GUNLAKE CONCRETE | GUNLAKE QUARRIES

Environmental Product Declaration (EPD)

in accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

100MPa High Strength GP/FA/GGBFS/SF Blend concrete

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EPD of a single concrete product from a manufacturer (based on a representative location).

An EPD may be updated or depublished if conditions change.

To find the latest version of the EPD and to confirm its validity, see www.environdec.com

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Contents

Disclaimer

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

General information

An Environmental Product Declaration (EPD) is a standardised way of quantifying the potential environmental impacts of a product or system. EPDs are produced according to a consistent set of rules – Product Category Rules (PCR) – that define the requirements within a given product category. These rules are a key part of ISO 14025 as they enable transparency and comparability between EPDs.

This EPD provides environmental indicators for a selected concrete product, manufactured at Gunlake's facilities in the Greater Sydney region in New South Wales (NSW), Australia. This EPD is a "cradle-to-gate plus modules C1-C4, D" declaration covering production and end-of-life life cycle stages.

This EPD is verified to be compliant with EN 15804. Gunlake Concrete NSW Pty Ltd, as the EPD owner, has the sole ownership, liability, and responsibility for the EPD.

EPD Program Operator and Licensee	**EPD Program Operator** **EPD International AB** Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: support@environdec.com	**Licensee** **EPD Australasia Limited** Address: 6 Cube Court Richmond 7020, New Zealand Web: www.epd-australasia.com Email: info@epd-australasia.com	
EPD registration number:	EPD-IES-0028003:001		
Published:	2026-03-20	Valid Until:	2031-03-19 (5 years)
Reference year for data:	2024-07-01 – 2025-06-30 (the mix design is current at time of publication of the EPD)		

Product Category Rules (PCR)	CEN standard EN 15804 served as the core Product Category Rules (PCR)
PCR:	PCR 2019:14 Construction Products, Version 2.0.1, 2025-06-05 (valid until 2030-04-07)
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com for a list of members. Review chair: Rob Rouwette | start2see (chair), Noa Meron | thinkstep-anz (co-chair). The review panel may be contacted via the Secretariat www.environdec.com/contact.
c-PCR	c-PCR-003 (to 2019:14) Concrete and concrete elements, version 2025-04-08
Third-party verification:	Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ Individual EPD verification without a pre-verified LCA/EPD tool
Third party verifier: Approved by EPD Australasia Ltd	Andrew D. Moore, Life Cycle Logic Email: andrew@lifecyclelogic.com.au Web: www.lifecyclelogic.com.au Phone: +61 424 320 057
Procedure for follow-up of data during EPD validity involves third-party verifier:	☐ Yes ☒ No

Information about the EPD owner

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EPD Produced by:	**start2see Pty Ltd** Unit 8, 2-4 Kensington Rd, South Yarra, VIC 3141, Australia Email: Rob.Rouwette@start2see.com.au Web: www.start2see.com.au Phone: +61 403 834 470

Gunlake is the largest independent supplier of concrete and quarry products in the Sydney Region and NSW. Over the last 19 years Gunlake have developed a cycle of continuous growth building state-of-the-art concrete batch plants. Currently we have five concrete plants in operation and plans for future expansion.

The Gunlake Group are a proudly Australian owned, family company spanning four generations in the quarrying and concrete industry in Australia. We strive to deliver:

- Industry leading service,
- The highest quality products, and
- Innovative solutions to support our customers' requirements.

Product information

Gunlake produces ready-mixed concrete in line with Australian Standards, AS1379 Specification and Supply of Concrete. The product covered by this EPD is manufactured at any of Gunlake's concrete plants in Sydney, NSW.

The product included in this EPD, its strength grade, density, mix description and typical application is shown below. The product composition is presented in Table 1. For reasons of confidentiality, a range is provided.

Product	Strength Grade	Density
100MPa High Strength GP/FA/GGBFS/SF Blend	100 Mpa	2 373 kg/m^3

Mix description	Application
100MPa 10mm agg, cement/fly ash/slag/Silica Fume mix, Verticals	8. Vertical columns

Technical compliance

Gunlake concrete products comply with relevant technical specifications as per AS 1379:2007 "Specification and supply of concrete", applicable legislation, regulations and industry standards plus project requirements.

G-Lab Materials Testing Pty Ltd is Gunlake's in-house laboratory that is NATA accredited. G-lab drives the highest standards of concrete and quarry material performance.

Geographical scope

The processes in modules A1-A3 have been modelled to represent concrete production by Gunlake in Sydney, NSW, Australia, using a representative plant (Glendenning). The raw materials are sourced from Japan (cement) and within Australia (all other raw materials), and the end-of-life (module C) of the product has been modelled to represent Australia as well (based on the default scenario from the PCR).

Content declaration

The product composition is presented in Table 1: Product content. For reasons of confidentiality, a range is provided. Ready-mixed concrete is delivered in bulk without packaging and does not contain biogenic carbon.

Table 1: Product content

Ingredients	Proportion (kg/m³)	Post consumer recycled material, mass (%)	Biogenic material, mass (%) of product	Biogenic material, kg C / declared unit
General Purpose Cement [¤]	120-680	0%	0%	0
Fly Ash [†]	0-150	0%	0%	0
Slag (GGBFS) [†]	0-275	0%	0%	0
Silica fume [†]	0-50	0%	0%	0
Coarse aggregates [†]	700-1 100	0%	0%	0
Manufactured sand [†]	0-300	0%	0%	0
Natural sand [†]	400-900	0%	0%	0
Admixtures	0-3	0%	0%	0
Water	150-225	0%	0%	0
Total	**2 373 kg/m³**	**0%**	**0%**	**0**

[¤] Cement in concrete contains traces of Chromium VI (hexavalent).
[†] Crystalline-silica (quartz) may be a constituent of sand, crushed stone, gravel, blast furnace slag, silica fume and fly ash used in any particular concrete mix.

Concrete products, as supplied, are non-hazardous. The product included in this EPD does not contain any substances of very high concern as defined by European REACH regulation* in concentrations >0.1% (m/m). Dust from this product is classified as Hazardous according to the Approved Criteria for Classifying Hazardous Substances 3rd Edition (NOHSC 2004). Concrete products are classified as non-dangerous goods according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. When concrete products are cut, sawn, abraded or crushed, dust is created which contains crystalline silica, some of which may be respirable (particles small enough to go into the deep parts of the lung when breathed in), and which is hazardous. Exposure through inhalation should be avoided.

The product code for ready mixed concrete is UN CPC 375 (Articles of concrete, cement and plaster) and ANZSIC 20330 (Concrete – ready mixed – except dry mix).

** Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals.*

LCA information

Declared unit

"1 cubic metre (m^3) of ready-mixed concrete, as ordered by our clients"
The conversion factor to mass is equal to the density of the concrete: 2 373 kg/m^3.

Scope of the Environmental Product Declaration

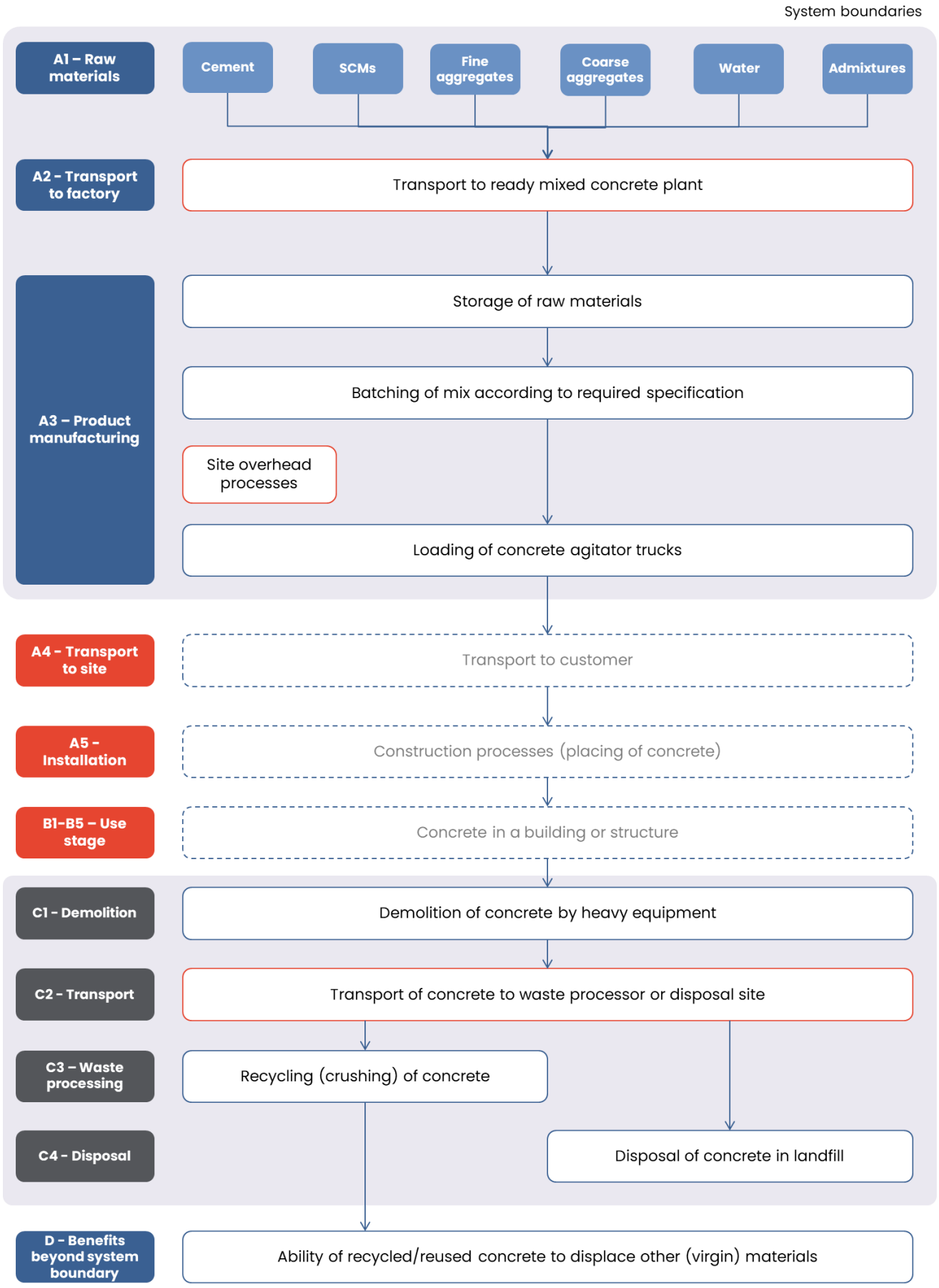
The scope of the EPD is cradle-to-gate with modules C1-C4 and module D (life cycle stages A1-A3, C1-C4 and D). This EPD covers the processes that occur in as many of the product's life cycle stages as could be effectively modelled. Stages A4, A5 and B1-B7 have not been included as these are better defined at building or structure level. The modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation are shown in Table 2.

Table 2: Scope of this EPD

Stages	**Product Stage**			**Construction Stage**		**Use Stage**							**End-of-life Stage**				**Benefits beyond system boundary**
	Raw Materials	Transport	Production	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/Demolition	Transport	Waste Processing	Disposal	Reuse, recovery, recycling potential
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
				Scenario		Scenario							Scenario				Scenario
Modules Declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	AU, JP	AU	AU										AU	AU	AU	AU	AU
Share of primary data	75%*																
Variation – products	0% (n/a)																
Variation – sites	3%																

X = module is included in this study
ND = module is not declared. When a module is not accounted for, the stage is marked with "ND" (Not Declared). ND is used when we cannot define a typical scenario.
** The share of primary data is high as we received primary data from our cement supplier, including shipping to Australia.*

Figure 1 – Flow diagram of main ready-mixed concrete production processes, life cycle stages and visualisation of system boundaries



Product stage (A1-A3)

Raw materials – Module A1

Extraction and processing of raw materials results in environmental impacts from the use of energy and resources, as well as from process emissions and waste.

- Cement is mainly produced from clinker (made from limestone) and gypsum.
- Aggregates are extracted from quarries. (Coarse aggregates and manufactured sand are sourced from Gunlake's Marulan Quarry.)
- Supplementary Cementitious Materials (SCM): Fly ash, GGBFS (ground granulated blast furnace slag) and silica fume are co-products from electricity generation, steel production, and (ferro)silicon production, respectively.
- Admixtures are specialised chemical formulations that are typically produced by blending selected ingredients.

Transportation – Module A2

Raw materials are typically transported from suppliers to our site via (articulated) trucks. Transport of raw materials has been included in the LCA based upon actual transport modes and distances relevant to our representative plant. Cement is shipped from Japan to Australia (Port Kembla). Our supplier has provided specific fuel consumption data for each shipment.

Manufacturing – Module A3

Ready-mixed concrete products are manufactured by mixing the concrete constituents in carefully dosed quantities to achieve desired engineering properties. The "Construction process stage" and "Use stage" have been excluded from the life cycle assessment, as the ready-mixed concrete can be used for a range of different applications for which the use scenarios are unknown. The impacts of these stages are best determined at project level.

End of life stage (C1-C4)

The end-of-life modules for ready-mixed concrete are based on generic scenarios (see

Table 3 and Table 4). The scenarios included are currently in use and are representative for one of the most probable alternatives.

Module C1 covers demolition of the concrete at the end of its service life. For concrete produced in Sydney, we have used the end-of-life scenario representative for NSW building & demolition materials products based on the National Waste Report 2022 (NWR 2022). This scenario implies that 79.6% of the concrete is recycled and the remaining 20.4% of the concrete is sent to landfill.

Module C2 comprises the transport from the demolition site to a recycling centre or landfill site (80km). Module C3 encompasses the recycling process (i.e. crushing of concrete), while Module C4 represents disposal of concrete in a landfill site. The concrete in module C3 reaches end-of-waste status when it is crushed and stockpiled as "recycled crushed concrete" (RCC) aggregates.

Due to high uncertainty in the parameters and lack of data, CO_2-uptake (carbonation) has not been included at end-of-life.

Resource recovery stage (D)

Module D includes any benefits and loads from net flows leaving the product system (that have passed the end-of-waste state). For this EPD, any material collected for recycling and processed in Module C3, is considered to go through to Module D. We have assumed that Recycled Crushed Concrete aggregates (the output of module C3) replace virgin aggregates (crushed rocks from Gunlake's quarry) in module D.

"Per cubic metre of concrete, module D credits the avoided impacts for 1.89 tonnes of crushed aggregates."

Table 3: End-of-life scenario parameters

Processes	Quantity per m^3 of concrete	Unit
Collection process specified by type	2 373	kg collected separately
	0	kg collected with mixed construction waste
Transport from demolition site to recovery / disposal sites	80	km transport
Recovery system specified by type	0	kg for re-use
	1 890	kg for recycling
	0	kg for energy recovery
Disposal to landfill	483	kg product or material for final deposition
Assumptions for scenario development		The default values from PCR 2019:14 (v2.0.1) table 4 have been used to model modules C1, C2, C3 and C4

Table 4: Default data for modelling modules C1, C2, C3 and C4

Module and processes	Quantity*	Energy carrier / transport means
C1: Demolition/deconstruction of concrete/reinforced concrete	24 kWh/m^3	diesel
C2: Transport (for products/materials not to be incinerated)	80 km	16-32 tonne lorry (EURO 5)
C3: Loading and unloading at sorting facility	4.3 kWh/m^3	diesel
C3: Mechanical sorting	5.3 kWh/m^3	electricity
C3: Crushing of concrete	4.8 kWh/m^3	diesel
C4: Compacting of inert construction waste for landfills (including backfilling)	3.8 kWh/m^3	diesel

** Quantities based on a density of 2.4 t/m^3. The EPD results are calculated using the actual density of the product.*

Background data

Gunlake Concrete has collected and supplied the primary data for the ready-mixed concrete LCA based on the FY25 reporting period (1 July 2024 – 30 June 2025). Gunlake Quarries provided data for the coarse aggregates and manufactured sand that they supply to Gunlake Concrete. Our cement supplier has provided key (FY25) data for clinker and cement production, as well as shipping of cement to Australia. Background data is predominantly sourced from AusLCI and the AusLCI shadow database v1.42 (AusLCI 2023). Data for admixtures has been sourced from EPDs published by EFCA (EFCA 2021a, 2021b, 2021c). As a result, the vast majority of the environmental profile of our products is based on life cycle data less than three years old. Background data used is less than 10 years old. Methodological choices have been applied in line with EN 15804:2012+A2:2019; deviations have been recorded.

Key assumptions

- The concrete composition of each product is provided by Gunlake and has been accepted as is.
- Our supplier has provided information on their cement (including cement clinker) production process. We have adjusted the generic AusLCI data for cement and clinker production accordingly.
- Additional environmental impact indicators are not declared in the admixture EPDs, which results in underreporting of these indicators.
- Allocation approaches may have a material effect on concrete products containing fly ash, silica fume and/or ground granulated blast furnace slag.
- Electricity has been modelled for core processes using adjusted AusLCI data to represent the estimated residual electricity grid mix in NSW. This is done by removing renewables from the Australian Energy Statistics 2025 data for the NSW electricity mix in FY24 (Table O.2). The GWP-GHG of the electricity is 0.89 kg CO_2e / kWh. The proxy residual grid mix is made up of black coal (94.2%), natural gas (4.5%), and oil products (1.2%). Given the low contribution of electricity consumption to the GWP emissions, the electricity grid mix selection does not significantly impact the results.
- The end-of-life scenario is based on landfill and recycling rates for masonry products in New South Wales, as per the National Waste Report 2022 (NWR 2022).

Allocation

The key processes that require allocation are:

- Production of concrete mixes: All shared processes are attributed to concrete products based on their volume.
- Fly ash: As around half of all the fly ash generated in Australia is not used but stored in ponds, economic allocation was applied with zero value assigned to the fly ash. In effect, all environmental impacts of the power plant have been allocated to the main product: electricity. Fly ash has only received the burdens of the transport to our site.
- Blast Furnace Slag (BFS): BFS is a by-product from steelmaking. We have used the AusLCI data for BFS ('Blast Furnace Slag allocation, at steel plant / AU U'), which contain impacts from pig iron production allocated to blast furnace slag using economic allocation. One tonne of slag equals the environmental impact of 0.0127 tonnes of pig iron. Drying of slag (using 769 MJ of natural gas per tonne) and milling of slag (using 50 kWh/t electricity) is included based on the AusLCI process as well.
- Silica fume: silica-fume is a by-product of silicon metal or ferrosilicon alloys production. Economic allocation is used to attribute impacts between silica fume and ferrosilicon production. One tonne of silica fume equals the production of 0.107 tonnes of ferrosilicon production (= 1.4 t CO_2e/t SF).
- Aggregates: Coarse aggregates and manufactured sand are produced through crushing of rock, which is graded in different sizes. The energy required for the crushing and screening does not differentiate from products. Therefore, impacts are allocated to products, based on the mass. In effect, all aggregates have the same environmental profile.

Cut-off criteria

The cut-off criteria applied are 1% of renewable and non-renewable primary energy usage, 1% of the total mass input of a process and 1% of environmental impacts.
The contribution of capital goods (production equipment and infrastructure) and personnel is excluded, as these processes are non-attributable and they contribute less than 10% to GWP-GHG.

Data quality assessment

Table 5: Data quality assessment

Process	Source type	Source	Reference year	Data category	Share of primary data (GWP-GHG; A1-A3)
Manufacturing of concrete	Collected data	EPD owner	2025	Primary data	0%
Generation of electricity used in manufacturing of concrete	Database	AusLCI v1.42	2023	Primary data	1%
Transport of raw materials to manufacturing site	Collected/ Database	EPD owner/ AusLCI v1.42	2025	Primary data	7-23%
Production of GP cement	Collected/ Database (adjusted)	Supplier/ AusLCI v1.42	2025	Primary data / Secondary data	37-92%
Production of HE cement	Database (adjusted)	AusLCI v1.42	2023	Secondary data	0%
Production of GGBFS	Database	AusLCI v1.42	2023	Secondary data	0%
Production of silica fume	Database (adjusted)	ecoinvent v3.10 (adjusted)	2023	Secondary data	0%
Production of coarse aggregates	Collected data	EPD owner	2021	Primary data	0-4%
Production of manufactured sand	Collected data	EPD owner	2021	Primary data	0-1%
Production of natural sand	Database	AusLCI v1.42	2023	Secondary data	0%
Production of admixtures	EPD	EFCA EPDs	2021	Proxy data	0%
Other	Database	AusLCI v1.42	2023	Secondary data	0%
Total share of primary data*, of GWP-GHG results for A1-A3					***75%***

** The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.*

The EPD covers ready mixed concrete produced in Sydney based on a representative plant. All of Gunlake's plants provided energy and waste data for the period July 2024 - June 2025. The mix designs, raw materials, and supply chain details are current as well. The ingredients are mixed in the batching plant and sent to the customer as wet concrete. The EPD covers end-of-life in Australia, although the default factors from the PCR are used to model module C. Background data was sourced from the AusLCI v1.42 database, with adjustments made to better reflect Gunlake's cement supply. Data quality was assessed according to EN 15804:2012+A2:2019, Annex E (Table E.1 - UN Environment Global Guidance on LCA database development). The use of very poor and poor data is provided in Table 6, together with fair data with more than 30 % of impact.

Table 6: Data quality information

Data set	Criteria	Data quality level	Reason for level	Reason for using	Relevance
Production of natural sand	Geographical Technical	Fair Fair	Generic background data	Consistent with other data used	60-85% of WDP; 0-10% of other core impact indicators
Production of admixtures	Geographical Technical	Fair Very poor	EPD represents worst case	Best available data	0-5% of all core impact indicators
Production of silica fume	Geographical Technical	Fair Fair	Generic background data	Reasonable data	50-65% of EP-fw; 0-20% of other core impact indicators

Life Cycle Assessment (LCA) indicators

An LCA serves as the foundation for this EPD. An LCA analyses the production systems of a product. It provides comprehensive evaluations of all upstream and downstream energy inputs and outputs. The results are provided in a form which covers a range of environmental impact categories.

Table 7: Environmental indicators legend (EN 15804 + A2)

Core indicators	Acronym	Unit
Climate change – total	GWP-total	kg CO_2 equivalent
Climate change – fossil	GWP-fossil	kg CO_2 equivalent
Climate change – biogenic	GWP-biogenic	kg CO_2 equivalent
Climate change – land use and land use change	GWP-luluc	kg CO_2 equivalent
Ozone layer depletion	ODP	kg CFC-11 equivalent
Acidification	AP	mol H^+ equivalent
Eutrophication aquatic freshwater	EP-freshwater	kg P equivalent
Eutrophication aquatic marine	EP-marine	kg N equivalent
Eutrophication terrestrial	EP-terrestrial	mol N equivalent
Photochemical ozone formation	POCP	kg NMVOC equivalent
Abiotic depletion potential - elements[2]	ADP minerals & metals	kg Sb equivalent
Abiotic depletion potential – fossil fuels[2]	ADP fossil	MJ, net calorific value
Water use[2]	WDP	m^3 world equivalent deprived
Additional indicators	**Acronym**	**Unit**
Global Warming Potential – Greenhouse gases	GWP-GHG	kg CO_2 eq
Particulate matter emissions	PM	disease incidence
Ionising radiation, human health[1]	IRP	kBq U235 equivalent
Ecotoxicity (freshwater)[2]	ETP-fw	CTUe
Human toxicity, cancer effects[2]	HTP-c	CTUh
Human toxicity, non-cancer effects[2]	HTP-nc	CTUh
Land use related impacts / soil quality[2]	SQP	- (dimensionless)
Additional GHG indicator	**Acronym**	**Unit**
Carbon footprint in line with IPCC AR5[3]	GWP-GHG (IPCC AR5)	kg CO_2 eq

[1] 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 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 experience with the indicator.

*[3] **Note regarding various GWP indicators:** GWP-total is calculated using the European Union's Joint Research Centre's characterisation factors (CFs) based on the "EF 3.1 package" for CFs to be used in the EU's Product Environmental Footprint (PEF) framework. CFs listed by JRC are based on the IPCC AR6 method (IPCC 2021) and include indirect radiative forcing, which results in higher numerical Global Warming Potential (GWP) values than the CFs in the internationally accepted (IPCC 2013). The GWP-GHG indicator is identical to GWP-total except that the CFs for biogenic CO2 are set to zero. The GWP-GHG indicator in PCR 2019:14 v2.0.1 differs from the GWP-GHG in earlier (pre v1.3) PCR 2019:14 versions. The "**GWP-GHG (IPCC AR5)**" indicator is determined using the IPCC AR5 GWPs with a 100-year time horizon (IPCC 2013). This indicator is aligned with Australia's greenhouse gas reporting frameworks.*

Table 8: Legend for parameters describing Resource Use, Waste and Output Flows

Parameters	Acronym	Unit
Parameters describing resource use		
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ_{NCV}
Use of renewable primary energy resources used as raw materials	PERM	MJ_{NCV}
Total use of renewable primary energy resources	PERT	MJ_{NCV}
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ_{NCV}
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ_{NCV}
Total use of non-renewable primary energy resources	PENRT	MJ_{NCV}
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ_{NCV}
Use of non-renewable secondary fuels	NRSF	MJ_{NCV}
Use of net fresh water	FW	m^3
Waste Categories		
Hazardous waste disposed	HWD	kg
Non-Hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
Output Flows		
Components for re-use	CRU	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported energy	EE	MJ

Table 9: Legend for EN 15804+A1 indicators

Indicators	Acronym	Unit
Global warming potential	GWP	kg CO_2 equivalent
Ozone layer depletion potential	ODP	kg CFC-11 equivalent
Acidification potential	AP	kg SO_2 equivalent
Eutrophication potential	EP	kg PO_4^{3-} equivalent
Photochemical oxidation (Photochemical ozone creation) potential	POCP	kg ethylene equivalent
Abiotic depletion potential - elements	ADPE	kg Sb equivalent
Abiotic depletion potential – fossil fuels	ADPF	MJ_{NCV}

Environmental performance

The following section presents the results for each Life Cycle Assessment module. The results have been calculated with SimaPro software v9.6.0.1, using characterisation factors based on the "EF 3.1 package" for characterisation factors to be used in the EU's Product Environmental Footprint (PEF) framework.

Water flows have been disaggregated using the 36 ALCAS water catchments for which characterisation factors are available for both Pfister WSI and the AWARE method.

To separate the use of primary energy into energy used as raw material and energy used as energy carrier, Option B from Annex 3 of PCR 2019:14 has been applied.

Please consider the following mandatory statements when interpreting the results:

"The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks".

"*The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).*"

100MPa High Strength GP/FA/GGBFS/SF Blend

The environmental indicators of each product are expressed per m^3.

Table 10: Environmental indicators EN 15804+A2, 100MPa High Strength GP/FA/GGBFS/SF Blend ready-mixed concrete, per m^3

Environmental Indicator	Unit	Module A1-A3	Module C1	Module C2	Module C3	Module C4	Module D
Core Indicators							
GWP-total	kg CO_2-eq.	4.52E+02	7.11E+00	2.62E+01	5.46E+00	2.41E-01	-1.38E+01
GWP-fossil	kg CO_2-eq.	4.50E+02	7.11E+00	2.62E+01	5.45E+00	2.41E-01	-1.38E+01
GWP-biogenic	kg CO_2-eq.	1.89E+00	4.90E-04	1.75E-03	7.27E-03	1.60E-05	-2.10E-02
GWP-luluc	kg CO_2-eq.	4.76E-02	3.54E-06	1.18E-05	1.17E-06	1.16E-07	-4.30E-06
ODP	kg CFC11-eq.	1.08E-05	1.18E-06	4.90E-06	3.63E-07	3.86E-08	-1.15E-06
AP	mol H+ eq.	2.47E+00	8.12E-02	9.17E-02	3.72E-02	2.65E-03	-1.16E-01
EP-freshwater	kg P eq.	3.20E-03	9.84E-07	1.74E-06	2.09E-06	3.21E-08	-1.55E-05
EP-marine	kg N eq.	6.30E-01	3.54E-02	3.35E-02	1.28E-02	1.15E-03	-3.79E-02
EP-terrestrial	mol N eq.	7.05E+00	3.88E-01	3.69E-01	1.40E-01	1.27E-02	-4.33E-01
POCP	kg NMVOC eq.	1.77E+00	1.04E-01	8.94E-02	3.72E-02	3.38E-03	-1.09E-01
ADP minerals & metals[2]	kg Sb eq.	5.78E-06	8.72E-09	2.29E-08	2.75E-09	2.85E-10	-1.00E-06
ADP fossil[2]	MJ (NCV)	3.25E+03	1.03E+02	3.48E+02	7.74E+01	3.37E+00	-1.66E+02
WDP[2]	m^3 world eq. deprived	5.37E+01	6.52E-01	2.24E+00	3.89E-01	2.13E-02	-1.61E+00
Additional indicators							
GWP-GHG	kg CO_2-eq.	4.51E+02	7.11E+00	2.62E+01	5.46E+00	2.41E-01	-1.38E+01
PM	Disease incidence	1.01E-05	2.15E-06	8.61E-07	7.59E-07	7.02E-08	-2.22E-06
IRP[1]	kBq U235 eq.	2.16E+00	1.51E-04	5.30E-04	4.77E-05	4.92E-06	-2.31E-04
ETP-fw[2]	CTUe	9.28E+02	2.28E+01	6.80E+01	7.30E+00	7.46E-01	-2.44E+01
HTP-c[2]	CTUh	1.66E-06	2.86E-10	7.24E-11	2.48E-10	9.33E-12	-5.62E-10
HTP-nc[2]	CTUh	1.57E-06	1.52E-09	2.20E-09	1.45E-09	4.97E-11	-6.89E-09
SQP[2]	-	1.01E+03	4.95E-01	2.47E+00	8.91E+00	1.62E-02	-3.45E+02
Carbon footprint							
GWP-GHG (IPCC AR5)	kg CO_2 eq	4.51E+02	7.1	26.2	5.5	0.24	-13.7

Table 11: EN 15804+A2 parameters, 100MPa High Strength GP/FA/GGBFS/SF Blend ready-mixed concrete, per m^3

Parameter	Unit	Module A1-A3	Module C1	Module C2	Module C3	Module C4	Module D
PERE	MJ_{NCV}	2.23E+02	1.60E-01	4.84E-01	3.28E+00	5.21E-03	-6.23E+00
PERM	MJ_{NCV}	3.23E-01	0.00E+00	0.00E+00	-2.57E-01	0.00E+00	0.00E+00
PERT	MJ_{NCV}	2.23E+02	1.60E-01	4.84E-01	3.03E+00	5.21E-03	-6.23E+00
PENRE	MJ_{NCV}	3.24E+03	1.03E+02	3.48E+02	7.74E+01	3.37E+00	-1.66E+02
PENRM	MJ_{NCV}	1.59E+01	0.00E+00	0.00E+00	-1.27E+01	0.00E+00	0.00E+00
PENRT	MJ_{NCV}	3.25E+03	1.03E+02	3.48E+02	6.47E+01	3.37E+00	-1.66E+02
SM	kg	3.70E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ_{NCV}	1.66E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	5.42E+01	1.49E-02	5.14E-02	1.09E-02	4.88E-04	-2.16E-01
HWD	kg	3.72E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.54E-01	4.73E-04	1.43E-03	9.76E-03	4.84E+02	-4.63E-02
RWD	kg	1.92E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	3.12E+01	0.00E+00	0.00E+00	1.89E+03	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
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 12: EN 15804+A1 indicators, 100MPa High Strength GP/FA/GGBFS/SF Blend ready-mixed concrete, per m^3

Environmental Indicator	Unit	Module A1-A3	Module C1	Module C2	Module C3	Module C4	Module D
GWP	kg CO_2 eq	4.51E+02	7.09E+00	2.61E+01	5.44E+00	2.41E-01	-1.38E+01
ODP	kg CFC11 eq	8.58E-06	9.33E-07	3.87E-06	2.87E-07	3.05E-08	-9.10E-07
AP	kg SO_2 eq	1.84E+00	5.78E-02	6.70E-02	2.04E-02	1.89E-03	-6.53E-02
EP	kg PO_4^{3-} eq	2.36E-01	1.19E-02	1.16E-02	4.31E-03	3.87E-04	-1.48E-02
POCP	kg C_2H_4 eq	9.92E-02	5.66E-03	1.99E-03	1.92E-03	1.85E-04	-5.36E-03
ADPE	kg Sb eq	8.90E-06	8.84E-09	2.32E-08	5.04E-09	2.88E-10	-1.01E-06
ADPF	MJ_{NCV}	3.18E+03	1.03E+02	3.48E+02	7.74E+01	3.37E+00	-1.66E+02

Additional scenarios

Table 7: Environmental indicators EN 15804+A2, 100% end-of-life scenarios, 100MPa High Strength GP/FA/GGBFS/SF Blend ready-mixed concrete, per m^3

Environmental Indicator	Unit	Module C3	Module C4	Module D	Module C3	Module C4	Module D
		100% recycling			100% landfill		
GWP-total	kg CO_2-eq.	6.86E+00	0.00E+00	-1.54E+01	0.00E+00	1.18E+00	0.00E+00
GWP-fossil	kg CO_2-eq.	6.85E+00	0.00E+00	-1.53E+01	0.00E+00	1.18E+00	0.00E+00
GWP-biogenic	kg CO_2-eq.	9.14E-03	0.00E+00	-2.35E-02	0.00E+00	7.84E-05	0.00E+00
GWP-luluc	kg CO_2-eq.	1.47E-06	0.00E+00	-4.80E-06	0.00E+00	5.66E-07	0.00E+00
ODP	kg CFC11-eq.	4.56E-07	0.00E+00	-1.28E-06	0.00E+00	1.89E-07	0.00E+00
AP	mol H+ eq.	4.67E-02	0.00E+00	-1.29E-01	0.00E+00	1.30E-02	0.00E+00
EP-freshwater	kg P eq.	2.63E-06	0.00E+00	-1.73E-05	0.00E+00	1.57E-07	0.00E+00
EP-marine	kg N eq.	1.61E-02	0.00E+00	-4.23E-02	0.00E+00	5.66E-03	0.00E+00
EP-terrestrial	mol N eq.	1.76E-01	0.00E+00	-4.83E-01	0.00E+00	6.21E-02	0.00E+00
POCP	kg NMVOC eq.	4.67E-02	0.00E+00	-1.22E-01	0.00E+00	1.66E-02	0.00E+00
ADP minerals & metals[2]	kg Sb eq.	3.46E-09	0.00E+00	-1.12E-06	0.00E+00	1.40E-09	0.00E+00
ADP fossil[2]	MJ (NCV)	9.73E+01	0.00E+00	-1.85E+02	0.00E+00	1.65E+01	0.00E+00
WDP[2]	m^3 world eq. deprived	4.89E-01	0.00E+00	-1.79E+00	0.00E+00	1.04E-01	0.00E+00
Additional indicators		**100% recycling**			**100% landfill**		
GWP-GHG	kg CO_2-eq.	6.86E+00	0.00E+00	-1.54E+01	0.00E+00	1.18E+00	0.00E+00
PM	Disease incidence	9.54E-07	0.00E+00	-2.47E-06	0.00E+00	3.44E-07	0.00E+00
IRP[1]	kBq U235 eq.	5.99E-05	0.00E+00	-2.58E-04	0.00E+00	2.41E-05	0.00E+00
ETP-fw[2]	CTUe	9.17E+00	0.00E+00	-2.73E+01	0.00E+00	3.66E+00	0.00E+00
HTP-c[2]	CTUh	3.11E-10	0.00E+00	-6.28E-10	0.00E+00	4.58E-11	0.00E+00
HTP-nc[2]	CTUh	1.82E-09	0.00E+00	-7.69E-09	0.00E+00	2.43E-10	0.00E+00
SQP[2]	-	1.12E+01	0.00E+00	-3.85E+02	0.00E+00	7.92E-02	0.00E+00
Carbon footprint		**100% recycling**			**100% landfill**		
GWP-GHG (IPCC AR5)	GWP-GHG (IPCC AR5)	kg CO_2 eq	6.86	0.00	-15.3	0.00	1.18

Table 8: EN 15804+A2 parameters, 100% end-of-life scenarios, 100MPa High Strength GP/FA/GGBFS/SF Blend ready-mixed concrete, per m^3

Parameter	Unit	Module C3	Module C4	Module D	Module C3	Module C4	Module D
Additional indicators		**100% recycling**			**100% landfill**		
PERE	MJ_{NCV}	4.13E+00	0.00E+00	-6.95E+00	0.00E+00	2.55E-02	0.00E+00
PERM	MJ_{NCV}	-3.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ_{NCV}	3.80E+00	0.00E+00	-6.95E+00	0.00E+00	2.55E-02	0.00E+00
PENRE	MJ_{NCV}	9.73E+01	0.00E+00	-1.85E+02	0.00E+00	1.65E+01	0.00E+00
PENRM	MJ_{NCV}	-1.59E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ_{NCV}	8.13E+01	0.00E+00	-1.85E+02	0.00E+00	1.65E+01	0.00E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ_{NCV}	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.37E-02	0.00E+00	-2.42E-01	0.00E+00	2.39E-03	0.00E+00
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.23E-02	0.00E+00	-5.17E-02	0.00E+00	2.37E+03	0.00E+00
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	2.37E+03	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
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00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Additional Information

Waste and Recycling

Throughout Gunlake's operations some materials are re-used into our production processes, including concrete washout, which beneficially reuses materials that would otherwise require disposal.

Biodiversity Management

Gunlake has established biodiversity offset land at its Marulan Quarry. These areas are managed in accordance with both NSW and Commonwealth requirements and have been established to provide long term protection and enhancement of habitat and ecological communities.

Community Investment

Gunlake participates in numerous local community programs and events, including ongoing annual funding/grant commitments, community initiatives and memberships.

Gunlake will continue to provide such community support and investment within the local and regional areas in which it operates.

Abbreviations

Abbreviation	Definition
AusLCI	Australian Life Cycle Inventory (database)
BFS / GGBFS	blast furnace slag / ground granulated blast furnace slag
CEN	European Committee for Standardization
CPC	Central Product Classification
EF	Environmental Footprint
EFCA	European Federation of Concrete Admixtures Associations
EN	European Norm (Standard)
EPD	Environmental Product Declaration
GPI	General Programme Instructions
ISO	International Organization for Standardization
kWh	kilo Watt hour
NATA	National Association of Testing Authorities, Australia
ND	Not Declared
NSW	New South Wales
NWR	National Waste Report
PCR / c-PCR	Product Category Rules / complimentary Product Category Rules
PEF	Product Environmental Footprint
SCM	Supplementary Cementitious Materials
SF	Silica fume
SVHC	Substances of Very High Concern
UN	United Nations

Version history

Version	Notes
1	Original version of the EPD, published 2026-03-20

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