes/annum

The CO_2 savings which can be achieved by increasing the use of alternative fuels on site as proposed, amounts to circa 314,340 tonnes of CO_2 per annum resulting in a positive effect on climate. This is due to the fact that alternative fuels are typically less carbon intensive than fossil fuels.

As outlined previously, the increase in operational traffic volumes as a result of the proposed development is not considered significant; therefore no climatic effects are envisaged.

8.5 Mitigation Measures

8.5.1 Construction Phase

As outlined in Section 8.2, no sensitive receptors are located within 25m of the areas of the proposed construction works and therefore no significant effects due to construction activities are envisaged. However, measures will be undertaken during the construction works to minimise dust generation. The following measures will be implemented at a minimum:

- Spraying of exposed earthwork activities and on site haul roads during dry weather.
- Control of vehicle speeds on site.
- Sweeping of hard surfaces on-site and in the surrounding area, as required.

Dust deposition monitoring is required by the Platin Cement Works Industrial Emission licence on a quarterly basis. Dust deposition monitoring will be carried out and compared to the limit of 350mg/m^2/day (averaged over a 30-day period) to ensure the effectiveness of the measures outlined above. Refer to the dust minimisation strategy included the Construction and Environmental Management Plan - Appendix 3.4 of the EIA Report.

8.5.2 Operational Phase

As outlined in Section 8.4, the modelling assessment predicts that all air quality standards and guidelines will be complied with; therefore no mitigation measures are proposed as part of this development. However, a number of mitigation measures are currently in place to reduce emissions from sources. These include an electrostatic precipitator and a selective non catalytic reduction (SNCR) on kiln 2 and a bag filter and SNCR on kiln 3.

Potential odours are mitigated through off-site preparation of alternative fuels to required specification; enclosed delivery, primarily for 'just-in-time' use; handling within purpose-designed buildings, silos and tanks and direct feed to the kilns.

8.6 Worst case scenario

The worst-case scenario has been assessed in Section 8.4. As outlined in Section 8.2.4, the modelling predictions represent the most conservative or worst-case concentrations that could possibly arise. Several worst-case conditions are assumed to be coincident:

- Emission sources are operating at maximum flow rates;

- Emission sources are operating at maximum emission concentrations, rather than average emission concentrations;
- Emission sources are operating for every hour of every day of the year;
- The assessment is based on the meteorological conditions that give rise to the maximum predicted concentration over a five year period;
- Receptor location is that which experiences the maximum predicted concentration.

The model predictions are therefore extremely conservative, giving worst-case ground-level concentrations, which are very unlikely to be realised in practice.

8.7 Residual Effects

8.7.1 Construction Phase

No significant residual effect on air quality and climate is likely following the implementation of mitigation measures outlined above.

8.7.2 Operational Phase

No significant residual effect on air quality and climate is likely following the implementation of mitigation measures outlined above.

8.8 References

EPA, Industrial Emissions Licence Register Number P0030-04

EU, Industrial Emissions Directive (2010/75/EU)

Environmental Protection Agency (EPA) Air Dispersion Modelling from Industrial Installations Guidance Note (AG4), 2009

Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011)

Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (SI 58 of 2009)

UK Environment Agency (EA) (2002, 2011) "Integrated Pollution Prevention and Control (IPPC) Environmental Appraisal and Assessment of BAT; Horizontal Guidance Note IPPC H1"

WHO air quality guidelines for Europe, 2nd edition, 2000 (WHO, 2000)

EU, BAT Conclusion on the Production of Cement Lime and Magnesium, 2013

Greenhouse Gas Emissions Permit No IE-GHG043-10364

EPA, Air Quality in Ireland 2015, Key Indicators of Ambient Air Quality, 2016

EPA, Air Quality in Ireland 2014, Key Indicators of Ambient Air Quality, 2015

EPA, Air Quality in Ireland 2013, Key Indicators of Ambient Air Quality, 2014

EPA, Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, May 2017

UN/ECE, 2003. Empirical Critical Loads for Nitrogen. Expert workshop 2002

Indaver. 2012. Indaver Carranstown Environmental Impact Statement

A4

Client
Irish Cement Ltd

Job Title
Expansion of Alternative Fuels and use of Alternative Raw Materials

ARUP
Arup, 50 Ringsend Road
Dublin, D04 T6X0
www.arup.ie
Tel +353(0)1 233 4455 Fax +353(0)1 668 3169

Drawing Title
Figure 8.1

Scale at A4	NTS
Date	June 2017
Discipline	Environmental
Job No	325374-47
Drawing Status	Report
Drawing No	N3001
Issue	R1

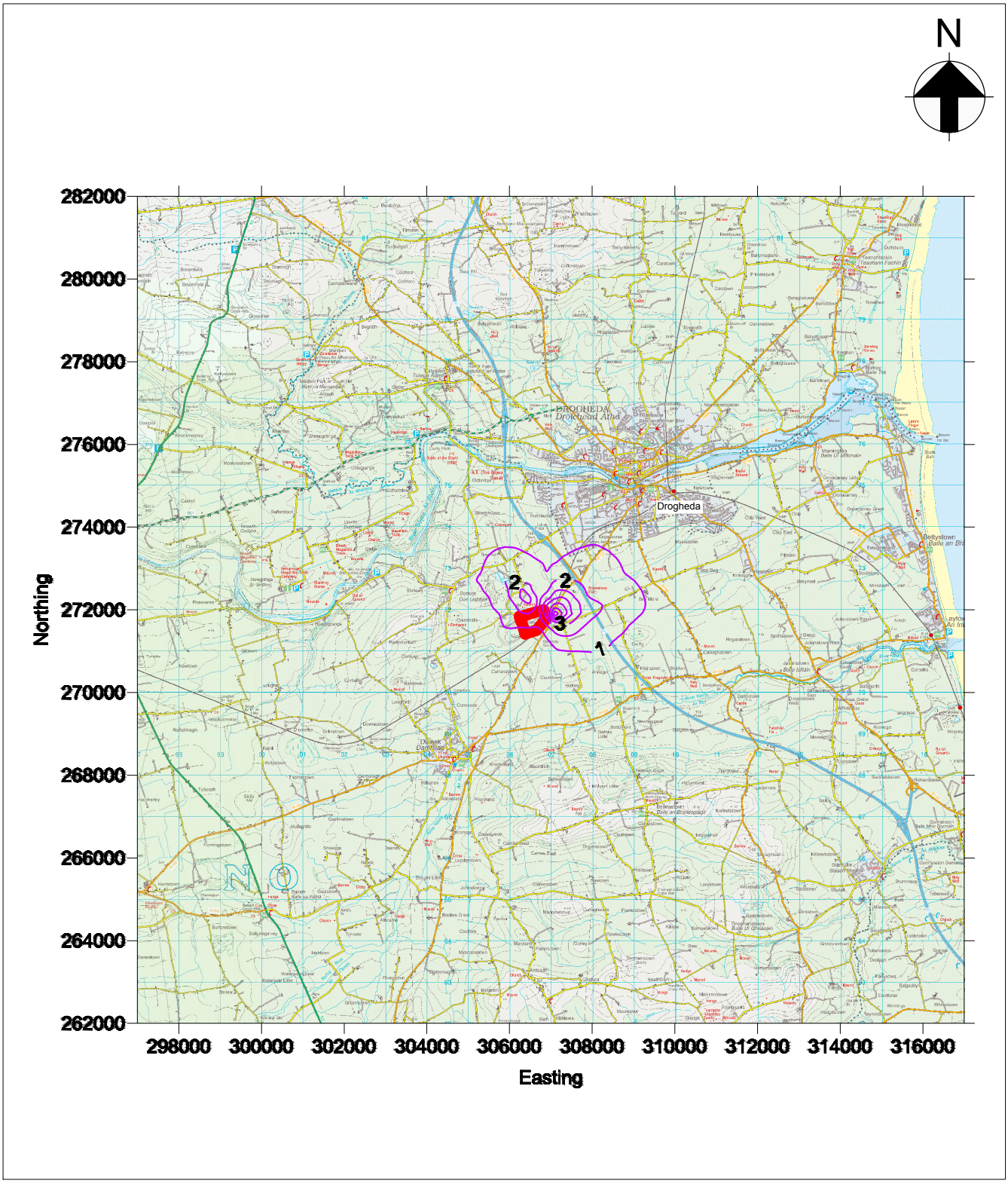


Figure 8.1: Isopleth of 90.41st of 24-hr ground level concentrations of PM10

A4

Client
Irish Cement Ltd

Job Title
Expansion of Alternative Fuels and use of Alternative Raw Materials

ARUP
Arup, 50 Ringsend Road
Dublin, D04 T6X0
www.arup.ie
Tel +353(0)1 233 4455 Fax +353(0)1 668 3169

Drawing Title
Figure 8.2

Scale at A4	NTS	Date	June 2017
Discipline	Environmental		
Job No	325374-47	Drawing Status	Report
Drawing No	N3002	Issue	R1

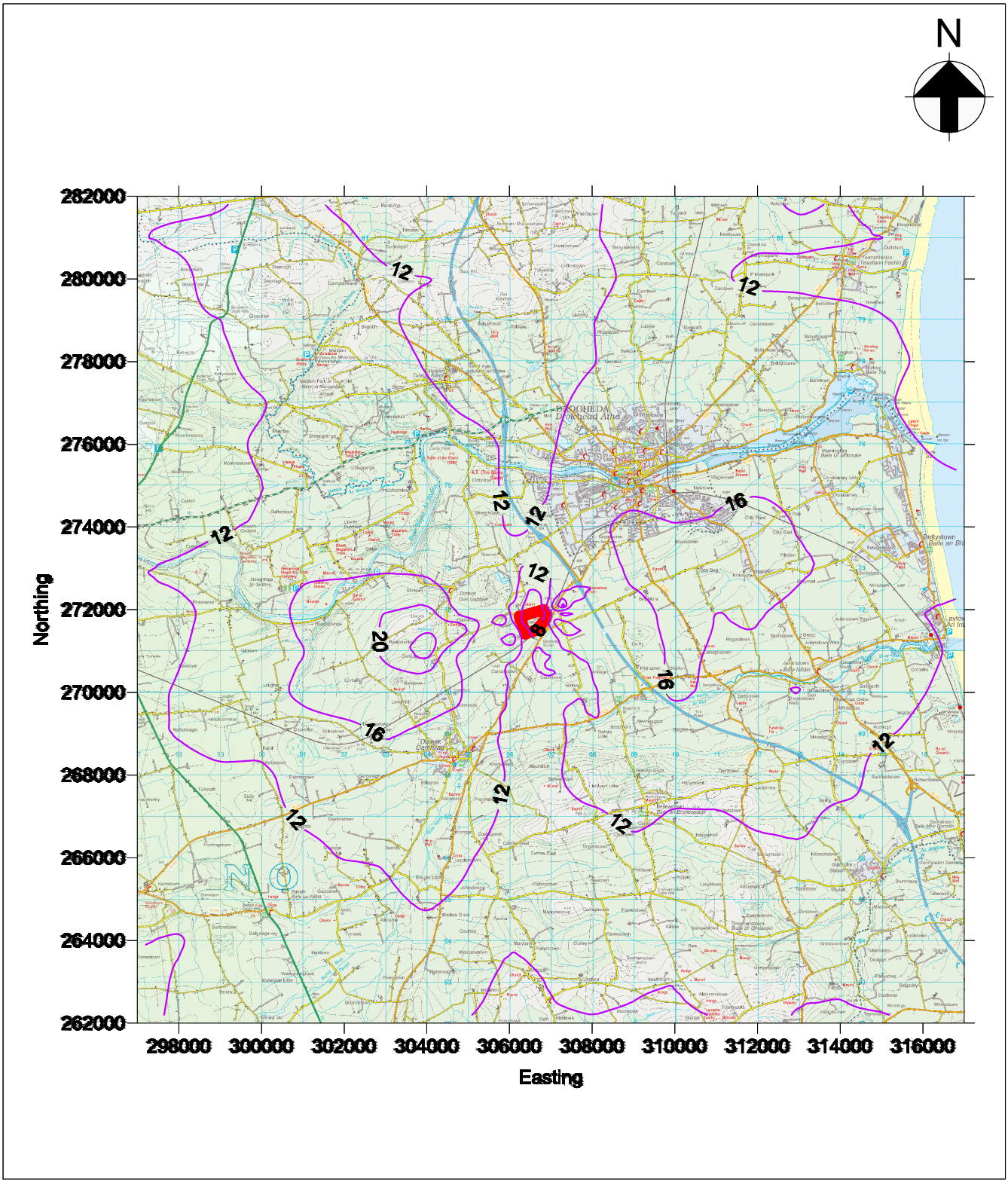


Figure 8.2: Isopleth NO2 of 99.79th of 1-hr ground level concentrations of NO2

9 Noise

9.1 Introduction

This chapter assesses the potential effects on the existing noise and vibration environment arising from the Proposed Development during the construction and operational phases.

9.2 Methodology

9.2.1 Environmental Noise Survey Methodology

Noise was measured in the vicinity of the site using a methodology in accordance with ISO 1996: 2007 Acoustics – Description and Measurement of Environmental Noise Parts 1 – 4 and the EPA Guidance Noise for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).

All day time and night-time measurements are expressed as $L_{AeqT,30\ mins}$ as stated in the guidance documentation.

9.2.1.1 Monitoring Locations

Figure 9.1 shows the location of the three monitoring locations where baseline monitoring was undertaken. These locations are referred to as:

- NSL 1 – located on the western boundary of the site;
- NSL 2 – located on the north eastern boundary of the site; and
- NSL 3 – located to the east of the site.

9.2.1.2 Instrumentation

The instrumentation used during the attended daytime and night-time monitoring are presented in Table 9.1 below.

Table 9.1 Instrumentation used during the attended daytime and night-time surveys.

Manufacturer	Instrument Type	Calibrated by	Calibrated reference
Cirrus Research plc.	CR: 171B Sound Level Meter	Cirrus Research plc.	2nd March 2016 Cal. no. 235486
Cirrus Research plc.	CR: 511E Sound Level Calibrator	NSAI National Metrology Lab	9th November 2015 Cal. no. 151990
Bruel & Kjær	2250 Light Sound Level Meter	NSAI National Metrology Lab	14th June 2016 Cal. no. 161998

9.2.1.3 Monitoring Procedure

For measurements at attended locations the microphone was attached to a tripod extending to more than 1.5m above ground level and the meter was set up approximately 3.5meters from reflective surfaces. Measurement locations at residential properties were at the property boundaries. The measurement locations are shown in Figure 9.1.

9.2.1.4 Measurement Parameters

The noise survey results are presented in terms of the following four parameters:

- L_{Aeq} is the equivalent continuous sound level. It can be considered as the 'average' noise level and is used to describe a fluctuating noise in terms of a single noise level over the sample period. It is typically used as a descriptor for ambient noise.

- L_{A10} is the instantaneous maximum sound level measured during the sample period.
- L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.
- L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2x10-5Pa.

At locations where the presence of an audible tone could be disruptive to neighbouring properties, an octave band measurement was completed at the residential dwelling to establish if such pure tones were present.

9.2.2 Assessment Criteria

9.2.2.1 Noise

Platin Cement Works is licenced to operate under Industrial Emissions Licence Register No. P0030-04. The licence states that "the licensee shall carry out a noise survey of the site operations annually. The survey programme shall be undertaken in accordance with the methodology specified in the *'Environmental Noise Survey Guidance Document' as published by the Agency'*. Table 9.2 presents the current noise emission limits for the site for both daytime and night-time to be applied at the nearest sensitive receptors.

Table 9.2 Daytime and Night-time noise emission limits

Daytime dB(A) L_{Aeq} (30 minutes)	Night-time dB(A) L_{Aeq} (30 minutes)
55[Note1]	45[Note1]

Note 1: There shall be no clearly audible loud component or impulsive component in the noise emission from the activity of any noise-sensitive location.

In accordance with the Industrial Emissions Licence, noise monitoring is carried out at three noise sensitive locations (NSL), refer to Figure 9.1. Furthermore, Section 4.5 of the licence states that "*Noise from the installation shall not give rise to sound pressure levels ($L_{Aeq,T}$) measured at Noise Sensitive Locations (NSL) of the installation which exceed the limit value(s) by more than 2dB(A)".*

The "*Design Manual for Roads and Bridges (DMRB) Volume 11*", Section 3, Part 7, HD 213/11, *Noise and Vibration* states that an increase of 25% in total traffic flows is considered approximately equivalent to a +1dB change in noise levels, above which a detailed assessment is required. Where increases in total traffic flow greater than the 25% are predicted to occur, detailed modelling is carried out using *Calculation of Road Traffic Noise* (CRTN, 1998) methodology.

The effect of the Proposed Development is assessed through the application of significance criteria based on predicted changes in noise level due to the development. This was done by calculating the change in L_{Aeq} and categorising the significance (refer to Table 9.3).

Table 9.3: Changes in Noise Level – Significance Criteria

Change in Sound Level (dB)	Subjective Reaction	Significance Level
<3	Inaudible	Imperceptible
4-5	Perceptible	Slight
6-10	Up to doubling of loudness	Moderate
11-15	Over a doubling of loudness	Significant
>16		Profound

9.2.2.2 Vibration

Irish Cement operates to EPA licence limits with regard to vibration during quarry blasting. The licence limits are set out in Table 9.4. In 2016, vibration monitoring was carried out during 56 blasts on site at the quarry. 100% compliance with these licence limits was achieved.

Table 9.4: Maximum Allowable Vibration Levels during blasting

Vibration Limit Value	Air Overpressure Limit Value
12mm/sec	125dB (lin)

9.3 Existing Environment

In order to establish the existing environment, a series of noise surveys were carried out during daytime and night-time at three noise sensitive locations (see Figure 9.1). Daytime and night-time noise measurements were undertaken on the 27th and 28th of July 2016, respectively. Surveys were carried out on a week-day and during time periods which were selected in order to provide a typical snapshot of the existing baseline noise climate.

9.3.1 Weather Report

Stable weather conditions persisted throughout the measurement periods and remained dry and mild throughout. Conditions were overcast throughout both monitoring periods – (July 27th and 28th, 2016). Weather details are presented in Table 9.5.

Table 9.5 Weather as recorded using an anemometer during the day- and night-time monitoring and a brief overview of localised conditions at each location.

Date / Period	Locations	Temp (°C)	Wind speed (m/s)	Comments
27 July 2016 Day	NSL 1	20	1.0	Weather was characterised by overcast, dry with sunny periods at all of the monitoring locations during this period
	NSL 2	21	1.0	
	NSL 3	21	2.0	
27/28 July 2016 Night	NSL 1	14	0.5	Weather was characterised by dry stable conditions at all of the monitoring locations during this period.
	NSL 2	16	0.5	
	NSL 3	14	0.5	

9.3.1.1 NSL 1

The monitoring location was directly adjacent to a residential property in the Cruicerath locality, west of the Cement Works.

Day-time (27th July, 2016, 11:30-17:30):
Plant noise was not audible. The immediate soundscape was typically rural in character and at times farm machinery operating in nearby fields was audible as background noise. Noise due to traffic passing at the junction was sporadic and effectively increased overall noise levels during the daytime period.

Night-time (28th July, 2016, 00:00-00:30):
The plant was not audible during the night-time period. General noise levels were registering extremely low on the sound level meter and therefore it was considered unnecessary to continue measuring noise during this period. The results from a single measurement taken at this time clearly demonstrate this.

9.3.1.2 NSL 2

The meter was set up at a residential property to the north/northwest of the Cement Works where attended noise measurements were made during the daytime period. During the night-time period attended measurements were made to the rear of the property. An additional meter was put in place on site to monitor continuous noise levels over the night-time period.

Day-time (27th July, 2016, 11:00-16:30):
Plant noise was audible as a distinctive steady state noise character throughout the monitoring period. Such noise characters may be associated with cement mill 3 and Kiln 3 which were operating during this period.

Various contributory noise sources relating to activity at the adjacent farmyard were identified as follows: grain drying process produced a thrashing-like cyclical noise character; intermittent sources included farm machinery and engine and reverse beacons which were intermittent in character.

Other contributory noise sources were associated with general movements of people around the property.

Night-time[1] (27th - 28th July, 2016, 23:00-02:30):
The noise levels were associated with that of an operating plant and distant motorway (M1) traffic was a noted contributor to the measured noise level values.

9.3.1.3 NSL 3

The meter was set up adjacent to a residential property, east of the Cement Works.

Day-time (27th July, 2016, 12:00-18:00):
Daytime noise levels were dominated by traffic passing across the junction at this monitoring location. Heavy vehicles added to maximum noise levels.

Plant noise was clearly audible; multiple noise characters described as a drone undertone which were steady state and constant throughout the daytime monitoring period. Intermittent internal plant noise associated with vehicles and forklifts were also audible.

Such noise characters may be associated with Cement Mill 3 and Kiln 3 which were operating during this period. Noise intensities arising from the plant were noted as constant throughout the daytime period; hence remained unaffected during the final daytime measurement when all four mills were operating.

Night-time (27th - 28th July, 2016, 23:00-01:00):
Plant noise was clearly audible in comparison to the daytime period. Noise characters were as described during the daytime period. Local traffic had reduced significantly since the daytime period. Traffic associated with the M1 motorway was clearly audible as a constant source of background noise.

9.3.2 Measurement Results

9.3.2.1 Tonal Noise

With regard to tonal or impulsive noise, the findings from one third octave band analysis results indicate there was no tonal or impulsive noise detected within the range specified as according to NG4 Guidelines. Level differences must be greater than or equal to the following values in both adjacent one-third octave bands:

- 15dB in low-frequency one-third-octave bands (25 Hz to 125 Hz)
- 8dB in middle-frequency one-third-octave bands (160 Hz to 400 Hz)
- 5dB in high-frequency one-third-octave bands (500 Hz to 10 kHz)

9.3.2.2 NSL 1

The results from the noise survey carried out at NSL1 are presented in Table 9.6. The daytime and night-time noise results show resultant noise levels at this location are not attributable to operations at Platin Cement Works, with traffic passing on the road from Duleek to is the predominant source of noise during daytime hours.

During the night-time measurements the plant was not audible. Night-time noise levels at this location are shown to be very low.

[1] Noise meter was set up to continuously monitor night-time noise levels at (NSL 2).

Results show that NSL 1 is not impacted by noise arising from operations at Platin Cement Works, and therefore, an assessment of tonal noise was not required.

Table 9.6: Results of Noise Survey for Day and Night-time periods at NSL 1

Location NSL1			Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{10}	L_{90}
Daytime	27July 2016	11:54-12:26	58	82	34	54	40
		14:13-14:43	60	86	37	56	40
		16:51-17:21	62	90	33	58	40
Night-time	28 July 2016	00:06-00:36	37	63	18	31	21

9.3.2.3 NSL 2

The results from the noise survey carried out at NSL2 are presented in Table 9.7. The setting is rural in character, with the main contributory source of noise associated with operations at the adjacent farm. However, the plant is clearly audible above other daytime noise.

The results show that in the absence of farm activities noise levels are slightly reduced during the night-time period; hence noise levels at this location may be directly attributed to plant noise which is the dominant source of noise during the night-time period in particular. Noise levels are shown to be in compliance with the daytime limit (55dB L_{Aeq}). With regard to night-time levels, a result of 47dBLAeq would indicate compliance when the tolerance of +/- 2dB is factored in.

Results from 1:3 Octave Band Analysis reveal that no element of tonal or impulsive noise is present. This validates the subjective description of the plant noise as being steady state / constant in character.

Table 9.7 Results of Noise Survey for Day and Night-time periods NSL 2

Location NSL2			Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
			LA_{eq}	L_{Amax}	L_{Amin}	L_{10}	L_{90}
Daytime	27 July 2016	11:05-11:35	51	67	46	52	48
		13:25-13:55	50	62	43	53	46
		16:09-16:39	48	72	43	49	45
Night-time	27 July 2016	23:05-23:35	47	50	45	48	46
	28 July 2016	01:35-02:05	47	51	45	48	46

9.3.2.4 NSL 3

The results from the noise survey carried out at NSL3 are presented in Table 9.8. While traffic is a major source of daytime noise at this location, the plant is clearly audible. In such a scenario the L_{A90} parameter may be used to determine the contribution of plant-related noise. Results infer that the background (L_{A90}) levels are in compliance with the daytime limit (55dBA).

During the night-time period when traffic is at a minimum, results show a significant reduction in noise levels. However plant noise was noted as dominant and intense during this period; factoring in the tolerance of +/-2dB a result of 47dB LA90 would indicate compliance.

Results from 1:3 Octave Band Analysis reveal that no element of tonal or impulsive noise is present. This validates the subjective description of the plant noise as being steady state / constant in character.

Table 9.8 Results of Noise Survey for Day and Night-time periods at NSL 3

Location NSL3			Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{10}	L_{90}
Daytime	27 July 2016	12:40-13:10	57	78	45	57	48
		15:07-15:37	59	80	44	56	47
		17:36-18:04	59	82	44	59	49

Location NSL3			Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{10}	L_{90}
Night-time	27 July 2016	23:27-23:53	54	78	45	52	47
	28 July 2016	00:50-01:20	51	74	46	51	47

9.4 Potential Effects of the Proposed Development

9.4.1 'Do-Nothing' Scenario

The do-nothing scenario would be the same as described in Section 9.3 Existing Environment.

9.4.2 Construction Phase

The construction phase of the Proposed Development will involve minimal site demolition works, site clearance, excavation and the construction of buildings and structures associated with the Proposed Development. A variety of items of mobile plant will be in use, such as excavators, breakers, lifting equipment, dumper trucks, compressors, generators and pile drivers. There will be vehicular movements to and from the site that will make use of the existing roads and site access points.

No traffic routes are predicted to experience increases of more than 25% in total traffic flows during the construction phase, therefore, no detailed assessment is required (DMRB Guidelines), refer to Chapter 12 of the EIA Report.

9.4.3 Operational Phase

No major new noise sources are proposed as part of the new development. The development mainly consists of the provision of buildings for the storage, handling and introduction of additional alternative fuels and raw materials. Additional conveyors will also be provided to transfer fuels and materials to Kilns 2 and 3. These conveyors, of which there are similar structures on site already, will be enclosed and are not likely to generate significant noise.

The EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) 2012 specifies the following noise limits:

- Daytime (07:00 to 19:00hrs) – 55dB $L_{Ar,T}$;
- Evening (19:00 to 23:00hrs) – 50dB $L_{Ar,T}$;
- Nighttime (23:00 to 07:00hrs) – 45dB $L_{Aeq,T}$.

It is likely that these limits will be applied to a new licence that will be issued for Plant Cement Works as part of an Industrial Emissions licence review. ICL will be obliged to ensure that these limits are complied with. In addition, ICL will ensure that the proposed development will be inaudible at sensitive receptors resulting in an imperceptible impact (refer to Table 9.3).

No traffic routes are predicted to experience increases of more than 25% in total traffic flows during the operational phase and therefore no detailed assessment is required as per the DMRB Guidelines. In fact the maximum predicted increase in traffic is significantly below the 25% limit - refer to Chapter 12 of the EIA Report.

9.4.4 Worst Case Scenario

The assessment outlined in Section 9.4 is an assessment of the worst-case scenario.

9.4.5 Cumulative Effects

The cumulative effects have been considered through the completion of baseline monitoring which incorporates all existing noise sources, such as nearby roads and other industrial facilities *e.g.* Carranstown Waste to Energy Facility.

9.5 Mitigation Measures

9.5.1 Construction Phase

The following text outlines typical measures that will be employed by the contractor in order to minimise the potential for noise and vibration disturbance in the surrounding area and to ensure compliance with the construction noise limits outlined in Tables 9.2 and 9.4 respectively.

BS 5228 (2009+A1:2014) *Code of practice for noise and vibration control on construction and open sites. Noise:* provides guidance on the implementation of measures to reduce the effect of construction noise and vibration.

The measures to be implemented include, but are not limited to:

- Selection of plant/location of plant
  Prior to deployment of construction plant on site, an assessment of the noise characteristics of each of the individual plant items in terms of noise and vibration emissions will be undertaken. Where possible, plant which will have the least effect in term of noise will be selected. In addition, plant will only be left running during works and will be switched off at all other times.

- Hours of work
  All construction related works, other than emergency works, security and pumping out of excavations will be carried out during normal working hours.

9.6 Residual Effects

No residual noise and vibration effects are predicted as a result of the Proposed Development as Platin Cement Works is obliged to comply with the noise limits specified in its Industrial Emissions licence.

9.7 Monitoring

Noise and vibration will continue to be monitored by the EPA in accordance with the IE licence for the Cement Works.

9.8 References

British Standards Institution (BSI), 2009+A1:2014. BS 5228-1: 2009+A1:2014 Code of practice for Noise Vibration Control on Construction and Open Sites - Noise. British Standards Institution, United Kingdom.

British Standards Institution (BSI), 2009+A1:2014. BS 5228-2: 2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Vibration. British Standards Institution, United Kingdom.

EPA, 2012. Guidance Note for Noise: Licence Applications, Surveys and Assessments in relation to Scheduled Activities (NG4). Environmental Protection Agency, Wexford, Ireland.

International Standards Organisation (ISO), 1996:2007: Acoustics – Description, measurement and assessment of environmental noise - Part 1-4. ISO, Geneva, Switzerland.

EPA, 2013. Industrial Emission Licence (Irish Cement Limited, P0030-04), Johnstown Castle Estate, Co. Wexford.

Transport Infrastructure Ireland (TII), 2014. Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes.

Design Manual for Roads and Bridges (DMRB) Volume 11", Section 3, Part 7, HD 213/11, *Noise and Vibration*

Calculation of Road Traffic Noise (CRTN, 1998) Department of Transport - Welsh Office, *HMSO*, London, 1988

A4

ARUP

Arup, 50 Ringsend Road
Dublin 4
Tel +353(0)1 233 4455
www.arup.ie

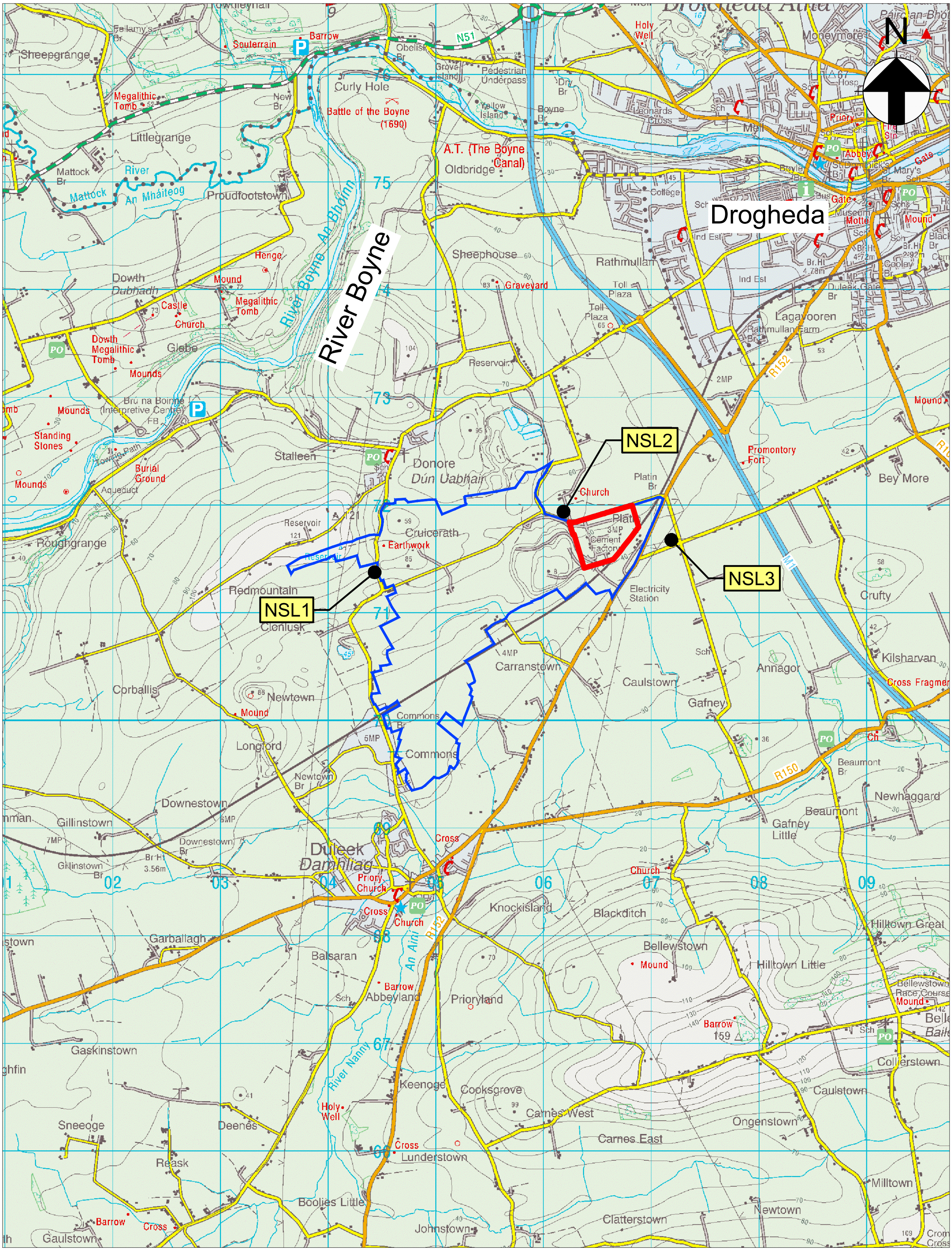
Client Title
Irish Cement Ltd

Irish Cement

Job Title
Irish Cement Alternative Fuels Facility

Figure: 9.1
Noise Monitoring Locations

Scale at A4	1:50000	Date	July 2017
Discipline	Environmental		
Job No	325374-47	Drawing Status	Report
Drawing No	N2004	Issue	R4



\\globaleurope\Dublin\Jobs\D5300-D5399\D5374\4) Drawings\1) Environmental\47\N2004_325374-47_R4.dwg 3 Jul 2017 12:02:00

Do not scale

9 Noise

9.1 Introduction

This chapter assesses the potential effects on the existing noise and vibration environment arising from the Proposed Development during the construction and operational phases.

9.2 Methodology

9.2.1 Environmental Noise Survey Methodology

Noise was measured in the vicinity of the site using a methodology in accordance with ISO 1996: 2007 Acoustics – Description and Measurement of Environmental Noise Parts 1 – 4 and the EPA Guidance Noise for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).

All day time and night-time measurements are expressed as $L_{AeqT,30\ mins}$ as stated in the guidance documentation.

9.2.1.1 Monitoring Locations

Figure 9.1 shows the location of the three monitoring locations where baseline monitoring was undertaken. These locations are referred to as:

- NSL 1 – located on the western boundary of the site;
- NSL 2 – located on the north eastern boundary of the site; and
- NSL 3 – located to the east of the site.

9.2.1.2 Instrumentation

The instrumentation used during the attended daytime and night-time monitoring are presented in Table 9.1 below.

Table 9.1 Instrumentation used during the attended daytime and night-time surveys.

Manufacturer	Instrument Type	Calibrated by	Calibrated reference
Cirrus Research plc.	CR: 171B Sound Level Meter	Cirrus Research plc.	2nd March 2016 Cal. no. 235486
Cirrus Research plc.	CR: 511E Sound Level Calibrator	NSAI National Metrology Lab	9th November 2015 Cal. no. 151990
Bruel & Kjær	2250 Light Sound Level Meter	NSAI National Metrology Lab	14th June 2016 Cal. no. 161998

9.2.1.3 Monitoring Procedure

For measurements at attended locations the microphone was attached to a tripod extending to more than 1.5m above ground level and the meter was set up approximately 3.5meters from reflective surfaces. Measurement locations at residential properties were at the property boundaries. The measurement locations are shown in Figure 9.1.

9.2.1.4 Measurement Parameters

The noise survey results are presented in terms of the following four parameters:

- L_{Aeq} is the equivalent continuous sound level. It can be considered as the 'average' noise level and is used to describe a fluctuating noise in terms of a single noise level over the sample period. It is typically used as a descriptor for ambient noise.

- L_{A10} is the instantaneous maximum sound level measured during the sample period.
- L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.
- L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2x10-5Pa.

At locations where the presence of an audible tone could be disruptive to neighbouring properties, an octave band measurement was completed at the residential dwelling to establish if such pure tones were present.

9.2.2 Assessment Criteria

9.2.2.1 Noise

Platin Cement Works is licenced to operate under Industrial Emissions Licence Register No. P0030-04. The licence states that "the licensee shall carry out a noise survey of the site operations annually. The survey programme shall be undertaken in accordance with the methodology specified in the *'Environmental Noise Survey Guidance Document' as published by the Agency'*. Table 9.2 presents the current noise emission limits for the site for both daytime and night-time to be applied at the nearest sensitive receptors.

Table 9.2 Daytime and Night-time noise emission limits

Daytime dB(A) L_{Aeq} (30 minutes)	Night-time dB(A) L_{Aeq} (30 minutes)
55[Note1]	45[Note1]

Note 1: There shall be no clearly audible loud component or impulsive component in the noise emission from the activity of any noise-sensitive location.

In accordance with the Industrial Emissions Licence, noise monitoring is carried out at three noise sensitive locations (NSL), refer to Figure 9.1. Furthermore, Section 4.5 of the licence states that "*Noise from the installation shall not give rise to sound pressure levels ($L_{Aeq,T}$) measured at Noise Sensitive Locations (NSL) of the installation which exceed the limit value(s) by more than 2dB(A)".*

The "*Design Manual for Roads and Bridges (DMRB) Volume 11*", Section 3, Part 7, HD 213/11, *Noise and Vibration* states that an increase of 25% in total traffic flows is considered approximately equivalent to a +1dB change in noise levels, above which a detailed assessment is required. Where increases in total traffic flow greater than the 25% are predicted to occur, detailed modelling is carried out using *Calculation of Road Traffic Noise* (CRTN, 1998) methodology.

The effect of the Proposed Development is assessed through the application of significance criteria based on predicted changes in noise level due to the development. This was done by calculating the change in L_{Aeq} and categorising the significance (refer to Table 9.3).

Table 9.3: Changes in Noise Level – Significance Criteria

Change in Sound Level (dB)	Subjective Reaction	Significance Level
<3	Inaudible	Imperceptible
4-5	Perceptible	Slight
6-10	Up to doubling of loudness	Moderate
11-15	Over a doubling of loudness	Significant
>16		Profound

9.2.2.2 Vibration

Irish Cement operates to EPA licence limits with regard to vibration during quarry blasting. The licence limits are set out in Table 9.4. In 2016, vibration monitoring was carried out during 56 blasts on site at the quarry. 100% compliance with these licence limits was achieved.

Table 9.4: Maximum Allowable Vibration Levels during blasting

Vibration Limit Value	Air Overpressure Limit Value
12mm/sec	125dB (lin)

9.3 Existing Environment

In order to establish the existing environment, a series of noise surveys were carried out during daytime and night-time at three noise sensitive locations (see Figure 9.1). Daytime and night-time noise measurements were undertaken on the 27th and 28th of July 2016, respectively. Surveys were carried out on a week-day and during time periods which were selected in order to provide a typical snapshot of the existing baseline noise climate.

9.3.1 Weather Report

Stable weather conditions persisted throughout the measurement periods and remained dry and mild throughout. Conditions were overcast throughout both monitoring periods – (July 27th and 28th, 2016). Weather details are presented in Table 9.5.

Table 9.5 Weather as recorded using an anemometer during the day- and night-time monitoring and a brief overview of localised conditions at each location.

Date / Period	Locations	Temp (°C)	Wind speed (m/s)	Comments
27 July 2016 Day	NSL 1	20	1.0	Weather was characterised by overcast, dry with sunny periods at all of the monitoring locations during this period
	NSL 2	21	1.0	
	NSL 3	21	2.0	
27/28 July 2016 Night	NSL 1	14	0.5	Weather was characterised by dry stable conditions at all of the monitoring locations during this period.
	NSL 2	16	0.5	
	NSL 3	14	0.5	

9.3.1.1 NSL 1

The monitoring location was directly adjacent to a residential property in the Cruicerath locality, west of the Cement Works.

Day-time (27th July, 2016, 11:30-17:30):
Plant noise was not audible. The immediate soundscape was typically rural in character and at times farm machinery operating in nearby fields was audible as background noise. Noise due to traffic passing at the junction was sporadic and effectively increased overall noise levels during the daytime period.

Night-time (28th July, 2016, 00:00-00:30):
The plant was not audible during the night-time period. General noise levels were registering extremely low on the sound level meter and therefore it was considered unnecessary to continue measuring noise during this period. The results from a single measurement taken at this time clearly demonstrate this.

9.3.1.2 NSL 2

The meter was set up at a residential property to the north/northwest of the Cement Works where attended noise measurements were made during the daytime period. During the night-time period attended measurements were made to the rear of the property. An additional meter was put in place on site to monitor continuous noise levels over the night-time period.

Day-time (27th July, 2016, 11:00-16:30):
Plant noise was audible as a distinctive steady state noise character throughout the monitoring period. Such noise characters may be associated with cement mill 3 and Kiln 3 which were operating during this period.

Various contributory noise sources relating to activity at the adjacent farmyard were identified as follows: grain drying process produced a thrashing-like cyclical noise character; intermittent sources included farm machinery and engine and reverse beacons which were intermittent in character.

Other contributory noise sources were associated with general movements of people around the property.

Night-time[1] (27th - 28th July, 2016, 23:00-02:30):
The noise levels were associated with that of an operating plant and distant motorway (M1) traffic was a noted contributor to the measured noise level values.

9.3.1.3 NSL 3

The meter was set up adjacent to a residential property, east of the Cement Works.

Day-time (27th July, 2016, 12:00-18:00):
Daytime noise levels were dominated by traffic passing across the junction at this monitoring location. Heavy vehicles added to maximum noise levels.

Plant noise was clearly audible; multiple noise characters described as a drone undertone which were steady state and constant throughout the daytime monitoring period. Intermittent internal plant noise associated with vehicles and forklifts were also audible.

Such noise characters may be associated with Cement Mill 3 and Kiln 3 which were operating during this period. Noise intensities arising from the plant were noted as constant throughout the daytime period; hence remained unaffected during the final daytime measurement when all four mills were operating.

Night-time (27th - 28th July, 2016, 23:00-01:00):
Plant noise was clearly audible in comparison to the daytime period. Noise characters were as described during the daytime period. Local traffic had reduced significantly since the daytime period. Traffic associated with the M1 motorway was clearly audible as a constant source of background noise.

9.3.2 Measurement Results

9.3.2.1 Tonal Noise

With regard to tonal or impulsive noise, the findings from one third octave band analysis results indicate there was no tonal or impulsive noise detected within the range specified as according to NG4 Guidelines. Level differences must be greater than or equal to the following values in both adjacent one-third octave bands:

- 15dB in low-frequency one-third-octave bands (25 Hz to 125 Hz)
- 8dB in middle-frequency one-third-octave bands (160 Hz to 400 Hz)
- 5dB in high-frequency one-third-octave bands (500 Hz to 10 kHz)

9.3.2.2 NSL 1

The results from the noise survey carried out at NSL1 are presented in Table 9.6. The daytime and night-time noise results show resultant noise levels at this location are not attributable to operations at Platin Cement Works, with traffic passing on the road from Duleek to is the predominant source of noise during daytime hours.

During the night-time measurements the plant was not audible. Night-time noise levels at this location are shown to be very low.

[1] Noise meter was set up to continuously monitor night-time noise levels at (NSL 2).

Results show that NSL 1 is not impacted by noise arising from operations at Platin Cement Works, and therefore, an assessment of tonal noise was not required.

Table 9.6: Results of Noise Survey for Day and Night-time periods at NSL 1

Location NSL1			Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{10}	L_{90}
Daytime	27July 2016	11:54-12:26	58	82	34	54	40
		14:13-14:43	60	86	37	56	40
		16:51-17:21	62	90	33	58	40
Night-time	28 July 2016	00:06-00:36	37	63	18	31	21

9.3.2.3 NSL 2

The results from the noise survey carried out at NSL2 are presented in Table 9.7. The setting is rural in character, with the main contributory source of noise associated with operations at the adjacent farm. However, the plant is clearly audible above other daytime noise.

The results show that in the absence of farm activities noise levels are slightly reduced during the night-time period; hence noise levels at this location may be directly attributed to plant noise which is the dominant source of noise during the night-time period in particular. Noise levels are shown to be in compliance with the daytime limit (55dB L_{Aeq}). With regard to night-time levels, a result of 47dBLAeq would indicate compliance when the tolerance of +/- 2dB is factored in.

Results from 1:3 Octave Band Analysis reveal that no element of tonal or impulsive noise is present. This validates the subjective description of the plant noise as being steady state / constant in character.

Table 9.7 Results of Noise Survey for Day and Night-time periods NSL 2

Location NSL2			Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
			LA_{eq}	L_{Amax}	L_{Amin}	L_{10}	L_{90}
Daytime	27 July 2016	11:05-11:35	51	67	46	52	48
		13:25-13:55	50	62	43	53	46
		16:09-16:39	48	72	43	49	45
Night-time	27 July 2016	23:05-23:35	47	50	45	48	46
	28 July 2016	01:35-02:05	47	51	45	48	46

9.3.2.4 NSL 3

The results from the noise survey carried out at NSL3 are presented in Table 9.8. While traffic is a major source of daytime noise at this location, the plant is clearly audible. In such a scenario the L_{A90} parameter may be used to determine the contribution of plant-related noise. Results infer that the background (L_{A90}) levels are in compliance with the daytime limit (55dBA).

During the night-time period when traffic is at a minimum, results show a significant reduction in noise levels. However plant noise was noted as dominant and intense during this period; factoring in the tolerance of +/-2dB a result of 47dB LA90 would indicate compliance.

Results from 1:3 Octave Band Analysis reveal that no element of tonal or impulsive noise is present. This validates the subjective description of the plant noise as being steady state / constant in character.

Table 9.8 Results of Noise Survey for Day and Night-time periods at NSL 3

Location NSL3			Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{10}	L_{90}
Daytime	27 July 2016	12:40-13:10	57	78	45	57	48
		15:07-15:37	59	80	44	56	47
		17:36-18:04	59	82	44	59	49

Location NSL3			Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{10}	L_{90}
Night-time	27 July 2016	23:27-23:53	54	78	45	52	47
	28 July 2016	00:50-01:20	51	74	46	51	47

9.4 Potential Effects of the Proposed Development

9.4.1 'Do-Nothing' Scenario

The do-nothing scenario would be the same as described in Section 9.3 Existing Environment.

9.4.2 Construction Phase

The construction phase of the Proposed Development will involve minimal site demolition works, site clearance, excavation and the construction of buildings and structures associated with the Proposed Development. A variety of items of mobile plant will be in use, such as excavators, breakers, lifting equipment, dumper trucks, compressors, generators and pile drivers. There will be vehicular movements to and from the site that will make use of the existing roads and site access points.

No traffic routes are predicted to experience increases of more than 25% in total traffic flows during the construction phase, therefore, no detailed assessment is required (DMRB Guidelines), refer to Chapter 12 of the EIA Report.

9.4.3 Operational Phase

No major new noise sources are proposed as part of the new development. The development mainly consists of the provision of buildings for the storage, handling and introduction of additional alternative fuels and raw materials. Additional conveyors will also be provided to transfer fuels and materials to Kilns 2 and 3. These conveyors, of which there are similar structures on site already, will be enclosed and are not likely to generate significant noise.

The EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) 2012 specifies the following noise limits:

- Daytime (07:00 to 19:00hrs) – 55dB $L_{Ar,T}$;
- Evening (19:00 to 23:00hrs) – 50dB $L_{Ar,T}$;
- Nighttime (23:00 to 07:00hrs) – 45dB $L_{Aeq,T}$.

It is likely that these limits will be applied to a new licence that will be issued for Plant Cement Works as part of an Industrial Emissions licence review. ICL will be obliged to ensure that these limits are complied with. In addition, ICL will ensure that the proposed development will be inaudible at sensitive receptors resulting in an imperceptible impact (refer to Table 9.3).

No traffic routes are predicted to experience increases of more than 25% in total traffic flows during the operational phase and therefore no detailed assessment is required as per the DMRB Guidelines. In fact the maximum predicted increase in traffic is significantly below the 25% limit - refer to Chapter 12 of the EIA Report.

9.4.4 Worst Case Scenario

The assessment outlined in Section 9.4 is an assessment of the worst-case scenario.

9.4.5 Cumulative Effects

The cumulative effects have been considered through the completion of baseline monitoring which incorporates all existing noise sources, such as nearby roads and other industrial facilities *e.g.* Carranstown Waste to Energy Facility.

9.5 Mitigation Measures

9.5.1 Construction Phase

The following text outlines typical measures that will be employed by the contractor in order to minimise the potential for noise and vibration disturbance in the surrounding area and to ensure compliance with the construction noise limits outlined in Tables 9.2 and 9.4 respectively.

BS 5228 (2009+A1:2014) *Code of practice for noise and vibration control on construction and open sites. Noise:* provides guidance on the implementation of measures to reduce the effect of construction noise and vibration.

The measures to be implemented include, but are not limited to:

- Selection of plant/location of plant
  Prior to deployment of construction plant on site, an assessment of the noise characteristics of each of the individual plant items in terms of noise and vibration emissions will be undertaken. Where possible, plant which will have the least effect in term of noise will be selected. In addition, plant will only be left running during works and will be switched off at all other times.

- Hours of work
  All construction related works, other than emergency works, security and pumping out of excavations will be carried out during normal working hours.

9.6 Residual Effects

No residual noise and vibration effects are predicted as a result of the Proposed Development as Platin Cement Works is obliged to comply with the noise limits specified in its Industrial Emissions licence.

9.7 Monitoring

Noise and vibration will continue to be monitored by the EPA in accordance with the IE licence for the Cement Works.

9.8 References

British Standards Institution (BSI), 2009+A1:2014. BS 5228-1: 2009+A1:2014 Code of practice for Noise Vibration Control on Construction and Open Sites - Noise. British Standards Institution, United Kingdom.

British Standards Institution (BSI), 2009+A1:2014. BS 5228-2: 2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Vibration. British Standards Institution, United Kingdom.

EPA, 2012. Guidance Note for Noise: Licence Applications, Surveys and Assessments in relation to Scheduled Activities (NG4). Environmental Protection Agency, Wexford, Ireland.

International Standards Organisation (ISO), 1996:2007: Acoustics – Description, measurement and assessment of environmental noise - Part 1-4. ISO, Geneva, Switzerland.

EPA, 2013. Industrial Emission Licence (Irish Cement Limited, P0030-04), Johnstown Castle Estate, Co. Wexford.

Transport Infrastructure Ireland (TII), 2014. Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes.

Design Manual for Roads and Bridges (DMRB) Volume 11", Section 3, Part 7, HD 213/11, *Noise and Vibration*

Calculation of Road Traffic Noise (CRTN, 1998) Department of Transport - Welsh Office, *HMSO*, London, 1988

A4

ARUP

Arup, 50 Ringsend Road
Dublin 4
Tel +353(0)1 233 4455
www.arup.ie

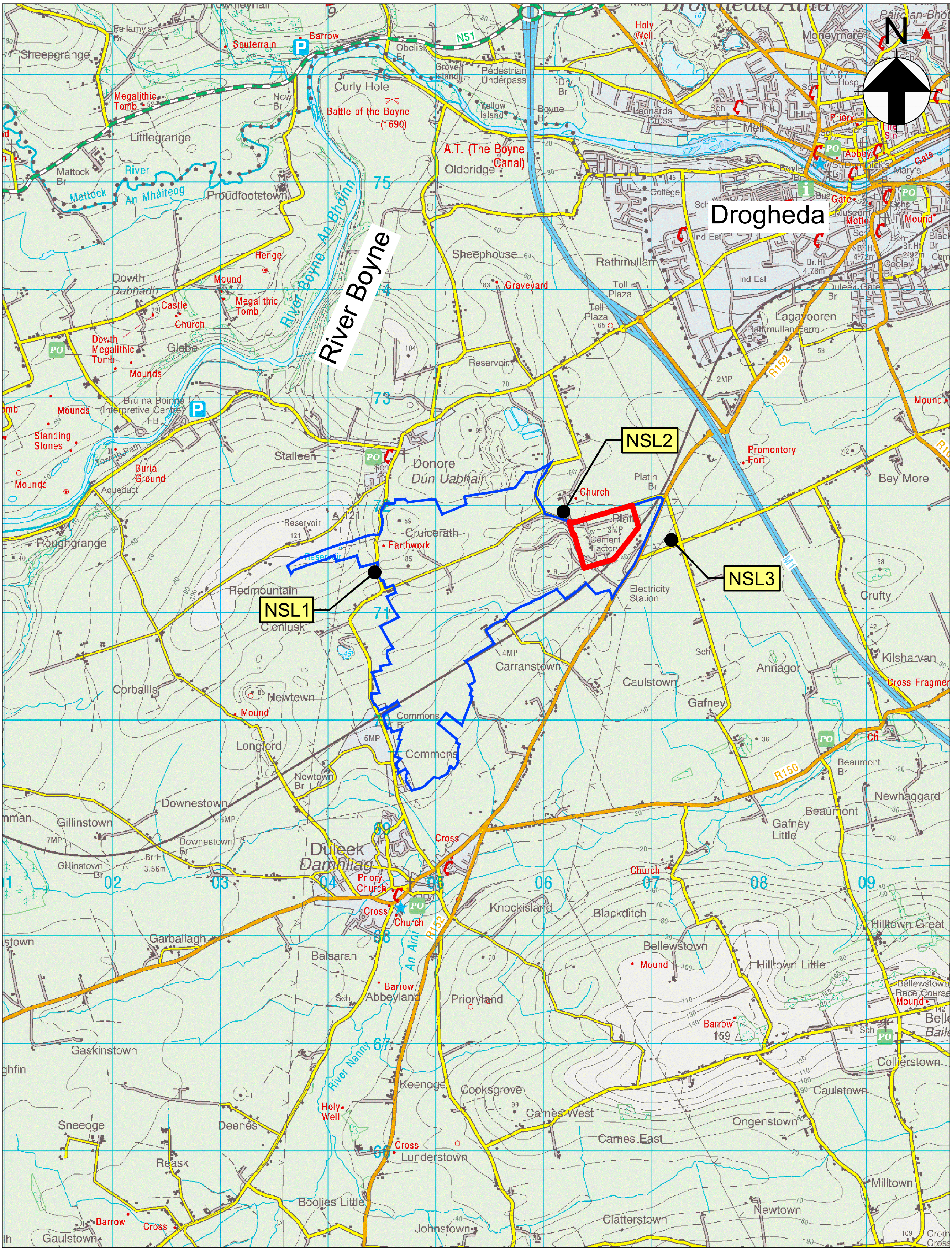
Client Title: Irish Cement Ltd

Irish Cement

Job Title: Irish Cement Alternative Fuels Facility

Figure: 9.1
Noise Monitoring Locations

Scale at A4	1:50000	Date	July 2017
Discipline	Environmental		
Job No	325374-47	Drawing Status	Report
Drawing No	N2004	Issue	R4



Do not scale

\\globaleurope\Dublin\Jobs\D5300-D5399\D5374\4) Drawings\1) Environmental\47\N2004_325374-47_R4.dwg 3 Jul 2017 12:02:00

10 Landscape and Visual Assessment

10.1 Introduction

This Chapter assesses the landscape and visual effects of the Proposed Development which will facilitate further replacement of fossil fuels with alternative fuels and will facilitate allow for the use of alternative raw materials at Platin Cement Works, Duleek, County Meath. The Proposed Development includes for the provision of a number of new buildings and structures with associated conveyors and mechanical equipment as detailed in Chapter 3.

The assessment involved reviewing plans of the existing site and plans, elevations and sections of the Proposed Development; reviewing various statutory and other publications and visits to the site and its environs.

A series of Photomontages have been prepared to assist in illustrating the physical and visual nature of the Proposed Development within the context of the existing landscape and visual setting.

10.2 Methodology

The assessment is made with regard to the sensitivity of the landscape and its vulnerability to change, taking consideration of the location of visual receptors relative to the Proposed Development.

The methodology used is based on the Guidelines on Information to be contained in Environmental Impact Statements (2002) and the Advice Notes on Current Practice in the preparation of Environmental Impact Statements (2003) and also has regard to the revised Consultation Draft Guidelines on Information to be contained in the Environmental Impact Statements (2015) and the Consultation Draft Advice Notes for Preparing Environmental Impact Statements (2015).

Landscape has two separate but closely related aspects. The first is visual effect, i.e. the extent to which a new development can be seen in the landscape. The second is effect on landscape character, i.e. effect on responses that are felt towards the landscape, drawing on the appearance of the land, including shape, form and colour, and the interaction of these elements to create specific patterns and pictures that are distinctive to particular localities.

Visual effects are defined under visual intrusion and/or visual obstruction where:

- visual intrusion involves effect on a view but avoiding blocking thereof, and
- visual obstruction involves effect on a view with at least some degree of blocking.

The character of the existing landscape setting is considered taking account of the various natural and man-made features, such as topography, landform, land-use, vegetation, built environment *etc*. together with the visibility of and the views to and from the landscape. In addition aspects relating to the landscape planning environment are considered on a national, regional and local basis.

10.2.1 Significant Assessment Criteria

The significance criteria used for the landscape (and visual) impact assessment are based on those given in the *Guidelines on the information to be contained in Environmental Impact Statements (2002)* as set out in Table 10.1 Significance Criteria. The effect of the Proposed Development is assessed at two distinct stages:

Construction Stage: effect arising during the period of initial site setup works up to the opening of the facility to normal operation, and

Operation Stage: effect arising during the period of normal operation of the facility

The ratings may have negative, neutral or positive applications where:

- Positive effect – A change that improves the quality of the environment.
- Neutral effect – A change that does not affect the quality of the environment.

- Negative effect – A change that reduces the quality of the environment.

Terms relating to the duration of effects are as described in the EPA Guidelines as:

- Temporary Effect - lasting one year or less
- Short-term Effect - lasting one to seven years
- Medium-term Effect - lasting seven to fifteen years
- Long-term Effect - lasting fifteen to sixty years
- Permanent Effect - lasting over sixty years

Table 10.1 Significance Criteria

Level of Effect	Definition
Imperceptible	An effect capable of measurement but without noticeable consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with the existing and emerging trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

10.3 Existing Environment

10.3.1 Context

Platin Cement Works is situated immediately west / northwest of the R152 Road, c.2km north of Duleek and c.1km southwest of the southwestern edge of Drogheda. The northern boundary of the Cement Works is defined by Platin County Road (CR311) and Platin limestone quarry is located to the west of the Works. A section of the Drogheda - Navan railway runs through the Cement Works (refer Figure 10.1 Site Context). Existing site levels within the Works fall gradually north to south from c.60 above ordnance datum (AOD) at Platin County Road to c.40m along the R152.

Cement manufacture has occured on this site since 1972 and over the intervening years the plant has continually developed to meet on-going market demands and to take on board improvements in technology and sustainability. Today the Cement Works includes a wide variety of large buildings and structures related to cement production. The tallest structures are the existing kiln stacks rising to 145m AOD and 153m AOD and the Kiln 3 Cyclone Preheater Tower at 168m AOD. While the Cement Works is the most prominent and significant built structure in the area, the nearby Carranstown Waste to Energy Facility is also visually significant with a stack rising to 95m AOD.

The landscape surrounding the cement works is typically rural, and pastoral agricultural land-uses predominate. Within this landscape, the solid vertical mass of the existing Cement Works is a prominent visual feature and more immediately it forms the dominant visual element in the landscape, particularly when viewed from the east and from elevated lands to the south. The adjoining quarry is not especially visible from surrounding areas.

While visually prominent, the Cement Works tend to move in and out of views when travelling along local roads. This glimpsing effect is particularly evident travelling either north or south along the R152 Road outside of the immediate zone of primary visibility. However, the facility is particularly dominant from local roads east of the site and remains in view for longer from these more open areas. The Cement Works are also visible from sections of the M1 Motorway and depending on topography and intervening vegetation is also visible from further field.

The landscape immediately surrounding the facility is gently rolling typically between 50m and 70m AOD. However in a wider context, visually prominent ridges include Bellewstown Ridge (140m+ AOD) to the south / southeast; Red Mountain (121m AOD) to the west, and Donore Hill (104m AOD) to the northwest. Red Mountain and Donore Hill are important in screening views from the Boyne Valley, including from Brú na Bóinne World Heritage Site and from

the principal sites of Newgrange, Dowth and Knowth which are all located over 3km to the west / northwest of Platin Cement Works.

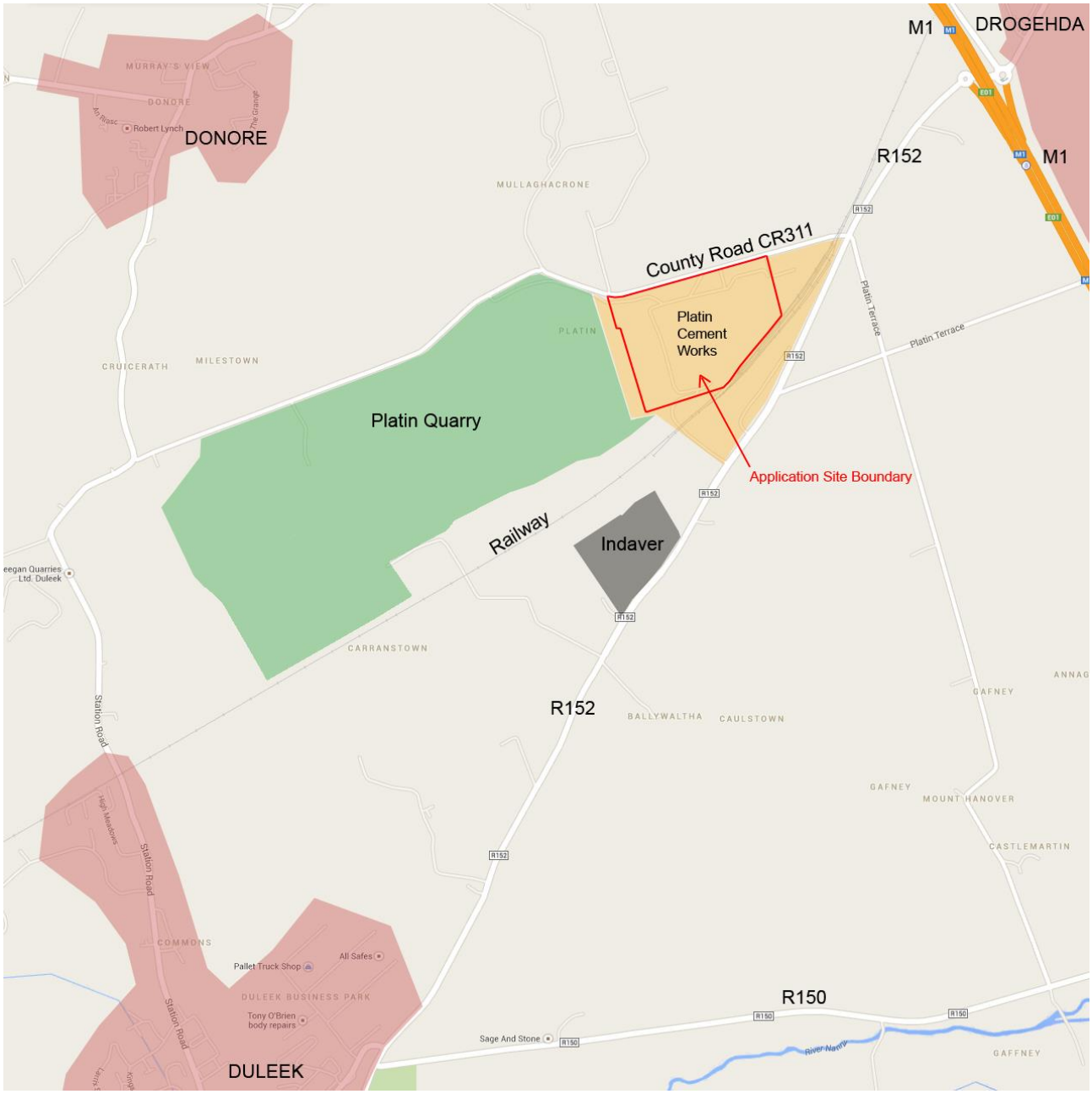


Figure 10.1: Context of Platin Cement Works and the Application Site for the Proposed Development

Residential development is typically clustered and dispersed along local roads and has notably expanded around Drogheda, and the smaller settlements of Donore and Duleek. Such development is particularly prominent along Station Road (Duleek to Donore local road) located west / southwest of the Cement Works and the Quarry, as well as along the R152, south of the Cement Works. More dispersed residential development also occurs along local roads in the landscape east of the R152.

Over the past 30 years, extensive landscaping has been carried out in and around the Cement Works. As it continues to mature, the planting has gradually 'softened' the appearance of the Works and has assisted in visually distancing the structures. The effect is more noticeable at proximity, *e.g.* from along the R152 Drogheda-Duleek Road, and is enhanced where the planting is viewed in combination with intervening tree-lined hedgerows.

The application site for the Proposed Development is located within the site of the existing developed Cement Works and for the most part comprises existing developed areas, including hard-standing and areas used for storage of materials. The majority of the new structures are to be located to the west and north of the Works, with other structures located more centrally within the Cement Works.

10.3.2 Landscape Planning Context

Meath County Development Plan 2013-2019 identifies four landscape character types within the county. The objective of the Landscape Character Assessment is to identify the value, importance and sensitivity of each landscape character type and the potential capacity to accommodate development.

The western part of Platin, comprising the limestone quarry, is located within a lowland landscape described as the '*Central Lowlands.'*(Character Area 6). The Cement Works, located immediately east of the quarry, is located at the western end of a *'Coastal Landscape'* (Character Area 7) described as the 'coastal plains'. The landscape character assessment places a value on each landscape character area ranging from exceptional to low. The *'Central Lowlands'* has a high value, is of regional importance and medium sensitivity. The Coastal Landscape has a moderate value, and is of high sensitivity and regional importance.

More sensitive landscape areas are located at some distance from the site. The Boyne Valley (Character Area 5), located some 3km to the northwest, is shown as a landscape of Exceptional Value, of International Importance and high sensitivity. Bellewstown Ridge 2km to the southeast of the site is located within Landscape Character Area 9 *'Hills and Upland Areas.'* This area comprises the East Meath Farmland and is described as Very High Value, Regional Importance and medium sensitivity.

10.3.3 Cultural Heritage - Brú na Bóinne World Heritage Site

The UNESCO World Heritage Site of Brú na Bóinne is one of the most significant sites of archaeological and cultural heritage in the country. It is the objective of Meath County Council to protect and enhance the Outstanding Universal Value of the cultural landscape in the UNESCO World Heritage Site and to ensure that its integrity, authenticity and significance is not adversely affected by cumulative inappropriate change and development, and to enhance views within and adjacent to the site.

Due to the Outstanding Universal Value and international significance of the area of the World Heritage Site, the site contains a designated core as well as a surrounding buffer zone as identified on Map 9.1 of the CDP. The core area extends to about 780 hectares, while the total area, including the buffer zone, is c.3,300 hectares. It is the policy of Meath County Council to refuse permission for new development within the core area of Brú na Bóinne and to permit only small-scale development in the buffer zone with appropriate planning conditions.

Platin Cement Works and its associated Quarry are located outside of the designated core and outside of the buffer area associated with Brú na Bóinne – refer to Figure 10.2. The Cement Works, and the site for the Proposed Development is located over three kilometres from the core area and over 1.5 kilometres from the boundary of the buffer zone. Upper aspects of the existing Cement Works are visible from the World Heritage Site, and to a greater or lesser degree, in existing views from the 3 principal sites of Newgrange, Knowth and Dowth. Existing views from these 3 sites are included in the Photomontages (Appendix 10-1) at Figures 1.5.1, 1.6.1 and 1.7.1 respectively.

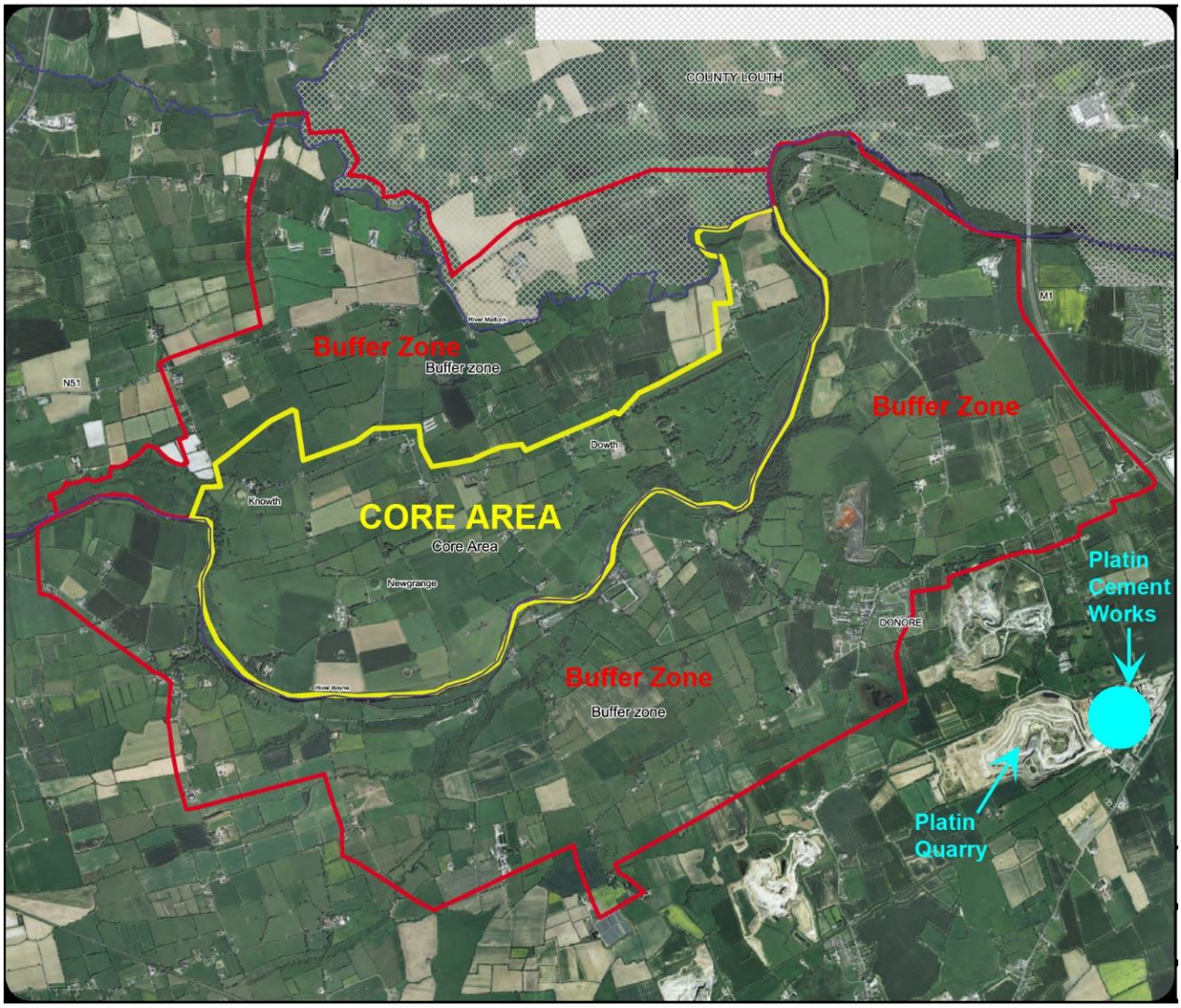


Figure 10.2 Site Location in relation to Brú na Bóinne (Annotated Extract of Figure 9.1 Meath CDP 2013-2019)

10.3.4 Views and Prospects

Meath County Development Plan, 2013-2019 identifies 94 separate protected views and Prospects within the county (Refer to Map 9.5.1 and Appendix 12 of the County Development Plan). In assessing the views and prospects, the development notes that the purpose of the listings is not to prohibit appropriate development within these views. Rather such development, where permitted, should not hinder or obstruct these views and prospects, and should be designed and located so as not to be intrusive in the landscape as seen from these vantage points.

The County Development Plan identifies 14 views associated with the Brú na Bóinne World Heritage Site, namely View No. 59 and Nos.87a to 93c inclusive. Being panoramic in nature, six of these views already take in Platin Cement Works – these are View 59 (from Knowth), Views 87a to d (from Newgrange) and View 88 (from Dowth). As previously noted, upper aspects of the existing Cement Works are visible to a greater or lesser degree in each view and the description of the views, as listed in Appendix 12 of the Meath County Development Plan, notes each as:

> *Elevated panoramic View across the landscape within the World Heritage Site of Brú na Bóinne. Note that this is a working landscape containing agricultural structures, dwellings, infrastructure.*

While upper aspects of the existing Cement Works are visible from the core area, lower aspects of the Works are screened by existing topography. Existing views from Newgrange, Knowth and Dowth are included in the Photomontages (Appendix 10-1) at Figures 1.5.1, 1.6.1 and 1.7.1 respectively.

The remaining view taking in aspects of the Cement Works, is View No. 66 from the county road between Duleek and Carnes East. This is a panoramic view from southwest to north. The view, in which the Cement Works is visible, is described as being already compromised by industry and urbanisation. Table 10.2 below identifies all of the views and prospects which pertain to the area within which the Cement Works and the Proposed Development is located and identifies the significance of each view.

Table 10.2 Views & Prospects from Meath County Development Plan.

View No.	Location	Direction	Description	Significance
59	Knowth Tumulus	Panorama	Panoramic views in all directions from top of Knowth tumulus. Extensive views across a working countryside.	International
88	Dowth Passage Tomb	Panorama	Elevated panoramic View across the landscape within the World Heritage Site of Brú na Bóinne. Note that this is a working landscape containing agricultural structures, dwellings, Infrastructure.	International
87	Newgrange Passage Tomb	East, West, North and South	Elevated panoramic View across the landscape within the World Heritage Site of Brú na Bóinne. Note that this is a working landscape containing agricultural structures, dwellings, and infrastructure.	International
66	County road between Duleek and Carnes East	South West, West, Northwest and North	Panoramic views from south west to north. South West - Very distant horizons visible. Views to north and west - very compromised by Industry and urbanisation.	Regional

Source: Extract from Appendix 12 Protected Views and Prospects, Meath County Development Plan, 2013-2019.

In order to assess the appropriateness of development, Objective CH OBJ 3 encourages pre-planning consultation with applicants regarding the siting and design of developments affecting the UNESCO World Heritage Site of Brú na Bóinne, and the scope of any necessary impact assessments. Pre-planning consultation was undertaken with Meath County Council and Photomontages as requested, demonstrating the visual effect from various sites within the World Heritage Site, are included at Appendix 10.1 to this EIA Report.

10.3.5 Other Landscape Planning Aspects

There are no trees or woodlands identified for Tree Preservation on or surrounding the site. Map 18 'Tourist Attractions' of the County Development Plan identifies a number of walking, cycling routes, driving routes and tourist attractions within the vicinity of the site. The nearest cycle track runs some 1.5-2km to the south of Platin, along the R150 from Duleek to the coast. There are driving routes to the northwest around Donore and a way-marked route along the River Boyne. There are two tourist attractions on Bellewstown Ridge. Brú na Bóinne, including Newgrange, Knowth and Dowth and its associated visitors centre, the River Boyne in general and the site of the Battle of the Boyne are major tourist attractions in the wider area. Other than as discussed under Brú na Bóinne (section 10.3.3) and Views and Prospects (Section 10.3.4) above, the Cement Works do not impinge on these aspects.

10.3.6 Summary

Platin Cement Works and associated limestone quarry is a long-standing feature of the local environment having operated on this site since 1972. The Cement Works is dominated by large-scale structures of significant bulk and height and as such, is a prominent feature within its local context and forms the dominant visual reference, especially when viewed from the east. Extensive landscape works and planting has taken place around the works and this is important in providing visual buffering and anchoring of the Works from nearby views.

Upper aspects of the existing Cement Works are visible from within Brú na Bóinne World Heritage Site and from within protected views and prospects from this cultural heritage site. Lower aspects of the Works are screened by intervening topography and or vegetation.

10.4 Characteristics of the Proposed Development

The application seeks to allow for further replacement of fossil fuels with alternative fuels and to also allow for the use of alternative raw materials at Platin Cement Works, Duleek, County Meath. The development includes for the provision of a number of new buildings, structures, silos and associated conveying components as are set out in detail in Chapter 3 of this EIA Report.

The proposed main buildings, while large in plan area, are relatively low in height, being typically between c.8m and c.16m in height. The taller structures associated with the Proposed Development are silos of between c.9m and c.27m in height and materials handling / transfer stations and associated transfer conveyors, which are of between c.30m and c.40m in height. The proposed By-Pass Filter for Kiln 2, which has an overall maximum height of c.46m, is the tallest proposed structure on site. However, the tallest component of the filter is a narrow cooling tower, and the main structure itself is less than 25m in height.

Given the existing built context and the many structures that comprise the existing facility, the proposed buildings and structures are significantly lower than many other already on site. As noted, the existing stacks rise to 145m and 153m (AOD) and the Cyclone Preheater Tower rises to 168m AOD. In addition, the vast bulk of existing structures already rise to over 40 to 50m in height and the Proposed Development will not be particularly visible or prominent from outside of the Cement Works itself.

The external treatment of all of the proposed components on the site will comprise a mixture of exposed cast concrete, metal steelwork and corrugated sheeting to remain in keeping with the finishes on existing structures.

10.5 Predicted Effects of the Proposed Development

10.5.1 Visual Effects

For the most part, the Proposed Development will not be visible outside of the Cement Works. In limited situations where the Proposed Development is visible it will be viewed against the background of the existing built environment of the Cement Works without giving rise to any additional visual effect.

(References to Photomontage Figures and Images in the following text are to those included in Appendix 10.1 to this EIA Report.)

A glimpse view of the Cement Works is available (through a farm gate) from the county road north of the Cement Works (refer to Location 1, Figure 1 and Figure 1.1.1 of the Photomontages – Appendix 10.1). For illustrative purposes, the full extent of the Proposed Development is outlined in red on Photomontage Figure 1.1.2; however in effect, only a small part of a proposed conveyor and the upper aspect of the proposed Kiln 2 Bypass Filter will be visible in reality. Both are viewed against the existing mass of the Cement Works and have no visual effect – see Photomontage Figure 1.1.3.

The most open views of the existing Cement Works are from the local road (Whiterock Road) running east west between the R152 and the M1 Motorway overbridge. Typical views from this location are shown in Photomontage 2 (Figure 1.2.1). For illustrative and referencing purposes, the full extent of the Proposed Development is outlined in red on Photomontage Figure 1.2.2; however, no aspect of the Proposed Development is visible – screened as it is by the existing development on the Cement Works – see Photomontage Figure 1.2.3.

Representative views of the existing Cement Works from the R152 are shown in Photomontages 3 and 4 (Figures 1.3.1 & 1.4.1). These views also illustrate the screening nature of intervening hedgerows and landscaping and other development when the Cement Works are viewed from nearby locations. Again for illustrative and referencing purposes, the full extent of the Proposed Development is outlined in red on Photomontage Figures 1.3.2 & 1.4.2; however, no aspect of the Proposed Development is visible – screened as it is by intervening foreground and the existing development on the Cement Works – see Photomontage Figures 1.3.3 & 1.4.3.

Likewise the Proposed Development will have no visual effect from Brú na Bóinne. While upper aspects of the existing Cement Works are visible from the World Heritage Site, the Proposed Development is set at a lower level and screened by intervening topography. The effect of this screening is clearly illustrated in the Photomontage Views from Newgrange, Knowth and Dowth, and particularly in the view analysis sheets (Figures 1.5.3, 1.6.3 and 1.7.3 respectively), which provides a two-times magnified version of the existing and proposed Photomontage for each viewpoint. For illustrative and referencing purposes, the full extent of the Proposed Development, which will not be visible in reality, is outlined in red on Photomontage Figures 1.5.2, 1.6.2 & 1.7.2.

Photomontage View 8 illustrates the existing view (Photomontage Figure 1.8.1) and the minimal visibility of the Proposed Development (Photomontage Figures 1.8.2 & 1.8.3) as viewed from the elevated vantage of Bellewstown Ridge (Protected View 66).

Photomontage View 9 illustrates an existing open view east from the Duleek to Donore local road (Photomontage Figure 1.9.1). While the existing Works are openly visible, the Proposed Development (Photomontage Figures 1.9.2 & 1.9.3) is visually integrated within the background context of the existing Cement Works.

In summary, visual effects arising from the Proposed Development will be either slight or imperceptible. While the existing Cement Works may be openly visible or glimpsed from particular viewpoints, the Proposed Development will tend to be either entirely screened or backgrounded by existing development.

10.5.2 Effects on Landscape Planning Context

The Proposed Development would have a neutral effect on landscape planning aspects. The existing and proposed development site is located within a landscape defined as 'Coastal' in the County Development Plan. This landscape has a moderate value, high sensitivity and is of regional importance - however the site is located at the western (*i.e.* inland) limit of this landscape area. However, the Proposed Development does not add to the prominence or effect of the existing development and would have no adverse effect on the landscape of the area.

The Proposed Development would have no effect on preservation objectives for trees and woodland. As discussed under Visual Effects above (Section 10.5.1), the Proposed Development would have no negative effect on views and prospects as listed in the Development Plan. Potential for the Proposed Development to effect views from Brú na Bóinne has also been discussed above – and no effect arises.

Again when assessed within the context of existing development, the Proposed Development would have a negligible or imperceptible effect on landscape planning aspects.

10.5.3 Cumulative Effects

The Proposed Development, which will be sited within the developed footprint of an existing industrial cement manufacturing facility, has little or no landscape or visual effect outside of the boundary of the Cement Works and as such the Proposed Development will not give rise to cumulative effects.

10.5.4 Summary

In summary, the Proposed Development would not give rise to additional landscape or visual effects. The scale and nature of the change is small and for the most part the proposed buildings, structures *etc*. are entirely screened by existing development within the Cement Works. Potential for viewing elements of the Proposed Development is limited and where such views arise the development is also backgrounded by existing development.

10.6 Mitigation Measures

Over the course of the last twenty years Irish Cement has undertaken extensive landscape and planting works, particularly around the Cement Works and more recently around the adjoining limestone quarry. These landscaping works have increasingly provided a 'strongly landscaped' perspective to nearer views of the Works.

Landscape works to date at Platin Cement Works have included the planting of over 65,000 trees and shrubs on c.12 hectares. Along with these works, smaller scale landscape works were also undertaken at the entrances and around the offices. As part of their on-going environmental management programme Irish Cement continues to review and wherever possible augment and enhance the landscape and planting at Platin.

As part of the Proposed Development, it is proposed to under-plant and inter-plant the existing landscape edge along the northern boundary of the site with Platin County Road. This will help in increasing the density and existing screening provided along this road.

10.7 Residual Effect

The construction of the Proposed Development will have no perceptible landscape and visual effect. Given the nature and mass of existing structures on the site the Proposed Development, representing comparatively small scale additions, will not result in any residual adverse landscape or visual effects.

10.8 Monitoring

No monitoring is required for landscape and visual aspects. Proposed planting along the local road to the north of the site will be maintained and replaced as appropriate, as part of the existing landscape maintenance programme for the Cement Works.

10.9 References

Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), 2003, Environmental Protection Agency.

Guidelines on Information To Be Contained In Environmental Impact Statements, 2002, Environmental Protection Agency.

Revised (Consultation Draft) Advice Notes for Preparing Environmental Impact Statements, 2015, Environmental Protection Agency.

Revised Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports, May 2017, Environmental Protection Agency.

Meath County Development Plan, 2013-2019

Meath County Development Plan 2013-2019 Appendix 7: Landscape Character Assessment

Meath County Development Plan 2013-2019 Appendix 12: Views and Prospects

11 Cultural Heritage

11.1 Introduction

This chapter presents a statement of the known or potential cultural heritage, including architectural and archaeological resources on the site its context and an assessment of the potential of the Proposed Development for effect on these resources. This baseline includes a collation of existing written and graphic information in order to identify the likely context, character, significance and sensitivity of the known or potential cultural heritage including the architectural and archaeological resource.

11.2 Methodology

The study involved detailed investigation of the cultural heritage including the archaeological, architectural and historical background of the application area, the landholding and the surrounding area of the Proposed Development. The application site is indicated in Figure 11.1 and the overall study area for this assessment is presented on Figure 11.2. This area was examined using information from:

- The Record of Monuments and Places (RMP) of County Meath;
- The Meath County Development Plan 2013-2019;
- Topographical and Correspondence files and finds list of the National Museum of Ireland;
- Aerial photographs;
- Excavations reports;
- Cartographic sources; and
- Documentary sources.

A field assessment was carried out on the 22nd of July 2015 and reviewed again on the 29th March 2017 to identify and assess any known archaeological sites and previously unrecorded features and possible finds within the application area.

No difficulties were encountered in the compilation of the information.

An impact assessment and mitigation strategy has also been prepared. The impact assessment undertaken outlines the potential adverse impacts that the development may have on the cultural resource, while the mitigation strategy has been designed to avoid, reduce or offset such adverse impacts.

11.3 Existing Environment

The application area is situated in the townland of Platin in east County Meath, circa 2.5km to the northeast of the town of Duleek and directly to the northwest of the R152 Drogheda to Kilmoon Cross Regional Road. The Cement Works lie between 40 and 60m above ordnance datum (AOD), with a gradual fall from north to south. The soil of the area is generally a grey brown podzolic developed from Irish Sea till with limestone and shale and the bedrock is limestone and calcareous shale (Gardiner and Radford 1980).

The application site comprises part of an existing cement works that received initial planning permission in 1969 (Pl. Ref. P69/106). The cement works has expanded and developed in the intervening years and today comprises a large development of tall silos, buildings, structures, *etc*. and is clearly industrial in character.

The Proposed Development comprises the addition of a number of buildings and associated structures to the current operational facility so as to allow for the expansion of the existing quantity and range of alternative fuels and to allow for the introduction of alternative raw materials for the cement-manufacturing process. These facilities, which vary in size and are primarily located within the existing developed footprint of the facility (refer to Figure 11.1), are described in detail in Chapter 3 of the EIAR.

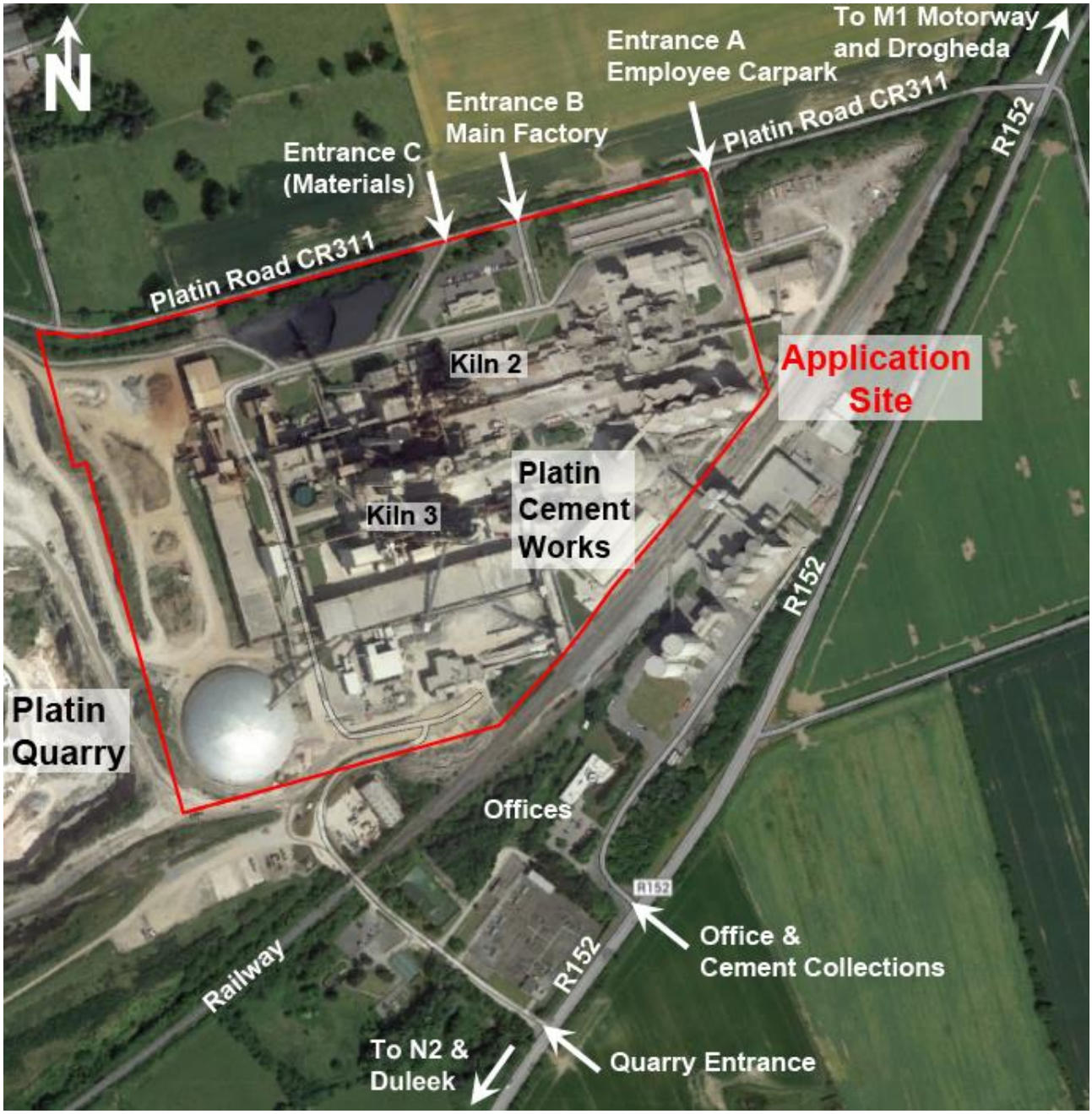


Figure 11.1 Platin Cement Works with application boundary outlined in red.

11.3.1 Historical & Archaeological Background

A number of archaeological and other cultural heritage finds have been made in the vicinity of the application site. Figure 11.2 identifies their locations in relation to the Proposed Development.

Bronze Age material has been found to the south-west of the application area in Carranstown where a series of Fulachta Fia (03E0790 and 05E1324) have been found along the northern bank of a stream. North of this, a Bronze Age barrow (03E1347) and additional Fulachta Fia (02E1306) have been found and a ring-ditch was uncovered in 2004 (04E0714).

In 2003, evidence of medieval settlement consisting of a rectangular structure measuring 20m x 9.5m; an F-shaped structure measuring 14.2m x 7m; ditches and pits and a trough associated with approximately 530 sherds of medieval pottery dating to the 13th - 14th centuries, were excavated within the study area in Cruicerath townland (03E0264).

Appendix 11.1 sets out in more detail the archaeological and historical development of the study area and the main types of sites and monuments that are known from the surrounding landscape. Appendix 11.2 includes results of excavations in the study area.

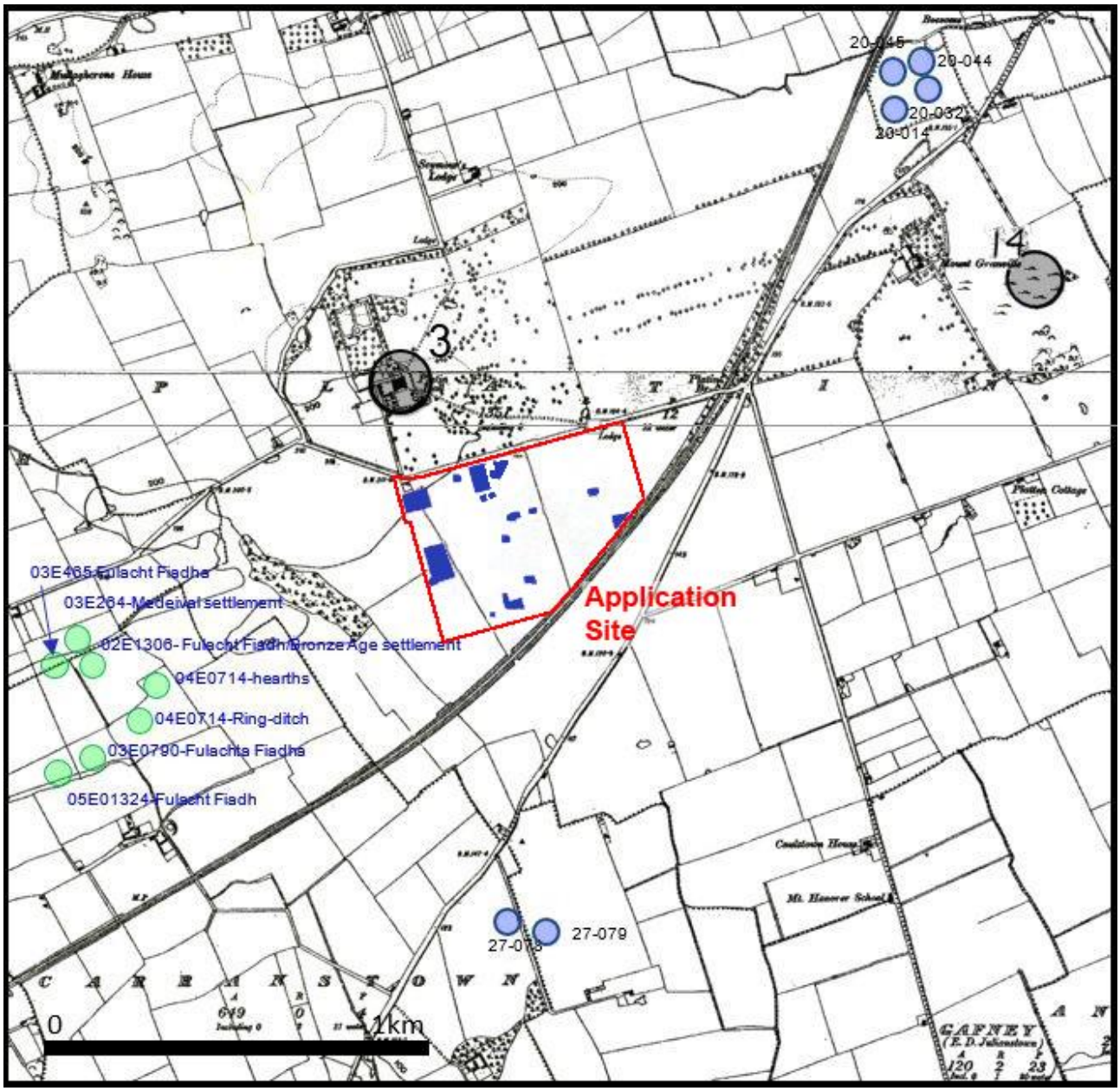


Figure 11.2 Application site for Proposed Development (outlined in red) superimposed on the RMP Map for County Meath. Proposed structures are indicated in dark blue shading within application site. Recorded Monuments in surrounding area are indicated with black circles (and grey shading added). Sites in the Archaeological Survey database are indicated with blue circles (and light blue shading added). Sites excavated within the adjoining Platin Quarry (to the west) are indicated with green circles (with light green shading added).

11.3.2 Recorded Monuments & Places

There are no Recorded Monuments situated within the application site. The closest Recorded Monument to the application site is a church in Platin townland (refer to RMP No. 3 on Figure 11.2) located over 200m to the north. A second recorded monument – a Promontory Fort (refer to RMP No. 14 on Figure 11.2) lies on the east side of the M1 Motorway, over 1km to the east of the site.

ME027-003001- Platin: Church (refer to RMP No. 3 on Figure 11.2)

The church is an undivided nave and chancel structure (int. dims 11.3m E-W; 5.2m N-S) that survives complete with opposing round-headed doorways (Wth 0.94m) in flat-headed embrasures towards the west end of the north and south walls, and with a stoup only inside the south doorway. Two crosses are also located in the church (ME027-003003 and ME027-003004).

The church is situated over 0.2km north of the proposed site. The church is situated in an area of dense overgrowth and has no views of the site (Photo 11.1). The church will not be directly impacted by the Proposed Development. The nearby castle (ME027-003002-) although included as a Recorded Monument has been demolished and the site will not be directly impacted by the Proposed Development.

Photo 11.1 View of the entrance to Platin Church ***ME027-003001*** *- facing south*

ME020-014 Platin: Promontory Fort - Inland (refer to RMP No. 14 on Figure 11.2)

Situated on top of rock outcrop and covering area of c. two acres. Banks and scarps define top of outcrop, and within this oval area is raised subcircular area (diam. c. 25m) and raised triangular area (dims. 29m E-W, 15m N-S). The promontory fort was investigated during the construction of the nearby M1 Motorway.

This monument is situated east of the M1 Motorway and 1.1km east /northeast of the application area and is too distant to be impacted by the Proposed Development.

11.3.3 Monuments in the Archaeological Survey Database

There are no monuments included in the Archaeological Survey database situated within the application area. There are eight monuments included in the database situated in the wider area surrounding the application site / cement works (refer to Figure 11.2). The closest monument in the database to the application area are the embanked enclosure (ME027-078) and adjoining enclosure (ME027-079) located circa 750m south in the townlands of Carranstown and Caulstown.

Both monuments are situated east of the R152 Regional Road and c0.75km south of the application area and are considered too distant to be impacted by the Proposed Development.

11.3.4 Cartographic Sources

The Down Survey 1654 mapping was consulted as well as Larkin's map of 1812, the Ordnance Survey First edition six inch map of 1836, the 1st edition Ordnance Survey 25 inch map and the Ordnance Survey 1909 edition six inch map were consulted. This analysis did not indicate any previously unrecorded archaeological sites, buildings or potential features of landscape importance in the application site.

11.3.5 Aerial Photography

Examination of 1995, 2000 and 2005 series Ordnance Survey Orthophotography, Google earth imagery from 2005, 2007, 2009, 2013 and 2016 and Bing Maps imagery from 2016 (Figure 11.1) did not indicate additional cultural heritage sites in the application area or vicinity.

11.3.6 Place Name Evidence

The English translations of the townland names of the study area are presented below are based on the Placenames Database of Ireland and the Down Survey mapping of 1655.

Anagore	Marsh of the goats
Carranstown	Originally Curranstown, town of the Currans
Caulstown	Town of the Caul family
Gafney	Town of the Gafney family
Lagavoreen	Hollow of the road
Platin	A small plateau or green.

The placenames refer to topographical features, landholding, family names and medieval settlement. There are no additional sites indicated in the area of the Proposed Development.

11.3.7 Archaeological Excavations

There have been no archaeological excavations carried out within the proposed site. There have been ten excavations carried out in the wider study area. Summaries are presented in Appendix 11-2 and the locations of the significant sites are indicated on Figure 11.2.

11.3.8 National Museum of Ireland

Examination of the finds registers and topographical files held by the National Museum of Ireland revealed that here have been no archaeological finds reported in the application area or vicinity.

11.3.9 Other Sources

Examination of archaeological corpus works on prehistoric artefacts (Harbison 1969, Eogan 1983, 2000, Kavanagh 1991, Simpson 1990), and pottery (O' Ríordáin and Waddell 1993) and Iron Age material (Raftery 1984) did not indicate any additional material in the application area or vicinity.

11.3.10 Field Inspection

A field inspection was carried out on the 22nd of July 2015 and reviewed again on the 29th March 2017. This involved an inspection of all the lands in the application site. Most of the proposed structures will be situated within the footprint of the existing cement factory. Topsoil has already been removed from this area and there is no remaining indication of any archaeological or cultural heritage material.

Six proposed structures will be situated on previously unbuilt ground around the periphery of the factory – albeit most of this ground has been used for storage of petcoke and other materials (refer to Figure 11.3). The location of each of these 6 structures is discussed separately in the following sections.

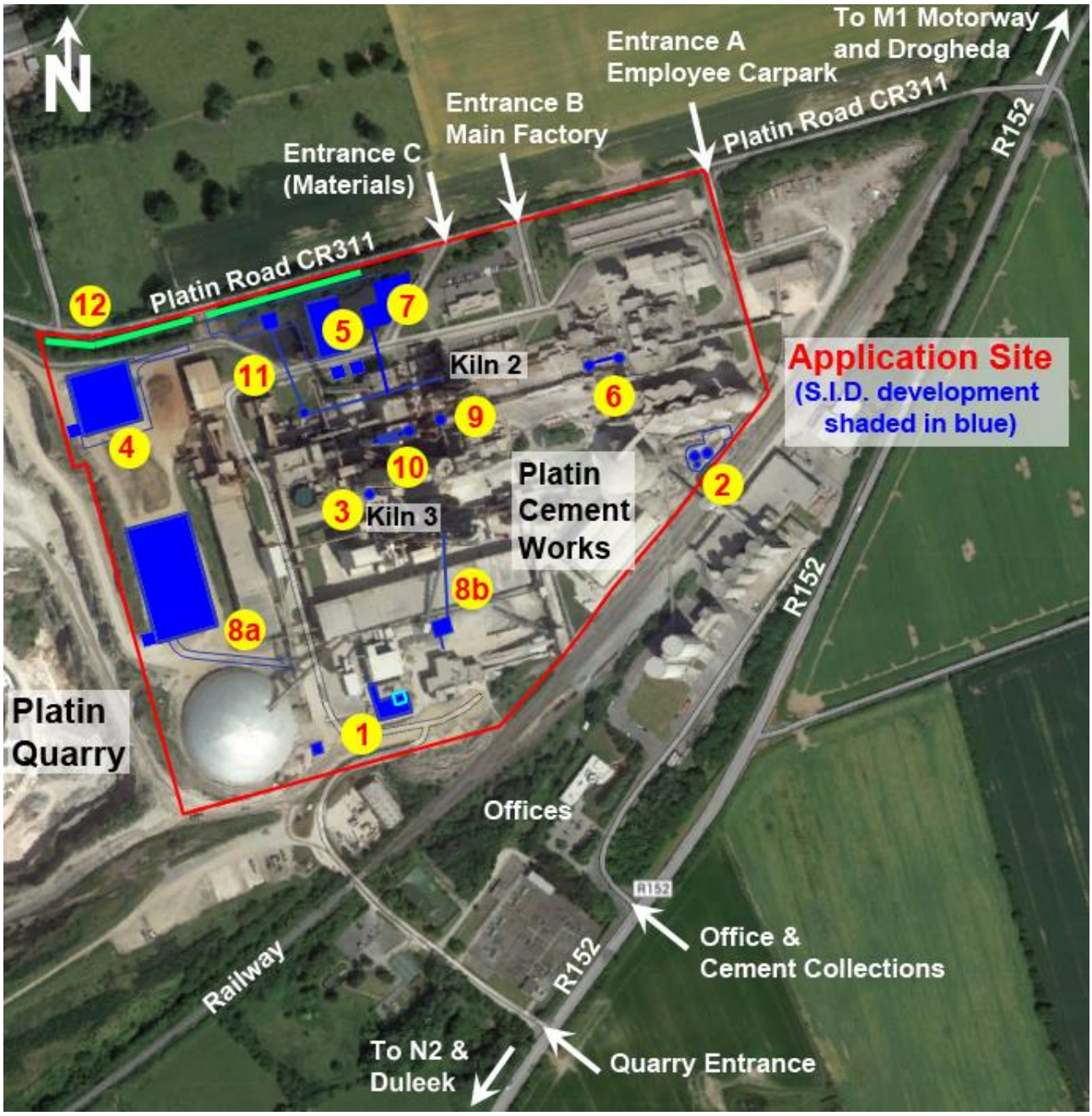


Figure 11.3 Indicative location of proposed new structures indicated in blue. Proposed structures located on previously unbuilt ground are numbered as Areas 1-6.

11.3.10.1 Area 1: Alternative Raw Material Building.

The area of this proposed structure has been previously stripped of all topsoil down into the subsoil and is being used to store overburden (Photo 11.2). There is no indication of any cultural heritage material within this area.

Photo 11.2: View of Area 1 looking north.

11.3.10.2 Area 2: Coarse Solids Handling Building for Kilns 2 & 3.

The area of this proposed structure has been previously stripped of all topsoil down into the subsoil and is being used to store overburden (Photo 11.3). There is no indication of any cultural heritage material within this area.

Photo 11.3: View of Area 2 looking south-east.

11.3.10.3 Area 3: Fine Solids Building Extension for Kiln 3.

The area of this proposed structure has been previously stripped of all topsoil down into the subsoil and is partly covered by a concrete slab (Photo 11.4). There is no indication of any cultural heritage material within this area.

Photo 11.4: View of Area 3 looking west.

11.3.10.4 Area 4: Coarse Solids Conveying Kiln 3

The area of this proposed structure has been previously stripped of all topsoil down into the subsoil (Photo 11.5). There is no indication of any cultural heritage material.

Photo 11.5: View of Area 4 looking west.

11.3.10.5 Area 5: Coarse Solids Conveying Kiln 2

The area of this proposed structure has been previously stripped of all topsoil down into the subsoil and is covered by a concrete slab (Photo 11.6) and storage of petcoke fuel. There is no indication of any cultural heritage material within this area.

Photo 11.6: View of Area 5 & Area 6 looking west.

11.3.10.6 Area 6: Fine Solids Kiln 2 & Whole Tyres Storage and Handling

The area for these proposed structures has been previously stripped of all topsoil down into the subsoil and is covered by a concrete slab (Photo 11.6) which is used for the storage of petcoke/fossil fuel. There is no indication of any cultural heritage material in this this area.

No additional items of heritage, structures or monuments were identified.

11.3.11 UNUESCO World Heritage Site of Brú na Bóinne

The Brú na Bóinne World Heritage Site was inscribed onto the list of World Heritage Sites by UNESCO in 1993. Within the area of the World Heritage Site, there are a number of National Monuments and Recorded Monuments, including the three main prehistoric site complexes of Newgrange, Knowth and Dowth that are protected under the National Monuments Acts (1930-2004) and the Planning and Development Acts. Meath County Council has accorded the area of the World Heritage Site a planning status through the inclusion of a number of policies and objectives in its County Development Plan 2013-2019 (see Section 9.6 and Appendix 10: UNESCO World Heritage Site and Brú na Bóinne Management Plan of the Development Plan).

Development Plan Objective CH OBJ 1 is:

> *To protect and enhance the Outstanding Universal Value of the cultural landscape in the UNESCO World Heritage Site of Brú na Bóinne in accordance with the relevant guidelines and national legislation, so that its integrity, authenticity and significance are not adversely affected by cumulative inappropriate change and development, and to enhance views within and adjacent to the site.*

Development Plan Objective CH OBJ 2is:

> *To protect the ridgelines which frame views within and from the UNESCO World Heritage Site of Brú na Bóinne from inappropriate or visually intrusive development.*

Appendix 12 of the 2013-19 Meath County Development Plan lists Protected Views and Prospects within the county. There are 14 Protected Views associated with the Brú na Bóinne World Heritage Site: *i.e.* No. 59 and Nos. 87a to 93c inclusive. Views 90, 91, 92 and 93a are restricted to areas within the World Heritage Site, while Views 89a, 89b, 89c, 93b and 93c look into or toward the World Heritage Site.

Upper elements of the existing Cement Works are visible in panoramic View 59 (from Knowth), Views 87a to 87d (from Newgrange) and View 88 (from Dowth). In each instance the description of the view as noted in Appendix 12 of the Meath County Development Plan is as follows:

> *Elevated panoramic View across the landscape within the World Heritage Site of Brú na Bóinne. Note that this is a working landscape containing agricultural structures, dwellings, and infrastructure.*

These Protected Views are also discussed in Chapter 10 Landscape and Visual Aspects (and illustrated in Appendix 10.1 Photomontages) of this EIA Report and clearly indicates that the Proposed Development will not have anyu impact on the Brú na Bóinne World Heritage Site.

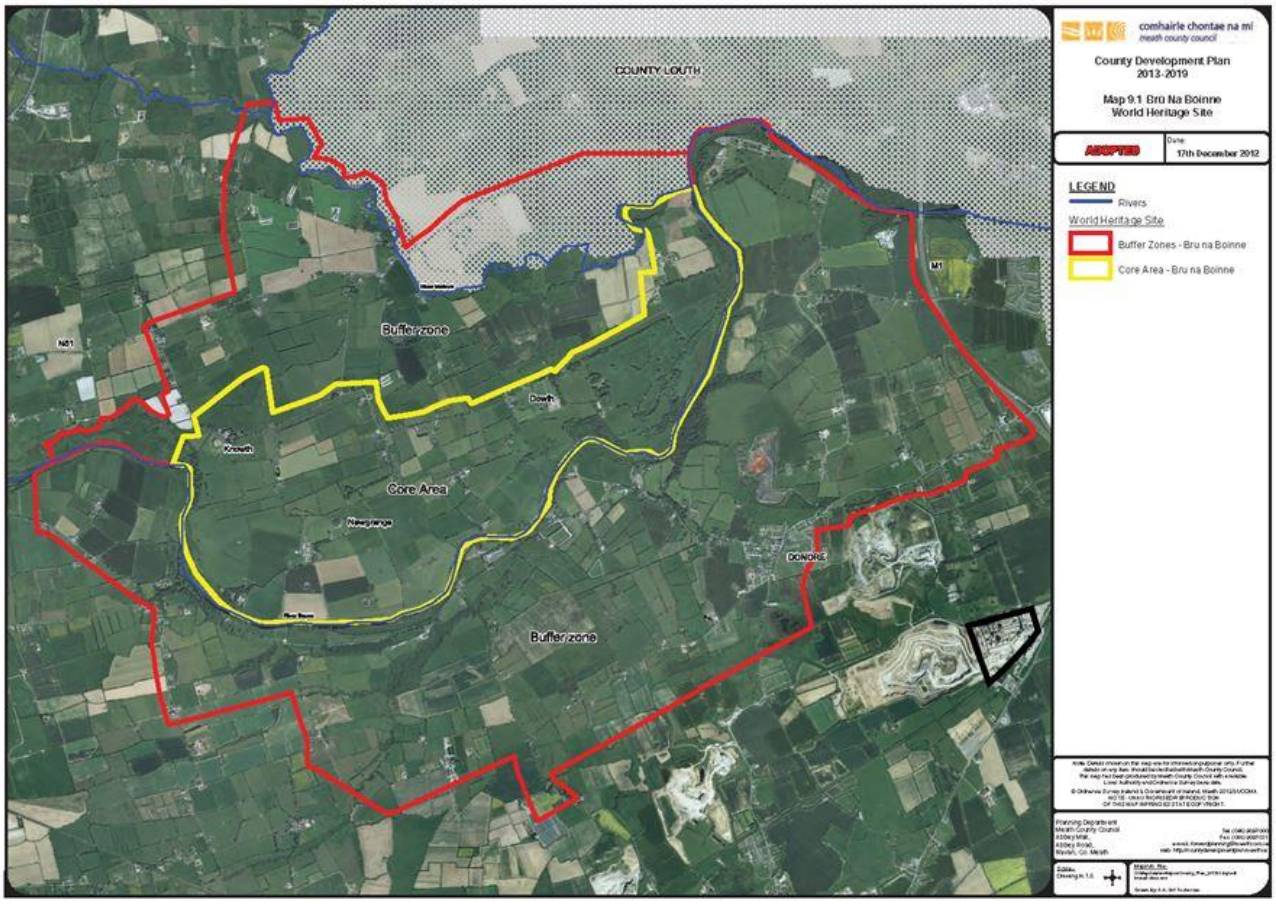


Figure 11.4: Application area superimposed on Map 9.1 of the Brú na Bóinne World Heritage Site (WHS) from the Meath Co. Development Plan. The Core Area of WHS is outlined in yellow; the Buffer Area is outlined in red and the Application Area is outlined in black outside of the Buffer Area (near the lower right side of the image).

11.3.12 Architectural Heritage

There are no structures within the application area or the study area listed as protected structures in the Meath County Development Plan 2013-2019 or in the National Inventory of Architectural Heritage for Co. Meath.

Fieldwork was carried out on the 22nd July 2015 and reviewed again on the 29th March 2017, so as to identify any additional non-designated structures within or in the vicinity of the application area. This involved assessing all upstanding structures that are marked on the 1909 edition of the six-inch Ordnance Survey mapping within 100m of the application area (see Fig. 11.1). However, there are no upstanding structures remaining within this area.

There are no buildings of architectural merit on the site of the Proposed Development. No buildings are to be demolished as part of the Proposed Development.

11.4 Predicted Impacts of the Proposed Development

There are no predicted direct or indirect impacts on any known items of cultural heritage, archaeology or buildings of heritage interest in the application area or the vicinity of the site.

11.4.1 Brú na Bóinne World Heritage Site

A visual impact assessment of the Proposed Development was undertaken from viewpoints within the World Heritage Site. The assessment as set out in Chapter 10 (and Appendix 10.1 Photomontages) of this EIA Report, concluded that the Proposed Development would have no effect on the visual amenity of Brú na Bóinne World Heritage Site.

The effect of emissions on decorated and inscribed stones were also considered as part of this assessment. However, the Proposed Development does not change the character or quantity of existing emissions arising from the Cement Works development and therefore, will not negatively impact the monuments of Brú Na Bóinne World Heritage Site. Refer also to Chapter 8 Air Quality for further detail on emissions.

11.4.2 'Do Nothing' Impact

If the Proposed Development were not to proceed there would be no effect on the cultural heritage. However, likewise it is also considered that the Proposed Development will not have any effect on cultural heritage.

11.4.3 Cumulative Effect

The Proposed Development will not have any effect on cultural heritage and therefore will not give rise to any cumulative effect on the cultural heritage.

11.5 Mitigation Measures

No direct or indirect impacts warranting specific mitigation were identified during the course of the cultural heritage assessment.

11.6 Residual Impacts

No residual impacts are anticipated.

11.7 Monitoring

No monitoring is required.

12 Traffic & Transportation

12.1 Introduction

This chapter of the EIS provides an assessment of traffic and transportation and comprises the following main elements:

- The receiving environment;
- Characteristics of the proposed development;
- The predicted impact of the proposed development; and
- Remedial and mitigation measures.

12.2 Assessment Methodology

This traffic assessment has been prepared based on the Traffic and Transport Assessment Guidelines prepared by Transport Infrastructure Ireland (TII, formerly National Roads Authority (May 2014)). The assessment has been based on traffic surveys undertaken on the surrounding road network.

12.2.1 Existing Traffic Information

Traffic counts on the surrounding road network were carried out in 2017, to develop an understanding of the current traffic conditions on the surrounding road network. The traffic count information has been used to assist with the assessment undertaken in this chapter of the EIS.

12.2.2 Traffic Generation

The volume of traffic generated by the proposed development has been estimated from first principles with each of the different traffic types (deliveries, staff, visitors etc.) described separately within the assessment. The traffic generation has been based on a number of assumptions which are detailed in Section 12.5.5.2.

12.2.3 Traffic Distribution

For the purposes of this assessment, it has been assumed that all traffic associated with the construction and operation of the proposed development would travel along the R152 to/from the M1.

12.3 Existing Environment

12.3.1 Site Location

The existing cement works is located in the townland of Platin approximately 4km southwest of Drogheda town centre. The cement works is bounded to the southeast by the R152 and by Platin County Road CR311 to the north. The application site, which is located within the existing cement works is presented in **Figure 12.1**.

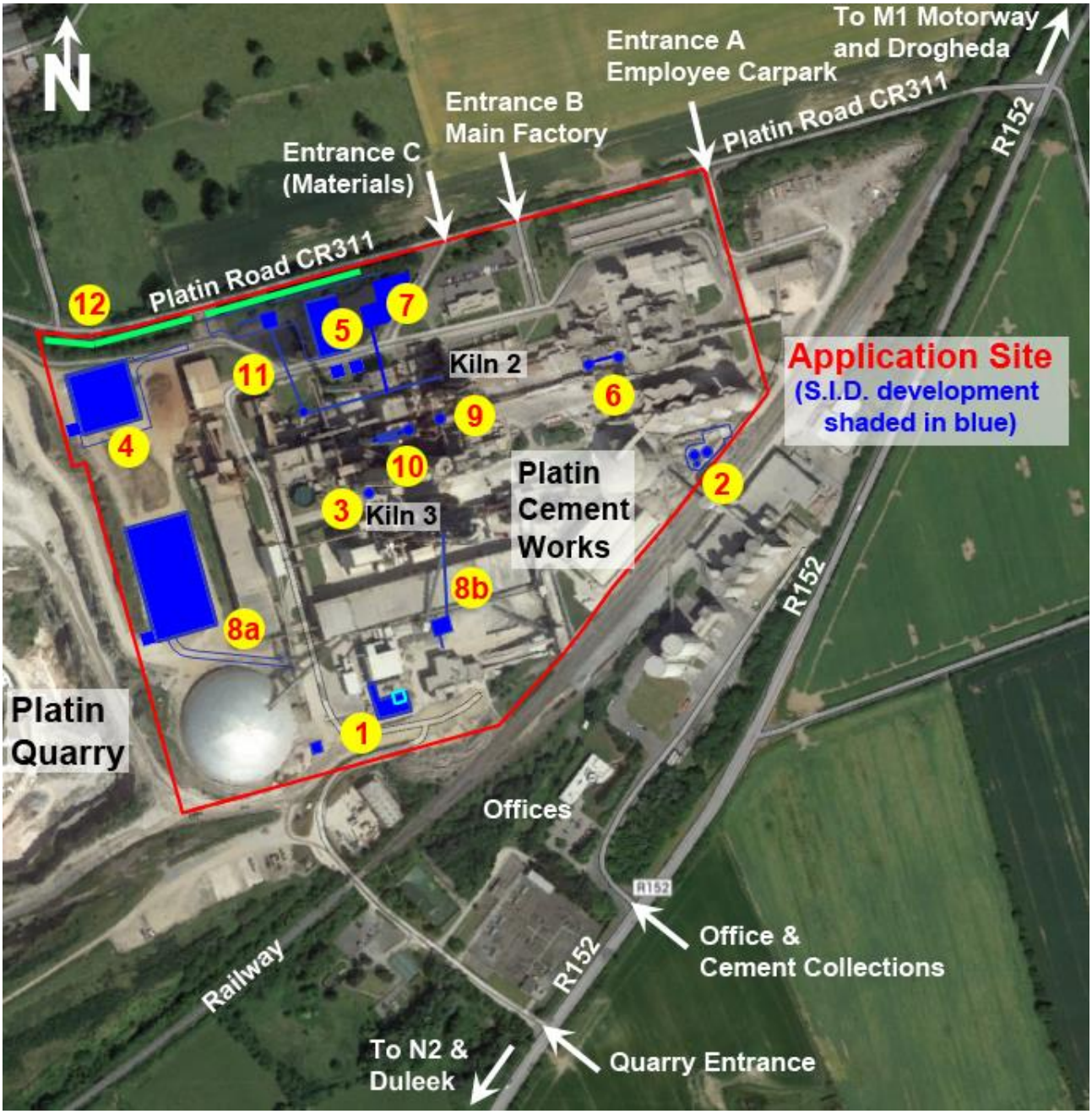


Figure 12.1 Irish Cement, Platin

12.3.2 Existing Development and Access

Irish Cement Ltd currently operates a cement production works at the site. There are currently five access points to the plant (Refer to Figure 12.1). These accesses are:

- A quarry access and a customer cement collection / offices access directly off the R152 Drogheda – Kilmoon Cross Regional Road; and
- Three Raw Materials/Employee/Factory access points located off the CR311. The CR311 connects to the R152 nearby

12.3.3 Existing Road Network

The Cement Works and the subject site is situated adjacent to the R152 Drogheda to Kilmoon Cross Regional Road, approximately 4km southwest of Drogheda Town Centre and 4km northeast of Duleek. The R152 is a single

carriageway road with an 80kph speed limit. Various country roads surround the site, with the CR311 providing access to the three factory / employee / raw material entrances along the northern boundary of the Works.

12.3.4 Existing Traffic Patterns

Traffic counts were carried out in February 2017 on the R152 just east of the Office & Cement Collections access junction. The average daily traffic flow on the R152 adjacent to the Cement Works was observed to be 10,887 vehicles (two-way average weekday volume). The peak two-way volumes on the R152 were observed to be 958 vehicles in the morning peak hour and 994 vehicles in the evening peak hour. The full findings of the 2017 counts are presented in **Appendix 12.1**.

12.3.5 Existing Fuel Use and Associated Traffic Patterns

Imported Petroleum Coke (petcoke), a fossil fuel, is currently the primary fuel in use in Platin. Coal has also been used in the past and could be used again in the future. In addition, ICL also has permission for the use of up to 120,000 tonnes per annum of alternative fuels.

At present, the Works is running below maximum output capacity and in 2016 used circa 62,700 tonnes of petcoke in addition to circa 120,000 tonnes of alternative fuel.

However, output is gradually increasing and with a planning limitation on the use of alternative fuels, this increase in output will be fueled by traditional petcoke / fossil fuel. If the Works were to run at full capacity it is expected that c. 220,000 tonnes of petcoke would be required on top of the current permitted capacity of 120,000 tonnes of alternative fuels per annum. **Table 12.3** summarises the existing (2016) and the maximum output fuel requirements based on current permissions.

Table 12.3: Existing (2016) Fuel Requirements and Fuel Requirement for existing permitted Maximum Output Scenario

	2016 Existing (tonnes)	Maximum Output (tonnes)
AF	120,000	120,000
Petcoke/Fossil fuel	62,700	220,000
Total	182,700	340,000

Petcoke or coal is stored in a defined stockpile area located on site, to the north of the main area of the cement works, while permitted alternative fuel use in Kiln 3 is managed via a purpose built handling and introduction facility located to the south of the Kiln – refer to Figure 3.2 in Chapter 3 of this EIS.

At present petcoke/coal is delivered by ship to ICL's facility in Dublin Port and from there is delivered by truck to the existing on-site storage area at Platin. The storage area has capacity for c. 15,000 tonnes of petcoke. Deliveries to meet current demand (c.65,000t) are made consistently over the year. Typically, approximately 200 tonnes are delivered per day (over c.260 days per year). There are however peaks whereby 400 tonnes are delivered per day (over c.40 days per year).

The existing 120,000 tonnes of alternative fuels is contract delivered on a regular on-going basis throughout the year to meet the demands of the Works equating to approximately 360 tonnes per day (over c.330 days per year).

Under current permissions, if the Cement Works was to run at maximum output capacity, the requirement for deliveries of fossil fuel to meet additional fuel demand will increase to typical deliveries of 600 tonnes per day (over c.250 days per year) with peaks of 1,200 tonnes per day (over c.60 days per year). In this scenario, deliveries of alternative fuel would remain at 2016 levels.

Table 12.4 summarises the existing 2016 and the existing maximum output daily trip generation. The numbers are based on the peak delivery activity outlined above.

Table 12.4: Existing 2016 and existing Maximum Output Daily Peak Trip Generation (vehicles)

	2016 Existing (vehicles)	Maximum Output (vehicles)
Alternative Fuels Deliveries	16	16
Petcoke Deliveries	13	40
Staff/Visitors	10	15
Total	39	71

Table 12.5 summarises the existing 2016 and existing maximum output peak hour truck numbers. The numbers are based on the peak delivery activity outlined above.

Table 12.5: Existing and Maximum Output Peak Hour Trip Generation (vehicles)

	2016 Existing (vehicles)	Maximum Output (vehicles)
Alternative Fuels Deliveries	3	3
Petcoke Deliveries	3	8
Staff/Visitors	3	4
Total	9	15

12.4 Proposed Development

12.4.1 Characteristics of the Proposed Development

In order to replace fossil fuels, Irish Cement Ltd are proposing to increase the quantity and range of alternative fuel (AF) usage and to use alternative raw materials (ARM) in their Cement Works at Platin. The proposed changes involve the expanded use of alternative fuels as a gradual progressive replacement for virtually all existing fossil fuels. Once fully implemented it is estimated that the use of AF as proposed will reduce the amount of fossil fuel usage to a minimal buffer quantity assumed to be less than 10,000 tonnes per annum for the purposes of this assessment. Table 12.6 presents the proposed quantities for each fuel type.

Table 12.6: Proposed Fuel Quantities

	Proposed (tonnes)
AF & ARM	600,000
Fossil fuel	10,000
Total	610,000

It is important to note that while the shift to alternative fuels would result in an overall increase in the quantity of fuel used at the Works, there would be no corresponding increase in output.

12.4.2 Access Arrangements

The existing site access points will remain unchanged following implementation of the proposed development.

12.5 Predicted Effects of the Proposed Development

12.5.1 Construction Impact

12.5.1.1 Required Construction Works

The change to alternative fuels, will require the provision of a number of buildings, silos, and associated conveyors and structures, etc. for the receiving, handling and introduction of the alternative fuels and raw materials to the cement plant. The buildings and structures will be provided on a gradual basis in line with the progressive introduction of new fuels. Further details on the works required are detailed in section 3.4.3 of this EIS.

12.5.1.2 Site Access and Vehicular Routes

It is proposed that access to the construction site will be via one of the existing access points to the Irish Cement plant located on Platin Road CR311 (Entrance A, B or C on **Figure 12.1**).

Insofar as possible, construction vehicles will be instructed to use the M1 to arrive to and depart from the site. However, there may be a need for some traffic to arrive at the site from other routes. Further details on the construction access strategy will be prepared by the contractor for the works and included in a construction traffic management plan which will be submitted to MCC for approval prior to the commencement of the works.

12.5.1.3 Trip Generation

Assumptions

For a robust (conservative) estimation of the anticipated increase in trips related to the construction of the proposed development, the following general assumptions are made:

- Construction is expected to take place in 3 stages as the demand for fuel increases. Each stage will last approximately 9 months and will require approximately 30 construction workers.
- To account for some car sharing among construction staff, a car occupancy of 1.2 people per vehicle has been assumed.
- It is expected that the majority of construction staff will start before and finish after the morning and evening peak hours respectively. However, to ensure a robust (conservative) scenario assessment it is assumed that 40% of construction staff trips (10 vehicles) will coincide with AM and PM peak hour traffic movement on the external road network.
- The construction site is anticipated to operate 10-12 hours per day. To ensure a robust assessment it is assumed that 50% of daily HGV movements (1 vehicle) will coincide with morning (AM) and another 50% with the evening (PM) peak hour period.
- Furthermore, to add to the robustness of the assessment, a number of trips equivalent to 20% of the total maximum daily increase in site trips for the construction stage (including staff and HGV movements), were added to account for visitors and other scheduled maintenance operators arriving to the site. It is assumed that 20% of these trips would coincide with the peak hour (1 vehicle).

12.5.1.4 Trip Distribution

While it is acknowledged that there may be a need for some traffic to travel south along the R152, for the purpose of this assessment, it has been assumed that all construction traffic will arrive from and depart to the M1. This ensures a worst case assessment in terms of construction traffic impact on the R152 i.e. all construction traffic is focused on a particular section of the R152.

12.5.1.5 Predicted Construction Traffic Movements

The anticipated traffic movements during the construction of the proposed development are presented in **Table 12.7.**

Table 12.7: Construction Traffic Generation

	Daily	Peak Hour
LGV	36	11
HGV	2	1
Total	**38**	**12**

As can be seen in **Table 12.7**, on a daily basis, 38 veh/day (76 trips) are anticipated during the construction stage. Peak hour trips during the construction phase are predicted to be 12 veh/hr (24 trips).

12.5.1.6 Construction Traffic Impact

Daily two-way traffic flows on the R152 between the Cement Works and the M1 are 10,887 vehicles. This would increase to 10,963 vehicles when the proposed development is being constructed. This corresponds to an increase on the R152 of 0.7% and this will therefore not have a material impact on traffic conditions.

The recorded two-way traffic flows along the R152 towards the M1 are 958 vehicles in the peak hour in the morning. This would increase to 982 vehicles during the construction of the proposed development. The additional traffic associated with the construction activity would result in an increase in traffic flows of only 2.4% over the existing volumes, and therefore, this will not have a material impact on traffic conditions.

The *Traffic and Transport Assessment Guidelines* (TII) states that a Traffic Impact Assessment (including junction assessment) should be produced where "traffic to and from the development exceeds 5% of the traffic flow on the adjoining road". As the percentage increases outlined above are significantly less than 5%, no junction assessment is required.

12.5.2 Operational Impact

12.5.2.1 Site Access and Vehicular Routes

The existing site access points will remain unchanged following implementation of the proposed development.

In terms of access routes, it is anticipated that all petcoke deliveries will arrive from the M1 (via the R152). It is also anticipated that the vast majority of alternative fuels will arrive from the M1 (north). There may also be a need for a small portion of alternative fuel deliveries to arrive from the R152 south of the Works, whilst noting that these movements will be minimized where possible.

12.5.2.2 Trip Generation

Assumptions

For a robust (conservative) estimation of the anticipated increase in trips related to the proposed change in fuel type to alternate fuels, the following general assumptions are made:

- 330 working days in a year.
- The capacity of trucks to be used are based on existing site data:
- AF - 22.8t,
- Petcoke - 30t
- All petcoke required for the year is assumed to be delivered over 50 days (200 tonnes per day).

- AF deliveries are assumed to occur consistently over the year equating to approximately 1,800 tonnes per day (330 days per year).
- The Cement Works operates 24 hours a day. To ensure a robust assessment it is assumed that 20% of daily HGV movements will coincide with morning (AM) and another 20% with the evening (PM) peak hour period.
- It is assumed that 70% of operational staff movements would take place in the morning or evening peak hour.
- Furthermore, to add to the robustness of the assessment, a number of trips equivalent to 20% of the total maximum daily increase in site trips for both operational and construction stages (including staff and HGV movements), were added to account for visitors and other scheduled maintenance operators arriving to the site. It is assumed that 20% of these trips would coincide with the peak hour.

12.5.2.3 Trip Distribution

For the purpose of this assessment, it has been assumed that all traffic to and from the proposed development will arrive from and depart to the M1. This ensures a worst case assessment in terms of traffic impact on the R152. This ensures a worst case assessment in terms of operational traffic impact on the R152 i.e. all construction traffic is focused on a particular section of the R152.

12.5.2.4 Predicted Operational Traffic Movements

The anticipated daily traffic movements for the future plant operation are presented in **Table 12.8.** As the trip generation presented for the proposed development corresponds to the maximum output for the proposed development, for the purposes of this assessment, the impact of the proposed development is compared against the existing permitted Maximum Output scenario as outlined in Section 12.3.5 above.

Table 12.8: Daily Trip Generation (vehicles)

	Existing Maximum Output	Proposed Development Maximum Output	Difference between Existing and Proposed Development
Alternative Fuels Deliveries	16	80	+64
Petcoke Deliveries	40	6	-34
LGV	15	23	+8
Total	**71**	**109**	**+38**

When the plant is operational, approximately 109 vehicles/day (218 trips) are expected. Compared to the maximum output scenario, this represents an increase of 38 veh/day (76 trips).

The anticipated peak hour traffic movements for the future plant operation are presented in **Table 12.9.** The maximum output traffic movements are also presented for comparison purposes.

Table 12.9: Peak Hour Trip Generation (vehicles)

	Existing Maximum Output	Proposed Development Maximum Output	Difference between Existing and Proposed Development
Alternative Fuels Deliveries	3	16	+13
Petcoke Deliveries	8	1	-7
LGV	4	8	+4
Total	**15**	**25**	**+10**

When the proposed development becomes fully implemented, peak hour traffic at maximum output is estimated to be 25 veh/hour (50 trips). Compared to the existing maximum output scenario, this represents an increase of 10 veh/hour (20 trips).

12.5.2.5 Operational Traffic Impact

Daily two-way traffic flows on the R152 between the Cement Works and the M1 are 10,887. This would increase to 10,951 when the Works is operating at existing permitted maximum output. It is expected that the additional operational traffic for the proposed scenario will increase daily traffic by 76 trips when compared to the maximum output scenario for the existing plant operation. This corresponds to an increase on the R152 of 0.7% and this will not have a material impact on traffic conditions.

The recorded two-way traffic flows along the R152 towards the M1 are 958 vehicles in the peak hour in the morning. This would increase to 970 vehicles when the Works is operating at existing maximum output. The additional operational traffic associated with the proposed increased use of AF would result in an increase in traffic flows of 2% over the existing maximum output scenario, and therefore, this will not have a significant impact on traffic conditions.

The *Traffic and Transport Assessment Guidelines* (TII) states that a Traffic Impact Assessment (including junction assessment) should be produced where "traffic to and from the development exceeds 5% of the traffic flow on the adjoining road". As the percentage increases outlined above are significantly less than 5%, no junction assessment is required.

12.6 Mitigation Measures

12.6.1 Construction Stage Mitigation

General Construction Traffic Strategy

Construction traffic will be limited to certain routes and times of day, with the aim of keeping disruption to existing traffic and residents to a minimum. To minimise disruption to the local areas, construction traffic volumes will be managed through the following measures:

- During peak hours, ancillary, maintenance and other site vehicles movements will be discouraged.
- Daily construction programmes will be planned to minimise the number of disruptions to surrounding streets by staggering HGV movements to avoid site queues.
- Construction vehicle access routes will be restricted to/from the M1 where possible.
- The contractor will be required to promote travel by sustainable modes of transport. A framework mobility management plan is presented later in this section.

Hours of Working

Construction operations on site will generally be between the hours of 07:00 and 19:00, Monday to Friday, and 07:00 to 14:00 on Saturdays. Similarly, deliveries of materials to site will generally be between the hours of 07:00 and 19:00, Monday to Friday, and 07:00 to 14:00 on Saturdays.

The construction shift times will ensure construction traffic will have limited impact on the peak periods of 08:00-09:00 in the morning and 17:00-18:00 in the evening as it is envisaged most construction staff will arrive to work before 08:00 in the morning and leave after 18:00 in the evening.

Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) will be developed by the Contractor and presented to MCC for approval prior to commencement of the construction works.

Mobility Management

The contractor will be required as part of the contract to introduce a mobility management plan for its workforce to encourage access to the site by means other than by private car. The following section identifies some of the measures the contractor will provide as part of the Mobility Management Plan. The Mobility Management Plan will form part of the Construction Traffic Management Plan and will be agreed with MCC prior to works beginning on site.

Cycling: Cycle parking spaces will be provided on the site for construction staff, in addition lockers will be provided to allow cyclists store their cycling clothes.

Car Sharing: Car sharing among the construction staff should be encouraged, especially from areas where construction staff may be clustered. The Contractor will aim to organise shifts in accordance to staff origins, hence enabling higher levels of car sharing. Such a measure offers a significant opportunity to reduce the proportion of construction staff driving to the off-site car parking facility, and will minimise the potential traffic impact on the road network surrounding this facility.

12.6.2 Operational Stage Mitigation

The proposed increase in alternative fuels and the use of alternative raw materials will result in an increase of only 10 vehicles into and out of the cement works during the peak hour (20 trips) over the existing maximum output scenario. This insignificant increase will have no impact on surrounding road network or the operation of the existing access points. Accordingly no mitigation measures are required.

12.7 Residual Effects

The proposed development will result in additional traffic on the road network in both the operational and construction stages. The assessment presented in this chapter demonstrates the increase in traffic during both the construction and operational stages is insignificant and will have no material impact on the road network. A number of mitigation measures are proposed during the construction stage to mitigate against the impact of construction traffic as outlined in Section 12.6.

12.8 Cumulative Effects

The cumulative effects of the proposed development and other existing developments have been considered through the completion of traffic counts. There are no known committed or planned developments in the vicinity of the proposed development that would impact on the operation of the road network.

12.9 Monitoring

No monitoring is required as part of the Proposed Development.

12.10 References

Traffic and Transport Assessment Guidelines, Transport Infrastructure Ireland, May 2014

13 Material Assets - Utilities

13.1 Introduction

This chapter examines the existing material assists in the vicinity of the proposed development, predicts the potential effects that may occur on these assets and identities any measures required to mitigate these effects.

13.2 Methodology

A desktop study was carried out to outline the utilities in the existing environment. In order to assess the impacts of the proposed development on material assets, a review of the proposed development to identify potential impacts on material assets was undertaken and the significance of these impacts assessed.

13.3 Existing Environment

13.3.1 Electrical Services and Other Utilities

The existing Platin 110kV substation is located on ICL lands south of Platin Cement Works adjacent to the entrance to Platin Quarry (refer to Figure 13.1). The substation serves Irish Cement Ltd. (ICL) only and all electrical power requirements for the Cement Works are provided from this substation. There is no gas network connection on site.

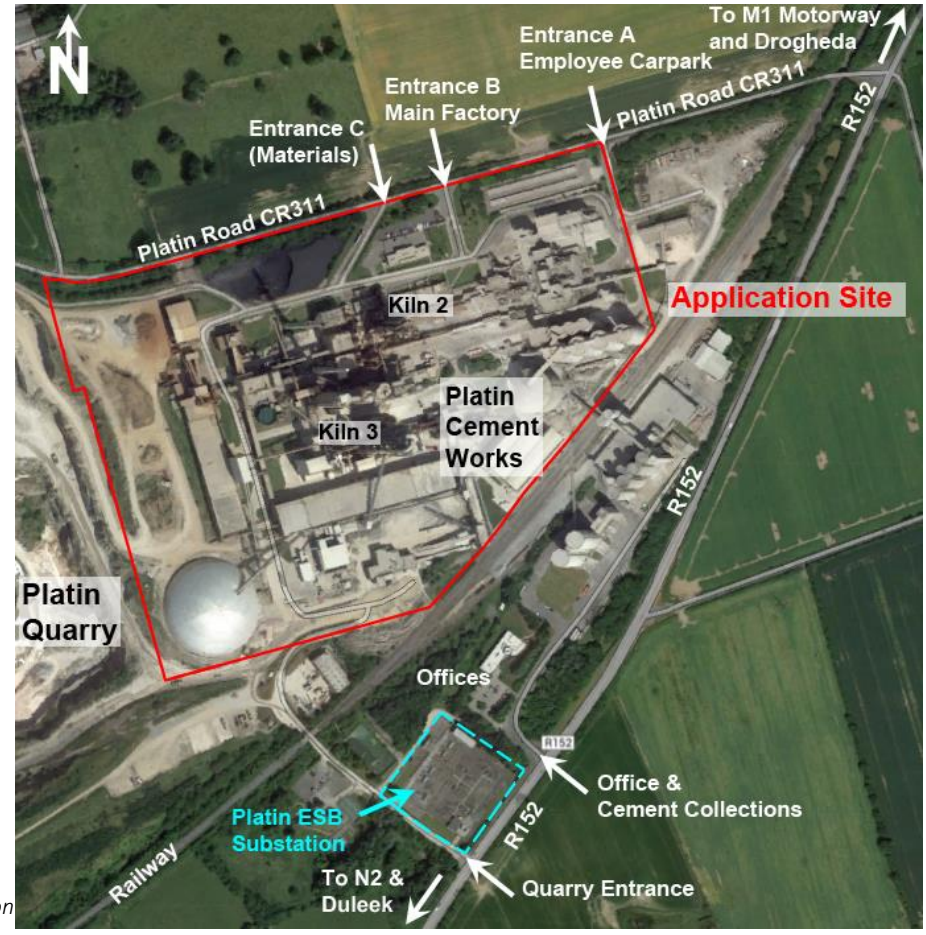


Figure 13.1 Platin Cement Works with location of Platin 110kV ESB Substation

13.3.2 Water Supply and Foul Drainage

The existing Cement Works is not connected to the public water supply. Water is sourced from Irish Cement's adjoining deep quarry. Discharge of process and stormwater are managed through a stormwater balancing tank

followed by a sedimentation tank. Domestic effluent is treated in a purpose built on-site wastewater treatment plant. Treated process water, stormwater and wastewater is then discharged to the River Nanny in accordance with Industrial Emission (IE) Licence P0030-04.

13.3.3 Ownership and Access

Irish Cement Ltd. has full ownership of the site area in which the proposed development is located and its associated access points.

13.3.4 Non-Renewable Resources

Platin Cement Works has existing permission for the maximum use of up to 120,000 tonnes per annum of alternative fuels. Platin Cement Works also uses imported non-renewable fossil fuels (e.g. petcoke) for additional fuelling requirements in the cement manufacturing process. In 2016, in addition to the use of 120,000 tonnes of alternative fuels, the Cement Works also used c.62,000 tonnes of imported fossil fuel. This use of the existing maximum permitted 120,000 tonnes of alternative fuels replaced the use of c.53,500 tonnes of imported fossil fuel and reduced CO2 emissions by c. 64,500 tonnes. If the Cement Works was to operate at full output it would require up to 220,000 tonnes per annum of fossil fuel.

Platin Limestone Quarry is located immediately west of the Cement Works and of the site of proposed development. The permitted quarry is provides limestone, a natural resource and the primary raw material (over 80%) used in the manufacture of cement. Other natural resources used as raw materials in the manufacture of cement include alumina, shale, and iron ore. Overburden (soil and stones over rock) has also been used to replace a portion of shale use in the manufacture of cement.

13.4 Potential Effects

13.4.1 Electrical Services and Utilities

There will be no effect on the existing Platin 110kV Substation which is located south of the site and no effect on services or utilities external to the Cement Works. All services and utilities located in the vicinity of construction works will be identified and protected prior to and during construction works. The proposed development will be connected to the existing Irish Cement on-site electrical network for normal operation purposes (*i.e.* plant operation, lighting, *etc*.). There is no requirement for delivery of additional electrical or utility infrastructure to the site and the proposed development will have no adverse impact on such services.

13.4.2 Water Supply and Foul Drainage

The Proposed Development will not require a connection to the public water supply or to the public foul drainage network and there will be no negative effects on the surrounding water supply or foul drainage.

Existing on-site water supply and foul drainage connections in the vicinity of proposed construction works will be identified and protected prior to and during construction.

Water supply, drainage and foul drainage will continue to operate in accordance with IE Licence for Platin Cement Works and the proposed development will have no adverse impact on such water supply or foul drainage.

13.4.3 Ownership and Access

There will be no direct or indirect effect on ownership of the site as Irish Cement Ltd. will retain full ownership of the development site.

13.4.4 Non-Renewable Resources

During the construction stage, natural resources will be consumed primarily as building materials. This will have a minor negative effect on natural resources using:

- Diesel for construction machinery
- Steel, exposed cast concrete and metal corrugated cladding in building construction.

During the operation stage the Proposed Development allows for the use of up to an additional 360,000 tonnes of alternative fuels and for the use of up to 120,000 tonnes of alternative raw materials per annum. The proposed additional use of alternative fuels will have significant positive impact replacing up to 210,000 tonnes per annum of imported non-renewable fossil fuel. There will continue to be an on-going requirement for a small quantity of fossil fuel use (c.10,000 tonnes / annum) for initial firing of kilns (*i.e.* at start-up, or after maintenance stops) and as buffer to the availability of suitable alternative fuels.

The proposed development will also have a positive impact in diverting materials that would otherwise go to landfill or waste export, to the Cement Works, where they would be recovered and reused as alternative fuels. The proposed additional use of alternative fuels will reduce CO_2 emissions by up to c.314,000 tonnes per annum.

The proposed use of up to 120,000 tonnes per annum of alternative raw materials will offset the requirement for proportion of use of existing non-renewable raw material resources used in the manufacture of cement at Platin Cement Works.

13.5 Mitigation Measures

All utilities and services located in the vicinity of construction works will be identified and protected prior to and during construction works.

13.6 Residual Effects

The use of alternative raw materials and alternative raw materials will have an on-going positive residual impact in offsetting the use of up to 210,000 tonnes per annum of imported fossil fuel and on the replacement of a proportion of raw material resources used in the manufacture of cement.

13.7 Monitoring

No specific monitoring other than of utilities and services during construction is required. The use of alternative fuels and alternative raw materials will be monitored on an on-going basis in accordance with the industrial Licence for the cement Works.

14 Waste Management

14.1 Introduction

The principal objective of sustainable resource and waste management is to use material and energy resources more efficiently, to reuse, recycle and recover material and reduce the amount of waste requiring final disposal.

To achieve resource efficiency there is a need to move from a traditional linear economy model to a more circular economy model (refer to Figure 14.1).

However, where residual waste is generated, it should be dealt with in a way that follows the waste hierarchy (refer to Figure 14.2) and actively contributes to the economic, social and environmental goals of sustainable development.

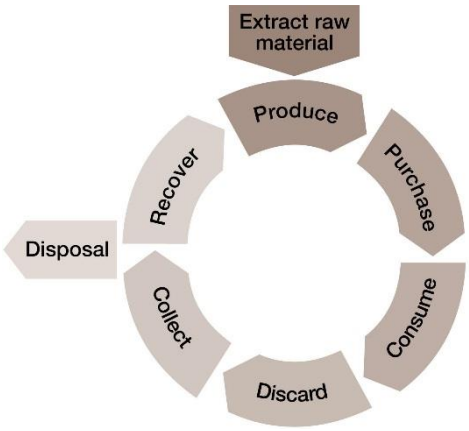


Figure 14.1 Circular Economy

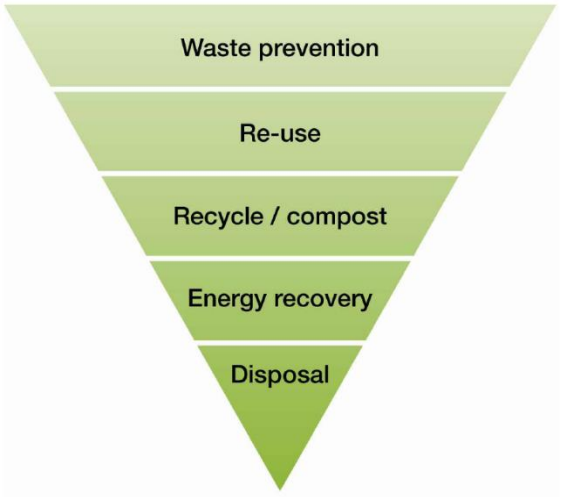


Figure 14.2 Waste Hierarchy

The phases of the proposed development during which waste and surplus materials will be generated are as follows:

- The construction phase (including demolition, excavation and construction); and
- The operation phase.

14.2 Methodology

This section sets out the methodology followed in carrying out this waste impact assessment.

The assessment is based on the proposed development, as described in Chapter 3 of the EIS, Description of the Proposed Development.

This Chapter considers the following aspects of resource and waste management:

- The legislative context;
- The construction phase, including demolition and excavation; and
- The operational phase.

The direct and indirect effects of waste-related transport are considered in Chapter 12, Traffic and Transportation and the geotechnical characterisation of the site is considered in Chapter 6, Soils and Geology.

A desk study was undertaken which included the following tasks:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland, including the *Eastern and Midlands Region Waste Management Plan 2015-2021 & Associated Reports.*
- Description of waste generation during the construction and operational phases; and
- The proposed development was systematically reviewed to identify mitigation to minimise the effect of the Proposed Development on the environment, reduce the quantity of waste sent for final disposal and to promote sustainable waste management practices (see Section 14.6 for mitigation).

The rating of impacts and significance criteria was determined in accordance with the following:

- Environmental Protection Agency, EPA, 2002. EPA Guidelines on the Information to be contained in Environmental Impact Statements.
- Environmental Protection Agency, EPA, 2003. EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements).
- Environmental Protection Agency (EPA) Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports, 2017; and
- (Consultation Draft) EPA Advice Notes on Current Practice in the Preparation of Environmental Impact Statements, 2015.

14.3 Existing Environment

14.3.1 Guidance and Legislation – Key aspects

Resource and waste management takes place in a policy and legislative framework. A review of applicable best practice guidance and legislation was undertaken to inform the impact assessment and recommended mitigation.

The key aspects of EU, national and local policy, legislation and guidance relevant to the Proposed Scheme are summarised as follows:

- Prevention and minimisation of waste is the preferred option;
- Where construction waste is generated it should be source separated to facilitate recycling and maximise diversion of waste from landfill;
- Where materials and by-products are generated, best practice is waste prevention and re-use through incorporation in the manufacturing process;
- Where operational waste is generated it should be separated to facilitate recycling and maximise diversion, from landfill;
- Where waste cannot be prevented or recycled it should be transported and disposed of in accordance with applicable legislation and without causing environmental pollution;
- Waste may only be transferred from site by a waste collection permit holder and delivered to an authorised facility; and
- Export from Ireland of hazardous and residual waste should be minimised.

14.3.1.1 Construction and Demolition Wastes

The most recent figures published by the EPA relating to construction and demolition (C&D) waste are for the year 2011 with some limited hazardous C&D waste data published relating to the year 2012 and preliminary data for 2014.

Approximately 3 million tonnes of C&D waste was collected in Ireland in 2011. Almost 2 million tonnes of this was soil and stones. In addition, just over 1 million tonnes of 'other' C&D Waste was generated, and comprised metal, wood, glass etc.

From 2010 to 2011 there was a 10% decrease in the total quantity of construction waste collected in Ireland. C&D waste collection has decreased annually from a peak of almost 18 million tonnes in 2007. This decrease is reflective of the significant downturn which occurred in the construction industry at this time.

In addition to the data above relating to 2011, the EPA reported that in 2012, excluding natural soil and stone, 97% by weight of C&D was prepared for reuse, recycling and other material recovery (including beneficial backfilling using waste as a substitute). As such Ireland has achieved the target under the EU Waste Framework directive of 70% by 2020.

Preliminary data for 2014 indicate increases in construction and demolition waste generation since 2011, most likely as a result of economic growth. In 2014, 3.31 million tonnes of C&D waste was generated according to preliminary EPA data. The EPA notes in its Report "Ireland's Environment –An Assessment 2016" that *"With a government policy focus on the provision of social housing, major road infrastructural projects and the new children's hospital, C&D waste generated will increase again in the coming years*."

14.3.2 Operational Wastes

14.3.2.1 National Waste Management

The EPA reports that 2,692,537 tonnes of municipal waste was generated in 2012. Municipal waste comprises household, commercial and non-process industrial waste. Of municipal wastes, 59% was recovered and 41% was sent for disposal. This was the first year in Ireland where the quantity of waste sent for recovery exceeded the quantity sent for disposal.

There was an 84% increase in the quantity of municipal residual wastes (which includes household waste) sent for energy recovery in 2013 (627 ktonnes) compared to 2012 (340 ktonnes). In relation to household waste, 34% of municipal waste managed in Ireland was exported for recovery in 2012. This includes export for energy recovery.

The EPA notes that "*Any waste exported abroad for energy recovery is a lost energy resource and opportunity for the State. A reliance on export as a management option poses a significant risk for Ireland should these export markets close in the future*."

For 2012 an estimated 1,115,437 tonnes of commercial and industrial waste was generated.

An estimated 296,838 tonnes of hazardous waste generated in Ireland was managed in 2012 (excluding contaminated soils). Of this 139,872 tonnes was exported for treatment and disposal abroad including 91,549 sent for recovery, use as a fuel or for energy recovery.

14.3.2.2 The Eastern Midlands Region Waste Management Plan 2015-2021

The Eastern Midlands Region Waste Management Plan 2015-2021 was launched in 2015. While the key focus of the plan is household wastes it includes some sections and high level objectives in relation to non-process and process industrial wastes. The strategic vision of the plan is to revise the current approach to managing waste, by viewing waste streams as valuable resources. The plan promotes a circular economy approach and places a strong emphasis on preventing waste and encouraging material reuse activities.

In relation to operational waste the plan notes that municipal waste is a key stream for Ireland and prevention of waste arisings in this stream is an ongoing challenge. Municipal wastes include non-process industrial wastes. The plan predicts projections of growth in municipal waste generation in the region over the lifetime of the plan. High quality source segregation and presentation of dry recyclables and organic wastes are identified as key objectives in this area.

In relation to industrial wastes the plan notes an increase in waste generation in the region in recent years from 94,379 tonnes in 2010 to 136,479 tonnes in 2012. Roles and responsibilities are outlined in the plan for business

and industry include implementing best waste management practices in the workplace with the emphasis on waste prevention and resource efficiency, segregation of waste produced into appropriate waste streams and implementation of appropriate Environmental Management Systems.

In relation to residual and biowaste exports from the region the plan states that:

> *"The local authorities of the region support self-sufficiency and the development of indigenous infrastructure for the thermal recovery of residual municipal wastes in response to legislative and policy requirements. The preference is to support the development of competitive, environmentally and energy efficient thermal recovery facilities in Ireland, including the replacement of fossil fuels by co-combustion in industrial furnaces or cement kilns, and ultimately to minimise the exporting of residual municipal waste resources over the plan period."*

14.3.2.3 Wastes generated and handled at the existing ICL facility

Waste management at the ICL facility in Platin takes place in accordance with the conditions of the Industrial Emissions Licence (Reg. NO. P0030-04) granted by the EPA.

In addition, ICL operates an Environmental Management System certified to the international standard for Environmental Management ISO 14001. ISO 14001 includes measures to reduce creation of waste and adverse environmental impacts.

Naturally occurring ash components of fuel are recycled into ICL product on site at Platin. Currently fossil fuels and alternative fuels (SRF) are used to fire the cement kilns at ICL Platin. In 2011, ICL was granted permission to use a maximum of 120,000 tonnes of alternative fuels in Kiln 3 (refer MCC: Planning Refs.: SA/803066, as varied by SA120301). There is no permission for use of alternative fuels in Kiln 2.

Process dusts extracted from the kiln system, process intermediates and byproducts are currently incorporated back into the production process via the quarry or into the products during the cement milling process. This approach will continue following the implementation of the proposed development.

Waste generation at the existing Cement Works at Platin is set out in Table 14.2 below. Details have been obtained from 2016 monitoring data. Primary process streams are limestone/overburden/clay from production on site and a small quantity of mixed municipal wastes arise from onsite operations. In addition, maintenance activities on site generated bulky waste and scrap metal.

Table 14.2: Waste generation at the existing ICL facility in 2016, Platin

Waste material	List of Wastes Codes (previously European Waste Catalogue Code)	Quantity (tonnes per annum, 2016)	Destination (Recovery/ Disposal)
Sludges from water clarification	20 03 04	30.00	Biological treatment
Mixed municipal waste	20 03 01	213.269	R1/R13
Mixed municipal waste	20 03 01	24.252	Engineered landfill
Wood	20 01 38	32.5	Organic substance recycling/reclamation
Mixed dry recyclables	20 01 99	6.42	Organic substance recycling/reclamation
C&D	17 09 04	111.68	Inorganic substance recycling/ reclamation

Waste material	List of Wastes Codes (previously European Waste Catalogue Code)	Quantity (tonnes per annum, 2016)	Destination (Recovery/ Disposal)
Iron & steel	17 04 05	65.5	Metal recycling/ reclamation
Ferrous metal	19 12 02	120.46	Metal recycling/ reclamation
Concrete	17 01 01	434.909	Inorganic substance recycling/ reclamation
C&D	17 09 04	432	Inorganic substance recycling/ reclamation
Non-ferrous metal	19 12 03	14.92	Metal recycling/ reclamation
Metals	20 01 40	94.04	Metal recycling/ reclamation
other engine, gear and lubricating oils	13 02 08*	5.646	Oil re-refining or other reuses of oil
absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances	15 02 02*	10.748	Oil re-refining or other reuses of oil
oil filters	16 01 07*	1.76	Oil re-refining or other reuses of oil
packaging containing residues of or contaminated by hazardous substances	15 01 10*	2.15	Use as fuel
oily water from oil/water separators	13 05 07*	5.44	Use as fuel
wastes containing oil	16 07 08*	0.375	Use as fuel
Kerosene	11 03 13*	1.74	Solvent reclamation/regeneration
aqueous liquid wastes containing hazardous substances	16 10 01*	1.006	Metal recycling/ reclamation
discarded electrical and electronic equipment	20 01 35*	1.053	Metal recycling/ reclamation
solid wastes from gas treatment containing hazardous substances	10 13 12*	4,541	Land treatment resulting

Waste material	List of Wastes Codes (previously European Waste Catalogue Code)	Quantity (tonnes per annum, 2016)	Destination (Recovery/ Disposal)
			in benefit to agriculture or ecological improvement

*Hazardous waste

14.4 Characteristics of the Proposed Development

14.4.1 Construction Phase

14.4.1.1 General

Construction waste is defined as waste which arises from construction and renovation activities. Also included within the definition are surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities. Construction waste likely to arise during the excavation, demolition and construction phases can vary significantly from site to site but typically would include the types set out in Table 14.3 below and categorized by List of Waste Code.

Table 14.3: Typical Construction & Demolition List of Waste Codes and Corresponding Waste Descriptions

List of Waste Code	Waste Categories
17 01†	Concrete, bricks, tiles and ceramics
17 02†	Wood, glass and plastic
17 03†	Bituminous mixtures, coal tar and tarred products
17 04†	Metals (including their alloys)
17 05†	Soil (incl. excavated soil from contaminated sites) , stones and dredging spoil
17 06†	Insulation materials and asbestos-containing construction materials
17 08†	Gypsum-based construction materials
17 09†	Other construction and demolition wastes
16 02†	Wastes from electrical and electronic equipment (WEEE)
16 06†	Batteries and accumulators
03 02†	Waste from wood preservation
17 05 03*	Soil and stones containing hazardous substances
13 07†	Wastes of Liquid Fuels

† Some wastes within these categories may be hazardous
* Wastes marked with an asterisk are hazardous in the List of Wastes

Hazardous waste streams which could arise from construction activities may include the following (refer to Table 14.3 for List of Waste Codes):

- Waste electrical and electronic components;

- Batteries;
- Wood preservatives;
- Liquid fuels; and
- Contaminated soil.

14.4.1.2 Demolition

Permission for the demolition of Kiln 1 and the Kiln 1 Electrostatic Precipitator has been previously granted under Pl. Ref: LB140961. Therefore, the only element of demolition in the proposed development is the Fire Water Retention tank (92m^2) which will be relocated slightly west of its existing location.

A mixture of primarily crushed concrete with some steelwork will be generated from demolition. Where possible, Materials from demolition of the Fire Water Retention Tank will either be re-used for construction of the new tank in another location or for other elements of the proposed works.

14.4.1.3 Excavation

The following on site activities will require excavation:

- Excavation for foundations; and
- Installation of services.

Soil will be excavated as part of the preparatory works. This is likely to be restricted to the shallow subsoil and in most cases to made ground. Excavated soil will be used for landscaping works or re-used for construction elements of the proposed works.

14.4.1.4 Construction

Construction of the key elements set out in **Table 14.4** are likely to result in wastes. The proposed development will likely be constructed in stages over the short, medium and long-term over a period of ten years. It is envisaged that each stage of construction would last in the order of 6-9 months.

Table 14.4 Key Elements for Construction

Details of Proposed Structures (with reference to location as indicated on Figure 3.4)	Approximate Overall Building Dimensions (LxWxH)(m) Silo Dimensions (HxDia)(m)	Proposed External Treatment of Walls/Roof
Short-Term Structures		
1. Fine Solids Building for Kiln 3 (As an extension to existing Fine Solids (SRF) building)	Building c.17m x 29m x 16m	Exposed cast concrete, steelwork & metal corrugated cladding
Fire-water Retention Tank (*i.e.* relocation of existing tank, which is to be demolished)	Concrete tank c.17m x 10.6m x 2.5m on concrete pad c. 18.6m x 11.6m	Exposed cast concrete & steelwork
2. Proposed Pumpable Fluids Tanks for Kilns 2 and 3	2 no. Tanks c.9m x 8.24m dia. 1no. Tank c.9m x 5m dia.	Exposed cast concrete, steelwork and metal corrugated cladding
Bunded Area surrounding tanks	420sq.m enclosed by 2m high wall	Exposed cast concrete and steelwork
Tanker off-loading area	Concrete yard of c.23m x 10m, with 25m3 underground storage sump. Enclosed by 2.5m security fence	Exposed cast concrete, & steelwork

Details of Proposed Structures (with reference to location as indicated on Figure 3.4)	Approximate Overall Building Dimensions (LxWxH)(m) Silo Dimensions (HxDia)(m)	Proposed External Treatment of Walls/Roof
3. Proposed 'Free Flowing' Solids Silos for Kiln 3	2 no. silos c.26m x 5.5m dia.	Steel silos/tanks and steelwork
Bunded Area	9.2m x 15.1m x 4m	Exposed cast concrete & steelwork
4. Alternative Raw Materials Building for Kilns 2 & Kiln 3	Building c.53.7m x 53m x 14.3m	Exposed cast concrete, steelwork & metal corrugated cladding
Fire-water Retention Tank	13.6m x 10.6m x 2.5m on concrete pad c. 14.6m x 11.6m	Exposed cast concrete & steelwork
Medium-Term Structures		
5. Proposed general Fine Solids Building for back end of Kiln 2	Building c.26m x 49.5m x 8m	Exposed cast concrete, steelwork & metal corrugated cladding
Fire-water Retention Tank	Concrete tank c.9.6m x 9.6m x 2.5m on concrete pad c.10.6m x11.6m	Exposed cast concrete & steelwork
6. Proposed 'selected' Fine Solids fuel introduction / metering structures for front end of Kiln 2	Building c.7.5m x 6m x 26.7m 2 no. truck off-loading stations c.4m x 7.5m x 5.5m and c.35m length of conveyor	Exposed cast concrete, steelwork & metal corrugated cladding
Longer-Term Structures		
7. Tyre Storage and Handling Area	835sqm with 3m high wall	Exposed cast concrete.
Tyre Intake Station and Conveyor	c.18m x 16m x 30m plus c. 57m proposed conveyor.	Exposed cast concrete, steelwork & metal corrugated cladding
Transfer Station and Conveyor	c.8.5m x 5.5m plus c 55.3m proposed conveyor	Exposed cast concrete, steelwork & metal corrugated cladding
Fire-water Retention Tank	Concrete tank c.9.6m x 9.6m x 2.5m on concrete pad c. 10.6m x 11.6m	Exposed cast concrete & steelwork
8a. Proposed Coarse Solids handling building for Kiln 2 & 3	Building c.97.5m x 50m x 12.15m	Exposed cast concrete, steelwork & metal corrugated cladding
Fire-water Retention Tank	13.6m x 10.6m x 2.5m on concrete pad c. 14.6m x 11.6m	Exposed cast concrete & steelwork
8b. Conveying Building and Conveyors for Kiln 3	c.18m x 16m x 30.5m plus c.83m of proposed conveyor	Exposed cast concrete, steelwork & metal corrugated cladding
9. Proposed Free-flowing Solids for Kiln 2.	2no. silos c.26m x 5.5m dia.	Steel silos/tanks & steelwork
Bunded Area	9.2m x 15.1m with 4m high wall	

Details of Proposed Structures (with reference to location as indicated on Figure 3.4)	Approximate Overall Building Dimensions (LxWxH)(m) Silo Dimensions (HxDia)(m)	Proposed External Treatment of Walls/Roof
		Exposed cast concrete & steelwork
10. Bypass Filter for Kiln 2	c.9m x 15m x 24m, with cooling tower to c.46m x 5.6m dia.	Steel, steelwork & ductwork
Proposed Coarse Solids for Kiln 2 (*makes use of same building as provided under Item 7a above*.)	Makes use of same building as provided for under Item 8a above.	Exposed cast concrete, steelwork & metal corrugated cladding.
11. Truck off-loading / elevator / buffer building for Kiln 2	c.16m x 18m x 30.5m	Exposed cast concrete, steelwork & metal corrugated cladding.
Transfer Station	c.8.5m x 5.5m x 38.5m plus c.200m of proposed conveyor	Exposed cast concrete, steelwork & metal corrugated cladding

The Building Research Establishment in the UK has gathered benchmark waste generation data from over 1,000 new build construction projects. For Industrial Buildings a waste generation rate of 13.4 tonnes/100m^2 floor area is estimated based on data gathered up to November 2011.

Therefore, at ICL Platin where the proposed new floor area is c.13,000m^2, (of which c.10,000 sq.m. is new building) an estimated 1,750 tonnes of waste could be expected to be generated during the construction phase.

14.4.2 Operational Phase

It is proposed to increase alternative fuel and alternative raw materials use at the Platin facility by 480,000 tonnes per annum on a phased basis over the ten years from grant of planning. This is based on introduction of alternative fuels to both Kilns 2 and 3 and the availability of suitable alternative raw materials. These alternative fuels are likely to include additional SRF, solvents, tyres and dried sewage sludge *etc*. Rejected consignments of alternative fuels and alternative raw materials will be returned to the supplier (see also Section 14.6.2). Current on-site cement production will be maintained.

Naturally occurring ash components of the fuels that arise inside the kiln are directly incorporated into the cement clinker production process at Platin. Process dusts extracted from the kiln system, process intermediates and by-products will continue to be incorporated back into the production process via the quarry or into the products during the cement milling process.

On the basis of the above, no additional process waste will be produced as a result of the operational phase of the proposed development.

14.5 Predicted Effects of the Proposed Development

14.5.1 Do-nothing Scenario

The resource and waste management impact assessment assumes that under the 'do-nothing' scenario the Proposed Development would not be developed. Consequently, there would be a neutral effect with regard to waste management.

14.5.2 Construction Phase

The construction stage waste management effects are deemed to be moderate, negative and short term.

14.5.3 Operational Phase

Use of residual and hazardous waste as fuel in cement kilns in Ireland is preferable to landfill or export for use as fuel as identified in the three Regional Waste Management Plans, 2015. Movement of waste management up the hierarchy and preventing export of residual and hazardous wastes is a key objective of Irish waste management policy and planning. The use of these alternative fuels directly replaces imported fossil fuels and therefore, the waste management effect during the operational phase of the proposed development is significant, positive and long-term.

14.5.4 Worst case Scenario

The worst-case scenario has been assessed in Section 14.5.3 above.

14.6 Mitigation Measures

14.6.1 Construction Phase

This section describes the measures to mitigate the significant effects for the construction phase of the proposed scheme.

The recommended mitigation for the demolition, excavation and construction phases of the scheme comprises the preparation of a Construction Waste Management Plan which meets the requirements of the *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects* (DoEHLG, 2006a). Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental effect. The outline Construction and Demolition Plan for the proposed development is attached as Appendix 14.1.

Possibilities for re-use of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use. Where excavation material cannot be re-used within the proposed works it can be transferred to the overburden mound on site.

The contractor will ensure that any off-site facilities to which construction waste is delivered have the appropriate Certificate of Registration, Waste Facility Permit or Waste License in place.

In addition to the above during the construction phase the following mitigation measures are recommended:

- Source Segregation: Where possible metal, timber, glass and other recyclable material will be segregated during demolition works and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation;
- Material Management: '*Just-in-time*' delivery will be used so far as is reasonably practicable to minimise material wastage; and
- Waste Auditing: The Contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material whether is recovered or disposed of.

14.6.2 Operational Phase

A number of measures are proposed to continue to ensure the quality of the alternative fuels and alternative raw materials being used on site:

- Visual inspection and sampling of all materials, where appropriate, will be carried out. Sampling procedures will be in compliance with the on-site ISO 9001 Quality System. Sampling frequencies will be determined

based on the previous fuel characterisation exercises carried out during supplier evaluation and auditing. Composite samples representing production campaigns from each supplier will be analysed as required by fuel specification. Regular testing will be carried out to determine compliance of the alternative fuels with relevant standards. Net Calorific Value (NCV) and relevant metals content will be tested. SRF will be tested to ensure compliance with "IS EN 15359:2011 Solid recovered fuels. Specifications and classes".

- Testing of a composite sample will be carried out to confirm that the fuels supplied are in compliance with the agreed specification. Testing frequency is likely to be greater during initial evaluations and be adjusted as compliance confidence increases.

In addition to the above, sampling and analysis system, random tests will continue to be carried out each quarter where samples will be taken from deliveries of alternative fuels and alternative raw materials from individual suppliers. These will be tested and the results will be used as part of an on-going supplier auditing programme to ensure compliance with specification. Non-conforming loads will be rejected where they fail to satisfy the fuel acceptance procedures. Any such rejected loads which have not been offloaded will be returned directly to the supplier. Further deliveries from the same supplier may be delayed and subject to additional testing until compliance can be re-established.

During the operational phase, all of the new proposed fuel types shall be stored in appropriate buildings, tanks, silos etc. and within appropriately bunded and protected areas so as to prevent any possible run-off to surface waters or leaching to groundwater or soils.

14.7 Residual effects

14.7.1 Construction Phase

Following implementation of the mitigation described in Section 14.6, the effect following the adoption of mitigation measures is determined to be slight, negative and short-term.

14.7.2 Operational Phase

The residual operational phase effect of the proposed development will be significant, positive and long term.

14.8 Monitoring

14.8.1 Construction Phase

The following shall be monitored by the contractor during the construction phase:

- Excavation waste generation measured in tonnes categorised by List of Waste Code;
- Demolition waste generation measured in tonnes categorised by List of Waste Code;
- Construction waste generation measured in tonnes categorised by List of Waste Code;
- Name, address and copy of current licence, permit or certificate of registration for all facilities to which waste from the site is delivered; and
- Waste type categorized by List of Waste code and quantity in tonnes delivered to each authorised waste facility from site.

14.8.2 Operation Phase

Monitoring of waste generation and management during operation will be undertaken by ICL as required by the Industrial Emissions Licence for the facility.

14.9 Cumulative Effects

No significant cumulative effects in relation to waste management are anticipated.

14.10 References

Building Research Establishment (BRE), 2012.

http://www.smartwaste.co.uk/filelibrary/benchmarks%20data/Waste_Benchmarks_for_new_build_projects_by_project_type_30_November_2011.pdf [accessed 16 June 2015]

Department of the Environment and Local Government (DoELG), 1998. 'Waste Management - Changing Our Ways' – A Policy Statement. DoELG, Dublin Ireland.

DoELG, 2002. Preventing and Recycling Waste – Delivering Change – A Policy Statement. DoELG, Dublin Ireland.

DoEHLG, 2004. Waste Management - Taking Stock and Moving Forward. DoEHLG, Dublin Ireland.

DoEHLG, 2006. National Strategy on Biodegradable Waste Management. DoEHLG, Dublin Ireland.

DoEHLG, 2006. Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects. DoEHLG, Dublin Ireland.

DoECLG, 2012. A Resource Opportunity- Waste Management Policy in Ireland. DoECLG, Dublin Ireland.

DoECLG, 2012. A Resource Opportunity- Waste Management Policy in Ireland. DoECLG, Dublin Ireland.

Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on Waste.

Eastern-Midlands Waste Region, 2015. Eastern-Midlands Region Waste Management Plan 2015-2021

Environmental Protection Agency, EPA, 2002a. EPA Guidelines on the Information to be contained in Environmental Impact Statements. EPA, Wexford, Ireland.

EPA, 2002b. EUROPEAN WASTE CATALOGUE AND HAZARDOUS WASTE LIST. VALID FROM 1 JANUARY 2002. EPA, Wexford, Ireland.

EPA, 2015. (Consultation Draft) Advice Notes on Current Practice in the Preparation of Environmental Impact Statements. EPA, Wexford, Ireland.

EPA, 2014. National Waste Report 2012. EPA, Wexford, Ireland.

EPA, 2014.National Hazardous Waste Management Plan 2014-2020. EPA, Wexford, Ireland.

EPA, 2015. Waste Classification List of Waste & Determining if Waste is Hazardous or Non- hazardous. Valid from 1st June 2015. EPA, Wexford, Ireland.

European Commission (EC), 2010. Europe 2020 Strategy. Publications Office of the European Union, Luxemburg.

European Commission, 2011. Roadmap to a Resource Efficient Europe. Publications Office of the European Union, Luxemburg. European Commission, 2014. 7th Environmental Action Programme, Publications Office of the European Union, Luxemburg.

Meath County Council, 2013. Meath County Development Plan 2013-2019. Meath County Council, Navan, Ireland.

National Standards Authority of Ireland (NSAI), 2009. I.S. EN ISO 14001:2004 Environmental Management. NSAI, Dublin, Ireland.

SI 126 of 2011 - European Communities (Waste Directive) Regulations 2011.

Waste Management Acts, 1996-2014 and Regulations Made under the Acts

Waste Management (Collection Permit) Regulations, 2007 as Amended.

15 INTERACTIONS OF THE FOREGOING

15.1 Introductions

Chapters 4 to 14 inclusive of the EIA Report has assessed the effects of the proposed development on individual environmental topics (e.g. biodiversity, noise & vibration, etc.). In the course of these assessments and where appropriate, consideration was also given to potential interactions with other environmental topics (*e.g.* landscape & visual with cultural heritage; or air quality & climate with traffic & transportation *etc*.). These interactions are discussed, as appropriate, in the relevant chapters of the EIA Report.

The assessment of the proposed development has identified minimal potential for negative effect within individual environmental topics and as such, the potential for effects arising from interactions between environmental topics is similarly limited. Nonetheless, this chapter provides for specific assessment of the interactions between the various environmental topics and the potential for these interactions to give rise to further effects.

15.2 Context to Potential for Environmental Interactions

Platin Cement Works is an existing long-established cement manufacturing facility operating on its current site since 1972. The facility operates in accordance with its planning permissions and is also monitored and regulated by the Environmental Protection Agency (EPA) in accordance with the Industrial Emissions Directive Licence (IE No. P0030-04) issued by the EPA.

At present Platin Cement Works uses fossil fuel as well as up to 120,000 tonnes per annum of alternative fuels which it uses to replace a portion of fossil fuel use. This existing permitted use of alternative fuels is also covered by the IE licence and as such, many of the environmental parameters considered and assessed in the EIA Report are already a feature of the existing background under which Platin Cement Works currently operates on a daily basis.

The proposed development will allow for the further replacement of fossil fuel and will also allow for the replacement of a portion of traditional raw materials used in cement manufacture with alternative raw materials. This entails an increase in the quantity and range of such alternative fuels and alternative raw materials used up to an additional 480,000 tonnes per annum. While additional buildings, structures and plant are required, all will be located within the existing developed footprint of the Cement Works. Operation of the proposed development will also come within the control and monitoring of a revised IE Licence.

15.3 Environmental Interactions

In most instances, potential environmental interactions have already been considered in the preparation of the various chapters of the EIA Report. The following potential interactions have been specifically considered or are inherent in the assessments carried out in the relevant EIA Chapters. The assessments conclude that no potential for significant adverse effect arises and no adverse interaction effect was identified:

- Population & Human Health with Water & Hydrology
- Population & Human Health with Air Quality & Climate
- Population & Human Health with Noise & Vibration
- Biodiversity with Land, Soils, Geology and Hydrogeology
- Biodiversity with Water & Hydrology
- Biodiversity with Air Quality & Climate
- Land, Soils, Geology & Hydrogeology with Water & Hydrology
- Air Quality & Climate with Cultural Heritage
- Air Quality & Climate with Traffic & Transportation
- Landscape & Visual with Cultural Heritage
- Landscape & Visual with Population
- Waste Management with Traffic & Transportation

In addition, an interactions matrix table is provided at Table 15.1. This indicates where interactions have the potential to arise during the construction stage (C); operation stage (O) or construction & operation stages (CO).

These potential interactions are also discussed in further detail in section 15.2.1 below.

Table 15.1 Matrix of Potential Interaction of Effects

	Population & Human Health	Biodiversity – (Flora & Fauna)	Soils, Geology & Hydrogeology	Water & Hydrology	Air Quality & Climate	Noise & Vibration	Landscape & Visual	Cultural Heritage	Traffic & Transportation	Material Assets	Waste Management
Population & Human Health											
Biodiversity (Flora and Fauna)	-										
Land, Soils, Geology & Hydrogeology	-	C									
Water & Hydrology	CO	CO	-								
Air Quality & Climate	CO	O	-	-							
Noise & Vibration	CO	-	-	-	-						
Landscape & Visual	C	-	-	-	-	-					
Cultural Heritage	-	-	-	-	O	-	CO				
Traffic & Transportation	CO	-	-	-	CO	-	-	-			
Material Assets	CO	CO	CO	-	-	CO	-	-	CO		
Waste Management	CO	CO	-	CO	CO	-	CO	CO	CO	CO	

Key: - *No effect / imperceptible effect*
C Construction stage
O Operation stage
CO Construction & operation stages

15.3.1 Potential Interactions

While interactions between various environmental topics are detailed in the following, it is noted that potential effects may be negative or positive. The following provides examples of potential negative and positive interactions:

Potential Negative Effects

- potential effects on reduced water quality on population
- potential effects on reduced air quality on population
- potential effects of increased noise on population
- potential effects of dust on population

- potential effects of dust on biodiversity
- potential effects on air quality on stone work forming part of cultural heritage
- potential effects on increased traffic on air quality

Potential Positive Effects

- potential effects on climate on population arising from reduced CO_2 emissions
- potential effects of reducing waste disposal land, soils, geology and hydrogeology
- potential effects of reducing waste disposal on material assets (natural resources)

15.3.1.1 Population and Human Health

The assessment of effects on population and human health is detailed in Chapter 4 of the EIA Report. There is potential for effects from interaction with water & hydrology, air & climate, and noise & vibration arising from both the construction and operation stages to effect population and human health. As noted under 15.3 above potential effects on human health from these environmental factors are an inherent aspect of the assessment of effects on human health as detailed in Section 4.2 Human Health in Chapter 4 of the EIA Report. No significant effect is identified in the assessment.

The potential for effects of emissions on human beings is set out in detail in Chapter 7 Water & Hydrology; Chapter 8 Air Quality & Climate and Chapter 9 Noise & Vibration of the EIA Report. Specific mitigation measures are proposed, where required, during the construction stage and during operation stage, all emissions to the environment are licenced and monitored by the EPA in accordance with the Industrial Emissions Licence for the Cement Works. Therefore, with the specified mitigation in place for the construction stage, no adverse effect will arise either during the construction or operation stage arising from interactions with population & human health of water & hydrology, air & climate, and noise & vibration.

The potential for interaction with landscape and visual is an inherent aspect of the assessment prepared in Chapter 10 Landscape & Visual of the EIA Report, where no significant landscape or visual effect is predicted either during the construction or operation stages.

While potential for construction and operation stage effects exist in relation to traffic, Chapter 12 Traffic and Transportation concludes that '*the increase in traffic during both the construction and operational stages is insignificant and will have no material impact on the road network*.' (Section 12.7)

Chapter 13 Material Assets notes that proposed development has the potential in the use of natural assets for minor negative effect during the construction stage; however the operational will have a positive effect replacing the use of imported fossil fuels and a portion of traditional raw materials used in the manufacture of cement.

Potential for effects arising from construction stage waste are detailed in Chapter 14 Waste Management concludes that during the construction stage '*the effect following the adoption of mitigation measures is determined to be slight, negative and short-term*' (Section 14.7.1). The assessment concludes that recycling and recovering wastes that would otherwise be directed to export or landfill, the effect during the operation phase *will be significant, positive and long term.'* (Section 14.7.2)

15.3.1.2 Biodiversity (Flora & Fauna)

The assessment of effects on biodiversity is detailed in Chapter 4 of the EIA Report. The assessment notes that proposed development is sited in and around the existing Cement Works and concludes that the proposed development will have no direct adverse effect. However, during the construction stage potential for effects arises from interaction with land, soils, geology and hydrogeology and from water and hydrology. Chapter 6 Land, Soils, Geology and Hydrogeology and Chapter 7 Water & Hydrology detail specific mitigation measures to ensure that no such potential construction stage effects arise.

Potential effects from emissions, including to water & hydrology, during the operation stage are addressed under the controls and monitoring established by the IE licence for the Cement Works.

The impact of the proposed development on sensitive ecological sites has been fully assessed in Chapters 5 Flora and Fauna and Chapter 8 Air Quality and Climate of the EIA Report and no significant impact will arise. The predicted concentrations for NO_x complies with the relevant Air Quality Standards for the protection of vegetation.

In terms of interactions with Material Assets the proposed development has potential in the use of natural assets for minor negative effect during the construction stage; however the operation stage will have a positive effect replacing the use of imported fossil fuels and a portion of traditional raw materials used in the manufacture of cement.

Potential for effects arising from construction stage waste are detailed in Chapter 14 Waste Management concludes that during the construction stage '*the effect following the adoption of mitigation measures is determined to be slight, negative and short-term*' (Section 14.7.1). The assessment concludes that recycling and recovering wastes that would otherwise be directed to export or landfill, the effect during the operational phase *will be significant, positive and long term.'* (Section 14.7.2).

Separate Screening Report for Appropriate Assessment and Natura Impact Statement (NIS) have been prepared and no likely significant impact will arise on any Natura 2000 (European) sites.

Consequently, no significant effect will rise from the interaction between biodiversity and other environmental topics.

15.3.1.3 Land, Soils, Geology and Hydrogeology

The assessment of effects on land, soils, geology and hydrogeology is detailed in Chapter 6 of the EIA Report. This assessment indicates that with specified migration in place no significant effects will arise.

In terms of interaction with Materials Assets, the proposed development has potential for positive effect replacing a portion of traditional raw materials, which are natural resources, with alternative raw materials that may otherwise be treated as wastes. No significant effects will rise from the interactions with land, soils, geology and hydrogeology.

15.3.1.4 Water & Hydrology

The assessment of effects on water and hydrology is detailed in Chapter 7 of the EIA Report. Waste arising from the construction phase has potential for effect on emissions to water. Specific mitigation measures have been detailed in Chapter 7 of the EIA Report and in Appendix 3.4 Construction and Environmental Management Plan to ensure no risk to water arises from the construction activities. During the operation stage, all alternative fuels and alternative raw materials will be stored in appropriate buildings, tanks, silos etc. and within appropriately bunded and protected areas so as to prevent any possible runoff to surface waters. No processing of materials will take place on site and alternative fuels will be delivered to Platin Cement Works to a defined specification ready for use. Consequently, no significant effect will rise from the interaction between wastes and water or between water and hydrology and other environmental topics.

15.3.1.5 Air Quality & Climate

The assessment of effects on air quality and climate is detailed in Chapter 8 of the EIA Report. Platin Cement Works operate under IE licence from the EPA. This licence controls and monitors emissions to the air. Under the Proposed Development, the Cement Works will continue to operate to its licence limits and no adverse air quality impacts will arise. Specific mitigation measures have been detailed in Chapter 8 of the EIA Report and in Appendix 3.4 Construction and Environmental Management Plan to ensure minimise dust generation during construction activities.

Potential arises for interaction with traffic generation both during construction, including from waste removal, and during operation. Chapter 12 which sets out the assessment of effects on Traffic and Transportation notes that while the proposed development will result in additional traffic '*the increase in traffic during both the construction*

and operational stages is insignificant and will have no material impact on the road network'. (Section 12.7). The effect of traffic generation has also been considered in Chapter 8 Air Quality and Climate and traffic generation arising from waste management has been considered in Chapter 14 of the EIA Report.

The potential for air quality to effect on features of cultural heritage is considered in Chapter 11 Cultural Heritage of the EIA Report and no adverse effect will arise as a result of the proposed development.

No significant effects will rise from the interactions with air quality and climate.

15.3.1.6 Noise & Vibration

The assessment of effects on noise and vibration is detailed in Chapter 9 of the EIA Report. Platin Cement Works operate under IE licence from the EPA. This licence controls and monitors noise and vibration emissions. Under the Proposed Development, the Cement Works will continue to operate to its licence limits and no adverse noise and vibration impacts will arise. Specific mitigation measures have been detailed in Chapter 8 of the EIA Report and in Appendix 3.4 Construction and Environmental Management Plan to minimise noise effects during construction activities. No significant effects will rise from the interactions with air quality and climate.

15.3.1.7 Landscape & Visual

The assessment of effects on landscape and visual aspects is detailed in Chapter 10 of the EIA Report. Consideration of potential for visual impact from the UNESCO World Heritage Site of Brú na Bóinne has been considered in full under Chapter 10 Landscape and Visual and notes no significant effect will arise on cultural heritage.

In terms of interaction with waste management, it is noted that specific mitigation measures are detailed for the construction stage in Appendix 3.4 Construction and Environmental Management Plan of the EIA Report and that during the operation stage all alternative fuels and alternative raw materials will be stored in appropriate buildings, tanks, silos etc. and within appropriately bunded and protected areas. No processing of materials will take place on site and alternative fuels will be delivered to Platin cement Works to a defined specification ready for use. No significant effects will rise from the interactions with landscape and visual.

15.3.1.8 Cultural Heritage

The assessment of effects on cultural heritage is detailed in Chapter 11 of the EIA Report. Potential interaction with landscape and visual aspects has been considered in Chapter 10 of the EIA Report. No significant effects will rise from the interactions with cultural heritage.

15.3.1.9 Traffic & Transportation

The assessment of effects on traffic and transportation is detailed in Chapter 12 of the EIA Report. Potential arises for interaction with material assets (natural resources as raw materials) both during construction, and from waste removal, as well as during operation. Chapter 12 which sets out the assessment of effects on Traffic and Transportation notes that while the proposed development will result in additional traffic '*the increase in traffic during both the construction and operational stages is insignificant and will have no material impact on the road network'*. (Section 12.7). The effect of traffic generation arising from waste management has also been considered in Chapter 14 of the EIA Report. No significant effects will rise from the interactions with traffic and transportation.

15.3.1.10 Material Assets

The assessment of effects on materials assets is detailed in Chapter 13 of the EIA Report. In using alternative fuels and alternative raw materials, the proposed development offsets the requirement for use of fossil fuels and a portion of traditional raw materials with a positive effect on natural resources and on CO_2 emissions. With specified mitigation measures in place no significant adverse effects will rise from the interactions with material assets.

15.3.1.11 Waste Management

The assessment of effects on waste management is detailed in Chapter 14 of the EIA Report. Potential interactions with other environmental topics is discussed in the sections above. In using alternative fuels and alternative raw materials, the proposed development provides for recovery and recycling of materials that may otherwise go as waste export or to landfill. Therefore, the proposed development can have a positive effect on waste. With specified mitigation measures in place no significant adverse effects will rise from the interactions with waste management.

15.4 Cumulative Effects

The potential for interaction and cumulative effects between the proposed development and other developments in the surrounding area are considered, where appropriate, in the individual chapters of the EIA Report, (*e.g.* air quality & climate, traffic and transportation, etc.).

Platin Cement Works is an existing long-established cement manufacturing facility operating on its current site since 1972. The facility is monitored and regulated by the Environmental Protection Agency (EPA) in accordance with the Industrial Emissions Directive Licence (IE No. P0030-04) issued by the EPA.

The proposed development is located within the context of an existing facility, which will continue to operate in accordance with its IE licence. The proposed development also relates to the expansion of an existing permitted and licenced activity – the replacement of imported fossil fuel with alternative fuels. The proposed development will also allow replacement a portion of traditional raw materials used in cement manufacture with alternative raw materials.

Therefore, the proposed development does not introduce new development and effects to a greenfield site but continues and expands an existing activity on an existing major industrial cement manufacturing facility where potential effects are appropriately managed and licenced.

15.5 Conclusion of Potential effects of Interactions

The Proposed Development at Platin Cement Works site will allow for the virtual replacement of imported fossil fuels with alternative fuels and for the use of alternative raw materials in the manufacture of cement. Many of these alternative fuels and raw materials are waste materials which would otherwise go to export or to waste disposal such as landfilling.

The proposed development is considered to be consistent in the proper planning plan and sustainable development of the area and is consistent with national, regional and local policy including with the Eastern-Midlands Regional Waste Management Plan.

Previous chapters of this EIA Report have dealt with any potential effects arising from the proposed development and where potential negative effects have been identified appropriate mitigation measures have been proposed to reduce or avoid these impacts. No potential significant effects have been identified arising from interactions or from cumulative effects.