EN 15804+A2 EPD

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2.
Owner of the Declaration – Moore Concrete Products Ltd.

Declaration number: EPDIE-22-87
Issue date 26th September 2022
Valid to 26th September 2027

EPD Programme - EPD Ireland
Programme Operator - Irish Green Building Council
www.epdireland.org

Asset BEBO Arch Precast Concrete Arch

Asset International Structures is the exclusive BEBO license holder for the UK and Ireland.

1. General information

PROGRAMME OPERATOR	OWNER OF DECLARATION
Irish Green Building Council 19 Mountjoy Square, Dublin D01 E8P5 info@igbc.ie	Moore Concrete Products Ltd Caherty House, 41 Woodside Road, Ballymena Co. Antrim, N. Ireland BT42 4QH www.moore-concrete.com, info@moore-concrete.com
DECLARATION NUMBER	**MANUFACTURER ADDRESS**
EPDIE-22-87	Moore Concrete Products Ltd Caherty House, 41 Woodside Road, Ballymena Co. Antrim, N. Ireland BT42 4QH
ECO PLATFORM EPD	**DECLARED UNIT**
Yes	1 m^3 of precast concrete, mass 2.537 tonne
APPLICABLE PRODUCT CATEGORY RULES	**DECLARED PRODUCT**
1. EN 15804:2012+A2:2019 2. Product Category Rules : Part A Implementation and use of I.S. EN 15804:2012+A1 and + A2, and CEN TR 16970:2016 in Ireland for the development of Environmental Product Declarations (issued 05.03.2022), Version 2.1. 3. Sustainability of construction works - Environmental product declarations - Product Category Rules for concrete and concrete elements, I.S. EN 16757:2017	1 m^3 of BEBO Arch precast concrete, mass 2.537 tonne
DATE OF ISSUE	**SCOPE OF EPD**
26th September 2022 Reissue: 10th October 2022 - additional client information (Asset)	Cradle to gate, with options including Modules C and D
DATE OF EXPIRY	**LCA CONSULTANT OR PERSON RESPONSIBLE FOR LCA**
26th September 2027	Ecoreview, Kilkenny, Ireland. +353 (087) 258 9783 www.ecoreview.ie
TYPE OF EPD: SINGLE OR MULTI PRODUCT	**LCA SOFTWARE AND DEVELOPER IF APPLICABLE**
Average product EPD	Ecochain LCA tool version 3.5.13 (2022)
PRODUCT CLASSIFICATION OR NACE CODE	**NAME AND VERSION OF INVENTORY USED**
NACE Code 26.61 Manufacture of Precast Concrete	Ecoinvent version 3.6
COMPARABILITY	
Environmental Product Declarations from different programmes may not be directly comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See clause 5.3 of EN 15804:2012+A2:2019	
The CEN Norm /EN 15804 serves as the core PCR	
Independent verification of the declaration according to ISO 14025	

Internally ☐ Externally ×

SIGNATURE OF PROGRAMME OPERATOR	SIGNATURE VERIFIER
Pat Barry - CEO - Irish Green Building Council  IGBC IRISH GREEN BUILDING COUNCIL	Chris Foster - EuGeos SRL  EuGeos

2. Scope and Type of EPD

Scope

This is a cradle to gate, with options EPD. The Modules that are declared are shown in the table below.

PRODUCT STAGE			CONSTRUCTION ON PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse – Recovery – Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
MDT	MDT	MDT	OP	OP	OP	OP	OP	OP	OP	OP	OP	MDT	MDT	MDT	MDT	MDT

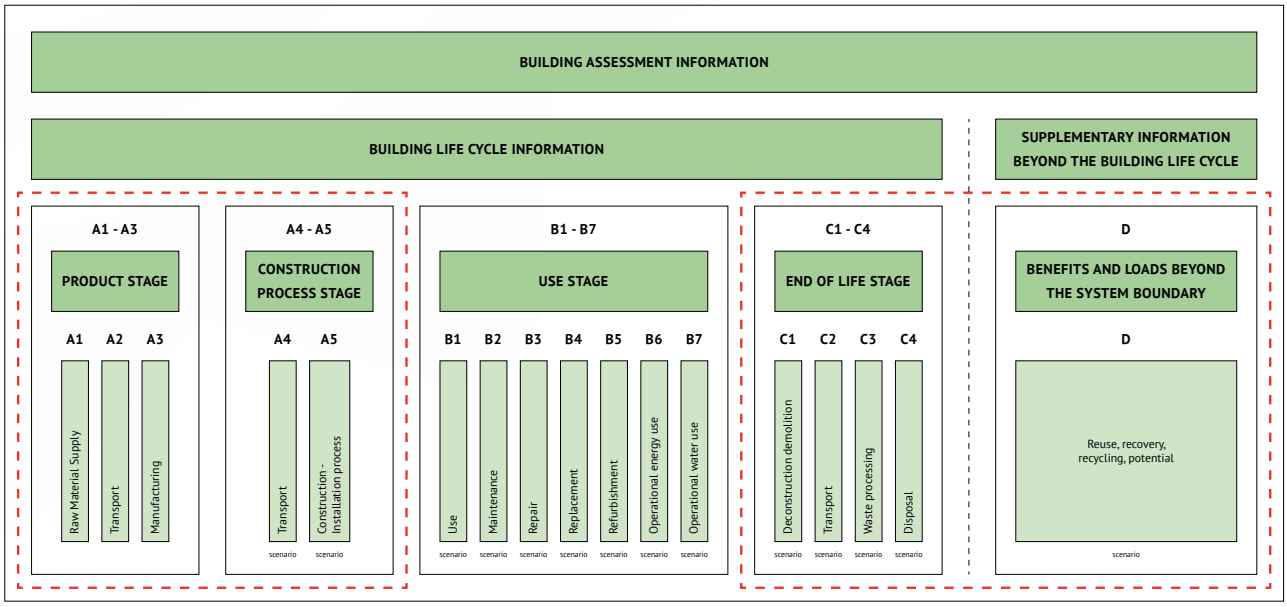
X = Module declared; ND = Module not declared; MDT = Mandatory; OP = Optional.

Declared Functional Unit

1 m^3 of precast concrete BEBO Arch

System Boundaries

This LCA covers the Product (A1 - A3), Construction Process (A4 - A5), End of Life (C1 - C4), and benefits and loads beyond the system boundary (D).



3. Detailed product description

This average product EPD is for Moore Concrete's BEBO Arch precast reinforced concrete. The results presented in this EPD are the results for a weighted average of the concrete mixes and steel reinforcement of the BEBO Arch products manufactured by Moore Concrete in 2021. The raw materials are cements, GGBS, aggregates, admixtures, reinforcing steel and lifting accessories. In addition, consumables include steel for formwork, release agents and curing agents, plastic and concrete spacers. The products are manufactured in accordance with the following standard: EN 13369 'Common rules for precast concrete products'.

The precast units are delivered to site on flat-bed trucks. No product packaging is used in the delivery to the customer, other than re-useable wood skids as and when needed.

Asset International Structures (A Division of Hill & Smith Ltd) introduced the precast concrete asset BEBO arch system to the UK market in 2006. AIS are the exclusive license holder for BEBO in UK & Ireland in partnership with Swiss engineers; BEBO Arch International. BEBO's wealth of experience of over 50 years combined with the building of 1200 arch structures worldwide made a perfect addition to asset's portfolio. AIS began the relationship with Moore Concrete Products in 2006 to pursue the UK and Ireland structures market. Developing a strong 16-year partnership championing quality, best practice and innovation to expand into new markets within the private and public sectors including housing, rail, highways and marine and coastal. The asset BEBO Arch System is a standardised patented precast concrete arch system for the design and construction of earth overfilled bridges, tunnels, culverts and other underground structures. The fully pre-engineered asset BEBO System features the world's largest precast concrete arch structures, offering spans from 3.7m to in excess of 35m.

The partnership between AIS and MCP has strengthened through the offering of the asset VSoL® Retained Earth System. AIS again acting as the exclusive partner for the UK and Ireland, supported by precast provider MCP, the VSoL® solution compliments the BEBO arch system offering a cost-effective end treatment. The modular, easy to install system can be used for a range of backfill soils and foundation conditions. Straight, curved, tiered, superimposed or back-to-back walls can all be accommodated by design due to the flexibility of the asset VSoL® Polymeric Strip Reinforcement System.

Full technical details on the precast Asset BEBO arch system can be found on the Asset International Structures website which is the official license holder for the UK and Ireland.

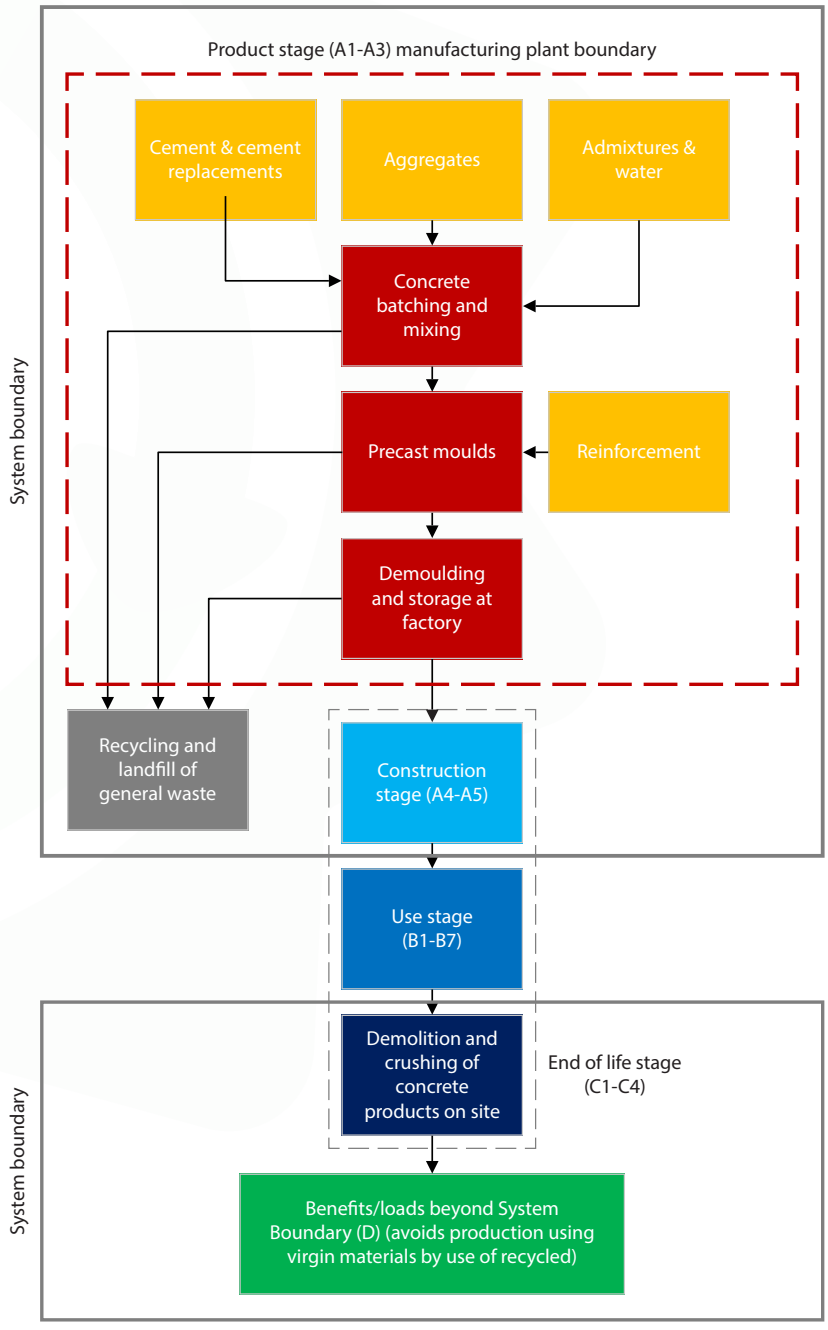
https://www.assetint.co.uk/asset-bebo-arch-system

3.1 Manufacturing Process Description

The precast products are manufactured from cement and cement replacements, aggregates, water and a variety of admixtures. The concrete mix ingredients are batch-weighed, mixed and dropped into a hopper that is transported across the factory hall so that the fresh concrete is then placed into the selected formwork/mould.

The moulds are prepared with a mould oil, reinforcing bars and spacers before the mix is poured. Once the fresh concrete is placed in the moulds, the surface is sprayed with a curing agent to assist curing. The moulds are left in place on the factory floor to allow the concrete to cure. Demoulding of the precast concrete elements takes place once the correct strength has been achieved. Units are finished in the factory and transported to a storage area.

The manufacturing process flowchart is shown below:



4.A. LCA results

Core Environmental impact per 1 m^3 of precast concrete BEBO Arch

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	[kg CO_2 eq.]	4.23E+02	4.57E+00	7.88E+00	4.35E+02	3.55E+01	4.35E-01	ND	ND	ND	ND	ND	ND	ND	1.41E+01	8.17E+00	0.00E+00	0.00E+00	-5.74E+01
GWP-fossil	[kg CO_2 eq.]	4.23E+02	4.57E+00	1.67E+00	4.29E+02	3.55E+01	4.29E-01	ND	ND	ND	ND	ND	ND	ND	1.41E+01	8.17E+00	0.00E+00	0.00E+00	-5.75E+01
GWP-biogenic	[kg CO_2 eq.]	1.76E-01	2.46E-03	6.20E+00	6.38E+00	2.04E-02	6.38E-03	ND	ND	ND	ND	ND	ND	ND	3.93E-03	4.39E-03	0.00E+00	0.00E+00	1.72E-01
GWP-luluc	[kg CO_2 eq.]	1.48E-01	1.63E-03	8.68E-03	1.58E-01	1.31E-02	1.58E-04	ND	ND	ND	ND	ND	ND	ND	1.11E-03	2.91E-03	0.00E+00	0.00E+00	-1.64E-02
ODP	[kg CFC-11 eq.]	2.44E-05	1.04E-06	1.65E-07	2.56E-05	7.99E-06	2.56E-08	ND	ND	ND	ND	ND	ND	ND	3.05E-06	1.86E-06	0.00E+00	0.00E+00	-3.25E-06
AP	[mol H+ eq.]	2.06E+00	1.31E-02	4.00E-02	2.11E+00	1.66E-01	2.11E-03	ND	ND	ND	ND	ND	ND	ND	1.48E-01	2.35E-02	0.00E+00	0.00E+00	-3.31E-01
EP-freshwater[1]	[kg P eq.]	1.08E-02	3.65E-05	1.21E-04	1.10E-02	3.09E-04	1.10E-05	ND	ND	ND	ND	ND	ND	ND	5.15E-05	6.52E-05	0.00E+00	0.00E+00	-2.49E-03
EP-marine	[kg N eq.]	4.47E-01	2.60E-03	1.75E-02	4.67E-01	3.27E-02	4.67E-04	ND	ND	ND	ND	ND	ND	ND	6.53E-02	4.64E-03	0.00E+00	0.00E+00	-8.07E-02
EP-terrestrial	[mol N eq.]	5.18E+00	2.91E-02	1.96E-01	5.40E+00	3.67E-01	5.40E-03	ND	ND	ND	ND	ND	ND	ND	7.16E-01	5.19E-02	0.00E+00	0.00E+00	-9.94E-01
POCP	[kg NMVOC eq.]	1.57E+00	1.11E-02	4.81E-02	1.63E+00	1.22E-01	1.63E-03	ND	ND	ND	ND	ND	ND	ND	1.97E-01	1.99E-02	0.00E+00	0.00E+00	-3.69E-01
ADP-minerals&metals[2]	[kg Sb eq.]	5.08E-03	1.26E-04	2.47E-05	5.23E-03	9.02E-04	5.23E-06	ND	ND	ND	ND	ND	ND	ND	2.17E-05	2.25E-04	0.00E+00	0.00E+00	-2.67E-04
ADP-fossils[2]	[MJ] ncv	3.49E+03	6.91E+01	1.99E+01	3.58E+03	5.35E+02	3.58E+00	ND	ND	ND	ND	ND	ND	ND	1.95E+02	1.23E+02	0.00E+00	0.00E+00	-5.75E+02
WDP[2]	m^3 world eq. deprived	1.51E+02	1.95E-01	1.80E-01	1.51E+02	1.73E+00	1.51E-01	ND	ND	ND	ND	ND	ND	ND	2.61E-01	3.49E-01	0.00E+00	0.00E+00	-1.52E+01

GWP-total = Global Warming Potential total; GWP-fossil= Global Warming Potential fossil fuels (GWP-fossil; GWP-biogenic= Global Warming Potential biogenic; GWP-luluc= Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP =Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&fossils = Abiotic depletion potential for non-fossil resources; ADP-fossils= Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential, deprivation-weighted water consumption.

The measurement of environmental impacts uses the recommended default LCIA methods for the PEF 3.0 method. These methods include amongst others: USEtox® 2.0, ReCiPe (2016), CML-2001, EDIP 2003, IPCC.

[1]To express EP freshwater as kg of PO43- eq, multiply the value for kg P eq. by 3.067

[2]The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

ND = Module not declared; INA = Indicator not assessed.

4.B. LCA results

Resource use per 1 m^3 of precast concrete BEBO Arch

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	3.53E+02	9.89E-01	2.36E+02	5.90E+02	8.00E+00	5.90E-01	ND	ND	ND	ND	ND	ND	ND	1.05E+00	1.77E+00	0.00E+00	0.00E+00	-2.40E+01
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	3.53E+02	9.89E-01	2.36E+02	5.90E+02	8.00E+00	5.90E-01	ND	ND	ND	ND	ND	ND	ND	1.05E+00	1.77E+00	0.00E+00	0.00E+00	-2.40E+01
PENRE	[MJ]	3.72E+03	7.33E+01	2.12E+01	3.81E+03	5.68E+02	3.81E+00	ND	ND	ND	ND	ND	ND	ND	2.07E+02	1.31E+02	0.00E+00	0.00E+00	-6.07E+02
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	3.72E+03	7.33E+01	2.12E+01	3.81E+03	5.68E+02	3.81E+00	ND	ND	ND	ND	ND	ND	ND	2.07E+02	1.31E+02	0.00E+00	0.00E+00	-6.07E+02
SM	[kg]	4.07E+03	7.43E+01	2.57E+02	4.40E+03	5.76E+02	4.40E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	1.00E+01	7.39E-03	7.71E-03	1.01E+01	6.04E-02	1.01E-02	ND	ND	ND	ND	ND	ND	ND	1.00E-02	1.32E-02	0.00E+00	0.00E+00	-4.07E-01

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water.

ND = Module not declared; INA = Indicator not assessed.

4.C. LCA results

Output flows and waste categories per 1 m^3 of precast concrete BEBO Arch

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	9.70E-03	1.81E-04	3.82E-05	9.92E-03	1.32E-03	9.92E-06	ND	ND	ND	ND	ND	ND	ND	5.30E-04	3.23E-04	0.00E+00	0.00E+00	-4.73E-03
NHWD	[kg]	8.97E+01	3.36E+00	5.73E-01	9.36E+01	2.41E+01	9.36E-02	ND	ND	ND	ND	ND	ND	ND	2.30E-01	6.01E+00	0.00E+00	0.00E+00	-9.03E+00
RWD	[kg]	1.03E-02	4.70E-04	8.69E-05	1.09E-02	3.63E-03	1.09E-05	ND	ND	ND	ND	ND	ND	ND	1.35E-03	8.41E-04	0.00E+00	0.00E+00	-1.25E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

ND = Module not declared; INA = Indicator not assessed.

4.D. LCA results

Additonal Environmental impact per 1 m^3 of precast concrete BEBO Arch

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	2.27E-05	2.90E-07	1.43E-06	2.44E-05	2.16E-06	2.44E-08	ND	ND	ND	ND	ND	ND	ND	3.91E-06	5.19E-07	0.00E+00	0.00E+00	-5.96E-06
IRP[1]	kBq U235 eq	8.95E+00	3.02E-01	7.92E-02	9.33E+00	2.34E+00	9.33E-03	ND	ND	ND	ND	ND	ND	ND	8.34E-01	5.40E-01	0.00E+00	0.00E+00	-1.05E+00
ETP-fw[2]	CTUe	9.66E+03	5.56E+01	2.84E+02	1.00E+04	4.25E+02	1.00E+01	ND	ND	ND	ND	ND	ND	ND	1.17E+02	9.95E+01	0.00E+00	0.00E+00	-5.69E+03
HTP-c[2]	CTUe	1.01E-06	1.55E-09	9.01E-09	1.02E-06	1.20E-08	1.02E-09	ND	ND	ND	ND	ND	ND	ND	4.10E-09	2.77E-09	0.00E+00	0.00E+00	-2.70E-07
HTP-nc[2]	CTUe	1.25E-05	5.86E-08	1.57E-07	1.27E-05	4.40E-07	1.27E-08	ND	ND	ND	ND	ND	ND	ND	1.01E-07	1.05E-07	0.00E+00	0.00E+00	-1.91E-06
SQP[2]	dimensionless	1.94E+03	4.83E+01	1.08E+03	3.07E+03	3.52E+02	3.07E+00	ND	ND	ND	ND	ND	ND	ND	2.49E+01	8.64E+01	0.00E+00	0.00E+00	-3.35E+02

PM = Potential incidence of disease due to PM emissions, IRP = Potential Human exposure efficiency relative to U235, ETP-fw = Potential Comparative Toxic Unit for ecosystems; HTP-c:Potential Comparative Toxic Unit for humans, HTP-nc = Potential Comparative Toxic Unit for humans, SQP = Potential soil quality index.

[1] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuelcycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

[2] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

ND = Module not declared; INA = Indicator not assessed.

5. Calculation rules

The measurement of environmental impacts in this EPD uses the LCIA methodologies recommended for PEF3.0.

The process descriptions and input quantities detailed and used in this study are a true representation of the actual processes and quantities used in the manufacturing and use of the products. The references of all sources, both primary and public sources and literature, have been documented in the LCA report. The 'polluter pays' and 'modularity' principles have been followed.

In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated which can be accessed via the LCA tool. This data portfolio contains a summary of all the data used in this LCA.

Cut-off criteria

The cut-off criteria of section 6.3.6 of EN15804:2012+A2:2019 have been followed, where 99% of the total energy and materials are included, and the total neglected input flows for the modules reported on in the LCA are less than 5% of the energy usage and mass.

Data Quality

The dataset is representative for the production processes used in 2021, in the country of production, Northern Ireland. The data Quality Level, according to Table E.1 of EN 15804 +A2, Annex E, is as follows:

- Geographical representativeness: Very Good
- Technical representativeness: Very Good
- Time representativeness: Very Good

Allocations

Allocation of energy and electricity types and amounts to the various manufacturing processes has been provided by the manufacturers along with production waste. Allocation of impacts to the products is based on the product composition mass.

Flows related to human activities such as employee transport are excluded. The construction of capital assets such as buildings, manufacture of machines and transportation systems are also excluded since the related flows are assumed to be negligible compared to the manufacture of the building material when compared to these systems over a full lifetime of operation.

6. Scenarios and additional technical information

A4. Transport to site

The transport to market is based on the transport from Moore Concrete in Ballymena Northern Ireland, by a distance of 200 km (road) and 250 km (sea) to a construction site in Great Britain.

Parameter	Value / Description
Road transport	Transport, freight, lorry 16-32 metric ton, EURO6 engine
Sea transport	Transport, freight, sea, bulk carrier for dry goods
Distance, road	200 km
Distance, sea	250 km
Capacity utilisation, road freight	46%
Bulk density transported goods	2,350 kg/m^3

A5. Installation on site

On-site construction losses have been confirmed from Moore Concrete as being approximately 0.1%.

C1. De-construction demolition

In the deconstruction/demolition phase C1 it is assumed that the concrete structure is demolished on site, and then crushed on site. It is assumed that 3.6 litres of diesel are used per m^3 of concrete in the demolition [11], and 0.22 litres of diesel per m^3 for crushing, where the crushing utilisation is 300 tonnes per hour [12].

C2. Transport

In the transport phase C2, it is assumed that the removed materials travel 50km to the recycling location.

C3. Waste processing

The energies for processing the wastes are not included in this analysis. During the demolition, crushing and stockpiling phases, (modules C1 and C3), when the crushed concrete is exposed to air, carbonation (adsorption of CO_2 onto the surfaces of the concrete fragments) may occur. Carbonation is not assessed in this LCA, however it is noted that in the absence of specific guidance on the amount of carbonation that may occur, a value of 5 kg of CO_2 per m^3 can be used should an estimate of carbonation be of interest.

C4. Disposal

It is assumed that no disposal of materials occurs, and 100% of materials are recovered and recycled. This is the default scenario for concrete materials in the Product Category Rules PCR for EPD Ireland [5].

D. Reuse – Recovery – Recycling potential

The following assumptions are made in Module D:

1. 100% of the aggregates replace the production of virgin aggregates.
2. 20% of the steel replaces the production of virgin steel. 20% is the amount of virgin steel in the reinforcing steel that is recycled. The remaining 80% is not counted, as this has already been through the recycling process, and has previously replaced virgin steel.

Declaration of biogenic carbon content at the production gate

There is no biogenic carbon contained (C) in the products. No product packaging is used in the delivery to the customer, other than re-useable wood skids, as and when needed. The products are delivered to site on flat-bed trucks in most cases.

Wood formwork is a consumable material used in the manufacture of the precast products. This wood is included in the product (A1) phase and is considered an element of the bill of materials for the precast products. Thus a small amount of biogenic CO_2 is evident in the GWP environmental impact of the products. However after use, the wood is burned (as a waste) to create heat in the factory. This process is modelled in the manufacturing (A3) phase, where the biogenic CO_2 is returned to the atmosphere.

Due to inherent uncertainties in the assumptions of the densities of the wood formwork together with the assumptions in the modelling the burning of wood for heat there is a small discrepancy in the net biogenic CO_2 in the A1 - A3 phase. This discrepancy is noted, however it is in the order of 0.2 to 0.6% of the overall precast product CO_2 footprint.

BIOGENIC CARBON PER DELCARED UNIT	BEBO Arch
Biogenic carbon content in product (kg C per m^2)	0
Biogenic carbon content in packaging (kg C per m^2)	0

Additional Technical Information

N/A.

7. Mandatory additional information on release of dangerous substances to indoor air, soil and water

None of the substances contained in the product are listed in the “Candidate List of Substances of Very High Concern for authorisation”, or they do not exceed the limit for registration with the European Chemicals Agency.

8. Other optional additional environmental information

N/A.

9. References

[1] ISO 14040: Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO14040:2006.

[2] ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006.

[3] ISO 14025: Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures', International Organization for Standardization, ISO14025:2006.

[4] I.S. EN 15804:2012+A2:2019,: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', EN 15804:2012+A2:2019.

[5] Ecochain, Version 3.5.13 (2022), web: http://app.ecochain.com.

[6] Product Category Rules : Part A Implementation and use of I.S. EN 15804:2012+A1 and + A2, and CEN TR 16970:2016 in Ireland for the development of Environmental Product Declarations (issued 05.03.2022), version 2.1.

[7] Sustainability of construction works - Environmental product declarations - Product Category Rules for concrete and concrete elements, I.S. EN 16757:2017

[8] CML - Department of Industrial Ecology, CML-IA Characterisation Factors, Dated August 2016, Leiden University, Leiden, Netherlands Available at: https://www.universiteitleiden.nl/en/research/research-output/science/cml-ia-characterisation-factors

[9] Ministerie van Verkeer en Waterstaat, 8 maart 2004, Toxiciteit heeft z'n prijs, Schaduwprijzen voor (eco-) toxiciteit en uitputting van abiotische grondstoffen binnen DuboCalc.

[10] PEF methodology final draft.pdf (europa.eu).

[11] Climate and resource footprint assessment and visualization of recycled concrete for circular economy, Journal of Resources, Conservation and Recycling, Elsvier. Mostert, Sameer, Glanz, Bringezu, University of Kassel, Germany, Center for Environmental Systems Research (CESR), Faculty of Civil and Environmental Engineering. https://doi.org/10.1016/j.resconrec.2021.105767

[12] https://www.rubblemaster.com/en/rm-120go/#technical_specification.

[13] EN 13369:2018 'Common rules for precast concrete products'.

10. Annex

N/A.