ATTACHMENT No. C

SITE MANAGEMENT AND CONTROL

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C.1 Site Management & Control

The structure of the company is provided in the organisational chart for Head Office, Platin and Limerick works below. The Technical Manager has overall responsibility for the Environmental Management System within the organisation as a whole. The relevant Environmental Manager or his nominated deputy at each works has overall responsibility for all environmental issues at works level.

C.2 Environmental Management System (EMS)

The Limerick Works operates within the overall Irish Cement Ltd Environmental Policy. The Company Environmental Policy can be found in the Company Environmental Manual. The most recent revision of the Company Environmental Manual is included in this Addendum C1.

The scope of the Environmental Management System deals with the environmental aspects of Irish Cement Operations, which have a direct and significant impact on the environment.

In order to further demonstrate its commitment to implementing, maintaining and continually improving its environmental management system Irish Cement Ltd. has adopted the International Standard ISO 14001: 2004 and ISO 9001:2008. A copy of these documents are contained in Addendum C2.

This manual outlines the requirements for the environmental management system at Irish Cement Limited. A description of company operations is outlined in section 3 of the Company Quality Manual. A copy of this manual is contained in Addendum C3.

The ISO 14001 standard specifies requirements for an environmental management system, to enable the organisation to formulate a policy and objectives taking into account legislative requirements and information about significant environmental impacts.

This Company Environmental Manual mirrors the format of the requirements of the standard ISO 14001:2004 and provides an overview of the Environmental Management System within the organisation as a whole. A copy of this document is contained in Addendum C1.

This manual is available to both management and relevant personnel to serve as a guide to environmental issues relating to the operations of the organisation.
It is company policy, and the policy of plant management, to be good neighbours and to address environmental concerns in the locality. In order to succeed it is the responsibility of all personnel (employees and contractors) at each location to be vigilant and to be aware of good environmental practices.

Any queries relating to this manual, or any environmental issues, are addressed to the Technical Manager or to the relevant Environmental/Production Managers at each works or their nominated deputies.

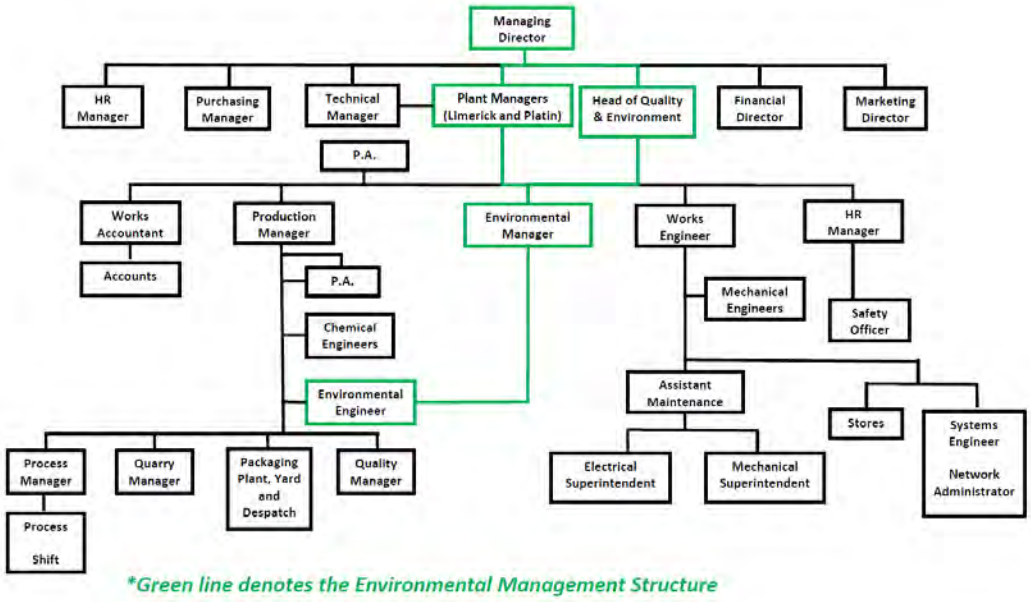

Figure C.1 Organisational chart for Irish Cement Head Office, Platin and Limerick works

Irish Cement implemented the ISO14001 accredited Environmental Management System and an ISO9001 accredited Quality Management System into day-to-day operations in order to continually improve, attain and maintain the highest standards of performance.

In addition, in November 2014, ICL became the first company in the Republic of Ireland to attain accreditation to the BES6001 standard for the Eco-efficient CEMI and CEM II products. The BES6001 standard requires that measurable and verifiable performance improvements under all three pillars of sustainability (Environmental, Societal and Economic) must be addressed rather than just focus on any one aspect to the detriment of any other. The introduction of this certification ensures that the broader sustainable development aspects are integrated into all business decisions.

Irish Cement recognises the environmental responsibilities associated with all the aspects of its operations and as a matter of policy seeks to avoid, reduce and mitigate any potentially adverse effects on the environment.

The Company is committed to the integration of environmental considerations into decision making at all levels of its organisation.

Through its Annual Environmental Programmes, Irish Cement aims at continual improvements with regard to the following:

- Minimising the environmental impact of emissions
- Conserving mineral and energy resources
- Minimising waste generation
- Minimising water consumption
- Reducing the visual impact of its operations
- Reducing the adverse impact of transportation
- Responsible sourcing of supply materials

The company seeks to exist as a good neighbour to those living close to its plants and has adopted a policy of open communication on environmental performance.

C.3 Hours of Operation

Operational Phase
The continuous plant from raw material stores to cement silos is operated under the control of a shift supervisor. Normally Limerick works operates 24 hours per day and for 7 days each week from quarry operation through to cement despatch/customer collections.

Construction Phase

The proposed structures will be constructed over a number of construction stages; each likely to be of approximately 6 to 9 months duration.

The hours of construction will be in compliance with the planning permission for the development.

C.4 Fit and Proper Person

Irish Cement can confirm that no employees of ICL Limerick have been convicted under the Environmental Protection Agency Act 1992, as amended, the Waste Management Act 1996, as amended, the Local Government (Water Pollution) Acts 1997 and 1990, the Air Pollution Act 1987 and the Air Pollution Act 1987 (Environmental Specifications for Petrol and Diesel Fuels)(Amendment) Regulations 2004.

Details of the qualifications, technical knowledge and experience of the relevant ICL Limerick employee, Mr Seamus Breen is provided in Addendum C5.

Addendum C

C.1 Company Environmental Manual

NOTE

THE CONTROLLED VERSION OF THIS ENVIRONMENTAL MANUAL IS THE COMPUTER NETWORK DRIVE VERSION (LOCATED AT {\\icl-ho-files\ISO_14001_EMS}).

COMPANY ENVIRONMENTAL MANUAL

ISSUE NO. 4

ISO 14001: 2004

Irish Cement Ltd.
Platin
Drogheda
Co. Louth

Tel: (041) 987 6000
Fax: (041) 987 6400
e-mail: info@irishcement.ie

Jimmy Kehoe, Technical Manager

This Company Environmental Manual incorporates, the Irish Cement Environmental Management Systems, at the following locations,

- **HEAD OFFICE**

(Platin, Drogheda, Co. Louth)

- **LIMERICK WORKS**

(Castlemungret, Co. Limerick)

- **PLATIN WORKS**

(Platin, Drogheda, Co. Louth)

Including the following locations,

- **PREMIER CEMENT**

(Toomebridge Depot, Co. Antrim)

- **RINGSEND DEPOT**

(Dublin)

- **RINGASKIDDY DEPOT**

(Cork)

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DISTRIBUTION AND UPDATING

The electronic network version of this Company Environmental Manual is the master-copy. All printed versions of this Company Environmental Manual are uncontrolled. Any paper copy must be cross-checked with the electronic network version to ensure that it is current.

This Environmental Manual is available on all three separate computer network systems at the three main company locations i.e. Head Office, Platin Works and Limerick Works in a "Read Only" format.
Amendments to the mastercopy will be accessible immediately on all three network systems.

The electronic network version of the Company Environmental Manual and the relevant procedures, required by the Environmental Standard ISO 14001: 2004, is available through the following link, {\\icl-ho-files\ISO_14001_EMS}.

Seamus Breen, Environmental Manager has overall responsibility for issuing necessary amendments to the network master copy version of the Company Environmental Manual.

All pages reissued or pages added shall be listed in a revision list on page (iii), which shall indicate Section, Page, Revision Number, Date Effective and the name of the Approver.

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REVISIONS TO ISSUE NO.3

SECTION	PAGE	REV.NO.	EFFECTIVE	APPROVED BY
All		0	01/10/12	J Kehoe

Index

1. INTRODUCTION & SCOPE

Irish Cement is committed to providing cement products for use in construction which are sustainable. To this end we have developed a Responsible Sourcing Policy in accordance with the requirements of the BRE Environmental and Sustainability Standard BES 6001. This standard has been prepared by BRE to provide a framework for the assessment of responsible sourcing and to give a route to certification of construction products. The requirements of the standard include that we measure, monitor, verify and report on our sustainability performance across a wide range of parameters including:

- Health & Safety Management
- Quality Management
- Environmental Management
- Supply Chain Management & Material traceability

All of these aspects of our sustainability performance are available via the links on the company website at **www.irishcement.ie/sustainable-development** .

Irish Cement Limited operates under the conditions of the IPPC licences issued to its facilities at Platin and Limerick by the EPA under IPC legislation since 1996. Irish Cement is also committed to complying with other environmental legislation outside the scope of IPC legislation, which is relevant to its operations and activities. The scope of the Environmental Management System deals with the environmental aspects of Irish Cement Operations, which have a direct and significant impact on the environment.

The Environmental Management System also incorporates the "Greenhouse Gas Monitoring and Reporting Management System". This system is outlined in the Greenhouse Gas Monitoring and Reporting Manual (See Masterlist of Controlled Documents - Appendix A – No 26).

In order to further demonstrate its commitment to implementing, maintaining and continually improving its environmental management system Irish Cement Ltd. has decided to adopt the International Standard ISO 14001: 2004.

This manual outlines the requirements for the environmental management system at Irish Cement Limited. A description of company operations is outlined in section 3 of the Company Quality Manual, which can be accessed here or by reference to the Masterlist of Controlled EMS Documents (See Appendix A – No. 2).

The ISO 14001 standard specifies requirements for an environmental management system, to enable the organization to formulate a policy and objectives taking into account legislative requirements and information about significant environmental impacts.

This Company Environmental Manual mirrors the format of the requirements of the standard ISO 14001:2004 and provides an overview of the Environmental Management System within the organisation as a whole.

This manual is available to both management and relevant personnel to serve as a guide to environmental issues relating to the operations of the organisation.

It is company policy, and the policy of plant management, to be good neighbours and to address environmental concerns in the locality. In order to succeed it is the responsibility of all personnel (employees and contractors) at each location to be vigilant and to be aware of good environmental practices.

Any queries relating to this manual, or any environmental issues, should be addressed to the Technical Manager, Environmental Manager or to the relevant Production Managers at each works or their nominated deputies.

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2. INTEGRATED POLLUTION PREVENTION CONTROL (IPPC) LICENCES

The Environmental Protection Agency (EPA), the statutory body for IPPC licensing, in exercise of the powers conferred on it by the Environmental Protection Agency Act: 1992, has granted Licences to both Platin Works and Limerick Works, concerning the production of cement subject to the conditions as set out in the licences.

The primary aim of IPPC Licensing is to prevent or reduce emissions to air, water and land, including noise emissions, and to reduce waste arising.

Both IPPC licences follow the same format with a series of conditions and schedules. These schedules are specific to the site and stipulate for all emissions, the emission limit values, the control equipment along with the method and frequency of monitoring. The management of waste is also addressed. Finally, the reporting requirements are summarised.

Platin Works was granted an IPPC licence on 31st January 2011, i.e. Licence Register number P0030-04 (formally known as Reg. No. P0030-03, P0030-02, 268 and originally 30). All references to the old Reg. No. "P0030-02" or "268" or "30" now refer to the current IPPC Licence "P0030-04".
Limerick Works was granted an IPPC licence on 28th April 2009,, i.e. Licence Register number P0029-02 (formally known as Reg. No. P0029-01, 268 and originally 29). All references to the old Reg. No. "P0029-01 "or "29" now refer to the current IPPC Licence "P0029-02".
Plant operating instructions are drafted to incorporate licence requirements. Specific instructions or interpretations are issued as required.

Also Environmental Instructions and Guidelines have been issued at both works, which contain instructions relating to the management of environmental issues specific to that location.

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3. ORGANISATIONAL STRUCTURE

Roles and Responsibilities

The structure of the company is outlined in the organisational charts for Head Office, Limerick and Platin works, which are set out in Appendices A-C of the Company Quality Manual , which can be accessed here or by reference to the Masterlist of Controlled EMS Documents (See Appendix A – No.2).

The Technical Manager has overall responsibility for the Environmental Management System within the organisation as a whole.

The Environmental Manager or his nominated deputy has overall responsibility for all environmental issues at works level.

The Management Representative at Head Office is Jimmy Kehoe, Technical Manager, or his nominated deputy.

The Management Representative at Platin and Limerick Works is Seamus Breen, Environmental Manager, or his nominated deputy.

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4.0 ENVIRONMENTAL MANAGEMENT SYSTEM GENERAL REQUIREMENTS

4.1 General Requirements

Irish Cement Ltd. is committed to implementing maintaining and continually improving an environmental management system, which meets the requirements of the Environmental standard ISO 14001:2004.

The means by which the organisation aims to comply with the requirements of this standard is described in the whole of section 4 of this manual and its sub-sections.

The IPPC licences and their reporting requirements in particular provide a fundamental framework for environmental management at plant level.

Compliance with requirements relevant to company operations but which are outside the scope of IPPC legislation is also addressed within the scope of the Environmental Management System.

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4.2 ENVIRONMENTAL POLICY

All aspects of environmental management at each company location have been developed to ensure that the Company Environmental Policy is fully implemented.

Environmental Policy Statement

Irish Cement Limited recognises the environmental responsibilities associated with all the aspects of its operations and as a matter of policy seeks to avoid, reduce and mitigate any potentially adverse effects on the environment.

The Company is committed to the integration of environmental considerations into decisions making at all levels of the organisation.

It is Company policy to comply with all legal requirements imposed on its operations and in particular to operate its production facilities at Platin, Co. Meath and Castlemungret, Co. Limerick in accordance with the requirements of the Integrated Pollution Control Licences issued by the Environmental Protection Agency.

Through its Annual Environmental Programmes, Irish Cement aims at continual improvements with regard to the following:

- Minimising the environmental impact of emissions
- Conserving mineral and energy resources
- Minimising waste generation
- Minimising water consumption
- Reducing the visual impact of its operations
- Reducing the adverse impact of transportation
- Responsible sourcing of supply materials

The Company seeks to exist as a good neighbour to those living close to its plants and has adopted a policy of open communication on environmental performance.

In order to demonstrate its commitment to the highest level of environmental management Irish Cement Limited has adopted the environmental standard ISO 14001:2004.

Irish Cement Limited, through its parent company CRH, is a member of the Cement Sustainability Initiative (CSI) of the World Business Council for Sustainable Development. The CSI is a voluntary initiative by 23 of the world's major cement producers which aims to promote greater sustainability in the cement industry.

Signed: Jimmy Kehoe

Technical Manager
Irish Cement Limited

Date: 1st January 2011

The implementation of the policy is achieved by,

- Setting and reviewing environmental objectives and targets as part of the company Environmental Management System.
- Management commitment to the objectives and provision of the necessary resources.

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4.3 PLANNING

4.3.1 Environmental Aspects

Cement manufacture is a large scale industrial undertaking involving quarrying, raw material preparation, raw meal homogenisation, clinker burning, clinker grinding and cement despatch. Particulate emissions arise from cement manufacturing operations and from the transport and handling of cementitious products. Carbon Dioxide, CO2, and the oxides of Sulphur and Nitrogen, SOx and NOx respectively, may arise from the clinker burning process. During the co-firing of waste derived fuels, additional emission parameters are monitored including Hydrogen Chloride (HCL), Hydrogen Fluoride (HF), total Organic Carbon (TOC), Heavy Metals and Dioxins and Furans. Fugitive emissions may also arise from materials handling.
There are also emissions to water arising from the quarrying process, from site run-off water and from the use of water for cooling in the manufacturing process.

The Environmental Aspects associated with the activities and operations of Irish Cement Ltd. are outlined in the Register Of Environmental Aspects, which can be accessed here or by reference to the Masterlist of Controlled EMS Documents, (See Appendix A – No.7). The Register identifies the Environmental Impact associated with each Environmental Aspect. The Register also contains a Procedure to Evaluate the Significance of Environmental Aspects. The responsibility for making changes to the Register of Environmental Aspects lies with the Technical Manager in conjunction with plant management

These environmental aspects are managed and controlled to ensure minimum impact on the environment and are addressed by the company through the systems in place to meet the requirements of the IPPC licences.

At site locations not directly covered by IPPC licences environmental aspects have been identified and are managed and controlled to minimise the effect on the environment. Planning requirements, relevant environmental legislation and water discharge licence requirements identify the key issues.

Due to CO2 emissions arising from fuel emissions and limestone decomposition Irish Cement Ltd. at Platin and Limerick works has been issued with Greenhouse Gas Emissions Permits under Irish Legislation implementing the EU Emissions Trading Scheme.
All aspects of the monitoring and recording of CO2 emissions are covered under these permits.

All relevant environmental aspects are controlled to ensure that they are managed properly. Appropriate controls are outlined in the relevant IPPC licences, Greenhouse Gas Emissions Permits, the Environmental Instructions and Guidelines, site operational manuals and other relevant documentation for each location. In all cases, consideration is given to normal and abnormal operations.

Environmental aspects are reviewed on an ongoing basis but particularly at the yearly management review, when a full review of the effectiveness of the environmental management system is carried out.

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In addition, the annual report to the EPA provides a comprehensive summary of environmental performance and reports on the annual environmental plan for the year ended and outlines plans for the coming year.

Relevant documentation:

- IPPC Licences
- Relevant Planning Permissions
- Greenhouse Gas Emissions Permits
- Water-Discharge Licences
- Annual Environmental Report
- Environmental Instructions and Guidelines
- Waste Incineration Directive (WID)

Sustainable development performance parameters are reported on the company website at www.irishcement.ie/sustainable-development

4.3.2 Legal and other requirements

The Register of Environmental Legislation, which can be accessed here or by reference to the Masterlist of Controlled EMS Documents (See Appendix A – No. 8), identifies the legal requirements and other requirements that Irish Cement Ltd. subscribes to, that are applicable to the environmental aspects of its activities, products and services. Irish Cement also maintains a Legal Compliance Policy Procedure which is part of the Masterlist of Controlled EMS Documents (See Appendix A – No. 28).

The Register of Environmental Legislation contains a list of Irish Environmental Legislation that is of relevance to the activities and operations of Irish Cement Ltd. The requirements of each piece of legislation are outlined in a summary sheet. There is also a section on the relevance of each piece of legislation to the operations of Irish Cement Ltd.
The content of the Register is as follows,

1. Planning and EIA (Environmental Impact Assessment)
2. Water Pollution
3. Air Pollution
4. Waste
5. Noise
6. General Environmental Legislation

This register allows access to legal requirements and promotes awareness of same.
The register will be drafted, maintained and updated in co-operation with the Environmental Legislation Update Service provided by IBEC.

The List of Permissions, Licences & Permits, which can be accessed with reference to the Masterlist of Controlled Documents (See Appendix A – No 20), identifies other requirements such as Planning Permissions relevant to company locations, IPPC licences, Greenhouse Gas Emissions Permits and Discharge licences amongst others.

The Technical Manager has overall responsibility for identifying and ensuring there is access to legal and other requirements. In this role he will ensure that the company complies with requirements subscribed to and he will also keep abreast of potential legal and other developments, which may have an impact on the operations of the company.
He will also ensure that the environmental management system documentation is updated with respect to legal and other requirements.
Any changes to legal requirements will be identified and addressed as part of the management review process.
The Environmental Manager is responsible for keeping up to date with any changes in legal and other requirements that are relevant to their site and for updating their individual environmental management system documentation.

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4.3.3. Objectives, Targets and Programmes

The Irish Cement Environmental policy requires all our locations to,

- Comply with all applicable environmental legislation
- Continuously improve environmental stewardship towards best industry practice
- Optimise the use of energy and material resources
- Proactively address the challenges of climate change
- Be good neighbours in the community in which they operate

Documented targets and objectives for each works and for the company as a whole are established in line with the environmental policy, pollution prevention and the relevant legal requirements including planning permits.

Key long-term objectives are as follows,

- minimising the environmental impact of the operation of both cement plants
- reduction in CO2 emissions per ton of cement manufactured
- continuous process improvements to improve energy efficiency
- maximisation of filler usage in line with standards developments
- reduction in fugitive emissions (including bag filter installations and cooler maintenance etc.)
- minimisation of filter trips
- reduction of NOx emissions and dust emissions.

It is also a fundamental objective of Irish cement Ltd. to comply with the requirements of the IPPC licences granted by the EPA to both Platin and Limerick Works.

Environmental Management Programme
Condition 2.2.1 of EPA licence No. P0030-04 requires Platin Works to establish an Environmental Management System and update it on an annual basis.
Condition 2.2.1 of EPA licence No. P0029-02 also requires Limerick Works to establish an Environmental Management System and update it on an annual basis.

As both Platin and Limerick are dry-process plants and utilise modern energy efficient technology with significant investment in environmental protection equipment, Irish Cement believes that the Annual Environmental Management Programmes specific to each works is the appropriate route for management to establish and meet environmental targets, (See Appendix B: Masterlist of Environmental Records – No.s 1 & 2)

Therefore, each year objectives and targets are established by, management at both plants along with an investment programme developed to meet these objectives. This is subject to the budgetary approval system in operation within the company. The associated timeframes involved are also specified.

A report on the programme is to be submitted to the Environmental Protection Agency as part of the relevant Annual Environmental Report.
Environmental considerations are also integrated into the annual plant maintenance programmes.

Irish Cement Limited as a company within CRH PLC is committed to the World Business Council, Cement Sustainability Initiative. Relevant environmental information is reported to CRH, (See Appendix B: Masterlist of Environmental Records – No 31)

4.4 IMPLEMENTATION AND OPERATION

4.4.1 Resources, Roles, Responsibility and Authority

Irish Cement is committed to providing the resources necessary to achieve its environmental objectives by implementing, maintaining and improving the Environmental Management System.

We identify and make resources available including necessary people, finance, facilities and equipment when preparing the annual budget. Resources are provided in a timely manner and are reviewed at management meetings and at the management review.

Organisational charts for Head Office, Platin Works and Limerick Works are outlined in Appendices A, B & C of the Company Quality Manual, (See Appendix A: Masterlist of Controlled EMS Documents).
Overall responsibility and authority are as described and defined in section 3 of this Company Environmental Manual.

The Company Environmental Policy is established by the Board of Directors and the Managing Director.

The role of co-ordinating and implementing company environmental policy is the responsibility of the Company Technical Manager.

At works level the person in charge of environmental management in the context of EPA/IPPC legislation and the ISO 14001:2004 environmental management system is the Environmental Manager.
Specific responsibilities may also be defined in environmental plans and other procedures.

4.4.2 Competence, Training and Awareness

Persons doing work with an environmental impact must be competent on the basis of appropriate education, training or experience and must be adequately instructed with regard to any work they are carrying out on site.

Competence

We identify the competence needed and assess the qualifications needed for relevant personnel performing work with an environmental impact.

Line managers allocate and instruct (via departmental engineers and supervisors) personnel, performing work with an environmental impact. In doing so line managers ensure that the competence of each individual is assessed and that appropriate instruction/training is given. This may include liaison with the Human Resources Department as appropriate to co-ordinate any formal training courses.

Competency levels are identified through a variety of environmental management system functions such as operations reports, management review, corrective actions, etc.

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Training

Appropriate and regular training or education is provided to ensure qualified persons perform each activity. Training needs are identified and training of environmental personnel is ongoing.

Training may be planned or is provided where needed or where the opportunity arises on the job. Personnel with specific environmental assignments are trained in their particular area of expertise.
Training and competency levels are evaluated to keep apace of current requirements.
An Environmental Training Needs Analysis shall be prepared as required and shall be updated where new issues have been identified, (See Appendix B: Masterlist of Environmental Records – No. 33).
Records of education & training are maintained, (See Appendix B: Masterlist of Environmental Records – No. 30).

Awareness

Various mechanisms are used to make relevant persons aware of conforming to the Environmental Policy, Environmental Procedures and the Environmental Management System.

An Environmental Continuous Improvement Group has been established in both Platin and Limerick Works. The Group is composed of a multidisciplinary team, with representatives from all main departments.

Generally line managers, technical staff and supervisors give guidance to staff on environmental issues.
The environmental impact of their work, personal responsibility and the consequences of departing from procedure are communicated to individuals doing work with an environmental impact.
This Company Environmental Manual, the Environmental Instructions and Guidelines manuals at each works and other environmental procedures also give guidance to staff on environmental issues relevant to their work.
Internal and external training programmes also serve to promote environmental awareness.

In line with Irish Cement policy environmental considerations are now integrated into all aspects of the operation of each works and the company as a whole. Environmental briefings form part of management communication programmes as required.
The internal communication process (See Section 4.4.3) provides a platform for the communication of environmental issues and promotes awareness of same.

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4.4.3 Communication

The following procedures are in place to deal with (a) internal communication and (b) external communication.
The decision to adopt " a policy of open communication on environmental performance" is stated in the Environmental Policy Statement. Irish Cement also maintains a Environmental Complaints Procedure which is part of the Masterlist of Controlled EMS Documents (See Appendix A – No. 29).

Internal Communication

Communication on all aspects of the Environmental Management System is achieved through meetings, shift and operating instructions, notice boards, reports and e-mail circulation.
Operations meetings at each works and the management review process also provide a platform for internal communication.

- Company Communications Meetings are held twice yearly at which senior management brief senior line management and all employees on key aspects of company operations including environmental performance.
- Management Reviews are held twice yearly and include a review of environmental performance.
- Monthly Management Meetings are held at Head Office and also address environmental issues.
- Environmental Issues are also communicated at works level at the Operations Meetings (Monday to Friday) at the Weekly Communication Meeting (Every Friday) and via the Shift Supervisors Instructions / Reports (Daily basis).

External Communication

Public Queries
The company maintains a policy of open communication on environmental matters.
A programme is in place to ensure that members of the public can obtain information regarding environmental issues.
All communication and complaints from the public are treated seriously and are fully investigated.

In addition the company at both Head Office and plant level is prepared to meet with neighbours and interested members of the public to provide background to the environmental aspects of company operations.

The procedure for dealing with queries from the public is outlined in section 11 of the Platin Works Environmental Instructions and Guidelines, and is outlined in section 10 of the Limerick Works Environmental Instructions and Guidelines Manual

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Notification

Condition 11.2 of IPPC licence No. P0030-004 at Platin Works and IPPC licence No. P0029-02 at Limerick Works, deal with notification of external bodies should any of the scenarios outlined in condition 11 take place.
The Production/Environmental Manager is responsible for notifying the EPA. When notifying the EPA, the notification should be made by both phone and by fax, where the incident is categorised as either,

- Ranking 1; Minor (No contamination, localised effects, ELV breaches)
- Ranking 2; Limited (simple contamination, localised effects of short duration; local limited impact to water, land and air)
- Ranking 3; Serious (simple contamination, widespread effects of extended duration; significant effects on water quality, agriculture, major damage to an ecosystem)
- Ranking 4; Very Serious (heavy contamination, localised effects of extended duration)
- Ranking 5; Catastrophic (very heavy contamination, widespread effects of extended duration)

See Appendix B: Masterlist of Environmental Records – No. 34.

Section 11 of the Environmental Instructions and Guidelines Manual at Platin Works deals with notification of the relevant authorities i.e., the EPA, Meath Co. Council, and the Eastern Fisheries Board should any of the scenarios as outlined in that section take place.

Section 9 of the Environmental Guidelines booklet at Limerick Works also deals with notification of the relevant authorities i.e. the EPA, Limerick County Council and the Shannon Regional Fisheries Board should any scenario as outlined in section 9 take place.
Any such incidents including details of corrective actions taken are logged by management.
Outside normal office hours, the details of such incidents, including details of actions taken, are to be recorded in the Shift Supervisors Report at the relevant cement works.
The relevant Production/Environmental Manager or his deputy should also be notified immediately.

Reporting to the EPA – Monthly & Annual Environmental Reports

Condition 11.8 of IPPC Licence No.P0030-04 requires Platin Works to prepare and submit an Annual Environmental Report (AER). A list of items, which must be covered in the AER, is included in schedule D of this licence.

Condition 2.2 of IPC Licence No. 29 also requires Limerick Works to prepare and submit a an Annual Environmental Report (AER). A list of items, which must be covered in the AER, is included in schedule D of this licence.

These reports relate to each calendar year and address the implementation of the Environmental Management Plans and also evaluate the success in meeting agreed targets and objectives.

Both Platin and Limerick Works send monthly reports to the EPA. The format of these reports is as specified by the agency.

In addition a Report on Greenhouse Gas Emissions is also submitted to the EPA on an annual basis. This report is submitted in accordance with the EU Commission Decision of 29-01-04 establishing guidelines for the monitoring and reporting of GHG emissions pursuant to Directive 2003/87/EC of the European Parliament and of the council.

Records of all Monthly & Annual Environmental Reports to the EPA are maintained, (See Appendix B -Masterlist of Environmental Records – No.s 20 & 21).

4.4.4 Documentation

An established system is in place to control and maintain documentation pertaining to the environmental management system within the company (See section 4.4.5).
This manual is a controlled document and the overall responsibility for updates rests with the Company Technical Manager or his nominated deputy.

The Irish Cement Environmental Management System documentation includes the following,
(a) The Irish Cement Ltd., Environmental Policy Statement along with documented objectives and targets.
(b) A description of the scope (See section 1 of this manual).
(c) A description of the main elements of the Environmental Management System and their interaction and reference to related documents as outlined in this Company Environmental Manual and in the Environmental Instructions and Guidelines Manuals specific to each works.
(d) Procedures and documents, including records, required by the International Environmental Management System Standard ISO 14001:2004
(e) Documents, including records, determined by Irish Cement Ltd., to be necessary to ensure the effective planning operation and control of processes that relate to its significant environmental aspects, (See Appendices A & B, Masterlist of Controlled EMS Documents and the Masterlist of Environmental Records respectively).

Various operational documents also exist which address the environmental impact of relevant processes.

4.4.5 Control of Documents

Documents of importance to the environmental management system are controlled.
A documented procedure for the control of documents relating to both the Environmental Management System, (EMS), and to the Quality Management System, QMS, is described in the Document Control Procedure, which can be accessed here or by reference to the Masterlist of Controlled EMS Documents, (See Appendix A – No.9).

This procedure outlines the general format for document control including verification, review, revision and current status, availability and identification.
A Masterlist of Controlled EMS Documents is maintained giving the file reference of each document, (See Appendix A).

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4.4.6 Operational Control

Operational controls are applied to processes, which have significant environmental aspects in order that company objectives and targets, company environmental policy and legal requirements are complied with.
The significant environmental aspects concerned and operational controls for each location are identified as part of the management review process.

Documented procedures are in place to address the operational controls of those processes with a significant environmental impact to ensure that relevant persons working in that area are informed as to the potential environmental impact of the processes concerned.
These procedures specify the correct operating criteria to control situations where their absence can lead to a deviation from policy and targets.

Procedures also exist which identify the environmental aspects of goods and services used by the company and also deal with communicating procedures and requirements to suppliers and contractors.

The fundamental document pertaining to operational control of environmental issues at works level is the Environmental Instructions and Guidelines manuals of relevance to each works, (See Appendix A: Masterlist of Controlled EMS Documents – No.s 5 & 6).
Other operational controls are also outlined in this Company Environmental Manual and in other relevant Environmental Management System documentation.

Operational controls applied however may be a combination of tools, such as documented procedures, work instructions, physical controls and or use of trained personnel.
In addition to procedures and instructions, operational controls may include provisions for measurement and evaluation and for determining whether operating criteria are being met.

Operational controls are reviewed for ongoing suitability and effectiveness and corrective actions are then taken where necessary.

Operational control of compliance with regulatory requirements is achieved through completion of a Monthly Environmental Report, which is sent to the EPA. The report is compiled against a template, which highlights irregularities and non-compliances should they exist.

It is the responsibility of the works management team to identify the operational controls required to manage the operations and activities associated with the identified significant environmental aspects. This will be done in conjunction with the Operations Manager and the management team.

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4.4.7 Emergency preparedness and response

Irish Cement shall respond to actual emergency situations and shall prevent or mitigate associated adverse environmental impacts.
At Irish Cement locations, the major emergency situations with potential to cause significant harm to the environment are (a), fire (b), accidental spills of hazardous materials and (c), explosions.
The emergency situations identified may impact on the environment through, (a) accidental emissions to the atmosphere, (b) accidental discharges to water and land and (c) specific environment and ecosystem effects from accidental releases.

Condition 9.2 of IPPC Licence No.P0030-04 and IPPC Licence No.P0029-02 at Platin and Limerick Works respectively, requires that the emergency response procedure at each works shall be capable of dealing with any environmental emergency and shall be capable of minimising the effects of any emergency on the environment.
In response to the requirements of the standard ISO 14001:2004 and the IPPC Licences issued to each works, emergency response procedures entitled "Disaster and Post Disaster Plans", (Emergency Response Procedures), are in place at both works to deal with incidents, which may have a detrimental impact on the environment (See Appendix A: Masterlist of Controlled EMS documents – No.s 13 & 14).
The Disaster and Post Disaster Plans identify potential emergency situations and give instructions on what actions to take should they occur.

Reference to the Emergency Response Procedures relevant to each works is also made in Section 10 and Section 8 of the "Environmental Instructions and Guidelines Manuals" at Platin Works and Limerick Works respectively.

The Safety Procedures Manual relevant to each works also identifies potential dangerous and emergency situations through the use of Risk Assessment Forms. A number of the situations identified have the potential to have a significant impact on the environment. However these issues are addressed from a personnel safety point of view rather than from an environmental perspective.

Irish Cement Ltd. will review and revise its emergency preparedness and response procedures in particular after the occurrence of accidents.
Emergency procedures shall also be tested where relevant or practical to do so.

Control of MSDS sheets
Where a new chemical is being brought onto a site location then an appropriate hazard/risk assessment should be carried out and the copy of the Materials Safety Data Sheet (MSDS) for that chemical shall be sent to the Safety Officer at the relevant works location. The Safety Officer at each works location shall maintain a file of MSDS sheets at that location.
In some cases updated versions of relevant MSDS sheets are forwarded directly by the supplier to the relevant Safety Officer.

The hazard/risk assessment must be carried out by a person or organisation instructed by the plant management

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Responsibility

It is the responsibility of the Operations Manager to ensure that an Emergency Response Procedure is available for that location.

It is the responsibility of the Operations Manager to ensure safety procedures are in place, which address existing or potential risks to personnel safety at that location.

The Operations Manager must also ensure that all relevant safely legislation is complied with.

Resources

- Adequate bunding for all above ground storage tanks
- Training of staff
- Appropriate Emergency Spill Kits are located at high risk locations.

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SECTION 4.5 CHECKING

4.5.1 Monitoring and measurement

The significant environmental aspects related to company operations are outlined in the Register of Environmental Aspects, (See Appendix A: Masterlist of Controlled EMS Documents).
The significant environmental aspects at works level is identified in the site operational manuals and in the IPPC licence specific to that location. Procedures are in place, which document how monitoring and measurement of the key characteristics of company operations, which have a significant environmental impact, are carried out.
The Monitoring & Measurement Procedure for Platin Works, outlines monitoring & measurement carried out at that location.
The Monitoring & Measurement Procedure for Limerick Works, outlines monitoring & measurement carried out at that location.
Both documents may be accessed here or by reference to the Masterlist of Controlled EMS Documents, (See Appendix A – No.s 15 & 16).

The IPPC Licence specific to each works identifies the minimum frequency and methods of environmental monitoring and measurement within the scope of that licence.
Monitoring and measurement is also carried out where necessary to meet requirements outside the scope of the IPPC licences.

Schedules A - D of both IPPC Licences at Platin Works and Limerick Works follow a similar format and provide comprehensive information and instructions regarding the analysis of, emissions to the atmosphere, emissions to water, waste for disposal off-site, noise and groundwater.

Calibrated or verified monitoring and measurement equipment is used and calibration records are also maintained (See Appendix B: Masterlist of Environmental Records – No.s 4, 11, 12, 13 & 14).

Responsibility

It is the responsibility of the Environmental Manager and relevant Production Manager at each works to carry out the required monitoring and measurement as identified in the Monitoring & Measurement Procedure for that location, and to report to the Company Technical Manager and any other interested party (e.g. Local Authority as required by planning permissions, licenses etc.) as defined.

It is also the responsibility of the Environmental Manager and relevant Production or his nominated deputy to summarize the findings of monitoring and measurement and to prepare the Annual Environmental Report (AER), which is sent to the EPA.

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4.5.2 Evaluation of compliance

Procedures are in place to evaluate compliance with legal requirements and to other requirements to which the company subscribes.
Evaluation of compliance is ongoing and any non-compliance with EPA licences and permits is referred to the EPA and the necessary corrective actions are taken.

The IPPC licences specify much of the criteria on which compliance is evaluated at each works. Among the many requirements specified are the requirements pertaining to the emission limit values for (a), emissions to the atmosphere (b), emissions to water (c), noise emissions and (d), vibration and overpressure limit values for blasting operations.
Other legal requirements along with company targets and objectives also set out the criteria on which compliance is evaluated.

- Monitoring & Measurement

In general compliance with relevant environmental legislation is evaluated from analysis of the results of continuous and noncontinuous monitoring and measurement along with plant maintenance/inspections.
This information is analysed on an-ongoing basis and is evaluated at both operations meetings and at management review meetings.

- Monthly & Annual Environmental Reports

The information from monitoring and measurement is compiled in the Monthly Environmental Report, which is sent to the EPA. The report is compiled against a template, which highlights irregularities and non-compliance.
The Annual Environmental Report (AER), a requirement of the IPPC Licence, performs a similar function and is also sent to the EPA.

- Audits

Internal & external environmental audits serve as a useful tool in identifying areas of non–compliance and those aspects of the environmental management system which fail to meet requirements.

- EPA Visits

Site-visits by the EPA which take place approximately 3-4 times yearly may also highlight areas of non-compliance should they exist.

- Annual CRH Group Environmental Review Questionnaire

A Questionnaire on the status of environmental issues, including compliance issues pertaining to the operations of Irish Cement Ltd. is completed on a yearly basis. This questionnaire is circulated by CRH and is completed and returned to CRH by the Technical Manager in his role as Environmental Liaison Officer (ELO) at Irish Cement Ltd.

- Management Review

Compliance issues are also addressed as part of the management review process.

The company maintains records of the results of periodic evaluations of compliance (See Appendix B: Masterlist of Environmental Records)

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4.5.3 Non-conformity, corrective action and preventative action

A non-conformity is a non-fulfilment of a requirement. A requirement may be stated in terms of the Environmental Management System or in terms of the environmental performance of the operations concerned.
Non-conformities are identified through the monitoring and measurement process and or through evaluation of compliance as described in section 4.5.2.
Should a non-conformity be identified, then it is investigated to determine the cause so that corrective actions are focused on the appropriate part of the system. Actions are taken to eliminate the cause and to prevent the problem from recurring where relevant.
Where a potential problem is identified but no actual non-conformity exists then preventive actions are taken to eliminate potential causes of future problems.
The corrective action process and the preventative action process are described in the "Corrective and Preventative Action Procedure", (See Appendix A: Masterlist of Controlled EMS Documents – No. 12).

The responsibility for initiating corrective actions in the event of an incident at a particular location leading to a non-conformity rests with the Environmental Manager and the relevant Production Manager at that location. It is also the responsibility of management to ensure corrective actions are implemented and that there is follow-up to ensure their effectiveness.

Note: Any corrective or preventive action taken to eliminate the causes of actual and potential non-conformance shall be appropriate to the magnitude of problems and commensurate with the environmental impact encountered.
Details of non-conformances should be notified to the EPA in accordance with the licence requirements, by both phone and fax (see Appendix B: Masterlist of Environmental Records – No. 34) and also should be recorded in the Monthly Report to the EPA.

4.5.4 Control of Records

A documented procedure for the control of records, relevant to the Environmental Management System is described in the "Control of Records Procedure", which can be accessed here or by reference to the Masterlist of Controlled EMS Documents, (See Appendix A – No. 10).

This procedure outlines the controls for identification of required environmental records, their storage protection, retrieval, retention and location.
Responsibility for each of these aspects is defined in the Control of Records Procedure.

A master list of the required environmental records is appended to this manual (See Appendix B – Masterlist of Environmental Records).

4.5.5 Internal Audit

Internal Environmental Audits are carried out at planned intervals in accordance with the "Internal Audit Procedure" (See Appendix A: Masterlist of Controlled EMS Documents – No.11).
Internal audits are carried out to determine whether the Environmental Management System is implemented and maintained and conforms to planned arrangements including the requirements of the standard I.S. EN ISO 14001:2004.

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Internal audits are used to check for areas of deficiency in the system and also serve as a useful tool for continual improvement.

The audit programme is planned and implemented taking account of the environmental importance of operations concerned and the results of previous audits. Previous action points are then checked to confirm that the appropriate corrective action has been taken. The audit programme specifies the responsibilities and requirements for planning and conducting audits, reporting results and retaining records.

The frequency of audits will be determined by the Company Technical Manager and will not be less than once per year. Audits will be carried out by competent personnel, not directly involved in environmental management at that location, in order to ensure the objectivity and impartiality of the audit process. Responsibility for dealing with any actions arising as a result of these audits will rest with the Environmental Manager and relevant Production Manager at that location.

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SECTION 4.6 MANAGEMENT REVIEW

4.6 General

The Environmental Management System is reviewed at planned intervals to ensure its continuing suitability and effectiveness. The review shall address opportunities for improvement in and changes to the Environmental Management System including the environmental policy and the environmental objectives and targets. Environmental complaint issues will also be reviewed.

The Annual Environmental Report (AER) produced by the organisation provides a summary of the performance of the EMS for the senior management team (and other internal personnel). The content of the AER is based on the requirements of Schedule 6 of the IPPC Licences relevant to each works.

The review of the Environmental Management System is integrated into various aspects of the ongoing overall management of the company. The following formal meetings provide a framework for addressing the individual aspects of items listed in 4.6.1 & 4.6.2.

The individual meetings are outlined as follows along with topics relevant to the Environmental Management System:

- Board of Directors Meeting (held once a year)
- Management Reviews are held twice yearly
- Monthly Management Meetings
- Weekly Works Management Meeting
- Daily Works Meetings

The management reviews of environmental performance at each works are undertaken by senior management and the responsibility for this review rests with the Company Technical Manager. The results of this review are used as input to the continuous development of the Environmental Management Systems at both works and contribute to the development of the Annual Environmental Management Programmes specific to each works.

4.6.1 Review Inputs

The review shall address at a strategic level,

- The results of internal audits and evaluations of compliance with legal requirements and with other requirements to which the organisation subscribes,
- Communication from external interested parties including complaints,
- The environmental performance of the organisation, including GHG emissions,
- The extent to which objectives and targets have been met,
- Status of corrective and preventive actions,
- Follow-up actions from previous management reviews,
- Changing circumstances, including developments in legal and other requirements related to environmental aspects and,
- Recommendations for improvement.

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4.6.2 Review Outputs

It is the overall objective of the management review process to improve environmental performance and to improve the effectiveness of the Environmental Management System.

The output from the management review process includes decisions and actions related to possible changes to environmental policy, objectives, targets and other elements of the environmental Management System consistent with the commitment to continual improvement.

Records of the Environmental Management Reviews are also maintained (See Appendix B: Masterlist of Environmental Records – No. 18).

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APPENDIX A: MASTERLIST OF CONTROLLED DOCUMENTS

Item	Document	Head Office	Platin Works	Limerick Works
1	Company Environmental manual	Network	H drive 3.6.13	Network 11.9.1
2	Company Quality Manual	Network TE 2.7	Z drive 6.102.1	Network 11.9.0
3	IPC Licence No. 268	--	Intranet 3.600	--
4	IPC licence No. 29	--	--	Intranet 16.1.1
5	Environmental Instructions and Guidelines at Platin Works	--	Intranet 3.616	--
6	Environmental Instructions and Guidelines at Limerick Works	--	--	Intranet 16.1.7
7	Register of Environmental Aspects	Network	H drive	Network
8	Register of Environmental Legislation	Network	H drive	Network
9	Document Control Procedure	Network TE 2.7	Z drive 6.102.1V	Network 11.9.102
10	Record Control Procedure	Network TE 2.7	Z drive 6.102.1V	Network 11.9.102
11	Internal Audit Procedure	Network TE 2.7	Z drive 6.102.1V	Network 11.9.102
12	Environmental Corrective and Preventative Action Procedure	Network	H drive 3.607A	Network 16.9.4
13	Disaster and Post Disaster Plan for Platin Works	--	Intranet 3.617	
14	Disaster and Post Disaster Plan Limerick Works	--	--	Intranet 16.13.4
15	Environmental Monitoring and Measurement Procedure for Platin Works	--	Intranet 3.680	--
16	Environmental Monitoring and Measurement Procedure for Limerick Works	--	--	16.9.5
17	Ringsend Depot Procedure	TE 2.1	6.103.2	--
18	Ringaskiddy Depot Procedure	TE 2.1	--	13.1.2.1
19	Toomebridge Depot Procedure	TE 2.1	6.103.3	--
20	List of Permissions, Licences & Permits	TE 2.1	3.681	16.9.3 5(2)
21	Procedure for Decommissioning of Obsolete Plant and Equipment		Intranet	16.9.7
22	Procedure for Control of Gas Cylinders			16.9.6
23	Induction Procedures for Contractors (Platin)		Safety Manual	
24	Induction Procedures for Employees/Visitors & Contractors (Limerick)			Intranet
25	Accidental Spills Procedure (Limerick)			Intranet 16.13.4
26	GHG Monitoring & Reporting Manual		K/GHG/M&R	GHG.001

Item	Document	Head Office	Platin Works	Limerick Works
27	Noise Management Plan		K/Env/Noise	
28	Legal Compliance Policy Procedure	Network ICL-HO-Files	ICL-HO-Files ISO 14001 ems	Network
29	Environmental Complaints Procedure	Network ICL-HO-Files	ISO 14001 ems	Network
30	SOP for weekly checks	ICL-HO-Files	ISO_14001_ems/ Platin's SOPs	
32	SOP for Bund Pumpout	ICL-HO-Files	ISO_14001_ems/ Platin's SOPs	
33	SOP for Overburden Mound	ICL-HO-Files	ISO_14001_ems/ Platin's SOPs	
34	SOP for SRF Handling	ICL-HO-Files	ISO_14001_ems/ Platin's SOPs	
35	SOP for K3 Operating Manual	ICL-HO-Files	ISO_14001_ems/ Platin's SOPs	
36	SOP for AF Maintenance and Calibration Function Check	ICL-HO-Files	ISO_14001_ems/ Platin's SOPs	
37	SOP – Minor Bag Filters	ICL-HO-Files	ISO_14001_ems/ Platin's SOPs	

APPENDIX B: **MASTERLIST OF ENVIRONMENTAL RECORDS**

Item	Record	Head Office	Platin Works	Limerick Works
1	Annual Environmental Management Programme (Platin)		3.610	
2	Annual Environmental Management Programme (Limerick)			16.10.1
3	Results of Monitoring and Measurement		Numerous files 3.600 -- 3.677	
4	Continuous Monitoring Calibration		Electrical Dept.	Electrical Dept
5	Air Monitoring (Limerick)			16.3.1—16.3.9
6	Water Monitoring (Limerick)			16.4.1—16.4.9
7	Noise & Vibration Monitoring (Limerick)			16.5.1—16.5.2
8	Waste (Limerick)			16.6.1 Prod. Office
9	Birdhill Environmental Files (Limerick)			16.7.1—16.7.3
10	Limerick Co.Co. Correspondence (Limerick)			16.8.1
11	Chemical Laboratory Calibration Records (Platin)		Chem. Lab. File	
12	Chemical Laboratory Calibration Records (Limerick)			Chem Lab. File
13	WWTP Equipment Calibration Records (Platin)		3.627	
14	WE1 Calibration Record (Limerick)			Production Office, File 8 (2)
15	Environmental Complaint Issues		3.606	16.2.1
16	Internal Audit results		3.603A	16.1.5 (a)
17	EPA External Audit results		3.603	16.1.5
18	Management Review records		6.102.5	16.10.1
19	Records of Corrective & Preventive Actions		3.607A	16.1.5 (b)
21	EPA Annual Environmental Reports		3.610	16.10.1
22	EPA Monthly Environmental reports		3.611	Production Office
23	EPA Correspondence		3.605	16.1.2
24	Public Access File		3.608	16.7.4
25	EPA visits (Platin)		3.604	
26	EPA Licence Applications		3.601	Prod. Mgr. Office
27	EPA Licence Review (Platin)		3.602	
28	CO2 Emissions (Limerick)			16.14.1
39	Waste Permits		3.679	Prod. Office
30	Training Records	H.O. HR Dept.	7.101 H.R. Dept	11.13.1--11.3.3 H.O. H.R. Dept.
31	CRH group Environmental Review Questionnaire		K/Env/Reports	Prod. Dept. Computer Files
32	Monitoring & Measurement Procedures			File 5(2) 16.9.5
33	Environmental Training Needs Analysis		Intranet	16.13.2
34	Notification of Non-conformances		3.607	16.1.2

Addendum C

C.2 EMS & QMS Certificates

NSAI

Certificate of Registration
of Quality Management System to I.S. EN ISO 9001:2008

Irish Cement Ltd
Castlemunget
Co. Limerick

NSAI certifies that the aforementioned company has been assessed and deemed to comply with the provisions of the standard referred to above in respect of:-

The production and supply of Portland and other cements and cementitious products

Approved by:
Maurice Buckley
CEO NSAI

QUALITY
I S EN ISO 9001:2008
NSAI Certified

ISO 17021
INAB
ACCREDITED
MANAGEMENT SYSTEM CERTIFICATION
DETAILED IN SCOPE REG NO.5001

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT
IAF

Registration Number: 19.3828/1
Original Registration: 19 March 1991
Last amended on: 24 November 2013
Valid from: 24 November 2013
Remains valid to: 02 December 2016

This certificate remains valid on condition that the Approved Quality Management System is maintained in an adequate and efficacious manner. NSAI is a partner of IQNet - the international certification network (www.iqnet- certification.com)
This certificate is issued as part of multi-site certificate No. 19.3825HQ

IQNet
THE INTERNATIONAL CERTIFICATION NETWORK

All valid certifications are listed on NSAI's website - www.nsai.ie. The continued validity of this certificate may be verified under "Certified Company Search"

NSAI (National Standards Authority of Ireland), 1 Swift Square, Northwood, Santry, Dublin 9, Ireland T +353 1 807 3800 E: info@nsai.ie www.nsai.ie

Certificate of Registration
of Environmental Management System to I.S. EN ISO 14001:2004

Irish Cement Ltd

Castlemungret
Co. Limerick

NSAI certifies that the aforementioned company has been assessed and deemed to comply with the provisions of the standard referenced above in respect of:-

The production and supply of Portland and other cements

ENVIRONMENT
I.S. EN ISO 14001:2004
NSAI Certified

Registration Number: 14.0392/1
Original Registration: 02 October 2006
Last amended on: 23 March 2015
Valid from: 23 March 2015
Remains valid to: 09 February 2018

This certificate remains valid on condition that the Approved Environmental Management System is maintained in an adequate and efficacious manner. NSAI is a partner of IQNet – the international certification network (www.iqnet-certification.com) This certificate is issued as part of multi-site certificate No. 14.0392HQ

All valid certifications are listed on NSAI's website – www.nsai.ie. The continued validity of this certificate may be verified under "Certified Company Search"

NSAI (National Standards Authority of Ireland), 1 Swift Square, Northwood, Santry, Dublin 9, Ireland T +353 1 807 3800 E: info@nsai.ie www.nsai.ie
NSAI Inc. 402 Amherst Street, Nashua, New Hampshire, NH 03063, USA T +1 603 882 4412 E: info@nsaiinc.com www.nsaiinc.com

THE INTERNATIONAL CERTIFICATION NETWORK

IQNet and NSAI hereby certify that the organization

Irish Cement Ltd

Castlemungret
Co. Limerick

for the following range of activities

The production and supply of Portland and other cements.

has implemented and maintains a

Management System

which fulfils the requirements of the following standard

I.S. EN ISO 14001:2004

Registration Number:	**IE-14.0392/1**
Registration Date:	**02 October 2006**
Last Amended on:	**23 March 2015**
Remains valid until:	**09 February 2018**

Michael Drechsel
President of IQNet

Maurice Buckley
CEO NSAI

The validity of this certificate is maintained through on-going surveillance inspections.

National Standards Authority of Ireland, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland

IQNet Partners*:
AENOR *Spain* AFNOR Certification *France* AIB-Vinçotte International *Belgium* ANCE-SIGE *Mexico* APCER *Portugal* CCC *Cyprus* CISQ *Italy* CQC *China* CQM *China* CQS *Czech Republic* Cro Cert *Croatia* DQS Holding GmbH *Germany* FCAV *Brazil* FONDONORMA *Venezuela* ICONTEC *Colombia* IMNC *Mexico* Inspecta Certification *Finland* IRAM *Argentina* JQA *Japan* KFQ *Korea* MIRTEC *Greece* MSZT *Hungary* Nemko AS *Norway* NSAI *Ireland* PCBC *Poland* Quality Austria *Austria* RR *Russia* SII *Israel* SIQ *Slovenia* SIRIM QAS International *Malaysia* SQS *Switzerland* SRAC *Romania* TEST St Petersburg *Russia* TSE *Turkey* YUQS *Serbia*
IQNet is represented in the USA by: AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc.
* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

Addendum C

C.3 Company Quality Manual

QUALITY MANUAL

ISSUE NO. 4

ISO 9001: 2008

Irish Cement Ltd.
Platin
Drogheda
Co. Louth

Tel: (041) 987 6000
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Jimmy Kehoe
Technical Manager

This Quality Manual incorporates the Irish Cement Quality Management System at the following locations:

1. **Head Office**
2. **Platin Works**
3. **Limerick Works**
4. **Premier Cement**
5. **Ringsend Depot**
6. **Ringaskiddy Depot**
7. **Ghent Depot**

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DISTRIBUTION AND UPDATING

The electronic network version of this Quality Manual is the Master copy. All printed versions of this Quality Manual are uncontrolled. Any paper copy must be cross-checked with the electronic network version to ensure that it is current.

This Quality Manual is available on all three separate computer network systems at the three locations i.e. Head Office, Platin Works and Limerick Works and remotely to authorised users at VVM Cement in a "Read Only" format. Amendments to the master copy will be accessible immediately on all three network systems.

The electronic network version of the Quality Manual and the Documented Procedures, required by the standard ISO 9001: 2008, is available through the following link, {\\icl-ho-files\ISO_9001 _QS}.

Bryan Liston, Quality Manager, has overall responsibility for issuing necessary amendments to the network master copy version of the Quality Manual. All pages reissued or pages added shall be listed in a revision list on page (iii), which shall indicate Section, Page, Revision Number, Date Effective and the name of the Approver.

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REVISIONS TO ISSUE NO.5

SECTION	PAGE	REV. NO.	EFFECTIVE	APPROVED
All			1/10/12	J Kehoe

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1. Introduction

Irish Cement manufactures and supplies a range of cements to the Irish construction industry and export markets from two production plants, which have been in operation for many years.

Platin Works is located in Co. Meath, two miles south-west of Drogheda and supplies the market in eastern and northern parts of the country.

Limerick Works is located in Castlemungret, Co. Limerick and serves the southern and western market areas. Exports to other countries may be supplied by either plant.

The company Head Office is based adjacent to Platin Works.

Ringsend Depot, Dublin, is an Irish Cement controlled import terminal used for GGBS and cement.

Ringaskiddy Depot, Cork, is also an Irish Cement controlled import terminal.

VVM Cement, Ghent Depot (Belgium) is the distribution outlet for Irish Cement in Belgium and The Netherlands

Premier Cement, Toome, Co. Antrim, is the distribution outlet for Irish Cement in Northern Ireland.

Premier Cement, Swansea Terminal (UK) is the distribution outlet for Irish Cement in the United Kingdom.

The basic production process for cement is shown in the following schematic diagram (Fig. 1).

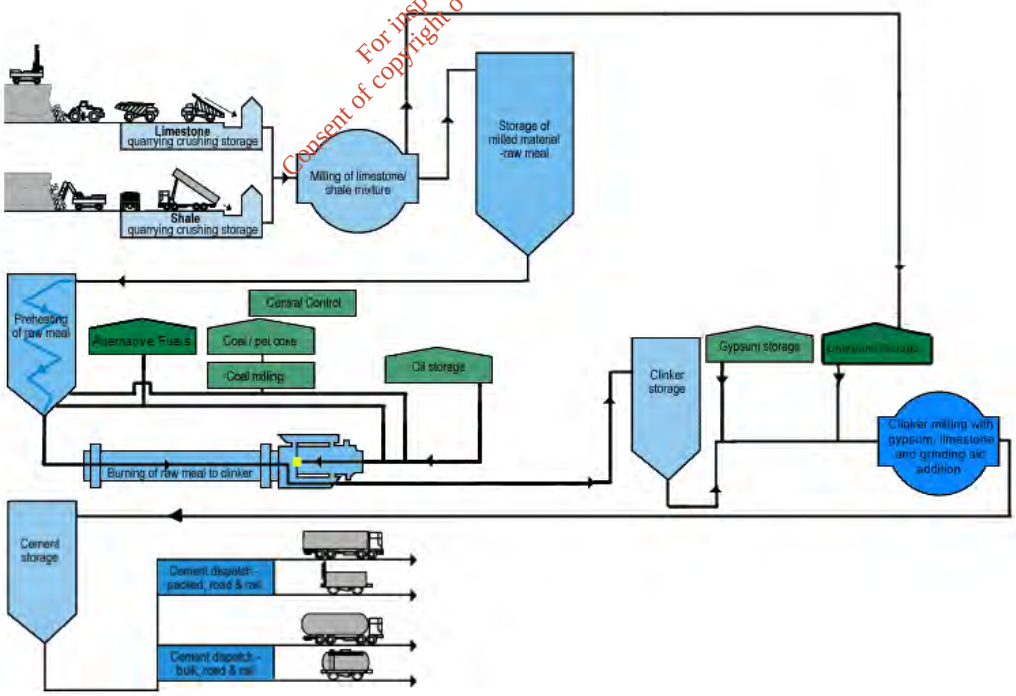

Figure 1 Cement Production Process

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2. Organisational Structure

Roles and Responsibilities

The structure of the company is outlined in the organisational charts for Head Office, Limerick and Platin works, which are in Appendix A – C.

The Technical Manager has overall responsibility for the Quality Management System.

The Marketing and Sales Director has overall responsibility for all aspects of Marketing.

The Operations Director has overall responsibility for all plant operations at both Limerick and Platin Works.

Specific quality responsibilities are assigned as follows:

Works Quality Control	-	The Works Production Managers are responsible for Quality Control at each works.
Customer Liaison & Feedback	-	The Technical Advisory Manager is responsible for customer liaison and feedback as regards product quality. The Sales and Marketing Director is responsible for customer liaison and feedback as regards service quality.

The Management Representative at Head Office is Jimmy Kehoe, Technical Manager, or his nominated deputy.

The Management Representative at Limerick Works is Pat Robinson, Production Manager, or his nominated deputy. Ringaskiddy deport falls under the operational control of Limerick Works.

The Management Representative at Platin Works is Ronan Breslin, Production Manager, or his nominated deputy. Ringsend deport falls under the operational control of Platin Works.

The product quality of products supplied by Irish Cement via the Ghent depot is controlled and assured by the Irish Cement Quality Management System. Local operation of the facility is managed by Michael Duggan, VVM Operations Manager who is also the QMS Management Representative for VVM. ...

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3. Cements

General

Cement production is a capital intensive industry and the company continually invests in plant and systems to modernise the production process, the control systems for plant operation and quality control along with product storage and despatch facilities.

3.1 Production Process

Irish Cement utilises the dry production process, in which there are three main stages in the manufacture of Portland cement. These stages are preliminary processing, the burning process and grinding of clinker to cement. A description of these stages is given below.

Preliminary Processing

Limestone consisting almost entirely of calcium carbonate ($CaCO_3$) and shale containing a high proportion of silica (SiO_2) with lesser amounts of alumina (Al_2O_3) and ferrous oxide (Fe_2O_3) provide the essential constituents for the manufacture of cement. The raw materials are separately crushed and stored, and are then blended in proportions of approximately 4:1 limestone: shale, along with other raw materials, and ground in a ball or vertical mill to very fine powder as raw meal.

The care and attention given to eliminating natural variations at this stage has a critical influence on the consistency and performance of the finished product. During this operation hourly checking of chemical composition and sophisticated blending techniques play a very important role.

The Burning Process

Burning takes place in the rotary kiln. This is a large, long, welded steel tube lined with refractory materials and inclined slightly towards one end. It rotates slowly and continuously about it's longitudinal axis and is fired by pulverised coal, petroleum coke, oil or specified Alternative Fuels. Alternative Fuels are waste derived fuels prepared by external suppliers to company specifications and permitted for use under IPPC licence issued by the EPA.

Raw meal is preheated by kiln exhaust gases in a preheater tower before entering the upper end of the kiln. The rotation of the unit gradually conveys the powder towards the firing zone. Initially carbon dioxide is driven off. As the temperature continues to rise the original raw meal undergoes further changes until at temperatures approaching 1500°C a white hot mass with a complex chemical composition is produced. On cooling this has the appearance of dark grey irregular gravel and is called cement clinker.

From Clinker to Cement

All that is now required is to grind the clinker to a very fine powder in a ball or vertical mill. During this milling operation – approximately 5% of gypsum is interground and up to 5% of minor additional constituents (limestone, raw meal or PFA) are added to produce a CEM I type cement. CEM II cements are also produced with the addition of another main constituent i.e. limestone at addition rates of between 6% and 20%.

The gypsum controls the setting time of the cement to a level appropriate for practical site use. The finished product is then stored in large silos from where it is despatched in bulk, or packed in paper sacks.

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3.2 Products

The cements produced are described as follows: **Classification***

- Portland Limestone Cement - CEM II / A-L 42.5 N (Bulk)
- Rapid Hardening Portland Cement** - CEM I 42.5 R Bulk and Bagged
- Ordinary Portland Cement - CEM I 42.5 R (POPC)
- Portland Limestone Cement - CEM II / A-L 32.5 N (Bag)
- Tegral Cement - CEM I 42.5 N (Tegral)
- Sulfate Resisting Portland Cement - CEM I 42.5 N SR-3 to EN 197-1
- Oil Well Cement API Class G Spec 10A

* The product classification and characteristics for each product are fully described in I.S. EN 197-1 'Composition, specifications & conformity criteria for common cements'.

** For the CEM I 42.5R Bulk cement product manufactured at both Limerick and Platin Works the additional product characteristic requirements of PTV603 and TRA600 (Belgium) and the BRL2601 National Assessment Guideline (The Netherlands) are also met. This material will bear the BENOR and KOMO labels as well as the CE mark.

Note: The API licence for the manufacture of Oil Well cement is currently in suspension due to poor market conditions in the oil well cement sector.

Other products which are supplied and which the company takes responsibility for product quality are:

- Pulverised Fuel Ash (PFA) to EN 450
- Ground Granulated Blastfurnace Slag (GGBS) to EN 15167.
- Slag Binder to agreed customer specification

3.3 Chromate Reduction of Cement

Chromate Reduction of bulk cement and packed cement is carried out in order to comply with EU Directive 53/2003/EC. There are Chromate Reduction Procedures specific to each works. (See Appendix E; No.s 15 & 16; Masterlist of Additional Documents and Operating Procedures).

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4. QUALITY MANAGEMENT SYSTEM

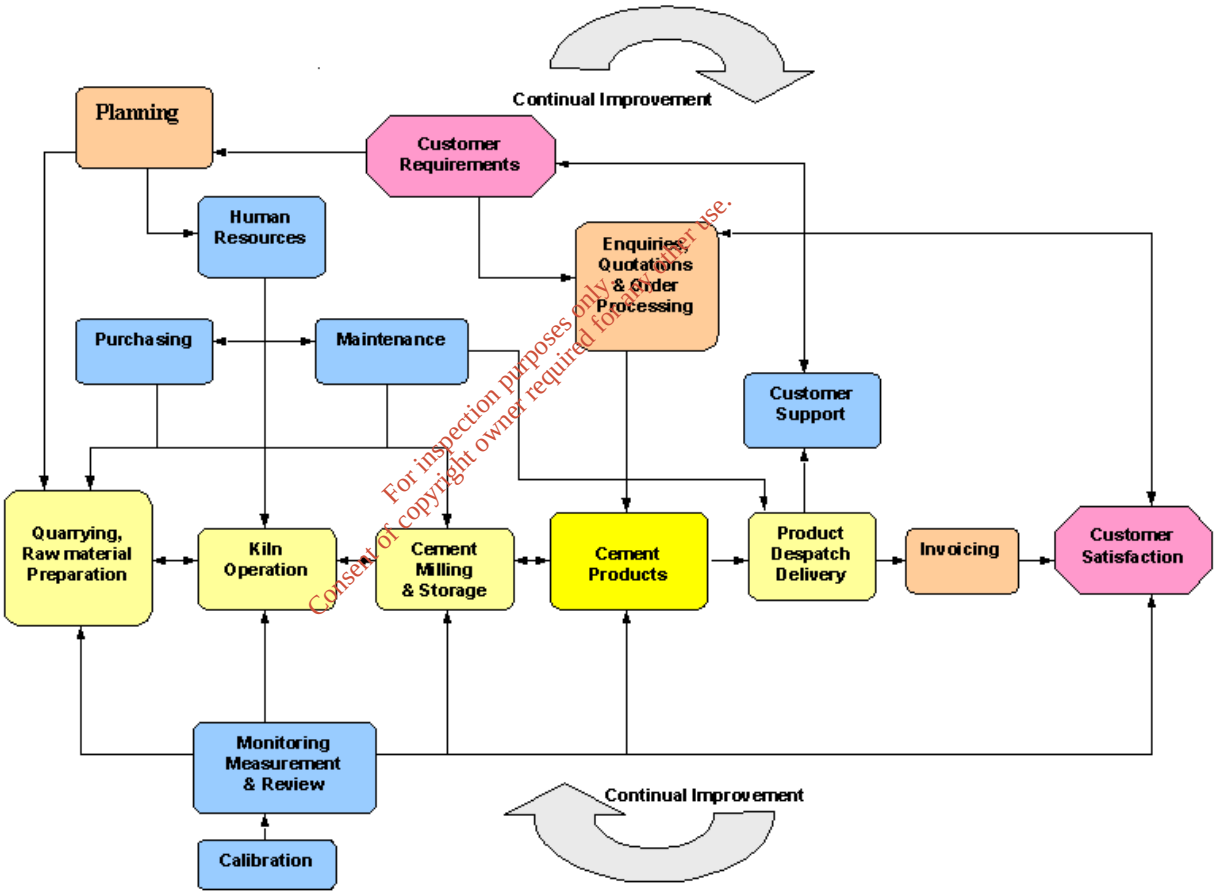
4.1 General Requirements.

Irish Cement employs a Quality Management System, which involves people from all levels of the organisation. In the accompanying Quality Management System flowchart Irish Cement identifies the processes required so that they can be applied, managed and continually improved. The company ensures that these processes are resourced and information is provided to ensure effective control.

Planned results and continuous improvements are achieved through the monitoring, measurement and analysis of the processes.

Quality Management System

Process flow schematic



System Procedures

Document and Record Control
Corrective and Preventive Action
Customer Satisfaction
Non-Conforming Product
Internal Audit & Management Review
Works Procedures Manuals
Purchasing Procedure
Customer Service Manuals
Sampling & Testing Procedures
Cement Distribution Procedures

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4.2 DOCUMENTATION REQUIREMENTS.

4.2.1 General

The Quality Management System in Irish Cement includes the following documentation

- Statements of the Quality Policy and the Quality Objectives,
- Documented procedures required by ISO 9001:2008,
- Other procedures and work instructions for the effective operation and control of the process,
- This Quality Manual,
- Records,
- External Standards.

Procedure manuals are drawn up for different departments to describe and control relevant parts of the quality system and these are referenced in this Quality Manual.

Relevant documentation can be accessed with reference to Appendices D, E, F and G of this manual.

4.2.2 Quality Manual

This Quality Manual defines the Quality Management System in operation in Irish Cement to comply with the requirements of ISO 9001:2008.

Any exclusion is explained and justified in Sections 7.3 and sections 7.5.4 of this manual. This manual references out any procedures and other documents not included in the manual.

The Control features required by API Spec. Q1 7th Edition are detailed in the controlled document i.e. API Documented Procedures & Control Features (See Appendix D – No.17 – Masterlist of Controlled Documents).

The quality manual is organised and controlled to ensure that it is adequate and current. Amendments will be flagged by revision number and date. Controlled copies will be identified.

4.2.3 Control of Documents

A documented procedure for the control of documents in the quality management system is described in the Document Control Procedure, which can be accessed here or by reference to the Masterlist of Controlled Documents (See Appendix D – No.4).

This procedure outlines the general format for document control including verification, review, revision and current status, availability and identification.

A master list of controlled documents is maintained giving the file reference of each document (See Appendix D).

Relevant documents of external origin are identified and their distribution controlled.
Controlled standards include Irish (EN) standards, British Standards, Belgian standards, Dutch standards and API standards.

4.2.4 Control of Records

A documented procedure for the control of records, relevant to the quality management system is described in the Control of Records Procedure, which can be accessed here or by reference to the Masterlist of Controlled Documents (See Appendix D – No.2). This procedure outlines the controls for identification of required quality records, their storage protection, retrieval, retention and location. Responsibility for each of these aspects is defined in the Control of Records Procedure. A master list of the required quality records is appended to this manual (See Appendix G – The Masterlist of Quality Records).

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5. Management Responsibility

5.1 Management Commitment

The commitment of ICL management to the quality management system adopted is evidenced by:

- Establishing and implementing the company quality policy
- Incorporating quality as a key responsibility for managers
- Ensuring quality objectives are established and achieved
- Allocation of sufficient resources to achieve quality objectives
- Undertaking yearly management reviews
- A communication process with all employees which includes customer needs and requirements as well as other regulatory requirements

5.2 Customers

ICL are committed to understanding and satisfying customer needs in terms of product quality and customer service.

Product quality targets are established to meet the requirements of product specifications in standards and customers needs.

A customer service policy is documented to meet the needs of customers as regards product availability, product presentation and despatch/delivery.

Customer contact is essential to understanding and satisfying the needs of our customers and is regarded as being a very important part of our business.

5.3 Quality Policy

It is the established policy of Irish Cement to provide to it's customers with products which are fit for their intended purpose and which are in conformance with:

- Agreed Standards or Specifications as regards product quality.
- The Company's Customer Service Policy as regards product presentation, despatch and delivery.

It is company policy to deal efficiently and effectively with all customer concerns regarding product quality and service and to resolve issues as far as possible to the satisfaction of its customers.

It is company policy to offer a comprehensive technical advisory service to its customers on all aspects of the use and application of its products and in the production of quality concrete.

Cement products are certified to the national / European standard I.S. EN 197-1 and carry CE marking following independent certification by NSAI.

The company supports the implementation of independent quality monitoring as an added guarantee of quality and consistency and has adopted the Standard ISO 9001:2008 which it uses to continually improve its quality management system. Quality objectives are established and reviewed annually, taking account of market requirements.

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5.4 Planning

Quality Objectives

In addition to the quality objectives and requirements to comply with product standards, ICL establishes specific measurable objectives on at least an annual basis relating to its products, systems and services at relevant levels within the organisation. These objectives are clearly outlined and then monitored at appropriate intervals and can be accessed with reference to the Masterlist of Controlled Documents (See Appendix D – No. 11), and the Masterlist of Additional Documents and Standard Operating Procedures (See Appendix E – No.s 2 & 3).
The objectives will relate to,

- Product Quality
- Plant and Process Performance
- Purchasing of raw materials
- Customer Service
- Human Resources and Safety

Quality Management System Planning

ICL production processes are controlled by procedures and targets. Any changes to the processes or targets are managed to ensure ongoing compliance and integrity of the quality management system.

Changes to the quality management system may arise due to reviews of the system.

5.5 Responsibility and Authority

Overall responsibility and authority are as described and defined in section 2 of the manual.

Specific responsibilities are defined in quality plans and other procedures.

The Management Representative at Head Office is the Technical Manager, who has overall responsibility and authority for the Quality Management System in the company.

Local management representatives in each Works are the Production Managers, who are responsible for the operation of the Quality Management System at Works level.

The local management representative at Ghent depot is the VVM Quality Manager who is responsible for the operation of the Quality Management System at Depot level.

Internal Communication

Communication on all aspects of the Quality Management System is achieved through meetings, notice boards, reports and e-mail circulation.

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5.6 Management Review

General

The review of the Quality Management System is integrated into various aspects of the ongoing overall management of the company. The following formal meetings provide a framework for addressing the individual aspects of items listed in 5.6.1 & 5.6.2. The individual meetings are outlined as follows along with topics relevant to the Quality Management System:

Weekly Local Management Meetings (**Platin & Limerick Works**)
- Product quality, product and process performance

Monthly Sales Meetings
- Customer feedback including product quality and service quality complaints
- Market requirements
- Aspects of service quality improvement

(An action sheet is drawn up based on issues reviewed at each meeting).

Monthly Management Meetings
- Product quality performance
- Market feedback including complaints
- Customer satisfaction including feedback from customer contact

Customer Service Team Meetings

Customer service teams meet at each works and at Head Office
- Customer service quality complaints
- Cement distribution and despatch issues
- The results of customer satisfaction feedback
- Feedback from Regional Sales Managers on current issues in the marketplace.

(A summary of each meeting and associated key action points is recorded).

Individual Works Quality Review Meetings

Occur once a year at both Platin Works and Limerick Works.
- Focus on product quality and market performance including customer feedback.
- Corrective actions and follow up actions from previous reviews

(A summary of key issues and action points is recorded)

The Annual Joint Works Quality Review
- Product quality
- Customer feedback
- Overall strategic quality issues and developments
- Product quality & service quality complaints
- Results of internal and external audits
- Review of the quality management system
- Areas for improvement
- Corrective actions and follow up actions from previous reviews

(A summary of key issues and action points is recorded).

Board of Directors Meetings

These meetings take place on a quarterly basis.
- Strategic Quality issues are addressed at these meetings.

This integrated approach to the management review ensures that opportunities for improvement in and changes to the Quality Management System, including quality policy and quality objectives, are continually assessed and appropriate amendments introduced.
Records of the results and findings of the management review are maintained (See Appendix G- No 37; Master-list of Quality Records).

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5.6.2 Review Inputs

- The review shall address, at a strategic level:

- Product Conformity

- Quality Management System – (Overview of system)

- Market requirements.

- Customer Feedback, including complaints.

- Results of internal/external audits

- Corrective Actions – Status

- Follow-up actions from previous reviews

5.6.3 Review Outputs

The outputs of the review should record decisions and actions in relation to:

- Product quality improvement

- Service quality improvement

- Improvement in the effectiveness of the Quality Management System.

- Customer Requirements

- Resources

- Process Optimisation

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6. Resource Management

Irish Cement is committed to providing the resources necessary to achieve our quality objectives by implementing and improving the Quality Management System and thereby enhancing customer satisfaction. We identify and make resources available including necessary people, finance facilities and equipment.

6.1 Provision of Resources

Resources are provided in a timely manner and are reviewed at management meetings and at the management review. A description of plant management activity at Limerick works is in existence (See Appendix E – No.17 – Masterlist of Additional Documents and Operating Procedures).

6. 2 Human Resources

6.2.1 General

Irish Cement determines that all relevant personnel are competent on the basis of appropriate education, skills, training and expertise. We make all employees aware of their contribution to the Quality Management System so that our quality objectives can be achieved (See Section 5.5 Internal Communication).

6.2.2 Competence, Awareness & Training

We identify the competence needed and assess the qualifications needed for relevant personnel performing work affecting product quality. Appropriate and regular training or education is provided to ensure qualified persons perform each activity. The suitability of training and competency levels are evaluated to keep apace of current requirements.

All personnel performing work affecting product quality have been appointed by line managers. In doing so the line managers have assessed competencies. The minimum educational requirements applied initially. A review was then taken by the managers and supervisors as to the skills and experience of the personnel and if training was then required to rectify the situation it was completed. Appropriate supervision was applied throughout.

In the event of additional education being required due to changing circumstances then this was provided. If a line manager/supervisor identifies personnel who are not fully competent then this issue is addressed through communicating with the Human Resources Manager who takes the appropriate actions necessary.

Competency levels are identified through a variety of quality system functions such as management review, corrective actions, etc. Records of education, training, skills and expertise are maintained (See Appendix G – No. 47; Master-list of Quality Records).

6.3 Infrastructure

Irish Cement provides and maintains the infrastructure required to achieve conformity to product and process requirements. This concerns the performance of, including the health and safety aspects of, (a) plant buildings, work space and associated utilities, (b) Plant and process equipment, and (c), supporting services, transport, communications and IT. Descriptions of the Maintenance Management System at Platin Works and at Limerick Works exist (See Appendix E – No.s 18 & 19, Masterlist of Additional Documents and Standard Operating Procedures)

6.4 Work Environment

Irish Cement is committed to providing a work environment, which satisfies the requirements needed to achieve conformity of product and which addresses factors affecting motivation, satisfaction and performance of personnel in the workplace.

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7. Product Realisation

7.1 Planning of Product Realisation

Products
Irish Cement produces a range of cementitious products in its two plants at Limerick and Platin and also has:

- An Import Terminal at Ringsend, (Dublin)
- An Import Terminal at Ringaskiddy, (Cork)
- The Premier Cement Bulk Depot in Northern Ireland and Despatching Centre at Swansea (UK)
- The VVM (Belgium) Bulk Depot in Ghent

The Import Terminal at Ringsend, (Dublin), the Premier Cement Bulk Depot in Northern Ireland and Despatching Centre Swansea (UK) are under the quality control of Platin Works.

The Import Terminal at Ringaskiddy (Cork) is under the quality control of Limerick Works.

The Import Terminal at Ghent is jointly under the control of Limerick and Platin Works.

(operational procedures for each location are available as referenced in Appendices D & E).

Cementitious products manufactured are described in the company's product literature. These products are manufactured to comply with National and European standards in accordance with the company's quality management system. The standards applicable to our range of products are,

I.S. EN 197- Parts 1 & 2	Normal/Rapid Hard Portland Cements
I.S. EN 196 (Series)	Normal/Rapid Hard Portland Cements
TRA 600 (Belgium)	CEM I 42.5R Cement
PTV603 (Belgium)	CEM I 42.5R Cement
BRL 2601 (The Netherlands)	CEM I 42.5R Cement
I.S. EN 197- Parts 1	Sulphate Resisting Cement.
API Spec 10A	Oil well Cement.
EN 450	PFA
I.S. EN 15167	GGBS

Production Control:
Irish Cement has developed production processes, quality objectives, desired outputs, control measures, and provides training, equipment, materials and information to ensure product realisation for each product is achieved.

Monitoring and Inspection
A comprehensive programme of sampling, testing and monitoring is in place in each plant for raw materials, intermediary products and final products. These programmes are to ensure verification and validation and are specific to each product and other criteria for product acceptance. These programmes can be accessed by reference to the Masterlist of Quality Records (See Appendix G – No. 35).

Physical performance testing of products from both plants is conducted at the centralised Physical Testing Laboratory located at Platin Works.

Records are identified to provide evidence that realisation processes and resulting products meet requirements (See Appendix G; Masterlist of Quality Records – No.s 1-19 and other files).

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7.2. Customer related Processes

7.2.1 Determination of Requirements

Irish Cement recognises that in some cases customers can have specific requirements above that of a national or international standard. These requirements are identified and can be defined in an agreed quality plan between the company and the customer and/ or be included as part of the delivery schedule or other documentation.

7.2.2. Review of Customer Requirements

Customer requirements are defined and reviewed against the ability of Irish Cement to meet these requirements prior to accepting the purchase order. Normally products are supplied to the standard on an ongoing basis and are subject to very little change. Records of the details of the annual Quality Management Reviews are maintained (See Appendix G – No 37; Masterlist of Quality Records).

Note

The control features required by API Spec. Q1 7th Edition are covered in the controlled document i.e. API Documented Procedures and Control Features (See Appendix D – No.17 Masterlist of Controlled Documents).

7.2.3 Customer Communication

Product Information

Product data sheets and Health & Safety data sheets are provided to customers. Product Despatch Test Reports are made available electronically to customers on a weekly basis. Requests for additional specific information are dealt with by the Technical Marketing Department.

Sales Orders & Enquiries

Sales Orders and other enquiries are dealt with by Works Despatch staff and the Regional Sales Managers.

Customer Support – Product Quality

The Technical Marketing Department provides a back up service to the customer. Customer feed back is actively encouraged and is generally communicated through regional sales managers. Customer complaints arising in Ireland and the UK are recorded on the electronic complaints forms system (SQL System Database). Product Quality complaints are reviewed at monthly sales meetings.

For product supplied from Ghent Depot, the VVM complaints system will be used in the first instance whereby local VVM operations management will record, address and resolve any complaints / queries raised initially. Any complaints unable to be resolved locally by VVM pertaining to the quality of the product supplied will be escalated to the Irish Cement Technical Management for resolution within the Irish Cement complaints system.

Customer Support – Service Quality

The Technical Marketing manager issues a report once a month and details of complaints and market place perception are given. Each Works has in place a Customer Services committee who deal with customer complaints and suggestions.

7.3 Design and Development

Cements manufactured by Irish Cement at its two plants in Limerick and Platin are based exclusively on International Standard specifications (Designs) and any subsequent amendments made by the Standard bodies. Designs are not developed by Irish Cement and therefore the procedure (4.4 API Q1 7th Ed. – 7.3 ISO 9001-2008) does not apply.

These standard specifications can be accessed with reference to the Masterlist of External Standards (See Appendix F).

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7.4 Purchasing

Each purchased material has an approved specification. We ensure that purchased product conforms to the specified purchase requirements and the Purchases Department is responsible for procuring these materials from the agreed Acceptable Supplier List.

Suppliers are selected on conformance with specification, a successful plant trial, if necessary and other commercial criteria. The Suppliers performance is evaluated annually, based on conformance to specification, quality complaints, documentation, packaging, delivery and overall satisfaction with the supplier. A record is maintained of the results of supplier evaluation (See Appendix G – No 23; Masterlist of Quality Records). These procedures are fully described in the Purchasing Procedures Manual. (See Appendix D – No. 10; Masterlist of Controlled Documents).

The supplies of each material are covered by a Purchase Order. Purchasing Documents clearly describing the materials ordered are maintained in the relevant Supplier File.

These purchasing documents consist of instructions, procedures and specifications necessary to ensure the required quality.

The Quality Control system to ensure continuous supplier conformance to specification is based on the Sampling and Testing Plans (See Appendix G – No 42 Masterlist of Quality Records) for each material, which are defined and listed in each Works. The Sampling and Testing Plan outlines whether in-house testing or suppliers analysis is required to determine conformance to specification. In these plans it is outlined how samples are taken, what analyses are performed and what personnel should perform them.
Purchase orders are approved and reviewed prior to release to ensure conformance with the established procedures.

The system used is described in detail in the Purchasing Procedures Manual (See Appendix D – No. 10 Masterlist of Controlled Documents). This manual outlines the procedure for the review and ordering of purchased materials and refers to the quality control system as specified in the Sampling and Testing Plans.

A specification for all incoming products is present (See Appendix D – No.s 15 & 28 – Masterlist of controlled Documents). These are tested as per sampling and Testing Procedures.

Customer Supplied product is not used in the cement manufacturing processes at Irish Cement facilities in Limerick and Platin.

Note
The control features required by API Spec. Q1 7th Edition are covered in the controlled document i.e. API Documented Procedures and Control Features (See Appendix D – No.17 Masterlist of Controlled Documents).

7.5 Production and Service Provision:

Irish Cement identifies requirements for operations that realises its products and delivers its services. To meet these requirements Irish Cement reviews its capacity, process flows, training programmes, production yield, monitoring and measuring, communication and any other activity that effects these operations.

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7.5.1 Control of Production and Service Provision:

Production and Service operations are controlled as applicable through:

a) Availability of information on product requirements.
b) Availability of work instruction as necessary.
c) Use of suitable equipment.
d) Availability and use of monitoring and measuring devices.
e) Implementation of monitoring and measurement.
f) Use of defined processes for release, delivery and post delivery activities.

All work is carried out to documented quality plans, procedures and work instruction. Known variables during processes are monitored and minimised. Specifications are used to define acceptance criteria for most procedures and final products.

Note
The control features required by API Spec. Q1 7th Edition are covered in the controlled document i.e. API Documented Procedures and Control Features (See Appendix D – No.17 Masterlist of Controlled Documents).

7.5.2 Validation of Processes for Production and Service Provision

Irish Cement's products are comprehensively monitored and measured/tested at all stages of the manufacturing process. Upon release these products are again sampled and tested to at least International Standard frequencies.

The cement manufacturing process is an example of a "qualified process", where the results of measurements to confirm that the product meets customer requirements are not all immediately available, particularly the results of compressive strength testing.

As a result of being a "qualified process", strict controls are adhered to during the production process as detailed in the Quality Targets Sheet (See Appendix D – No.s 27 & 29: Masterlist of Controlled Documents) and also (See Appendix E – No. 1: Masterlist of Additional Documents and Standard Operating Procedures). This is to ensure that when the despatched cement test results in question become available they shall be satisfactory.

Irish Cement has established arrangements to validate the process ability to achieve planned results by:

a) Defined criteria for review and approval of the process.
b) Approval of equipment and qualification of personnel.
c) Use of specific methods and procedures.
d) Maintaining records.
e) Revalidation.

In the event of a customer requiring a non-standard product then the above process shall be adhered to.

Note
The control features required by API Spec. Q1 7th Edition are covered in the controlled document i.e. API Documented Procedures and Control Features (See Appendix D – No.17 Masterlist of Controlled Documents).

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7.5.3 Identification and Traceability:

Products are identified throughout the manufacturing process by a comprehensive series of records which identify Type, Silo, Test results and machine performance.

Products are presented in two ways to the customer.

- Bulk Cement is despatched from Bulk Silos and comprises of 80% of the tonnage sold. Bulk Cement is identified by Silo designation. Each silo is designated a product type and class. Large signposts are erected on each silo clearly stating Product type and class. Due to the continuous nature of the production/despatch process it is difficult to directly trace the production of a specified quantity of cement, however in the event of a problem the comprehensive series of records maintained are sufficient to carry out traceability investigation.

- Bagged cement is despatched on pallets weighing 2 tonnes and accounts for the remaining 20% of tonnage sold. Paper sack products are identified by bag marking and the filling and palletising operation of every bag is traceable by the use of a date stamp.

Note

The control features required by API Spec. Q1 7th Edition are covered in the controlled document i.e. API Documented Procedures and Control Features (See Appendix D – No.17 Masterlist of Controlled Documents).

7.5.4 Customer Property

This section addressing customer property is not applicable to Irish Cement as there is no provision for customer supplied materials, in the standards or production procedures, for use or incorporation into the product and this is borne out by our production history over the last twenty years.

7.5.5 Preservation of Product

Cement is stored at each Plant in such a way as to prevent deterioration due to handling or coming in contact with moisture. Quality System Procedures for both Bulk and Packed Cements exist at both Works. These manuals detail among other topics,

- Silo designation.
- Use of Rail and Road Tankers.
- Packing, Palletising, Wrapping and Date Stamping of Packed cement.

The Cement Distribution Procedures Manual (See Appendix D – No. 8 Masterlist of Controlled Documents) also addresses, silo designation and the use of rail and road tankers for both Bulk and Packed Cements.

Note

The control features required by API Spec. Q1 7th Edition are covered in the controlled document i.e. API Documented Procedures and Control Features (See Appendix D – No.17 Masterlist of Controlled Documents).

7.6 Control of Monitoring and Measuring Devices

Irish Cement uses monitoring and measuring devices to validate product conformity. Control of monitoring and measuring devices is carried out as per Test and Measurement equipment files in Limerick and Platin.

7.6.1 Irish Cement identifies Monitoring and Measuring requirements for assuring the conformity of the product to the specified requirements. Monitoring and measuring devises are used and controlled to ensure the measurement capability is consistent with the measurement requirements.

7.6.2 All monitoring and measuring devices are listed in Calibration Logs. This log lists the accuracy required, frequency of the calibration and status of each device.

7.6.3 On specified intervals, all measuring and monitoring devices are calibrated against measurement standards traceable to NIST. When no such standard exists, the basis used for calibration or verification is recorded. (See Appendix G – No.s 30, 31, 36; Masterlist of Quality Records).

7.6.4 All measuring and monitoring devices are safe guarded for adjustments that would invalidate the measurement result. They are also protected from damage and deterioration during handling, maintenance and storage.

The results of device calibration are recorded. If the device is found out of calibration, the validity of previous recorded results is assessed and appropriate corrective action is taken (See Appendix G – No.s 30, 31, 36; Masterlist of Quality Records).

Note

The control features required by API Spec Q1 7th Edition are covered in the controlled document i.e. API Documented Procedures and Control Features (See Appendix D – No.17 Masterlist of Controlled Documents).

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8. Measurement, Analysis & Improvement

8.1 General

Irish Cement monitors, measures and evaluates its products, processes and customer satisfaction at appropriate intervals to ensure conformity of product, conformity of the Quality Management System and to improve the effectiveness of the Quality Management System. The company identifies the modes of measurement and analysis including the use and need of statistical techniques where applicable.

8.2 Monitoring and measurement

8.2.1 Customer Satisfaction

The customer's perception of how Irish Cement Limited meets its customer requirements is monitored on a regular basis in order to evaluate customer satisfaction, a vital factor in determining the effectiveness of the Quality Management System. Defined methods are in place to collect and evaluate this information in the Procedure for Measurement of Customer Satisfaction, which can be accessed here or with reference to the Masterlist of Controlled Documents (See Appendix D – No. 7).

The recommendations from analysis of customer satisfaction are addressed in the management review to achieve continual improvement of same.

8.2.2 Internal Audit

Irish Cement Ltd. Performs Internal Audits at planned intervals in accordance with the Internal Audit Procedure, which can be accessed with reference to the Masterlist of Controlled Documents (See Appendix D – No. 5).

The audit criteria, scope, frequency and methods are defined taking into account the importance and status of areas to be audited, as well as the results of previous audits. Information obtained from the audit is addressed in the management review. Records of the results of Internal Audits are maintained (See Appendix G – No. 38 – Masterlist of Quality Records).

8.2.3 Monitoring and Measurement of Processes

Irish Cement Limited applies suitable methods for the monitoring and measurement of the Quality Management System processes. These methods demonstrate the ability of the processes to achieve planned results and meet customer requirements. Correction and corrective action are taken to ensure conformity of product where necessary.

8.2.4 Monitoring and Measurement of the product

Product characteristics are monitored and measured using defined procedures as outlined in the sampling and quality plan (See Appendix G; Masterlist of Quality Records – No. 42) to verify that product requirements are met. Results are reviewed on a continuous basis and evidence of conformity with acceptance criteria is maintained (See Appendix G; Masterlist of Quality Records – No.s 1-19 and *numerous records*). The Production Manager at each location is the person responsible for product release and for dealing with any issues relating to specified requirements or criteria not being met.

Note

The control features required by API Specification Q1 7th Edition are covered in the controlled document i.e. API Documented Procedures and Control Features (See Appendix D – No.17 Masterlist of Controlled Documents).

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8.3 Control of nonconforming product

The actions taken in the event of any product failing to meet defined product criteria are described in the Non-Conforming Product Procedure, which can be accessed here or with reference to the Masterlist of Controlled Documents (See Appendix D – No. 6). We ensure that product which does not conform to product requirements is identified and controlled to prevent its unintended use or delivery.

In the highly unlikely event that product not conforming to the relevant external standard requirements is inadvertently released by the company, both the customer and the relevant certification bodies will be notified.

Nonconformities and their causes are recorded, (See Appendix G; No. 52 and *numerous records* – Masterlist of Quality Records), and analysed to determine trends in order to make quality improvements and are addressed in the management review.

8.4 Analysis of Data

Irish Cement Limited evaluates all product and process data to determine whether the QMS systems are compliant and effective. Data from monitoring and measuring devices and other relevant sources is used to evaluate where improvements to the QMS can be made. Particular emphasis is placed on customer satisfaction but conformity of product and suppliers are also analysed. Trends in process and product characteristics are used to identify where preventative action can be made.

Note

The control features, required by API Spec. Q1 7th Edition, are covered in the controlled document i.e. API Documented Procedures and Control Features (See Appendix D – No.17 Masterlist of Controlled Documents).

8.5 Improvement

8.5.1 Continual Improvement

Irish Cement Limited is committed to continually improving the effectiveness of the quality management system and thereby improving customer satisfaction. The quality policy, quality objectives, audit results, corrective and preventative actions and data analysis all contribute to achieving this objective.

Note

The control features required by API Spec. Q1 7th Edition, are covered in the controlled document i.e. API Documented Procedures and Control Features (See Appendix D – No.17 Masterlist of Controlled Documents).

8.5.2 Corrective Actions

Irish Cement Ltd. Ensures that immediate action is taken to eliminate the causes of non-conformities to prevent recurrence. The corrective action process is described in the Corrective and Preventive Action Procedure, which can be accessed here or by reference to The Masterlist of Controlled Documents, (See Appendix D – No. 3). The procedure also addresses the customer complaints process.

A record of the results of Corrective Actions is maintained (See Appendix G; No. 52 and *numerous records* – Masterlist of Quality Records). A list of records relevant to this section is also outlined in The Corrective and Preventive Action Procedure.

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8.5.3 Preventive Action

Preventive action seeks to eliminate the occurrence of potential problems that could have a negative impact on the business. The preventive action taken is relative to the potential impact of the problem.

Relevant data sources are analysed to identify trends in performance, which indicate potential problems. The stages of the preventive action process are outlined in the Corrective and Preventive Action Procedure, which can be accessed here or by reference to the Masterlist of Controlled Documents (See Appendix D – No. 3).

A record of the results of Preventive Action is maintained (See Appendix G; No. 52 and *numerous records* – Masterlist of Quality Records).

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APPENDIX A

Note: The H.R. Dept. maintains records of the number of personnel in each department at any one time.

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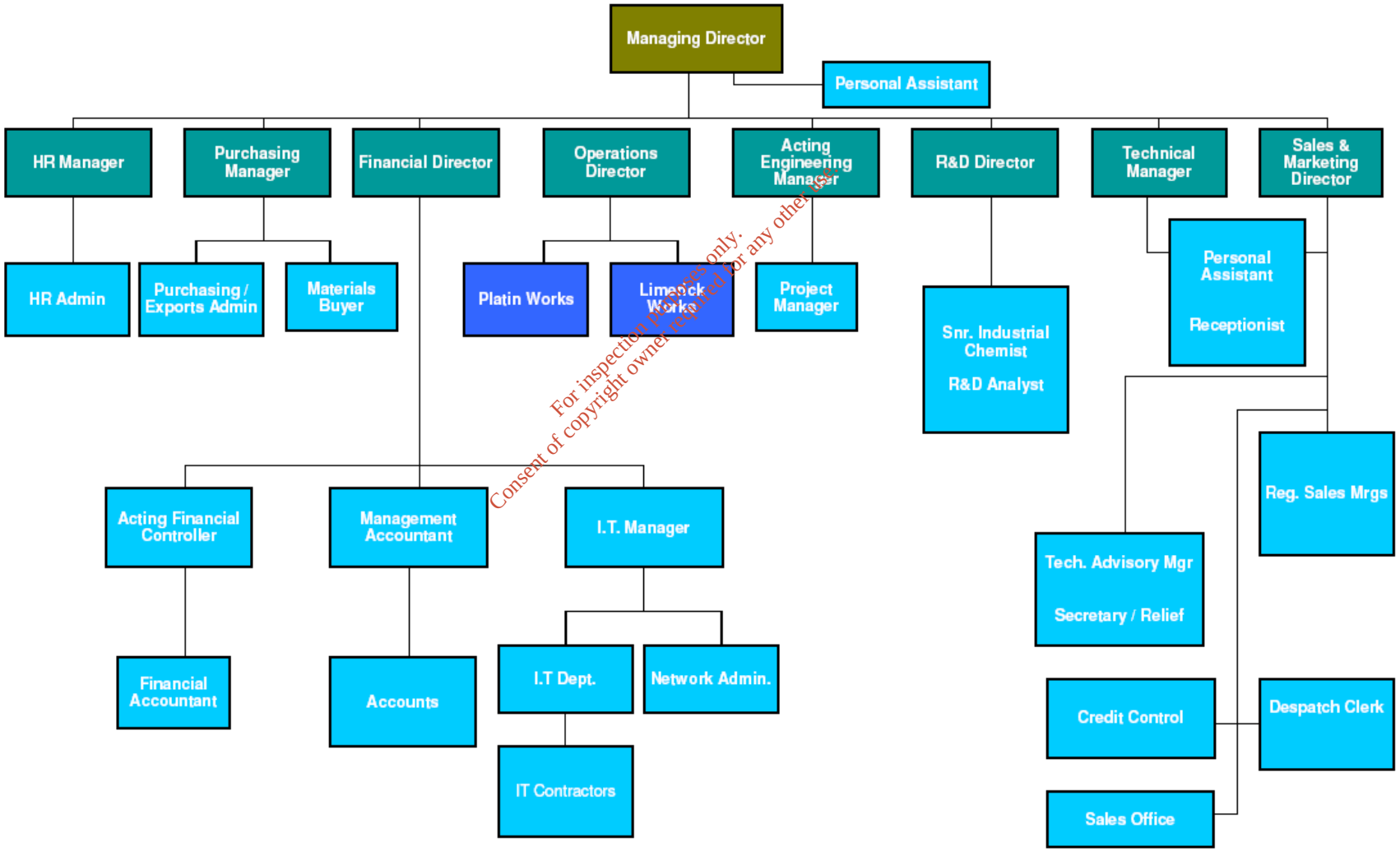
IRISH CEMENT LIMITED – HEAD OFFICE



APPENDIX B

Note: The H.R. Dept. maintains records of the number of personnel in each department at any one time.

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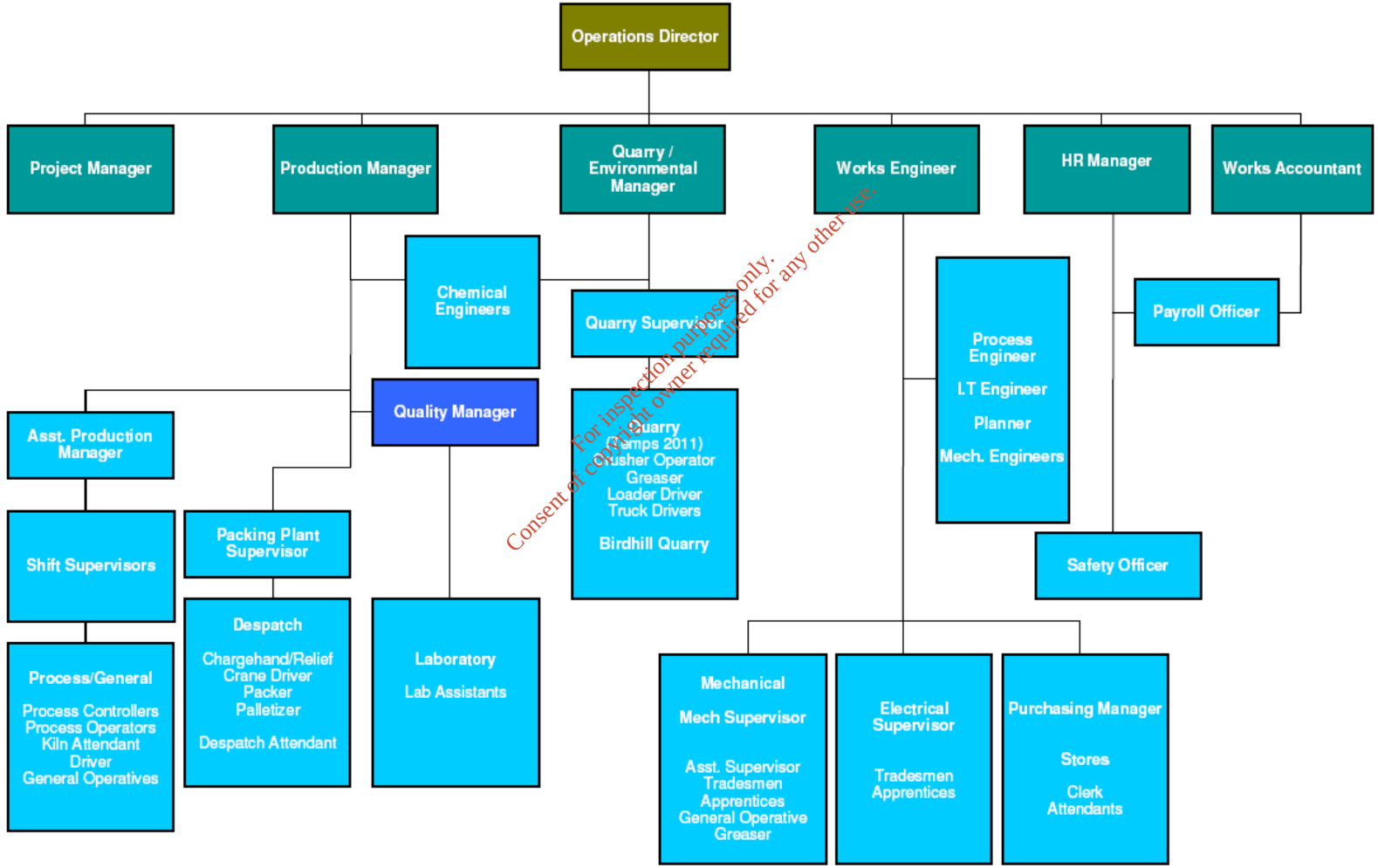
IRISH CEMENT LIMITED – LIMERICK WORKS



APPENDIX C

Note : The H.R. Dept. maintains records of the number of personnel in each department at any one time.

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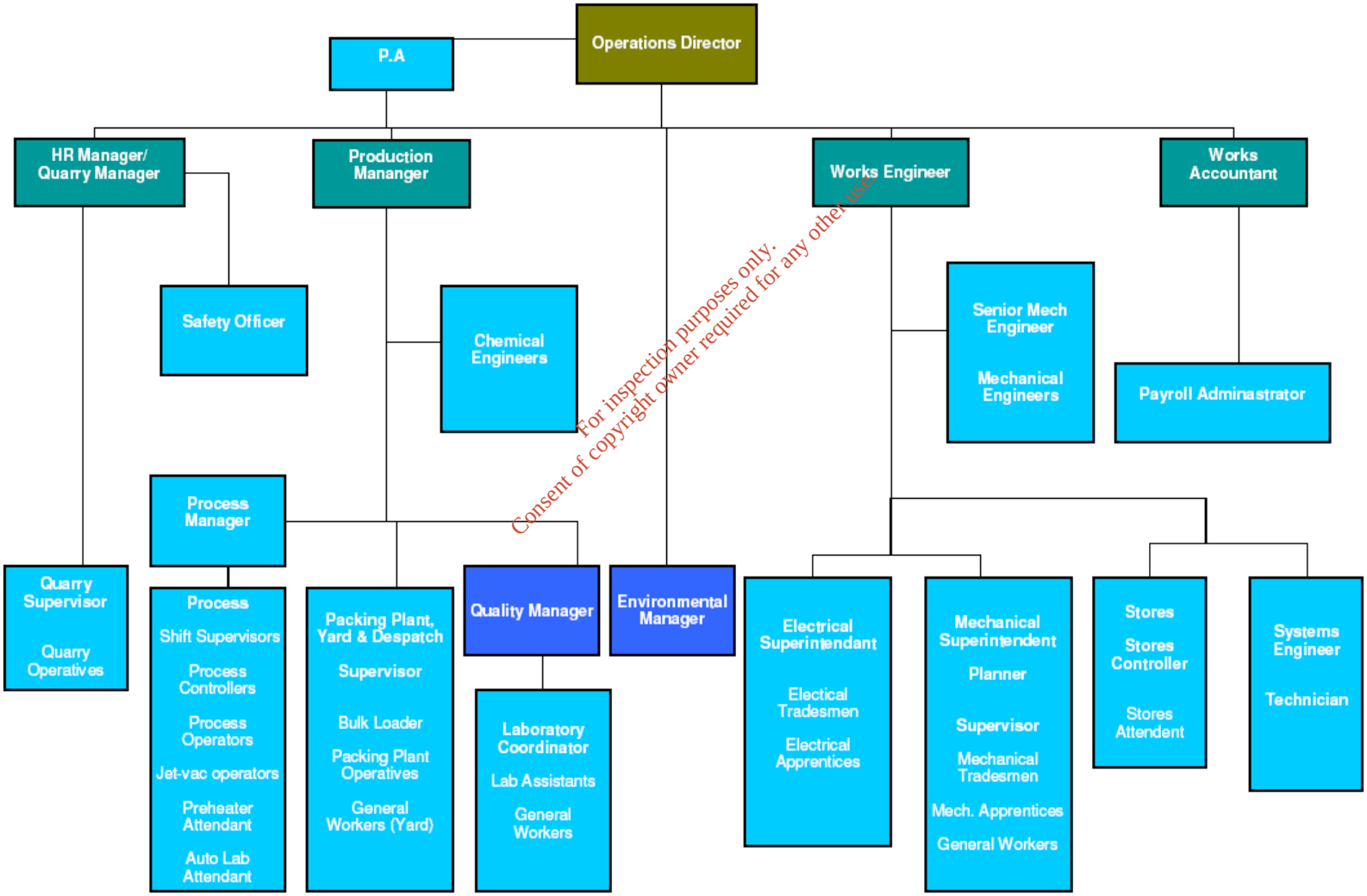
IRISH CEMENT LIMITED – PLATIN WORKS



APPENDIX D: MASTERLIST OF CONTROLLED DOCUMENTS

	Controlled Documents	Head Office	Platin Works	Limerick Works
No.	*Document Name*	*File No.*	*File No.*	*File No.*
1	Quality Manual (ISO 9001: 2008)[1]	\\icl-ho-files\ISO_9001_QS		
2	*Control of Records Procedure[1]	\\icl-ho-files\ISO_9001_QS		
3	*Corrective and Preventive Action Procedure[1]	\\icl-ho-files\ISO_9001_QS		
4	*Document Control Procedure[1]	\\icl-ho-files\ISO_9001_QS		
5	*Internal Audit Procedure[1]	\\icl-ho-files\ISO_9001_QS		
6	*Non-Conforming Product Procedure[1]	\\icl-ho-files\ISO_9001_QS		
7	Procedure for Measurement of Customer Satisfaction[1]	\\icl-ho-files\ISO_9001_QS		
8	Cement Distribution Procedures Manual[1]	\\icl-ho-files\ISO_9001_QS		
9	Customer Service Manual (Head Office)	SA 5.1	6.203.3	11.9.14
10	Purchasing Procedures Manual[1]	PU 13.1		
11	Quality Objectives (Company Wide)[1]	TE 2.7		
12	Ringsend Depot Quality Procedure	TE 2.1	6.103.2	
13	Company Product Targets Sheet	TE 2.1	8.102.2	11.1.1
14	Customer Service Manual (Platin Works)		# 6.203.3	
15	Purchased Materials Specifications (Platin Works)	PU 13.2	6.102.1D	
16	API Procedures Manual			11.9.17
17	API – Documented Procedures & Control Features			11.4.10.1
18	Auto-control Procedures			11.9.61
19	Backup Procedures For Computer Software			11.9.70
20	Bulk Despatch Manual			11.9.13
21	Calibration Methods			11.12.12
22	Continuous Process Manual			11.9.10
23	Customer Service Manual (Limerick Works)			11.9.14
24	Q.S. Procedure for Packing Plant			11.9.12
25	PFA Quality Control Procedures Manual			11.9.15
26	Laboratory Test Procedures Vol. 1-5			11.9.6
27	Quality Control Targets Sheet			11.11.9.1
28	Purchased Materials Specifications (Limerick Works)	PU 13.2		11.6.1
29	Quality Diversion Limits Sheet			11.11.11
30	Quality Procedures Manual for GGBS			11.9.18
31	Quarry Operating Manual			1.1
32	Raw Materials Procedures Manual			11.9.9
33	Revision Status of Documents (Limerick Works)			11.9.100
34	Test & Measurement Equipment			11.12.11
35	Contract Review (Limerick Works)			11.1.2
36	Inspection, Testing and Calibration Methods			11.12.11.1
37	Ringaskiddy Depot Quality Procedure			13.1.2.1
38	Ghent Depot Quality Procedure – Irish operations	\\icl-ho-files\ISO_9001_QS		
39	Ghent Depot Quality Procedures – Belgian operations[1] • Organisatie & Organigram • Overslag activiteit • Kwaliteit	\\icl-ho-files\ISO_9001_QS/Ghent_Local_procedures		

Note 1: The electronic mastercopy versions of No. 1-8, 10-11 and 39 are available at \\icl-ho-files\ISO_9001_QS
Note 2: * Documented Procedures specifically required by the standard (ISO 9001:2008)
Note 3: # Document is available on Intranet

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APPENDIX E: MASTERLIST OF ADDITIONAL DOCUMENTS & STANDARD OPERATING PROCEDURES

	Documents Name	Head Office	Platin Works	Limerick Works
No.	*Document Name*	*File No.*	*File No.*	*File No.*
1	Quality Targets Sheet (Platin Works)		8.102	
2	Quality Objectives (Platin Works)		8.102.1	
3	Quality Objectives (Limerick Works)			11.9.103
4	Calibration Reports		6.102.1B	
5	Platin Despatch Sales Procedure		6.102.1S	
6	Procedure for General Packing Plant Operation		6.102.1T	
7	Procedure Manual for BSI Audit sampling		6.102.1N	
8	Procedures Manual for Rough, Shift & Chemical Lab		6.103	
9	Procedures Manual for Physical Testing Laboratory		6.103.1	
10	Process Control Quality Systems		6.102.1G	
11	Quarry Operating Procedure		6.102.1F	
12	Recalibration Details for PW2404-2400 X-Ray spectrometer		6.102.1U	
13	Revision Status of Documents (Head Office)	TE 2.7		
14	Revision Status of Documents (Platin Works)		6.102.1P	
15	Chromate Reduction Procedure (Limerick Works)			11.9.80
16	Chromate Reduction Procedure (Platin Works)		6.102.1W #	
17	Description of Plant Management Activity (Limerick Works)			11.9.19
18	Description of Maintenance Mgt. System (Platin Works)		6.102.1X	
19	Description of Maintenance Mgt. System (Limerick Works)			11.9.20
20	Toomebridge Depot Procedure		6.103.3	
21	Premier Cement; Swansea Terminal Quality Manual			

Note

1: # Document is available on Intranet.

2: Further to the ongoing Laboratory Integration project several operational procedures are currently under revision as highlighted. These will be replaced or removed on a case by case basis.

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APPENDIX F: MASTERLIST OF EXTERNAL STANDARDS

	List of External Standards	Head Office	Platin Works	Limerick Works
No.	*Name of Standard*	*File No.*	*File No.*	*File No.*
1	**I.S. EN 197- Parts 1 & 2** (Part 1: Composition, specifications & conformity criteria for common cements) (Part 2: Conformity evaluation)	TE Library	6.002	11.4.3
2	**I.S. EN 196 - Part 1** (Determination of strength)	TE Library	6.002	11.4.3.1
3	**I.S. EN 196 - Part 2** (Chemical analysis of cement)	TE Library	6.002	11.4.3.1
4	**I.S. EN 196 - Part 3** (Determination of setting time and soundness)	TE Library	6.002	11.4.3.1
5	**I.S. EN 196 - Part 5** (Pozzolanicity test for pozzolanic cements)	TE Library	6.002	11.4.3.1
6	**I.S. EN 196 - Part 6** (Determination of fineness)	TE Library	6.002	11.4.3.1
7	**I.S. EN 196 - Part 7** (Methods of taking and preparing samples of cement)	TE Library	6.002	11.4.3.1
8	**I.S. EN 196 - Part 8** (Heat of hydration – solution method)	TE Library	6.002	11.4.3.1
9	**I.S. EN 196 - Part 9** (Heat of hydration – semi-adiabatic method)	TE Library	6.002	11.4.3.1
10	**EN 196-10:2004** Determination of the water-soluble chromium (VI) content of cement	TE Library	6.002	11.4.3.1
11	**I.S. EN 196 - Part 21** (Determination of the chloride, carbon dioxide and alkali content of cement)	TE Library	6.002	11.4.3.1
12	**I.S. EN ISO 9001:2008** (Quality management systems requirements)	TE Library	6.002	11.4.2.1
13	**I.S. EN 450** (Fly ash for concrete)	TE Library	--	11.4.3.1
14	**EN 197-1: 2011** (Sulphate resting portland cement)	TE Library	6.002	11.4.4
15	**BS 6610** (Specification for pozzolanic fly- ash cement)	TE Library	--	11.4.6.2
16	**I.S. EN 15167** (Ground granulated blastfurnace slag for use with portland cement)	TE Library	6.002	11.4.3.1
18	**BS 1016** (Methods for the testing and analysis of coal & coke)	--	6.002	11.4.12
19	**API Spec. 10A** (Specification for cements and materials for well cementing)	--	--	11.4.10
20	**API Spec. Q1** (Specification for quality programs for the petroleum & natural gas industry)	--	--	11.4.10
21	**ASTM: C204** (Fineness of hydraulic cement by air permeability apparatus)	--	--	11.4.8
22	**TRA 600** (Regulations for BENOR mark usage)			
23	**PTV 603** (Additional characteristics for cement produced to comply with TRA 600)			
24	**BRL 2601** (National assessment guideline for the KOMO®-product certificate for cement and masonry cement)			

**Note: The latest edition of each standard applies.*

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APPENDIX G: MASTERLIST OF QUALITY RECORDS

1. Test Reports for Cement & Raw Materials

No.	*List of Quality Records*	Head Office	Platin Works	Limerick Works
1	Daily Cement Test Report		Physical Lab.	11.3.1
2	Weekly Quality Reports	TE 2.22	6.121	11.3.2
3	Despatch Cement Test Reports (BSQAS)	ETC Directory. ICL-HO-NT-S1'(:W)	13.120	
4	Despatch Cement Test Reports (LA)	ETC Directory ICL-HO-NT-S1'(:W)	13.108F	
5	Despatch Cement Test Reports (NOR)	ETC Directory ICL-HO-NT-S1'(:W)	13.108	11.3.7.0
6	Despatch Cement Test Reports (OILWELL)	--		11.3.7.10
7	Despatch Cement Test Reports (PACK)	ETC Directory ICL-HO-NT-S1'(:W)	13.108D	11.3.7.1
8	Despatch Cement Test Reports (RH)	ETC Directory ICL-HO-NT-S1'(:W)	13.108	11.3.7.4
9	Despatch Cement Test Reports (SR)	ETC Directory ICL-HO-NT-S1'(:W)	13.114	11.3.7.3
10	Tegral Reports			11.3.7.8
11	Chemical Control of Daily Production		Chemical lab.	QCX Computer
12	Shift Chemical Control		Chemical lab.	QCX
13	Chemical Logsheet for Limestone		Chemical lab	Chemical Lab.
14	Chemical Logsheet for Shale and other raw materials		Chemical lab	Chemical Lab.
15	Clinker Cargo Analysis Certificates		5.108	11.3.7.5---7
16	Despatch Cement/Clinker Chemical Analysis			11.3.9.1---5
17	Test results of raw materials, intermediates & finished products.		Labs Database.	Labs Database & Lab. Logbooks

2. Materials / Purchased Materials / Fuels

	List of Quality Records	Head Office	Platin Works	Limerick Works
18	Raw Materials (Specification-Purchase-Test Results)	PU 13.1		11.6.1---11.6.7
19	Gypsum - General		4.301	11.6.3.1 + 11.6.3.2
20	Slag/PFA etc.	PU 2.5 + PU 2.6 TE 2.23 + ETC Dir. ICL-HO-NT-S1'(:W)	4.203 + 4.203.1	11.3.9
21	Supplier Evaluation	PU 13.5	6.102.5A	Stores Controller
22	Timber Pallets		5.202	11.6.5---11.6.5.1
23	Paper Sacks - Bag Breakage Test		P.P.1 or 5.202	11.6.4---11.6.4.1
24	Fuels (other than Pet. Coke)		3.506---3.508	11.6.2---11.6.2.1
25	Petroleum Coke		3.511 + 3.512	11.9.4
26	Test Results of Purchased Materials		Labs. Database	Labs. Database + Logbooks

Note

1: Further to the ongoing Laboratory Integration project several operational procedures are currently under revision as highlighted. These will be replaced or removed on a case by case basis.

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3. Laboratory / Calibration

	List of Quality Records	Head Office	Platin Works	Limerick Works
27	Laboratory Equipment		6.104	11.5
28	XRF Calibration Log		X-Ray Computer	X-Ray Computer
29	Calibration files and records		QA2 + QAP1	11.12.1---11.12.8
30	Physical Laboratory Temperature and Humidity Records		QAP2	Physical Lab.
31	Physical Laboratory Testing Equipment		QAP2	Physical Lab.
32	Sand and Aggregate Testing		QAP2	
33	Sampling & Testing Procedures		6.102.1G	11.9.6
34	Weighbridge Results, Reports and records		8.109 Maint. Engineer	Elec. Engineer Production Office

4. Management Reviews / Audits /Planning

	List of Quality Records	Head Office	Platin Works	Limerick Works
35	Management Review	TE 2.3	6.102.5	11.9.5
36	Internal Audit	TE 2.7	6.102.5	11.9.4 + 11.9.4.1
37	NSAI – External Audit		6.008E	11.2.1.6
38	BSI – External Audit		6.008D	11.2.1.0
39	API External Audit			11.4.10.2
40	Sampling and Testing Plan		6.102.1G	11.9.6

5. Customer Complaints / Quality Upsets

	List of Quality Records	Head Office	Platin Works	Limerick Works
41	Customer Complaints and reviews	TE 2.6	6.202	11.7.2---11.7.6
42	ICL Complaints system	SQL Database TE 2.6	SQL Database 6.201 A & B	SQL Database
43	Quality Manual System failures			11.9.1
44	Quality Upsets		Platin Comp. Network	

6. Miscellaneous

	List of Quality Records	Head Office	Platin Works	Limerick Works
45	Training - Personnel Development	Filing Cabinets HR Dept.	7.101 H.R. Dept.	11.13.1---11.13.3 H.R. Dept
46	Statistical Techniques		6.012.7	11.9.101
47	Retained Obsolete Files		8.106 & Prod. Office	Alongside Current File
48	Despatch Dockets		Despatch Office	Despatch Office
49	Cement Mill Logs		Production Office	Production Office
50	Shift Instructions / Reports		Intranet	Intranet

Further to the ongoing Laboratory Integration project several operational procedures are currently under revision as highlighted. These will be replaced or removed on a case by case basis.

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Addendum C

C.5 Curriculum Vitae of Seamus Breen

Personal Details

Name:	Seamus Breen
Work Address:	Castlemungret, Mungret, Co. Limerick
Telephone No:	(041) 9876000 (W) (086) 4103010 (M)
E-mail:	spbreen@irishcement.ie
Present Company:	Irish Cement Ltd., Castlemungret, Limerick. 1991-YTD (A group within CRH)
Present Job Title:	Quality and Environmental Manager
Qualifications:	BSc. (1984-1988), MSc. (1988-1991), Diploma in Personnel Management (1997-1999), Member of the Institute of Engineers of Ireland (MIEI)

Employment Details

Dec '91	Employed as Development Chemist in R&D, Irish Cement, Drogheda.
Dec '93	Promoted to the position of Process Engineer at ICL Drogheda.
Sept '94	Promoted to Limerick Works as Chemical Engineer with responsibility for commissioning an automatic laboratory and associated computer system.
June '95	Promoted to the position of Senior Chemical Engineer at ICL Limerick Works.
Nov '95	Responsible for all environmental issues at ICL Limerick including the coordination of the IPPC licence application
Jan – May '96	Acting Laboratory Head with direct responsibility for Plant ISO 9002 quality system, product certification and Product quality.
Feb '97	Promoted to the position of Personnel Manager of Irish Cement Ltd., Limerick Works.
June '99	Promoted to the position of Production and Environmental Manager at Irish Cement Limerick.
Sept '12	Promoted to the position of Quality and Environmental Manager for the company Irish Cement.

Key Achievements:

- Kept the local cement market supplied with Cement in the years 2000 – 2012
- This was achieved with the highest possible efficiencies and without adverse environmental impact.

- Significant environmental improvements were established and commissioned during my tenure e.g. conversion of all site ESPs to bag filters, kiln upgrades, control system upgrades.

- Made improvements in product consistency year on year.

- Improvements in efficiencies have led to improved site operations.

I have attended various management courses through the auspices of the Irish Management Institute (IMI, Sandyford Dublin)

9th October 2015

ATTACHMENT No. D

INFRASTRUCTURE AND OPERATION

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D.1. Operational Information Requirements

D.1.1 Introduction to Irish Cement Ltd

Irish Cement Ltd (ICL) was one of the founding companies of CRH, now one of the world's leading building materials groups. It has manufactured cement in Ireland for 78 years. Since commencing operations (at Drogheda and Limerick) in 1938, the company has continually invested in best available technologies, thus achieving continued improved environmental performance as the company's operations have developed to satisfy market demands.

Limerick Works

The ICL Limerick Works at Castlemungret has been used for the manufacture of cement since 1938. The site comprises a large landbank located in the townlands of Bunlicky, Castlemungret and Conigar on the south side of the River Shannon. The site is bounded on the south by the N69 road from Limerick to Foynes, Tralee and Co Kerry. Mungret Village lies close to the southern boundary of the site, and additional intermittent residential development is located to the south west of the site. To the east and south east of the site, lie the residential areas of Dooradoyle and Gouldavoher. An industrial estate is located in this area at the junction of the N20 and R510. The approach road to the facility, the N69, has developed as an industrial area extending from Limerick as far as the entrance to the Cement Works.

The site itself is predominately flat to undulating. An active quarry is in operation on the western side. The Bunlicky Clayfield Pond, a man-made lagoon, is located to the north, which drains as required to the River Shannon. The Cement Works is located in the south and east quadrants parallel to the N69 roadway. In general the landscape to the south and west is gently undulating agricultural land of medium sized fields with hedgerows and stands of trees.

Portland cements and other cements are manufactured at the Limerick Works in accordance with relevant EU, and Irish Standards. Cement is a powdered mineralogical composite, manufactured predominantly from natural raw materials, which exhibits hydraulic properties when mixed with water. The principal materials used in the cement manufacturing process are:

- Limestone; and
- Shales.

Secondary materials are:

- Iron oxide;
- Pulverised Fly Ash (PFA);
- Overburden;
- Gypsum;
- Ferrous/tin sulphates;
- Grinding aids;
- Bauxite;
- Ground Blast Furnace Slag (GBS)
- Ground Granulated Blast Furnace Slag (GGBS);
- Flue Dust Portland Cement (FDPC); and
- Other materials as required.

Limestone is quarried on-site and can also be sourced off-site. Overburden is removed from the rock in the Limestone Quarry before quarrying commences. Shale is quarried off-site. Overburden can be used as a shale replacement material depending on its mineralogical composition. Iron ore and PFA are used as raw materials to optimise the mineral composition of cement clinker. Planning permission was granted in 2004 for limestone and overburden to be taken off-site for use by local industry.

At ICL, cement manufacture begins at the feeders to the primary crushing equipment. Pre-crushed shales are delivered to site. An on-site jaw crusher/ hammer mill arrangement can be used for crushing of other shales.

After primary crushing, the materials are homogenised in separate blending stores. Limestone, Shale, PFA and Iron Oxide are then mixed, dried and milled in a raw mill.

The proportions of mixing are controlled by chemical analysis. The raw mill operates in the exhaust system of a rotary kiln, thereby using the available excess low-grade heat for drying of the raw materials. The product of the raw mill is a powdered blend of raw materials called 'raw meal'. The mineralogical composition of the raw meal is carefully controlled.

The raw meal is blended in homogenising silos before being converted to cement clinker in the kiln systems. Kiln 6 is a four stage cyclone preheater kiln. Evaporation of residual moisture and partial calcination of the meal occurs in the cyclone preheater. Calcination of the raw meal, now known as kiln feed begins in the preheater stage. The preheater of the kiln system is a counter current, cyclone based heat exchanger where heat is recovered from the exiting exhaust gases to the incoming kiln feed. Clinker formation occurs in the kiln at temperatures of 1,450°C.

Pet coke and/or coal is the standard fossil fuels for the kiln. Small quantities of gas and diesel oil are used in the heating up process. Solid fuels are milled on site before use.

This application is seeking permission to substitute traditional fossil fuels with Alternative Fuels in the Kiln 6 system and the use of alternative raw materials at the plant.

Clinker produced at ICL is stored in dedicated silos and sheds. Imported clinker can be introduced to the cement production process downstream of the kiln stage.

Ball mills are currently used to mill the clinker to produce the final cement products. Minor additional constituents (PFA/limestone) are added to the clinker and gypsum to make cement at ICL Limerick in accordance with cement Standard requirements. ICL Limerick currently produces Eco-efficient CEM II cements that have a lower carbon footprint and require less energy to produce than high clinker CEM I cements. CEM II cements are produced by inter grinding secondary cementitious materials notably PFA and limestone during the final cement milling phase as a replacement for some of the clinker.

In accordance with current legislation, chromate reducing agents (tin sulphate or ferrous sulphate) are added either at the cement milling or at the packing stages to reduce Cr6 concentrations to below 2 ppm. Cement is pneumatically or mechanically conveyed from the cement mills to storage silos. These silos are either fitted with bulk loading facilities or feed transport systems to the Packing Plant. Bulk cement is loaded for road transport. In the Packing Plant, cement is packed into multi-layered paper sacks and palletised prior to despatch by road.

The factory is designed to operate 24 hours per day and 365 days per year. Maintenance periods and market demand influence the actual operating pattern of the factory.

Irish Cement's Products

The different cement's manufactured at ICL Limerick are:

- CEM I Normal Portland Cement
- CEM I Rapid Hardening Portland Cement
- CEM II Portland Limestone Cement
- Sulphate Resisting Portland Cement

- Specials can be manufactured if the market requires

D.2. Proposed Introduction of Alternative Fuels and Raw Materials

Petroleum Coke (petcoke), a carbon residue left after the oil refining process and imported into Ireland is the fossil fuel currently in use at ICL Limerick. Coal can be used as an alternative to Petcoke.

Permission to use up to 90,000 tonnes per annum alternative fuels is now being sought. It is planned to replace a portion of fossil fuels in Kiln 6 over a phased period, subject to the availability of suitable alternative fuels.

Permission is also sought for the introduction of alternative raw materials at Kiln 6. These materials which will replace a proportion of the traditional raw materials and can be accommodated within the 90,000 tonnes overall permission.

Many of the alternative fuels, used around Europe like tyres, solvents, sewage sludge are also available locally in Ireland. Alternative fuels have successfully been used at the EPA licenced ICL Platin Cement Works since 2011.

Whole tyres, solvents, sewage sludge and Solid Recovered Fuels (SRF) are likely to be the first fuels to come on stream. Starting with whole tyres each additional individual fuel will be added on phased basis over the coming years allowing for the steady replacement of fossil fuels. Quantities will be determined by availability and calorific content of the materials.

Dried sewage sludge is also proposed to be a fuel in Limerick in the coming decade. Waste water treatment plants with the capability to produce a dried output are becoming more common so it is expected that availability of this fuel will increase in the future.

Other types of alternative fuels are available in Ireland, and are likely to arise in the future. It is not possible to predict with any certainty the likely quantities and types of fuels that will be available for use in Limerick.

It is proposed to introduce alternative raw materials in ICL Limerick over the coming 5-10 years. Alternative raw materials typically arise on a batch basis and the usage will depend on compositional analysis and physical handling characteristics.

The most common alternative raw materials in use in cement plants in Europe are industrial wastes and by-products, hydrocarbon contaminated soil and sludges from water treatment works, e.g. alum sludges. The market for these material is currently not well developed in Ireland, therefore predicting the future availability at this point is difficult.

D.3. Description of Activities and Processes

Generally the cement manufacturing operation is a series of size reduction and mixing processes leading to the thermal process in the kiln where the clinker minerals are formed. A final size reduction process reduces the clinker produced in the kiln to cement. There are specific inputs and outputs to each process on-site. The principal processes and their associated inputs and outputs are summarised in Table D.2.

Table D.2 Cement Making Process Outline

Activity	Outline of the activity
Quarrying	Limestone the primary ingredient is quarried on site. Overburden also originates on the site. Other raw materials are delivered.

Raw Material Preparation	All the raw materials are tested, milled and blended to produce an homogenous mixture called 'raw meal' which ensures the correct chemical balance is fed into the calciner and kiln
Clinker production	Heating the raw materials up to 1,450ºC is essential for clinker production, where the minerals fuse together. This stage requires significant heat inputs from fuel combustion
Testing & Quality Control	Quality control is a vital activity at all stages of the cement production process. Most of the testing is carried out on-site including in a fully automated laboratory
Cement Milling	Clinker and additional materials are milled into the final fine cement product. It is at this stage that 'unburnt' milled limestone is added to make CEM II 'eco-efficient' cements
Packing & Dispatch	The cements are stored in silos for dispatch in bulk road tankers or packed in to 25kg paper sacks

D.3.1 Main Activities

D.3.1.1 Quarrying

Quarrying involves overburden stripping, drilling, blasting, loading, hauling, crushing and storage of limestone. In ICL Limerick's case, the crushing and storage of argillaceous shales, sourced from off-site quarries, also features. Various process material streams from the factory are recycled via the quarry and crushing plants. Roof tiles that do not meet quality control specification are also recycled through the limestone crusher.

D.3.1.2 Rawmilling

Limestone and overburden/shale are extracted from stores by specially designed reclaimers and conveyed to separate mill feed hoppers. Limestone, overburden/shale, bauxite and iron oxide are extracted from their respective storage hoppers and conveyed together to the raw mills.

The objective of the rawmilling unit operation is to produce a meal of finely ground, dry and homogenised raw material. The raw meal produced in the mills is conveyed to homogenising silos by mechanical equipment. There are two raw meal homogenising silos and two raw meal storage silos. The raw meal is homogenised in the upper chambers prior to dropping by gravity to the storage silos below.

Raw Mill 6 is a horizontal ball mill that uses the action of spherical steel media in a revolving chamber for grinding. It has a nominal capacity of 200 tonnes per hour. Energy is recovered from the exhaust gases of the kiln by directing the gases to dry the raw materials in the mills. The gases are also used to convey raw meal from the mill.

D.3.1.3 Cement Clinker Making

Raw meal is extracted from the storage silos and mechanically transported to feed hoppers. Raw meal flow is controlled and weighed on extraction from the feed hoppers before mechanical transport into the kiln system.

Kiln 6 is a single string four stage cyclone preheater kiln. Evaporation of residual moisture and partial calcination of the meal occurs in the cyclone preheater. Calcination of the raw meal commences in the preheater (pre-calciner) stage. The preheater cyclone system of the kiln system is a counter current, cyclone based heat exchanger where heat is recovered from the exiting exhaust gases to the incoming kiln feed.

In the preheater towers any residual moisture is driven off. Thereafter the temperature of the raw meal rises rapidly as it descends through the preheater system. Calcination begins in the preheater system. Conversely the temperature of the exhaust gases falls rapidly as it flows to the exit of the preheater system.

The raw meal drops into the kiln from the preheater. As the material travels down the rotating kiln the calcination process is completed and the transformation into clinker minerals occurs at a material temperature of approximately 1,450ºC with the main flame temperature of approximately 2,000ºC. To protect the kiln shell at these high temperatures, a lining of refractory material is installed. This lining gradually wears away by abrasion and thermal shocks. Renewal is required at approximately yearly intervals.

Conservation of energy is achieved by recovering heat from the cooling clinker to preheat the combustion air. There are 9 planetary cooler tubes attached to the kiln into which the clinker falls as the kiln rotates. Clinker exiting from the kiln is cooled rapidly.

Cooled clinker is transported by enclosed mechanical conveyors to enclosed clinker storage silos.

To facilitate market demand and maintenance and production planning, it may be necessary from time to time to store clinker in enclosed storage sheds.

Exhaust gases from Kiln 6 are dedusted using a modern bag filter. A gas conditioning tower cools and conditions the exhaust gases using water sprays before the dedusting. The NO_X abatement equipment installed on Kiln 6 is an SNCR installation.

Kiln 6 is currently fired with solid fossil fuels. Solid fuel storage is in outside stockpiles. The fuel is retrieved from storage and pulverised in a gas swept ball mill. The fuel is metered and pneumatically conveyed thereafter to the kiln burner. Exhaust gases from the kiln is used to ventilate the pet coke/coal mills. These gases are dedusted in a dedicated hybrid filter designed to handle high temperature gases.

While the kiln is currently pet coke fuelled, small quantities of LPG and oil are used for lighting the kiln during start-up.

This application is seeking permission to substitute a portion of traditional fossil fuel types used in Kiln 6 with Alternative Fuels and to introduce the use of alternative raw materials in the process.

A bypass filter and cooling tower is proposed for Kiln 6. The bypass system removes a controlled amount of process gas from the system, treats it by air quenching, conditioning and electrostatic precipitation before venting it to atmosphere. The benefit of the system is that helps to control the alkali content of the clinker and facilitates the removal of mineral salts which if not removed can cause blockage in the kiln system. The dust collected is returned back into the process in a similar manner to filter dusts.

D.3.1.4 Cement Milling

Cement milling involves extraction of clinker from storage and milling of clinker with small portions of gypsum and minor additional constituents (raw meal/limestone/gypsum/Pulverised Flyash/Ground Granulated Blast Furnace Slag (GGBS)/Cr VI reducing agents/grinding aids). In the production of CEM II cement unburnt finely-ground limestone is added in quantities exceeding 5%. The milled cement is transported to silos.

D.3.1.5 Packing/Dispatch

The final stage of cement making is the packing/dispatch phase where cement is bulk loaded into tankers for road transport, or packed into 25 kg bags prior to dispatch by road.

D.1.3.6 Plant Utilities

Process Water, Mains Water, Emergency Water and Firewater Hydrant Supply

No additional water will be required as a result of the introduction of alternative fuels to the site.

The mains water to the site is from Limerick County Council public supply. This supply enters the site near the main vehicle entrance. The mains water is used to supply the offices, canteen and laboratories with potable water.

The process water used on-site is normally taken from the groundwater collected in a sump in the quarry. When required it can also be taken from Bunlicky Clayfield Pond on the south bank of the Shannon. When flooding of the quarry occurs in wet periods, there is a facility available to pump water from the quarry floor to Bunlicky Clayfield Pond via SW2.

Plant process water is pumped to two storage tanks (100m³ each) located at the top of the Raw Mill building. From the storage tanks, water is supplied to the various areas of the plant by gravity feed. The majority of the process water is used for cooling e.g. water injection in the cement mills, kiln bearings, compressors, cooling tower, which is returned via a drainage network back to Bunlicky Clayfield Pond via SW1.

An emergency supply of water is available on-site in case there is failure of any pumps to supply water to the process. An emergency water tank is located behind the electrical workshop. A weir pump with a capacity of 270 m³/hour is located at this emergency tank. This pump is driven by a key started diesel generator with variable output speed. The tank is filled with water from Bunlicky Clayfield Pond during normal operation.

Emergency water and firewater hydrant supply water is supplied to the plant through the hydrant system. A fire-water and contaminated storm water risk assessment has been prepared for the facility in accordance with the requirements of IE Licence Reg. No. P0029-03. This document is provided in Attachment No. J.

Electricity

A 110kV electricity station is used to supply power to the plant. This is linked to a number of substations by cable tunnels.

Gas

Liquefied Petroleum Gasoline (LPG) is stored in a 6,000 litre tank on the site.

Water Treatment

All storm water and spent cooling water is returned through the site drains to Bunlicky Pond via emission point SW1. The site drainage system is described in more detail in **Attachment No. E**.

Sewage System

Domestic effluent arising on-site is discharged to the Municipal Waste Water Treatment Plant (MWWTP) at Bunlicky via the Irish Water sewer for discharge of domestic effluent. A description of the MWWTP treatment system is included in **Attachment No. F.** No on-site treatment is undertaken. Four septic tanks are in operation. They are periodically cleaned out and the material recovered is delivered to the MWWTP for treatment.

D.3.1.7 Ancillary Activities

In addition to the cement making process, the ICL Limerick Works operates support services and activities as follows:

- Garage
- Mechanical Maintenance Workshop
- Stores
- Electrical Maintenance Workshop
- Laboratories/Control Room
- Plant Compressed Air
- Process Water System
- Domestic Water System
- Canteen
- Medical Centre
- Administration

Process Control System

The operation of the plant is controlled by a PLC based control system, which monitors the manufacturing process by a comprehensive array of analogue instruments and switches. Alternative fuels feeding systems and controls will be added to the existing control system.

Stop and start sequences are programmed in a safe manner to minimise emissions. In the event of faults or emergency situations developing during operation, the control system completes a pre-programmed stop procedure which is designed to minimise danger to the plant, employees and the environment.

The operation of the control system is supervised by process controllers, employees who are specially trained in the operation of the cement making process and the system used in Limerick to control the process. Specific written instructions for the operation are available to the process controllers.

The objective of the process control of the kiln systems is the correct throughput of properly clinkered material at economic energy consumption while minimising emissions to atmosphere. Inputs to the system include clinker density and concentration of unreacted lime, kiln rotation speed, fuel firing rate, burning zone temperature, kiln drive torque, gas temperatures at the kiln and preheater outlets and O_2 and NO_X concentration in exhaust gases.

The computerised control system controls and monitors the speed of rotation of the kiln, the fuel firing rate, the speed of the kiln exhaust fan and the feed rate of the raw meal.

PID or closed loop control are used to control other parameters. For instance, the outlet temperature of the cooling tower is controlled by varying water injection rates while the outlet temperature of coal mills is controlled by varying the vent air flow.

All silos, hoppers and storage vessels have maximum level probes. When the maximum level has been reached in a container, the transport of material to the container is shut off.

To control the composition and quality of raw materials during the cement making process a computer is used. The system is called QCX (Quality control by Computer and X-ray). The control system is based on

a control loop consisting of automatic sampling of the raw mix followed by automatic sample preparation and X-Ray fluorescence (XRF) analysis in the laboratory. Depending upon on the analytical results and the desired chemical composition, new raw material feeder set points are automatically positioned.

The particle size and sulphate content (as measured using SO_3) are the controlling parameters for the making of the final cement. Target set-points for particle size and SO_3 content in cement milling are controlled by on line expert optimizers.

Overpressure Protection Philosophy

The primary area of concern at the works with regard to explosion is the petcoke/coal plant. The plant is swept by inert gas from the kiln, which ensures a non-explosive atmosphere prevails in normal operation.

Diagram of Activities

The site plan, showing the location of the various buildings is given in Figure D.1. The overall generic cement making process is shown in Figure D.2. The unit operations flow diagrams are shown in Figures D.3.1 to D.3.12 in this Attachment.

D.1.5 Unit Operations and Emission Points

List of Unit Operations

The following is a list of the unit operations at the Limerick works:

- Limestone crushing and transport to store
- Transport of shale to store
- Raw Mill 6
- Raw mill feed to homo silos and homogenising
- Coal Mill 6
- Preheater and Kiln 6
- Cement Mill 5
- Cement Mill 6
- Cement Mill 7
- Proposed bypass
- Packaging plant
- Bulk dispatch
- Compressed air

D.1.6 Emission Points

The main emission points at the Limerick Works are described in **Table D.1.3** (refer also to **Figure E.1**).

Table D.1.3 Industrial Emissions Licensed Main Emission Points to Atmosphere

IE Licence Label	Description
A2-01	Kiln 6
A2-02	Coal Mill 6

A2-03	Cement Mill 5
A2-04	Cement Mill 6
A2-05	Cement Mill 6 Separator
A2-06	Cement Mill 7
A2-07	Cement Mill 7 Separator

A minor emission is an emission, which on the basis of its concentration and mass emission is not considered environmentally significant. Therefore it is not classified as a main emission.

Minor emission points to atmosphere (e.g. extract from transfer points on materials handling systems) are abated using bag filters. ICL request that minor emissions points are excluded from its revised licence, in line with current EPA practice.

Fugitive dust emissions can occur from operations on-site. Every effort is made to minimise such emissions. Dust management measures appropriate to modern cement manufacture are applied and are continually reviewed as part of the annual Environmental Management Plan for the site.

A potential emission point is an emission point that is not active under normal operations. There are no potential emission sources associated with the introduction of alternative fuels and raw materials.

Refer to Tables in Section E.1 of the application.

D.1.7 Abatement Treatment and Recovery Systems

Main Emissions – Description of Abatement Systems

Particulate emissions from the following sources A2-01, A2-03, A2-04, A2-05, A2-06 and A2-07 are abated using bag filters:

Source	Description
A2-01	Kiln 6
A2-03	Cement Mill 5
A2-04	Cement Mill 6
A2-05	Cement Mill 6 Separator
A2-06	Cement Mill 7
A2-07	Cement Mill 7 Separator

Particulate emissions from A2-02 Coal Mill 6 are abated using a hybrid filter i.e. a combination of electrostatic precipitator plates and bag filters.

NO_X emissions from A2-01 are abated using selective non-catalytic reduction (SNCR), this represents BAT for cement production. SNCR involves injecting aqueous ammonia into the kiln exhaust gas to reduce NO_X to N2. Exhaust gas from A2-01 is occasionally fed through A2-02 post-abatement for drying purposes.

Further information on the abatement systems for emissions to atmosphere is provided in **Attachment No. F.**

Mobile Industrial Vacuum Cleaner

A vehicle mounted industrial vacuum cleaner is used to recover spilled solid materials. Depending on the material collected, it is returned to the quarry, process stream or the appropriate storage facility.

Enclosure of Noise Sources

Wherever possible, significant sources of noise are enclosed inside buildings or housings.

Water Sweeping and Water Spraying of Roadways

In dry weather fugitive dust emissions from all roads and paved areas are abated by regular spraying with water from a vehicle mounted 'bowser' and by a road sweeper.

D.1.8 Laboratory Activities

Laboratory Departments

There are three distinct laboratory departments:

- Heavy Preparation H.P. Lab
- Chemical Lab. Chemical Testing
- Shift Testing Auto (Robotic) Lab.

The Laboratory Department at Limerick Works provides for the extensive testing of:

- Raw Materials – Limestone(s) and shales/PFA, alternative raw materials
- Intermediary Materials – Raw meal, kiln feed, clinker, pet coke and coal
- Final Products – Cement(s) and PFA (sales)
- Fuels – Pet coke, coal and alternative fuels

The following routine tests will be carried out in the laboratories as part of the Plant's Quality Control System:

- X-ray analysis for chemical control
- Analysis for free lime
- Analysis for alkalis
- Analysis for sulphur
- Insoluble residue evaluation analysis
- Particle size distribution analysis
- Specific surface analysis
- Moisture content analysis

Much of the chemical testing is carried out by XRF Spectroscopy. Samples are prepared into stable glass beads (Tetraborate or Metaborate) in a programmable furnace. The use of this method has eliminated the use of most of the chemicals traditionally associated with chemical laboratories. Some tests such as for alkalis sulphates, chlorides and free lime are still carried out using wet chemistry methods in order to comply with the EC cement standard EN196-2.

The EPA Office of Radiological Protection Licence is held by ICL for the use of XRF Spectroscopy. A copy of this Licence is included in **Attachment No. L.**

D.1.9 Development and Operational History of the Site

Cement Limited (subsequently named Irish Cement Ltd.) was founded as a public company in 1936. The construction of two cement plants, one at Boyne Road, Drogheda, Co. Louth and the other at Castlemungret, Co. Limerick, was undertaken in the following two years.

At that time, the Limerick factory had an annual production capacity of 75,000 tonnes. Demand for cement rose quickly and in 1954 a second kiln was added at Limerick. By the mid-sixties three further kilns had been added in Limerick, increasing combined yearly output of both the Drogheda and Limerick Works to 1.3 million tonnes.

The Limerick plant began operations as a wet process. In 1983 the current dry process commenced operations as a more efficient modern energy efficient process. The five wet kilns were decommissioned and demolished. Some buildings remain from the old plant such as the garage and the old dispatch building.

The clay extraction area to the north of the plant, created when clay was removed from land to be used in the wet process has been licenced for landfill of specified non- hazardous wastes arising at the Cement works. This area is known as "Bunlicky Clayfield Pond"

The local availability of large deposits of the limestone and shale which the modern dry process demands, easy access to rail and road transport and the proximity of the site to Limerick City all make Castlemungret an ideal location for cement manufacture.

The Agency granted a licence for the production of cement at the plant in 1996, Licence Reg. No. 29 (P0029-01). This was replaced in 2008 by Licence Reg. No. P0029-02 which allowed for upgrading of environmental protection technology at the works. A licence review of Licence Reg. No. P0029-02 was initiated by the Agency in June 2011 to ensure compliance with the *European Communities Environmental Objectives (Surface Waters) Regulations 2009*, the *European Communities Environmental Objectives (Groundwater) Regulations 2010* and the *Waste Management (Management of Waste from the Extractive Industries) Regulations 2009.* Following this review Licence No. P0029-03 was issued in February 2013. In December 2013, Licence P0029-03 was amended to become an Industrial Emissions Licence.

The facility has achieved ISO 14001 accreditation for its Environmental Management System.

Where minor Industrial Emission Licence non-compliances do occur, they are reported to the Agency after the incident, also in monthly reports to the Agency and again in the Annual Environmental Report (AER).

An industrial emissions licence to use up to 90,000 tonnes per annum alternative fuels is now being sought. It is planned to replace a portion of fossil fuels in Kiln 6 over a phased period, subject to the availability of suitable alternative fuels. Permission is also sought for the introduction of alternative raw materials at Kiln 6. These materials which will replace a proportion of the traditional raw materials and can be accommodated within the 90,000 tonnes overall permission. The principle aim of this strategy is to further reduce dependence on imported fossil fuels and to improve the environmental and business performance of the company.

D.4. Additional Requirements for Waste Activities

This section of the application applies to activities set out in Class 11 of the First Schedule of the EPA Act 1992, as amended. The wastes set out in Table D.2(i) below will be accepted at the installation for recovery.

TABLE D.2(i) Waste Acceptance at the Facility for Recovery (type and quantities)

List of Waste (LOW) Code[1]	LOW code description	Tonnes per annum (proposed)
Proposed Fuels		
02 01 02**	animal tissue waste (feathers)	
02 01 03	plant-tissue waste	
02 01 04	waste plastics (except packaging)	
02 01 06	animal faeces, urine and manure (including spoiled straw), effluent, collected separately and treated off-site	
02 01 07	wastes from forestry	
02 01 08*	agrochemical waste containing dangerous substances	
02 01 09	agrochemical waste other than those mentioned in 02 01 08	
02 02 03**	materials unsuitable for consumption or processing (wastes from meat, fish and other foods animal origin)	
02 03 04	materials unsuitable for consumption or processing (wastes from fruit, veg, cereals…)	
02 07 02	wastes from spirits distillation	
02 07 04	materials unsuitable for consumption or processing	
03 01 01	waste bark and cork	
03 01 04*	sawdust, shavings, cuttings, wood, particle board and veneer containing dangerous substances	
03 01 05	sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04	
03 03 01	waste bark and wood	
03 03 08	wastes from sorting of paper and cardboard destined for recycling	
05 01 07*	acid tars	
05 06 01*	acid tars	
07 01 01*	aqueous washing liquids and mother liquors	
07 01 03*	organic halogenated solvents, washing liquids and mother liquors	
07 01 04*	other organic solvents, washing liquids and mother liquors	
07 02 01*	aqueous washing liquids and mother liquors	
07 02 03*	organic halogenated solvents, washing liquids and mother liquors	
07 02 04*	other organic solvents, washing liquids and mother liquors	
07 02 13	waste plastic	
07 03 01*	aqueous washing liquids and mother liquors	
07 03 03*	organic halogenated solvents, washing liquids and mother liquors	
07 03 04*	other organic solvents, washing liquids and mother liquors	
07 04 01*	aqueous washing liquids and mother liquors	

[1] 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)

List of Waste (LOW) Code[1]	LOW code description	Tonnes per annum (proposed)
07 04 03*	organic halogenated solvents, washing liquids and mother liquors	
07 04 04*	other organic solvents, washing liquids and mother liquors	
07 05 01*	aqueous washing liquids and mother liquors	
07 05 03*	organic halogenated solvents, washing liquids and mother liquors	
07 05 04*	other organic solvents, washing liquids and mother liquors	
07 06 01*	aqueous washing liquids and mother liquors	
07 06 03*	Organic halogenated solvents, washing liquids and mother liquors	
07 06 04*	other organic solvents, washing liquids and mother liquors	
07 06 99	wastes not otherwise specified	
07 07 01*	aqueous washing liquids and mother liquors	
07 07 03*	organic halogenated solvents, washing liquids and mother liquors	
07 07 04*	other organic solvents, washing liquids and mother liquors	
08 01 11*	waste paint and varnish containing organic solvents or other dangerous substances	
08 01 12	waste paint and varnish other than those mentioned in 08 01 11	
08 04 09*	waste adhesives and sealants containing organic solvents or other dangerous substances	
08 04 10	waste adhesives and sealants other than those mentioned in 08 04 09	
12 01 05	plastics shavings and turnings	
13 07 01*	fuel oil and diesel	
13 07 03*	other fuels (including mixtures)	
15 01 01	paper and cardboard packaging	
15 01 02	plastic packaging	
15 01 03	wooden packaging	
15 01 05	composite packaging	
15 01 06	mixed packaging	
15 01 10*	packaging containing residues of or contaminated by dangerous substances	
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	
15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02	
16 01 03	end-of-life tyres	
16 11 01*	carbon-based linings and refractories from metallurgical processes containing dangerous substances	

List of Waste (LOW) Code[1]	LOW code description	Tonnes per annum (proposed)
16 11 02	carbon-based linings and refractories from metallurgical processes others than those mentioned in 16 11 01	
17 02 01	Wood	
17 02 03	plastic	
19 02 07*	oil and concentrates from separation	
19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09	
19 08 05	sludges from treatment of urban waste water	
19 10 03*	fluff-light fraction and dust containing dangerous substances	
19 10 04	fluff-light fraction and dust other than those mentioned in 19 10 03	
19 11 02*	acid tars	
19 12 01	paper and cardboard	
19 12 04	plastic and rubber	
19 12 06*	wood containing dangerous substances	
19 12 07	wood other than that mentioned in 19 12 06	
19 12 08	textiles	
19 12 10	combustible waste (refuse derived fuel)	
19 12 11*	other wastes (including mixtures of materials) from mechanical treatment of waste containing dangerous substances	
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11	
20 01 01	paper and cardboard	
20 01 13*	solvents	
20 01 25	edible oil and fat	
20 01 26*	oil and fat other than those mentioned in 20 01 25	
20 01 37*	wood containing dangerous substances	
20 01 38	wood other than that mentioned in 20 01 37	
20 01 39	plastics	
Proposed Raw Materials		
01 01 01	wastes from mineral metalliferous excavation	
01 01 02	wastes from mineral non-metalliferous excavation	
01 03 06	tailings other than those mentioned in 01 03 04 and 01 03 05	
01 03 08	dusty and powdery wastes other than those mentioned in 01 03 07	
01 03 09	red mud from alumina production other than the wastes mentioned in 01 03 07	
01 05 05*	oil-containing drilling muds and wastes	
01 05 06*	drilling muds and other drilling wastes containing hazardous substances	
02 03 05	sludges from on-site effluent treatment	
03 03 09	lime mud waste	
06 02 03*	ammonium hydroxide	

List of Waste (LOW) Code[1]	LOW code description	Tonnes per annum (proposed)
10 01 05	calcium-based reaction wastes from flue-gas desulphurisation in solid form	
10 01 07	calcium-based reaction wastes from flue-gas desulphurisation in sludge form	
10 01 17	fly ash from co-incineration other than those mentioned in 10 01 16	
10 03 05	waste alumina	
17 05 03*	soil and stones containing hazardous substances	
17 05 05*	dredging spoil containing hazardous substances	
17 08 02	gypsum-based construction materials other than those mentioned in 17 08 01	
19 01 12	bottom ash and slag other than those mentioned in 19 01 11	
19 01 17*	pyrolysis wastes containing hazardous substances	
19 01 18	pyrolysis wastes other than those mentioned in 19 01 17	
19 03 05	stabilised wastes other than those mentioned in 19 03 04	
19 07 02*	landfill leachate containing hazardous substances	
19 07 03	landfill leachate other than those mentioned in 19 07 02	
19 08 12	sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11	
19 08 14	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13	
19 09 02	sludges from water clarification	
19 13 01*	solid wastes from soil remediation containing dangerous substances	
19 13 02	solid wastes from soil remediation other than those mentioned in 19 13 01	
19 13 03*	sludges from soil remediation containing hazardous substances	
19 13 04	sludges from soil remediation other than those mentioned in 19 13 03	
TOTAL		**90,000** dependant on clinker production, fuel availability and calorific value of the fuel.

* Hazardous waste
** classified as animal by-products in accordance with Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation).
*** This is the current maximum licenced waste tonnage to be co-incinerated on site.

D 2.2 Waste Storage and Closure Costs

The maximum amount of waste that will be held or stored at the installation at any one time is set out in table D.2.2. The cost of disposing of waste (including treated waste) held, in storage or in process at the installation is also set out in Table D.2.2.

Table D.2.2 Maximum Amount of Waste that will be Held or Stored at the Installation at any One Time, Including Costs

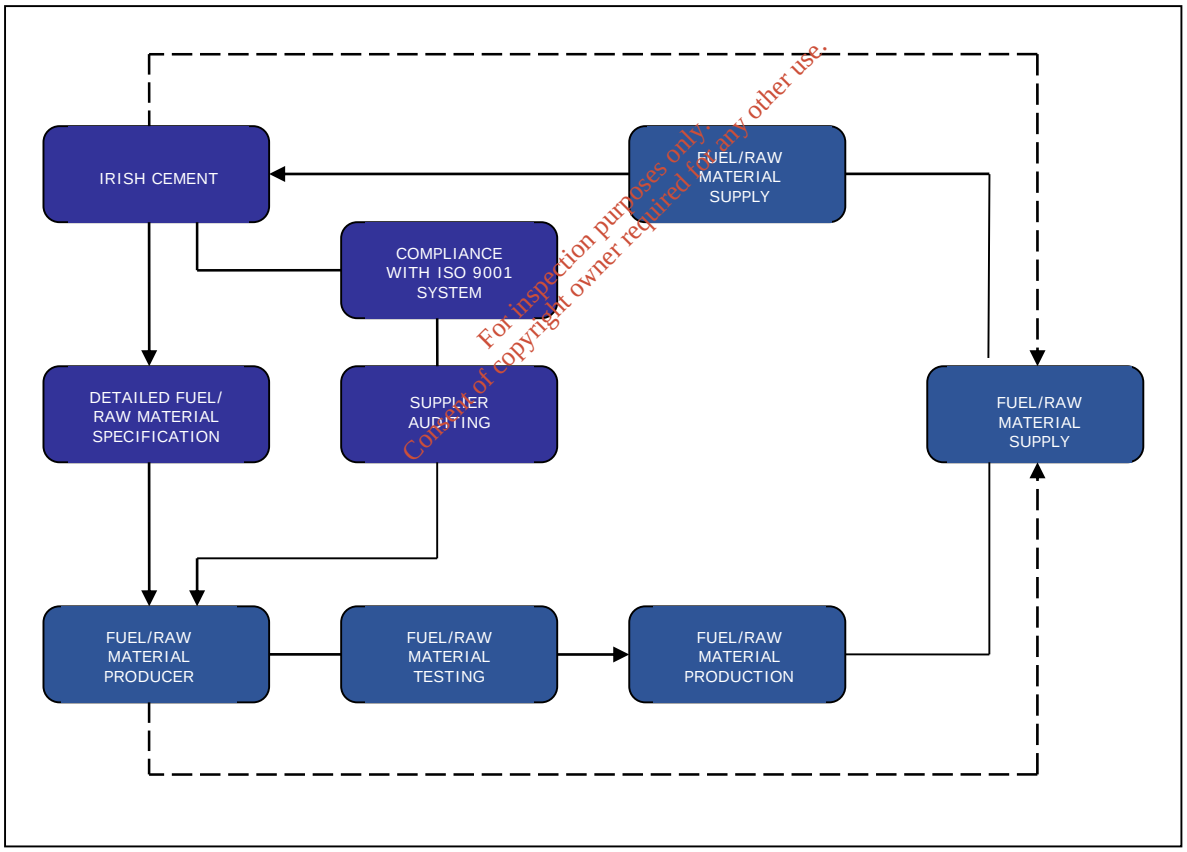
D.2.3 Waste Acceptance Procedures

Location of waste	Cubic metres	Unit cost (per tonne or m^3) for - removal AND - disposal in case of sudden closure	Disposal route and/or technique	Notes, rationale, clarifications
Holding areas	n/a			Wastes are not stored in holding, quarantine or inspection areas on site. Materials not meeting specification are immediately returned to suppliers.
Quarantine areas	n/a			
Inspection areas	n/a			
Storage areas (untreated waste)		€5,454,066	Disposal by licensed contractor or other cement manufacturer	Refer to CRAMP (includes any laboratory chemicals and raw materials requiring off site removal following closure)
Storage areas (treated waste)	n/a			Filter Dusts are transferred directly for reuse in the process
Treatment chambers, vessels and tanks	n/a			
Other (add rows as necessary)	n/a			
Total		€5,454,066		

Alternative Fuels and Raw Materials Delivery Acceptance Criteria

Each alternative fuel and alternative raw material will be accepted only in compliance with the pre-defined specifications, Commercial contracts for the supply of these fuels and raw materials to defined specifications will be adjudicated through the Irish Cement ISO 9001 quality control system in a similar manner to the supply of other fossil fuels or raw materials. The contracts will require that all suppliers' material must conform to the agreed specifications and are produced in compliance with the relevant environmental requirements. A pre-determined programme of testing will also be a condition of the contract. Sampling and testing will be performed by both the supplier and Irish Cement (or an approved contractor on behalf of Irish Cement).

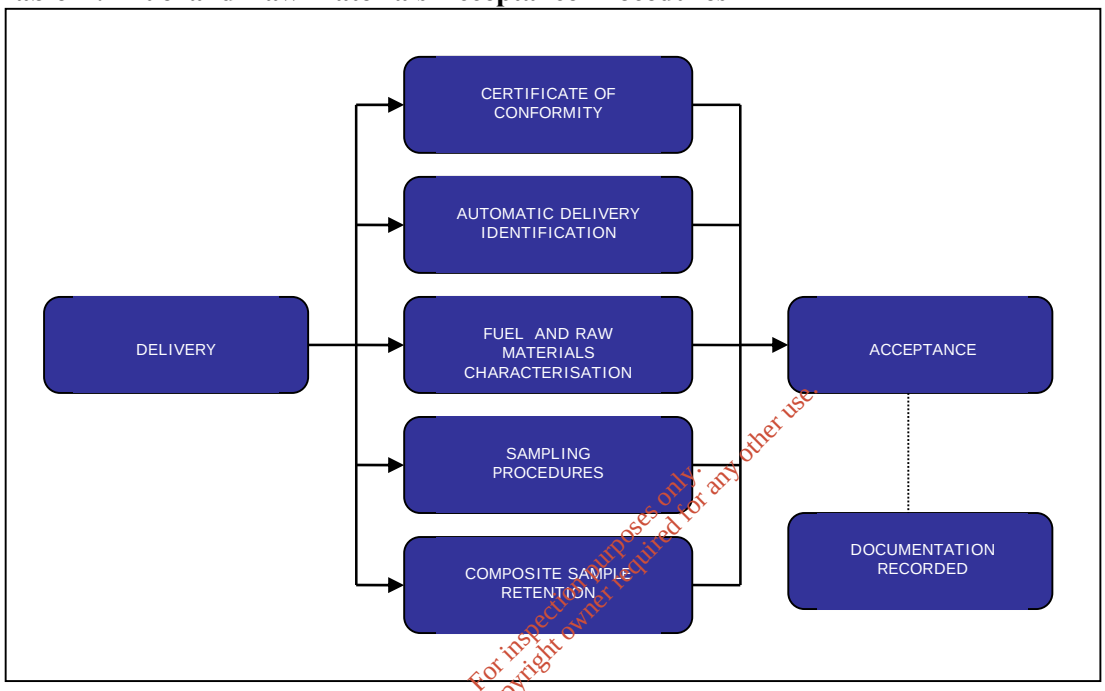
Details of each fuel or raw material will be entered into the site material database and full safety reviews and risk assessments will be performed in accordance with standard materials handling procedures. Characterisation of the fuels or raw materials will be carried out over a period of time to ensure that all parameters are in compliance with the Irish Cement fuel or raw material specification. All deliveries will be scheduled in advance. Detailed delivery plans will be established with all suppliers in advance of arrival onsite. Vehicle and driver details along with supplier information will be entered into the automated delivery acceptance system. Individual driver identification tags will be provided. All hauliers delivering alternative fuels and raw materials to site will be given full training in accordance with the CRH Code of Practice for Hauliers, as occurs for hauliers of other materials currently. The flowchart below outlines the fuel/raw material specification procedure.



On arrival at the Irish Cement entrance, all deliveries will be recorded and verified by the automated delivery acceptance system. For all deliveries, suppliers must provide a valid certificate of conformity before the material can be accepted. Instructions will be provided to drivers as to the appropriate unloading location on site. Visual inspection and sampling, 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 and raw material characterisation exercises carried out during earlier

supplier evaluation and auditing. Composite samples representing production campaigns from each supplier will be analysed to determine compliance with fuel and raw material specification.
Industry practice around Europe related to sampling, analysis and evaluation of incoming fuels is based on characterising the fuel and raw materials over time. Testing of a composite sample is carried out to confirm that the deliveries are in compliance with the expected specification. Testing frequency is likely to be greater during initial evaluations and decline as compliance confidence increases.

Table D.2 Fuel and Raw Materials Acceptance Procedures



D.2.4 Waste and Material Output from Waste Activities

Use of waste as alternative fuels and alternative raw materials in clinker and cement production will not give rise to any residual waste.

Waste treatment on site will consist of use of wastes as fuel for energy recovery in the cement kiln.

One of the key features of the cement production process is that there are no solid downstream waste outputs. No ash is produced due to the complete combustion achieved in the process and all mineral components of the fuels are fully incorporated in to the final cement product. This has particular relevance to the use of alternative fuels which removes the need to dispose of ash.

It is proposed to install a bypass system on Kiln 6. The bypass system will remove a controlled amount of process gas from the system, treat it by air quenching, conditioning and final abatement using a bag filter before venting the cleaned gas to atmosphere. The Flue Dust Portland Cement (FDPC) collected will be recycled back into the process where possible or can be used as a by-product for a range of off-site applications.

D.2.5 Principles of Self-Sufficiency and Proximity

The EPA, 2014 Bulletin 3: Residual waste treatment trends 2009 to 2013 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."*

The proposed introduction of alternative fuels and raw materials at the ICL Limerick Works will reduce waste export and contribute to the state moving towards being more self-sufficient in the management of wastes and reduce dependence on imported fossil fuels

The Southern Regional Waste Management Plan 2015-2021 (SRWMP) 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 SRWMP 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 achieving self sufficiency.

Specifically, in relation to Residual and Biowaste Exports (Section 4.3, page 34) the SRWMP states that 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."

It is considered that the proposed development, which seeks permission for the co-combustion of up to 90,000 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. This is based on the assumption that the proposed fuels are a mix of alternative fuels and not all SRF.

D.3 Additional Requirements for landfills (not covered above or elsewhere) (Class 11.5 of the First Schedule of the EPA Act 1992, as amended)

This section has not been completed as Irish Cement Ltd is not applying for classes 11.5 and 11.7 (landfills and underground storage facilities) of the First Schedule to the EPA Act 1992, as amended.

A3

TONE
RRY

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Job Title
Review of IE Licence
Reg No. P0029-03

Client
Irish Cement Ltd

Drawing Title
Proposed Site Layout

Scale at A3	NTS
Date	April 2016
Discipline	Environmental
Job No	325373-47
Drawing Status	Report
Drawing No	Figure D.1
Issue	R1

Do not scale

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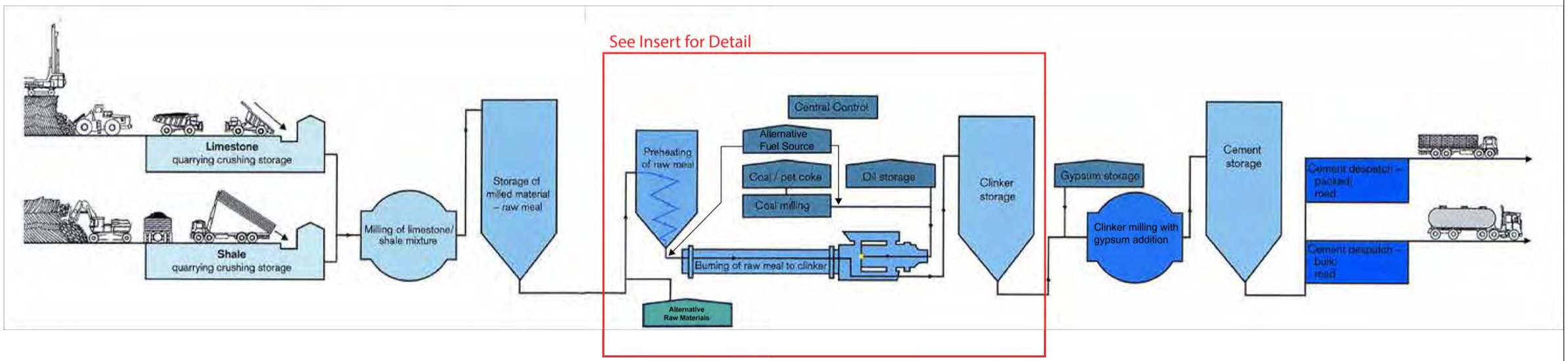

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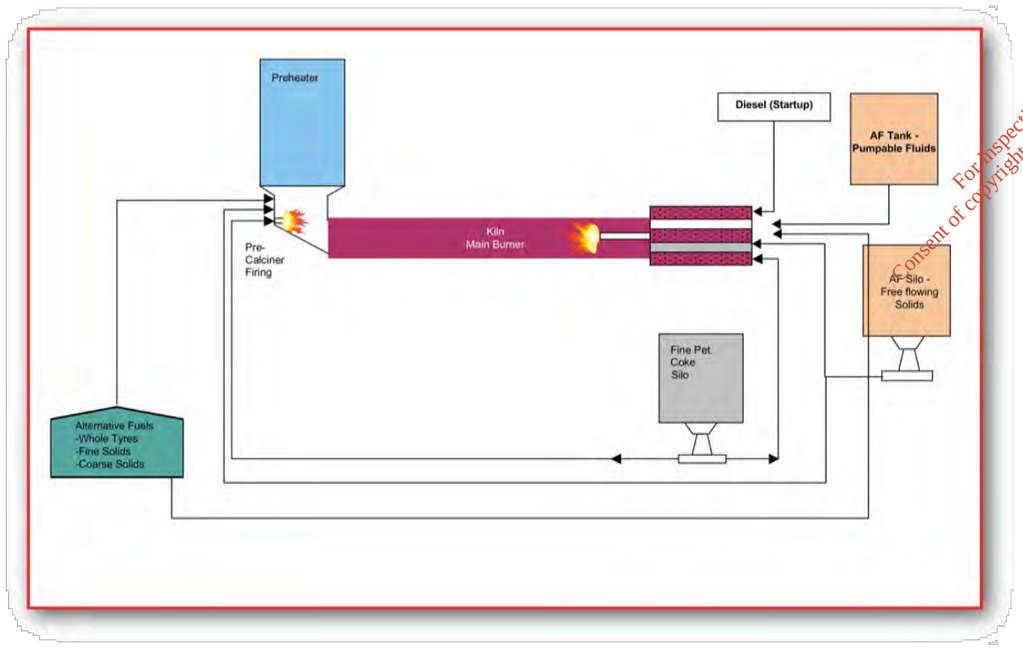

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Review of IE Licence
Reg No. P0029-03

Client
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Drawing Title
Overall Process Flow Diagram

Scale at A3 NTS | Date April 2016
Discipline Environmental
Job No 325373-47 | Drawing Status Report
Drawing No Figure D.2 | Issue R1

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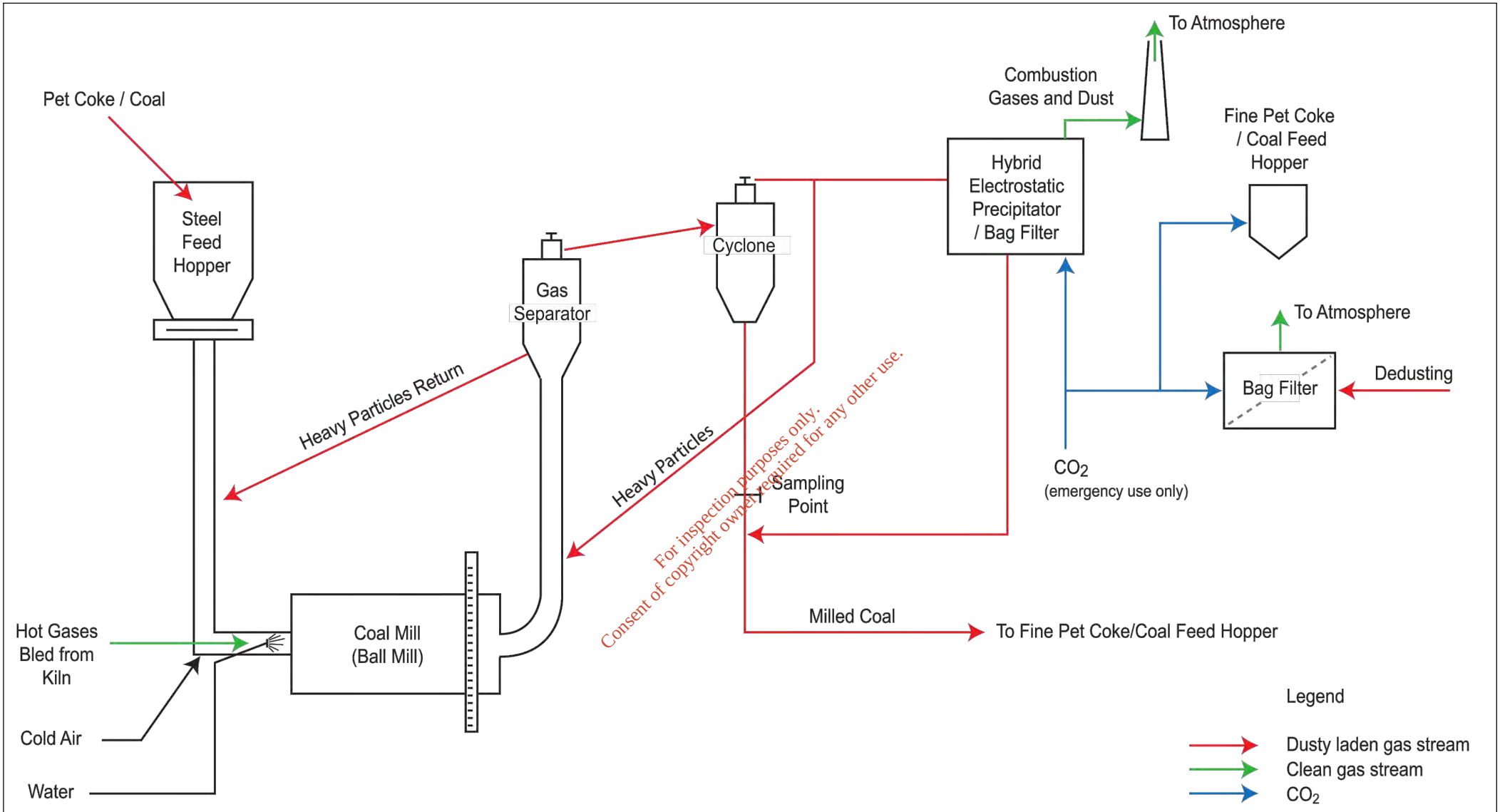

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Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Pet Coke / Coal Milling

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.1
Issue R1

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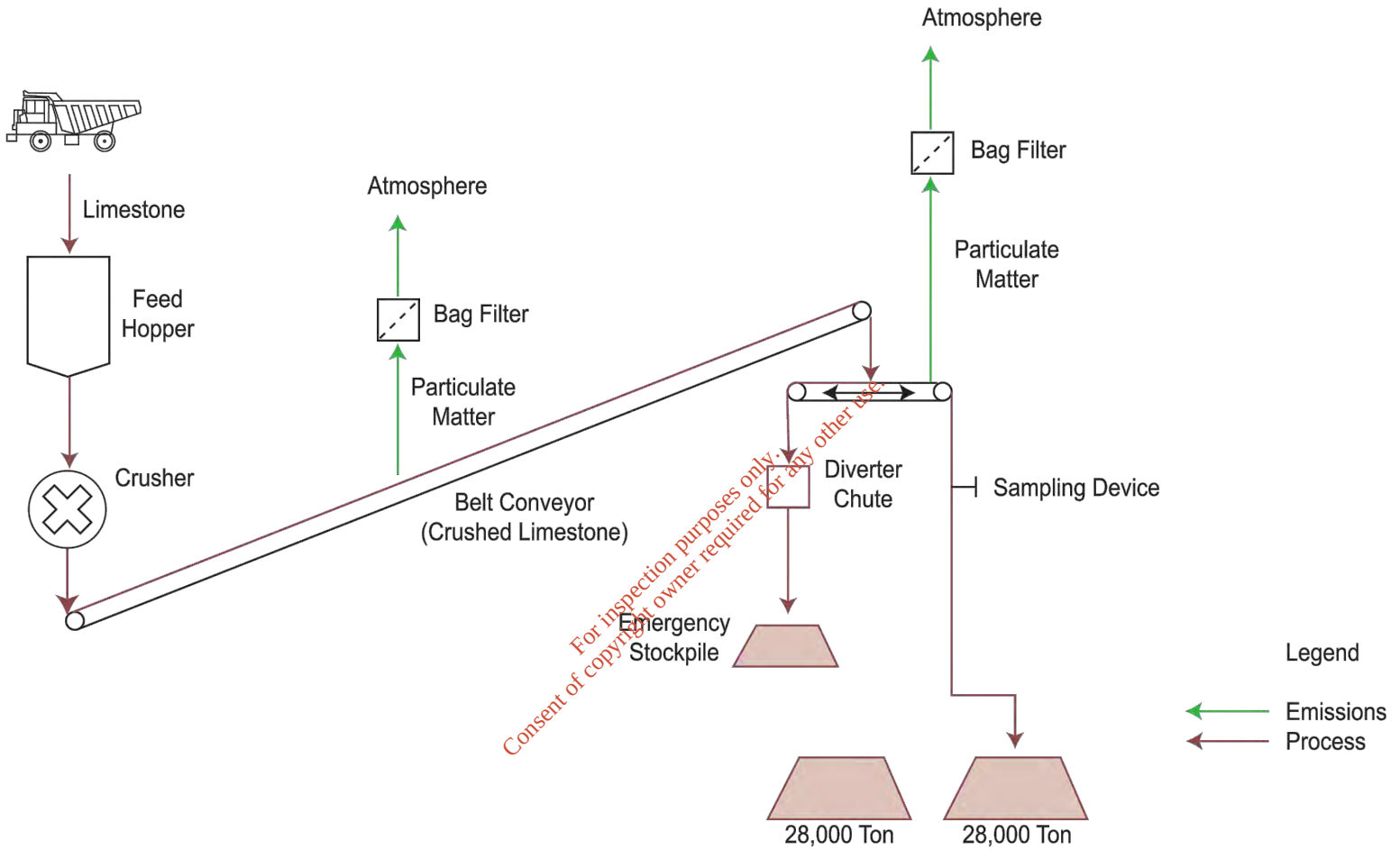

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Client Title
Irish Cement Ltd

Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Limestone Crushing and Transport to Store

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.2
Issue R1

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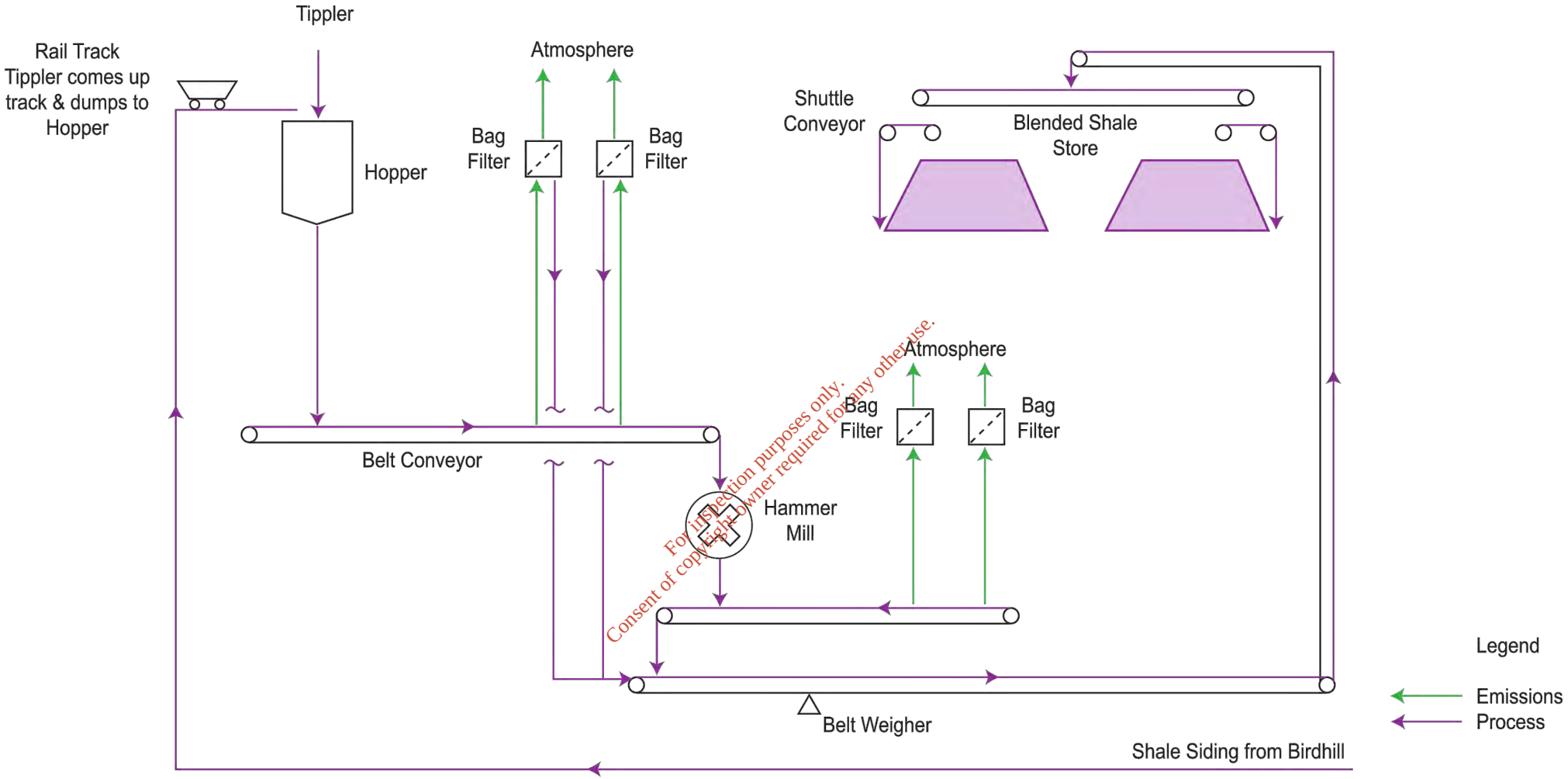

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Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Shale Transport to Store

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.3
Issue R1

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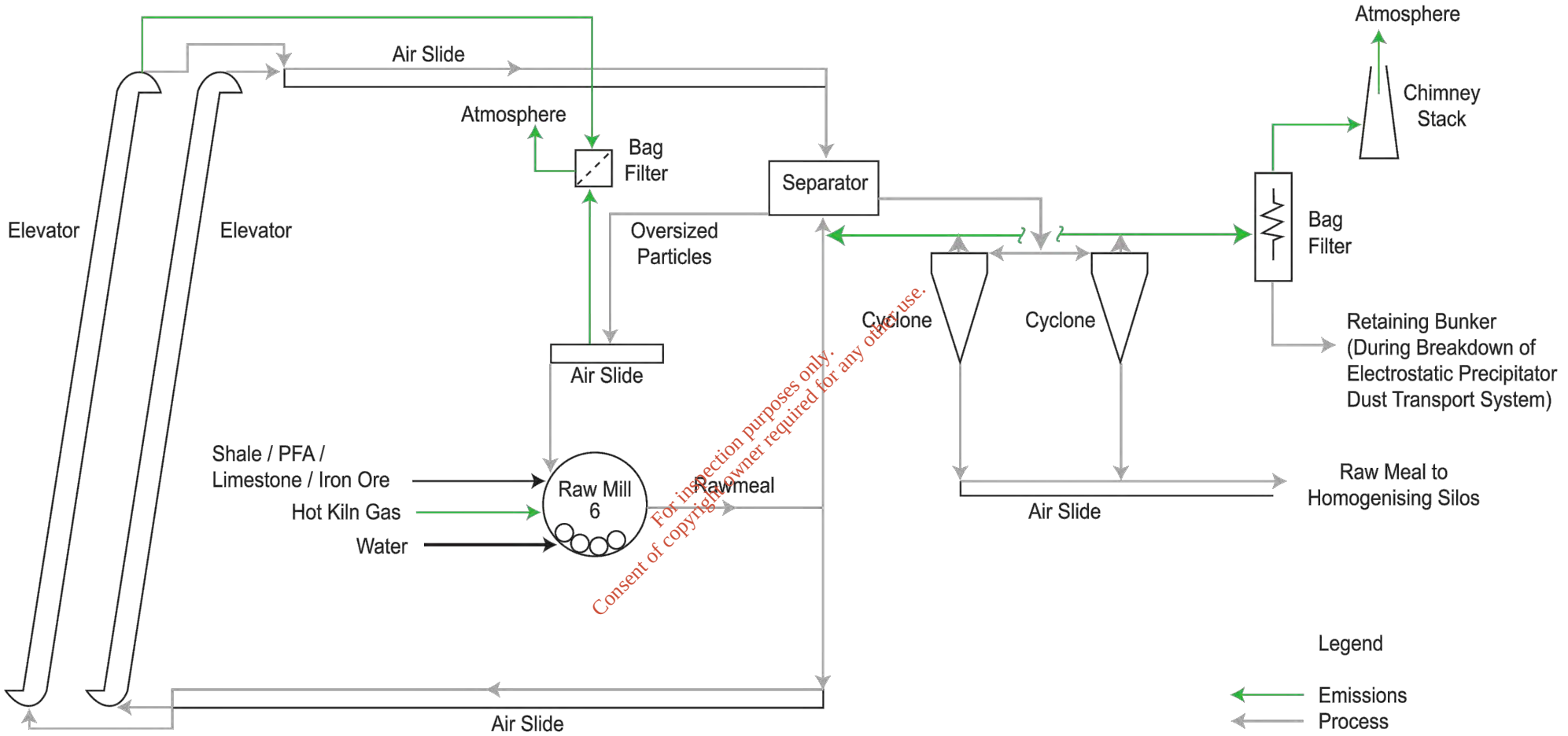

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Client Title
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Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Raw Mill 6

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.4
Issue R1

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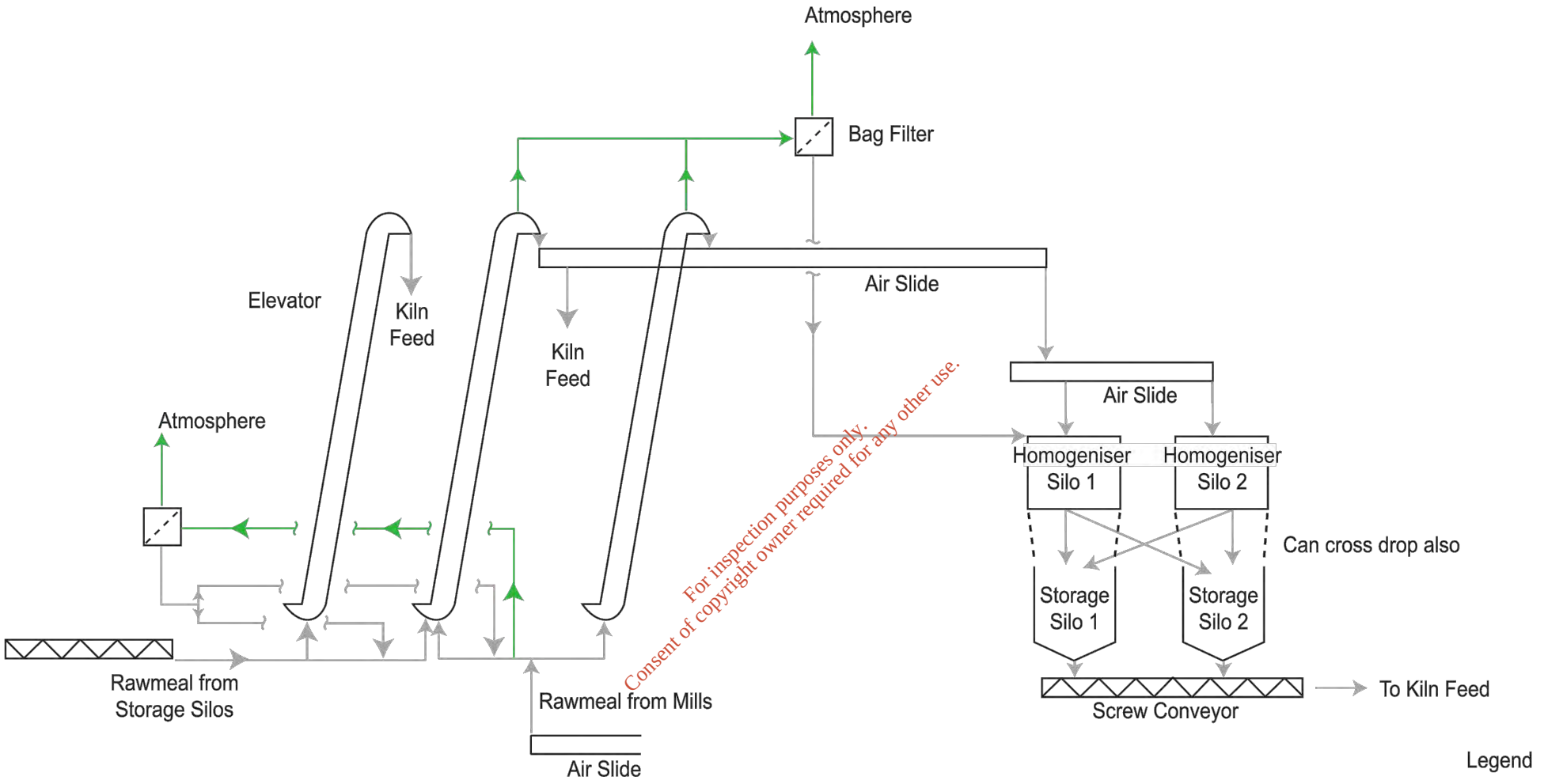

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Client Title
Irish Cement Ltd

Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Rawmeal Transport to Silos and Homogenising

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.5
Issue R1

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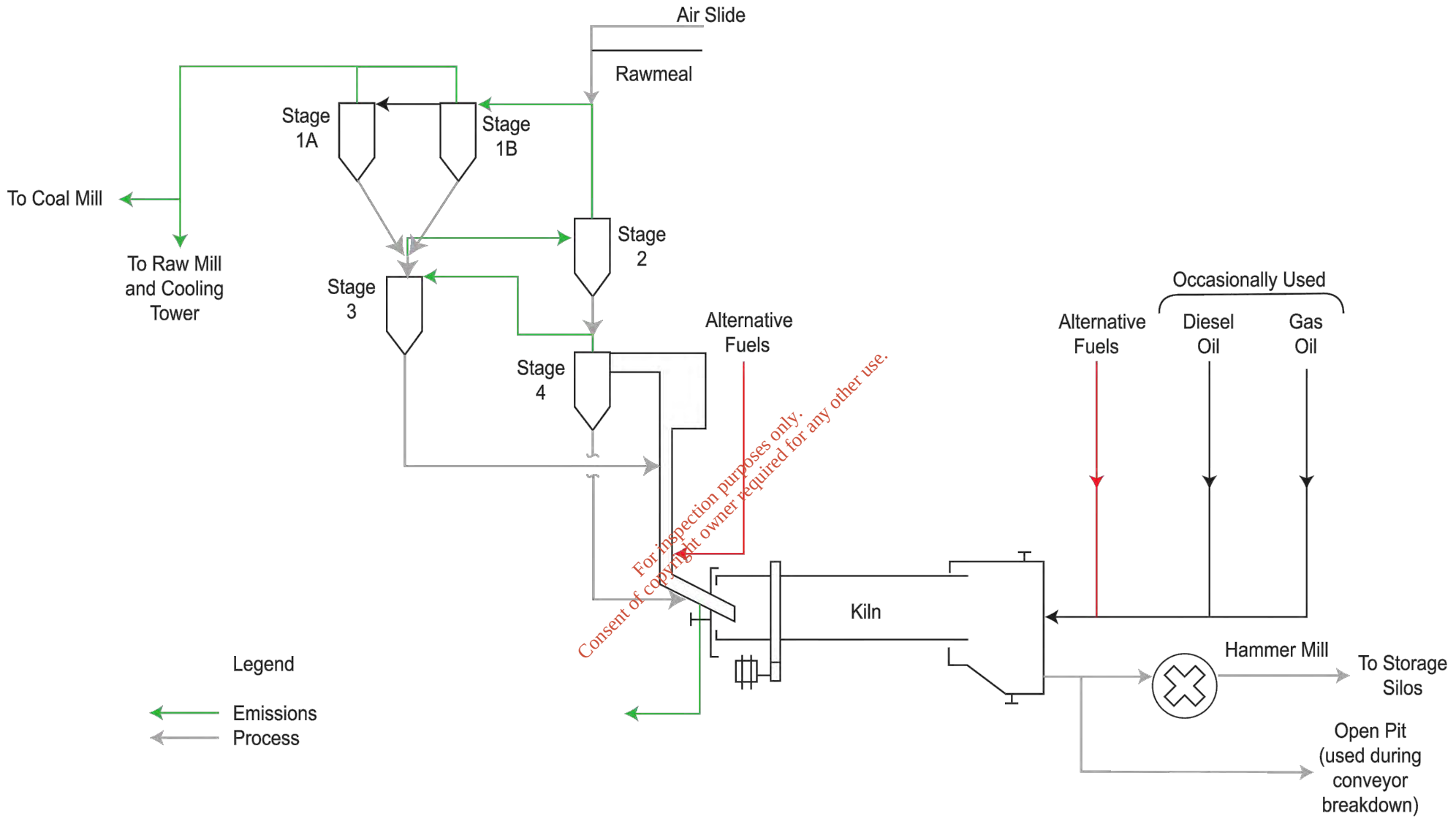

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Client Title
Irish Cement Ltd

Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Preheater and Kiln 6

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.6
Issue R1

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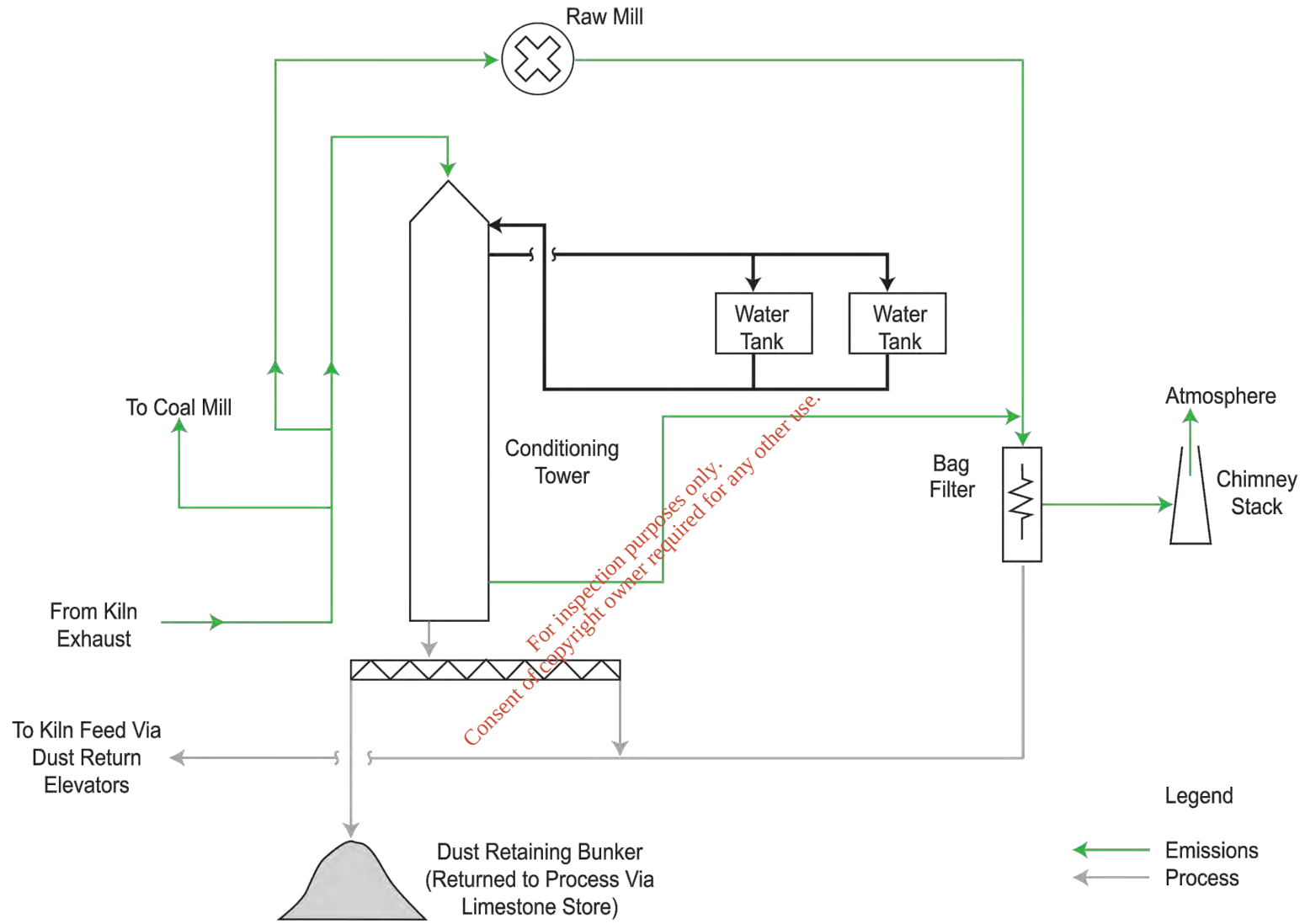

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Client Title
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Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Kiln 6 Exhaust Gas Handling

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.7
Issue R1

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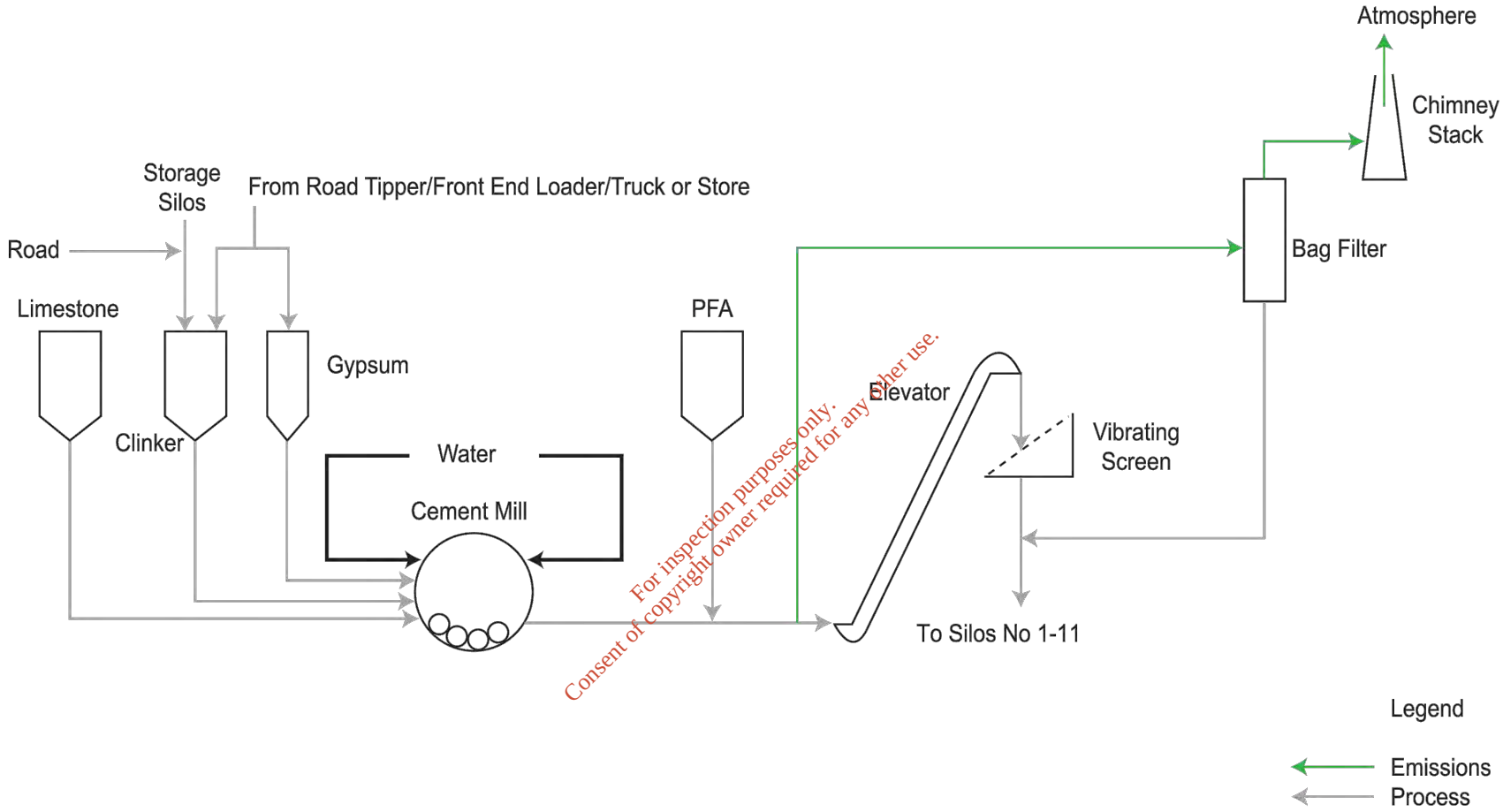

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Client Title
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Job Title
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Reg. No. P0029-03

Drawing Title
Cement Mill 5

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.8
Issue R1

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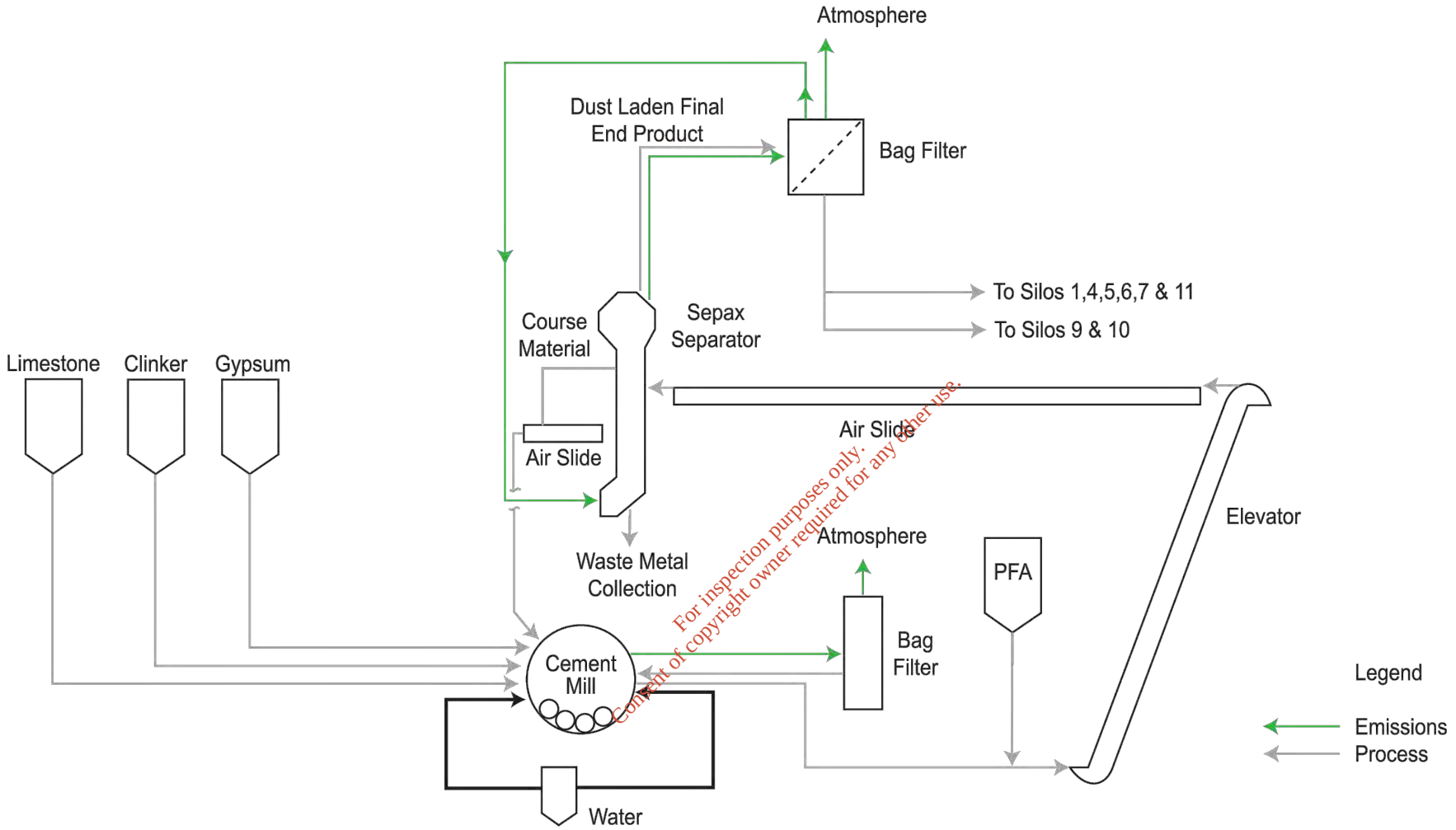

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Client Title
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Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Cement Mill 6 & 7

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.9
Issue R1

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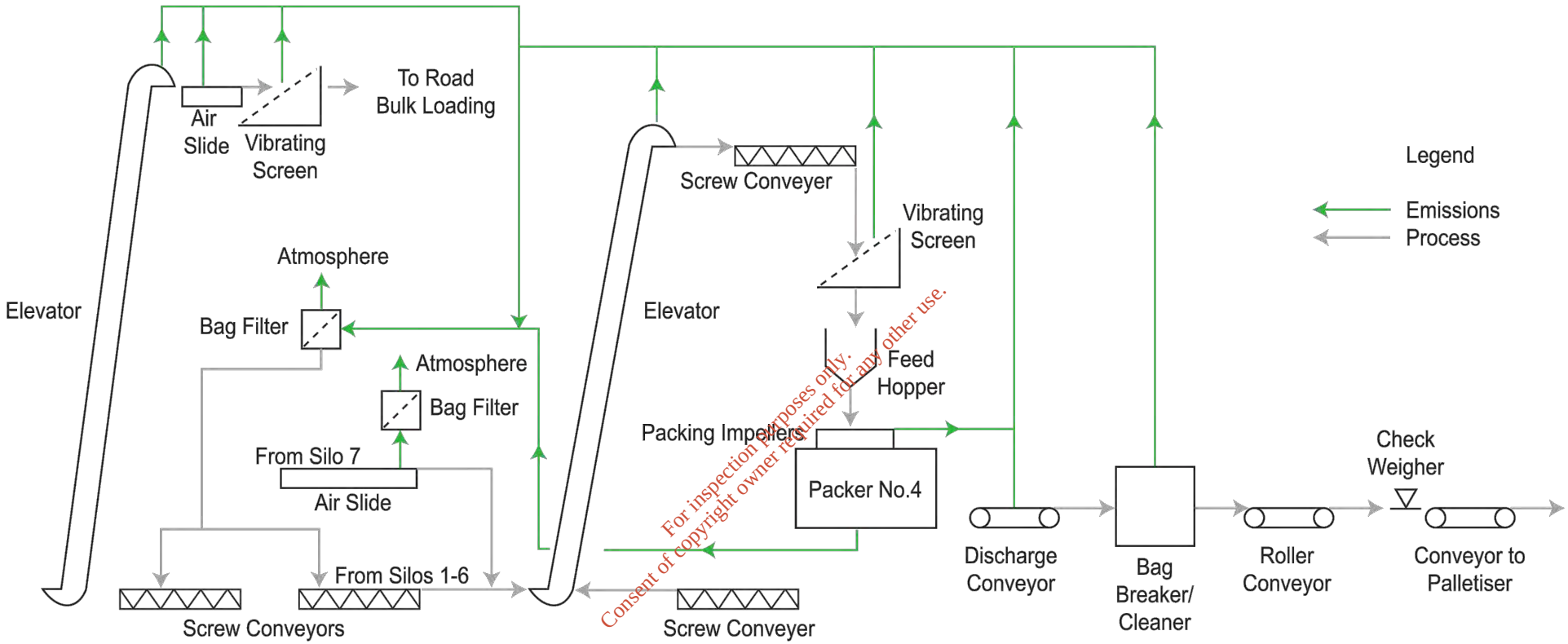

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Client Title
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Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Packer No. 4:
Flowsheet of Dedusting
Equipment

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.10
Issue R1

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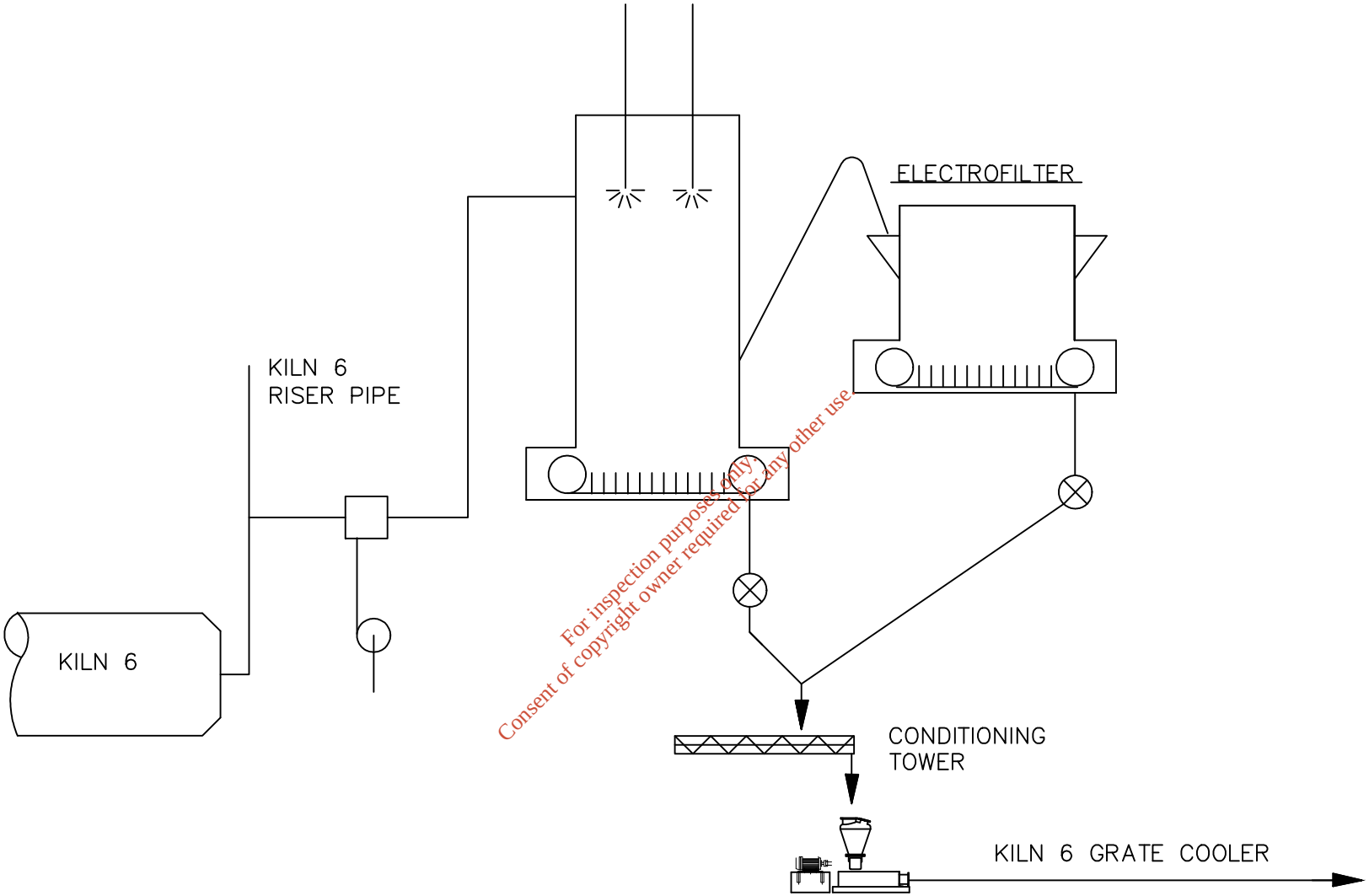

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Client Title
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Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Flowsheet for Kiln 6
Bypass Filter

Scale at A4 NTS | Date April 2016

Discipline Environmental

Job No **325373-47** | Drawing Status **Report**

Drawing No **Figure D.3.11** | Issue **R1**

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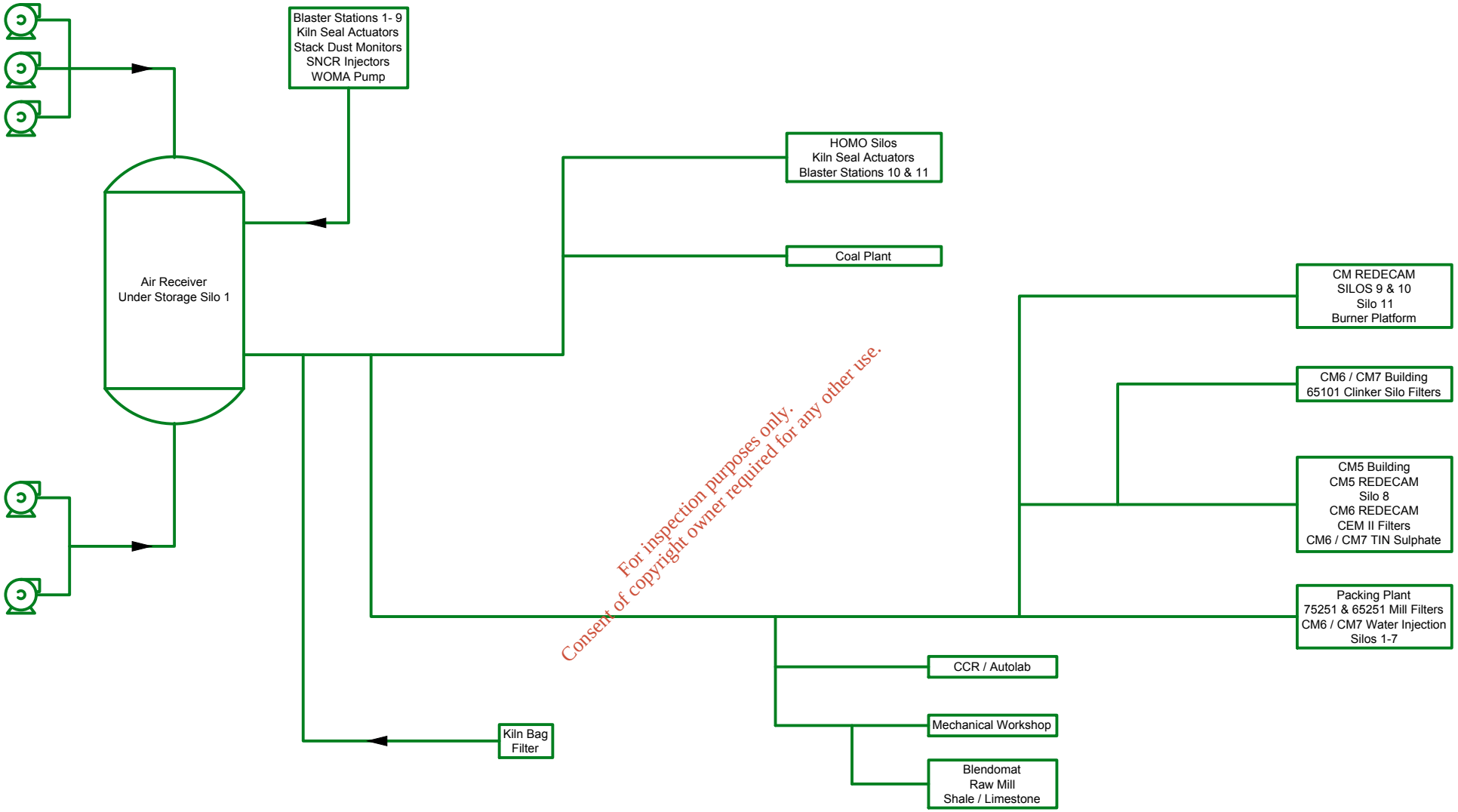

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Client Title
Irish Cement Ltd

Job Title
IE Licence Review
Reg. No. P0029-03

Drawing Title
Air Compression

Scale at A4 NTS
Date April 2016
Discipline Environmental
Job No 325373-47
Drawing Status Report
Drawing No Figure D.3.12
Issue R1

Do not scale

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ATTACHMENT No. E

EMISSIONS

TABLE OF CONTENTS

E.1. Emissions to Atmosphere

E.1.1 Boiler Emissions

There are no significant boiler emissions from the site associated with the cement manufacturing process.

E.1.2 Main Emissions

A description of the main emissions to atmosphere is given in the Application Form Tables E.1(ii). The emission values of the main emission points are provided in Tables E.1(iii).

The IE licensed main emission points at Irish Cement Ltd (ICL) are shown in Table E.1 (refer also to Figure E.1).

Table E.1 IE Licensed Main Emission Points to Atmosphere

IE Licence Label	Description
A2-01	Kiln 6
A2-02	Coal Mill 6
A2-03	Cement Mill 5
A2-04	Cement Mill 6
A2-05	Cement Mill 6 Separator
A2-06	Cement Mill 7
A2-07	Cement Mill 7 Separator

Table E.2 lists monitoring results for all main emission points in 2014 and compares results to IE licence limits. The limits from the BAT Conclusion on the Production of Cement Lime and Magnesium Oxide, 2013 are included in the table.

Table E.2 Emission Point Monitoring Results 2014

Source	Parameter	Monitoring duration	Measured concentration (mg/Nm^3@ 10%O_2)	IE Licence limits (mg/Nm^3@10% O_2)	BAT Conclusion limits mg/Nm^3
A2-01	Particulates	Continuous – annual average	5	50	20
	NO_X	Continuous – annual average	761	800	500
	SO_2	Continuous – annual average	7.6	200	50
A2-02	Particulates	Continuous – annual average	0.93	50	20
	NO_X	Average of quarterly results	700	800	500
	SO_2	Average of quarterly results	6.2	200	50
A2-03	Particulates	Average of quarterly results	0.95	50	20
A2-04	Particulates	Average of quarterly results	1.02	50	20
A2-05	Particulates	Average of quarterly results	12.12	50	20
A2-06	Particulates	Average of quarterly results	4.13	50	20
A2-07	Particulates	Average of quarterly results	18.23	50	20

Current NO_x emissions from Kiln 6 (A2-01) and Coal Mill 6 (A2-02) comply with the IE (Reg No P0029-03) limit value but exceed the *BAT Conclusions for Production of Cement, Lime and Magnesium Oxide* limit of $500mg/m^3$. ICL are continuously improving the performance of the SNCRs for these sources and expect that compliance can be achieved by refining the current systems.

Particulate emissions from sources A2-01, A2-03, A2-04, A2-05, A2-06 and A2-07 are abated using bag filters, this represents BAT for cement production.

Particulate emissions from A2-02 are abated using a hybrid filter i.e. a combination of electrostatic precipitator plates and bag filters, this represents BAT for cement production.

NO_X emissions from A2-01 and subsequently A2-02 are also abated using selective non-catalytic reduction (SNCR), this represents BAT for cement production.

Further information on the abatement systems for emissions to atmosphere is provided in **Attachment No. F**.

E.1.3 Minor Emissions

A minor emission is an emission, which on the basis of its concentration and mass emission is not considered environmentally significant. Therefore it is not classified as a main emission.

Some relevant minor emission points (e.g. extract from transfer points on materials handling systems) are abated using bag filters. Abatement systems for the minor atmospheric emission points on-site are detailed in Table E.1(iv) and shown in Figure E.1.

Three new minor emission points will be provided as part of the introduction of alternative fuels and raw materials. Bag filters will be installed on these emission points.

In the future, equipment which can be classified as having minor emissions may be required. ICL request that, in line with other industrial sectors licenced by the Agency, minor emissions points should not be required to be listed in the revised IE licence. This will permit any such minor emission sources to be accommodated by Letter of Agreement by the Agency's Office of Environmental Enforcement. All such equipment will continue to be monitored and the performance reported to the Agency as part of the Annual Environmental Report. This would allow a reasonable degree of flexibility in plant operation that has no significant impact on the environment.

E.1.4 Fugitive Emissions

Fugitive dust emissions can occur from a range of operations on-site. Every effort is made to minimise such emissions.

Dust management measures appropriate to modern cement manufacture are applied and are continually reviewed as part of the annual Environmental Management Plan for the site. All fugitive emission points are detailed in Table E.1(v).

Enclosed storage and conveyance systems will be used for all new alternative fuels and raw materials so there will be no new fugitive emission points associated with the proposed activity. Potentially odorous alternative fuels will all be contained in enclosed silos, tanks or buildings.

E.1.5 Potential Emissions

A potential emission point is an emission point that is not active under normal operations. Potential emissions and the malfunctions causing the emissions are identified in Table E.1(v).

There are no potential emission sources associated with the proposal to replace a portion of fossil fuels with Alternative Fuels and the introduction of raw materials.

E.1.6 Dust deposition monitoring results

Ambient dust and particulate monitoring is carried out in accordance with the IE licence requirements. Results are provided in Table E.3 for dust deposition monitoring in 2015. Refer to Figure F.5 for locations of monitors.

Table E.3: Dust deposition monitoring results for 2015

	Quarter 1 dust deposition rate ($mg/m^2/day$)	**Quarter 2 dust deposition rate ($mg/m^2/day$)**	**Quarter 3 dust deposition rate ($mg/m^2/day$)**	**Quarter 4 dust deposition rate ($mg/m^2/day$)**
AA1	129.8	71.7	274.7****	86
AA2	160.4	82.9	226****	179.3
AA3	Vandalised			
AA4	671.9*	217.6	147.6****	282***
AA5	129.8	213	137.2	211.7***
AA6	169.8	222	119.2	240.2***
AA8	153.5	305.6***	153.1	282.1***
AA9	479.8**	202.7	323.8****	241.5***
AA11	Only measured when AA12 not operating			

* contaminated with bird droppings

** contaminated with algae

*** contaminated with leaves etc.

**** insect contamination

In general, results are in compliance with the dust deposition limit of 240mg/m^2/day. Significant issues have been encountered in ensuring representative, undisturbed and uncontaminated samples. Elevated levels can be explained by the effects of sample contamination.

The dust deposition monitoring gauge, AA3, is located in the sportsfield on the southern boundary of the site, refer to Figure F.5. This monitoring point is regularly vandalised and no results could be obtained at this location in 2014 and 2015. ICL proposes to discontinue this monitoring point and relocate the monitoring equipment to a less vulnerable location, refer to Figure F.5 for proposed new location (AA3a).

Continuous ambient particulate monitoring is carried out at AA12. This is located adjacent to dust deposition gauge AA11, which will be used in the event of a fault with the continuous ambient monitor.

E.2. Emissions to Surface Waters

E.2.1 Source of Emissions

Surface water is discharged from the ICL facility through two emission points discharging spent cooling water, quarry water and surface run off from the facility into Bunlicky Clayfield Pond.

Surface water drains also flow into Bunlicky Clayfield Pond from lands surrounding the Irish Cement factory in Limerick. Irish Cement has no control over the quality or quantity of these additional flows.

The sources of Irish Cement emissions discharged through SW1 and SW2 are:

Spent Cooling Water
Plant process water is pumped from the quarry and at times from Bunlicky Clayfield Pond to two storage header tanks within the factory. This water is used for evaporative cooling in the conditioning tower to humidify kiln gases and also in the Rawmill, Coal Mill and in the three Cement Mills.

Water is also used for cooling the Coal Mill, the Kiln and other bearings. This spent cooling water is returned to Bunlicky Clayfield Pond via the surface drain system via SW1.

Bunlicky Clayfield Pond discharges into the Shannon River via an adjustable weir and flap valves which prevent the Shannon flowing into the Pond at high tide.

Storm Water
All storm water is collected in the same drain system as the spent cooling water and is discharged into Bunlicky Clayfield Pond via the surface drain system, SW1.

Quarry Water
All storm and surface water is collected in the same drain system as the spent cooling water and is discharged into Bunlicky Clayfield Pond via the surface drain system, SW1.

Quarry Water from the Limestone Crusher Area
The main quarry sump at the Limestone Crusher area is pumped and the water is used in the process. In flood conditions it is pumped directly into Bunlicky Clayfield Pond via SW2.

E.2.2 Emission Points

The two surface water emissions points at ICL are:

SW1

SW2 collects the surface water run-off from the factory site and the spent cooling water.

A monitoring station, type Sensor Products Mainstream open channel flow meter records flow. A monthly grab sample is also taken. The average daily flow to Bunlicky Clayfield Pond from SW1 in 2014 was 1,138m^3.

SW2

During times of flooding and in extreme weather conditions, water is pumped directly to Bunlicky Clayfield Pond through SW2.

Refer to Figure E.2.

E.2.3 Emissions to Surface Water Monitoring Results

Continuous monitoring results of licensed emission parameters to surface water are given in Table E.3.

Table E.3 Surface Water Emissions Monitoring Results 2014

Monitoring Point	Parameter	2014 Monthly Average Emission	IE Licence Limit
SW1	BOD	2.1 mg/l	10 mg/l
	Mineral oil	<0.1 mg/l	12 mg/l
	pH	8.15	6-9
	Flowrate (m^3/day)	1,138 m^3/day	18,000 m^3/day
	Temperature	11.1°C	25°C
SW2	BOD	3 mg/l	6 mg/l
	Suspended solids	3 mg/l	35 mg/l
	Mineral oil	0.01 mg/l	10 mg/l
	pH	8	6-9

E.3. Emissions to Sewer

E.3.1 Source of Emissions

There is no direct process waste stream generated at the ICL facility. Foul water effluent is comprised of domestic wastewater and utilities wastewater from laboratories.

Domestic effluent arising on-site is discharged to the Irish Water Municipal Wastewater Treatment Plant (MWTP) located adjacent to ICL facility via the domestic effluent sewer. No on-site treatment is undertaken. Four septic tanks are in operation. They are periodically cleaned out and the material recovered is delivered to the MWTP.

E.4. Emissions to Ground

There are no direct emissions to ground at the site.

E.5. Noise Emissions

The details of the significant noise sources and sound power levels are given in the Noise Summary Sheet Table E.5 (i). The location of the main noise sources on site are shown in Figure E.3.

Table E.5 below presents the vibration and air overpressure limits for the site. Vibration monitoring is conducted at a fixed blast monitoring site and at local residences, as shown in Figure E.4.

Table E.5 Vibration and overpressure limits

Operation	Locations	Peak particle velocity limit value	Air overpressure limits value
Blasting	1 fixed local residences	12mm/sec	125dB $(Lin)_{max\ peak}$

IE Licence Application Tables

E.1(i)

E.1(ii)

E.1(iii)

E.1(iv)

E.1(v)

E.2(i)

E.2(ii)

E.3(i)

E.3(ii)

E.4(i)

E.4(ii)

E.5(i)

Table E.1 (i) BOILER EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point:

Emission Point Ref. Nº:	Not applicable	
Location:		
Grid Ref. (12 digit, 6E,6N):		
Vent Details	Diameter:	Height above Ground(m):
Date of commencement of emission:		

Characteristics of Emission:

Boiler rating Steam Output: Thermal Input:				kg/hr MW
Boiler fuel Type: Maximum rate at which fuel is burned % sulphur content:				kg/hr
NOx				mg/Nm^3 0ºC. 3% O_2(Liquid or Gas), 6% O_2(Solid Fuel)
Maximum volume* of emission				m^3/hr 0ºC, 3 % O_2 (liquid or gas), 6 % O_2 (solid fuel)
Minimum efflux velocity				m.sec^{-1}
Temperature	ºC(max)	ºC(min)		ºC(avg)

* Volume flow limits for emissions to atmosphere shall be based on Normal conditions of temperature and pressure, (i.e. 0ºC,101.3kPa), dry gas; 3% oxygen for liquid and gas fuels; 6% oxygen for solid fuels.

(i) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up/shutdown to be included):*

Periods of Emission (avg)	_____min/hr _____hr/day _____day/yr

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	A2-01
Source of Emission:	Kiln 6 / Rawmill
Location:	Kiln stack
Grid Ref. (12 digit, 6E,6N):	153,344; 154,790
Vent Details Diameter: Height above Ground(m):	 2.6m 87.7m
Date of commencement:	Circa 1982

Characteristics of Emission:

(i) Volume to be emitted:			
Average/day	6,382,920 Nm^3/d	Maximum/day	12,000,000Nm^3/d
Maximum rate/hour	500,000Nm^3/h	Min efflux velocity	40.5$m.sec^{-1}$
(ii) Other factors			
Temperature	200ºC(max)	ºC(min)	150ºC(avg)
For Combustion Sources: Volume terms expressed as : ☐ wet. √ dry. ____10____ $\%O_2$			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	60 min/hr 24 hr/day 365 day/yr

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	A2-02
Source of Emission:	Coal Mill 6 Stack
Location:	Coal mill platform, next to Electrofilter
Grid Ref. (12 digit, 6E,6N):	153,414; 154,785
Vent Details Diameter: Height above Ground(m):	0.788m 30.4 m
Date of commencement:	1982

Characteristics of Emission:

(i) Volume to be emitted:			
Average/day	500,904 Nm^3/d	Maximum/day	840,000 Nm^3/d
Maximum rate/hour	35,000 Nm^3/h	Min efflux velocity	8.1 $m.sec^{-1}$
(ii) Other factors			
Temperature	95ºC(max) ºC(min)		95ºC(avg)
For Combustion Sources: Volume terms expressed as : ☐ wet. ☑dry. 10.0 $\%O_2$			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	60 min/hr 24 hr/day 365 day/yr

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	A2-03
Source of Emission:	Cement Mill 5
Location:	Cement Mill Stack
Grid Ref. (12 digit, 6E,6N):	153538 (E) 154597 (N)
Vent Details Diameter: Height above Ground(m):	0.701m 29.15 m
Date of commencement:	1965

Characteristics of Emission:

(i) Volume to be emitted:			
Average/day	189,960 Nm^3/d	Maximum/day	408,000 Nm^3/d
Maximum rate/hour	17,000 Nm^3/h	Min efflux velocity	8.4 $m.sec^{-1}$
(ii) Other factors			
Temperature	105ºC(max) ºC(min)		95ºC(avg)
For Combustion Sources: Volume terms expressed as : ☑ wet. ☐dry. 21 $\%O_2$			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	60 min/hr 24 hr/day 365 day/yr

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	A2-04
Source of Emission:	Cement Mill 6
Location:	Cement Mill 6 Stack
Grid Ref. (12 digit, 6E,6N):	153458 (E) 154653 (N)
Vent Details Diameter: Height above Ground(m):	 0.892m 26.87 m
Date of commencement:	1982

Characteristics of Emission:

(i) Volume to be emitted:			
Average/day	420,480 Nm^3/d	Maximum/day	720,000 Nm^3/d
Maximum rate/hour	30,000 Nm^3/h	Min efflux velocity	13.47 $m.sec^{-1}$
(ii) Other factors			
Temperature	130ºC(max) ºC(min)		110ºC(avg)
For Combustion Sources: Volume terms expressed as : ☑ wet. ☐dry. ___21___ $\%O_2$			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	___60___ min/hr ___24___ hr/day ___365___ day/yr

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	A2-05
Source of Emission:	Cement Mill 6 Separator
Location:	Cement Mill 6 Stack
Grid Ref. (12 digit, 6E,6N):	153482 (E) 154626 (N)
Vent Details Diameter: Height above Ground(m):	 1.69m 40.2 m
Date of commencement:	1997

Characteristics of Emission:

(i) Volume to be emitted:			
Average/day	1,632000 Nm³/d	Maximum/day	2,040,000 Nm³/d
Maximum rate/hour	85,000 Nm³/h	Min efflux velocity	12.5 m.sec^{-1}
(ii) Other factors			
Temperature	130ºC(max)	ºC(min)	85ºC(avg)
For Combustion Sources: Volume terms expressed as :	☑ wet.	☐dry.	21 %O_2

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	60 min/hr 24 hr/day 365 day/yr

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	A2-06
Source of Emission:	Cement Mill 7
Location:	Cement Mill 7 Stack
Grid Ref. (12 digit, 6E,6N):	153465 (E) 154665 (N)
Vent Details Diameter: Height above Ground(m):	 0.892m 26.87 m
Date of commencement:	1982

Characteristics of Emission:

(i) Volume to be emitted:			
Average/day	448,560 Nm^3/d	Maximum/day	720,000 Nm^3/d
Maximum rate/hour	30,000 Nm^3/h	Min efflux velocity	8.8 $m.sec^{-1}$
(ii) Other factors			
Temperature	130ºC(max) ºC(min)		110ºC(avg)
For Combustion Sources: Volume terms expressed as : ☑ wet. ☐dry. ___21___ $\%O_2$			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	___60___ min/hr ___24___ hr/day ___365___ day/yr

TABLE E.1(ii) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. Nº:	A2-07
Source of Emission:	Cement Mill 7 Separator
Location:	Cement Mill 7 Separator
Grid Ref. (12 digit, 6E,6N):	153483 (E) 154675 (N)
Vent Details Diameter: Height above Ground(m):	 1.69m 35.2 m
Date of commencement:	1995

Characteristics of Emission:

(i) Volume to be emitted:			
Average/day	1,632,000 Nm^3/d	Maximum/day	2,040,000 Nm^3/d
Maximum rate/hour	85,000 Nm^3/h	Min efflux velocity	12.5 $m.sec^{-1}$
(ii) Other factors			
Temperature	120ºC(max) ºC(min)		85ºC(avg)
For Combustion Sources: Volume terms expressed as : ☑ wet. ☐dry. 21 $\%O_2$			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	60 min/hr 24 hr/day 365 day/yr

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: **A2-01 Kiln 6**

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm³		kg/h			mg/Nm³		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg*	Max**	Avg	Max	Avg	Max
Dust	65,200	72,000	12,440	13,700	Bag filter	Not available	20	Not available	10	Not available	87,600
NO_X	1,200	1,800	319	603	SNCR	Not available	500	Not available	250	Not available	2,190,000
SOx	Not available	Not available	Not available	Not available	Absorption occurs in the preheater / raw mill	Not available	50	Not available	25	Not available	219,000
HCl	Not available	Not available	Not available	Not available		Not available	10	Not available	5	Not available	43,800
HF	Not available	Not available	Not available	Not available		Not available	1	Not available	0.5	Not available	4,380
Cd	Not available	Not available	Not available	Not available		Not available	0.05	Not available	0.0001	Not available	1
Tl	Not available	Not available	Not available	Not available		Not available		Not available	0.0249	Not available	218
Sb	Not available	Not available	Not available	Not available		Not available	0.5	Not available	0.025	Not available	219
As	Not available	Not available	Not available	Not available		Not available		Not available	0.00325	Not available	28
Pb	Not available	Not available	Not available	Not available		Not available		Not available	0.00795	Not available	70
Cr	Not available	Not available	Not available	Not available		Not available		Not available	0.0362	Not available	317

Co	Not available	Not available	Not available	Not available		Not available		Not available	0.0717	Not available	628
Cu	Not available	Not available	Not available	Not available		Not available		Not available	0.0015	Not available	13
Mn	Not available	Not available	Not available	Not available		Not available		Not available	0.02325	Not available	204
Ni	Not available	Not available	Not available	Not available		Not available		Not available	0.03705	Not available	325
V	Not available	Not available	Not available	Not available		Not available		Not available	0.04705	Not available	412
Hg	Not available	Not available	Not available	Not available		Not available	0.05	Not available	0.02205	Not available	193
Dioxins and furans	Not available	Not available	Not available	Not available		Not available	$1x10^{-07}$	Not available	$5x10^{-8}$	Not available	0.000438
Ammonia	Not available	Not available	Not available	Not available		Not available	50	Not available	25	Not available	219,000

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0ºC,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

* Emission data not available for the use of alternative fuels. 2014 data is provided in Table E.2.

** based on BAT limit

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: **A2-02 Coal mill 6***

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg**	Max***	Avg	Max	Avg	Max
Dust	65,200	72,000	12,440	13,700	Hybrid filter	Not available	20	Not available	0.7	Not available	6,132

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0ºC,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.
   *Some of the exhaust gases from Kiln 6 are also vented through this stack. These gases are monitored and abated at Kiln 6 and therefore no additional monitoring is required at coal mill 6. This is in compliance with BAT which states that only dust monitoring is required at non-kiln activities.
   ** Emission data not available for the use of alternative fuels. 2014 data is provided in Table E.2.

   *** BAT limit

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: **A2-03 Cement Mill 5**

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max*	Avg	Max	Avg	Max
Dust	303,000	334,000	2,400	2,640	Bag filter	0.95	20	0.001	0.34	9	2,978

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0^{o}C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

* BAT limit

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: **A2-04 Cement Mill 6**

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max*	Avg	Max	Avg	Max
Dust	320,000	351,000	5,600	6,160	Bag filter	1.02	20	0.003	0.6	32	5,256

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0^{o}C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

* BAT limit

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: **A2-05 Cement Mill 6 separator**

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max*	Avg	Max	Avg	Max
Dust	1,364,000	1,878,000	69,000	95,000	Bag filter	12.12	20	0.065	0.6	565	5,256

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0^{o}C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

* BAT limit

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: **A2-06 Cement Mill 7**

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max*	Avg	Max	Avg	Max
Dust	320,000	351,000	5,600	6,160	Bag filter	4.13	20	0.005	1.7	43	14,892

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0^{o}C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

* BAT limit

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: **A2-07 Cement Mill 7 Separator**

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max*	Avg	Max	Avg	Max
Dust	1,030,000	1,397,870	70,000	95,000	Bag filter	18.23	20	0.1	1.7	751	14,892

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0^{o}C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

* BAT limit

TABLE E.1(iv): EMISSIONS TO ATMOSPHERE - Minor atmospheric emissions

Emission point	Description	Emission details[1]				Abatement system employed
Reference Numbers		material	mg/Nm$^{3(2)}$	kg/h.	kg/year	
A3-01	Limestone crusher	Limestone	20	1.332	2,664	Bag filter
A3-02	Transfer building	Limestone	20	0.216	432	Bag filter
A3-03	Shale plant jaw crusher	Shale	20	0.332	660	Bag filter
A3-04	Shale plant hammermill	Shale	20	0.444	888	Bag filter
A3-05	Shale plant hammermill	Shale	20	0.22	442	Bag filter
A3-06	Shale plant jaw crusher	Shale	20	0.248	492	Bag filter
A3-07	Blendomat building top	Limestone	20	0.22	1,716	Bag filter
A3-08	Blendomat building extraction	Limestone / shale	20	0.228	1,788	Bag filter
A3-09	Blendomat building extraction	Limestone / shale	20	0.228	1,788	Bag filter
A3-10	Rawmill No. 6	Rawmeal	20	0.224	1,760	Bag filter
A3-11	Homo silo 1 Beumer elevators	Rawmeal	20	0.336	2,621	Bag filter
A3-12	Homo silo 1	Rawmeal	20	0.24	1,872	Bag filter
A3-13	Homo silo 2	Rawmeal	20	0.24	1,872	Bag filter
A3-14	Bottom Beumer elevators	Rawmeal	20	0.14	1,086	Bag filter
A3-15	Kiln feed bin	Rawmeal	20	0.156	1,208	Bag filter
A3-16	Pet Coke/Coal mill	Pet Coke/Coal	20	0.068	543	Bag filter
A3-17	Clinker silo	Clinker	20	0.124	955	Bag filter
A3-18	Rejects silo	Clinker	20	0.016	131	Bag filter
A3-19	Clinker silo extraction	Clinker	20	0.048	374	Bag filter
A3-20	Clinker to Cement Mill 6 Hopper	Clinker	20	0.2	1,544	Bag filter
A3-21	Cement Mill 6 Clinker Hopper	Clinker	20	0.06	298	Bag filter
A3-22	Cement Mill 5 Clinker Hopper	Clinker	20	0.06	496	Bag filter
A3-23	Bottom of cement belt to silos	Cement	20	0.068	496	Bag filter
A3-24	Top silo 9	Cement	20	0.092	711	Bag filter
A3-25	Top silo 10 and feed to silos	Cement	20	0.152	1,198	Bag filter
A3-26	PFA silo for cement mills 6 & 7	PFA	20	0.036	86	Bag filter
A3-27	Silo 7 extraction	Cement	20	0.532	1,598	Bag filter
A3-28	Top silo 7	Cement	20	0.068	198	Bag filter

A3-30	Silo 9 extraction	Cement	20	0.332	2,574	Bag filter
A3-31	Silo 10 extraction	Cement	20	0.332	1,106	Bag filter
A3-32	Silo 8 extraction	Cement	20	0.04	82	Bag filter
A3-33	Packing plant	Cement	20	0.532	1,598	Bag filter
A3-34	Top silo 1	Cement	20	0.052	12	Bag filter
A3-35	Top silo 5	PFA	20	0.292	436	Bag filter
A3-36	Top silo 8	Cement	20	0.168	370	Bag filter
A3-39	Silo 11 top	Cement	20	0.332	2,891	Bag filter
A3-40	Silo 11 extraction	Cement	20	0.032	284	Bag filter
A3-42	Airslide after Redecam	Cement	20	0.028	252	Bag filter
A3-43	Road Clinker intake hopper to mills	Cement	20	1.32	9,504	Bag filter
A3-44	Silo 7 to packer 4	Cement	20	0.116	1,020	Bag filter
A3-45	PFA silo for cement mill 5	Cement	20	0.06	536	Bag filter
A3-46	Road bulk loading silos 1 to 6	Particulates	20	0.208	1,808	Bag filter
A3-47	Clinker intake	Cement	20	1.6	14,016	Bag filter
A3-48	Filter at ground floor packer 5	Cement	20	0.184	1,599	Bag filter
A3-49	Filter top ferrous sulphate silo	PFA	20	0.184	1,599	Bag filter
A3-50	Filter limestone hopper to CM5	Clinker	20	0.03	261	Bag filter
A3-55	Central control building oil burner	Combustion gases (SO_2, NO_X, suspended particulates)	Not available	Not available	Not available	None
A3-56	Garage oil burner	Combustion gases (SO_2, NO_X, suspended particulates)	Not available	Not available	Not available	None
A3-57	Workshop and stores gas burner	Combustion gases (NO_X, suspended particulates)	Not available	Not available	Not available	None
A3-58	PFA silo blendomat building top	Limestone / shale	20	0.228	1,788	Bag filter
A3 - 59	Filter no.2 dedusting top	Cement	20	0.056	487	Bag filter
A3 - 60	Limestone hopper CM6 top	Clinker	20	0.15	1,069	Bag filter
A3 - 61	Limestone hopper CM7 top	Clinker	20	0.15	1,069	Bag filter
A3 - 62	AF free flowing solids	AF	10	0.1	876	Bag filter

A3 – 63	AF free flowing solids	AF	10	0.1	876	Bag filter
A3 - 64	AF bio solids	AF	10	0.1	876	Bag filter

1 The maximum emission should be stated for each material emitted, the concentration should be based on the maximum 30 minute mean.
2 Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0ºC101.3kPa). Wet/dry should be clearly stated. Include reference oxygen conditions for combustion sources.

TABLE E.1(v): EMISSIONS TO ATMOSPHERE – Fugitive and Potential atmospheric emissions

Emission point ref. no. (as per flow diagram)	Description	Malfunction which could cause an emission	Emission details (Potential max. emissions)[1]		
			Material	mg/Nm^3	kg/hour
A4-01	Pet Coke/Coal Mill Hybrid Overpressure flaps	Overpressure in Pet Coke/Coal mill system	Pet Coke/Coal	30,000	10kg will be the total emission as the plant will automatically stop
A4-02	Fine Pet Coke/Coal hopper overpressure flaps	Overpressure in Pet Coke/Coal mill system	Pet Coke/Coal	30,000	
A4-03	Coal Bag Filter Overpressure flaps	Overpressure in Pet Coke/Coal mill system	Pet Coke/Coal	30,000	
A4-04	Coal Separator Overpressure flaps	Overpressure in Pet Coke/Coal mill system	Pet Coke/Coal	30,000	
A4-05	Pet Coke/Coal Mill Fan Overpressure Flap	Overpressure in Pet Coke/Coal mill system	Pet Coke/Coal	30,000	

[1] Estimate the potential maximum emission for each malfunction identified.

TABLE E.2(i): EMISSIONS TO SURFACE WATERS (One page for each emission)

Emission Point:

Emission Point Ref. Nº:	SW1
Source of Emission:	Cooling water, storm water and quarry water
Location of discharge :	Bunlicky Pond
Grid Ref. (12 digit, 6E,6N):	153,632, 155,138
Name of receiving waters and water body code:	Bunlicky Clayfield Pond – no water body code
Flow rate in receiving waters:	0.06 $m^3.sec^{-1}$ Dry Weather Flow 0.06 $m^3.sec^{-1}$ 95%ile flow
Available assimilative capacity:	2.5 million m^3

Emission Details:

(i) Volume to be emitted			
Normal/day	1,138m^3	Maximum/day	18,000m^3
Maximum rate/hour	740m^3		

(ii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	60 min/hr 24 hr/day 365 day/yr

TABLE E.2(ii): EMISSIONS TO SURFACE WATERS - Characteristics of the emission (1 table per emission point)

Emission point reference number: ***SW1***

Parameter	Prior to treatment				As discharged				% Efficiency
	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	
BOD	Not available	Not available	Not available	Not available	Not available	10	180	65,700	Not available
Mineral Oil	Not available	Not available	Not available	Not available	Not available	12	216	78,840	Not available

TABLE E.2(i): EMISSIONS TO SURFACE WATERS (One page for each emission)

Emission Point:

Emission Point Ref. Nº:	SW2
Source of Emission:	Excess quarry water
Location of discharge :	Bunlicky Pond
Grid Ref. (12 digit, 6E,6N):	153,576, 155,181
Name of receiving waters and water body code:	Bunlicky Clayfield Pond – no water body code
Flow rate in receiving waters:	0.06 $m^3.sec^{-1}$ Dry Weather Flow Not available $m^3.sec^{-1}$ 95%ile flow
Available assimilative capacity:	2.5 million m^3

Emission Details:

(i) Volume to be emitted			
Normal/day	Not available	Maximum/day	Not available
Maximum rate/hour	Not available		

(ii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	60 min/hr 24 hr/day 365 day/yr

TABLE E.2(ii): EMISSIONS TO SURFACE WATERS - Characteristics of the emission (1 table per emission point)

Emission point reference number: ***SW2***

Parameter	Prior to treatment				As discharged				% Efficiency
	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	
BOD	Not available	6	72	26,280	N/A	6	72	26,280	Not available
Suspended Solids	N/A	35	420	153,300	N/A	35	420	153,300	Not available
Mineral Oil	N/A	10	120	43,800	N/A	10	120	43,800	Not available

TABLE E.3(i): EMISSIONS TO SEWER (One page for each emission)

Emission Point: No process emissions to sewer

Emission Point Ref. Nº:	No process emissions to sewer
Location of connection to sewer:	
Grid Ref. (12 digit, 6E,6N):	
Name of sewage undertaker:	

Emission Details:

(i) Volume to be emitted			
Normal/day	m^3	Maximum/day	m^3
Maximum rate/hour	m^3		

(ii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	_____min/hr _____hr/day _____day/yr

TABLE E.3(ii): EMISSIONS TO SEWER - Characteristics of the emission (1 table per emission point)

Emission point reference number: ***Not applicable***

Parameter	Prior to treatment				As discharged				% Efficiency
	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	

TABLE E.4(i): EMISSIONS TO GROUND (1 Page for each emission point)

Emission Point or Area: not applicable

Emission Point/Area Ref. Nº:	Not applicable
Emission Pathway: (borehole, well, percolation area, soakaway, landspreading, etc.)	
Location :	
Grid Ref. (12 digit, 6E,6N):	
Elevation of discharge: (relative to Ordnance Datum)	
Aquifer classification for receiving groundwater body:	
Groundwater vulnerability assessment (including vulnerability rating):	
Identity and proximity of groundwater sources at risk (wells, springs, etc):	
Identity and proximity of surface water bodies at risk:	

Emission Details:

(i) Volume to be emitted			
Normal/day	m^3	Maximum/day	m^3
Maximum rate/hour	m^3		

(ii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	_____min/hr _____hr/day _____day/yr

TABLE E.4(ii): EMISSIONS TO GROUND - Characteristics of the emission (1 table per emission point)

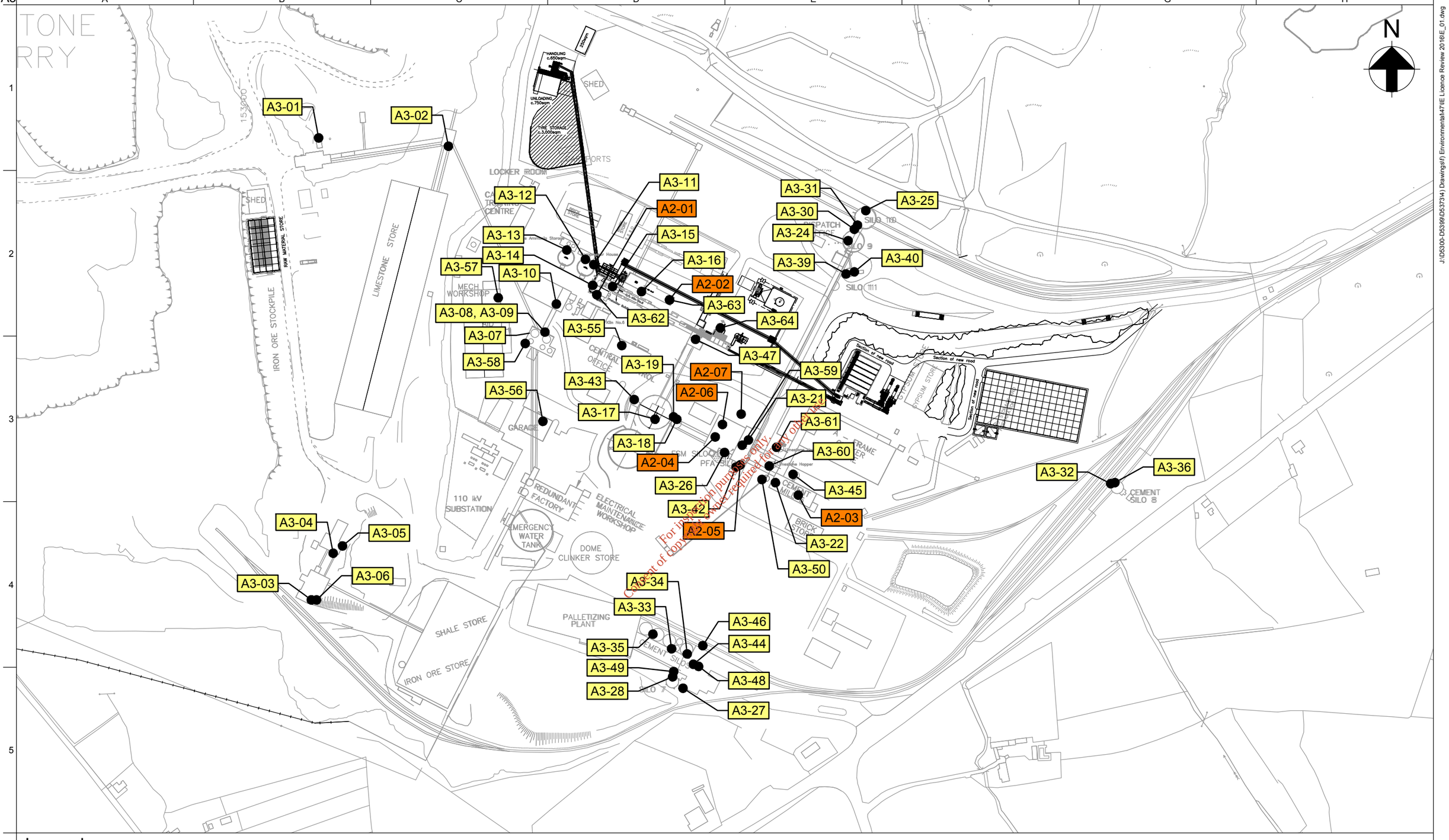
Emission point/area reference number: ***Not applicable***

Parameter	Prior to treatment				As discharged				% Efficiency
	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	

Table E.5(i): NOISE EMISSIONS - Noise sources summary sheet

Source	Emission point Ref. No	Equipment Ref. No	Sound power level (dB)	Octave bands (Hz) Sound Power[1] Levels dB(unweighted) per band									Impulsive or tonal qualities	Periods of Emission[2]
				31.5	63	125	250	500	1K	2K	4K	8K		
Primary crusher	N1	62105	108	110	107	107	107	106	103	106	100	93	Minor	10 hrs/day - daytime
Raw mill entrance	N2	63116	102	93	98	98	100	100	93	88	83	70	None	24 hrs/day
Compressor room	N3	63372-63375	98	88	88	104	87	88	86	90	87	78	None	24 hrs/day
Exhaust fan drive	N4	64426	92	91	94	93	89	95	91	88	77	74	None	23 hrs/day
Booster fan	N5	64606	91	91	94	93	89	95	91	88	77	74	None	24 hrs/day
Coal mill	N6	64638/64640	99	93	109	103	104	108	109	109	110	103	None	24 hrs/day
Coal-fuller pumps	N7	64649	100	99	103	102	101	100	100	104	110	103	None	24 hrs/day
Coal mill-fan drive	N8	64201	104	88	95	103	97	95	91	88	94	91	None	24 hrs/day
Kiln cooling fans	N9	64310	90	104	105	111	111	110	105	100	97	92	None	24 hrs/day
Kiln Coolers	N10	65206	92	103	109	108	107	111	110	111	110	105	None	24 hrs/day
Cement mill-6 entrance	N11		98	86	94	97	99	99	99	98	85	73	None	24 hrs/day
Cement mill 5 entrance	N12		105	92	88	96	98	99	94	94	87	76	None	24 hrs/day
Gantry cooling fan	N13		102	98	99	106	109	108	104	98	91	82	None	24 hrs/day
New cooling tower	N14		100	Not available									none	24 hrs/day

1. For items of plant, sound power levels may be used.
2. Periods of emission should state if the plant item in question operates on a continuous or intermittent basis. If intermittent then further details of the hours of operation and any potential impulsive components associated with the source should be clearly identified.



Legend:

A2-02 Main

A3-16 Minor

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Job Title
Review of IE Licence
Reg No. P0029-03

Client
Irish Cement Ltd

Drawing Title
Main and Minor Emissions to Atmosphere

Scale at A3	NTS
Date	April 2016
Discipline	Environmental
Job No	325373-47
Drawing Status	Report
Drawing No	Figure E.1
Issue	R1

Do not scale

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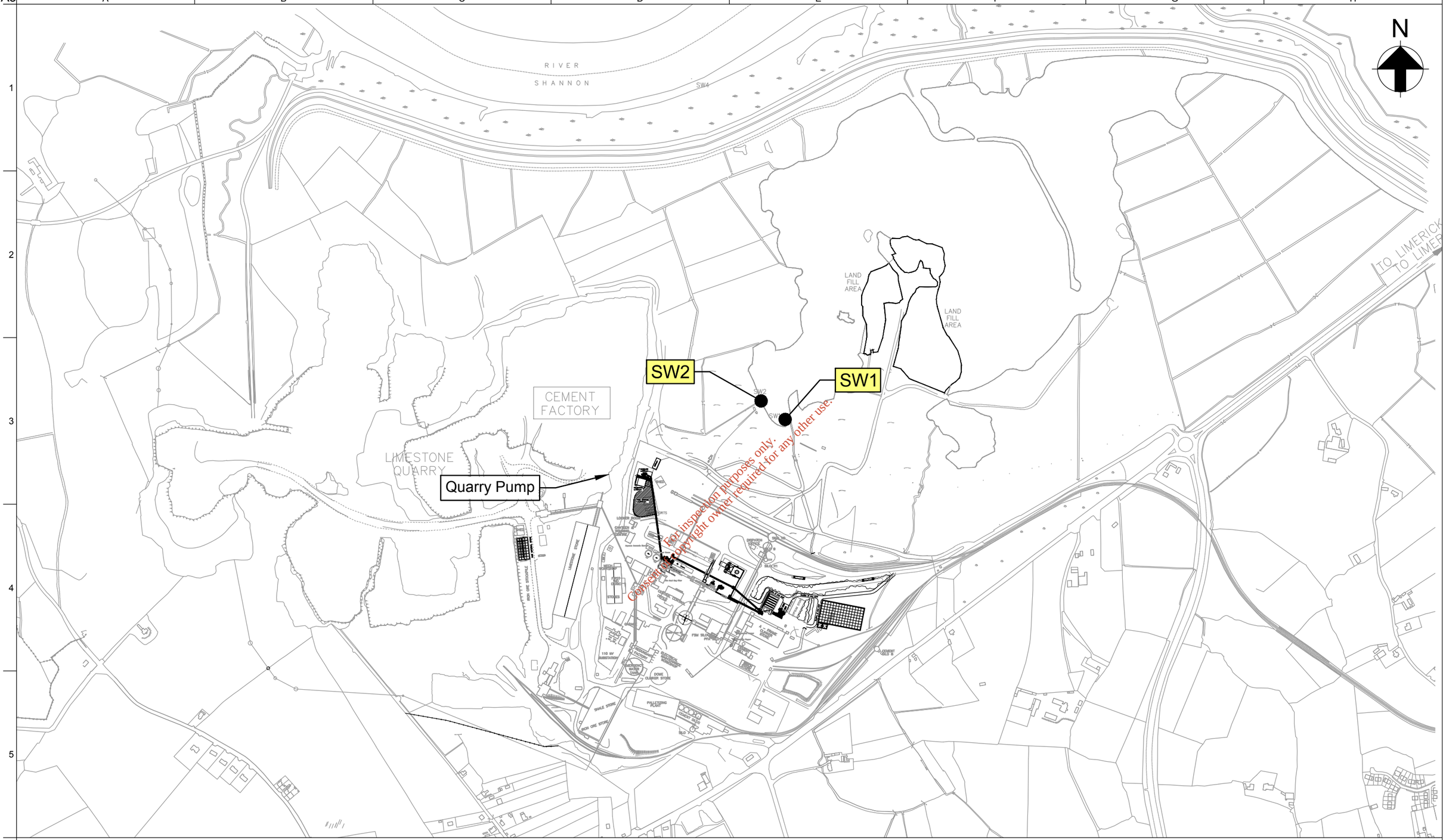
A3

A B C D E F G H

1 2 3 4 5



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Client
Irish Cement Ltd

Drawing Title
Surface Water Emission Points

Scale at A3: NTS	Date: April 2016
Discipline: Environmental	
Job No: **325373-47**	Drawing Status: **Report**
Drawing No: **Figure E.2**	Issue: **R1**

Do not scale

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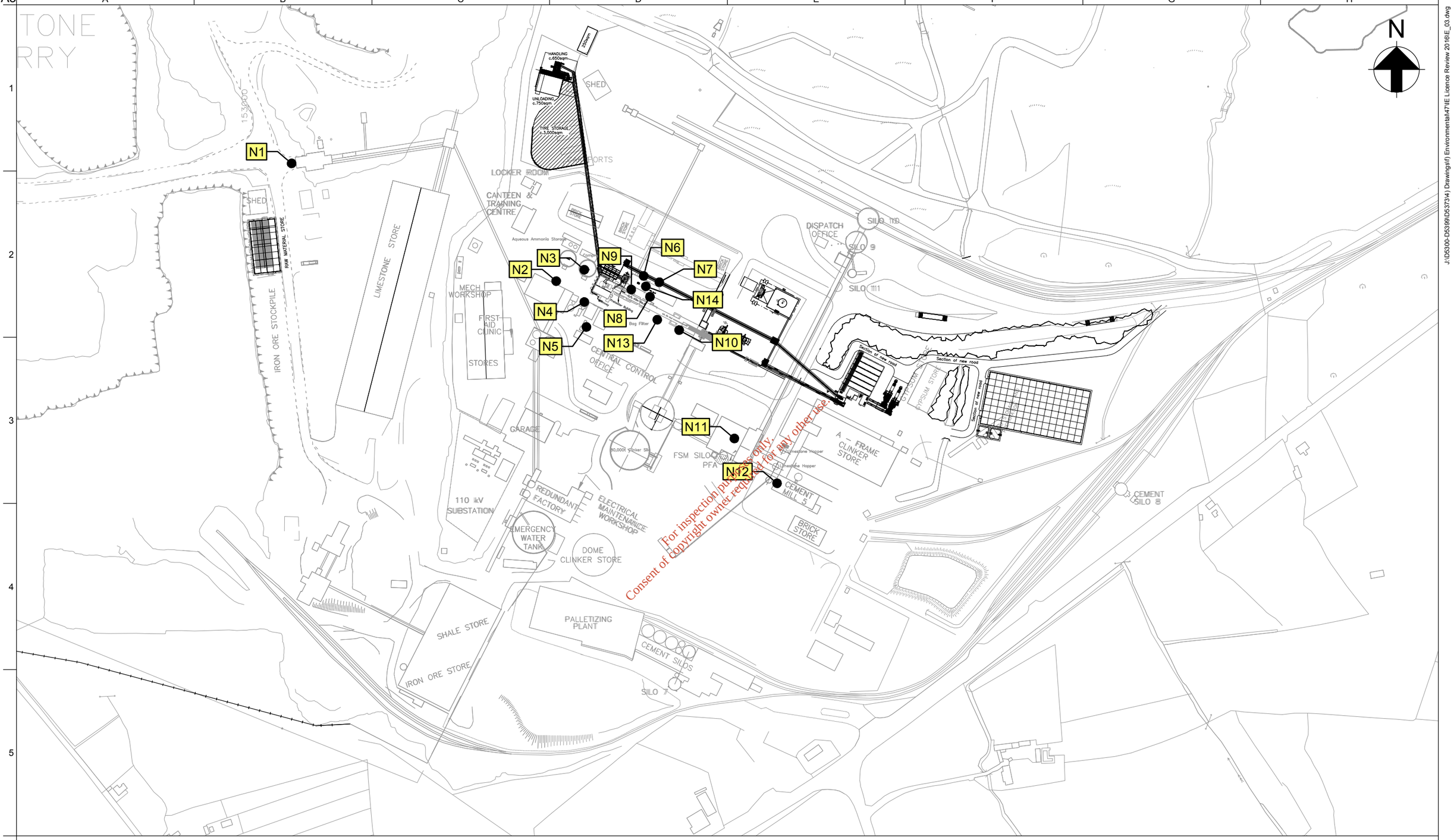

A3 | A | B | C | D | E | F | G | H

1 | 2 | 3 | 4 | 5

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Job Title
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Reg No. P0029-03

Client
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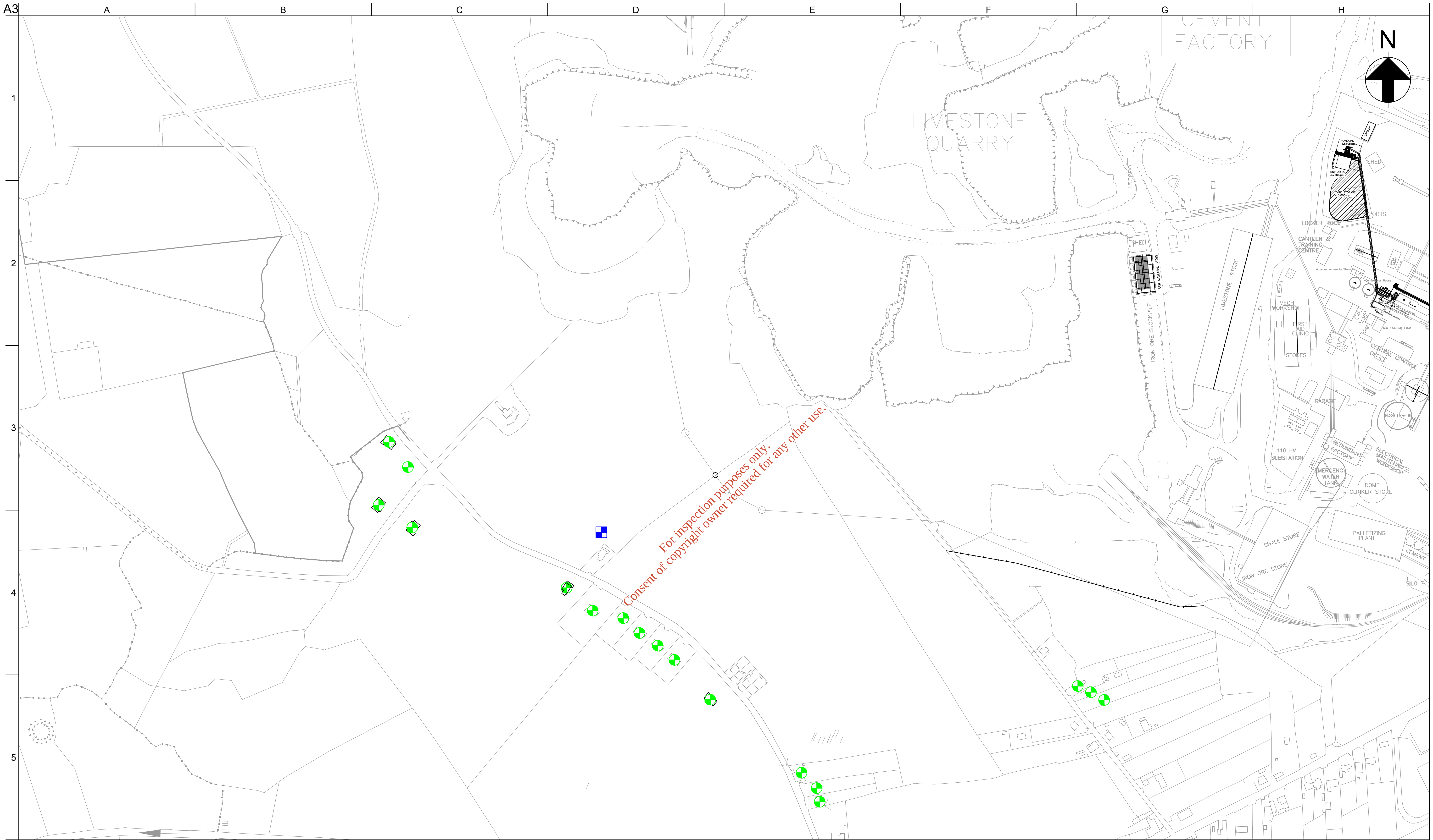
Drawing Title
Locations of Main Noise Sources

Scale at A3: NTS	Date: April 2016
Discipline: Environmental	
Job No: **325373-47**	Drawing Status: **Report**
Drawing No: **Figure E.3**	Issue: **R1**

Do not scale



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Legend:

- Fixed Monitoring Location
- Temporary Monitoring Locations

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Job Title
Review of IE Licence
Reg No. P0029-03

Client
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Drawing Title
Fixed Blast Monitoring Locations

Scale at A3	Date
NTS	April 2016
Discipline	
Environmental	
Job No	Drawing Status
325373-47	Report
Drawing No	Issue
Figure E.4	R1

Do not scale