

This Report has been cleared for submission to the Board by Programme Manager Warren Phelan.

Signed: Warren Phelan

Date: 06 April 2023



OFFICE OF ENVIRONMENTAL SUSTAINABILITY

Inspector's Report on a Recommendation for End-of-Waste Criteria

To:	Board
From:	Kate Clark, Inspector
Approved for the Board By:	Warren Phelan, Programme Manager
CC:	Caitríona Collins, Senior Inspector
Date:	6 th April 2023
File Reference:	EoW-N001/2023
Re:	Decision under Regulation 28(2) of the European Union (Waste Directive) Regulations 2011-2020 that recycled aggregates can cease to be waste.
Supporting Documents:	<ul style="list-style-type: none">• <i>Recommended National End-of-Waste Decision for Recycled Aggregates</i>; (hereafter referred to as the "recommend criteria");• <i>Recommended Explanatory Note on National End-of-Waste Decision for Recycled Aggregates</i>;• <i>SWECO 2023, Analysis of Aggregates Market in Ireland- In support of the development of National End-of-Waste Criteria</i>;• <i>Geosyntec Consultants Ltd. 2023, End-of-Waste Technical Information - Development of Pollutant Limit Values for Recycled Aggregate Products</i>; and• 30. no submissions on the draft criteria.

Executive Summary:

To address demand, support the construction sector transition to a circular economy, and manage Agency resources efficiently, the Circular Economy Regulation Team has developed recommended National end-of-waste criteria for recycled aggregates. The recommended criteria are the first of its kind in Ireland. Accordingly, it is considered that these criteria should be precautionary, with a level of control built in.

The purpose of this paper is to set out the approach taken in the development of the criteria and to demonstrate that all legislative requirements for establishing National end-of-waste criteria have been met. The criteria have been developed through extensive consultation and collaboration with stakeholders to ensure they are robust and fit for purpose.

The scope of works included the completion of a detailed environmental and human health risk assessment to derive pollutant limit values for recycled aggregates. A number of restriction and limitations protective of the environment and human health arose from the risk assessment undertaken. In addition, based on consultations with a number of competent authorities (including the Department of Housing, Local Government and Heritage) and other stakeholders (including the Irish Waste Management Association), the recommended criteria include restrictions on the structural use of recycled aggregates. The specified purposes under which recycled aggregate are recommended as suitable for use in are unbound (granular) applications and some limited bound applications.

Registration, storage and record keeping requirements have been included within the criteria to support enforcement, monitoring and surveillance activities. The criteria also include reporting requirements to enable data capture and statistical reporting in relation

to end-of-waste.

Stakeholders were provided with an opportunity to make submissions on the draft criteria which were made available for public consultation. Generally, the draft criteria were openly welcomed and supported, however some submissions raised concerns in relation to the number of restrictions and limitations within the criteria. These concerns were focused mainly in relation to structural restrictions and a number environmental limitations. The recommended criteria retain most of the structural and environmental limitations presented within the draft criteria, however a number of minor amendments, clarifications and additional definitions have been included.

The recommended criteria balance the need to provide for circular options for recycled aggregates, while taking account of scientific evidence, environment and health risk, as well as stakeholder inputs and concerns.

Decision:

The Board are asked to APPROVE the recommended end-of-waste criteria for recycled aggregates as set out in the enclosed recommended criteria.

1. INTRODUCTION

End-of-waste is a means of determining the point at which, for the purposes of environmental protection, a material need no longer be classified as waste when it has undergone a recycling or other recovery operation and complies with specific criteria to be developed in accordance with Regulation 28(1) and Regulation 28(2) of the European Union (Waste Directive) Regulations 2011-2020 (the Regulations). Regulation 28(2) specifies that:

"Where criteria have not been set at Union level, the Agency may establish detailed criteria on the application of the conditions laid down in paragraph 1 to certain types of waste. Those detailed criteria shall take into account any possible adverse environmental and human health impacts of the substance or object..."

The Circular Economy Regulation Team have undertaken work to develop recommended National end-of-waste criteria for recycled aggregates. This Inspector's Report:

- sets out the approach and steps undertaken in the development of the criteria in order to satisfy regulatory requirements;
- summarises and provides response to stakeholder submissions; and
- supports and provides context for the recommended National end-of-waste criteria for recycled aggregates.

2. BACKGROUND

According to the EPA National Waste Statistics Summary Report for 2020¹, the quantity of Construction & Demolition (C&D) waste generated and collected in Ireland in 2020 was 8.2 million tonnes. C&D waste represents the largest proportion of Ireland's overall waste, with C&D reported to represent approximately 50% of the overall waste by weight in 2020. The overall composition of C&D waste in 2020 was reported as 84% soil and stone waste, followed by waste concrete, brick, tile and gypsum (6%) and mixed C&D waste (5%).

Data from the CSO shows that Ireland's domestic material consumption was over 121 million tonnes of materials in 2019. The largest single component of domestic extraction was crushed rock aggregates which was over 30 million tonnes, followed by sand and gravel extraction at over 20 million tonnes. This data illustrates the extent of extraction of aggregates materials for construction projects in Ireland.

The vast majority (95%) of C&D waste underwent final treatment in Ireland in 2020; Only five per cent was exported abroad for final treatment. Most of the C&D waste was backfilled (82%), 8% was recycled with 10% sent for disposal. Less than 1% was sent for energy

¹ [EPA 2022, National Waste Statistics Summary Report for 2020](#)

recovery. The dominance of backfilling as a treatment operation reflects the large proportion of soil and stones in C&D waste.

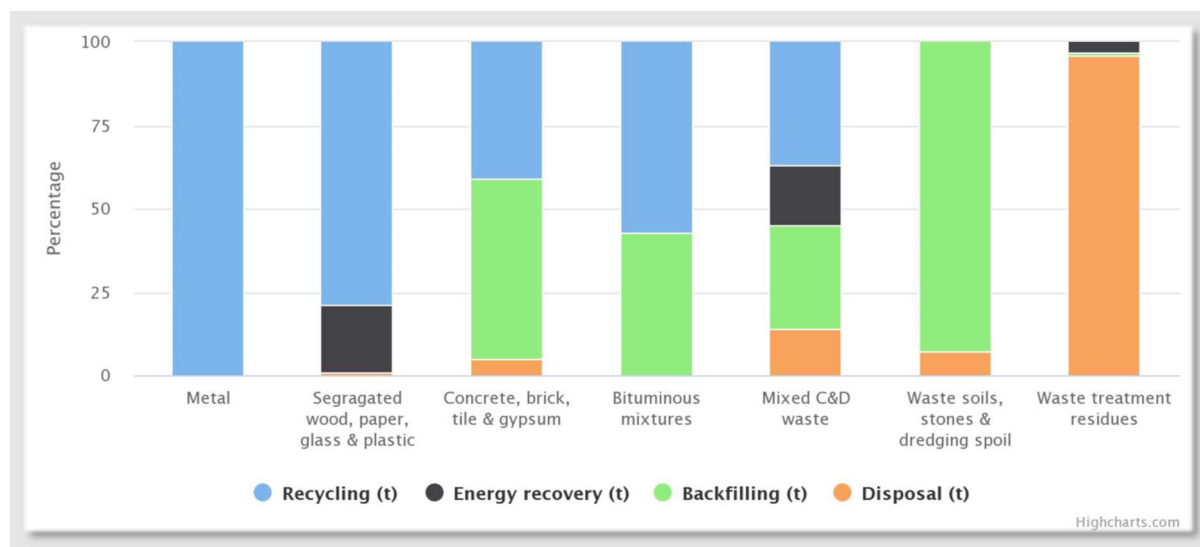


Figure 1: Final Treatment Operation by C&D waste fraction 2020 (Source EPA 2022)

End-of-waste sits in the middle band (recycling/ recovery) of the waste hierarchy and is generally a preferable option over recovery via backfilling or energy recovery and, of course, disposal. It is important to note that Ireland currently has limited capacity for backfilling/ landfilling and as such there is a strong demand for alternative, more circular solutions.

In recent years there has been increasing emphasis on reducing C&D waste and improving circularity of construction products and materials. This has been prioritised in the Waste Action Plan for a Circular Economy², Housing for All Action Plan³ as well as the Circular Economy Programme⁴.

Currently, there are 28 no. single case end-of-waste applications for C&D recycled aggregates, plus 2 no. industry led National applications, on hand with the Agency. Four single case decisions have been made by the Agency in relation to recycled aggregates to date. Recycled aggregates account for approximately 56% of all end-of-waste applications on hand. This level of application to the Agency is unsustainable. Considering the available resources, it is currently not feasible to assess single case decisions on hand in a timely manner. In addition, as each single-case decision is assessed on its own merits, this can lead to considerable inconsistencies between one decision and another. This presents significant challenges for stakeholders, including:

- uncertainty for industry operators for strategic business planning and investment;
- enforcement issues for regulators; and
- Ireland’s ability to achieve our circular economy ambitions.

Accordingly, the Circular Economy Regulation Team has set about making a significant strategic change to develop National end-of-waste for recycled aggregates, to address demand and support the circular economy.

3. SCOPE OF WORKS FOR THE DEVELOPMENT OF NATIONAL CRITERIA

3.1 APPROACH

Regulations 28(1) and 28(2) set out specific requirements which must be met in order for “waste which has undergone a recycling or other recovery operation” to be considered to have ceased to be waste. These conditions have set the basis for the scope of work undertaken to develop National end-of-waste criteria for recycled aggregates.

² Waste Action Plan for a Circular Economy (www.gov.ie)

³ Housing for All - a New Housing Plan for Ireland (www.gov.ie)

⁴ Circular Economy Programme (www.epa.ie)

In addition to the above conditions, a number of additional requirements were also identified as necessary to support the implementation of the end-of-waste criteria. The approach taken by the Agency to address the conditions of Regulation 28 and additional requirements is summarised in *Table 1* below. *Table 1* also includes a cross-reference to the recommended criteria which address each condition/requirement.

Table 1: Summary of approach to address the conditions of Regulation 28 and additional requirements

REQUIREMENTS	APPROACH					RECOMMENDED CRITERIA
	DERIVATION OF POLLUTANT LIMITS	MARKET ANALYSIS	STAKEHOLDER CONSULTATION	REVIEW OF LITERATURE AND DECISIONS	STAKEHOLDER CONSULTATION ON DRAFT	
Regulation 28(1)						
i. Used for specific purposes		✓	✓	✓	✓	Section 4 & Annex II
ii. Market or demand exists		✓	✓	✓	✓	Section 4 & Annex II
iii. Meets technical requirements and product legislation		✓	✓	✓	✓	<i>Section 3.1(d) and Annex I (Parts 3.1 to 3.3)</i>
iv. Will not lead to adverse environmental or human health impacts	✓				✓	<i>Section 3.1(d & e) and Annex I (Parts 3.4 to 3.7, Tables 2 to 4 and Part 4)</i>
Regulation 28(2)						
a. Permissible inputs	✓			✓	✓	<i>Section 3.1(b) and Annex I (Part 1)</i>
b. Recovery process	✓		✓		✓	<i>Section 3.1(c) and Annex I (Part 2)</i>
c. Meets quality criteria		✓	✓	✓	✓	<i>Section 3.1(d & e) and Annex I (Parts 3.1 to 3.7, Tables 2 to 4 and Part 4)</i>
d. Quality Management System	✓	✓	✓	✓	✓	<i>Section 3.1(g) and Section 6</i>
e. Statement of conformity			✓	✓	✓	<i>Section 3.1(g) Section 5 and Annex III</i>
Additional criteria						
Storage			✓	✓	✓	<i>Section 3.1(f) and Annex II, Part 5</i>
Register & Reporting			✓		✓	<i>Section 3.1(g) and Section 7</i>
Compliance			✓		✓	<i>Section 3.1(g) and Section 9</i>
Entry into Force					✓	<i>Section 8</i>

3.2 DRAFT CRITERIA

Following completion of the above scope of work and based on the findings, a draft criteria document and an accompanying explanatory note were drafted. The draft criteria and accompanying explanatory note were published and made available for public consultation between 31st January and 24th February 2023.

3.3 SUBMISSIONS

A total of 30 no.⁵ submissions were received in response to the public consultation on the draft criteria.

In addition, on the 21st February 2023, during the above referenced consultation period on the draft criteria, three targeted stakeholder engagements (webinars) were held. Separate webinars were held for regulators, waste operators and construction and demolition industries. The purpose of the webinars was to provide an opportunity for questions and answers, to gather feedback in relation to the criteria and to identify any critical issues with the criteria. There was approximately 200 no. attendees across the three webinars.

Taking into account stakeholder submissions and comments, where appropriate, amendments have been made to the draft criteria within the recommended criteria.

3.4 REPORT STRUCTURE

The report is structured so to separately assess each of the above conditions and requirements set out in *Table 1*. As Regulation 28(2)(c) mirrors Regulation 28(1)(iii) on technical requirements and product legislation and Regulation 28(1)(iv) on no overall environmental or human health harm, this condition has not been not addressed individually.

Due to the fact that many of the submissions raise common key issues, individual submissions are not presented. The key issues raised within the submissions are extracted and discussed under the relevant sections of this report. The comments and queries raised by stakeholders during webinars are also included as submissions within the key issues. An inspector's response to the key issues by way of discussion is provided. All amendments made to the draft criteria in response to issues raised are clearly identified in the responses provided.

3.5 RECOMMEND CRITERIA AND SUPPORTING DOCUMENTS

The recommended criteria have been drafted to mirror EU level end-of-waste criteria and the requirements of Regulation 28(2). The recommended criteria, as by their nature, are somewhat legalese. Therefore, to support implementation, an explanatory note is presented to accompany the criteria. It is recommended that both documents are read in conjunction.

The recommended criteria have been written in such a way so not to require regular updating as a result of changes to legislation or harmonised aggregate product standards. It is intended that the explanatory note will be a dynamic document, to take account of any relevant changes to legislative or harmonised aggregate product standards where possible. It will also specify any additional requirements subsequently set by the Agency to interpret or implement the criteria.

It is recommended that this Inspector's Report (IR) is read in conjunction with the recommended criteria and the explanatory note. Supporting documents and submissions are also provided for further reference.

⁵ Submitters include: TII x 2; IWMA; ARUP; IMS; ESB x 2; NSAI; Cork County Council (Waste Section); FIR, NSAI recycled Aggregates Panel; Kilsaran; WSP on behalf of Enva; Re-mine; Irish Plant Contractors Association; Institute of Geologist Ireland; Mayo County Council (Environment, Climate Change and Agriculture Section); Cora Consulting Engineers; Barnmore, SMART Test Solutions Limited; Thomas Fleming; Stream BioEnergy; Department of Transport; ICF; Silicate; CIF; Coillte; Irish Green Building Council; CCMA; and DHLGH.

4. SPECIFIC PURPOSE & MARKET AND DEMAND

Regulation 28(1)(a) requires that:

- "(i) the substance or object is to be used for specific purposes; and*
- (ii) a market or demand exists for such a substance or object."*

The presence of a market and demand is indicative that the material is used for specific purposes. Accordingly, these conditions have been grouped for assessment.

4.1 APPROACH

In order to satisfy these conditions, the specified use of recycled aggregates needs to be defined and the associated market or demand for that use must be demonstrated.

During initial scoping works it was proposed that the specified use would be for unbound uses of recycled aggregate only. During the development of the criteria, it was explored whether the criteria could also include for bound applications of recycled aggregates.

The following work and assessments were undertaken to satisfy the above conditions:

- a. Issue of questionnaire to industry stakeholders⁶;
 - 29 no. responses received;
- b. Market analysis of recycled aggregates via completion of 11 no. site visits⁷;
- c. Market analysis of virgin aggregates (including issue of questionnaire, online consultation and site visits);
- d. Completion of comparative analysis on markets for primary (virgin) vs secondary (recycled) aggregate, synopsis items (a) to (c) above, and associated reporting.

The SWECO report on the *Analysis of Aggregates Market in Ireland*⁸ prepared in satisfaction of these conditions is provided within supporting documentation to this report.

4.2 OVERVIEW & INSPECTOR'S ASSESSMENT

Firstly, in order to define what the specified uses of recycled aggregate are, it is important to understand what recycled aggregate is. Recycled aggregate has many different definitions depending on the application for use and the country in which it is used. In some Member States where end-of-waste is applied, the definition for recycled aggregate relates to the inputs from which it is derived. Denmark refers to "*sorted building and construction waste*". Italy provides a definition for "*recovered aggregate*". Whereas Austria mirrors the definition for recycled aggregates set out within harmonised aggregate product standards (often referred to as technical standards or harmonised technical standards (hENs)).

The harmonised aggregate product standards provide the following definitions:

- "*natural aggregate - aggregates from mineral sources which has been subject to nothing more than mechanical processing*";
- "*manufactured aggregate - aggregates from mineral origin resulting from an industrial process involving thermal or other modification*"; and

⁶ Questionnaire consultees include: all existing and previous end-of-waste applicants for recycled aggregates; Irish Concrete Federation, Irish Waste Management Association; Cement Manufacturers Ireland; Engineers Ireland; Irish Business & Employers Confederation; Irish Concrete Society; Construction Industry Federation and Local Government Management Agency.

⁷ Site visits included 5 no. licenced facilities, 5 no. permitted waste facilities (3 no. including active quarries) and 1 no. demolition site with permitted mobile crusher. Site visits included 2 no. facilities who currently hold single case end-of-waste decisions for recycled aggregates. Site visits included: Integrated Materials Solutions- Dublin; Shannon Valley Plant Hire-Meath; Ardinagh Construction & Waste Limited-Wexford; Enva-Laois; Walshestown Restoration Limited-Kildare; Beuparc Group- Meath; Marrakesh Ltd.-Wicklow; O'Connells Quarries-Clare; Lennon Quarries Ltd - Mayo; Kereen Quarries Ltd.-Waterford and a development site at Bellvelly Port- Cork.

⁸ SWECO 2023, Analysis of Aggregates Market in Ireland- In support of the development of National End-of-Waste Criteria

- *"recycled aggregate - aggregate resulting from processing of inorganic material previously used in construction".*

The recommended criteria provide for inputs of both inorganic construction material (concrete, tiles, brick and ceramics), and natural aggregate (from soil and stone, stone, rock etc.). They included material defined as recycled aggregate and as natural aggregate under the harmonised aggregate product standards. The recommended criteria also allow inorganic waste inputs from production residues (not previously used in construction), such as unused hardened concrete. Accordingly, for the purpose of clarity, the criteria provide a definition for recycled aggregate as:

" recycled aggregate means an aggregate which has resulted from the recovery of mineral wastes and which complies with the criteria laid down within this decision".

The specified purposes in the recommended criteria under which recycled aggregate can be used is defined for predominantly unbound (granular) uses with some limited bound uses. While it is evident that there is market and demand for uses of recycled aggregates in many bound applications, these have not been included within the scope of the criteria, for reasons discussed in *Section 7* below.

The SWECO report prepared in satisfaction of these conditions provides a detailed analysis of the market for primary (virgin) aggregates and secondary (recycled) aggregate. It also undertakes a comparison of these to demonstrate how recycled aggregates can access the aggregates market. The report clearly concludes there is a strong market for recycled aggregates in Ireland. It is recommended that the report is read in conjunction with this report for further expansion of these points.

There are numerous factors which demonstrate that recycled aggregate can be used for the purposes specified within the recommended criteria and which demonstrate that markets and demand exists for these products. These include, that:

- recycled aggregate is provided for and described within harmonised aggregate product standards and technical specifications;
- there is evidence through single case decisions in Ireland and practises in other Member States that recycled aggregate can meet applicable product specifications and can accordingly access the market;
- the presence of established recycling/recovery industry for recycled aggregate already exist in Ireland and other Member States;
- recycled aggregate is commonly used as aggregate in Ireland and other Member States;
- recycled aggregate can often be more economical and sustainable to produce than virgin aggregate, which in turn creates a high demand;
- recycled aggregates can be used as a direct replacement for virgin aggregate;
- there is significant emphasis in National legislation and policy for recycling and recovery of this material type;
- recycled aggregate presents as a sustainable product which may meet green procurement requirements in certain construction projects; and
- the revision of the Construction Products Regulation (CPR)⁹ *"may be a driver to foster recycling of CDW and act as a driver to establish minimum conditions for CDW when used in construction products"*¹⁰.

4.3 SUBMISSIONS

Submissions received on the draft criteria relating to market and demand and specified use, along with an inspector's response to each are detail below:

⁹ Construction Product Regulation (CPR) (EU No.305/2011)

¹⁰ [European Commission 2020, Study on Member States practices on by-products and end-of-waste: Final Report](#)

Issue No. 1- Additional Specified Uses	
Issue Details	A submission received requested that <i>Annex II, Section 2.1</i> of the draft criteria which specifies that <p style="text-align: center;"><i>"recycled aggregate that is produced in compliance with these criteria is not suitable for use as a growth medium in areas used for food production or livestock grazing"</i></p> be removed to allow recycled aggregates to be used as liming replacement (fertiliser).
Inspector's Response	The specified use of recycle aggregates as fertilisers (liming agents) was not assessed under the scope of the criteria and as such are not provided for within the criteria. Similarly, while there is a single case application on hand for recycled aggregates for use in cement production, this specified use does not come within the scope of the criteria. Specified uses are limited to those specified in <i>Annex II</i> , unless otherwise agreed by the Agency.
Issue No. 2 – Bespoke Criteria	
Issue Details	Submissions raised queries whether single case applications for recycled aggregates could continue to be made for criteria on a "bespoke" or site specific basis.
Inspector's Response	The intention of the National criteria was to avoid the need for assessment of numerous single case applications for similar purposes. As detailed in <i>Section 2</i> above the level of application to the Agency is unsustainable and resources available for assessment of such single cases are limited. In addition, the National criteria seek to introduce a level playing field that is easily enforceable. Single case decisions go against this aim in that they present variation due to their bespoke nature. That being said, while not encouraged, single cases may continue to be made to the Agency for recycled aggregates; However, such applications should be for specified uses and/or inputs outside the scope of the National criteria. Applications for such uses should provide strong evidence and justification for application outside the scope of the National criteria. A single case application should build on the criteria within the National criteria, particularly in relation to core criteria (e.g. QMS, statement of conformity etc.) which are not specific to the specified use of the material.
Related Submissions	
<i>Issue 11</i> , under <i>Section 7</i> below addresses submissions raised in relation to restrictions on structural use.	

4.4 INSPECTOR'S CONCLUSION & RECOMMENDED CRITERIA

I consider that conditions (1)(a) (i) and (ii) of Regulation 28 are satisfied. It has been clearly evidenced that there is a well-established market and strong demand for recycled aggregates in Ireland.

Section 4 and *Annex II* of the recommended criteria clearly set out the specified uses under which recycled aggregate can be used.

5. PERMISSIBLE INPUTS

Regulation 28(2)(a) requires that detailed criteria set by the Agency for end-of-waste shall specify:

"permissible waste input material for the recovery operation".

5.1 APPROACH

The following work and assessments were undertaken to define a suitable list of permissible inputs:

- a. Review of the National criteria set in other Member States, associated literature reviews and single-case recycled aggregate decisions issued by the Agency to date; and

- b. Consultation with the Office of Environmental Enforcement (OEE), National Waste Collection Permit Office (NWPCO), Waste Enforcement Regional Lead Authorities (WERLAs) and the EPA Circular Economy (CE) Waste Statistics team.

5.2 OVERVIEW & INSPECTOR'S ASSESSMENT

End-of-waste criteria, legislation and protocols for aggregates recovered from C&D waste have been established in a number of Member States (including but not limited to The Netherlands, Austria, Belgium (Flanders), France, Italy, Denmark, Germany, Croatia, Bulgaria and the United Kingdom (UK). For context, the descriptions below include a comparison against end-of-waste criteria for recycled aggregates within other Member States and the UK¹¹ where appropriate.

As with the definition of recycled aggregate, permissible inputs for recycled aggregate vary amongst Member States decisions. The Netherlands limits inputs to the "17" List of Waste (LoW) codes for "*construction and demolition wastes*" and do not include soil & stone inputs. Others, such as Austria and France, include "17" LoW codes, including soil & stone, and also allow for some limited inclusions of manufacturing inputs, as well as soil and stone from non-construction sources. The UK and Italy allow similar inputs as Austria and France with a few additional permissible inputs, including "19" codes for the "*mechanical treatment of waste*". Permissible waste inputs set out within *Table 1, Annex 1* of the recommended criteria are most aligned with the UK and Italian decisions. The recommended criteria do not allow bituminous mixtures (e.g. 17 03 02), whereas others such as Austria, France, Italy and the UK do. A detailed comparison of permissible waste inputs for recycled aggregates within different Member States is provided within *Appendix 1*.

The recommend criteria include as wide a list of inputs as reasonably possible in order to support circularity. However, it also conservatively excludes higher risks inputs that commonly present risk of contamination. The inputs include, predominantly "17 Construction and demolition wastes" LoW codes, some limited inclusions of manufacturing construction products under LoW codes "10 12" and "10 13", mining/ quarry waste gravel, rock and sand, waste soil and stone from gardens and parks (LoW coded 20 02 02), waste from mechanical treatment of "17" LoW codes (LoW Code 19 12 09) and waste code for the remediation of soil (LoW Code 19 13 02).

Literature widely emphasises that source separation is "*the first and crucial step for both re-use and recycling*".¹² As a rule of thumb, the cleaner the input, the cleaner the output, and the more likely the recycled aggregate is to meet quality criteria. The more mixed an input, for example a mixed C&D skip, the more likely that the material is going to need additional recovery steps such as washing in order to meet pollutant limits. Source segregation can greatly improve the likelihood of successful recovery of recycled aggregates. It is envisaged that the National decision will act as a driver for better source segregation whereby producers (waste operators) may charge higher gate fees for inputs that require additional processing/ treatment compared with well segregated material. Additionally, producers may refuse to accept poorly segregated C&D waste from suppliers.

¹¹ References for sources of information used in this section include:

- [European Commission 2020, Study on Member States practices on by-products and end-of-waste: Final Report;](#)
- [ECN 2017, End of Waste criteria for inert aggregates in Member States;](#)
- [Cinderela 2021, End of Waste criteria protocol for waste used as aggregates;](#)
- [Austrian End-of-Waste Criteria 2014;](#)
- [Austrian End-of-Waste Criteria 2016 amendment;](#)
- [French End-of-Waste Criteria 2017;](#)
- [Danish End-of-Waste Criteria 2016;](#)
- [Italian End-of-Waste Criteria 2022;](#)
- [European Commission, Joint Research Centre 2010, Study on the selection of waste streams for end-of-waste assessment](#)
- [United Kingdom 2013, End-of-Waste Quality Protocol.](#)

¹² [European Commission 2020, Study on Member States practices on by-products and end-of-waste: Final Report](#)

A waste authorisation is required to be in place for the recovery of recycled aggregate from waste as required by *Section 3.1(a)* of the recommended criteria. Waste acceptance procedures are a pre-requisite of any waste authorisation and these control waste inputs. The criteria specify particular LoW codes, so that the inputs into the end-of-waste recovery operation are controlled. They also include requirements in relation to knowledge of the source of the input to avoid inclusion of potential contamination or unsuitable material.

The waste input must contain recoverable mineral aggregates. For the purpose of clarity, the criteria include a definition for "minerals" as stone, rock, sand, gravel, concrete, brick, or ceramic tiles.

The criteria includes a specific list of restricted materials, which must not be used as inputs such as hazardous waste, asbestos, C&D fines etc. The inputs may contain some level of impurities or non-mineral content such as re-bar in concrete or other physical content such as plastic. Of course, in the case of inputs like soil & stone or dredgings, the non-mineral soil content may represent a large portion of the input. The key is whether the recovery process can remove both physical or chemical impurities or contaminants in the output to acceptable levels.

5.3 CONSULTATION

The recommend criteria presented in *Annex I, Table 1* of the recommended criteria include a number of carefully considered inputs. The list of inputs was developed in consultation with OEE. In addition, the NWPCO and the CE Waste Statistics team were consulted in relation to the type of typical reporting observed for certain LoW codes.

5.4 SUBMISSIONS

Submissions received on the draft criteria relating to permissible inputs, along with an inspector's response to each are detailed below:

Issue No. 3- Waste from remediation of deleterious materials	
Issue Details	<p>In their submission, the DHGLH recommended that criterion <i>1.7, Annex I</i> include that the waste inputs shall not contain the following:</p> <p><i>"j. Waste generated arising from remediation of deleterious materials e.g. pyrite remediation, or defective concrete block remediation etc."</i></p> <p>Another submission also suggests that <i>"waste acceptance procedures are critical to ensure deleterious materials do not enter the process."</i></p>
Inspector's Response	<p>End-of-waste could offer a more circular solution to the management of waste from the remediation of defective homes over landfilling. While its use in low grade applications such as agricultural lanes or forestry roads are unlikely to present any environmental or geotechnical risk, assessment of such has not been undertaken. It is considered that producers accepting such waste material could manage and process this waste to meet the recommended criteria. It is also acknowledged that producers could manage and control this waste separately with full traceability and direct it to specific low grade applications. Once placed in low grade applications however, there is currently no mechanism for traceability to its subsequent use i.e. next life . In order to avoid such high risk inputs re-entering the production chain, the above recommended criterion has been included within <i>Annex I, Part 1.7</i> of the recommended criteria.</p>
Issue No. 4 – LoW Codes (allowable inputs)	
Issue Details	<p>Submissions made have raised a number of queries in relation to allowable inputs, sought clarifications on list-of-waste codes and sought clarifications on classification including:</p> <ul style="list-style-type: none"> • What is acceptable in the view of the waste authorisation enforcement authority for reclassification of waste to 19 LoW codes? For example, for a mixed skips (e.g. Low Code 17 01 07) which has undergone mechanical treatment to be reclassified as LoW code 19 12 09.

	<ul style="list-style-type: none"> • Following mechanical treatment what waste material is acceptable to be reclassified as 19 12 09 and is the position agreeable by the waste authorisation enforcement authority?; • One submission also stated disappointment that treated hazardous soil and stone 17 05 03* (soil and stone containing hazardous substances) cannot be used as an input in the recovery process; and • A submission sought the inclusion of aggregates comprising grit, glass, stone and ceramics recovered from source segregated domestic and commercial organic waste. The submission noted that such inputs aggregates were omitted from LoW Code 19 12 09 due to the restriction on this code requiring that only pre-treated waste for 17 LoW codes could be used as inputs.
Inspector's Response	<p>I have consulted OEE in relation to the above issues/ queries. The below provides a summary on clarifications given.</p> <p><u>LoW Code 17 05 03* & Reclassification of Waste</u></p> <p>While LoW code 17 05 03* has not been included within the allowable inputs due to its hazardous nature, <i>Section 6, Part 3</i> of the criteria specify that:</p> <p><i>"Where any of the treatments referred to in Part 2 of Annex I is carried out by a prior holder, the producer shall ensure that the supplier implements a management system which complies with the requirements of this Section."</i></p> <p><i>Table I, Annex I</i> of the recommended criteria allow LoW code 19 13 02 ("<i>solid wastes from soil remediation other than those mentioned in 19 13 01</i>") to be used as an input for the recovery of recycled aggregates. Where soil and stone from LoW code 17 05 03* has undergone pre-treatment and has been reclassified under Low code 19 13 02, provided it is not hazardous, it may be used as an input for the recovery of recycled aggregates.</p> <p>I have consulted OEE in relation to the process for such reclassification of waste. OEE have advised that such a change of LoW codes at the waste facility following pre-treatment is subject to approval by the environmental enforcement authority with remit over the waste authorisation. OEE advised that approval of requests for reclassification is common practice and does not require the reclassified waste to leave the facility. In some cases, particularly in the case of hazardous material, waste classification in line with basic characterisation requirements specified within the Landfill Directive¹³, including verification testing, may be required to validate the reclassification.</p> <p>Where a waste operator is undertaking pre-treatment and wishes to reclassify waste, they should seek approval from the enforcement authority with remit over their waste authorisation for the reclassification. Written approvals, if granted, would be required to form part of the quality management system for the waste authorisation. Such approval may be subject to conditions in relation to basic characterisation as detailed above. It is envisaged this would be a once off request/ approval per authorisation, provided the inputs and reclassification process stays the same.</p> <p>In order to provide clarity, criterion <i>Section 6, Part 3</i> has been amended as follows (bold text added, strikethrough removed):</p> <p><i>Where any of the treatments referred to in Part 2 of Annex I is carried out by a prior holder, or the same holder, the producer shall ensure that the supplier implements a management system which complies with the requirements of this Section has been implemented for the pre-treatment.</i></p> <p>The explanatory note has also been updated to reflect this.</p> <p><u>LoW Code 19 12 09</u></p> <p>In addition to the above, I discussed the suitability of reclassifying LoW code 20 03 07 bulky waste (other municipal waste) to LoW code 19 12 09 (minerals for example sand, stones) with OEE. It was agreed that bulky waste would likely be sorted by hand picking/ grabber and would not constitute mechanical treatment. It was agreed that LoW code 19 12 09 inputs should remain restricted to wastes "originating from</p>

¹³ Council Decision 2003/33/EC of 19th December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC

	<p>the treatment of 17 01 01, 17 01 02, 17 01 03, 17 01 07, 17 05 04, or 17 09 04.” as per the draft criteria. Reclassification should be in line with that described above, for which operators should seek approval from the enforcement authority with remit over their waste authorisation for the reclassification.</p> <p>It is considered that domestic and commercial organic source waste are unsuitable as inputs under the National criteria and that these would need careful consideration and additional controls to be in place in order to be a suitable candidate for end-of-waste. In any case, recovered glass aggregates were not assessed under the scope of the criteria and as such are not provided for within the criteria.</p>
Issue No. 5 – Additional Restrictions on inputs	
Issue Details	<p>Submissions have suggested that criterion <i>Annex I, Part 1.7</i> include that the waste inputs shall not contain the following:</p> <ul style="list-style-type: none"> • Coal tar; and • Invasive species.
Inspector’s Response	<p>These recommendations have been included within <i>Annex I, Part 1.7</i> of the recommended criteria.</p>
Issue No. 6 – C&D fines & Soil Content	
Issue Details	<p>A number of submissions were made in relation to the definition of C&D fines. Submission were also made seeking clarification in regard to the soil content limit specified in <i>Annex I, Table 4</i> of the draft criteria.</p> <p>In their submission, the DHGLH recommend that criterion <i>1.7, Annex I</i> suggests inclusion of an additional criterion specifying that the waste inputs shall not contain the following:</p> <p style="text-align: center;"><i>"organic materials such as clays or soils".</i></p>
Inspector’s Response	<p>It is understood that there are limits on “fines” in various technical standards and specifications. This has given rise to confusion as to the meaning of the term “C&D fines” within the draft criteria. Accordingly, a definition for C&D fines has been provided in the recommended criteria to differentiate between these differing terms, as follows:</p> <p style="text-align: center;"><i>"construction & demolition (C&D) fines refers to the small-sized fraction of waste that is mechanically separated from a mixed-sized waste stream by means of passing it through a screen (such as a trommel) during a waste processing activity. Fines are typically segregated from a mixed waste stream after an initial shredding, agitation or crushing pre-step. There is no set or uniform screen size used by all operators to generate fines. Depending on the origin or nature of the waste from which the fines are generated, they may be specifically described by the operator as organic fines, C&D fines, inert fines or by some other name."¹⁴</i></p> <p>Some technical specifications require that for certain classifications of aggregate that the aggregates does not contain organic content. This has given rise to questions on the suitability of the maximum soil content limit specified in <i>Annex I, Table 4</i>. The intent of this criteria was to limit the amount of soils (and organic carbon) present in the recycled aggregate. Exclusion of soils from inputs would exclude the largest percentage of C&D waste (refer to <i>Section 2</i> above) from entering the end-of-waste route for recycled aggregates. This would be obstructive to a circular economy and is therefore not considered appropriate. Following discussion with the DHLGH in relation to the above suggestion, it was agreed that the suggested addition is not required and that technical specifications will prevent input of unsuitable organic content in aggregates, where appropriate to the end use.</p>
Issue No. 7- Due Diligence	
Issue Details	<p>Submissions made seek further clarity in relation to due diligence assessments, the identification of additional potential contaminants of concern in inputs and the associated establishment of acceptable limits for those contaminants, as required under the draft criteria under:</p> <ul style="list-style-type: none"> • criterion <i>Annex I, 1.8</i>: <p style="text-align: center;"><i>"The waste input shall be assessed for potential chemical contamination beyond pollutants listed within Tables 2 and 3. Where potential for chemical contamination</i></p>

¹⁴ Source: [EPA 2014, Guidance Note on Daily and Intermediate Cover at Landfills](#)

	<p><i>is identified, contaminants of concern shall be quantified via testing and shall be recorded. Testing shall be carried out in accordance with Part 4.2 of Annex I.”;</i></p> <ul style="list-style-type: none"> • criterion <i>Annex I, 3.6:</i> <i>"Chemical contamination identified under Part 1.8 shall be demonstrated to have been reduced to acceptable levels.</i> <i>Testing shall be carried out in accordance with Part 4.2”;</i> and • self-monitoring requirements under <i>Annex I, Part 1:</i> <i>"...A due diligence assessment for each new source of input waste shall be completed to identify any potential contamination.</i> <i>Where visual inspection or due diligence assessment raises any suspicion of possible hazardous properties or contamination, further appropriate monitoring measures shall be taken, such as sampling and testing where appropriate. The staff shall be trained on potential hazardous properties or contamination that may be associated with recycled aggregate and on material components or features that indicate these properties..."</i> <p>It was suggested that it needs to be made clearer that additional chemical analysis outside the PLVs may be required depending upon the source and makeup of the input materials.</p>
Inspector's Response	<p>The explanatory note is considered to provide sufficient levels of detail in relation to due diligence assessment requirements. Where necessary however, following stakeholder engagement in relation to training, additional information can be included in a revision of the explanatory note. For clarity, the due diligence assessment has been moved from self-monitoring requirements and incorporate into criterion <i>Annex I, 1.8. Annex I, 1.8</i> of the recommended criteria also includes the following changes to the draft criteria (bold text added, strikethrough removed):</p> <p><i>"A due diligence assessment for each new source of input waste shall be completed to identify any potential for contamination. The waste input shall be assessed for potential chemical contamination beyond pollutants listed within Tables 2 and 3. Where potential for chemical contamination is identified, any additional contaminants of concern, other than those specified within Tables 2 and Table 3, shall be quantified via testing and shall be recorded. Testing shall be carried out in accordance with Part 4.2 of Annex I."</i></p>
Issue No. 8- Pre-demolition audits	
Issue Details	<p>Disappointment was expressed in some submissions that the criteria do not require pre-demolition audits for source sites (inputs). It was suggested that these could replace waste acceptance procedures.</p>
Inspector's Response	<p>It is acknowledged that some other Member States, such as the Netherlands, rely on such pre-demolition audits within their National criteria. It is noted that the Netherlands has a well-established (circa 30 years) mature market in relation to recycling aggregates. Contrary to this, Ireland is in its infancy and such pre-demolition audits are still in early stages of adoption. As such it is considered premature to rely on these to control waste inputs here in Ireland.</p>

5.5 INSPECTOR'S CONCLUSION & RECOMMENDED CRITERIA

I consider that condition (2)(a) of Regulation 28 is satisfied, having regard to the fact that *Section 3.1(b)* and *Annex I (Part 1)* of the recommended criteria include:

- limitations for specific LoW codes for the allowable inputs; and
- limitations on hazardous inputs and other unsuitable inputs.

6. RECOVERY PROCESS

Regulation 28(2)(b) requires that detailed criteria set by the Agency for end-of-waste shall specify:

"allowable treatment processes and techniques".

6.1 APPROACH

The following work and assessments were undertaken to define allowable recovery processes:

- a. Extensive stakeholder engagement including completion of site visits; and
- b. Consultation with the WERLA.

6.2 OVERVIEW & INSPECTOR'S ASSESSMENT

End-of-waste recycled aggregates must be produced under appropriate waste authorisation. The waste authorisation must provide for the specific recovery activity and authorise the acceptance and recovery of the LoW codes for waste input into the end-of-waste recovery process.

Typically input waste, excluding soil/ sediment-containing inputs, undergo visual inspection followed by crushing. Crushing can be via a specific purpose crushing plant (fixed or mobile) or via other mechanical crushing such as diggers or muncher attachments. Some operators utilise crushers with inbuilt magnets and/or blowers to remove impurities such as metals, plastics and wood. Others utilise hand picking to remove physical impurities. While rarer, some operators also wash aggregates to improve the quality (environmental), typically for mixed inputs. For soil and stone/ dredge inputs, these may go through wash plants to remove soil content and contamination. Flocculants and other additives can be used in this process. Other soils and stones may be simply sieved to recover the stone content. In most cases the recovered aggregate is graded to a specific size.

So not to stifle innovation, the criteria do not require any specific recovery treatment processes. However, they do include requirements that the recovery process is capable of removing or reducing impurities & contamination to acceptable levels.

The criteria are intended to support recovery operations at both fixed waste facilities and at demolition site via mobile crushing under waste authorisation. As documented through literature and echoed by submissions received on the draft criteria, recovery at the demolition site presents a more sustainable option when taking carbon emissions associated with truck movements into account. Sustainability can be further increased where the material is used at the demolition site to replace imported virgin aggregate.

6.3 CONSULTATION

The Agency consulted the Eastern Midlands WELRA to gain an insight into current practises in relation to mobile crushing. It is understood from this consultation that the requirements can vary amongst local authorities and that, in many cases, the waste authorisation is hinged on planning permission for the demolition site. It is acknowledged that as the mobile crusher permitting regime currently stands, there will be a significant administrative burden for both industry and the local authorities to pursue the mobile crushing route. It is also acknowledged that consistent and clear rules in relation to planning permission and waste authorisations for mobile crushing are required to support wider adoption of this option. These issues are outside the scope of end-of-waste and the Agency, and as such cannot be resolved by the recommended criteria. Nevertheless, it is important that the recommended criteria provide for this option to enable a more sustainable circular economy into the future.

6.4 SUBMISSIONS

Submissions received on the draft criteria relating to the recovery operation, along with an inspector's response to each are detail below:

Issue No. 9 – Mobile Crushing	
Issue Details	A number of detailed submissions were received in relation to information provided within the draft explanatory note on mobile crushing, particularly in relation to associated planning permission and waste authorisation requirements. Arguments are made that the criteria favour recovery of aggregates at a fixed waste facility

	<p>rather than at the source of demolition. It is also stated that source segregation and recovery of recycled aggregate will result in better quality material as it will not be mixed with other waste sources. The sustainability of transport and associated CO₂ emission associated with treatment compared with treatment at source was also been drawn to attention, with a statement made that "off-site transfer would conflict with the transition towards a more circular economy and does little to promote sustainability or a reduction in a project's carbon footprint."</p> <p>There are opposing arguments in relation to this, with concerns raised that shortcuts may be taken in the issuing of statement of conformity when used on the site in which it was produced. Another submission states they would welcome planning being required for mobile crushing.</p>
Inspector's Response	<p>A synopsis in relation to mobile crushing are provided under <i>Sections 6.2 & 6.3</i>, above.</p> <p>Further engagement will be undertaken with stakeholders in due course and the explanatory note will be revised to provide any clarification necessary. In addition, training provided as part of the roll out of the decision will provide information in this regard.</p>
Issue No.10 - Waste vs By-Product vs Product	
Issue Details	<p>There appears to be confusion, as evidenced by a number of submissions, in relation to the classification of excavated soil and stone as to whether material is a product (site won crushed rock/ stone); a by-product or a waste. Similarly, queries have been raised as to whether crushed concrete can access the by-product mechanism or whether end-of-waste is the only avenue for such material in the view of the Agency.</p>
Inspector's Response	<p>It is important to note that the recommended criteria are solely for the purpose of inputs classified as <u>waste</u>. Guidance is available in the EPA 2020, <i>Draft By-product Guidance</i>¹⁵ as to what constitutes a product, production residue, by-product or waste. Crushing of uncontaminated virgin rock/stone for reuse at the same site in which it was excavated, is considered to be a product. This is provided the production process intended to produce that material. Where the production process (excavation/ construction activities) did not intend (not the main purpose) to produce the material, and the material is surplus to requirement for reuse at the source site, then it is a production residue. It is for material producer to determine whether the production residue is then a waste or by-product. Where criteria for being a by-product cannot be meet, then material is considered a waste. Key to note is that where a material undergoes a recovery process or processing other than normal industry practices, then this is likely to be considered a waste recovery activity and the material would therefore be classified as a waste. The Agency are currently developing National by-product criteria for soil and stone from greenfield sites.</p> <p>Any material producer may notify a by-product to the Agency for determination on a single-case basis, which shall be assessed by the Agency on its own merits.</p>

6.5 INSPECTOR'S CONCLUSION & RECOMMENDED CRITERIA

I consider that this condition (2)(b) of Regulation 28 is satisfied, having regard to the fact that *Section 3.1(c)* and *Annex I (Part 2)* of the recommended criteria:

- require an appropriate waste authorisation to be place for the recovery activity; and
- stipulate recovery/ treatment must be capable of removal of physical and chemical contaminants to acceptable levels.

7. TECHNICAL REQUIREMENTS & PRODUCT LEGISLATION

Regulation 28(1)(a)(iii) requires that:

"the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products."

¹⁵ [EPA 2020, Draft By-Product- Guidance Note](#)

Regulation 28(2)(c) requires that detailed criteria set by the Agency for end-of-waste shall specify:

"quality criteria for the end-of-waste materials resulting from the recovery operation in line with applicable product standards, ...".

In addition to the above Regulation 28(5) requires that:

"The natural or legal person who:

(a) uses, for the first time, a material that has ceased to be waste and that has not been placed on the market; or

(b) places a material on the market for the first time after it has ceased to be waste, shall ensure that the material meets relevant requirements under the applicable chemical and product related legislation."

7.1 APPROACH

The following work and assessments were undertaken to identify technical requirements and product legislation applicable to recycled aggregates:

- a. Extensive stakeholder engagement;
- b. Assessment of applicable legislation and harmonised aggregate product standards;
- c. Focused consultation with key competent authorities and stakeholders on the interpretation and implementation of technical requirements and product legislation¹⁶;
- d. Participation on National standards panels for construction products and aggregates;
- e. Industry consultation via questionnaire, online meetings and site visits as detailed under Regulation 28(1)(a)(i) and (ii) above; and
- f. Comparative market analysis, as detailed under *Section 4* above.

7.2 OVERVIEW

Regulation 28(1)(a)(iii) can be considered in two parts, by which the recycled/recovered material needs to:

- fulfil the technical requirements for the specified use(s); and
- meet the existing legislation and standard(s) applicable to products.

The term technical requirements is used to convey all relevant specifications, standards and legislation relevant to the specified use of the recycled aggregate products. Product legislation refers to general legislation applicable to product which is not specific to the material type or its specific use. Recycled aggregate should meet a certain standard(s) of quality meaning that it can be used in the same way as the virgin aggregate it replaces.

The technical requirements for recycled aggregates are numerous, complex and in some cases open to interpretation. Accordingly, a number of competent authorities were consulted to gain a better understanding of technical and product requirements.

7.3 CONSULTATION -TECHNICAL REQUIREMENTS

7.3.1 GSI – CPR (AGGREGATES)

¹⁶ Stakeholder consultees include: National Standards Authority Ireland, Department of Housing & Local Government, Geological Society Ireland, Transport Infrastructure Ireland, Federation for International Recycling, Irish Concrete Federation, Construction Industry Federation, Irish Waste Management Association, Iarnród Éireann, Office of Environmental Enforcement, Regional Waste Management Planning Offices, Waste Enforcement Regional Local Authorities; Coillte, Roadstone, National Waste Collection Permit Office and NSAI/TC 153 Aggregates Panel (WG 3 Recycled Aggregates). Meeting requests were also made to the National Building Control Office & Market Surveillance Office.

Geological Survey of Ireland (GSI) is the appointed competent National authority, as defined in the Construction Product Regulation (CPR)¹⁷, in respect of aggregate construction products in Ireland. Their role includes:

- assistance to quarry operators for reasoned requests;
- completion of research; and
- assistance to NBC &MSO in relation to market surveillance.

The Agency sought clarification into the requirements for petrographic assessments, initial type testing and knowledge of the raw material as set out in harmonised aggregate product standards and associated standard recommendations (S.Rs) for aggregates. GSI advised that petrographic assessment is reasonably straightforward for homogenous sources of aggregate, such as aggregate quarried from a bedrock of a uniform lithology. However petrographic assessment for aggregate from heterogenous sources is more complex. For example, recycled aggregate, including that from single or multiple sources, may present issues in attaining a representative sample of the overall product.

GSI indicated that National provisions have been made for hazardous and deleterious materials such as asbestos, silicas and radioactive materials. *Annex E* of *S.R. 21:2014+A1:2016* (S.R.21)¹⁸ provides for this. Geological assessment requirements are set out in all harmonised aggregate product standards and associated S.R.s. It is indicated that several classes of construction products, such as general fill, can be produced without requirement for geological assessment, apart from initial type testing. These can be produced for non-structural uses and can be used without any testing with regard to sulphides. It was advised that sulphur testing is used as an indicator for the presence of deleterious material such as pyrite. This testing is done in accordance with *I.S. EN 1744-1*¹⁹ for testing of total sulphur and acid soluble sulphate, which was indicated to be a workable test.

It was suggested that the EPA engage with the NSAI to determine how they see the geologist role and what is acceptable in relation to recycled aggregates, particularly for initial type testing.

They also noted that in relation to soil and stone inputs used to recover aggregates, that such inputs may differ in properties to rock quarried from bedrock. The stone from soil and stone can be variable and can be oxidised and weathered.

The GSI also highlighted their concern in relation to the use of recycled aggregates in structural applications.

7.3.2 NATIONAL STANDARDS AUTHORITY OF IRELAND (NSAI) – HARMONISED AGGREGATE PRODUCT STANDARDS

Harmonised aggregate product standards

The NSAI is the competent authority for standards in Ireland. The NSAI is responsible for the development of Irish Standards, representing Irish interests in the work of the European and International standards bodies CEN and ISO. The NSAI is also accredited to certify Factory Production Control (FPC) systems and other quality management systems.

In order to determine which standards are relevant in relation to the production of recycled aggregates, the Agency consulted the NSAI. Clarification was sought from NSAI in relation to any specific requirements to comply with standards and standard recommendations. In addition, the Agency sought details in relation to FPCs and Assessment and Verification of Constancy of Performance (AVCP). The following clarifications and information was given:

"EN Standards are voluntary instruments adopted by private bodies, CEN, Cenelec and ETSI (European Standards Organisations (ESOs)). When referenced in law they can produce legal effects. For example, a reference to a harmonised standard, (i.e. a standard produced by an ESO in response to a Commission request under a new legislative

¹⁷ Construction Product Regulation (CPR) (EU No.305/2011)

¹⁸ S.R. 21:2014+A1:2016 -Guidance on the use of I.S. EN 13242:2002

¹⁹ IS EN 1744-1:2009+A1:2012 - Tests for chemical properties of aggregate – Part 1: Chemical analysis

framework directive) when published in the Official Journal, creates the legal effect of presumption of conformity for products complying with the standard from the date of publication of its reference.

The principle of adopting standards as voluntary documents also applies for NSAI domestic standards adopted under the NSAI Act. These can be given legal effect when referenced in National legislation. The purpose of legal effect and choice as how to reference is a matter for the regulating body ...

S.R.s, while not standards are also adopted by NSAI as voluntary documents. Any legal effect depends on the legal framework stipulating their use or the context in which they are used.

National standards may be adopted under the NSAI Act 1996 as Irish Standard specifications in accordance with a process set down in Section 16 of the Act. However, European and International Standards are adopted through alternative processes of re-publication or endorsement ...

References to the following versions of the **aggregate standards** ... are published in the Official Journal of the European Union (OJEU) - Regulation (EU) No. 305/2011 laying down harmonised conditions for the marketing of construction products. See link [Construction products \(CPD/CPR\) \(europa.eu\)](http://europa.eu):

- EN 12620:2002+A1:2008 Aggregates for concrete
- EN 13043:2002 Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas
- EN 13043:2002/AC:2004 Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas
- EN 13055-1:2002 Lightweight aggregates - Part 1: Lightweight aggregates for concrete, mortar and grout
- EN 13055-1:2002/AC:2004 Lightweight aggregates - Part 1: Lightweight aggregates for concrete, mortar and grout
- EN 13055-2:2004 Lightweight aggregates - Part 2: Lightweight aggregates for bituminous mixtures and surface treatments and for unbound and bound applications
- 13139:2002 Aggregates for mortar
- EN 13139:2002/AC:2004 Aggregates for mortar
- EN 13242:2002+A1:2007 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction
- EN 13450 Aggregates for railway ballast
- EN 13450:2002/AC:2004 Aggregates for railway ballast"

Clause 4 of S.R. 21:2014+A1:2016 provides "information on the Provisions of the EU Construction Product Regulation which states that I.S. EN 13242:2002+A1:2007²⁰, Annex ZA details the allowed systems for Assessment and Verification of Constancy of Performance (AVCP) as "2+" or "4" for aggregates. The requirements of the two systems are summarized in Table 6 of S.R. 21:2014+A1:2016. In Ireland, the AVCP system for all aggregates for unbound and hydraulically bound materials is "4", with the exception of aggregates with the particular end-use described in Annex E i.e. unbound granular fill (hardcore) for use under concrete floors and footpaths, for which the system of AVCP is "2+."

It is also noted that S.R.16:2016 (S.R.16)²¹ states that the recommended AVCP system for all aggregates in Ireland under the scope I.S. EN 12620:2002+A1:2008²² and S.R.16 is System 2+.

It is understood from consultation with the NSAI that harmonised aggregate product standards do not generally specify limit values but instead require declaration of values and

²⁰ I.S. EN 13242:2002+A1:2007 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction.

²¹ S.R. 16:2016 - Guidance of the use of I.S. EN 12620:2002+A1:2008.

²² I.S. EN 12620:2002+A1:2008 - Aggregates For Concrete.

characteristics in accordance with specific test methods. Typically, compliance with a harmonised aggregate product standards is not a pass/ fail mechanism for quality, but rather a way of declaring the performance of the product. The harmonised aggregate product standards in some cases refer to National provisions that can be set at Member State level. National provisions (usually National positions, requirements or limits) can be specified in National S.R.s or annexes.

Certification of FPC

The Agency sought clarification from the NSAI in relation to requirements for petrographic and geological assessments, initial type testing and knowledge of the raw material as set out in harmonised aggregate product standards for recycled aggregates. The NSAI confirmed that:

"With respect to the necessity of carrying out site investigations on the material to satisfy knowledge of raw material requirements, we can use test data and inspections carried out on the material at the waste facility before processing. This would also be supported by the new TII series of standards".

7.3.3 DEPARTMENT OF HOUSING GOVERNMENT & LOCAL HERITAGE – BUILDING REGULATIONS & CPR

During a number of consultations with the Department of Housing Local Government & Heritage (DHLGH), concerns were raised in relation to the use of recycled aggregate in/under or adjacent to building structures and in structural applications. These concerns are borne namely from Ireland's recent catastrophic issues with deleterious materials in aggregate products including pyrite, mica and pyrrhotite in building structures, which has resulted in a significant bill (> 2 billion euro) to the State.

In addition, the DHLGH raised concerns in relation to requirements set out in harmonised aggregate product standards in relation to knowledge of the raw material and petrographic assessment. The DHLGH is responsible for preparing the Building Regulations. These Building Regulations apply to buildings and within a 1m curtilage of buildings.

Clause E.2.3 of *Annex E* of S.R 21 gives "Guidance for specifying aggregates for unbound granular fill (hardcore) for use under concrete floors and footpaths" and states (emphasis added): "**Recycled aggregates or manufactured aggregates should not be used.**" Technical Guidance Document C of the Building Regulations requires that hardcore placed under concrete floors should comply with the requirements of Annex E of S.R. 21:2014. Any change to the Building Regulations are notified to the European Commission under the TRIS system²³.

DHLGH stated that "D3 of Part D of the Building Regulations requires the use of "proper materials" means materials which are fit for the use for which they are intended and for the conditions in which they are to be used, and includes materials which: (a) bear a CE Marking in accordance with the provisions of the Construction Products Regulation; (c) comply with an appropriate Irish Standard...". The DHLGH developed "A Guide to the marketing and use of Aggregate Concrete Blocks to EN 771-3 in Ireland²⁴". They state that the guide was "developed in response to specific issues relating to concrete blocks but the guidance is broadly applicable for the use of any construction product, in so far as proper materials should be fit for use for their intended purpose."

In their recent submission to the Agency in response to the public consultation on the draft criteria, the DHLGH stated:

"The Department of Housing, Local Government and Heritage is responsible for the implementation of the Construction Products Regulation, CPR. The CPR sets the rules for the marketing of construction products in the EU.

²³ <https://ec.europa.eu/growth/tools-databases/tris/en/search/?trisaction=search.detail&year=2019&num=421>

²⁴ <https://www.gov.ie/en/publication/45415-a-guide-to-the-marketing-and-use-of-aggregate-concrete-blocks-to-en-771-3-in-ireland/>

The primary purpose of the CPR is to break down technical barriers to trade in order to ensure the free movement of construction products across Member States within the European Union. It does this by harmonising those elements which previously led to barriers to trade. In this regard, the CPR provides for:

- *a system of harmonised technical specifications (over 440 harmonised European standards for construction products (hENs) are currently in force²⁵),*
- *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*
- *the mandatory CE marking of construction products as a passport to the internal market.*

The CPR requires that each construction product, for which a harmonised European standard (known as a hEN) exists, has a Declaration of Performance from the manufacturer and must be affixed with the CE Mark before it can be placed on the market. In order to do so, manufacturers must test and declare the performance of their construction products using a common technical language prescribed in the hEN. The manufacturer must also take into consideration the National provisions in relation to the intended use or uses of the product, where the manufacturer intends the product to be made available on the market. In this regard, the National Standards Authority of Ireland (NSAI) has produced additional guidance to some hENs in the form of Standard Recommendations (SRs) which set out appropriate minimum performance levels for specific intended uses of the product in Ireland ...

A suite of hENs and accompanying SRs exist for aggregates, see Table 1 below in Appendix 1. While some of these hENs consider recycled aggregates within their scope many of them acknowledge that new test methods for recycled aggregates are in preparation and that more work is needed on standardisation to define clearly the origins and characteristics of these materials."

The DHLGH highlighted that while some harmonised aggregate product standards accommodate recycled aggregates, their suitability for use in Ireland has yet to be established. For example, I.S. EN 206:2013+A2:2021²⁶ (I.S. EN 206) states that the use of recycled aggregates "should be by agreement of the parties involved on a project by project basis."

In addition, the DHLGH also state that:

"New comprehensive hENs for recycled aggregates along with suitable National provisions in the form of SRs, developed by NSAI, would be necessary in order to consider further the potential use of recycled aggregates in buildings."

In their submission the DHLGH were supportive of the draft criteria and the level of structural restrictions specified. Further details are provided in *Section 7.5.1* and *Key Issue 11* in *Section 7.6* below.

7.3.4 TRANSPORT INFRASTRUCTURE IRELAND (TII) – CPR (ROADS CONSTRUCTION PRODUCTS)

Under the Roads Act, 1993, Part III, Section 19-(1)e, as amended, Transport Infrastructure Ireland (TII) (as the National Roads Authority) may specify standards in relation to construction or maintenance which must be complied with for any works on National roads. TII is the appointed competent National authority, as defined in European Union (Construction Product) Regulations 2013, in respect of road construction products in Ireland.

Clarity was sought from the TII in relation to the applicability of TII specifications for roadworks with regard to recycled aggregates. Clarity was also sought as to the relationship and hierarchy between TII specifications and harmonised aggregate product standards and on the applicability for use of their specifications in applications other than road construction.

²⁵ 6,240 European Technical Assessments (ETAs) were also issued between 1 July 2013 and 31 December 2018.

²⁶ I.S. EN 206:2013+A2:2021 Concrete - Specification, performance, production and conformity

TII advised that harmonised aggregate product standards are very broad and that these overarch TII specifications. They advised that the TII specifications are country (Ireland) specific and include more requirements in relation to type testing. It was noted that the NSAI S.R.s interpret the standard while the TII series sets out specifications. It was also discussed that S.R. 21 for *I.S. EN 13242* refers out to TII specifications.

In their recent submission to the Agency in response to the public consultation on the draft criteria, TII stated that:

"It should be note that these [TII] specifications have been developed specifically for use in Roads. While they may be relevant to other applications (and are probably the only relevant specification that exist), TII, as the National Roads Authority, does not have the remit to specify these requirements in non-roads applications."

Applicable TII specifications identified are listed in *Table 2* in *Section 7.5* below.

7.3.5 NATIONAL BUILDING CONTROL & MARKET SURVEILLANCE (NBC&MSO) NBC&MSO – CPR

In the preparation of the *Analysis of Aggregates Market in Ireland* report, SWECO consulted the National Building Control & Market Surveillance (NBC&MSO) on behalf of the Agency to gain insight into market surveillance activities undertaken in relation to aggregates. Information gathered and reported is extracted below:

"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 [not] 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 Programme²⁷ 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).*

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 appropriate²⁸. It is understood that market surveillance activities related to aggregate products will be carried over into 2023."

7.4 CONSULTATION -PRODUCT LEGISLATION

7.4.1 HSA– REACH REGULATION

²⁷ National Market Surveillance Programme 2021 – Ireland & National Market Surveillance Programme 2022 – Ireland -www.nbco.localgov.ie

²⁸ ICF Regional Meeting – November 2021

REACH Regulation²⁹ has a very wide scope and applies to all chemical substances that are manufactured, imported, placed on the market or used within the European Community, either on their own, in mixtures or in articles with intended release. The objective of REACH is to improve the protection of human health and the environment from the risks posed by chemicals used in manufacturing. The recycling of aggregates to produce a material that meets the end-of-waste criteria is considered to be a manufacturing process and therefore manufacturers (producers) of recycled aggregate are obliged to comply with the relevant Registration, Notification and Information requirements.

I consulted the HSA to determine what are the producer of recycled aggregates obligations under REACH. Clarification was also sought as to whether recycled aggregates are classified as articles, substances or mixtures under REACH. The HSA advised that "the determination of recycled aggregates as either a substance/mixture or an article is a borderline case". They advised discussions relating to this are ongoing within the ECHA working group for the borderline cases.

THE HSA have advised the below and suggested the following to be stated in the explanatory document with regard to REACH:

Recycled aggregates are within the scope of REACH and as such REACH obligations are likely to apply. It is the producer's responsibility to ensure and demonstrate that REACH obligations are satisfied.

ECHA guidance on waste and recovered substances is available on the ECHA website at the following link: https://echa.europa.eu/view-article/-/journal_content/title/echa-publishes-new-guidance-on-waste-and-recovered-substances.

The Health and Safety Authority (HSA) are the competent authority in relation to REACH in Ireland. Queries in relation to REACH can be directed to the HSA via chemicals@hsa.ie.

7.5 INSPECTOR'S ASSESSMENT

Most Member States who implement National level end-of-waste criteria for recycled aggregates require the recycled aggregates to comply with a harmonised aggregate product standards under CPR. Single case decisions on end-of-waste for recycled aggregates to date have specified the same requirement. It is noted, however, that precedent has also been set within the recent Italian National criteria³⁰, whereby not all aggregates under their criteria require compliance with a harmonised aggregate product standards. The Italian criteria do not require "the application of the CE marking as provided for in Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011" for recovered aggregate used for the purpose of "the realisation of environmental recoveries, filling and bridging." A harmonised technical aggregates standard is not identified within the criteria for this specified purpose.

The European Commission in their *EU Construction and Demolition Waste Management Protocol*³¹ states that:

"In theory, there could be several ways to validate the quality of recycled materials, including certification, accreditation, labelling and marking. However, harmonised European standards that apply to primary materials also apply to recycled materials. C&D recycled materials must be assessed in accordance with requirements of European product standards, when covered by them ...

The Construction Products Regulation (EU/305/2011, CPR) lays down harmonised rules for the marketing³² of construction products and provides tools to assess the performance

²⁹ Registration, Evaluation, Authorisation and Restriction of Chemicals - Regulation 1907/2006/EC (REACH)

³⁰ [Italian End-of-Waste Criteria for recovered aggregates 2022](#)

³¹ [European Commission 2016, EU Construction Waste Management Protocol](#)

³² The [European Commission](#) describe placing on the market with regard to the CPR as: "Any supply of the (individual) construction product for the first time within the European Internal Market for distribution or use in

of construction products. Construction products that are covered by Harmonised European Standards (hENs) need a Declaration of Performance (DoP) and have to be CE-marked to increase transparency ...

Products that are not (fully) covered by hENs can still be CE-marked with the use of European Technical Assessments (ETA) issued according to European Assessment Documents (EAD)."

Section 2.4 of the SWECO report provides a detailed synopsis of the applicability of harmonised aggregate product standards and technical specifications and also details whether each makes provision for recycled aggregates or not. Assessment of the required level of AVCP system is also given for each harmonised aggregate product standards.

The SWECO report identifies that *"current practice that exists is where [virgin] 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)".*

The *EU Construction and Demolition Waste Management Protocol* states that:

"In case European product standards or assessments do not apply, Quality Assurance schemes can be a useful additional tool. In several Member States there are Quality Assurance schemes in place for specific products, like recycled aggregates. Such schemes often contain requirements concerning waste acceptance and environmental issues. When working with such National or regional schemes it is important to secure that:

- *There is no conflict with the European harmonised approach;*
- *No technical barriers to trade are invoked;*
- *Impacts on costs and administrative burden have been fully taken into account and where possible mitigated;*
- *Innovative companies are not put at a disadvantage compared to other companies."*

Based on the above it would appear that not all aggregate products produced in Ireland are considered as "construction products". Accordingly, for ease of assessment and in line with NSAI and DHLGH comments, these aggregates falling outside the scope of CPR are termed "non-construction products". With consideration to submissions and consultation undertaken, the below categories and subcategories have been established for the purpose of clarity in the criteria, and are summarised as follows:

- Construction products;
The recommended criteria require that all recycled aggregate construction products falling under CPR, must comply with an applicable harmonised aggregate product standard for the specified use and any associated National provisions.
- Non-construction products;
 - a. *With applicable harmonised aggregate product standards or specifications*
Where a recycled aggregate is not considered to be a construction product i.e. a non-construction product, however there is a harmonised aggregate product standard or specification available for a specified use, it must comply with the applicable standard or specification. For example, recycled aggregates intended for use as an input into

the course of a commercial activity, whether in return for payment or free of charge. NB: Every product or batch of products (that is, every window or every package / truckload of bricks) is placed on the market individually. The fact that similar products have been marketed before, does not change this. Therefore, manufacturers have to draw up a [Declaration of Performance \(DoP\)](#) and affix the CE marking pursuant to the [Construction Products Regulation \(CPR\)](#) for all the products entering the market."

non-structural concrete for use as a hardstanding in a yard should meet I.S. EN 12620. This is clearly set out within the recommended criteria.

b. With no applicable harmonised aggregate product standards or specifications

Where no harmonised aggregate product standards or specification applies directly to the specified use, the recycled aggregate may be marketed without the need to conform to a standard or specification. This is the approach applies in the same way for uses of virgin aggregate which would not warrant compliance with an industry standard or specification. In this case a customer specification may apply. For example, recycled aggregates intended for use in agricultural lanes.

The recommend criteria require compliance with the CPR and a harmonised aggregate product standard for all construction products and any associated National provisions and technical specifications. Non-construction products are required to comply with a harmonised aggregate product standards or specification where available (suitable) for the specified use.

Table 2 below provides a synopsis of the applicable technical requirements under these categories for specified uses set out in the recommended criteria.

Table 2: Synopsis of the applicable technical requirements for construction and non-construction recycled aggregate products

Category	Construction products	Non-construction products	
Sub-category	<i>N/a</i>	<i>Applicable technical requirements</i>	<i>No current applicable technical requirements</i>
Specified use	Unbound & bound uses <u>in construction works</u> including: concrete & bituminous mixtures road construction; pavements, general fill, railway ballast; other linear features defined; pipe-bedding, haunching or surrounding materials; armourstone any other uses coming within the definition of construction works within the CPR.	All bound uses including: concrete & bituminous mixtures; non-construction general fill material; any other use within the criteria not defined as construction works within the CPR where technical requirements are available.	Temporary or permanent areas of unbound groundcover (e.g. decorative gravel); unbound haul/ access roads/ lanes/ tracks/ paths, bunds or similar; any other use within the criteria not defined as construction works within the CPR, and where an applicable technical requirement is not available.
Requirement	Compliance with CPR. The CPR requires that each construction product, for which a harmonised aggregate product standard exists, has a Declaration of Performance from the producer and must be affixed with the CE Mark before it can be placed on the market.	Compliance with harmonised aggregate product standards or specification applicable to the specified use.	Compliance with a customer specification, where required. A customer may specify that the material needs to meet classification set out in a harmonised aggregate product standards or specification. Similarly, where a material is marketed or declared as conforming with an industry classification, the material must comply with all requirements of that harmonised aggregate product standards or specification.
Details of technical requirements	Producers must test and declare the performance of their construction products using a common technical language prescribed in the standard. The producer must test in accordance with requirements and methods set out in the harmonised aggregate product standards. The product must comply with other applicable specifications, as required. Any classification of the product must be in accordance with the standard or specification. The manufacturer must also comply with any the National provisions for the applicable standard set out in S.R.s or National Annex.	The producer must test in accordance with requirements and methods set out in the harmonised aggregate product standards or specification. They must declare the performance of their products. Any classification of the product must be in accordance with the standard or specification. The manufacturer must also comply with any the National provisions for the applicable standard set out in S.R.s or National Annex.	Compliance with customer technical specifications, if specified.

Category	Construction products	Non-construction products
Applicable harmonised aggregate product standards and associated S.R.s or National Annex relevant to the criteria	S.R. 16:2016 - Guidance of the use of I.S. EN 12620:2002+A1:2008	
	I.S. EN 12620:2002+A1:2008 - Aggregates For Concrete	
	S.R. 17:2004- Guidance on the use of I.S. EN 13043:2002	
	I.S. EN 13043:2002: Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas	
	S.R. 21:2014+A1:2016 -Guidance on the use of I.S. EN 13242:2002	
	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 13450:2002 - Aggregates for Railway Ballast	
	I.S. EN 13383-1:2002 - Armourstone – Part 1: Specification	
Applicable technical specifications	I.S. EN 13055-1:2002 - Lightweight aggregates – Part 1: Lightweight aggregates for concrete, mortar and grout	
	I.S. EN 13055-2:2004 - Lightweight aggregates – Part 2: Lightweight aggregates for bituminous mixtures and surface treatments for unbound and bound applications	
	TII- CC-SPW-00500 - Specification for Road Works Series 500 – Drainage and Service Ducts	
	TII-CC-SPW-00600 - Specification for Road Works Series 600 – Earthworks	
	TII- CC-SPW-00800 Specification for Road Works Series 800 – Road Pavements – Unbound and cement bound mixtures	
TII- CC-SPW-00900 - Specification for Road Works Series900 – Road Pavements-Bituminous Mixtures.		

Note 1: CE marking is a part of the EU's harmonisation legislation. By affixing the CE marking to a product, a manufacturer declares that the product meets all the legal requirements for CE marking and can be sold throughout the EEA. Not all products must have CE marking. It is compulsory for most of the products covered by the New Approach Directives.

Note 2: While I.S. EN 13139:2002/AC:2004 *Aggregates for mortar* and S.R. 18:2021 *Guidance on the use of I.S. EN 13139:2002* have been identified as applicable standards for aggregate products; the restrictions on the recommended criteria exclude this use. Therefore, these are not listed above.

Note 3: While EN 206 has also been identified as an applicable standard to the Agency, it is noted that aggregate inputs for this standard requires aggregate inputs to comply with I.S. EN 12620:2002+A1:2008 - *Aggregates For Concrete* or I.S. EN 13242:2002 +A1:2007 - *Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*. Therefore I.S. EN 206 is not considered directly relevant to aggregates and is not listed above.

Note 4: While technical specifications listed are specified for road works, S.R. 21:2014+A1:2016 - *Guidance on the use of I.S. EN 13242:2002* requires compliance with these specifications for certain applications.

It is considered that the use of recycled aggregate may fall within the scope of REACH Regulation, POPs Regulation³³, CLP Regulation³⁴, Building Regulations³⁵, and General Product Safety Regulations³⁶ and any other legislation relevant to its use or products. Accordingly, the recommended criteria require compliance with these regulations where they are applicable. Of the above, the recycled aggregate must specifically:

- meet registration obligations under REACH and the conditions of commercialisation of substances of very high concern (SVHC) laid out in Article 56 of Regulation REACH;
- not be classified as hazardous following the definitions in Article 3 of the CLP Regulation; and
- meet the prescriptions about the restriction of the commercialisation of persistent organic pollutants laid out in Article 3 of POPs Regulation.

7.5.1 STRUCTURAL LIMITATIONS

It is evident that a market & demand for recycled aggregate for use in structural applications exist and that such uses are permitted in other Member States internationally. These uses are also provided for under harmonised aggregate product standards for bound applications (concrete, mortar, bituminous mixtures etc.). While the role of end-of-waste is solely to determine when a material stops being classified as waste, the Agency has considered concerns raised and highlighted in *Section 7.3* above. Taking these concerns into account in addition to a number of other factors as detailed below, structural uses of recycled aggregate were excluded from the scope of the draft criteria. The main reasons for exclusion are summarised as follows:

- Through extensive stakeholder consultation and engagement concerns were raised by a number of organisations including the DHLGH and GSI in relation to the use of recycled aggregate in/under building structures and in structural applications. The IWMA also raise concern that it may be misused in structural applications and consequently result in damage to the reputation of recycled aggregate products. These concerns are borne namely from Ireland's recent catastrophic issues with pyrite, mica and pyrrhotite in building structures, which has resulted in a significant bill (€2 billion) to the State. Refer to *Section 7.3* for further details;
- The original scope of the project to develop the criteria did not include a detailed assessment of the strength and performance of recycled aggregates in bound applications in Ireland or internationally;
- Further assessment of structural applications and bound uses would have significantly delayed a National decision on end-of-waste for recycled aggregates; and
- The scope of the environmental and human health risk assessment and derivation of PLVs was confined to unbound (granular) aggregate.

Annex II, Section 1.1 of the draft criteria included limitations on the use of recycled aggregate as follows:

The recycled aggregate that is produced in compliance with these criteria shall only be suitable for the following specific uses:

(i) unbound uses:

(a)... to (h)...

(ii) bound uses:

(a) non-structural concrete

³³ Persistent Organic Pollutants - Regulation 850/2004/EC (POPs)

³⁴ Classification, Labelling and Packaging - Regulation (EC) No 1272/2008 (CLP)

³⁵ Building Regulations 1997, as amended;

³⁶ S.I. No. 199/2004 - European Communities (General Product Safety) Regulations 2004

- (b) bituminous surfacing;
- (c) any other uses as agreed by the Agency.

Annex II, 2.1 of the draft criteria also included a number of restrictions to exclude use of recycled aggregate produced in accordance with the criteria from use in structural applications. The restrictions specified that the recycled aggregate shall not be used:

- in **structural concrete or mortar**, including concrete blocks or other bound applications for structural use;
- in **building structures**, including beneath the structure or within its fabric, foundations, or curtilage (within 1m);
- **footpaths adjacent to building structures**;
- in **civil engineering structures**, excluding linear features, including beneath the structure or within its fabric, foundations or supports;
- as unbound granular fill (hardcore) for use under concrete floors and footpaths;”.

As there was no suitable definitions identified within harmonised aggregate product standards, Eurocodes or legislation, a number of definitions were drafted for the purpose of clarity within the draft criteria, including:

- 'bound uses'- aggregate that has been bound using a hydraulic binder (e.g. concrete) or bituminous binder (e.g. asphalt);
- 'unbound uses'- aggregate used in granular form.
- 'non-structural concrete' means concrete other than that described as 'structural concrete';
- 'structural concrete' means concrete used in building or civil engineering works, excluding linear features (e.g. to construct structural walls of a buildings, retaining structures, foundations, bridges, tunnels or similar). Structural concrete includes concrete that:
 - (i) is load bearing; and/or
 - (ii) is reinforced; and/or
 - (iii) supports the weight of a structure;

7.6 SUBMISSIONS

Submissions received on the draft criteria relating to technical requirements and structural limitations/ restrictions on use, along with an inspector’s response to each are detail below:

Issue No. 11- Restrictions on structural use	
Issue Details	<p>Submissions and feedback received on the draft criteria in relation to the exclusion of structurally bound applications are mixed. The DHLGH and the IWMA are in support of these limitations and restrictions. The DHLGH state in their submission that:</p> <p><i>"Given that further work is required on the hENs to fully address recycled aggregates, and the potential consequences of inappropriate aggregates in buildings elements which has occurred in hardcore fill and concrete blocks, the Department is of the view that the restriction on use of recycled aggregates in buildings and structures is of utmost importance and must be maintained.</i></p> <p><i>Any proposed consideration to extend the uses should be carried out in consultation with this Department and NSAI."</i></p> <p>In general, submissions from the construction and demolition industry, as well as some waste operators, researchers and some regulators, have strongly expressed their disappointment that the draft criteria did not provide for structural bound uses of recycled aggregates. Submissions indicate that the restrictions as they stand would prevent use of recycled aggregates in most bound applications.</p> <p>The repeated argument is made within submissions that existing harmonised aggregate product standards are sufficient to ensure quality of aggregate for use in structural bound applications such as concrete. It is argued that it is for the</p>

	<p>designing engineer to decide what is suitable for their purpose and <u>not</u> the Agency. Submissions also suggest imposing such restriction are at conflicts with harmonised aggregate product standards.</p> <p>Submissions have highlighted that by limiting the use of recycled aggregates to non-construction uses conflicts with the principles of a circular economy. This being that secondary products should be used for the highest available value uses rather than in lower grade uses. e.g. recycled concrete should be used in construction products such as concrete, whereby it can be recycled again and again rather than it being use as fill or in forestry/ agricultural roads where it is unlikely to be recycled again.</p> <p>The international Federation for Recycling (FIR) stated that the restrictions on use in structural concrete <i>"is not in line with EU Harmonised Standards which allow recycled components in certain classes of concrete. It is unusual for an End of Waste decision which primarily focus on environmental matters to interfere with established EU standards which take account of structural risks. Construction waste in our view should be permitted to be recycled into construction products in line with circular economy principles and the existing EU standards (e.g. concrete can be made back into concrete)"</i>.</p>
Inspector's Response	Refer to <i>Section 7.5.1</i> above for a detailed assessment and response to this issue.
Issue No. 12 – Definitions for Structural & Engineering Terms	
Issue Details	<p>There are numerous submissions in relation to the definition for structural concrete, with some requesting that it be made clearer and others requesting it include minimum strengths, provide clarity around ready-mix concrete and masonry. In addition, clarity was sought in relation to the criterion <i>Annex II, 2.1</i> which prohibits the use of recycled aggregates in <i>"structural concrete or mortar, including concrete blocks or other bound applications for structural use;"</i>. It was queried whether this criterion rules out all concrete blocks or just load bearing concrete blocks.</p> <p>In addition, definitions for other structural and engineering terms have been requested.</p>
Inspector's Response	<p>'Structural concrete' features within engineering language features heavily within harmonised aggregate product standards, Eurocodes and legislation, however no formal definition is provided within these documents. While it is not the Agency's role to develop technical definitions, for the purpose of clarity and to avoid mis-interpretation/ mis-use, a definition has been drafted. The definition is solely intended for the purpose of the criteria and should not be used in other applications as a legal interpretation for the definition of structural concrete.</p> <p>I have engaged the NSAI aggregates panel to discuss this issue. It has been indicated that any further clarifications in relation to the definition, such as specifying a minimum strength, are best placed within the explanatory note. The explanatory note does not form part of the documentation for mandatory consultation of the National criteria with the Europe Commission. As such we shall continue to collaborate with stakeholders to provide any further clarifications necessary. Any such clarifications will be included within a revision of the explanatory note.</p> <p>While other definitions for structural/ engineering terms such as "civil engineering works" and "civil engineering structures" have been requested to be provided, these are not considered essential to the functioning of the criteria and are not for the Agency to define. As such no definitions for these have been provided.</p> <p>In order to provide clarity, structural limitations specified under <i>Annex II, 2.1</i> of the draft criteria have been set out separately under <i>Annex II, 2.2</i>. <i>Annex II, 2.1</i> has been revised to only contain limitations relating to environmental & human health protection. In addition, the draft criterion: <i>"structural concrete or mortar, including concrete blocks or other bound applications for structural use;"</i> has been amended under <i>Annex II, 2.2</i> of recommended criteria, separating it into two stand-alone criterion as follows:</p> <p><i>"The recycled aggregate that is produced in compliance with these criteria is not suitable for use: ...</i></p>

	<p>(i) <i>in structural concrete or mortar or other bound applications for structural use;</i></p> <p>(ii) <i>in concrete blocks or other masonry other than those specified in 1.1 (c);"</i></p> <p>The criteria are intended to exclude any potential use in concrete, concrete blocks or masonry used in building structures or other civil engineering structures. The criteria are drafted in such a way to allow bound applications in linear features (e.g. roads, haul/ access roads), areas of hardstanding (e.g. open air carparks), large interlocking non-structural concrete blocks. For clarity, criterion <i>Annex II, 1.1 (ii)(c)</i> has been added to the list of suitable uses, which provides for the use of recycled aggregates in:</p> <p><i>"large interlocking non-structural concrete blocks for use as division of storage bays and barriers".</i></p>
Issue No. 13- Applicable harmonised aggregate product standards s	
Issue Details	<p>It has been suggested in a number of submissions, including the DHLGH submission, that the criteria should explicitly reference the harmonised aggregate product standards and associate standard recommendations/ annexes that should be complied with.</p>
Inspector's Response	<p>Criterion <i>Annex I, 3.2</i> of the draft criteria required that:</p> <p><i>"The recycled aggregate shall comply with the relevant product harmonised aggregate product standards, industry specification, and customer specification, as applicable for the materials specified use.</i></p> <p><i>Where a harmonised aggregate product standards is available for a specified use, the recycled aggregate shall comply with the standard."</i></p> <p>As harmonised aggregate product standards are subject to revision and that new applicable standards can become available, reference to specific harmonised aggregate product standards was deliberately omitted from the criteria. The justification for this is that any change of National criteria would require notification to the European Commission for a three month period. It was instead envisaged that the explanatory note could provide live guidance in relation to the applicability of harmonised aggregate product standards. It remains recommended that this approach is adopted to minimise administrative burden on the Agency and so not to compromise functioning of the criteria, should standards be revised/ published. It is noted there is work currently under way to review a number of standard recommendation for aggregates as well as develop new aggregates standard. In addition, a review of CPR is underway.</p> <p>Criterion <i>Annex I, 3.2</i> of the draft criteria, has however been revised to provided clarity on what is required for construction products and non-construction products <i>as follows:</i></p> <p><u><i>"a. Construction Products</i></u></p> <p><i>Recycled aggregates which fall within the scope of CPR and are defined as construction products shall comply with:</i></p> <p><i>i a relevant harmonised aggregate product standard(s) applicable to the materials specified use;</i></p> <p><i>ii applicable industry specification(s) as available and as applicable for the materials specified use; and</i></p> <p><i>iii Any additional customer specifications;</i></p> <p><i>or</i></p> <p><u><i>b. Non-Construction Products</i></u></p> <p><i>Recycled aggregates which do not fall within the scope of CPR shall comply with:</i></p> <p><i>i relevant harmonised aggregate product standard(s), where available and as applicable for the materials specified use;</i></p> <p><i>ii applicable industry specification(s) as available and as applicable for the materials specified use; and</i></p> <p><i>iii Any additional customer specifications"</i></p>
Issue No. 14- Uncertified non-construction products	

Issue Details	Submissions have raised concern in relation to some recycled aggregates (non-construction products) not being required to conform to and be certified in accordance with a harmonised aggregate product standard. The submissions suggest that this will allow operators to exploit this and they raise concern in relation to "self-certification". It is suggested that the "lower quality material" produced from waste may present higher risk (to the environmental and to human health) than uncertified virgin material which it may replace for the same use. It is also argued that other Member States require all their recycled aggregate to be certified in accordance with a harmonised aggregate product standard for aggregate products.
Inspector's Response	<p>Refer to <i>Section 7.5</i> above for a detailed assessment and response to this issue. <i>Section 7.5</i> discusses precedent set in Italy for such uncertified applications.</p> <p>The criteria have been written in such a way to mirror Irish markets for virgin aggregates, for which it has been reported that markets for uncertified non-construction product virgin aggregates exist. One of the principles of end-of-waste is that the material can be used in the same way as the material it replaces. It is considered that the criteria are in line with this principle.</p> <p>There is a requirement for each batch of end-of-waste material to be tested against PLVs and that an independently certified QMS must be in place to control and oversee this process. It is considered that certifiers of an FPC would limit their scope of assessment to compliance with a harmonised aggregate product standard only and that they would not assess for compliance with environmental limits or any other end-of-waste requirements. As such it is considered that whether complying with harmonised aggregate product standard or not, the same controls with regard to environmental quality apply to certified construction products as to uncertified non-construction product for recycled aggregates. Therefore, the environmental risk present between these product types is deemed no greater risk. Sufficient control on quality is deemed to be required for non-construction recycled aggregate products.</p> <p>Further to the above, it is considered that recycled aggregates recovered from certain wastes, e.g. mixed construction and demolition wastes, will be unable to be defined as construction products by virtue of the definitions for recycled aggregates and natural aggregates within the harmonised aggregate product standard. This is confirmed by a submission made by NSAI aggregates panel in which they state:</p> <p><i>...it is important to note that only those recycled aggregates falling under the I.S. EN 13242, I.S. EN 12620 etc. definition can be used as "construction products". Such recycled aggregates are a sub-set of those permitted in the EPA document.</i></p> <p><i>All other recycled aggregates falling under the EPA definition can be used, but only as "non-construction products" (i.e. they cannot be used for the end-uses falling within the scope of I.S. EN 13242, I.S. EN 12620 etc.). In this regard they could for example, be used for haul roads, decorative stone and other "non-construction products" situations."</i></p> <p>Therefore, the recommended criteria provide circular options for non-construction product materials rather than them remaining as waste.</p> <p>Criterion <i>Annex I, 3.2</i> of the draft criteria, has however been revised to provide clarity on what is required for construction products and non-construction products, as detailed in <i>Key Issue 13</i> above.</p>
Issue No. 15– Footpaths	
Issue Details	<p>A number of submissions queried the justification for exclusion of recycled aggregates for use in footpaths which are not adjacent to building structures, as specified in <i>Annex II, 2.1</i> of the draft criteria:</p> <p><i>"unbound granular fill (hardcore) for use under concrete floors and footpaths."</i></p>
Inspector's Response	<p>This was an unintentional exclusion and was borne from the direct quote of restrictions specified in <i>Annex E</i> of S.R.21.</p> <p>The recommended criteria include the following changes to the draft criteria (bold text added), under <i>Annex II, 2.2 (vi)</i> :</p> <p><i>"as unbound granular fill (hardcore) for use under concrete floors and footpaths adjacent to building structures"</i></p>
Issue No. 16 - Soil Washing	

Issue Details	A submission makes the case that aggregates produced by washing of inert soil and stone (LoW Code 17 05 04) are “analogous” to natural aggregates derived from a virgin commercial sand and gravel operation. These would be classified as “natural aggregates” rather than recycled aggregates under harmonised aggregate product standards. It was stated that <i>“Washing of inert soil and stone is widely employed in other countries but is in its infancy here in Ireland. The draft End-of-Waste Criteria as it stands would in our opinion make this processing method uneconomic and result in this viable mineral material going to landfill”</i> . It is suggested that <i>“The specific use and restrictions on use as specified in Annex II of the Draft Criteria NOT be applied to washed 17 05 04 inert soil and stone derived aggregates.”</i>
Inspector’s Response	Recycled aggregates are derived from heterogenous and potentially mixes of multiple sources of waste compared with homogenous virgin aggregates quarried from a set uniform lithology/ source. Refer to <i>Section 7.3.1</i> above for further information. As such, recommended restrictions are considered appropriate and necessary. Where sufficient evidence (data) is made available to confirm consistency of environmental and geotechnical quality in line with the recommend criteria from such processing, the decision may be reviewed in the future with consideration to the suggestion above.
Issue No. 17- Development of Irish Standards	
Issue Details	Another submission suggest that an <i>“Irish Standard/Code of Practice”</i> be drawn up that would be specific to the production of recycled aggregates. It is added this could assist in quality control of non-construction products where no technical specifications or standards are applicable.
Inspector’s Response	Development of standards or codes of practice is outside the remit of end-of-waste and the Agency. Industry could however lead out on development of Irish standards, codes of practise or quality protocols. It is also noted that NSAI are the component authority for standards in Ireland.
Issue No. 18 – REACH Requirements	
Issue Details	A number of submissions were made seeking clarification on what REACH requirements apply to recycled aggregate. There also seems to be lack of clarity as to whether recycled aggregates constitute “articles, “substances” or “mixtures”
Inspector’s Response	Details in relation to the REACH requirements are provided in <i>Section 7.4</i> above. It is outside the scope of the Agency, or end-of-waste, to provide guidance in relation to REACH. The HSA are the competent authority in Ireland in relation to REACH.

7.7 INSPECTOR’S CONCLUSION & RECOMMENDED CRITERIA

It has been evidenced through Irish single case decisions and practises in other Member States that recycled aggregate can meet applicable technical requirements, standards and legislation relating to products and can accordingly access the market. The applicability of technical requirements and CPR (product legislation) may differ for recycled aggregates depending on whether the material is used as a construction product or not. The draft criteria and explanatory note have been revised to clearly differentiate the requirements for construction products and non-construction products. With the exception of CPR, all other product legislative requirements apply to both construction and non-construction products.

Numerous submissions were received as documented in *Key Issue 11* and *Key Issue 12* above relating to the structural restrictions imposed by the draft criteria. With consideration to this *Sections 7.7.1* and *7.7.2* below review options for the recommended criteria with this regard.

7.7.1 REVIEW OF OPTIONS FOR STRUCTURAL LIMITATIONS

Considering the submissions made, it is determined that the Agency have a number of options as follows:

- a. Keep limited bound use and associated structural restrictions as per draft criteria;
- b. Remove all bound uses from the decision, with the exception of bound use in linear features;

- c. Remove all restrictions on bound uses and require compliance with harmonised aggregate product standards for structural uses; or
- d. Remove all bound uses from the decision, limiting the decision to unbound use only.

7.7.2 RECOMMENDED CRITERIA FOR STRUCTURAL LIMITATIONS

In order for a decision to progress for structural applications of recycled aggregate the following evidence would be required:

- Firstly, we need to establish confidence and build a proven track record here in Ireland in the production of quality recycled aggregates;
- Further Irish based evidence is required in relation to the performance of recycled aggregates in these applications; and
- Further risk assessment is required in relation to the leachability of contaminants from bound applications, which may in fact, result in less stringent limitations, restrictions and PLVs.

Concerns were raised in submissions that the structural restrictions may conflict with harmonised aggregate product standards with a submission stating that *"One of the purposes of the construction products regulation and harmonised European product standards is that there is commonality of all harmonised products across the market area. In addition, Member States are prohibited from setting additional National requirements that conflict with those set out in the European standard in the interest of ensuring consistency of approach across all Member States."* While it is not the role of end-of-waste to specify technical restrictions for use, it can be inferred from the Regulations that end-of-waste can apply limitations/ restriction to ensure no overall adverse environmental or human health impacts. Similarly, Regulation 28(1)(a) requires that *"the substance or object is to be used for specific purposes"*. It is therefore argued that the Agency may decide that the criteria are for certain specified uses and not for others, regardless of what is specified within harmonised aggregate product standards. It is also worth noting that the draft criteria do not introduce any additional specifications of limits in relation to technical properties, but rather exclude specific end uses. I engaged the DHLGH and the aggregates panel subsequent to their submissions to discuss this point further. On the basis that Regulation 28 allows for the specification of use, it was agreed that this would likely subside any potential conflict with harmonised aggregate product standards.

The recommended criteria are the first of its kind in Ireland and as such should be used a baseline/ building block on which future end-of-waste criteria can be developed. Accordingly, it is considered that these criteria should have a certain level of precaution and control built in. This precaution is presented through the structural restrictions recommended within the criteria as well as the environmental limitations presented. Therefore, *Option C* is not recommended with consideration to submissions made, including that of the DHLGH, raising concerns in relation to structural uses.

With the above being said, the criteria should provide for as broad a scope of end uses as possible in order to support the circular economy. *Option A* best supports this objective, while *Option D* would contravene it. *Option A* proposes to allow some non-structural bound applications of the material. *Option B* supports this objective to a lesser degree, only allowing bound applications in linear features. The DHLGH and the IWMA are in support of the level of restriction as present in *Option A*, while most other stakeholders call for unrestricted uses to maximise circular use options (*Option C*). For the above reasons, it is recommended to retain restrictions on structural uses of recycled aggregates as per the draft criteria, with a number of minor clarifications and additions, in line with *Option A* above.

Once sufficient evidence and proven track records of quality have been established, the criteria can be reviewed to assess whether they remain fit for purpose and whether they need revision.

7.8 INSPECTOR'S CONCLUSION & RECOMMENDED CRITERIA

I consider that this conditions 1(a)(iii), (2)(c) and 5 of Regulation 28 are satisfied, having regard to the fact that Section 3.1(d) and Annex I (Parts 3.1 to 3.3) of the recommended criteria include:

- a requirement for each batch of recycled aggregate to comply with applicable product legislation and technical requirements specific to the materials intended use.

8. No Overall Adverse Environmental or Human Health Impacts

Regulation 28(1)(a)(iv) requires that:

"the use of the substance or object will not lead to overall adverse environmental or human health impacts.."

Regulation 28(2) requires that detailed criteria set by the Agency for end-of-waste shall:

"take into account any possible adverse environmental and human health impacts of the substance or object and shall satisfy the following requirements:

(c) quality criteria for the end-of-waste materials resulting from the recovery operation in line with applicable product standards, including limit values for pollutants where necessary".

8.1 APPROACH

The following work and assessments were undertaken to demonstrate that the use of recycled aggregates in line with the recommend criteria would not lead to overall adverse impacts and to derive a suitable set of Pollutant Limit Values (PLVs):

- a. A specialist hydrogeologist was appointed to undertake a detailed environmental and human health risk assessment including the derivation of Pollutant Limit Values (PLVs) and identification of limitations for use;
- b. Refinement and verification of suitability of PLVs through:
 - collection and assessment against National data (collected by local authority staff for the specified purpose);
 - collation and assessment against industry provided data; and
 - completion of refined laboratory trial (trial undertaken by specialist hydrogeologist).

8.2 OVERVIEW

A detailed synopsis of the environmental and human health risk assessment undertaken is summarised in the Geosyntec Consultants Ltd. report titled the *End-of-Waste Technical Information - Development of Pollutant Limit Values for Recycled Aggregate Products*³⁷. The report presents a set of PLVs as well as recommend limitations/ restrictions, which, if complied with, shall satisfy that the use of recycled aggregate in accordance with the recommended criteria and not lead to overall adverse environmental or human health impacts. The scope of the risk assessment was refined to unbound (granular) applications of recycled aggregates. While the PLVs focus on unbound applications, based on scientific evidence broadly available in literature, bound applications of recycled aggregates present a lower environmental risk than unbound applications due to reduced leachability of pollutants. As such the derived PLVs are consider protective of environment and human health if applied for bound applications.

The methodology and calculations applied in deriving the proposed PLVs are consistent with the UK Environment Agency 'Level 2 Dilutions' Remedial Targets Methodology³⁸. This method

³⁷ Geosyntec Consultants Ltd. 2023, End-of-Waste Technical Information - Development of Pollutant Limit Values for Recycled Aggregate Products

³⁸ UK Environment Agency, 2006. Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination

is also consistent with the methodology used for the Groundwater Regulations³⁹ and the European Union Joint Working Group on End-of-Waste guidance⁴⁰.

The PLVs will be applicable across the Republic of Ireland and its varied geological settings and, as a result, they should be viewed as generic criteria. Calculating PLVs that are specific to a given local geology and hydrogeology would lead to the generation of numerous area-specific values that would be complicated and impractical to implement at a National level. In effect, a “one size fits all” approach is considered more appropriate. The compromise to achieve this is an inherent level of inbuilt conservatism, and a number of assumptions have had to be made in their development. That said, a degree of pragmatism has also been applied to derive what are considered to represent a workable set of criteria.

The calculations require knowledge of infiltration/recharge rates, an area of interest through which recharge will percolate, and properties of the receiving aquifer, for example hydraulic conductivity and hydraulic gradient. For the estimation of recharge rates, two use scenarios were adopted; One for high permeability (PLV A) and one for low permeability (PLV B) applications. These are essentially dependent upon whether the recycled aggregate will be exposed as surface cover material (at ground level) or present below a low permeability cover (for example, roads, concrete or bituminous surface layers etc.). As the high permeability pollutant limits are more stringent they have been referred to as for ‘general use’, as when they are met, they generally can be used under any scenario.

8.3 CONSULTATION & COLLABORATION

In order to demonstrate that the pollutant limits are realistic and achievable laboratory analytical data was gathered through Local Authority collaboration and industry engagement. Industry representatives and waste operators were engaged through a questionnaire to gather their sampling data for recycled aggregates. A significant volume of data was provided by industry.

A collaborative approach was established with Regional Waste Management Planning Offices to collect data on recycled aggregates through a National sampling regime. This provided a “National” dataset which is regionally representative of recycled aggregates in Ireland.

In addition, three industry representatives accommodated sampling of recycled aggregate by the Agency appointed specialist hydrogeologist to facilitate leaching trials.

A detailed synopsis of the comparison of industry, “National” and trial laboratory analytical data against derived PLVs is provided within the Geosyntec Consultants Ltd. report.

8.4 INSPECTORS ASSESSMENT

The assessment of laboratory analytical data against the recommended PLVs has demonstrated that the PLVs are achievable and suitable for use. The recommended PLVs are considered suitably robust to ensure quality of recycled aggregates with respect to the environment and human health. As presented in Table 2.5 of the Geosyntec report, the PLVs are *generally less conservative than the published JRC (2014) and Nordic (Hjelmar et al 2016) End-of-Waste criteria but are, on the whole, similar to Nordic EoW for roads and lower than 2002 inert landfill WAC. The Nordic EoW criteria for roads and for 100m bunds have been generated for specific geotechnical uses which are similar to that proposed for PLVs.* Table 2.5 of the Geosyntec report is reproduced in *Appendix 2* below.

In order to ensure safe use of recycled aggregate without any adverse impacts, a number of limitations and restrictions have been deemed necessary. Recommended limitations and restrictions specified under *Annex II, 2.1* are targeted to specific receptors, including the environment (groundwater and surface water); human health and ecology, as detailed below.

³⁹ European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. no. 9 of 2010), as amended

⁴⁰ European Union, Joint Research Centre 2014. JRC Technical Reports: Study on methodological aspects regarding limit values for pollutants in aggregates in the context of the possible development of end-of-waste criteria under the EU Waste Framework Directive

All environmental, human health and ecological limitations are borne from the risk assessment undertaken to develop PLVs as reported in the Geosyntec Consultants Ltd. report. Justification for each restriction for use is categorised and set out below.

8.4.1 ENVIRONMENTAL PROTECTION LIMITATIONS

Criterion Annex II, 2.1(i) - recycled aggregate that is produced in compliance with these criteria is not suitable for use in contact with groundwater or surface waters

It is well documented, particularly for concrete/ mixed C&D waste derived aggregate, that leachate results typically exceed water quality standards. This implies that the aggregate is not suitable for direct contact with groundwater or surface water. On that basis a detailed risk assessment, including modelling, was undertaken to derive PLVs.

Criterion Annex II, 2.1(ii) - recycled aggregate that is produced in compliance with these criteria is not suitable for use within 25m of a groundwater abstraction;

Criterion Annex II, 2.1(iii) - recycled aggregate that is produced in compliance with these criteria is not suitable for use within 10m of a natural surface water feature, spring, lake, turlough likely to flood, or cavernous or karstified limestone features; and

Criterion Annex II, 2.1(iv) - recycled aggregate that is produced in compliance with these criteria is not suitable for use pipe bedding, haunching or surrounding materials around perforate pipe or in drainage construction (i.e. parts/ systems that may be in direct contact with water)

The Geosyntec Consultants Ltd. report states:

"It is recommended that a 25 m exclusion distance is placed in between the Recycled Aggregate and the abstraction point. For a natural surface water feature, spring, lake, turlough likely to flood and cavernous or karstified limestone features, it is recommended a 10 m exclusion distance is placed in between the Recycled Aggregate and such features. These exclusion distances:

(a) are consistent with distances applied in current guidance (e.g. European Union (Good Agricultural Practice for Protection of Waters) Regulations 2022, S.I. No. 113 of 2022; and EPA 2021, Code of Practice, Wastewater Treatment and Disposal Systems Serving Single Houses),

(b) will help limit the potential for accidental release of recycled aggregate/ concrete material or run-off [containing leachate from recycled aggregate] into surface water; and

(c) allow for additional attenuation processes (e.g. biodegradation, retardation etc.) within the unsaturated and saturated zones to take effect, which are not currently included in the proposed PLVs. The proposed exclusion distances will provide for an additional factor of safety with respect to the protection of sensitive receptors."

Criterion Annex II, 2.1(viii) - recycled aggregate that is produced in compliance with these criteria is not suitable for use in an area greater than or equal to 100m width x 100m length or in an area greater than 50m in width when used in linear features

The derivation of PLVs included a detailed risk assessment of potential environmental impacts from use of recycled aggregate in unbound (granular applications). Full details of this risk assessment and the basis for recommended limitations are presented in the Geosyntec Consultants Ltd. report.

In the derivation of pollutant limits the area of placement is required to be known in modelling calculations. A 100m x 100m area was deemed sufficiently large enough for the assessment of potential risks stemming from typical use scenarios for the recycled aggregate. The 100m x 100m assumption is consistent with other members states such as in the Nordic criteria. If a larger area was assumed, then the derived pollutants would be more stringent and would

be impractically low for use. Linear features such as roads & railway lines are considered unlikely to be wider than 100m in the direction of groundwater flow and, therefore are not considered to be excluded by this size constraint and are instead limited to 50m in width. Consequently, the criterion *Annex II, 2.1(viii)* restricts the area of use to 100m width x 100m length and 50m in width when used in linear features.

Criterion Annex II, 2.1(ix) - recycled aggregate that is produced in compliance with these criteria is not suitable for use within 25m of another area(s) of recycled aggregate where the combined area is greater than 100m in width for square or rectangular applications;

The Geosyntec Consultants Ltd. report states:

"If it is proposed to place Recycled Aggregate over a distance greater than 100m in one direction, then it is recommended that there is a minimum separation distance of 25m between individual areas of Recycled Aggregate. This is consistent with the recommended separation distance for groundwater abstraction wells, the intent being that any mild leachate plume arising from an area of Recycled Aggregate is likely to have dissipated within this distance, therefore the requirement for this separation distance should prevent cumulative effects on groundwater quality. This separation distance shall not apply to linear features (e.g. road and railway embankments), on the basis that such features are unlikely to be closely aligned with groundwater flow direction over an extended distance."

Criterion Annex II, 2.1(v) - recycled aggregate that is produced in compliance with these criteria is not suitable for use for the purpose of infilling of any former quarry, pit or mineral excavation related to mining;

The Geosyntec Consultants Ltd. report states:

"It is important to note that PLVs should not be used in place of WAC. Recycled Aggregate products passing PLVs are to be used in specific situations and should never be used in landfilling operations to infill any quarry or large void where WAC and specific risk assessments should apply. Large volume sources such as infilled quarries have the potential to generate a large volume of leachate and will represent a much higher risk to the water environment than the scenarios modelled to derive PLVs"

8.4.2 ECOLOGICAL LIMITATIONS

Criterion Annex II, 2.1(vi) - recycled aggregate that is produced in compliance with these criteria is not suitable for use as growth medium in areas used for food production or livestock grazing & Criterion Annex II, 2.1(vii) - recycled aggregate that is produced in compliance with these criteria is not suitable for use as ground cover in areas where protected species and habitats are present;

These criteria cover both ecological and human health receptors. The Geosyntec Consultants Ltd. report states:

"To protect against potential risks to human health and ecology [it is] recommended that Recycled Aggregate is not used as growth medium in areas used for food production or livestock grazing, or as ground cover in areas where sensitive ecological species are present. This exclusion does not incorporate tracks within forestry and agricultural land, on which living organisms are likely to spend only limited time. Additionally, to determine whether a sensitive ecological species could be present, an assessment should be made by checking for statutory defined ecological sensitive sites, or by seeking the advice of a competent ecologist."

8.4.3 HUMAN HEALTH RESTRICTIONS

Criterion Annex II, 2.1(vi), - recycled aggregate that is produced in compliance with these criteria is not suitable for use as growth medium in areas used for food production or livestock

grazing

Refer to *Section 8.4.2* above.

Criterion Annex II, 2.1(ii) - recycled aggregate that is produced in compliance with these criteria is not suitable for use within 25m of a groundwater abstraction

The Geosyntec Consultants Ltd. report states:

"Passing PLVs should mean groundwater is safe for human consumption, having an exclusion distance provides an extra safety factor."

Refer to *Section 8.4.1*, for further details.

Annex I, Table 3

While not set out within 'Restrictions on Use' in *Annex II* of the recommend criteria, arsenic and lead solid pollutant limits values (S-PLVs) have been included within Annex I, Table 3 in protection of human health.

As per the Geosyntec Consultants Ltd. report, recycled aggregate that is produced in compliance with these criteria is not suitable for use in:

- *"Residential (with and without homegrown consumption of produce), allotment or public open space (residential area) land uses where material will be exposed at the surface or in produce plant uptake areas where material does not meet additional arsenic and lead S-PLVs. "*

Compliance with these pollutant limits is only required where the material is being specified as suitable for use in residential settings, for example used as groundcover on driveways.

8.5 SUBMISSIONS

Submissions received on the draft criteria relating to pollutant limits and environmental and human health limitations/restriction on use, along with an inspector's response to each are detail below:

Issue No. 19 – Size and distance restrictions	
Issue Details	<p>There were numerous submissions made questioning the logic behind the inclusion of restrictions on areas of placement of the recycled aggregate, including:</p> <p><i>"Annex II, Criterion 2.1- recycled aggregate that is produced in compliance with these criteria is not suitable for use:</i></p> <ul style="list-style-type: none"> • <i>within 25m of a groundwater abstraction;</i> • <i>within 10m of a natural or man-made surface water feature, spring, open drain, lake, turlough likely to flood, or cavernous or karstified limestone features;</i> • <i>in an area greater than 100m width x 100m length or in an area greater than 1km long and over 50m in width when used in straight sections in linear features;</i> • <i>within 25m of another area(s) of recycled aggregate where the combined area is greater than 100m in width for square or rectangular applications or the length is greater than 1km and is less than 50m width for linear features".</i> <p>Submissions indicate that these criteria would:</p> <ul style="list-style-type: none"> • limit the overall effectiveness of the deployment; • prevent use in most construction products; • present as unworkable;

	<ul style="list-style-type: none"> • put off buyers/ users of the material due to the complexity and project management that would be required in applying these criteria and as a consequent reduce the uptake of use of the material; • prevent use in most road and linear feature constructions which, in most case include manmade water drainage features; • conflict with EU harmonised standards; and • reduce circularity and go against the principles of a circular economy. <p>In addition to the above, submissions were received questioning why there is not a limitation on the thickness of recycled aggregate that can be placed.</p>
<p>Inspector's Response</p>	<p><i>Section 8.4.1</i> above provides justification for these criteria.</p> <p>I consulted Geosyntec Ltd. to assess whether any of the recommendations for environmental limitations could be reduced, particularly in relation to the 10m separation distance from man-made surface waters drainage in road construction and the 25m separation distance between areas of placement of aggregate within the size constraints. Following discussion and appropriate review, it was agreed that following restrictions are not required:</p> <ul style="list-style-type: none"> • 10m separation distance from man-made surface waters in linear features; and • length restriction on the area of placement for linear features. <p>The PLVs have been generated assuming that recycled aggregate will be spread across a set area, up to 100 m long in the direction of groundwater flow and is adopted for the calculation of attenuation by dilution. The separation distance for linear features has been removed on the basis that such features are unlikely to be closely aligned with groundwater flow direction over an extended distance. Man-made surface-water drains associated with linear features are typically engineered structures designed to manage surface water run-off. These often include a designed systems to manage collected run-off. Such systems should be designed in accordance with <i>Building Regulations 2010, Technical Guidance Document H: Drainage</i> and Waste Water Disposal and the Dublin City Council "<i>Sustainable Drainage Design & Evaluation Guide</i>" (2021) provide good practice guidance for designing drainage systems to mitigate risks from contaminants within the collected surface water run-off. The finalised Geosyntec Consultants Limited Report reflects these amended recommendations.</p> <p>With consideration to the above the recommended criteria include the following changes <i>under Annex II, 2.1</i> to the draft criteria (bold text added, strikethrough removed):</p> <p><i>(iii) within 10m of a natural or man-made surface water feature, spring, lake, turlough likely to flood, or cavernous or karstified limestone features;</i></p> <p><i>(viii) in an area greater than or equal to 100m width x 100m length or in an area width greater than 1km long and over than 50m in width when used in straight sections in linear features;</i></p> <p><i>(ix) within 25m of another area(s) of recycled aggregate where the combined area is greater than 100m in width for square or rectangular applications or the length is greater than 1km and is less than 50km width for linear features".</i></p> <p>While it is accepted that the 100m x 100m restriction is somewhat conservative and restrictive, it is borne out of the derivation of pollutant limits. If a larger area was chosen for assessment then the pollutants would be more stringent and difficult to achieve. The establishment of a larger or unrestricted area for application would be hinged on a review of the modelling assumptions (namely compliance point) for the derivation of pollutant limits. This is discussed further in <i>Issue 20</i> below.</p> <p>The modelling methodology utilised did not include thickness of aggregate placed within its calculations and therefore a limitation has not been set. It is considered however, that the 100m x 100m restriction on area of placement would be likely to restrict use of recycled aggregate in any significant thickness.</p>
<p>Issue No. 20 – Pollutant Limit Values</p>	
<p>Issue Details</p>	<p>A number of submissions have suggested that the Polycyclic Aromatic Hydrocarbons (PAH) and mineral oil limits proposed are low and may be challenging. It is argued that the mineral oil PLV is disproportionately low compared to most National criteria</p>

	<p>for recycled aggregates in other most Members States and in single case decisions issued to date by the Agency. These allow up to 500mg/kg solid concentrations of mineral oil.</p> <p>In addition to concurring with the above submissions in relation to PAH and mineral limits, the FIR indicated that they consider a number of parameters (arsenic, lead, nickel, zinc, fluoride and sulphate) to be low. They state that they expect that a significant amount of recycled aggregates (>5%) may not pass the PLVs.</p> <p>Submissions were also made by stakeholders commenting that the report on the derivation of pollutant limits was not made available as part of the consultation.</p>
<p>Inspector's Response</p>	<p>The EPA 2011, <i>Guidance on the authorisation of Discharges to Groundwater</i>⁴¹ states: <i>"Regulation 7 of the Groundwater Regulations further states that "Point source discharges and diffuse sources liable to cause groundwater pollution shall be controlled so as to prevent or limit the input of pollutants into groundwater". This 'prevent or limit' objective is the core groundwater quality objective addressed by this guidance. In principle, 'prevent or limit' measures are the first line of defence in restricting inputs of pollutants to groundwater and thereby avoiding or reducing pollution. The 'prevent' objective relates to hazardous substances, whereby all necessary and reasonable measures should be taken to avoid the entry of such substances into groundwater and to avoid any significant increase in concentration in groundwater, even at a local scale. The 'limit' objective relates to non-hazardous substances,</i></p> <p><i>whereby all necessary measures should be taken to limit inputs into groundwater to ensure that such inputs do not cause deterioration in status of groundwater bodies, nor significant and sustained upward trends in groundwater concentrations.</i></p> <p><i>... Under Regulation 9 of the Groundwater Regulations, inputs of hazardous substances must be prevented from entering groundwater. In theory, the compliance point should be directly beneath the source, at entry into the groundwater underlying the site, and before dilution/mixing with groundwater."</i></p> <p>The PLVs for organics (including PAH and Mineral Oil) were derived for solid concentrations as the setting of leachate limits for these parameters would have resulted in impracticable low limits. In addition, laboratories would unlikely be able to achieve suitable low limits of detection to enable demonstration of compliance. Accordingly, the principle of assuming that the material should not be contaminated (i.e. organics PAH, mineral, BTEX (Benzene, toluene, ethyl-benzene and xylene), and Polychlorinated BiPhenols (PCBs) should not be present) was adopted with consideration to human health impacts also being given. Since the draft criteria were published for consultation, new data from laboratory trials has become available which raised concerns that the mineral oil PLV may result in a high rate of failures. It was identified that this may particularly be the case for recycled concrete aggregates. On further review it is considered that some low concentration of mineral oil may be attributable to additives present within concrete.</p> <p>The laboratory trials included leachate testing of speciated Total Petroleum Hydrocarbons (TPH) of which heavier chain fractions (C10-C40) can be representative of mineral oil. In all cases, where mineral oil was recorded within the solid analysis, all leachable TPH concentrations were recorded below the laboratory limits of detection (LoDs). Further details in relation to this is provided within the Geosyntec Consultants Ltd. report.</p> <p>Accordingly, it is considered that if leachable concentrations are below laboratory LoDs, then it can be demonstrated that the "prevent entry" principle as per the groundwater regulations is achieved. In light of this, criteria have been amended to include the following allowance for mineral oil:</p> <p><i>"If the Mineral Oil (C10-C40) S-PLV is exceeded the aggregate is still considered to pass proposed PLV as long as the following conditions apply:</i></p> <p><i>a. it is not to be used for a residential or allotment end-use</i></p>

⁴¹ <https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/Guidance-on-the-Authorisation-of-Discharges-to-Groundwater-Version-1-Part1-of-2.pdf>
<https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/Guidance-on-the-Authorisation-of-Discharges-to-Groundwater-Version-1-Part2-of-2.pdf>

- b. the solid Mineral Oil (C10-C40) concentration is less than 200 mg/kg and,
- c. leachable concentrations of all speciated total petroleum hydrocarbon criteria working group (TPH-CWG) fractions within the Mineral Oil (C10-C40) range are below laboratory methods detection limits. Minimum 10:1 L/S Ratio laboratory method detection limits that should be met are:
 - i 0.05 mg/kg: TPH Aliphatic (>C10-C12), TPH Aromatic (>C10-C12)
 - ii 0.1 mg/kg: TPH Aliphatic (>C12-C16), TPH Aliphatic (>C16-C21), TPH Aliphatic (>C21-C35), TPH Aliphatic (>C21-C44), TPH Aromatic (>C12-C16), TPH Aromatic (>C16-C21), TPH Aromatic (>C21-C35), TPH Aromatic (>C21-C44)."

I consulted Geosyntec Consultants Ltd. as to whether the same approach could be applied for PAH. They advised that trial data suggested that even where solid PAH concentrations were reported below the laboratory LoDs of 0.63mg/kg, leachate testing in some cases reported detections of leachable PAH. Accordingly, it was considered that this would not present as a workable alternative for solid PAH PLVs.

As per the guidance above modelling can be undertaken for non-hazardous pollutants to account for attenuation within the unsaturated zone (subsoil) and saturated zone (groundwater). The Guidance notes that "*Attenuation processes differ in nature and scale both as a function of site hydrogeology and the chemical nature of the pollutants in question, and therefore influence what compliance values are set*". The Pollutant limits will be applicable across the Republic of Ireland and its varied geological settings and, as a result they should be viewed as generic criteria. Calculating pollutant limits that are specific to a given local geology and hydrogeology would lead to the generation of numerous area-specific values that would be complicated and confusing to use at a National level. Accordingly, the modelling utilised assumed a compliance point for non-hazardous pollutants was set as the underlying groundwater. Therefore, PLV calculations for non-hazardous compounds included attenuation due to dilution of leachate into underlying groundwater using the EA (2006a) RTM Level 2 dilution calculations. The model only accounts for dilution via infiltration and do not account for attenuation or biodegradation within the unsaturated zone. The PLVs do not account for any attenuation of leachate concentrations within the groundwater. The compliance point adopted for hazardous pollutants was selected in line with the EPA guidance above i.e. at the base of the unsaturated zone. The model for hazardous substances does account for dilution attenuation or biodegradation within the unsaturated zone. Accordingly, this sets a somewhat conservative baseline for these PLVs. That being said, it is considered that the leachate PLVs are reasonably achievable and fit for purpose as verified through comparison with National, industry and trial data reported in the Geosyntec Consultants Ltd. report.

In the Netherlands, where a history of recycling aggregates has taken place and strong statistical evidence has been gathered, recycled aggregates can cease to be waste without the need for regular environmental verification testing.⁴² Should the areas of placement (see *Issue 19* above) or the PLVs prove to be unworkable, following roll-out, a review of the modelling could be undertaken. This could include the setting of a compliance point for non-hazardous substances at a further point (distance) within the groundwater aquifer, which could result in less stringent pollutant limits for some parameters and/or a larger allowable area of placement.

In addition to the above, it was noted on review of data that leachate PLVs set for phenol and the 'general use' PLV set for lead were below the laboratory LoDs within the draft criteria (*Annex I, Table 3*). Accordingly, these PLVs have been increased to the laboratory LoDs within the recommend criteria.

The Geosyntec report was not made available during consultation as work in relation to the leachate trials was ongoing at the time and accordingly the report had not been finalised.

8.6 INSPECTOR'S CONCLUSION & RECOMMENDED CRITERIA

⁴² EPA Circular Economy Conference 2022, Presentation by Federation Internationale du Recyclage https://www.youtube.com/watch?v=aiC_7GUtkaY

I consider that this conditions 1(a)(iv) and (2)(c) of Regulation 28 are satisfied, having regard to the fact that *Section 3.1(d & e)* and *Annex I (Parts 3.4 to 3.7, Tables 2 to 4 and Part 4)* of the recommended criteria :

- include a set of robust, yet achievable PLVs as well as limitations/ restrictions on use, that are protective of the environment and human health;
- require that each batch of recycled aggregates meet the PLVs; and
- set out sampling and testing requirements.

9. QUALITY MANAGEMENT SYSTEM

Regulation 28(2)(d) requires that detailed criteria set by the Agency for end-of-waste shall specify:

"requirements for management systems to demonstrate compliance with the end-of-waste criteria, including for quality control and self-monitoring, and accreditation where appropriate."

9.1 APPROACH

The following work and assessments were undertaken in the development of requirements for a Quality Management System (QMS):

- a. Review of single case end-of-waste decisions issued by the Agency;
- b. Consultation with competent authorities in relation to accreditation of Factory Product Control (FPC) system for harmonised aggregate product standards;

9.2 OVERVIEW

Confirming that the recycled aggregate have met the end-of-waste criteria and relevant product requirements is a key step in the recovery/recycling process. For recycled aggregates this is typically achieved through:

- verification testing of the recycled aggregate to ensure it meets pollutant limits, protective of the environment and human health;
- testing and grading of the recycled aggregate to declare its technical performance and characteristics as set out in harmonised aggregate product standards. This may also include demonstration of compliance with limits set out in National provisions/ annexes or technical specifications, and in some cases, customer specifications; and
- documentation of the above.

Implementation of a Quality Management System QMS assists in the above to ensure quality control and consistency of the quality of the output. The operation of a QMS for the waste recovery operation is a prerequisite of end-of-waste.

9.3 CONSULTATION

Refer to *Section 7.3* above for details of consultation undertaken in relation to FPC system accreditation.

9.4 INSPECTORS ASSESSMENT

For all single case decisions made to date by the Agency, each decision includes criteria requiring an independently accredited QMS to be implemented.

Third party accreditation provides assurance and credibility in relation to the consistency and quality of material produced. While independently accredited QMS is not explicitly required by Regulation 28(2), it is considered essential to ensure the quality of recovered material and to verify that the end-of-waste criteria and legislative requirements will be met. This requirement instils control and oversight over the recovery/production process and creates a

level-playing field. This is particularly important for non-construction recycled aggregates which fall outside of the scope of CPR and do not require an FPC to be in place. As such an independently accredited QMS has been included as a requirement within the recommended criteria.

Any aggregate construction products produced in accordance with a harmonised aggregate product standards must be produced under a Factory Product Control (FPC) system. This system is similar to a QMS in that it requires documented procedures and controls to be in place to manage the production process from inputs, processes, testing and outputs. The FPC system has different levels of attestation which include varying degrees of self-certification and independent certification. For construction product aggregates in Ireland, depending on the level of risk, attestation level 2+ (independent third party certification) or attestation level 4 (self-certification) is required. *Section 2.4 of the SWECO Analysis of Aggregates Market in Ireland* report provides a detailed synopsis of the required level of AVCP system for each applicable harmonised aggregate product standards. It is also noted from the SWECO report that all surveyed producers of virgin construction product aggregates *"produce material in accordance with the various hENs that specify the System 2+"*. The report also noted that some of the producers of recycled aggregates surveyed *"apply a quality assurance system as required by the applicable standard(s), which include FPCs and 3rd party (notified body) oversight."*

It should be noted that a FPC system may not be required for recycled aggregates which are specified as non-construction products.

It is noted that two of the four single case for recycled aggregates issued by the Agency imposed a requirement to operate FPC to attestation level 2+. The two more recent single case decisions do not include any requirements in relation to FPCs/AVCP and instead rely on compliance with the overarching harmonised aggregate product standards. The same approach is recommended for the subject criteria.

9.5 SUBMISSIONS

Submissions received on the draft criteria relating to requirements for an independently accredited QMS, along with an inspector's response to each are detail below:

Issue No. 21- QMS & FPC	
Issue Details	<p>A number of submissions have been made in relation to accreditation of the certification body for the QMS. In response to the draft requirement for the QMS to be accredited by Irish National Accreditation Board (INAB), a submission states that <i>"specifying Irish National Accreditation Board as the specific body that will accredit a Management System for the production of recycled aggregates may be seen as a restrictive trade/professional practice."</i> It is noted that other accreditation bodies operative in Europe to accredit management systems and these bodies also operate in Ireland.</p> <p>It is also suggested that <i>"Contractors meeting alternate standards to ISO should also be recognised. Examples being BREEAM (Building Research Establishment Environmental Assessment Method), LEED (Leadership in Energy and Environmental Design), EMAS (Eco Management and Audit Scheme), and NVIR-O-CERT."</i></p> <p>Other submissions state that the requirement to have the management system accredited and verified on annual basis will be onerous, can be costly and as such may cause issues for SMEs working in this market. It is indicated that a QMS is not currently a requirement for all waste authorisations. On the contrary some submissions welcome the requirement for all producers to operate an independently accredited QMS.</p> <p>Clarity was also sought in submissions as to whether the FPC and the end-of-waste QMS and the waste authorisation QMS could be amalgamated.</p>
Inspector's Response	<p>Justification for the requirement of an independently accredited QMS is provided within <i>Section 9.4</i> above. It is important to note that the QMS introduces control over the quality of the material. Independent certification strengthens the credibility of, and trust in, this end-of-waste system. If an independent certification is not in</p>

	<p>place then this control is lost and there is a higher risk that the criteria may be misused and that lower quality (environmental and geotechnical) products may be placed on the market which may damage the reputation of recycled aggregates.</p> <p>The NSAI Aggregate Panel state that they <i>"will need to ascertain if it is even possible to amalgamate the management system for the "waste conversion" with the FPC system for the subsequent aggregate (the secondary product)"</i>. The Agency will engage with stakeholders in this regard and update the explanatory note accordingly once this query has been addressed. It is however considered that the QMSs for the waste authorisation and end-of-waste recovery process can be merged.</p> <p>With consideration to the submissions the recommended criteria include the following changes to the draft criteria (bold text added):</p> <p><u>Definition:</u></p> <p><i>'management system certification body' is a body which has an accreditation certificate issued by the Irish National Accreditation Board (INAB), or equivalent European accreditation body to undertake QMS certification to an approved standard;</i></p> <p><u>Section 6, Part 4.</u></p> <p><i>The management system shall be certified by a Management System Certification Body accredited by the Irish National Accreditation Board, or equivalent European accreditation body This certification shall verify that the management system complies with the requirements of this Section. The verification shall be carried out annually.</i></p>
<p>Issue No. 22 – Records - Retention Times</p>	
<p>Issue Details</p>	<p>Submissions have highlighted that the retention time for the keeping of various records varies throughout the draft criteria, particularly in relation to the statement of conformity (<i>Section 5</i> of the criteria) and the QMS (<i>Section 6</i> of the criteria). It was stated that <i>"a retention period of one year is not sufficient for the statement of conformity and is not in keeping with typical record retention requirements set out in waste authorisation."</i> It was suggested that the producer of the material is required to <i>"retain all documentation including the statement of conformity for a period of between 3 to 7 years"</i>.</p> <p>Queries in relation to the requirement for the user (final holder) of the waste were also raised.</p>
<p>Inspector's Response</p>	<p>Required record retention times specified in the draft criteria have been revised to <i>"for a minimum of 5 years"</i> in <i>Section 5</i> of the recommended criteria.</p> <p>It is considered unenforceable and beyond the remit of the end-of-waste to impose requirements on user of products to comply with requirements of an end-of-waste decision. It is the users responsibility to comply with the manufactures (producers) instructions on the labelling (statement of conformity and declaration of performance) as is the case for any other product, primary or secondary, which is placed on the market. Any such requirements may act as a deterrent for the purchasing of recycled aggregates.</p>

9.6 INSPECTOR'S CONCLUSION & RECOMMENDED CRITERIA

I consider that (2)(d) of Regulation 28 is satisfied, having regard to the fact that *Section 3.1(g)* and *Section 6* of the recommended criteria include:

- A requirement to operate an independently accredited QMS.

10. STATEMENT OF CONFORMITY

Regulation 28(2)(e) requires that detailed criteria set by the Agency for end-of-waste shall specify:

"a requirement for a statement of conformity".

10.1 APPROACH

The following work and assessments were undertaken in the development of statement of conformity requirements:

- a. Review of single case end-of-waste decisions issued by the Agency; and
- b. Consultation with Eastern Midlands WELRA and OEE.

10.2 OVERVIEW

When no further treatment is necessary prior to its use, and once the recovered aggregate meets all end-of waste criteria and quality requirements, it can be considered to have ceased to be waste.

Statements of conformity are another prerequisite of end-of-waste. They act as documented evidence to demonstrate that the recycled material is a product and is no longer a waste, as well as confirming compliance with quality requirements. As with European Union level end-of-waste criteria, the statement of conformity must be issued for each consignment.

10.3 CONSULTATION

The Agency consulted the Eastern Midlands WELRA and OEE on the development of the recommended criteria. It was highlighted that the statement of conformity would be key in supporting their monitoring works and in enabling enforcement activities. WELRA and OEE comments and submissions in relation to the level of detail required to be included within the statement of conformity have been carefully considered in the development of the recommended criteria.

10.4 INSPECTORS ASSESSMENT

For all single case decisions made to date by the Agency, each decision included criteria requiring each batch or consignment of end-of-waste material to be accompanied by a statement of conformity.

The statement of conformity is essential in:

- documenting non-waste status of the product
- providing for traceability; and
- communicating the suitable uses of material and restrictions on use to the customer or user.

Once the output has been documented to meet all criteria, including quality requirements, the recycled aggregate may be considered to achieve end-of-waste meaning it is now a product. This means it may be stockpiled as a verified product, pending sale or use. Compliance with the criteria must be documented through issue of a statement of conformity.

For the purpose of traceability and to assist in surveillance, monitoring and enforcement activities, the statement of conformity has been enhanced compared to that set out in European Level end-of-waste criteria. Additions include a chain of custody, details of restrictions on use and waste authorisation details.

A statement of conformity must issue prior to the product leaving the site of production or being used. The chain of custody within the statement of conformity does not need to be complete if the statement of conformity issues before dispatch or use. The chain of custody must be complete however on dispatch or use, whichever occurs first.

10.5 SUBMISSIONS

Submissions received on the draft criteria relating to statement of conformity requirements, along with an inspector's response to each are detail below:

Issue No. 23 – Statement of Conformity	
Issue Details	<p>Submissions queried whether the statement of conformity and Declaration of Performance (required under CPR/ harmonised aggregate product standard) could be merged.</p> <p>A number of submissions queried the point at which the statement of conformity should issue and suggested that it be the at the point at which the material ceases to be waste.</p>

	In addition, clarity was sought in relation to the required qualifications/ competency qualifications for a person to issue a statement of conformity.
Inspector's Response	<p>The draft criteria set the point of issue of a statement of conformity at dispatch/consignment of the recycled aggregate from the site of recovery or prior to its use (where being used at the site of recovery). It allowed material to cease to be waste prior to the issue of the statement of conformity. With consideration to the submissions and to support enforcement/ surveillance/ monitoring activities, particularly in relation to storage (refer to <i>Section 11.1</i> below) the point of material ceasing to be waste has been revised in the recommend criteria to be on issue of the statement of conformity. The statement of conformity therefore provides documented evidence for compliance with the criteria and of the non-waste status of the material. The statement of conformity can therefore issue before dispatch or use. The recommended criteria include the following changes to the draft criteria (bold text added):</p> <ol style="list-style-type: none"> 1. The producer shall issue a statement of conformity conforming to the template set out in Annex III for each batch or consignment of recycled aggregate, whichever is of smaller quantity. 2. The statement of conformity, excluding the section on chain of custody, shall be issued as documented evidence that the recycled aggregate meets these criteria and that the material ceases to be waste. 2. 3. The statement of conformity, including a completed chain of custody, shall be issued prior to the recycled aggregate being dispatched to the next holder. <p>It is understood that it is not appropriate for the statement of conformity and Declaration of Performance to be merged as the Declaration of Performance has to follow a set format in accordance with the harmonised aggregate product standards. It is recommended however that the statement of conformity appends the Declaration of Performance. The explanatory note has been updated to reflect this.</p> <p>Clarifications in relation to the level of competency required to complete the statement of conformity is provided in <i>Issue 27</i> below.</p>

10.6 INSPECTOR'S CONCLUSION & RECOMMENDED CRITERIA

I consider that condition (2)(d) of Regulation 28 is satisfied, having regard to the fact that *Section 3.1(g)* *Section 5* and *Annex III* of the recommended criteria include:

- a. a requirement for each batch and/ or consignment, whichever is lesser, of end-of-waste recycled aggregate to be accompanied by a Statement of Conformity; and
- b. a requirement for the Statement of Conformity to conform to a set template.

11. ADDITIONAL CRITERIA

In addition to criteria required under regulation 28(1)(a) and Regulation 28(2), a number of additional criteria are recommended. These criteria are intended to provide clarity, support enforcement, monitoring and surveillance activities, as well as enabling data capture and statistical reporting in relation to end-of-waste.

11.1 STORAGE

In most cases, single case decisions issued by the Agency to date, apply criteria in relation to the storage of end-of-waste material.

Section 3.1(f) and *Annex II, Part 5* of the recommended criteria set out storage requirements for recycled aggregates. *Part 5 of Annex I* of the recommended criteria includes the following rules in relation to storage

- a. outputs from the recovery process (prior to achieving end-of-waste i.e. waste); and
- b. compliant end-of-waste material (non-waste i.e. products) at the site of production.

Submissions received on the draft criteria relating to storage requirements, along with an inspector's response to each are detail below:

Issue No. 24 - Storage space	
Issue Details	<p>It has been highlighted that producers will <i>"need a large amount of space in order to process, stockpile, quarantine numerous batches while awaiting testing which can take 4 – 6 weeks" on each 2,000 tonne batch</i>". It was stated that:</p> <ul style="list-style-type: none"> • this may render onsite mobile recycling unviable for some sites, particularly those with limited land space; • will not be workable on demolition sites for some permit holders; and • the batch testing requirements are too frequent and more onerous than for virgin aggregates.
Inspector's Response	<p>The requirement for testing every 2,000 tonnes specified in Annex I, Part 4, is in line with the EPA 2020, <i>Guidance on waste acceptance criteria for soil recovery facilities</i>⁴³. Recycled aggregates are derived from heterogenous and potentially mixes of multiple sources of waste as compared with homogenous virgin aggregates quarried from an uniform lithology. As such, the recommended frequency of testing is considered appropriate and necessary. Should the size of batching prove problematic with regard to storage, it is at the producer's discretion to undertake more frequent sampling i.e. to have smaller batch sizes.</p> <p>Recycled aggregate cannot be considered to be non-waste until all criteria are met, including environmental testing. Once a material has been confirmed to cease to be waste, it can be stored as a product. Storage of products should be in accordance with applicable planning requirements. Additional clarification is provided within the recommended explanatory note.</p>

11.2 REGISTER & REPORTING

Section 3.1(g) and *Section 7* of the recommended criteria set out registration and reporting requirements for producers of recycled aggregates.

Section 7.1 of the recommended criterion require:

"Any producer of recycled aggregates in accordance with these criteria shall register as a producer on the Agency's public register, or as may be otherwise prescribed by the Agency. Where it is the case that a producer operates under multiple waste authorisations, a separate registration shall be made relating to each waste authorisation under which the recycled aggregates are produced."

The register will be publicly available on the Agency website so that buyers/ users can choose an appropriate authorised supplier and that competent authorities can undertake compliance and/or surveillance checks. The relevant environmental enforcement authority shall receive an automatic alert (via the EPA register) when a waste authorisation within their remit has been added to the register. Further details in relation to the register and its functionality is provided within the recommended explanatory note.

Section 7.2 of the recommended criterion require that:

"The producer shall report tonnages of recycled aggregates produced per annum on an annual basis as part of environmental performance reporting/ annual environmental reporting for the waste authorisation under which the material is produced, or shall make such records available as may be otherwise prescribed by the Agency."

This criterion will enable collection of quantified data which will support National circular economy and waste statistics reporting in relation to end-of-waste.

Submissions received on the draft criteria relating to registration and reporting requirements, along with an inspector's response to each are detail below:

Issue No. 25 - Register

⁴³ <https://www.epa.ie/publications/compliance--enforcement/waste/Guidance-on-Waste-Acceptance-Criteria-at-Authorised-Soil-Recovery-Facilities.pdf>

Issue Details	A number of queries were raised in relation to the functionality of the register including, oversight, powers in relation to non-compliance with the criteria and as to whether registered users could be updated on revisions through the register.
Inspector's Response	The register is currently in early stages of ICT development and full details of its functionality are not yet available. Information in relation to the register is within the explanatory note. The register is proposed to be managed and overseen by the Agency. Registration will be via the EDEN portal. It will feature on the Agency website and will be filterable and have download functions. It is proposed that the register will include functionality for the Agency to remove producers from the register, where requested to do so by a competent authority as a result of non-conformance with the criteria. Revisions on the criteria and/or explanatory note can easily be communicated to registered producers.

11.3 COMPLIANCE

Section 3.1(g) and Section 9 of the recommended criteria set out compliance requirements for producers of recycled aggregates. Section 9.1 of the recommended criterion require:

"The producer of recycled aggregates shall comply with any request made by a competent authority in relation to the provision of evidence of compliance with these criteria or any associated waste, product, or health and safety requirements."

Regulatory oversight will be key in ensuring that the criteria are implemented correctly and to build confidence and trust in recycled aggregates. Accordingly, this criteria is intended to support competent authorities in their enforcement, monitoring and surveillance activities relating to end-of-waste material. Appendix 3 illustrates the roles and responsibilities of competent authorities in relation to the criteria.

Submissions received on the draft criteria relating to compliance requirements and enforcement, along with an inspector's response to each are detail below:

Issue No. 26 - Roles & Responsibilities (Competent authorities)	
Issue Details	There has been numerous requests, particularly from the local authority sector, for roles and responsibilities to be clearly defined. Further clarity is requested in respect of liabilities and enforcement where recycled aggregates are mis-used against the producer specifications set out in the statement of conformity i.e., if material is used in restricted uses or in uses not specified as suitable by the producer, it is queried who is responsible for enforcement of this.
Inspector's Response	Much of the process to recover recycled aggregates is already overseen by planning and regulation of waste authorisations. The end-of-waste step presents additional steps for local authority and OEE staff to oversee. These additional steps namely relate to the point in which waste transitions to a product, as well as its subsequent use. In parallel, as is the case with most virgin aggregates, a robust quality management system is required to be in place to ensure consistent quality of the product. This system is required to be overseen by an independent certified third party such as the NSAI or other certification body. Additionally, once being made available to the market, the product is subject to market surveillance by (including but not limited to): the NBC&MSO & 31 local authority building control/ market surveillance authorities, Consumer and Competition Protection Commission (CCPC), the HSA, the Health and Service Executive (HSE). Any use of the material will also be subject to planning control. Appendix 3 illustrates the roles and responsibilities of competent authorities in relation to the recommended criteria. This illustration has been included within the recommended explanatory note. Where further refinement or clarifications are needed, the explanatory note will be revised to reflect these. It should be noted that where recycled aggregate which has been placed on the market as a product (i.e. has ceased to be waste) and is misused against manufacturer (producer) specifications, the same rules and governing enforcement legislation that applies to virgin products apply. The recycled aggregate <u>does not revert back to waste</u> due to misuse. Depending on the misuse and risks posed by the

	<p>misuse, it could be viewed as a pollution incident, a breach of building regulations, as a hazard (health and safety) and so on. The competent authority relevant to the risk posed would then be the relevant enforcement authority.</p> <p>Where a non-conforming material (i.e. recycled aggregate which does not meet the end-of-waste criteria) is placed on the market, this material may be viewed as a waste and falls within the remit of the local authorities (environment sections) or OEE.</p>
<p>Issue No. 27 Qualified Person/ Staff- Competency</p>	
<p>Issue Details</p>	<p>Numerous submissions have been made seeking clarification and definitions in relation to training and competency requirements for "qualified staff" and "qualified person". Submissions seek clarity and make suggestions as to whether a "qualified staff" or a "qualified person" should undertake specific tasks listed. There is variance in opinion as to what tasks should be considered undertaken by a "qualified person" or "qualified staff". One submission suggested replacing the terms "qualified person" and "qualified staff" with "<i>competent person(s)</i>".</p> <p>It was also queried whether the Agency would "<i>recognise (and support, potentially through participation) appropriate training providers delivering the necessary education to the relevant Parties?</i>".</p>
<p>Inspector's Response</p>	<p>The Landfill Directive specifies the following on basic characterisation for waste:</p> <p><i>"Sampling and testing for basic characterisation and compliance testing shall be carried out by independent and qualified persons and institutions. Laboratories shall have proven experience in waste testing and analysis and an efficient quality assurance system.</i></p> <p><i>Member States may decide that:</i></p> <ol style="list-style-type: none"> <i>1. the sampling maybe carried out by producers of waste or operators under the condition that sufficient supervision of independent and qualified persons or institutions ensures that the objectives set out in this Decision are achieved;</i> <i>2. the testing of the waste maybe carried out by producers of waste or operators if they have set up an appropriate quality assurance system including periodic independent checking".</i> <p>Standard recommendations for harmonised aggregate product standards provide the following definition:</p> <p><i>"Competent Person (Professional Geologist) person possessing sufficient training, experience and knowledge appropriate to the nature of the work to be undertaken having regard to the task he or she is required to perform and taking into account the complexity of the work.</i></p> <p><i>Note 1 to entry: In the context of this S.R., the Competent Person will be listed as a professional Member of the Institute of Geologists of Ireland, or an equivalent professional body, with an established record of a minimum of 5 years of practical assessment of geological resources, with experience of quarries and aggregate quarry deposits and assessment of aggregates for proposed end-use suitability."</i></p> <p>From consultation undertaken with the GSI, it is understood that while harmonised aggregate product standards and associated S.R.s define roles for a competent person (professional geologist) under the standard, that some materials such as general fill can be produced without geologist assessment, with the exception of initial type testing. It is also understood there is no requirement for the geologist to be independent. The geologist role, with the exception of initial type testing, namely relates to "assessment" and does not specifically require them to be the sampler/tester.</p> <p>The draft criteria provide the following definition, as per the definition set out in EU level end-of-waste criteria :</p> <p><i>'qualified staff' means staff which are qualified by experience or training to monitor and assess the properties of recycled aggregate;</i></p> <p>For the purpose of clarity, the following definition has been included within the recommended criteria:</p> <p><i>'qualified person' means suitably qualified, trained and experienced person who has the requisite knowledge and experience required for sampling, testing and waste characterisation.</i></p> <p>The above definition is in line with that set out with the EPA 2020, <i>Guidance for waste</i></p>

acceptance criteria for soil recovery facilities.
able 3 below sets out the level of competence required to undertake the listed tasks.
Table 3: Competency requirements for undertaking tasks under the recommended criteria

Task	For completion by:
Assessment of potential contamination, including review of waste classification reports and asbestos surveys for inputs.	"qualified staff"
Visual assessments.	"qualified staff"
Waste characterisation/ acceptance, including basic due diligence assessment (for example ascertaining knowledge of the raw material or review of waste classification reports) to determine whether there is a risk of contamination and if further detailed due diligence is required.	"qualified staff"
Detailed due diligence assessment, including waste sampling and testing, interpretation of laboratory analytical results and drafting of waste classification reports or similar reporting.	"qualified person"
Geotechnical sampling & testing.	"qualified staff" or as required by harmonised aggregate product standard
Environmental sampling.	"qualified person"
Interpretation of environmental analytical results.	"qualified person"
Interpretation of geotechnical test results.	"qualified staff" or as required by harmonised aggregate product standard
Completion of statement of conformity.	"qualified staff" or "qualified person"
Responsibility for QMS, including maintaining training and records	"qualified staff" or "qualified person"

The explanatory note has been updated to reflect the above. No other additions or changes are deemed necessary to the draft criteria.

Issue No. 28 - Training & Support

Issue Details	<p>Numerous submissions have been made requesting that training sessions for all stakeholders be made available as soon as possible to assist in the implementation of the criteria. It has been stated that <i>"some form of support service would help in the initial stages of its implementation"</i>. A communication programme has also been requested so that all stakeholders can start to prepare for implementation of this new regime now.</p> <p>Finally, the CCMA submission suggests that <i>"consideration should be given to establishing a National group consisting of the various competent authorities involved. Such a group would identify emerging issues, training requirements etc and agree who will address any emerging issues identified. This could help to ensure the reputation of this new system"</i>.</p>
----------------------	--

Inspector's Response	<p>As communicated through stakeholder consultation and webinars, a training plan will be developed by the Agency in consultation with stakeholders during the European Commission consultation period between April and June 2023. This shall include a communication plan as well as developing support and training tools.</p> <p>Subject to approval by the Board of the Agency, it is planned to publish the proposed criteria, explanatory note, Inspector's Report and supporting documentation on the Agency website so that operators and other stakeholders can prepare for implementation.</p>
-----------------------------	---

Issue No. 29- Responsibilities for Use

Issue Details	<p>A number of submissions indicated that <i>"the risk and responsibility of the criteria are unfairly stacked against the producer"</i>, with no responsibility assigned to the users of recycled aggregates.</p>
----------------------	--

Inspector's Response	It is considered unenforceable and beyond the remit of the end-of-waste to impose requirements on user of products to comply with requirements of an end-of-waste decision. It is the users responsibility to comply with the manufactures (producers) instructions on the labelling (statement of conformity and declaration of performance) as is the case with any other product, primary or secondary, which is placed on the market. Refer to <i>Issue 26</i> above for detail in this regard. Any such requirements may act as a deterrent for purchasing recycled aggregates.
-----------------------------	--

11.4 ENTRY INTO FORCE

Section 8 of the recommended criteria set out the date of which the criteria enter into force.

Issue No. 30-Entry into force	
Issue Details	A submission was made querying whether " <i>there is a grace period in place from the date of the National Criteria coming into force and when all elements of the criteria must be in position.</i> "
Inspector's Response	It is intending that the criteria will come into force with immediate effect on publication of the finalised criteria. During consultation with the WERLAs, they have recommended that waste operators intending to utilise the National criteria should begin a dialogue with the enforcement authority with remit over their waste authorisation as early as possible. Engagements with the planning authority with remit over the facility/ site is also recommended. It is acknowledged that publication of the criteria, will increase applications for waste authorisation and planning permission to accommodate recovery activities of recycled aggregates, as well as requests to certification bodies for accreditation. Similarly, there will be additional monitoring, surveillance and enforcement activity associated. Accordingly, there will be a significant administrative burden for both industry and the competent authorities in implementing the criteria, for which an adjustment period is likely.
Issue No. 31- Evaluation of the Criteria	
Issue Details	A query was raised during the webinars as to whether there will be a review of the criteria after a certain period of implementation (for example a one year period) to assess if there are any issues, or difficulties that need fine tuning.
Inspector's Response	It is considered that such a periodic evaluation at an appropriate time would be useful. The approach and method for undertaking such an evaluation would need sufficient resource and planning.

12. CONCLUSION

It is my view that the recommended criteria presented are robust and clearly satisfy the requirements of Regulation 28. I consider that the criteria appropriately balance the level of protections required to support the production and use of high quality recycled aggregates in Ireland . The criteria will support the development of a trusted and robust system for secondary aggregate products. The restriction and limits within the criteria are evidence based and are suitably protective of the environment and human health. The recommended criteria provide for a regulatory framework supporting circular options for recycled aggregates, while taking account of scientific evidence, environment and health risk, as well as stakeholder inputs and concerns.

The recommended criteria are the first of its kind in Ireland and as such should be used as a baseline for developing future end-of-waste criteria.

In light of the submissions in relation to the draft criteria on structural restrictions. I considered that there are four options for the Board to consider as follows:

- a. Keep limited bound use and associated structural restrictions as per the draft criteria;
- b. Remove all bound uses from the decision, with the exception of bound use in linear features;

- c. Remove all restrictions on bound uses and require compliance with harmonised aggregate product standards for structural uses;
- d. Remove all bound uses from the decision, limiting the decision to unbound use only.

It is my recommendation to adopt *Option A*. The background, options assessment and justification for my recommendation are set out in detail in *Section 7.7.2* above.

13. NEXT STEPS

The next steps in relation to the National criteria for recycled aggregates is illustrated in *Figure 2* below.

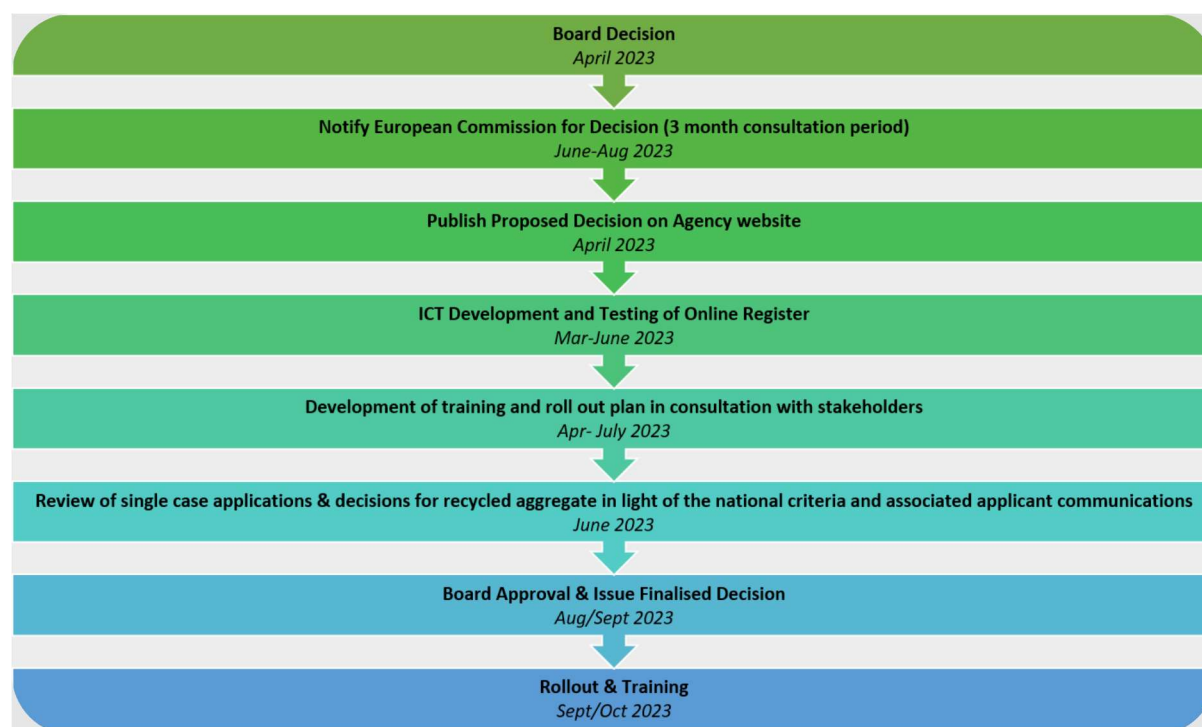


Figure 2: Next Steps & Delivery Timeframes for National Decision on End-of-Waste Recycled Aggregates

14. RECOMMENDATION

In accordance with Regulation 28(2) of the European Union (Waste Directive) Regulations 2011-2020, the Agency may establish detailed criteria on the application of the conditions laid down in paragraph 1 to certain types of waste. In this case, the Agency establish National end-of-waste criteria for recycled aggregates.

I recommend that the Agency decide that recycled aggregates will cease to be waste when:

- the requirements of the National End of Waste Decision document are met.

I recommend that the decision document is notified to the European Commission as a proposed decision in accordance with Regulation 28 and in accordance with Directive (EU) 2015/1535⁴⁴. Any comment or submission made by the European Commission, if one is made, will be assessed and any recommendations for amendment to the decision document on foot of the submission will be made for the Board’s consideration. If no submission is made, the decision document will be adopted as the final decision of the Agency.

⁴⁴ Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services

I further recommend that for transparency that the proposed decision, proposed explanatory note, this Inspector's Report and supporting documents are published on the Agency website following Board approval.

Signed:



Kate Clark
Inspector,
Circular Economy regulation Team
Circular Economy Programme

APPENDIX 1

COMPARISON OF RECOMMENDED PERMISSIBLE INPUTS AGAINST OTHER MEMBER STATES AND IRISH SINGLE CASE DECISIONS FOR RECYCLED AGGREGATES

LoW Code	Description	Proposed For IRL National	UK	Italy	France	Netherlands	Austria	JRC	Irish Single Case Decisions
17 CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)									
17 01 concrete, bricks, tiles and ceramics									
17 01 01	Concrete	✓	✓ *	✓	✓	✓	✓	✓	✓
17 01 02	Bricks	✓	✓	✓	✓	✓	✓	✓	✓
17 01 03	Tiles & ceramics	✓	✓	✓	✓		✓	✓	✓
17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	✓	✓	✓	✓	✓	✓	✓	✓
17 02 wood, glass and plastic									
17 02 02	glass		✓ *		✓				
17 03 bituminous mixtures, coal tar and tarred products									
17 03 02	bituminous mixtures other than those mentioned in 17 03 01		✓ *	✓	✓		✓	✓	
17 05 soil (including excavated soil from contaminated sites), stones and dredging spoil									
17 05 04	soil and stones other than those mentioned in 17 05 03	✓	✓ *	✓	✓		✓	✓	✓

LoW Code	Description	Proposed For IRL National	UK	Italy	France	Netherlands	Austria	JRC	Irish Single Case Decisions
17 05 06	dredging spoil other than those mentioned in 17 05 05	✓	✓ *						
17 05 08	track ballast other than those mentioned in 17 05 07	✓	✓ *	✓			✓	✓	
17 09 other construction and demolition wastes									
17 09 04		✓	✓ *	✓					✓
01 WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING, AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS									
01 04 wastes from physical and chemical processing of non-metalliferous minerals									
01 04 08	waste gravel and crushed rocks other than those mentioned in 01 04 07	✓	May include excavation from mineral workings	✓					
01 04 09	waste sand and clays	✓ *	✓ *	✓					
01 04 10	dusty and powdery wastes other than those mentioned in 01 04 07			✓					
01 04 13	wastes from stone cutting and sawing other than those mentioned in 01 04 07			✓					
10 WASTES FROM THERMAL PROCESSES									
10 02 wastes from iron and steel industry									
10 02 01	wastes from the processing of slag						✓		
10 02 02	unprocessed slag						✓		
10 11 wastes from manufacture of glass and glass products									

LoW Code	Description	Proposed For IRL National	UK	Italy	France	Netherlands	Austria	JRC	Irish Single Case Decisions
10 11 03	waste glass-based fibrous materials		✓ *						
10 12 wastes from manufacture of ceramic goods, bricks, tiles and construction products									
10 12 01	waste preparation mixture before thermal processing	✓		✓					
10 12 06	discarded moulds	✓		✓					
10 12 08	waste ceramics, bricks, tiles and construction products (after thermal processing)	✓		✓					
10 13 wastes from manufacture of cement, lime and plaster and articles and products made from them									
10 13 11	wastes from cement-based composite materials other than those mentioned in 10 13 09 and 10 13 10	✓		✓					
10 13 14	waste concrete and concrete sludge	✓ *							
12 WASTES FROM SHAPING AND PHYSICAL AND MECHANICAL SURFACE TREATMENT OF METALS AND PLASTICS									
12 01 wastes from shaping and physical and mechanical surface treatment of metals and plastics									
12 01 17	waste blasting material other than those mentioned in 12 01 16			✓					
15 WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED									
15 packaging (including separately collected municipal packaging waste)									
15 01 07	glass packaging		✓ *						
16 WASTES NOT OTHERWISE SPECIFIED IN THE LIST									
16 03 Off-specification batches and unused products									

LoW Code	Description	Proposed For IRL National	UK	Italy	France	Netherlands	Austria	JRC	Irish Single Case Decisions
16 03 04	Inorganic wastes other than those specified in 16 03 03				✓				
19 WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE									
19 12 wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified									
19 12 05	glass		✓ *						
19 12 09	minerals (for example sand, stones)	✓ *	✓ *	✓					
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11								✓ *
19 13 wastes from soil and groundwater remediation									
19 13 02	solid wastes from soil remediation other than those mentioned in 19 13 01	✓ *							
20 MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS									
20 01 separately collected fractions (except 15 01)									
20 01 02	glass		✓ *						
20 02 garden and park wastes (including cemetery waste)									
20 02 02	soil and stones	✓ *	✓ *		✓ *		✓		
20 03 3 other municipal wastes									
20 03 03	street-cleaning residues		✓ *				✓		

* Includes additional restriction within MS criteria

APPENDIX 2

COMPARISON OF RECOMMENDED PLVs AGAINST PUBLISHED CRITERIA AND LABORATORY LIMITS OF DETECTION

Extract for Geosyntec 2023 report: Table 14.1 Proposed Leachate PLVs compared against Published Criteria and Laboratory Limits of Detection

Determinand	Target Levels, All values for 10:1 L/S Ratio Leachate (mg/kg)							UKAS Accredited Laboratory Detection Limit, 10:1 L/S Ratio leachate (mg/kg)
	Initial Scenario A PLV (General Use)	Initial Scenario B PLV (Low Permeability Use)	Inert Landfill WAC	JRC EoW (Unrestricted)	Nordic EoW (Unrestricted)	Nordic EoW (Road)	Nordic EoW (100m x100m x5m bund)	
As	0.063	0.063	0.5	0.037	0.0026	0.096	0.012	0.025
Ba	5.1	11	20	0.049	0.049	3.4	0.3	0.03
Cd	0.0074	0.0074	0.04	0.00017	0.000042	0.011	0.0067	0.005
Cr Total	0.25	0.54	0.5	0.094	0.0014	0.17	0.0128	0.015
Cu	7.3	16	2	0.041	0.041	29	1.69	0.07
Hg	0.0057	0.0057	0.01	0.0079	0.00004	0.0018	0.00021	0.0001
Mo	0.28	0.6	0.5	0.057	0.057	8.1	0.59	0.02
Ni	0.069	0.15	0.4	0.01	0.0034	0.55	0.037	0.02
Pb	0.05	0.078	0.5	0.0012	0.0012	0.83	0.048	0.05
Sb	0.17	0.37	0.06	0.012	0.012	0.49	0.06	0.02
Se	0.15	0.32	0.1	0.027	0.027	1.7	0.17	0.03
Zn	0.33	0.71	4	0.011	0.011	1.7	0.12	0.03
V	1	2.2	-	-	-	-	-	0.006
Chloride	440	950	800	280	28	580	106	3
Fluoride	4.2	9.1	10	6.2	6.2	200	28	3
Sulphate	1,000	2,200	1000	750	90	2,000	344	5
Phenol	0.1	0.1	1	0.33	0.33	-	-	0.1
DOC	180	400	500	15	15	340	56	20

Note 1: PLVs for phenol (PLV A and PLV B) and lead (PLV A) have been amended to reflect revisions made to the final PLVs.

APPENDIX 3

ROLES & RESPONSIBILITIES FOR COMPETENT AUTHORITIES- MONITORING, SURVEILLANCE & ENFORCEMENT

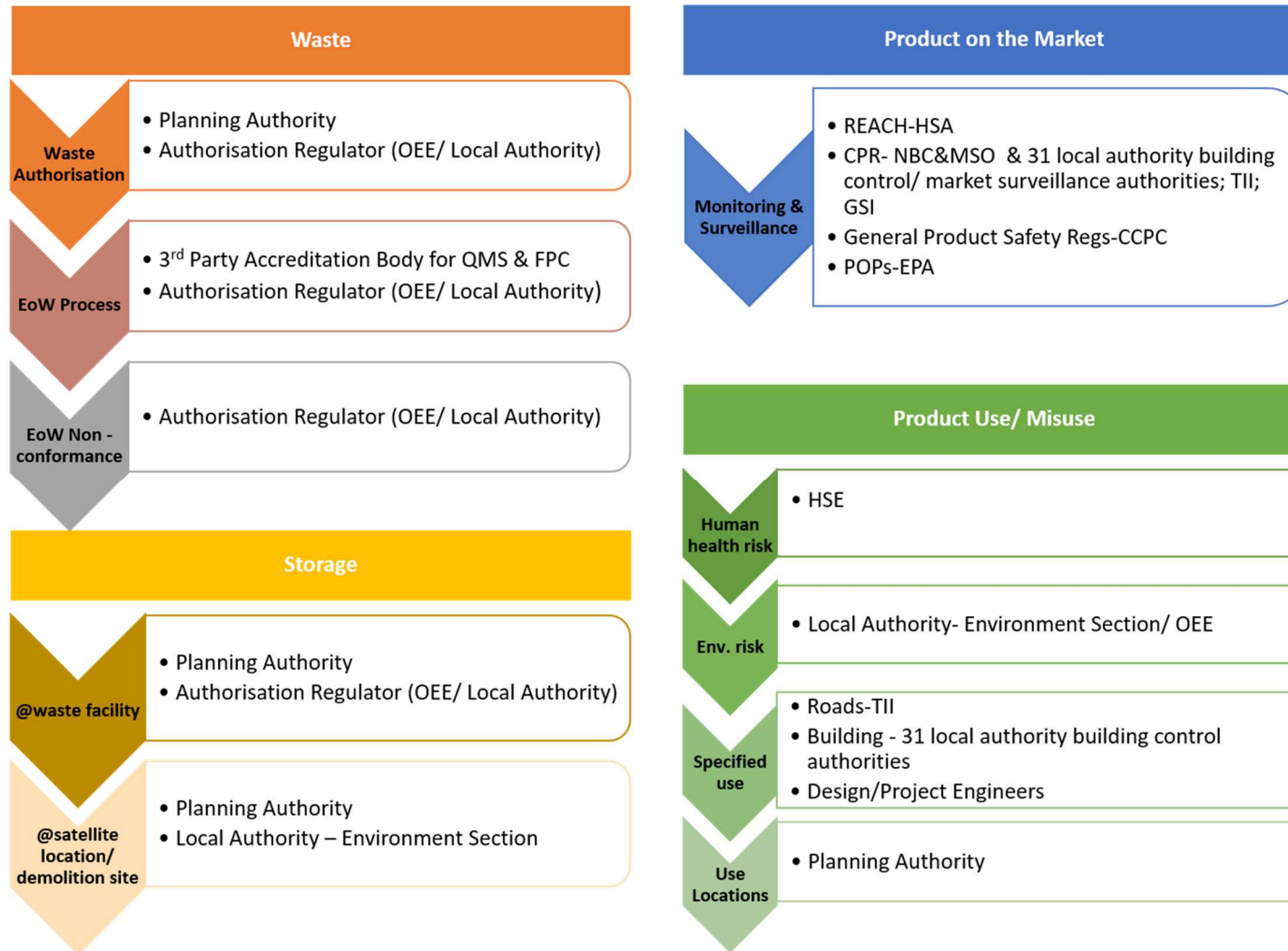


Figure A.3- Roles and responsibilities of competent authorities in relation to the recommended criteria for end-of-waste for recycled aggregates.