Ready-mix Concrete
Environmental Product Declaration

Levin – 45MPa 19mm Lattey Low GWP Mix

Managed By: Holcim NZ Ltd
EPD Process Certificate No.: 1016
Verified Accreditation Body: Epsten Group, Inc.
EPD Registration No.: EPD-IES-0019529

Publication Date: 2025-01-28
Version Date: 2025-01-28 **Valid Until**: 2030-01-28
Revision Number: 1.0
Geographical Scope: New Zealand

In accordance with ISO 14025:2016 and EN15804+A2:2019/AC:2021
Programme Operator: EPD International AB
Regional Programme: EPD Australasia Limited

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Revision Number	Revision Date	Description of Changes
1.0	2025-01-28	N/A

INTRODUCTION

Worldwide, there is a growing expectation for Governments and organizations to increase transparency and disclosure regarding environmental impacts, particularly greenhouse gas (GHG) emissions. This trend has gained momentum since the landmark COP 21 Paris Agreement in 2015, where nations collectively committed to ambitious efforts to combat climate change.

Simultaneously, the global demand for construction materials is on the rise due to population growth and increased urbanization. Concrete, the world's second most utilized commodity after water, significantly contributes to the embodied GHG emissions of infrastructure and property assets. In light of Aotearoa's commitment to achieving net zero by 2050, Holcim New Zealand is actively working towards a lower carbon footprint in the built environment.

For Holcim, building progress entails offering a comprehensive range of low carbon, high-performance, and specialty concrete solutions tailored for Aotearoa's homes, buildings, and infrastructure. We provide guidance, tools, and resources to empower you to confidently specify your projects. Our commitment extends to delivering solutions that align with your needs consistently.

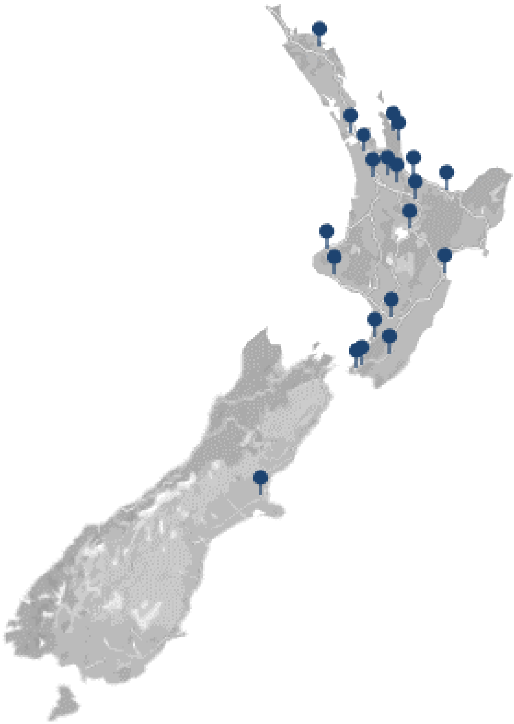
This underscores the urgent need for construction materials both now and in the future, emphasizing the construction materials industry's pivotal role in addressing climate change. At Holcim, we acknowledge our responsibility to contribute to global emissions reduction targets. To guide our efforts, we have developed a roadmap outlining specific actions to align with these objectives.

Together, we can build better
to help decarbonise Aotearoa.

ABOUT HOLCIM NEW ZEALAND

BUILDING PROGRESS

Holcim New Zealand (NZ) is a leading solutions provider for your design and construction needs in New Zealand, dating back to 1888. Today, we supply essential construction materials from cement terminals & depots, quarries and ready-mix concrete sites to customers. Our ready-mix concrete solutions offer a comprehensive range of low carbon, high-performance, and specialty concrete solutions tailored for Aotearoa's homes, buildings, and infrastructure throughout the country.



Globally, Holcim is 60,000 people around the world who are passionate about building progress for people and the planet through four business segments: Cement, Ready-Mix Concrete, Aggregates and Solutions & Products.

Sustainability is at the core of our global strategy, with our industry's first 2030 and 2050 net-zero targets validated by the Science Based Targets initiative for all scopes. We are leading the transition towards low-carbon construction and driving a circular economy by providing materials and solutions that are re-shaping the way our industry builds. Holcim NZ has developed a range of low carbon solutions specifically for the New Zealand market.

This EPD provides our stakeholders with confidence about the environmental impact of our products.

HOLCIM NZ READY-MIX CONCRETE

Holcim NZ is committed to delivering project-specific Environmental Product Declarations (EPDs) on demand, a significant stride in our sustainability journey. This approach reflects our comprehensive commitment to integrating sustainability throughout our organization and operations. Utilizing third-party verified data, our concrete solutions empower us to collaborate seamlessly with customers, optimizing sustainability performance from tender to design and construction.

Our concrete products from Holcim NZ come with the assurance of an EPD Process Certification. This certification signifies our ability to produce compliant EPDs in-house, providing substantial capability and flexibility in leveraging life cycle impact data for our operations and customer collaborations.

Obtaining our EPD Process Certification involved a strategic investment in integrating Life Cycle Assessment (LCA) into our systems and processes. We underwent a rigorous third-party evaluation adhering to relevant ISO standards and guidelines set by the International EPD Programme and EPD Australasia. This ensures the credibility and reliability of the data supporting our commitment to sustainability.

This EPD has been developed using our EPD Process Certification for 45MPa 19mm Lattey Low GWP Mix with production occurring at Levin Plant.

LCA INFORMATION

Declared Unit

The declared unit adopted is 1m³ of ready-mix concrete in use.

Time Representativeness

The plant data for the LCA is based on 2022 calendar year production data. The mix data for the LCA is based on 2025 calendar year production data.

Databases and LCA Software Used

The software used was SimaPro® LCA software (v 9.5.0.0). The inventory data for the processes are entered in the LCA software and linked to the pre-existing background data for upstream feedstocks and services. Inventory data was selected per the standards, in the following order of preference:

- Ecoinvent 3.9.1 database was used as the primary source for inventory data (Ecoinvent v3.9.1, 2023). At the time of this report, this Ecoinvent database version is less than 1 year old.
- The Australian Life Cycle Inventory (AusLCI) v1.42 was compiled by the Australian Life Cycle Assessment Society (ALCAS) – this data will comply with the AusLCI Data Guidelines (Australian Life Cycle Inventory Database Initiative (AusLCI), 2023). At the time of this report, this AusLCI database version is less than 1 years old.
- The Environmental Footprint (EF) database v3.1 is facilitated by the European Commission and developed by ecoinvent, Sphera, Blonk, CEPE, and Pré Sustainability (Developer Environmental Footprint (EF), 2022). At the time of this report, this EF database version is around 1 years old.

The following impact categories were calculated manually for the foreground data:

- Use of renewable primary energy resources used as raw materials (PERM)
- Use of non-renewable primary energy resources used as raw materials (PENRM)
- Materials for recycling
- Non-hazardous waste disposed

Data quality

Foreground data on raw material requirements, manufacture and distribution was provided as primary source by Holcim (NZ) for the year January 2022 – December 2022. Schemes for data quality assessment of generic and specific data from EN 15804+A2 are used to perform this data quality assessment activity.

Upstream processes

The upstream processes include those involved in Module A1 – raw material supply. This module includes:

- Extraction, transport, and manufacturing of raw materials.
- Generation of electricity from primary and secondary energy resources, also including their extraction, refining and transport for Modules A1 and A3.

Generic data from LCA databases were used to model all raw materials for ready-mix concrete, such as cement, additives, admixtures, aggregates and sand, water, fly ash and slag. The cellulose pulp is assumed to have 12.2 MJ/kg as renewable energy resource used as raw material, based on the energy density quoted for biomass municipal and industrial materials in the National Greenhouse Accounts Factors (Department of the Environment, 2021). A few exceptions apply where suppliers of raw materials publish product specific EPDs, which are incorporated in the background processes to better reflect the environmental impacts associated with these raw materials in processes (e.g., extraction, transportation, manufacturing) before arriving at Holcim (NZ) production plants.

Core processes

The core processes include those involved in Module A2 and Module A3 – upstream raw material transport and manufacturing. They include:

- External transportation of materials to the core processes and internal transport.
- Manufacturing of concrete.
- Transportation of materials for recycling and landfilling externally
- Treatment of waste and wastewater generated from the manufacturing processes.

All the materials used for producing ready-mix concretes were transported via truck. Specifically, aggregates and cements were assumed to be transported by heavy trucks and other raw materials were assumed to be transported by medium trucks.

Concrete manufacturing is undertaken at Holcim (NZ) branded concrete batching plants. All plants have the same or similar site resource use profile, management systems and operating systems. The process of manufacturing concrete involves the careful proportioning and mixing of cement, supplementary cementitious materials (SCMs), aggregates, water, chemical admixtures and additives including colour oxides in some instances. These raw materials are mixed in batching plants according to the specific concrete mix designs.

Site specific manufacturing data was collected during fiscal year 2022. These include inputs like energy (e.g., electricity, fuels, etc.) and outputs (e.g., waste to landfill, recyclables, etc.). They are allocated to 1m³ of ready-mix concrete product based on the annual production volume in each batching plant. Electricity is modelled based on the electricity grid mix from New Zealand Ministry of Business, Innovation & Employment.

Electricity for the manufacturing site is modelled based on the electricity mix published by the Ministry of Business, Innovation and Employment, with primary source from hydro (60%), geothermal (18%), wind (6.5%), gas (9.9%), and coal (2.88%). The electricity emission (GWP-GHG) is 0.0742 kg CO_2e/kWh.

Downstream processes

This includes deconstruction (Module C).

Deconstruction (C1) is assumed to use drilling to break and remove the concrete. The distance for waste collecting from construction site (C2) to landfill plant is assumed 50km. All products are assumed to be landfilled (C4) and there is no carbonation at the end of life. It's assumed that there is no recycling for the product at the end of life, so the C3 impact is 0.

No CO_2 uptake has taken place in any module declared.

Allocation

According to EN 15804+A2, in a process step where more than one type of product is generated, it is necessary to allocate the environmental stressors (inputs and outputs) from the process to the different products (functional outputs) in order to get product-based inventory data instead of process-based data. An allocation problem also occurs for multi-input processes. In an allocation procedure, the sum of the allocated inputs and outputs to the products shall be equal to the unallocated inputs and outputs of the unit process.

The following stepwise allocation principles shall be applied for multi-input/output allocations:

- The initial allocation step includes dividing up the system sub-processes and collecting the input and output data related to these sub-processes.
- The first (preferably) allocation procedure step for each sub-process is to partition the inputs and outputs of the system into their different products in a way that reflects the underlying physical relationships between them.
- The second (worst case) allocation procedure step is needed when physical relationship alone cannot be established or used as the basis for allocation. In this case, the remaining environmental inputs and outputs from a sub-process must be allocated between the products in a way that reflects other relationships between them, such as the economic value of the products.

Holcim (NZ) produces a range of concrete mixes at each of their concrete batching plants, with the range dependent on customer demand. Due to the random nature of which mixes are produced and the large number of concrete mixes, allocation was required to determine the amount of site resource use, discharges and emissions associated with each mix. Annual consumption of energy and resource were collected at each site. Allocation was carried out based on physical relationships - annual production amount, by volume in m^3. It's assumed that all kinds of ready-mix concrete products consume the same amount of resource and energy during production.

One exception is the fuel consumption for mixing and loading in manufacturing plants. Holcim (NZ) performed a fuel burn diagnostic report on a typical mixing truck they owned. The fuel consumption for mixing and loading or loading only (for some plants) for 1 m^3 product was diagnosed, calculated, and directly used without any allocation since it's measured per declared unit covered in this EPD.

Cut-off Rules

It is common practice in LCA/LCI protocols to propose exclusion limits for inputs and outputs that fall below a threshold % of the total, but with the exception that where the input/output has a "significant" impact it should be included. According to the PCR 2019:14, life cycle inventory data shall according to EN 15804+A2 include a minimum of 95% of total inflows (mass and energy) per module. It should also include a minimum of 99% of renewable and non-renewable primary energy use as well as the total mass input of that unit process. Inflows not included in the LCA shall be documented in the EPD. Data gaps in included stages in the downstream modules shall be reported in the EPD, including an evaluation of their significance. In accordance with the PCR 2019:14, the following system boundaries are applied to manufacturing equipment and employees:

- Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process are not accounted for in the LCI. Capital equipment and buildings typically account for less than a few percent of nearly all LCIs and this is usually smaller than the error in the inventory data itself. For this project, it is assumed that capital equipment makes a negligible contribution to the impacts as per Frischknecht et al. with no further investigation (Frischknecht, 2007).
- Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI. The impacts of employees are also excluded from inventory impacts on the basis that if they were not employed for this production or service function, they would be employed for another. It is very hard to decide what proportion of the impacts from their whole lives should count towards their employment. For this project, the impacts of employees are excluded.

Based on this guidance, no energy or mass flows, except packaging of materials were excluded. All materials required for manufacturing are delivered via trucks and ships without packaging.

Comparability

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For further information about comparability, see EN 15804 and ISO 14025.

Address and Contact Information

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Key Assumptions

Module	Assumption or limitation	Impact on LCA results	Discussion
A1	Raw material packaging	Minor	For simplicity and lacking comprehensive data, all raw material packaging is excluded in this study.
A1	Most emission factors assigned to raw materials are generic	Significant	The emission factors assigned to most raw materials covered in this calculator are generic that are available in the LCA databases. They are the closest proxy based on the available raw material information. If more specific impacts available from suppliers in the future, they should replace the current ones to better reflect the impacts of the raw material.
A2	Transport distance from raw material supplier to Holcim (NZ) production plants	Minor	Although transport distances are available for some raw materials, others that don't have the data are estimated and assumed to be the average distance of the corresponding material type.
A2	GreenStar and IS indicators for Holcim cement	Minor	This process EPD includes the GreenStar and IS indicators for their future use in reporting on these two platforms. However, the transport impacts in Holcim's published EPD for its cement product doesn't include these indicators. Thus, in the background calculation of these indicators, the tool uses the generic transport LCA background in ecoinvent 3.9.1 (heavy truck) and made assumptions that transport from Holcim terminal Auckland to depot is 200km (truck transport only), and transport from terminal Timaru to depot is 50km (truck transport only). Based on these assumptions, the tool calculated the GreenStar and IS indicators.
A3	Waste production	Minor	The amount of waste and wastewater produced are estimated by Holcim (NZ). If more specific data is available in the future, it could improve accuracy of the impacts for 1m^3 of product.
C1	Deconstruction	Minor	The deconstruction process is assumed to be the same for all products.
C2	Transport to landfill	Minor	It is assumed 50km distance to landfill based on the distance from likely construction sites within major cities to main landfill sites for the area.

Table 1. Assumptions, choices, and limitations

Data Quality

Foreground data on raw material requirements, manufacture and distribution was provided as primary source by Holcim (NZ) for the year January 2022 – December 2022. Schemes for data quality assessment of generic and specific data from EN 15804+A2 are used to perform this data quality assessment activity, as shown in table 2.

Module	Life Cycle Stage	Collected Foreground Data	Data Source and Year	Data Quality
A1	Raw material	Raw material types and characterizations	Supplied by Holcim (NZ), 2022	Primary source data, very good
A2	Raw material transport from suppliers	Location of material suppliers Transport mode, truck information, and distances	Supplied by Holcim (NZ), 2022	Primary and secondary source data, good
A3	Manufacturing	Energy and water inputs Estimated waste outputs. Annual production volumes	Supplied by Holcim (NZ), 2022	Primary source data, good
C1	Deconstruction and demolition	Inputs for deconstruction & demolition	Assumptions for deconstruction energy	Secondary source data, fair
C2	Transport to waste processing	Distance to end-of-life destination	General assumption	Secondary source data, fair
C4	Disposal	End of life destination	Waste to landfill rate based on New Zealand national GHG report from Ministry for the Environment	Secondary source data, fair

Table 2. Data Quality Assessment

SYSTEM BOUNDARY

The system boundary is shown in Figure 1 below. The scope of LCA for this EPD is cradle-to-gate with modules C1-C4, and module D. Emissions from construction installation (A5) was excluded as Holcim (NZ) does not have operational control over the installation of products at the construction site. In addition, the following life cycle stages were also excluded: distribution (A4) and use stages (B1-B7).

All modules included in this EPD are marked as X and those excluded are marked as 'Not declared' (ND) Table 3.

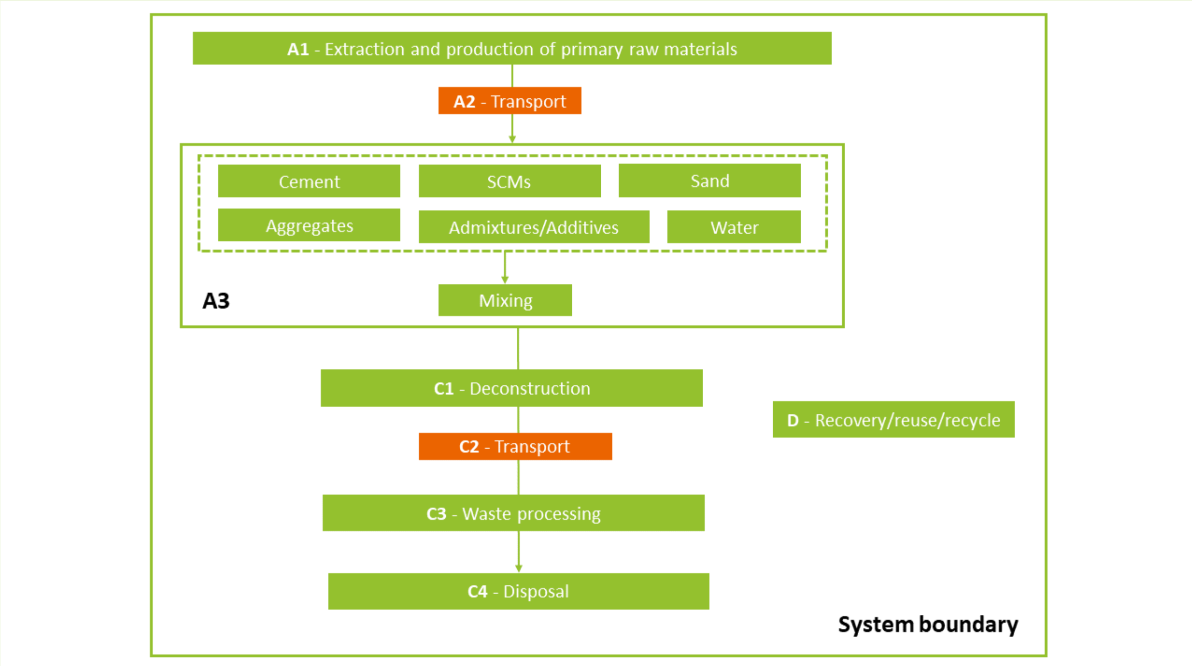

Figure 1. System Boundary

	Product Stage			Construction Stage		Use Stage							End of Life Stage				Benefits & loads for the next product system
	Raw Material Supply	Transport	Manufacturing	Transport	Construction/Installation process	Use	Maintenance incl. transport	Repair incl. transport	Replacement incl. transport	Refurbishment incl. transport	Operational Energy Use	Operational Water Use	De-construction & Demolition	Transport	Re-use Recycling	Final Disposal	Reuse, Recovery Recycling potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module Declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	NZ	NZ	NZ										NZ	NZ	NZ	NZ	NZ
Specific data used	NZ for All																
Variation – products	<10%																
Variation - sites	N/A																

Table 3. System Boundary declared in this EPD

ND: Module not declared

EPD PRODUCT DESCRIPTION AND USE

Product Description

Ready-mix concrete is produced at batching plants where controlled operations allow precise mix designs resulting in a product that is delivered to construction sites in a freshly mixed, plastic, or unhardened state.

Concretes categorised as Normal and Special are defined and made in accordance with NZS 3104:2003, to ensure that nominal strengths and performance requirements are achieved.

Concrete covered by this EPD are listed in Table 4.

Product Name	Strength	Plant	Mix Code	Description of Use
45MPa 19mm Lattey Low GWP Mix	45MPa	Levin	4519LATD35	Ready Mix and precast concrete products

Table 4. Concrete covered by this EPD

Content Declaration

The following table provides a summary of the materials included in Holcim ready-mix concrete and their relative composition by weight.

Item	Hazardous Content	Mass (%)
Portland Cement	✓	5-21%
Aggregate		67-84%
Supplementary Cementitious materials	✓	0-11%
Water		6-12%
Admixture	✓	0.01-0.2%

Table 5. Material Composition

The product does not contain one or more substances that are listed in the “Candidate List of Substances of Very High Concern for Authorisation”.

Manufacturing process and flow diagram

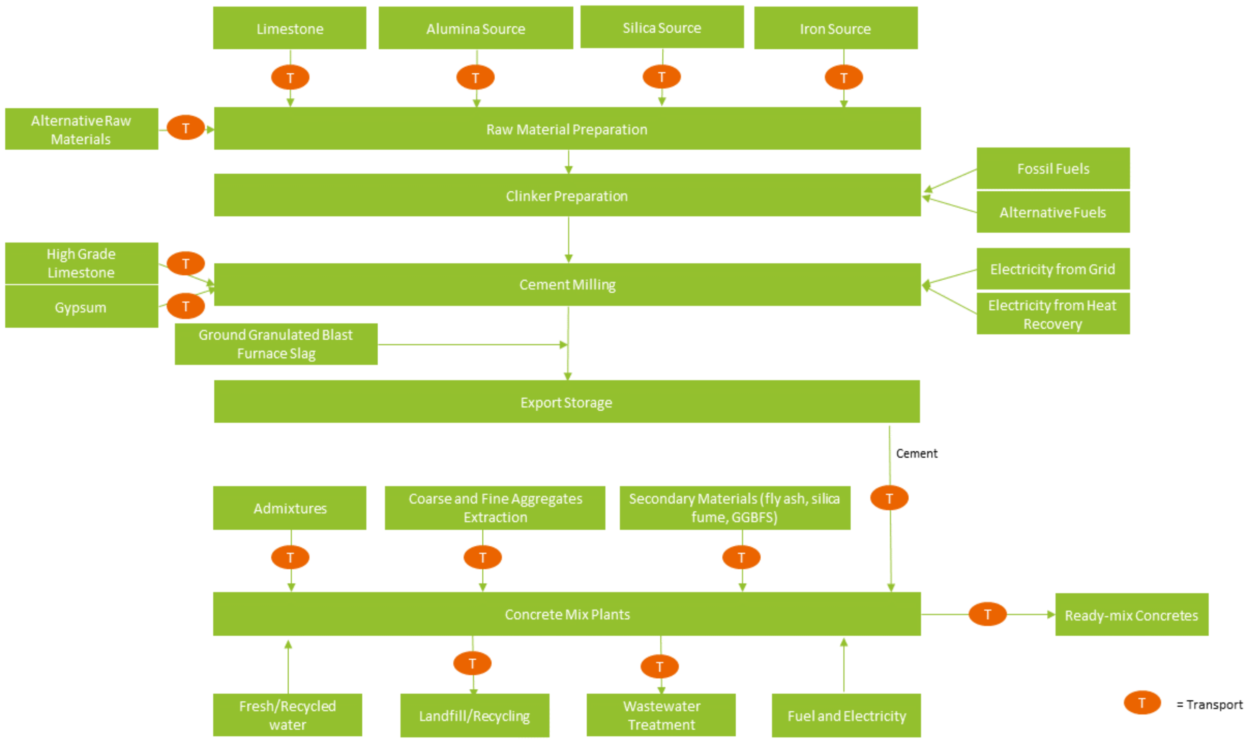

Figure 2. Manufacturing Process Flow

Packaging

Holcim ready-mix concrete is delivered in bulk with no packaging.

Recycled Material

BS EN 16757:2017 specifically lists the following materials relevant to the study as co-products:

- Fly ash;
- Ground granulated blast furnace slag; and
- Silica Fume.

As such, the above materials are considered as co-products of their production process and the impacts for their production process are allocated according to PCR 2019:14 Construction Products and Construction Services (co-produced goods, multi-output allocation).

There is no recycled materials used in producing the product.

ENVIRONMENTAL PERFORMANCE

The potential environmental impacts, use of resources and waste categories included in this EPD were calculated using the SimaPro v9.5.0.0 tool and are listed in the table below. All tables from this point will contain abbreviations only. The potential environmental performance is calculated based on the input data and the emission factors from Ecoinvent v3.9.1. The LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds and safety margins or risks.

Long-term storage (>100 years) is not taken into consideration in the impact estimate.

Impact Category	Abbreviation	Measurement	Assessment Method & Implementation
Potential Environmental Impacts			
Global warming potential (fossil)	GWP-fossil	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Global warming potential (biogenic)	GWP-biogenic	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Galo warming potential (Land use/ land transformation)	GWP-luluc	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Total global warming potential	GWP-total	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013
Acidification potential	AP	mol H^+ eq.	Accumulated Exceedance, Seppälä et al. 2006, Posch et al., 2008
Eutrophication – aquatic freshwater	EP - freshwater	kg P equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication – aquatic marine	EP - marine	kg N equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication – terrestrial	EP – terrestrial	mol N equivalent	Accumulated Exceedance, Seppälä et al. 2006, Posch et al.
Photochemical ozone creation potential	POCP	kg NMVOC equivalents	LOTOS-EUROS, Van Zelm et al., 2008, as applied in ReCiPe
Abiotic depletion potential (elements)*	ADPE	kg Sb equivalents	CML (v4.1)
Abiotic depletion potential (fossil fuels)*	ADPF	MJ net calorific value	CML (v4.1)
Ozone depletion potential	ODP	kg CFC 11 equivalents	Steady-state ODPs, WMO 2014
Water Depletion Potential*	WDP	m^3 equivalent deprived	Available Water Remaining (AWARE) Boulay et al., 2016
Resource use			
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ, net calorific value	Manual for direct inputs [1]
Use of renewable primary energy resources used as raw materials	PERM	MJ, net calorific value	Manual for direct inputs [2]
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ, net calorific value	Sum of "Non-renewable, biomass", "Renewable, biomass", "Renewable, wind, solar, geothe", and "Renewable, water" indicators from calculating Cumulative Energy Demand based on fuels' lower heating values
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ, net calorific value	Manual for direct inputs [3]
Use of non- renewable primary energy resources used as raw materials	PENRM	MJ, net calorific value	Manual for direct inputs [4]
Total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ, net calorific value	Sum of "Non-renewable fossil" and "Non-renewable, nuclear" indicators from calculating Cumulative Energy Demand based on fuels' lower heating values
Use of secondary material	SM	kg	Manual for direct inputs
Use of renewable secondary fuels	RSF	MJ, net calorific value	Manual for direct inputs

[1] PERE = PERT - PERM
[2] Calculated based on the lower heating value (LHV) of renewable raw materials. LHV is taken from https://phyllis.nl/, as recommended by SimaPro in compliance with EN15804+A2: https://support.simapro.com/s/article/How-to-calculate-EN-15804-A2-indicators-in-desktop-SimaPro
[3] PENRE = PENRT - PENRM
[4] Calculated based on the lower heating value (LHV) of non-renewable raw materials. LHV is taken from https://phyllis.nl/, as recommended by SimaPro in compliance with EN15804+A2: https://support.simapro.com/s/article/How-to-calculate-EN-15804-A2-indicators-in-desktop-SimaPro

Impact Category	Abbreviation	Measurement	Assessment Method & Implementation
Use of non-renewable secondary fuels	NRSF	MJ, net calorific value	Manual for direct inputs
Use of net fresh water	FW	m^3	ReCiPe 2016
Waste categories and Output flows			
Hazardous waste disposed	HWD	kg	EDIP 2003 (v1.05)
Non-hazardous waste disposed	NHWD	kg	EDIP 2003 (v1.05) [5]
Radioactive waste disposed/stored	RWD	kg	EDIP 2003 (v1.05)
Hazardous waste disposed	HWD	kg	EDIP 2003 (v1.05)
Non-hazardous waste disposed	NHWD	kg	EDIP 2003 (v1.05) [6]
Radioactive waste disposed/stored	RWD	kg	EDIP 2003 (v1.05)
Hazardous waste disposed	HWD	kg	EDIP 2003 (v1.05)
Non-hazardous waste disposed	NHWD	kg	EDIP 2003 (v1.05) [7]
Additional environmental impacts			
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2013 [8]
Particulate matter	Potential incidence of disease due to PM emissions (PM)	Disease incidence	SETAC-UNEP, Fantke et al. 2016
Ionising radiation - human health**	Potential Human exposure efficiency relative to U235 (IRP)	kBq U-235 eq.	Human Health Effect model
Eco-toxicity (freshwater)*	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	CTUe	USEtox
Human toxicity potential - cancer effects*	Potential Comparative Toxic Unit for humans (HTP-c)	CTUh	USEtox
Human toxicity potential - non cancer effects*	Potential Comparative Toxic Unit for humans (HTP-nc)	CTUh	USEtox
Soil quality*	Potential soil quality index (SQP)	dimensionless	Soil quality index (LANCA®)

[5] Calculated as sum of *Bulk waste* and *Slags/ash*.
[6] Calculated as sum of *Bulk waste* and *Slags/ash*.
[7] Calculated as sum of *Bulk waste* and *Slags/ash*.
[8] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero; calculated as the sum of *GWP-luluc* and *GWP-fossil* in the LCA model.
* Disclaimer 1 – 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 experience with the indicator.
** Disclaimer 2 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. 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.

Life cycle impact, measurement, and methods for Green Star and IS Rating

Impact Indicators	Measurement Unit	Assessment Method and Implementation
Green Star		
Human toxicity cancer	CTUh	USEtox - cancer effect
Human toxicity non-cancer	CTUh	USEtox - noncancer effect
Land use	kg C deficit eq.	Soil Organic Matter method
Resource depletion – water	m^3	Water Stress Indicator
Ionising radiation	kBq U-235 eq.	Human Health Effect model
Particulate matter	kg PM2.5 eq.	RiskPoll
IS Rating		
Global Warming Potential	kg CO_2 eq.	CML (v4.02) based on IPCC AR4
Ozone Depletion Potential	kg CFC-11 eq.	CML (v4.02) based on WMO 1999
Acidification Potential	kg SO_2 eq.	CML (v4.02)
Eutrophication Potential	kg PO_4^{3-} eq.	CML (v4.02)
Photochemical Ozone Creation Potential	kg C_2H_4 eq.	CML (v4.2)
Abiotic Depletion Potential (Elements)	kg Sb eq.	CML (v4.2)
Abiotic Depletion Potential (Fossil Fuels)	MJ net calorific value	CML (v4.2)

LEVIN – 4519LATD35 (45MPA 19MM LATTEY LOW GWP MIX)

Potential Environmental Impact – mandatory indicators according to EN 15804+A2

Impact Indicators	Unit	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO2 eq.	2.40E+02	8.99E+00	1.86E+01	0.00E+00	2.40E+01	0.00E+00
GWP-biogenic	kg CO2 eq.	6.96E-02	3.87E-04	8.33E-04	0.00E+00	1.64E-01	0.00E+00
GWP-luluc	kg CO2 eq.	2.80E-02	3.09E-04	5.42E-04	0.00E+00	1.14E-02	0.00E+00
GWP-total	kg CO2 eq.	2.40E+02	8.99E+00	1.86E+01	0.00E+00	2.42E+01	0.00E+00
ODP	kg CFC-11 eq.	7.01E-06	1.41E-07	2.49E-07	0.00E+00	6.37E-07	0.00E+00
AP	mol H+ eq.	1.05E+00	8.40E-02	5.04E-02	0.00E+00	2.73E-01	0.00E+00
EP-freshwater	kg P eq.	1.57E-01	7.34E-05	3.77E-04	0.00E+00	4.10E-02	0.00E+00
EP-marine	kg N eq.	1.67E-01	3.95E-02	1.84E-02	0.00E+00	6.86E-02	0.00E+00
EP-terrestrial	mol N eq	3.47E+00	4.33E-01	2.01E-01	0.00E+00	7.36E-01	0.00E+00
POCP	kg NMVOC eq.	8.99E-01	1.29E-01	7.51E-02	0.00E+00	2.58E-01	0.00E+00
ADP-minerals & metals	kg Sb eq.	4.07E-05	3.76E-07	1.10E-06	0.00E+00	9.22E-06	0.00E+00
ADP-fossil	MJ	1.16E+03	1.18E+02	2.48E+02	0.00E+00	5.54E+02	0.00E+00
WDP	m3	-4.30E+01	9.42E-02	2.30E-01	0.00E+00	-3.84E+02	0.00E+00

Potential Environmental Impact – additional mandatory and voluntary indicators

Impact Indicators	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG	kg CO2 eq.	2.40E+02	8.99E+00	1.86E+01	0.00E+00	2.42E+01	0.00E+00

Resource use

Impact Indicators	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	4.76E+01	2.65E-01	4.04E-01	0.00E+00	5.07E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	4.76E+01	2.65E-01	4.04E-01	0.00E+00	5.07E+00	0.00E+00
PENRE	MJ	1.21E+03	1.18E+02	2.48E+02	0.00E+00	5.54E+02	0.00E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.21E+03	1.18E+02	2.48E+02	0.00E+00	5.54E+02	0.00E+00
SM	kg	1.98E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	9.90E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	9.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	1.26E+01	3.71E-03	8.33E-03	0.00E+00	-8.92E+00	0.00E+00

Waste Production

Impact Indicators	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	3.61E-03	8.12E-04	1.70E-03	0.00E+00	3.63E-03	0.00E+00
Non-hazardous waste disposed	kg	1.48E+00	3.46E-03	1.06E-02	0.00E+00	2.40E+03	0.00E+00
Radioactive waste disposed	kg	1.43E-03	6.05E-06	8.91E-06	0.00E+00	8.81E-05	0.00E+00

Output Flows

Impact Indicators	Unit	A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	1.62E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Additional environmental impact indicators

Impact Indicators	Unit	A1-A3	C1	C2	C3	C4	D
Particulate matter	disease incidence	8.42E-06	2.41E-06	1.24E-06	0.00E+00	4.08E-06	0.00E+00
Ionising radiation - human health	kBq U-235 eq.	1.08E+03	2.52E-02	3.77E-02	0.00E+00	3.64E-01	0.00E+00
Eco-toxicity (fresh-water)	CTUe	3.28E+02	4.09E+00	1.63E+01	0.00E+00	5.71E+02	0.00E+00
Human toxicity potential - cancer effects	CTUh	3.54E-07	6.27E-10	1.56E-09	0.00E+00	3.27E-08	0.00E+00
Human toxicity potential - non cancer effects	CTUh	1.33E-05	8.92E-09	1.22E-07	0.00E+00	7.15E-07	0.00E+00
Soil quality	dimensionless	1.99E+03	2.51E-01	1.01E+00	0.00E+00	1.31E+03	0.00E+00

LEVIN – 4519LATD35 (45MPA 19MM LATTEY LOW GWP MIX)

SUSTAINABILITY SCHEME INDICATORS

GreenStar Indicators – Results are in Accordance with Greenstar V1.3

Impact Indicators	Unit	A1-A3	C1	C2	C3	C4	D
Human toxicity cancer	CTUh	1.10E-08	6.27E-11	7.10E-10	0.00E+00	1.62E-09	0.00E+00
Human toxicity noncancer	CTUh	7.42E-10	3.36E-12	1.60E-11	0.00E+00	2.94E-10	0.00E+00
Land use	kg C deficit eq.	1.29E+03	1.08E-01	5.01E-01	0.00E+00	3.06E+02	0.00E+00
Resource depletion - water	m3	-1.01E+00	4.69E-03	1.21E-02	0.00E+00	-1.24E+01	0.00E+00
Ionising radiation	kBq U-235 eq.	1.94E+00	2.52E-02	3.78E-02	0.00E+00	3.65E-01	0.00E+00
Particulate matter - Greenstar	kg PM2.5 eq.	1.55E-01	2.29E-02	1.14E-02	0.00E+00	4.87E-02	0.00E+00

IS (Infrastructure Sustainability) Indicator - Results are in accordance with EN15804+A1:2013

Impact Indicators	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential	kg CO2 eq.	2.42E+02	8.99E+00	1.86E+01	0.00E+00	2.41E+01	0.00E+00
Ozone Depletion Potential	kg CFC-11 eq.	4.65E-06	1.12E-07	1.97E-07	0.00E+00	5.05E-07	0.00E+00
Acidification Potential	kg SO2 eq.	7.55E-01	5.89E-02	3.77E-02	0.00E+00	2.19E-01	0.00E+00
Eutrophication Potential	kg PO43- equivalent	2.89E-01	1.35E-02	7.59E-03	0.00E+00	1.48E-01	0.00E+00
Photochemical Ozone Creation Potential	kg C2H4 eq.	3.91E-02	1.50E-03	2.23E-03	0.00E+00	9.20E-03	0.00E+00
Abiotic Depletion Potential (Elements)	kg Sb eq.	1.73E-04	3.77E-07	1.10E-06	0.00E+00	9.25E-06	0.00E+00
Abiotic Depletion Potential (Fossil Fuels)	MJ net calorific value	7.08E+02	1.38E+00	9.33E+00	0.00E+00	4.31E+01	0.00E+00

PREVIOUS VERSION

N/A

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PROGRAMME-RELATED INFORMATION AND VERIFICATION

Declaration Owner	HOLCIM	**Holcim (New Zealand) Ltd** 23 Plumer Street, Central Auckland 1010, New Zealand www.holcim.co.nz
EPD Programme Operator	EPD® THE INTERNATIONAL EPD® SYSTEM	**EPD International AB** Box 210 60, SE-100 31 Stockholm, Sweden www.environdec.com | info@environdec.com
EPD Regional Programme	AUSTRALASIA EPD® ENVIRONMENTAL PRODUCT DECLARATION	**EPD Australasia Limited** 315a Hardy Street Nelson 7010, New Zealand www.epd-australasia.com | info@epd-australasia.com
EPD Produced by	edge impact	**Edge Impact Sustainability Consulting Inc** 269 Cordaville Road, Southborough, MA 01772, USA www.edgeimpact.global
EPD Process Certified by	epstengroup	**Epsten Group** Suite 2600, 101 Marietta St NW, Atlanta, Georgia 30303, USA www.epstengroup.com
EPD Registration Number	EPD-IES-0019529	
Valid From	2025-01-28	
Version	1.0	
Valid Until	2030-01-28	
Product category rules	Product Category Rules (PCR) 2019:14 Construction products (EN 15804+A2), Version 1.3.2 c-PCR-003 Concrete and concrete elements (EN 16757:2022)	
EPD type	Specific EPD	
Product group classification	**UN CPC 375**	
Geographical Scope	New Zealand	
Reference Year for Data	2022 Plant Data, 2024 Mix/Materials Data	

CEN standard EN 15804:2012+A2:2019 served as the core Product Category Rules (PCR)

Product category rules	PCR 2019:14 Construction Products and Construction Services, Version 1.3.2, 2023-12-08 c-PCR-003 Concrete and concrete elements (EN 16757:2022)
PCR review was conducted by	The Technical Committee of the International EPD® System. Review chair: Claudia A. Peña, University of Concepción, Chile. Contact via info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	☒ EPD process certification ☐ EPD verification
EPD Process Certified by	Epsten Group, Inc. Suite 2600, 101 Marietta St NW, Atlanta, Georgia 30303, USA Accredited by: A2LA, Certificate #3142.03
Procedure for follow-up of data during EPD validity involves third party verifier:	☒ Yes ☐ No

Programme-related information and verification

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

Contact your Holcim representative today for more information.

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