

Analysis of Aggregates Market in Ireland

In support of the development of National End-of-Waste Criteria

Client: Environmental Protection Agency

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1 Glossary of Terms

All-in Aggregate	Aggregate consisting of a mixture of coarse and fine aggregates.
Aggregate	Granular material used in construction. Aggregates may be natural, manufactured or recycled.
Attestation Level	A measure of how onerous a system of assessment is required to verify constancy of performance under the Construction Product Regulation (CPR).
Declaration of Performance	A Declaration of Performance (DoP) is a document drawn up by the manufacturer or authorised representative to declare a product complies with EU requirements.
Factory Production Control	A management system focusing mainly on the production process which aims to ensure that product quality is consistently maintained to the required specifications as set out in relevant European Standards.
With/without High Safety Requirements	The differentiation between the requirement or otherwise for high safety requirements is addressed in Council Decision 98/598/EC ¹ and typically expressed (in Ireland) through the Standard Recommendations (SRs).
Natural aggregate	Aggregate from mineral sources which has been subjected to nothing more than mechanical processing.
Manufactured aggregate	Aggregate of mineral origin resulting from an industrial process involving thermal or other modification.
Recycled aggregate	Aggregate resulting from the processing of inorganic or mineral material previously used in construction.
Recycled armourstone	Armourstone resulting from the processing of inorganic material previously used in construction.
Recycled railway ballast	Railway ballast resulting from the processing of previously used railway ballast.

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:01998D0598-20020720&from=EN>

2 Introduction

Sweco UK Ltd. (Sweco) was commissioned by the Environmental Protection Agency (EPA) to conduct market research and analysis of aggregate use in the Republic of Ireland in support of developing national End-of-Waste (EoW) criteria. Its purpose is to compare the markets for virgin and recycled aggregates. This is done by documenting the findings of engagement undertaken by the EPA with operators handling waste aggregates and by Sweco with the quarry sector in relation to quarried aggregates.

2.1 Objectives of the Study

Understanding the market for virgin and recycled aggregates is an important keystone in the success of establishing national EoW criteria in accordance with Article 6 of the Waste Framework Directive (WFD). Article 6 has been transposed into Irish national law by Regulation 28 of the European Union (Waste Directive) Regulation 2011-2020².

Regulation 28 sets down criteria on EoW and requires compliance with four conditions or pillars that, following a recycling and recovery operation, the resultant processed material ceases to be waste if:

- i. the substance or object is to be used for specific purposes;
- ii. a market or demand exists for such a substance or object;
- iii. the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and
- iv. the use of the substance or object will not lead to overall adverse environmental or human health impacts.

The objective of this study is to establish the second pillar, i.e., that a market or demand exists for recycled aggregates in Ireland but also addresses aspects of the first pillar. In doing so, this study looks to understand the current and future demand for quarried aggregates, provision within harmonised standards and specifications for the use of recycled aggregates along with the appetite or demand within the sector to use recycled aggregates alongside quarried aggregates.

2.2 Aggregates Production

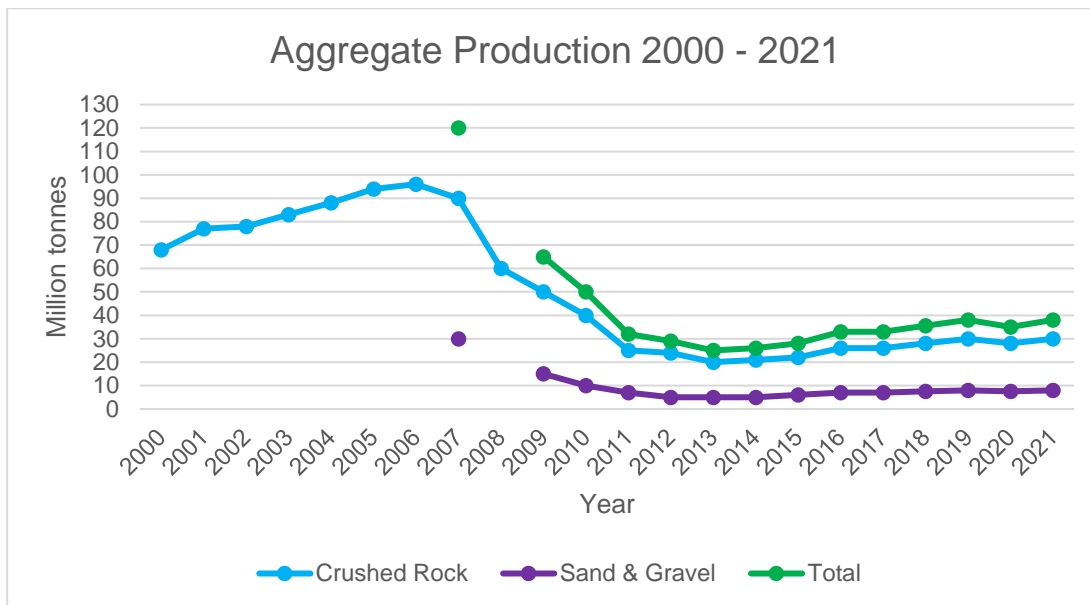
The demand for aggregates in Ireland (12 tonnes per capita) is double that of the average demand in other EU countries³. There are approximately 500 active quarries extracting aggregate from natural resources in Ireland³. These quarries produce aggregates from crushed rock, sand and gravel for use as a basic raw material for unbound applications or concrete and other construction products.

The Irish Concrete Federation (ICF) estimated that Ireland's aggregate production rate in 2021 was approximately 38 million tonnes, as shown in Figure 1.

² SI 126 of 2011, as amended as by SI 323 of 2020

³ Essential Aggregates Providing for Ireland's Needs to 2040, Irish Concrete Federation

Figure 1: Irish Aggregate Production Estimates (excluding production for concrete production)



Recycled aggregates are derived from the reprocessing of materials originally used in construction and are derived predominately from construction and demolition (C&D) waste streams (preferably source separated). They include sand, gravel, crushed stone, asphalt and concrete being crushed to a specific aggregation specification. There are currently four facilities in Ireland that hold an EoW decision from the EPA for the production of recycled aggregates.

2.3 Quality Control & Regulatory Regime

Where a waste material (in this case waste derived aggregate) ceases to be considered a waste and achieves end-of-waste (EoW) status, as determined by the Commission or an individual Member State, it is then considered to be a product and must comply with specific product rules relating to placement of a product on the EU market. In this regard, a number of pieces of legislation relate to the placement of waste derived aggregate products on the EU market, namely the Construction Product Regulation, and the REACH Regulation. Summaries of the Construction Product Regulation and REACH Regulation are outlined in Appendix A and Appendix B.

2.4 Standards and Specification

The Construction Products Regulation⁴ set out the requirements of construction products and how those requirements are consequently reflected in national product standards and other national technical specifications relating to construction products which include aggregates for specific end uses/products.

As Ireland's National Standards body, NSAI give status to European standards (EN) through their publication as Irish Standards (I.S. EN) as well as development and publication of technical standards developed within Ireland (I.S.). In addition, the NSAI develop and publish national guidance, on published technical standards such as Standard Recommendations (S.R.).

The main standards governing the production/use of aggregates in Ireland include:

- I.S. EN 12620:2002+A1: 2008 Aggregates for Concrete and S.R. 16:2016 Guidance on the use of I.S. EN 12620:2002 + A1:2008
- I.S. EN 13043:2002⁵: Aggregates for Bituminous Mixtures and Surface Treatments for roads, airfields, and other trafficked areas and S.R. 17:2004 Guidance on the use of
- I.S. EN 13139:2002 +AC 2004⁶ Aggregates for Mortar and S.R. 18:2021 Guidance on the use of I.S. EN 13139:2002 – Aggregates for Mortar
- I.S. EN 13242+A1: 2007 Aggregates for Unbound and Hydraulically Bound Materials for use in Civil Engineering Work and Road Construction and S.R. 21:2014+A1: 2016 Guidance on the use of I.S. EN 13242:2002+A1:2007 – Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction
- I.S. EN 13055:2016 Lightweight Aggregates
- I.S. EN 13450:2003 Aggregates for railway ballast
- I.S. EN 13383-1:2002 Armourstone – Part 1: Specification.

Both I.S. EN 12620:2002+A1: 2008 Aggregates for Concrete and S.R.16:2016 Guidance on the use of I.S. EN 12620:2002 + A1:2008 are currently being reviewed by the NSAI. Reviews of SR17, SR18 & SR21 will follow.

Table 1 assesses whether recycled aggregates are provided for within these standards. The Assignment of evaluation of conformity tasks is outlined in Table A1 of Appendix A.

⁴ Regulation (EU) No . 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC Text with EEA relevance

⁵ As per NSAI website, I.S. EN 13043:2002 is the national adoption of EN13043:2002/AC:2004

⁶ As per NSAI website, I.S. EN 13139:2002&AC:2004 is the national adoption of EN 13139:2002/AC:2004

Table 1: Summary of Standards Governing the Production/Use of Aggregates

Standard Name	Scope	Covers Recycled Aggregate	Attestation of Conformity System(s)	Comments
I.S. EN 12620:2002+A1:2008	Aggregates for Concrete	Yes – covers recycled aggregates with densities between 1,50 mg/m ³ and 2,00 mg/m ³ with appropriate caveats ⁷ and recycled fine aggregate (4 mm) with appropriate caveats.	Aggregates for concrete, mortar and grout for use in buildings, roads, and other civil engineering works with high safety requirements require System 2+ ⁸ Aggregates for concrete, mortar and grout for use in buildings, roads, and other civil engineering works without high safety requirements require System 4 ⁹ .	-
S.R. 16:2016	Guidance on the use of I.S. EN 12620:2002 + A1:2008	Yes – provides guidance for recycled concrete aggregates. Does not provide guidance for recycled aggregates other than recycled concrete aggregates or manufactured aggregates.	As per I.S. EN 12620:2002+A1:2008. S.R. 16:2016 states that the recommended AVCP system for all aggregates in Ireland under the scope I.S. EN 12620:2002+A1:2008 and S.R. 16 is System 2+.	TII Guidance DN-PAV-03053 further specifies the values/categories for resistance to surface abrasion for concrete pavements.
I.S. EN 13043:2002	Aggregates for Bituminous Mixtures and Surface Treatments for roads, airfields, and other trafficked areas	Yes – covers recycled aggregates. Does not cover reclaimed bituminous materials.	Aggregates for bituminous mixtures and surface treatments for use in roads and other civil engineering works with high safety requirements require System 2+ . Aggregates for bituminous mixtures and surface treatments for use in roads and other civil engineering works without high safety requirements require System 4 .	-

⁷ Caveats include classification of constituents, testing methods and limits, including water soluble sulfate content of recycled aggregates (Section 6.3.3 of standard), additional test methods when assessing acid-soluble content ion content of recycled aggregate where required (Section 6.2 of standard), additional test methods when assessing impacts of recycled aggregates on the rate of setting and hardening of concrete (Section 6.4.1 of standard), and a documented input control of raw material to be recycled (as required by Annex H.3.3 of standard).

⁸ System 2+: See Directive 89/106/EEC (CPD) Annex III.2.(ii), First possibility, including certification of the factory production control by an approved body on the basis of initial inspection of factory and of factory production control as well as of continuous surveillance, assessment and approval of factory production control

⁹ System 4: See Directive 89/106/EEC (CPD) Annex III.2.(ii), Third possibility

Standard Name	Scope	Covers Recycled Aggregate	Attestation of Conformity System(s)	Comments
S.R. 17:2004	Guidance on the use of I.S. EN 13043:2002 - Aggregates for Bituminous Mixtures and Surface Treatments for roads, airfields, and other trafficked areas	Yes	As per I.S. EN 13043:2002. S.R. 17:2004 states that the level of attestation of aggregates in Ireland is "4", with the exception of coarse aggregates, defined as high specification aggregates (i.e., with a declared PSV or 58 or higher) for use in skid resistant surfacing are subject to a level of attestation of "2+". See the TII Specifications for Road Works for further guidance on the properties, and the use of recycled bituminous materials.	See the TII Specifications for Road Works for further guidance on the properties, and the use of recycled bituminous materials.
I.S. EN 13139:2002 +AC 2004	Aggregates for Mortar	Yes	Aggregates for mortar for use in buildings, roads, and other civil engineering works with high safety requirements require System 2+ . Aggregates for mortar for use in buildings, roads, and other civil engineering works without high safety requirements require System 4 .	-
S.R. 18:2021	Guidance on the use of I.S. EN 13139:2002 – Aggregates for Mortar	No – only covers natural aggregates used to make masonry mortar plaster/rendering and floor screeds.	As per I.S. EN 13139:2002. As per S.R. 18, it is recommended that the AVCP system for all aggregates under the scope I.S. EN 13139:2002 and S.R. 18 is System 2+.	-
I.S. EN 13242+A1: 2007	Aggregates for Unbound and Hydraulically Bound Materials for use in Civil Engineering Work and Road Construction	Yes	Aggregates for unbound and hydraulically bound mixtures for use in roads and other civil engineering works with high safety requirements require System 2+ . Aggregates for unbound and hydraulically bound mixtures for use in roads and other civil engineering without high safety requirements require System 4 .	-
S.R. 21:2014+A1: 2016	Guidance on the use of I.S. EN 13242:2002+A1:2007 – Aggregates	Yes includes recycled aggregates but does not	As per I.S. EN 13242+A1:2007.	For aggregates to be used for pipe bedding, haunching and surrounding

Standard Name	Scope	Covers Recycled Aggregate	Attestation of Conformity System(s)	Comments
	for unbound and hydraulically bound materials for use in civil engineering work and road construction	cover manufactured aggregates.	<p>S.R. 21:2014+A1:2016 states that the AVCP system for all aggregates for unbound and hydraulically bound materials is “4” with the exception of aggregates with the particular end-use of ‘unbound granular fill (hardcore) for use under concrete floors and footpaths’, for which the system of AVCP is “2+”.</p> <p>Section E.2.3. of Annex E states that recycled aggregates should not be used for unbound granular fill (hardcore) for use under concrete floors and footpaths.</p>	<p>material, the relevant properties should be as specified in I.S. EN 13242+A1:2007 and the TII Specification for Road Works Series 500.</p> <p>For aggregates to be used for backfilling of filter drains, the relevant properties should be as specified in I.S. EN 13242+A1:2007 and the TII Specification for Road Works Series 500.</p> <p>For aggregates to be used as fill material, the relevant properties should be as specified in I.S. EN 13242+A1:2007 and the TII Specification for Road Works Series 600.</p> <p>For aggregates to be used as unbound sub-bases for road pavements, the relevant properties should be as specified in I.S. EN 13242+A1:2007 and the TII Specification for Road Works Series 800.</p> <p>For aggregates to be used in cement bound bases or sub-bases for roads, the relevant properties should be as specified in I.S. EN 13242+A1:2007 and the TII Specification for Road Works Series 800.</p>
I.S. EN 13055:2016	Lightweight aggregates	Yes – covers recycled aggregates from by-products of industrial processes or	-	-

Standard Name	Scope	Covers Recycled Aggregate	Attestation of Conformity System(s)	Comments
		recycled source materials ¹⁰ and as by-products of industrial processes ¹¹ (not from construction and demolition waste).		
I.S. EN 13450:2003	Aggregates for railway ballast	Yes	Aggregates (railway ballast) for use in construction of railway track with high safety requirements require System 2+ . Aggregates (railway ballast) for use in construction of railway track without high safety requirements require System 4 .	-
I.S. EN 13383-1:2002	Armourstone – Part 1: Specification	Yes	Armourstone for use in hydraulic protection and regulation structures with high safety requirements require System 2+ . Armourstone for use in hydraulic protection and regulation structures without high safety requirements require System 4 .	-

¹⁰ The specific lightweight aggregate (LWA) source materials for manufactured LWA from by-products of industrial processes or recycled source materials are sintered fly ash, cold bonded fly ash, foamed blast furnace slag, expanded pelletized blast furnace slag, expanded glass and foamed glass

¹¹ The specific LWA source materials as by-products of industrial processes are furnace clinker, (furnace) bottom ash (BA, FBA) and fly ash (FA, PFA)

2.4.1.1 TII Standard Construction Details

Transport Infrastructure Ireland (TII) publish Standard Construction Details (SCDs) for use on National Road Scheme (i.e., Series 500, 600 and 800) which include specification on the use of aggregates in transport infrastructure.

1. CC-SPW-00500

The TII specification CC-SPW-0500 outlines the specification for drainage and service ducts for road works and the associated requirements around the specified aggregates. Aggregates may be used for bedding material should it be natural granular material incorporating recycled aggregate or light weight aggregates, should the properties be compliant with the series 500 requirements.

Class 1 or Class 2 material (complying with the requirements of the 600 series) can be used above the bed, haunch and surround (except for filter drains).

2. CC-SPW-00600

The TII specification CC-SPW-0600 (Series 600) covers Earthworks for road works. It outlines the uses and specifications of aggregates (including recycled aggregates) for use in earthworks. The definition of recycled aggregate within this specification is as follows:

Recycled aggregate refers to 'aggregate resulting from the processing of material used in a construction process. The aggregate shall be classified by hand-sorting the coarse aggregate particles in accordance with IS EN 933-11. The content of materials including wood, plastic and metal shall not exceed 1% by mass'.

The classification, typical use and permitted constituents of acceptable earthworks materials is outlined in Table 2.

Series 600 provides for the use of recycled aggregates in numerous classifications, however some classes only provide for certain material e.g. natural stone, gravel or rock. Some classes however permit use of concrete and other recycled aggregates. Recycled aggregates are commonly used and provided for in classifications: general granular fill (Class 1); general cohesive fill (Class 2); selected granular fill (Class 6, incl. 6F2) and Misc. Fill (Class 8).

3. CC-SPW-00800

Transport Infrastructure Ireland (TII) published the specification on Road Pavements – Unbound and Hydraulically Bound Mixtures in August 2022 (replacing the publication of the same name published in March 2013). The publication outlines the specification of unbound and hydraulically bound granular mixtures for use in pavements and foundations.

The use of recycled aggregates (referred to as reclaimed aggregates¹² is set out in Section 2.3.2 of Series 800.. Reclaimed aggregates are allowed in unbound granular mixtures (UGMs) and Hydraulically Bound Mixtures (HBM) when derived from a combination of concrete, bituminous materials or unbound granular and hydraulically bound mixtures. All aggregates must comply with the requirements of the Specification document.

There are six types of UGMs and two types of HBM outlined in the document. Sections 2.2.1.3 and 3.2.1.1 of CC-SPW-00800 specifies requirements related to the use of reclaimed aggregates.

The specifications set out allowable content (% by mass) for different UGMs as outlined in Table 2.2 of CC-SPW-00800 and re-produced hereunder.

¹² Reclaimed aggregates refers to aggregates produced by the reuse or recycling of materials respectively defined by Article 27 and Article 28 as defined in EU (Waste Directive) Regulation 2011 – 2020)

Table 2.2 Allowable reclaimed aggregate content within a UGM.

UGM A / Ac / Am	UGM B / Bc / Bm
% by mass	% by mass
≤ 30	No Limit

UGM A /Ac/Am may contain up to 30% reclaimed aggregates and must be combined with crushed rock aggregate. UGM B/Bc/Bm may include reclaimed aggregate, crushed rock aggregate, crushed natural gravels or a combination thereof, for which there is no limitation on % content

The specifications set out allowable content (% by mass) for different HBMs as outlined in Table 3.2 of CC-SPW-00800 and re-produced hereunder.

Table 3.2 Allowable reclaimed aggregate content within a HBM.

HBM A	HBM B
% by mass	% by mass
≤ 50	No Limit

HBM A may contain up to 50% reclaimed aggregates and must be combined with crushed rock aggregate. HBM B may include reclaimed aggregate, crushed rock aggregate, crushed natural gravels or a combination thereof, for which there is no limitation on % content.

2.4.2 Market Surveillance

Each of the EU Member States is responsible for regulating its own market surveillance activities in accordance with the CPR. The competent authority in Ireland for undertaking market surveillance is the National Building Control & Market Surveillance Office (NBC&MSO). The NBC&MSO are tasked with the market surveillance of construction products having regard to the requirements of the CPR and Regulation (EU) No. 765/2008. The NBC&MSO may inspect facilities producing aggregates and/or aggregate related products under a CE mark. They may test/inspect the products and request documentation relating to the product. Following inspection, they may request the Minister for Housing, Local Government and Heritage to prohibit or restrict the use of a product and prosecute offences.

The CPR requires that market surveillance be undertaken to ensure that products placed on the market achieve their declared performance and where this is found to be the case, require that appropriate corrective actions be undertaken, which can include withdrawal or recall of products from the market.

In 2021 & 2022, Ireland's National Market Surveillance Programme¹³ included, among others, construction products generated from quarries and pits, specifically products from Area Code 24 (Aggregates) of the CPR with a particular focus on:

- Aggregates for concrete (EN 12620)
- Bituminous Mixtures (EN13043)
- Unbound and hydraulically bound material (EN 13242)
- Masonry units (Dense and lightweight aggregates) (EN 771-3).

¹³ National Market Surveillance Programme 2021 – Ireland & National Market Surveillance Programme 2022 – Ireland - www.nbco.localgov.ie

It is understood that in 2021 & 2022, the NBC&MSO undertook approximately 133 announced and unannounced inspections at quarries, pits, aggregate manufacture and storage locations. These inspections are advised to have comprised of the review of relevant documentation and the taking of samples of aggregates and blocks, where appropriate¹⁴. It is understood that market surveillance activities related to aggregate products will be carried over into 2023.

¹⁴ ICF Regional Meeting – November 2021

3 Market Analysis

3.1 Introduction

The project brief requires the undertaking of a market analysis of the virgin aggregate market and the completion of a comparative analysis of the virgin aggregate market with a separate, similar evaluation undertaken in relation to the current market that exists for recycled aggregates.

The evaluation of the existing recycled aggregates market was undertaken by Agency personnel as a standalone exercise and the findings of this assessment were provided by the Agency as an input to this report to inform the comparative analysis. This included a number of site visits to licenced and permitted waste facilities in addition to a number of active quarries and a demolition site.

3.2 Virgin Aggregate Market Analysis

A profile of the virgin aggregate market was developed based on discussions with a number of relevant stakeholders across a 3-4 week period in Q3 of 2022. Stakeholders were identified with the Agency in advance of this engagement and were primarily quarry operators/producers located in different parts of the country, but also included representative organisations and the National Building Control & Market Surveillance Office.

This engagement generally took the form of videocalls, with a questionnaire provided in advance, which was typically submitted after the meeting was held.

While questionnaires and requests for meeting were issued to a large number of stakeholders, responses were received (and meetings held) from 10 no. organisations which included representatives of quarry operators and larger Irish aggregate producers as well as a number of umbrella organisations for the sector. Given the consistency of responses provided by stakeholders, it is considered that the information determined in engagement can be taken to be an accurate representation of the market for virgin aggregate material nationally.

3.2.1 Comparative Analysis of the Virgin Aggregate Market and the Existing Recycled Aggregate Market

The analyses of the markets for both virgin and recycled aggregates are presented in the following tables under the headings of:

- Market Uses
- Economics
- Certification
- Product Classifications
- Quality Systems
- Compliance.

MARKET USES	
<p><i>When engaging with stakeholders in relation to market uses for both the virgin and recycled aggregate markets, responses were typically presented in an ‘interchangeable’ manner with various classifications of different product types and/or applicable standards. Uses identified here focus on the description of the application identified (with classifications/standards identified in the following sections).</i></p>	
Virgin Aggregates	Recycled Aggregates
<p>Operators with whom engagement was undertaken produce a wide range of aggregate materials that reflects the breadth of the market as it exists in Ireland today. Aggregates produced at different locations may be more suitable for specific end use applications, depending on geological conditions, but the broad categories of uses of virgin aggregates are:</p> <ul style="list-style-type: none"> • Use as a structural aggregate in fill, sub-base, sub-layers, or surface dressings in road, structures or civil engineering applications; • Use for drainage applications; • Use in concrete production; • Use in production of bituminous materials; • Use in mortar production; and • Specific applications – railway ballast, rock armour, decorative stone, landscaping. 	<p>Operators currently producing (or who have produced recycled aggregate material in the past¹⁵) identified the following applications for the current or future intended use of recycled aggregates (note some descriptions provided are similar in nature):</p> <ul style="list-style-type: none"> • Temporary hardstanding; • Haul roads, forestry roads, agricultural road; • Landscaping applications; • Piling mats; • Gabion baskets; • Unbound use in road construction; • Blended with virgin aggregate as a ‘general fill’; • As a ‘6F2’ material in civil/road works; and • Fill or sub-base for road construction or footpaths. <p>A number of operators expressed the opinion that recycled aggregates could in the future be used for:</p> <ul style="list-style-type: none"> • Bound and unbound use for construction products; • Concrete/bituminous products; • Pipe bedding material (500 Series); and • Potential export.
Discussion	
<p>Naturally, there is cross over in terms of the end use applications of aggregates produced from virgin materials and those from recycled materials. Operators producing, or intending to produce, recycled aggregates have identified ‘unbound uses’ as being the primary current/intended application for these materials where the relevant specifications that apply allow for the inclusion of recycled aggregates. Indeed, the allowance within relevant specifications (bound and unbound) for the inclusion of recycled aggregates in applicable products, is, in itself an indication of the fact that markets for such recycled aggregates exist. In general terms, the responses from operators within</p>	

¹⁵ Note that a number of large-scale quarry operators have accepted C&D waste material on waste permitted facilities that they operated in the past, such that significant quantities (c. 500,000 – 700,000 tonnes) of C&D waste aggregates are currently stockpiled, awaiting EoW determination.

the virgin aggregate and recycled aggregates sectors confirm the strong market demand for recycled aggregates for use in a range of bound and unbound applications. Trials using recycled aggregates (20-30%) in bound uses by producers are reported to be resulting in positive outcomes.

ECONOMICS

The economic model that applies in relation to recycled aggregates (at present) differs from that which applies to virgin aggregates. Virgin aggregates financial model for quarry operators is a 'production cost plus margin' basis while the recycled aggregates financial model typically sees the operator commanding a gate fee for the acceptance of material as a waste material at a facility operating under an appropriate waste authorisation (licence or permit). Market values of materials are presented here on an 'ex pit' basis i.e., market value exclusive of VAT and delivery costs.

Virgin Aggregates	Recycled Aggregates
<p>Costs and pricing identified by quarry operators varies dependent on location, local geology, quarry scale, product type, classifications and end use application.</p> <p>Most respondents produce the majority of their output material to EN13242 & SR21 requirement and classify them under TII Series 600 & 800 specifications. Markets costs for these materials, identified as 'general fill' or '6F2' material varied from as low as €5.50/tonne up to €14/tonne, with €6 - 10/tonne being a general median value. Materials used in higher grade applications such as HPSV road chippings were identified as having market value up to €25/tonne.</p> <p>Materials identified as being produced under EN12620 & SR16 and used in concrete products and/or drainage applications command a market value of €14-16/tonne.</p>	<p>Gates fees were identified as varying depending on the nature of the materials being accepted¹⁶, broadly classified as follows:</p> <ul style="list-style-type: none"> • €3.50 - €6 per tonne for clean concrete • €7 - €8 per tonne for soil & stones • €7 – 10 per tonne for mixed C&D¹⁷ <p>Production costs were generally identified as being €2.50 - €6.50 per tonne, dependent on the extent of processing – if washing is applied, these costs can be doubled.</p> <p>Market costs depend on end use – specific details were not provided in many instances, but cost ranges were broadly identified as follows:</p> <ul style="list-style-type: none"> • 'General' unbound fill - €4.75 - €10 per tonne • Used in specific applications - €10 – €14 per tonne

¹⁶ LoW Codes identified as being accepted at facilities and used in the production of recycled aggregates are as follows:

17 01 01 Concrete	17 02 02 Glass	17 05 04 Soil and Stones	19 12 09 (Minerals (sand, stones))
17 01 02 Bricks	17 03 01 Bituminous Mixtures	17 05 06 Dredging spoil	19 12 12 Other wastes (mechanical treatment)
17 01 03 Tiles & Ceramics	17 03 02 Other bituminous mixtures	17 05 08 Track Ballast	20 02 02 Soil and Stones (garden/park waste)
17 01 07 Mixture of concrete, bricks, ceramics	17 03 03 Coal tar and tarred products	17 09 04 Mixed C&D waste	20 03 03 Street Cleaning residues

¹⁷ One operator identified a gate fee as low as €2-4 per tonne for mixed C&D, but this related to a specific end use where no processing was applied to the material, while another operator identified a gate fee of between €12 - €36 per tonne for 'inert and non-hazardous' material.

<p>Material identified as being produced for 'low grade' applications, e.g., farm road and not produced to CE certification requirements, were identified as having a market value of €4 – 10/tonne, dependent on location.</p> <p>Data on <i>production costs</i> was somewhat limited, but where provided, a consistent value of €4.50 to €6/tonne was identified by a number of operators when producing material under EN13242 & SR21 to various classifications.</p> <p>One respondent noted costs of €2/tonne that can apply in relation to compliance with technical standards and certification.</p>	
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Discussion

Market values of recycled aggregate and the wide range of virgin aggregates are broadly comparable, with materials being produced and used in similar applications commanding similar market values. However, given the gate fee element of the acceptance of waste materials as applies to recycled aggregate, these materials are currently likely to be more profitable for operators.

For example, taking a virgin aggregate material sold for €10/tonne, with a €5 production cost, the €5 profit represents a margin of 50%. However, a recycled aggregate used in a similar application, also sold for €10/tonne, with a similar production cost of €5/tonne, may also command a gate fee of €5/tonne, with gate fee therefore covering production costs, and a €10 (100%) profit margin applying. It is noted that the margin will increase significantly on high grade virgin products such as HPSV road chippings.

One recycled aggregate producer noted however that they would envisage a potential lowering of gates fee in the event of a sectoral wide EoW decision as there may be competition for input material between operators in the sector. However, on the other hand, virgin aggregate producers have highlighted the growing demand for 'green' material and the ability to demonstrate reduced embodied carbon content particularly in concrete products which may increase the market value of recycled aggregates in the future.

Costs associated with certification and external auditing (for System 2+ AVCP) are typically fixed, irrespective of scale of aggregate production – some aggregate producers retain in-house staff to undertake sampling/testing, while others retain external consultants for this. Costs also arise with external laboratory testing and auditing. Additionally, the production of recycled aggregates adds costs associated with extra environmental testing, which is not required for virgin aggregate production.

CERTIFICATION	
<p><i>Certification is primarily applicable to the virgin aggregates market, given the requirements laid down in the Construction Products Regulation – however, operators currently producing recycled aggregates under existing end-of-waste (EoW) decisions are required to produce material in compliance with appropriate standards and legislative requirements.</i></p>	
Virgin Aggregates	Recycled Aggregates
<p>Based on engagement with respondents, there appears to be widespread awareness of and adherence to the requirements of the Construction Products Regulation, in respect of the requirements of appropriate standards and specific legislative obligations e.g., employing appropriate quality assurance systems (FCPs, AVCPs), preparing DoPs, notified body oversight, providing appropriate documentation etc.</p> <p>Respondents indicated that the combination of their legal obligations under CPR, and their customer demands in terms of supplying compliant 'CE marked' material, have transformed the industry in terms of regulatory oversight and control.</p> <p>It is evident however, that there remains a demand for 'low grade' material (such as 'quarry run') for certain application e.g., farm road, and forest roads that is being met by a number of quarry operators and which is not CE marked. The availability of such material can depend on the 'stage' of the quarry operations for example, after topsoil clearance where the first level of exposed rock may be poorer quality (quarry run), or where lower grade deposits are encountered during extraction. Of the responses received, this material could comprise on average 5 -15% of a quarry output but this was very location driven. In some instances, uncertified material was indicated as being as high as 40%.</p> <p>The majority of materials produced by respondents under CPR were produced in adherence with EN13242 & SR21, broadly described as:</p> <ul style="list-style-type: none"> • Annex E material - unbound granular fill (hardcore) for use under concrete floors and footpaths; • Crushed stone – single sizes or graded; and • Granular material for sub-bases, drainage, road pavements. 	<p>Responses regarding certification can largely be classified in three ways:</p> <ol style="list-style-type: none"> 1. Those where operators produce material that is not certified and where little consideration is given to certification; 2. Those where operators produce material that is not certified but are aware of requirements and have undertaken some level of product analysis/assessment; and 3. Those operators producing material in accordance with relevant standards and certification requirement (mostly, but not limited to, entities with EoW decisions in place). <p>A number of respondents were of the opinion that certification was not required given the applications in which recycled aggregates are being utilised i.e., haul roads, agricultural roads, driveways etc.. Other respondents outlined that the requirements in relation to certification are being driven by engineers overseeing specific projects in which recycled aggregates are being utilised.</p> <p>A number of respondents are producing materials from recycled aggregates in accordance with EN13242 or EN13285, and applying FCP and System 2+ AVCP, in accordance with the requirements of their EoW decisions, and the material is generally marketed as a '6F2' classification.</p> <p>One operator who does not have an EoW decision is producing certified material in accordance with EN13242 (with FCP and System 2+ AVCP), with the material being marketed as a '6F2' and a 'Clause 803' classification.</p>

<p>Some respondents also produced material in accordance with EN12620 & SR16 and EN13043& SR17, described as:</p> <ul style="list-style-type: none"> • Granular material for concrete and wet mix macadam <p>as well as aggregate for mortar, in accordance with EN13139 & SR18.</p>	
<p>Discussion</p> <p>The virgin aggregates market operates within the scope and extent of the Construction Products Regulation, producing CE marked materials for use in a wide range of civil engineering and construction related applications. All operators surveyed were fully aware of the regulator requirements and of their obligations, while noting that customer demand was a significant driver in the improved changes of the industry, in terms of compliance. There was anecdotal reference made to a low number of small-scale operators still 'getting to grips' with compliance requirements, but which were considered the exception rather than the rule.</p> <p>A current practice that exists is where material is produced for certain 'low grade' applications e.g., farm, windfarm or forestry roads but not being produced in accordance with a hEN or being CE marked. While it is clear that some demand exists for this type of material in certain locations, it is likely reasonable to conclude that such a demand is localised, limited and represents only a small fraction of the virgin market. This is mirrored in the current recycled aggregates markets where such material is also being used in these types of applications, being generally marketed to a specification, but without consideration of relevant certification requirements (i.e. called 6F2, but not CE marked under EN 13242).</p>	

PRODUCT CLASSIFICATION	
<p><i>The classification of aggregate products combines general industry terminology with specifications laid down in specified harmonised standards, standard recommendation (SR) documents and other wider industry specification, notably Transport Infrastructure Ireland (TII) requirements.</i></p>	
Virgin Aggregates	Recycled Aggregates
<p>Specific classifications of virgin aggregates identified by respondents include those :</p> <p>Produced under EN13242 &SR21, described as:</p> <ul style="list-style-type: none"> • Annex E material: <ul style="list-style-type: none"> • T0, T1, T2, T3; • Crushed stone: <ul style="list-style-type: none"> • single sizes 6 mm to 100mm; • Graded material: <ul style="list-style-type: none"> • 4 inch down, 2 inch down, grits; • Series 800: <ul style="list-style-type: none"> • Clause 803; • Clause 804 ; • Series 600: <ul style="list-style-type: none"> • 6F2 (and others). <p>Produced under EN12620 & SR16 and EN13043 & SR17, described as:</p> <ul style="list-style-type: none"> • 'General' materials <ul style="list-style-type: none"> • Dust up to 30mm; • Series 800 <ul style="list-style-type: none"> • Clause 808; • Clause 810 	<p>Materials were identified by respondents either in terms of the end use/application in which recycled aggregates are used or in terms of a broad general classification.</p> <p>Where a product classification was identified (irrespective of whether the material is produced under certification), the primary classification used is '6F2'¹⁸, likely due to the provision with this specification for the use of recycled aggregates of up to 50%. As identified previously, in one instance, material is being classified as 'Clause 803'¹⁹, which again allows for the use of recycled aggregate materials.</p> <p>Respondents provided general opinion as to other product classifications that they felt recycled aggregates could potentially be used in, these being Series 500²⁰ (503 & 505) and other Series 800 classes (Clause 804), as well as broader application descriptions related to grade size e.g., 3 inch clean, 4 inch, 30 mm down. Some respondents also expressed a growing interest in the use of recycled aggregates in concrete.</p>

¹⁸ From Transport Infrastructure Ireland (TII) "Specification for Road Works Series 600 -Earthworks"-- where 6f2 is identified as 'selected granular fill' and being "*Crushed rock (other than argillaceous rock) and crushed concrete. Recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders*".

¹⁹ From Transport Infrastructure Ireland (TII) "Specification for Road Works Series 800 - Road Pavements - Unbound and Cement Bound Mixtures" (WITHDRAWN August 2022)-- where Clause 803 is identified as 'Granular Material Type A' and where "*Type A granular material shall be gravel, crushed rock, or recycled crushed mixed concrete aggregates as defined in Annex A of IS EN 13285, including recycled coarse aggregate complying with clause 801.3.*"

²⁰ From Transport Infrastructure Ireland (TII) "*Specification for Road Works Series 500 - Drainage and Service Ducts*"

<p>Materials used in higher grade applications such as HPSV road chippings.</p>	
<p>Discussion</p> <p>From a product classification perspective, it is important to note that material produced in accordance with a particular hEN can be further classified in a range of particular specifications i.e., the geometric, physical, chemical and durability characteristics of the material (determined in accordance with the hEN). These specifications can apply to a material that is then, for example crushed, graded, and sized to the requirement of a range of different specifications. Aggregates can therefore be classified on the basis of their allowance within the scope of a particular hEN standard and the relevant specification.</p>	

QUALITY SYSTEMS & COMPLIANCE	
<p><i>The objective of this table is to identify:</i></p> <ul style="list-style-type: none"> • <i>the application quality systems, control and accreditation that may be in place; and</i> • <i>the nature and frequency of product compliance inspections, where these have occurred.</i> 	
Virgin Aggregates	Recycled Aggregates
<p>Quality systems applied by producers of virgin aggregates centre on the factory product controls²¹ (FPCs) that are required to be in place, where products are produced in accordance with the Construction Products Regulation.</p> <p>All respondents identified that they produce virgin aggregate under 'NSAI' approval – this is taken to refer to the fact that all respondents identified that they produce material in accordance with the various hENs that specify the System 2+ AVCP i.e., initial inspection of the plant and FPC procedures in place, followed by annual audit, by the notified body, being the NSAI in these instances. Thus, all operators surveyed producing virgin aggregate materials have 'quality' systems, in the form of FPCs, in place, that are subject to third party oversight. However, this does not include non-certified, low-grade material that may be produced.</p> <p>In terms of compliance assessment, approximately two-thirds of respondents have, to date, been subject to a market surveillance inspection, to determine compliance with the requirements of the Construction Products Regulation (as per the campaign described in Section 2.4.2 previously). General feedback received in relation to these inspections was that the operators welcome the level of regulatory oversight, that the inspections were thorough, and the inspectors were well briefed.</p>	<p>Those operators producing CE certified material apply a quality assurance system as required by the applicable standard(s), which include FPCs and 3rd party (notified body) oversight.</p> <p>Other respondents referred to the requirement to maintain a quality management system (QMS) as part of their waste authorisation (permit or licence).</p> <p>Those respondents producing CE material fall within the compliance requirement of the Construction Product Regulation and will be subject to market surveillance in accordance with the regulation.</p>

²¹ 'Factory production control' is the means by which to define the quality system which producers are required to operate to demonstrate ongoing conformity of their product to the relevant European Standard

Discussion

The aspect of quality systems within the virgin markets is 'covered' by the FPC requirements of the Construction Products Regulation, which, for all respondents engaged with, is subject to AVCP System 2+ and therefore 3rd party notified body oversight. While it is entirely possible that an operator can produce material in accordance with the Construction Products Regulation under AVCP System 4 only (i.e., self-declaration with no 3rd party oversight), such aggregates will only be utilised in 'non-Annex E' applications under EN13242 & SR21.

4 Summary of Main Findings

Consultation with the sector has highlighted a clear demand for recycled aggregates, driven by a desire not only to manage existing reserves but by procurement processes in the private and public sector seeking 'green materials'. It was identified that the ability to demonstrate the use of recycled aggregates in products used in civil/construction projects is becoming of significant interest to customers, from a sustainability and embodied carbon perspective, driven by the likes of LEED and BREEAM, such that the ability to produce an Environmental Product Declaration (EPD) for such products is being required. Given the high-end use of this recycled material, its certification is a prerequisite. To this end, it was identified that the potential exists for (1) there to be an increased demand for recycled aggregates due to its positive environmental performance and (2) for this to realise an increased value for this material.

The regional assessment conducted as part of this study, identifies the Dublin region as where c. 40% of national civil and construction related activity occurs, and accordingly where the highest demand for aggregates exists. While extensive national aggregate reserves exist throughout Ireland, reserves of specific aggregates such as high-quality sand and high PSV aggregates are nationally limited.

Operators producing, or intending to produce, recycled aggregates have identified 'unbound uses' as being the primary current/intended application for these materials, where the use of recycled aggregates is provided for in the relevant specifications that exist when marketing aggregates products for these applications. The sector would also consider bound uses feasible with one producer conducting internal trials using primarily crushed concrete recovered aggregates in both unbound fill and concrete applications confirming positive performance when compared to virgin aggregates, noting a slight increase in cement requirement when using crushed concrete aggregates in concrete production.

The study found that current market values of recycled aggregate and the wide range of virgin aggregates are broadly comparable, with materials being produced and used in similar applications commanding similar market values. However, given the gate fee element of the acceptance of waste materials as applies to recycled aggregate, these materials are currently likely to be more profitable for operators. Costs associated with certification and compliance are relevant cost factors also.

One recycled aggregate producer noted that they would envisage a potential lowering of gates fee in the event of a sectoral wide EoW decision (due to competition for input material between operators in the sector). However, some virgin aggregate producers believe that the future demand for recycled aggregates may outstrip their availability as a replacement for virgin aggregates. While it was highlighted that there are significant quantities of C&D waste currently stockpiled in the absence of national EoW criteria, feedback from the sector indicated that the supply of recycled aggregates will comprise only some 5% of future overall aggregate demand in Ireland, in turn potentially resulting in an increased market value for these products, particularly given their green credentials, as noted above.

The virgin aggregates market operates within the scope and extent of the CPR, producing CE marked materials for use in a wide range of civil engineering and construction related applications. Customer demand was the key driver in terms of compliance. Some virgin material continues to be produced for certain 'low grade' applications e.g., farm, windfarm or forestry roads and is not CE marked. While it is clear that some demand exists for this type of material in certain locations (particularly outside the Dublin Region), it is likely reasonable to conclude that such a demand is localised, limited and represents only a small fraction of the virgin market.

Engagement with the sector highlighted the following additional observations:

1. There was a misconception in parts of the sector that the national EoW criteria will remove the obligation of producers to hold and comply with the relevant waste authorisation(s) or any other National or European legislation which may apply when transporting, storing, or processing waste. On the other hand, two producers were in the process of obtaining planning permission and consents for the acceptance of waste aggregate in anticipation of the national EoW.
2. The importance of good source segregation of C&D material on the site of origin was highlighted as a very important factor in the preparation of a consistent, quality-controlled material.

In conclusion, it can be clearly stated that:

- A strong future demand for the use of recycled aggregates is demonstrated, in the event of development of EoW criteria, with the 'green' profile of these materials being a relevant factor in the establishment of this demand;
- A comprehensive legislative regime exists, in the form of the Construction Products Regulation (and REACH), to govern the production of recycled aggregate materials in accordance with relevant standards and specifications that apply;
- The economics of the production of recycled aggregates is supported by the gate fee element of the financial model, which is broadly considered as being at an equivalent rate, such that the gate fee typically is seen to cover processing costs of recycled aggregates; and
- Both the waste operators and virgin aggregate producers expressed a strong desire to see the establishment of relevant EoW criteria in relation to recycled aggregates in order to satisfy the emerging demand that exists, in terms of having a clear regulatory framework to oversee the management and subsequent use of recycled aggregates.

Appendix A – Construction Products Legislation

Regulation (EU) No 305/2011 (Construction Products Regulation or ‘CPR’) came into force in Ireland in 2013 (S.I. No. 225 of 2013). The main purpose of the CPR is to allow movement of construction products across the Member States of the European Union by implementing the following:

- Harmonised technical specifications. There are currently more than 450 harmonised standards for construction products (hENs);
- An agreed system of attestation of conformity and verification of constancy for each product family (as set out in the harmonised technical specifications);
- A framework of notified bodies; and
- A requirement for all construction products to be CE marked.

‘Construction products’ are defined as *“any product or kit which is produced and placed on the market for incorporation in a permanent manner in construction works or parts thereof and the performance of which has an effect on the performance of the construction works with respect to the basic requirements for construction work”*.

In the context of the use of aggregates in construction, ‘construction works’ means *“building and civil engineering works”* – therefore, it can be considered that any aggregates permanently used in building or civil engineering works come within the scope of the CPR.

Annex 1 of the CPR outlines the ‘Basic Requirements for Construction Works’, such that construction products must be fit for their intended purpose – these requirements being:

1. Mechanical resistance and stability;
2. Safety in case of fire;
3. Hygiene, health and the environment;
4. Safety in use;
5. Protection against noise;
6. Energy economy and heat retention; and
7. Sustainable use of natural resources.

These ‘basic’ requirements mirror the ‘essential’ requirements as listed in the Construction Products Directive (CPD), with the addition of a further requirement – that being *Point “7. The sustainable use of natural resources”*, which sets the requirement that ensures, inter alia, the *“reuse or recyclability of the construction works, their materials and parts after demolition”*. Such a requirement strongly supports efforts to maximise the recovery of waste aggregates.

The CPR requires that the ‘essential characteristics’ (i.e., as related to the basic requirements) of products outlined in either technical specifications (harmonised European Standards (hENs) or European Technical Assessments (ETAs)). Furthermore, national provisions can outline essential characteristics or limits. Such national provisions are set out within “Standard Recommendations” (SRs) in Ireland.

Annex ZA of a hEN outlines the Essential Requirements for the particular products covered by that standard and identifies the condition applicable to applying the CE mark to the products. Where a product is not covered by a hEN, the ETAs is a voluntary, alternative method for CE marking that can be applied to a product, with the details of the ETA being set out in a European Assessment Document (EAD).

Where a manufacturer places a relevant construction product on the EU market, they must ensure that the product has been produced in conformity with the requirements of the hEN or ETA, issue a Declaration of Performance (DoP) with the products and ensure that the CE marking is affixed or displayed with the product.

Further responsibilities of the manufacturer include:

- Keeping documentation for 10 years;
- Ensuring consistent product production;
- Monitoring the product on the market;
- Ensuring the product is identifiable;
- Indicating a contact point on the product;
- Providing instructions and safety information;
- Taking corrective actions where necessary; and
- Cooperating with requests from national authorities.

The CPR is currently under review at a European level and a revised regulation has been proposed, which aims to further improve the function of the EU single market provisions and to enhance the sustainability of construction products²².

Quality control of aggregates under the CPR

Each hEN outlines the means by which conformity with its requirements is to be demonstrated. This takes the form of an initial type test to establish the raw materials properties with respect to end use, followed by the establishment of factory production controls (FPCs), which are specified in the annexes of the hENs.

FPCs broadly follow a quality management system approach and address the following aspects:

- Organisation:
 - Responsibility and authority;
 - Management representative;
 - Management review;
- Control Procedure:
 - Control Manual;
 - Document & Data control;
 - Sub-contract services;
 - Knowledge of raw material;
- Management of Production;
- Inspection and test:
 - General;
 - Equipment;
 - Frequency and location of inspection, sampling and tests;
- Records;
- Control of non-conforming product;
- Handling, storage and condition in product areas;
- Transport and packaging:
 - Transport;
 - Packaging; and
- Training of personnel.

In relation to frequency of sampling and testing of materials, the FPCs lay down a minimum test frequency for the different material properties, which typically follow a weekly, monthly, bi-annual or annual basis.

Additionally, hENs may specify certain systems of conformity assessment that apply to the use of aggregates covered by the hEN in different applications, known as the Attestation and

²² Further detail available here: https://single-market-economy.ec.europa.eu/sectors/construction/construction-products-regulation-cpr/review_en

Verification of Constancy of Performance (AVCP), with different levels of AVCP applying. There are five levels or ‘systems’ of AVCP that can be applied, these being System 1+, 1, 2+, 3, & 4, which vary in the extent of associated actions that must be undertaken by the manufacturer and a notified body²³ (where applicable). In relation to aggregate type materials, AVCP systems 2+ and 4 are the systems generally referenced, as outlined in Table A1 below. Table A1 summarises the actions required in relation to System 2+ and System 4.

Table A1: Systems of Assessment and Verification of Constancy of Performance

Tasks		System of Assessment and Verification of Constancy of Performance	
Declaration of the performance of the essential characteristics of the construction product by the manufacturer on the basis of the following items:		2+	4
For the manufacturer: Determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product.		Yes	Yes
Factory production control.		Yes	Yes
Further testing of samples taken at a factory (quarry) according to prescribed test plan.		Yes	No
Tasks for notified factory production control certification body	Initial inspection of the manufacturing plant and of factory production control.	Yes	No
	Continuous surveillance, assessment and approval of factory production control.	Yes	No

The AVCP ‘System 4’ is effectively a ‘self-conformity’ process where the manufacturer has responsibility for the development of the FPCs and undertaking initial type testing, with there being no requirement for notified body involvement.

In certain applications, the hEN can specify that a AVCP ‘System 2+’ is required, whereby the FPCs developed by the manufacturer are subject to inspection and continuous surveillance and approval by a notified body. Such surveillance typically takes the form of an annual audit by a notified body and can be supplemented by input by a retained independent geological professional.

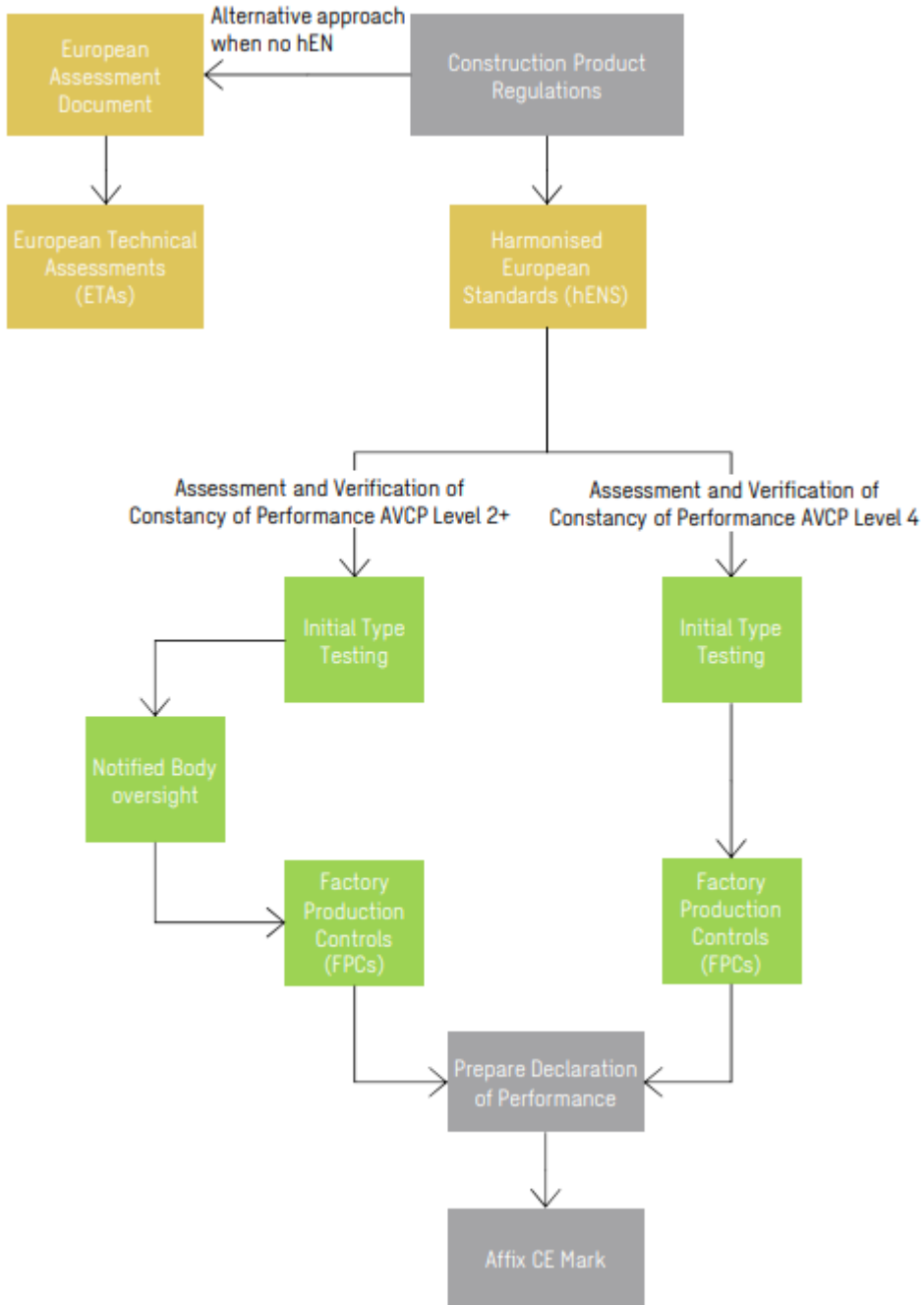
Notified bodies are designated by EU member countries and are the only recognised third party carrying out the assessment of performance of construction products. Notified bodies can also certify constancy of performance and certify factory production control. There are currently two notified bodies in Ireland²⁴ for aggregates for uses with high safety requirements (as per the NANDO Notified bodies list):

- National Standards Authority of Ireland (NSAI)
- CTI-CEM International Ltd.

²³ An organisation designated by an EU country to assess the conformity of certain products before being placed on the market.

²⁴ As of October 2022

Figure A1: Regulatory and Quality Control Regime



Appendix B – REACH Regulation

Regulation (EC) 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) lays down certain rules relating to the use of substances, with the aim of ensuring a high level of protection of human and environmental health, while allowing free movement of substances and supporting innovation and competitiveness. Where more than one tonne of a substance is placed on the market by a manufacturer or importer, a registration must be submitted to the European Chemicals Agency (ECHA).

While waste material is not covered by REACH, where waste ceases to be a waste and becomes a product (or substance) REACH requirements will apply to the recovered material in the same way as to any other substance, mixture or article manufactured, produced or imported in the EU.

ECHA has developed a guidance document²⁵ on waste and recovered substances. The guidance provides clarification on *“the status of materials that have been recovered, that have ceased to be waste and that are subject to REACH obligations for substances, mixtures or articles. The guidance explains on the basis of which principal information a recovery operator may be able to benefit from the exemption under Article 2(7)(d) of REACH: 2.7. The following shall be exempted from Titles II, V and VI: [...]:*

d) Substances, on their own, in mixtures or in articles, which have been registered in accordance with Title II and which are recovered in the Community if:

- (i) the substance that results from the recovery process is the same as the substance that has been registered in accordance with Title II; and*
- (ii) the information required by Articles 31 or 32 relating to the substance that has been registered in accordance with Title II is available to the establishment undertaking the recovery.”*

An important factor in considering the extent of applicability of REACH is whether a material is considered to be an ‘article’²⁶ or a ‘substance’²⁷. The guidance provides general information in relation to recovered aggregates classification as a substance or article, however, does not provide detailed synopses of REACH requirements for recycled aggregates.

Determining what REACH obligations may apply to waste derived aggregate materials is beyond the scope of this report. The Health and Safety Authority (HSA) are the competent authority for REACH in Ireland and should be consulted directly.

²⁵ ECHA, Guidance on waste and recovered substances – available at:

https://echa.europa.eu/documents/10162/2324906/waste_recovered_en.pdf/657a2803-710c-472b-8922-f5c94642f836

²⁶ Where an ‘article’ is: *An object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition*

²⁷ Where a substance is: *A chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition*