InfraBuild

Building futures through sustainable steel

ENVIRONMENTAL PRODUCT DECLARATION

Reinforcing bar (500E)

Steel reinforcing bar

Type of EPD:	EPD of a single product from a manufacturer, from multiple sites		
In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for reinforcing bar (500E) from InfraBuild.			
Programme:	The International EPD System www.environdec.com	EPD registration number:	EPD-IES-0025331:001
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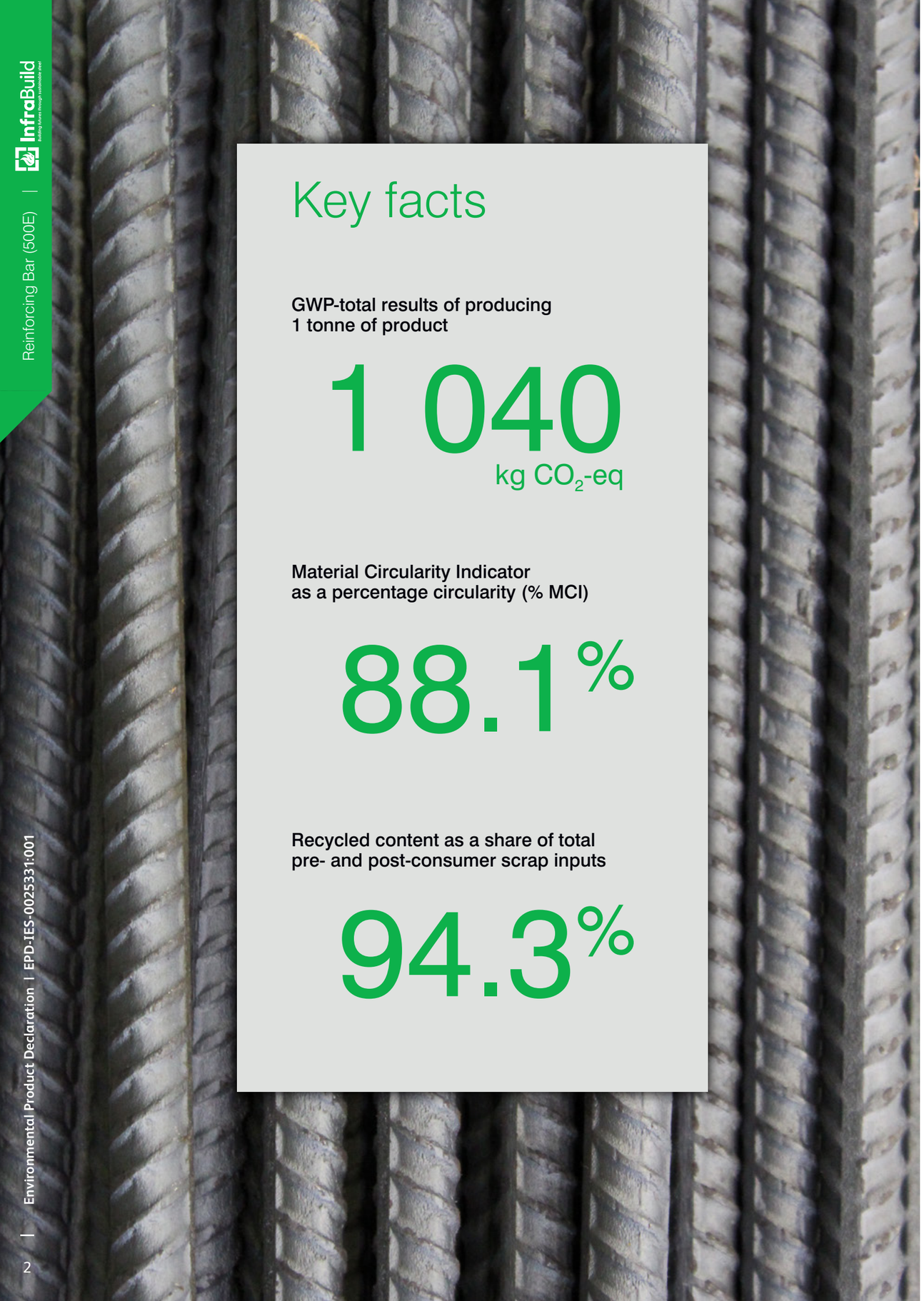
EPD INTERNATIONAL EPD SYSTEM

AUSTRALASIA EPD® INTERNATIONAL EPD SYSTEM

ECO PLATFORM EPD VERIFIED

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.



Key facts

GWP-total results of producing 1 tonne of product

1 040
kg CO_2-eq

Material Circularity Indicator as a percentage circularity (% MCI)

88.1%

Recycled content as a share of total pre- and post-consumer scrap inputs

94.3%

Content

What is an environmental product declaration?

An Environmental Product Declaration (EPD) tells the environmental story of a product over its life cycle in a format that is clear and transparent. It is science-based, independently verified and publicly available.

EPDs help manufacturers translate complex sustainability information about their product's environmental footprint into simpler information that governments, companies, industry associations and end consumers can trust to make decisions.

An EPD communicates the environmental impacts at different stages in a product's life cycle. This may include the carbon emitted when it's made, and any emissions that pollute the air, land or waterways during its use.

This EPD covers the environmental impacts of steel reinforcing bar. The product is manufactured by InfraBuild in Australia.

This EPD is based on a 'cradle-to-gate' Life Cycle Assessment (LCA), with end-of-life and distribution options included. 'Cradle' refers to the raw material extraction and 'the gate' is the gate of the InfraBuild manufacturing facility or facilities as the product is ready to go out to customers. Distribution includes transport from InfraBuild's manufacturing facilities to New Zealand customers.

InfraBuild Australia Pty Ltd, Level 34, 50 Bridge Street, Sydney NSW 2000, as the EPD owner has the sole ownership, liability, and responsibility for the EPD.
Contact InfraBuild: sustainablesteel@infrabuild.com

thinkstep Pty Ltd, 25 Jubilee Street, South Perth, WA 6151 Australia, is the LCA practitioner commissioned by the EPD owner.
Contact thinkstep: info@thinkstep-anz.com

Information about EPD owner

InfraBuild
Building futures through sustainable steel

InfraBuild is a key part of Australia's manufacturing industry, as the only electric arc furnace (EAF) based steelmaker and the country's second-largest metals recycler.

We proudly employ over 4 500 employees, have more than 17 600 wholesale and retail customers, and approximately 15 000 suppliers.

But InfraBuild is not just a steel company. We are transforming a traditionally high-emission industry and leading it into a decarbonised future.

Using innovation, technology, our sustainability leadership, and a century of local manufacturing heritage, we are a trusted partner that empowers customers to create tomorrow's buildings and infrastructure while achieving today's sustainability goals.

more than
100 years
continuous manufacturing in Australia

Recycling

Our vertically integrated domestic supply chain includes approximately 22 scrap metal recycling sites across Australia. Our InfraBuild Recycling business contributes the scrap metal to our steelmaking operations, with our electric arc furnaces using approximately 1.4 million tonnes of scrap metal annually.

Manufacturing

We have an integrated steelmaking and manufacturing network, comprising two electric arc furnaces (in Rooty Hill, Sydney and Laverton, Melbourne), with a combined steelmaking capacity of approximately 1.4 million tonnes a year. From our ten product manufacturing mills on the east coast of Australia, we make and roll reinforcing bar, reinforcing rod, reinforcing wire, mesh products, merchant bar products, hollow tubular sections and wire products. They are supplied to distributors and processors across Australia and New Zealand.

annual combined steelmaking capacity of approximately
1.4 m tonnes

Distribution

We have a significant national footprint through over 100 retail and processing sites across the country. We provide quality products and technical expertise to supply chain partners in Australia and New Zealand, including several independent distributors and processors across Australia and New Zealand.

Our EAF-based steelmaking approach significantly reduces carbon emissions compared to traditional blast furnace methods. We have a proud history of more than 100 years of continuous manufacturing in Australia and InfraBuild operates across more than 130 locations nationwide. We are proud to make and supply essential steel products and services to a wide range of sectors including construction, infrastructure, residential, mining, transport, manufacturing, industrial, and agricultural applications.

Accreditations

InfraBuild's Environmental Product Declarations (EPDs) are independently generated and verified in accordance with the current accepted requirements and standards, including ISO 14025, EN15804+A2 and PCR 2019:14 Construction Products of the International EPD System (version 2.0.1 dated 2025-06-05).

In responding to the markets' needs for relevant sustainability-based certifications to support projects rated to the GBCA's Green Star and ISC's ISv2.1 ratings tools, InfraBuild has developed and maintains numerous accreditations, initiatives and certifications, including:

- ISO 14001 – Environmental Management System
- GECA – Good Environmental Choice Australia
- SSA – Steel Sustainability Australia
- worldsteel Climate Action Data Program
- worldsteel Sustainability Charter Membership
- ISC ISupply Membership
- Material Circularity Indicators (MCI)
- Our range of EPDs, including this one.

Our EPDs are premier contributors to transparently describing the environmental performance of our products, as well as supporting our holistic commitment to the environmentally sustainable manufacture and application of our products.

InfraBuild | Reinforcing Bar (500E)

InfraBuild and worldsteel

The World Steel Association (worldsteel) is the international body representing the global iron and steel industry, comprising steel producers, national and regional industry associations, and research institutes. worldsteel plays a pivotal role in promoting sustainable practices, safety, technological innovation, and economic transparency across the steel sector, and advocates for climate action and zero-harm workplace policies.

worldsteel Climate Action

The worldsteel Climate Action Data Collection Programme recognises steel producers that have fulfilled their commitment to participate in the worldsteel CO_2 emissions data collection programme.

InfraBuild is currently a member of the Climate Action Data Collection Programme and has been continuously for at least 15 years. Our latest certificate is available here.

Being a current member of the Worldsteel Climate Action Data Collection Programme is one of the mandatory Compliance Requirements for InfraBuild to be recognised as a 'Responsible Steel Maker' in the GBCA's Green Star ratings tools.

It is also a prerequisite for our GECA Certification, as well as our mill 'Verified Steel Supplier' status in the Steel Sustainability Australia Scheme.

worldsteel ASSOCIATION

worldsteel Sustainability Charter

Under its Sustainability Charter program, worldsteel has taken a new purpose-driven and action-oriented approach to encourage steel producers to both proactively engage in its program of sustainability initiatives and also to continue its own sustainability journey.

The Sustainability Charter helps coordinate existing worldsteel sustainability activities, including the eight Sustainability Indicators, the worldsteel day for safety and health, the Life Cycle Inventory (LCI) data collection program, the annual Steelie Awards, and recognition as a worldsteel Sustainability Champion.

Published in 2022, the worldsteel Sustainability Charter has 20 criteria (covering nine principles) that steel companies must meet, covering the areas of environment, social, governance, and economics.

InfraBuild first gained membership to the worldsteel Sustainability Charter in 2023, for the three-year period covering 2023 to 2025, and during FY25 was again recognised by worldsteel as a Sustainability Charter Member for the three-year period from 2025 to 2027, inclusive.

InfraBuild's recognition of being part of the worldsteel Sustainability Charter is available here.

InfraBuild and ISO 14001

ISO 14001 is an internationally recognised standard to design, implement, maintain, and improve an organisation's Environmental Management System (EMS).

Certification to this standard recognises the processes related to how products are manufactured, rather than the products themselves. Having our processes certified to ISO 14001 provides a platform for InfraBuild to measure and improve our performance.

ISO 14001 certification shows that we use materials and processes more efficiently, save money, and manage our environmental responsibilities in a clear and consistent way.

InfraBuild's certification to ISO 14001 supports our products being recognised in several key Australian sustainability ratings tools.

Certification to ISO 14001 is one of the mandatory compliance requirements InfraBuild needs to meet for our products to be recognised in the GBCA's 'Design & As Built' and 'Green Star Buildings' sustainability ratings tools. Our certification allows InfraBuild's structural and reinforcing steels to be used in projects rated to these two ratings tools.

Our Certification to the GECA 'Steel & Steel Products standard' and the Steel Sustainability Australia scheme is also reliant on having ISO 14001 Certification. Both GECA and SSA are recognised in the GBCA's Green Star Buildings ratings tool and the ISC's ISv2.1 ratings tool.

InfraBuild's current ISO 14001 Certificate is available here.

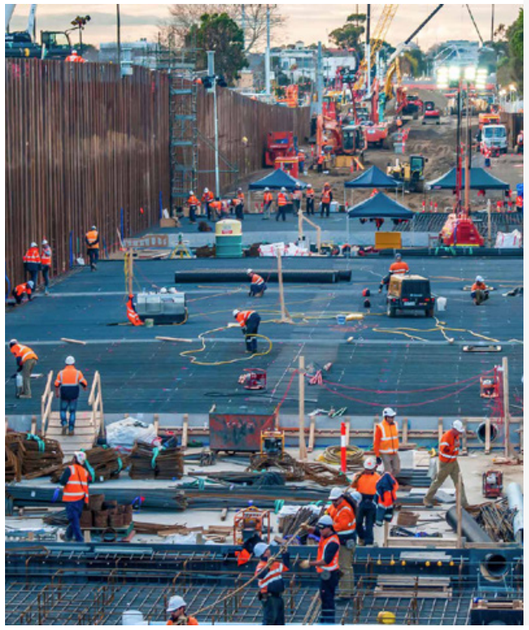
InfraBuild and the GBCA's 'Energy Reducing Process'

InfraBuild uses a warm charging process to minimise the time between a billet being cast at InfraBuild's EAF mills and when it enters the rolling mills at those sites to be formed into reinforcing bar, rod or wire products.

When done consistently and effectively, warm charging can deliver significant savings in gas use and carbon emissions by minimising the time between a billet being cast and when it enters the reheat furnace.

In March 2022, the GBCA acknowledged that our warm charging technique qualified as a valid Energy-Reducing Process (ERP), in line with Section 20.1B of the GBCA 'Design & As Built v1.3' tool.

This recognition can deliver one Green Star point in the GBCA 'Design & As Built' tools from the use of reinforcing products made by InfraBuild.



A third-party, independently verified update is done annually on our use of warm charging to ensure we continue to meet the GBCA's requirements.

This ERP Certificate is always a retrospective certification that covers the previous financial year and the current ERP Certificate is available online here.

Alignment with the Green Building Council of Australia

The Green Building Council of Australia (GBCA) has been driving sustainable transformation of the built environment for over 20 years, through innovative tools and initiatives, including the Green Star rating system. InfraBuild has been a member of the GBCA since 2010 and is proud of our association with the GBCA and the relationships that guide us to develop solutions aligned to the GBCA's Purpose.

InfraBuild has closely followed the evolution of the new Green Star Buildings tool, to ensure our products are best positioned to support customer and stakeholder needs.

We also continue to ensure our products have the certifications that are recognised in the Green Star Design & As Built rating tool.

Alignment with the GBCA Green Star ratings tools

How do InfraBuild products support Credits in the 'Green Star Buildings' ratings tool?

Responsible Structure Credit

InfraBuild strives to deliver pathways that provide the highest possible recognition in the Responsible Structure Credit, and at the time of publication of this EPD:

- This product has Good Environmental Choice Australia (GECA) Certification, which provides an RPV of 15.
- Several of InfraBuild Reinforcing's steel processing sites have Level 2B certification to the Steel Sustainability Australia (SSA) Scheme, which provides an RPV of 15 or above, in conjunction with InfraBuild's EPD.

Both pathways deliver a 'Best Practice Product' outcome that can support a construction project's ability to gain up to five Green Star points in the Responsible Structure credit, depending on the version of Green Star tool being used.

How do InfraBuild products support Credits in the 'Design & As Built' ratings tool

InfraBuild continues to support projects that are being rated to the Green Star Design & As Built ratings tool. Although the opportunity for projects to register to this version of the Green Star tool closed on 31 Dec 2021, we continue to supply steel to projects that are being constructed beyond that date.

To assist this, InfraBuild continues to maintain:

- Current and valid ISO 14001 (Environmental Management System) Certification for the manufacturing facilities where the steel is produced.
- Membership of the worldsteel Climate Action Programme (CAP).
- A recognised and approved Energy Reducing Processes (ERP), via our use of a Warm Charging technique.
- Select InfraBuild reinforcing bar and reinforcing mesh products with Good Environmental Choice Australia (GECA) Certification.

More information on how InfraBuild supports your Green Star rated project is available here.

Alignment with the Infrastructure Sustainability Council (ISC)

InfraBuild, the ISC & the ISv2.1 ratings tools

InfraBuild has been a dedicated member of the Infrastructure Sustainability Council (ISC) for over a decade, working closely to promote sustainability in infrastructure projects across Australia and Aotearoa New Zealand. This partnership focuses on promoting positive sustainability outcomes, establishing standards and compliance measures, providing technical education and design support, and advocating for supply chain transparency and traceability.

How do InfraBuild products support credits in the ISC 'ISv2.1' ratings tool?

Rso-7: Sustainability Labelled Products and Supply Chains

This product has GECA Certification, which is an ISC Approved Environmental Type I Label. GECA Certification provides a Sustainability Factor (SF) of 1.00, which is the highest Sustainability Factor possible. This can support a project target of having up to 100% of all materials with ISC Approved Environmental Labels. Our GECA Certificate shows which InfraBuild products have GECA Certification.

Rso-7: Sustainability Labelled Products and Supply Chains

In May 2025, the ISv2.1 'Rulings Register' recognised that businesses that are Certified to Level 2A, 2B or 3 of the Steel Sustainability Australia Program now meet the criteria of an ISC Approved Environmental Type I Label.

This recognition provides for projects that are supplied through an SSA with the highest possible Sustainability factor (SF) of 1.00, which can support the target of up to 100% use of ISC approved sustainability labelled products.

ISupply

By being included in the ISC's ISupply product directory, InfraBuild helps those undertaking an IS Rating to connect with sustainable suppliers who can support projects achieve sustainability outcomes awarded under the IS Rating Scheme. InfraBuild has been part of the ISupply product directory since its inception. Using three recognised ISupply companies can support a project to achieve up to 0.75 IS Credits.

Material Circularity Indicators (MCI)

The ISv2.1 Ratings tool recognised and rewards projects that use products with Material Circularity Indicators. This EPD provides MCI metrics, refer to page 34.

More information on how InfraBuild supports your ISv2.1 rated project is available here.

Product information

Our **500E reinforcing bar range** is manufactured only from scrap steel by InfraBuild at our EAF facilities in Laverton (VIC) in accordance with AS/NZS 4671 (Steel for the reinforcement of concrete), for supply to the domestic Aotearoa New Zealand market.

InfraBuild's Laverton EAF mill only uses scrap as the ferrous feed for our electric arc furnace-based steelmaking process, and has been making steel from scrap since 1985.

The 500E reinforcing bar range has been made and supplied by InfraBuild to the Aotearoa New Zealand market since 2011.

Our 500E reinforcing bar range is manufactured in accordance with AS/NZS 4671 (Steel for the reinforcement of concrete) and has third-party JAS/ANZ Certification to independently confirm it consistently meets the requirements of the Standard.

This EPD represents the average results for identical products produced from these production sites.

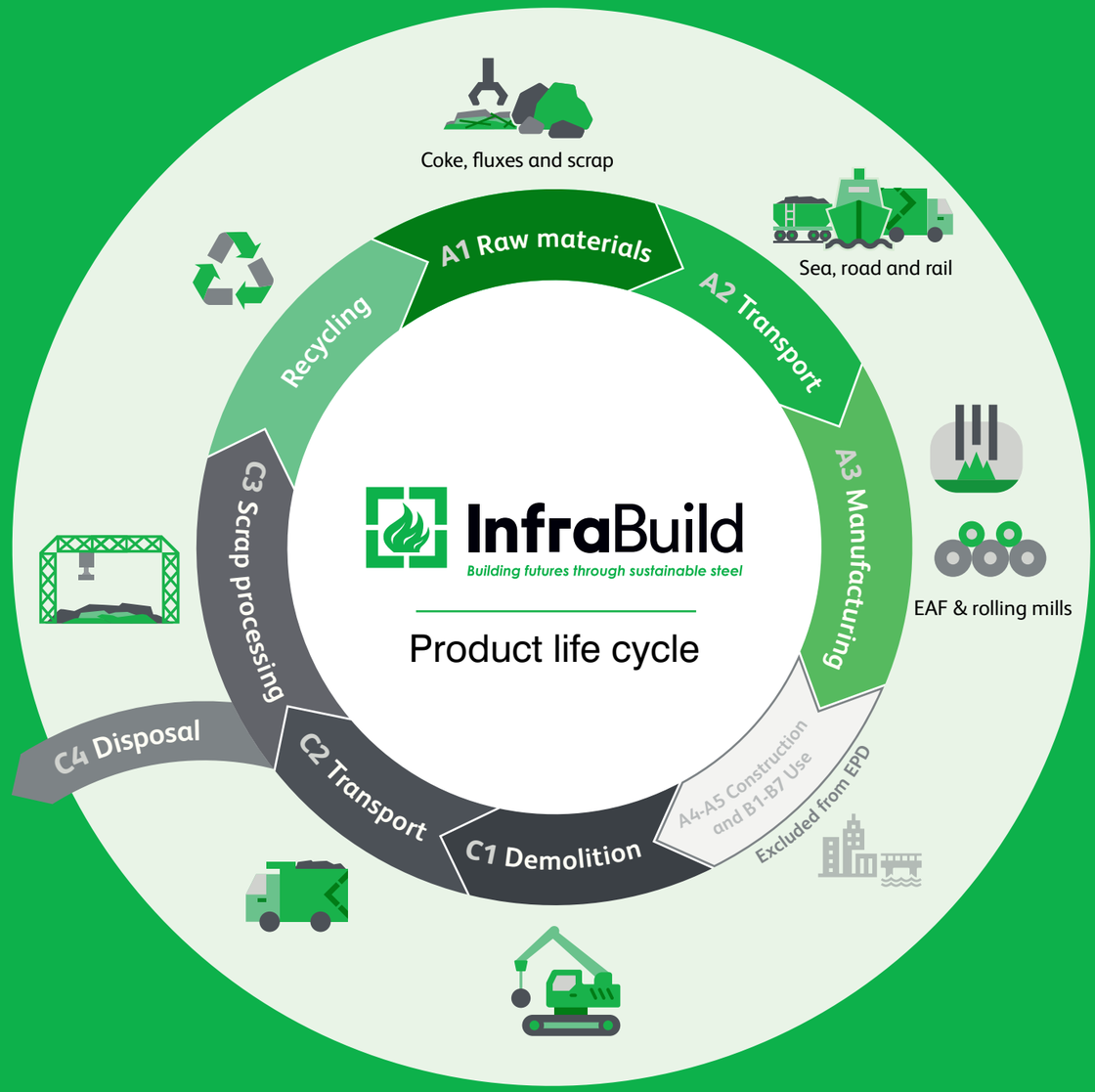
Our 500E reinforcing bar is primarily used as reinforcement in concrete elements and structures designed to the relevant New Zealand Standards, including:

- NZS 3101.1:2006 – Part 1: The Design of Concrete Structures

More information on InfraBuild's 500E reinforcing bar products are available at www.infrabuild.com.

InfraBuild is proud to publish this updated product-specific EPD in 2025 to showcase the sustainability credentials of our 500E reinforcing bar product range.

Figure 1. Life cycle of InfraBuild products



Classification

These tables show the relevant Australian standard and application for the products in this EPD.

Table 1. Industry classification

Product	Classification	Code	Category
InfraBuild reinforcing products	UN CPC Ver.3	41241	Bars and rods, hot-rolled, in irregularly wound coils, of iron or non-alloy steel
	UN CPC Ver.3	41242	Other bars and rods of iron or non-alloy steel, not further worked than forged, hot-rolled, hot-drawn or extruded, but including those twisted after rolling
	UN CPC Ver.3	41264	Bars and rods, cold-formed or cold-finished, of alloy steel (except bars or rods of high-speed steel or silico manganese steel)
	ANZSIC 2006	2221	Structural Steel Fabricating

Table 2. Technical specifications

Product group	Relevant standards
InfraBuild reinforcing products	AS/NZS 4671: Steel for the reinforcement of concrete

InfraBuild | Reinforcing Bar (500E)

Manufacturing process

An overview of the manufacturing process of InfraBuild's products is shown in Figure 2. The manufacturing process includes the following steps:

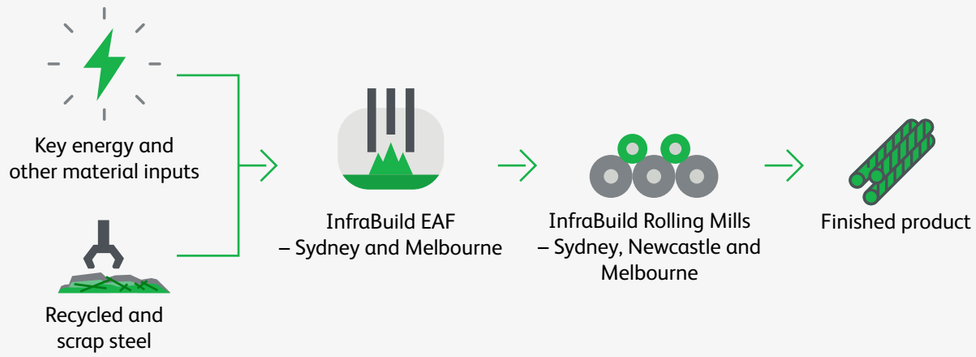
Step 1. Recycling of steel scrap.

Step 2. Steel-making at Sydney and Laverton steel mills uses an Electric Arc Furnace (EAF) process which primarily uses scrap steel and electricity.

Step 3. Steel billets are hot rolled in bar and rod rolling mills into final products.

Step 4. Final products are tied with steel wire, which is also produced by InfraBuild, before being shipped to customers.

Figure 2. Basic manufacturing process



Environmental Product Declaration | EPD-IES-0025331:001

Content declaration

Table 3. Typical steel composition of products

	Iron	Manganese	Silicon	Carbon	Other
Mass-% (versus the product)	>97.5	<1.2	<0.35	<0.20	<0.35

Table 4. Composition of reinforcing bar (500E) (per 1 tonne)

Product components	Mass (kg)	Post-consumer recycled material, mass-% of product	Pre-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/ declared unit
Steel – 500E	1 000	86.5	7.84	0	0
Sum	1 000	86.5	7.84	0	0

Table 5. Content declaration of packaging (per 1 tonne)

Packaging materials	Mass (kg)	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit
Steel wire	1.50	0.150	0
Sum	1.50	0.150	0

Dangerous substances from the candidate list of SVHC for authorisation

The product declared within this EPD:

- Does not release dangerous substances to soil and water.
- Does not contain hazardous substances requiring labelling.
- Does not contain materials identified in the European Chemicals Agency's Candidate List of Substances of Very High Concern in the products at a concentration greater than 0.1 % (ECHA, 2025).

LCA information

Declared unit

The declared unit for the EPD is 1 tonne (t) of product ready for dispatch to a customer.

System boundaries

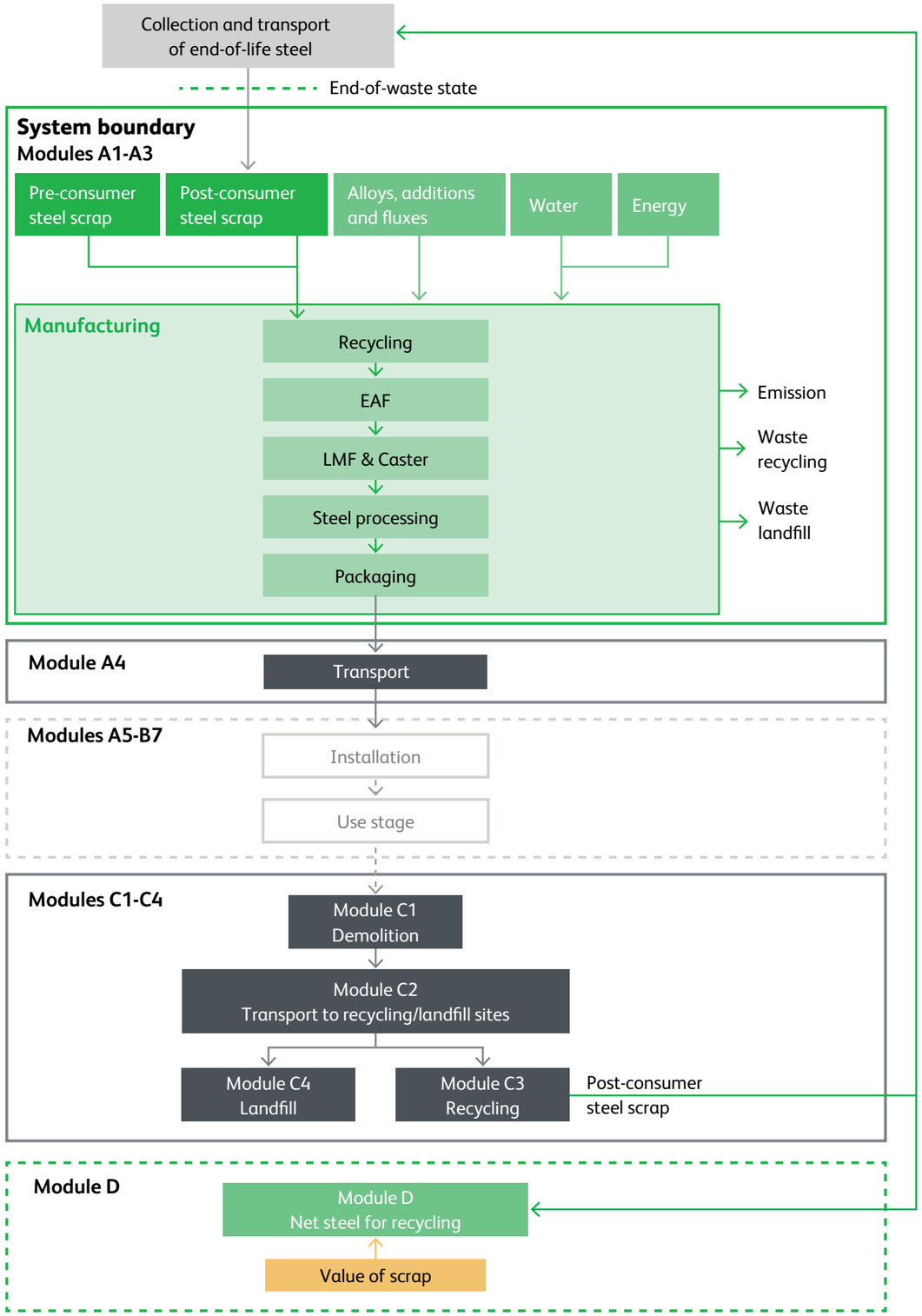
In Life Cycle Assessments (LCA), the system boundary is a line that divides the processes which are included from those which are excluded.

As shown in the table below, this EPD is of the type: Cradle-to-gate with options, modules C1-C4, module D (A1-A3 + A4 + C + D). Other life cycle stages (modules A5 and B1-B7) are dependent on particular scenarios and best modelled at the building level.

Table 6. Modules included in the scope of the EPD (X = declared module l ND = module not declared)

	Product stage				Construction process stage		Use stage						End-of-life				Beyond product life cycle
	Raw material supply	**Transport**	**Manufacturing**	**Transport**	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	**Deconstruction / demolition**	**Transport**	**Waste processing**	**Disposal**	**Future reuse, recycling or energy recovery potential**
Module	**A1**	**A2**	**A3**	**A4**	A5	B1	B2	B3	B4	B5	B6	B7	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	AU	AU, NZ	-	-	-	-	-	-	-	-	NZ	NZ	NZ	NZ	NZ

Figure 3. System boundary diagram



LCA software and database

The LCA was conducted in Microsoft Excel. The LCA utilises life cycle inventory data from ecoinvent, Allocation, cut-off, EN15804, ecoinvent database version 3.10 (Wernet, 2016) for several of the raw and process materials obtained from the background system. The ecoinvent datasets have been exported from SimaPro to Excel and exclude capital goods and infrastructure, except for electricity datasets. Regional averages for water inputs, electricity grid mixes and wastewater treatment were obtained from AusLCI database version 2.45 (ALCAS, 2025).

Electricity

Market-based modelling has been used for grid supplied electricity consumed in processes at InfraBuild sites. For InfraBuild manufacturing facilities in NSW, i.e., Rooty Hill and Newcastle, 25 % of electricity use is renewable electricity contracted from EnergyAustralia, an energy retailer and generator in Australia. The renewable electricity is modelled with ecoinvent dataset, 'AU: electricity production, wind, >3MW turbine, onshore ecoinvent'. The transmission and distribution losses for renewables supplied through the grid are the same as for the relevant state grid, i.e., New South Wales, as documented below. The remaining (75 %) electricity used at NSW sites are modelled using the residual electricity mix on the market.

For other InfraBuild manufacturing facilities, electricity is modelled using the residual electricity mix on the market. Datasets of electricity grid residual supply mixes from AusLCI v2.45 are used in this EPD. Modelling methods are available in a whitepaper published by thinkstep-anz (thinkstep-anz, 2024) and the methodology paper Life Cycle Inventory of Australian Electricity (Brown & Grant, 2025).

The composition of the residual electricity grid is modelled based on published data (Australian Government, 2024). The modelling accounts for losses at the generation facility (onsite consumption) and in distribution. Onsite consumption is calculated based on the same source as the grid mix (Australian Government, 2024). The medium voltage (1kV-60kV) grid's transmission and distribution losses are calculated based on data from the Australian Energy Market Operator (AEMO, 2022). The process of electricity modelling for each state:

- The New South Wales residual electricity mix is made up of Black coal 65.6 %, Solar 11.1 %, Wind 5.03 %, Hydro 4.74 %, Natural gas 2.01 %, Biomass 0.633 %, Biogas 0.379 %, Oil Products 0.114 %, and Coal seam methane 0.00228 %. The remaining electricity is imported: 5.29 % is imported from Victoria, and 5.16 % is imported from Queensland. The losses of onsite consumption and in distribution are 4.15 % and 1.83 %, respectively. The emission factor for the mix residual grid mix for the GWP-GHG indicator is 0.808 kg CO_2-eq /kWh (based on EF3.1).
- The Queensland residual electricity mix is made up of Black coal 69.2 %, Solar 12.9 %, Natural gas 9.54 %, Wind 3.22 %, Hydro 1.90 %, Coal seam methane 0.898 %, Biomass 0.742 %, Biogas 0.296 %, and Oil Products 0.0274 %. The remaining 1.24 % is imported from New South Wales. The losses of onsite consumption and in distribution are 7.05 % and 2.70 %, respectively. The emission factor for the mix residual grid mix for the GWP-GHG indicator is 0.876 kg CO_2-eq /kWh (based on EF3.1).

- The Southern Australian residual electricity mix is made up of Wind 31.9 %, Natural gas 30.3 %, Solar 23.1 %, Biogas 0.418 %, Oil Products 0.252 %, and Biomass 0.0152 %. The remaining 14.0 % is imported from Victoria. The losses of onsite consumption and in distribution are 2.93 % and 4.79 %, respectively. The emission factor for the mix residual grid mix for the GWP-GHG indicator is 0.308 kg CO_2-eq /kWh (based on EF3.1).
- The Victorian residual electricity mix is made up of Brown coal 64.2 %, Wind 14.4 %, Solar 7.41 %, Hydro 5.83 %, Natural gas 2.15 %, Biogas 0.662 %, and Biomass 0.0391 %. The remaining electricity is imported: 2.38 % is imported from Southern Australia, 1.56 % is imported from Tasmania, and 1.43 % is imported from New South Wales. The losses of onsite consumption and in distribution are 5.57 % and 2.31 %, respectively. The emission factor for the mix residual grid mix for the GWP-GHG indicator is 0.977 kg CO_2-eq /kWh (based on EF3.1).

Location-based grid mix EFs (using the published grid mix) is used for other electricity consumption including modules C and D. Location-based electricity modelling is used in upstream secondary datasets for modelling modules A1-A3 (e.g. for production of raw materials) because the aggregated datasets cannot be modified for electricity supply.

Modelling of infrastructure and capital goods

In general, the production and end-of-life processes of infrastructure and capital goods used in the product system are not included within the system boundary. All datasets exclude capital goods and infrastructure. An exception is for capital goods for electricity generation, where the capital goods are very important for modelling of changes towards more renewable generation. Capital goods related to electricity generation is included in all electricity datasets used in this study. This is not regarded as limiting the scope of the inventory or as an incomplete inventory (i.e. a cut-off).

Allocation

Allocation generally follows the requirements of PCR 2019:14 v2.0.1 section 4.5 (EPD International, 2025b). When allocation becomes necessary during the data collection phase, the allocation rule most suitable for the respective process step is applied.

Irrespective of any allocation between product systems, the inherent properties of the product and the packaging, such as calorific content or biogenic or fossil carbon content are not allocated away and always follow the physical downstream flow and the product system that finally uses it.

Allocation of co-products

Co-product allocation was applied for mill scale losses during manufacturing. Steel products are the main product produced and sold by InfraBuild. Mill scale losses during manufacture are wastes with an economic value that are sold for recycling outside of the product system. The difference in revenue per mass from the product and co-products is greater than 25 %. This is therefore considered a co-product, to which economic allocation of modules A1-A3 impacts is applied. The adoption of economic allocation has minimal impact on the overall results, as less than 0.5 % of the total environmental impacts were assigned to scrap co-products.

Allocation of waste

The study follows the polluter pays principle for allocation of waste, following the requirements of PCR 2019:14 v2.0.1 section 4.5.2 (EPD International, 2025b) and the system boundary is set where the waste reaches the end-of-waste state. Environmental impacts of all processes before end-of-waste state are included in the system boundary of this EPD. The system boundary also includes the landfilling of manufacturing waste from module A3.

Allocation of materials for recycling

The steel-making process uses steel scrap as an input. The scrap comes from several sources, with quantity from each source captured in data collection. Each source has a specific modelling approach as required by the PCR.

- Post-consumer scrap (91.7 % of scrap feed): externally-sourced scrap generated from the end-of-life of products, which has reached end-of-waste state and is burden-free at the point of delivery to a recycling site. GWP-GHG impact of post-consumer scrap is 0 kg CO_2-eq. per kg of scrap at the point of delivery. Further impacts are modelled for processing (including shredding) at InfraBuild's recycling centres and transport to InfraBuild's steel manufacturing sites.
- Post-industrial scrap (8.31 % of scrap feed, also known as pre-consumer scrap): externally-sourced scrap generated by downstream manufacturers or other producers and purchased directly by InfraBuild, which has a burden assumed based on economic allocation between product and scrap. The sold price of general steel products is estimated based on the price of steel billets from InfraBuild and the average cost of steel fabrication in Australia (iseekplant, 2025). The purchase price of scrap is provided by InfraBuild. The price ratio between fabricated steel and steel scrap is 10.7:1. The average environmental impact of InfraBuild's products is used to allocate impact to pre-consumer scrap inputs.
- GWP-GHG impact of pre-consumer scrap is 0.129 kg CO_2-eq. per kg of scrap at the point of delivery. Further impacts are modelled for processing (including shredding) at InfraBuild's recycling centres and transport to InfraBuild's steel manufacturing sites.
- Internal scrap: scrap generated by InfraBuild processes and used within the same product system does not require allocation. Internal transport – where required to return it to the production site – is included.

Other allocation in production

Packaging is only used for final products. It is allocated by production volume across the total throughput of packaged product.

InfraBuild has numerous sub-meters measuring electricity use across the different process steps. Often the measured electricity accounts for production stages that include multiple unit processes. In such cases, electricity is allocated to a unit process based on whether the process requires electricity use and the mass of valuable output from the unit process. All electricity is allocated within the production system.

Data quality assessment

A data quality assessment that complies with EN 15941 (CEN, 2024) was done as part of the LCA study.

This EPD covers the product from multiple InfraBuild facilities across Australia. Manufacturing data for FY2024 (2023-07-01 to 2024-06-30) is collected. The product is made based on internal steel feed via EAF. While most facilities use electricity from grid, Sydney and Newcastle sites replace part of their electricity consumption with renewable electricity from wind. This EPD covers production in Australia and end-of-life in New Zealand. Background data was sourced from the ecoinvent, AusLCI and EPD databases. The data generally has good geographical representativeness, fair technological representativeness and very good temporal representativeness.

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.

Dataset used for modelling silico manganese has poor technological representativeness. No data is available. For steel billet production at InfraBuild's sites, the impact of silico manganese dataset is less than 10 % of GWP-total and less than 25 % of other core the environmental indicator results.

Table 7. Data sources and share of primary data

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Generation of electricity used in manufacturing of product	Data collection, database	EPD Owner, AusLCI v2.45	2023	Primary data	10.7 %
Fuel used in manufacturing of product	Data collection, database	EPD Owner, ecoinvent v3.10	2023	Primary data	10.0 %
Production of steel feed	Data collection, database, EPD	EPD Owner, ecoinvent v3.10, AusLCI v2.45, CARES EPD No.: 0017, thinkstep-anz	2019-2025	Primary data, rep. secondary data	54.4 %
Upstream transport	Database	ecoinvent v3.10	2023	Primary data	0 %
Other processes	Database	ecoinvent v3.10, AusLCI v2.45	2023	Rep. secondary data, proxy data	0 %
Total share of primary data, of GWP-GHG results for A1-A3*					75.1 %

*Note: Total share of primary data may not add up due to rounding.

Modelling of downstream stages

The processes below are included in the product system to be studied. For modules beyond A3, the scenarios included are currently in use and are representative for one of the most probable alternatives.

Distribution (module A4)

Distribution of reinforcing bar 500E includes transport of product to customer (A4). The weighted average distances from Laverton mills to the different ports in New Zealand were calculated based on the percentage of national sales. It was assumed the road transport distance from port to end-user is 100 km in New Zealand. The modes of transport are outlined in Table 8.

Table 8. Transport to building site

Scenario information	Unit (expressed per declared unit)
Vehicle type used for transport	100 % of sea transport via "transport, freight, sea, container ship" from ecoinvent database. 100 % of road transport via "transport, freight, lorry >32 metric ton, EURO4" from ecoinvent database.
Distance	> 20 km truck in Australia > 3 782 km ship from Australia to New Zealand > 100 km truck in New Zealand
Capacity utilisation (including empty returns)	Default values from relevant datasets in ecoinvent database
Bulk density of transported products	7 850 kg / m³
Volume capacity utilisation factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products)	1

End of life (modules C1-C4)

The end-of-life stage (modules C1-C4) is modelled using a scenario reflecting end-of-life recycling/landfilling rates for steel products in the New Zealand's construction sectors. The recycling scenario in New Zealand is modelled based on a steel recycling report for New Zealand Heavy Engineering Research Association (HERA), where it is estimated that 85 % of steel scrap from the building and infrastructure sector is recovered (thinkstep-anz, 2021).

The type(s) and quantity of energy and transport used for modelling end-of-life processes are the default values required by the PCR (EPD International, 2025b), since no more specific data is available.

Table 9. End of life scenarios for products

Process	Unit (expressed per declared unit of products)		
	EOL Main Scenario	**100% Recycling Scenario**	**100% Landfilling Scenario**
Collection process specified by type	1 tonne of product collected with mixed construction waste		
Recovery system specified by type	0.85 tonne for recycling*	1 tonne	0 tonne
Disposal specified by type	0.15 tonne modelled as inert material in landfill	0 tonne	1 tonne
Assumptions for scenario development	> C1: Demolition/deconstruction – diesel use of 10 kWh/tonne > C2: 80 km of transport by 16-32 tonne lorry (EURO 5), 50 % load factor > C3: > > Loading and unloading at sorting facility – diesel use of 1.8 kWh/tonne > > Crushing of concrete – diesel use of 2.0 kWh/tonne > > Mechanical sorting – electricity use of 2.2 kWh/tonne > > Fragging of steel – diesel use of 7.4 kWh/tonne > C4: Compacting of inert construction waste for landfills (including backfilling) – diesel use of 1.6 kWh/tonne		

*The European Union Guidance on PEF identifies an R2 value of 85% for steel (European Commission, 2020). This is consistent with the New Zealand value, i.e., 85% (thinkstep-anz, 2021).

Recovery and recycling potential (module D)

Module D assigns a credit for secondary material outputs if the output of secondary material from module C3 is higher than the input of secondary material needed for the production of steel; alternatively, a burden is assigned if the ratio is the other way around. Therefore, only net scrap is sent to module D (i.e. the scrap remaining after any recycled content needed for modules A1-A3 is subtracted).

The input of secondary material needed for the production of steel is calculated based on post-industrial scrap and post-consumer scrap inputs, which is 1.12 tonne per tonne of product. The scrap from module C3 is 0.85 tonne per tonne of product. Therefore the net scrap is -0.268 tonne per tonne of product. Module D presents a burden of recycling.

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.

Packaging of minor raw materials that are insignificant to the overall impacts have been cut off.

Key assumptions

The power purchase agreement of renewable electricity is implemented since 2025 and will cover the full validity period of the EPD. Therefore, a share of renewable electricity was modelled in this EPD.

The share of renewable electricity consumption was assumed to be 25 % of the total electricity consumption of NSW sites. The was considered a conservative approach as the actual share was higher than the assumption based on electricity consumption records for six months in 2025.

Burdens were assigned to pre-consumer scrap inputs for steel production. The burden was calculated based on the price ratio, i.e., 10.7:1.0, of general steel products and the scrap. Environmental impact of steel manufacturing in each product system was used to allocate the burdens to scrap inputs. It should be noted that the allocation of incoming pre-consumer scrap requires considerable assumptions as actual data are not available. This can have significant impacts on the results.

ODP (EN15804+A1) impacts are several orders of magnitude higher compared to original EPDs due to modelling differences in the background databases. InfraBuild's operations do not have direct impact on ODP.

Assessment indicators

An introduction the core environmental impact indicators is provided below. The best-known effect of each indicator is listed in the descriptions and the abbreviations, in brackets, correspond to the labels in the environmental results tables in the following section.

Climate change (global warming potential)

(GWP-total, GWP-fossil, GWP-biogenic, GWP-luluc)
A measure of greenhouse gas emissions, such as CO_2 and methane. These emissions are causing an increase in the absorption of radiation emitted by the earth, increasing the natural greenhouse effect. This may in turn have adverse impacts on ecosystem health, human health and material welfare. GWP is split into three sub-indicators: fossil, biogenic, and land-use and land-use change.

Ozone depletion potential

(ODP)
Depletion of the ozone leads to higher levels of UVB ultraviolet rays reaching the earth's surface with detrimental effects on humans and plants. The ozone depletion potential is a measure of air emissions that contribute to the depletion of the stratospheric ozone layer.

Acidification potential

(AP)
Acidification potential is a measure of emissions that cause acidifying effects to the environment. A molecule's acidification potential indicates its capacity to increase the hydrogen ion (H+) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline, and the deterioration of building materials.

Eutrophication potential

(EP-freshwater, EP-marine, EP-terrestrial)
Eutrophication covers all potential impacts of excessively high levels of macronutrients, the most important of which are nitrogen (N)and phosphorus (P). In aquatic ecosystems where this term is mostly applied, this typically describes a degradation in water quality. Eutrophication can result in an undesirable change in the type of species that flourish and an increase in the production of biomass. As the decomposition of biomass consumes oxygen, eutrophication may decrease the available oxygen level in the water column and threaten fish in their ability to respire.

Photochemical ozone formation potential

(POCP)
Photochemical ozone formation potential gives an indication of the emissions from precursors that contribute to ground level smog formation, mainly ozone (O_3). Ground level ozone may be harmful to human health and ecosystems and may also damage crops. These emissions are produced by the reaction of volatile organic compounds (VOCs) and carbon monoxide in the presence of nitrogen oxides and UV light.

Abiotic depletion potential

(ADP-m&m, ADP-fossil)
The consumption of non-renewable resources decreases the availability of these resources and their associated functions in the future. Depletion of mineral and metal (m&m) resources and non-renewable energy (fossil) resources are reported separately. Depletion of mineral resources is assessed based on total reserves.

Water use

(WDP)
Water scarcity is a measure of the stress on a region due to water consumption.

Environmental performance

Results for primary scenario

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 EN 15804 reference package based on EF 3.1 is used.

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).

Results for 1 tonne of 500E reinforcing bar.

Table 10. Abbreviations for EN15804+A2 core environmental impact indicators

Abbr	Indicator
GWP-total	Climate change (total)
GWP-fossil	Climate change (fossil)
GWP-biogenic	Climate change (biogenic)
GWP-luluc	Climate change (land use and land use change)
ODP	Depletion potential of the stratospheric ozone layer
AP	Acidification potential
EP-freshwater	Eutrophication potential (freshwater)
EP-marine	Eutrophication aquatic (marine)
EP-terrestrial	Eutrophication (terrestrial)
POCP	Formation potential of tropospheric ozone
ADP-m&m	Depletion abiotic resources – minerals & metals
ADP-fossil	Depletion abiotic resources – fossil fuels
WDP	Water (user) deprivation potential, deprivation-weighted water consumption

Table 11. EN15804+A2 core environmental impact indicators

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D	Max A-C variation
GWP-total	kg CO_2 eq.	1.04E+03	5.47E+01	3.13E+00	1.24E+01	3.48E+00	8.11E-02	2.17E+02	1.5 %
GWP-fossil	kg CO_2 eq.	1.04E+03	5.47E+01	3.13E+00	1.23E+01	3.47E+00	8.11E-02	2.17E+02	1.5 %
GWP-biogenic	kg CO_2 eq.	6.28E+00	6.80E-03	4.79E-04	1.44E-03	6.24E-03	1.24E-05	-2.13E-02	1.9 %
GWP-luluc	kg CO_2 eq.	2.09E+00	1.58E-03	1.08E-04	3.61E-04	1.15E-04	2.79E-06	2.31E-03	2.1 %
ODP	kg CFC 11 eq.	4.48E-06	7.84E-07	4.93E-08	1.66E-07	5.43E-08	1.28E-09	5.02E-08	0.0 %
AP	Mol H+ eq.	7.51E+00	1.18E+00	2.93E-02	3.35E-02	3.09E-02	7.58E-04	2.43E-01	1.8 %
EP-freshwater	kg P eq.	1.01E-01	6.15E-04	2.56E-05	2.51E-04	2.40E-04	6.63E-07	7.32E-02	3.2 %
EP-marine	kg N eq.	8.46E-01	2.99E-01	1.38E-02	1.22E-02	1.43E-02	3.57E-04	-1.08E-02	1.7 %
EP-terrestrial	Mole N eq.	8.92E+00	3.32E+00	1.51E-01	1.34E-01	1.56E-01	3.91E-03	7.38E-01	1.7 %
POCP	kg NMVOC eq.	2.93E+00	9.06E-01	4.49E-02	5.00E-02	4.67E-02	1.16E-03	2.43E-01	1.5 %
ADP-m&m[1]	kg Sb eq.	8.03E-04	1.49E-06	1.31E-07	7.33E-07	1.41E-07	3.39E-09	3.43E-03	2.1 %
ADP-fossil[1]	MJ	5.56E+03	6.93E+02	4.13E+01	1.65E+02	4.57E+01	1.07E+00	1.65E+03	0.8 %
WDP[1]	m^3 world equiv.	1.89E+02	7.03E-01	5.37E-02	2.32E-01	5.52E-02	1.39E-03	-7.74E+01	2.3 %

Additional environmental impact indicators

Optional environmental impact categories provide further information on environmental impacts.

Table 12. Abbreviations for EN15804+A2 additional environmental impact indicators

Abbr	Indicator
GWP-GHG	Global warming potential
GWP-GHG (IPCC AR5)	IPCC AR5 GWP-GHG
PM	Potential incidence of disease due to PM emissions
IRP	Ionising radiation – human health
ETP-fw	Ecotoxicity – freshwater
HTPc	Human toxicity, cancer
HTPnc	Human toxicity, non-cancer
SQP	Land use related impacts / soil quality

Table 13. EN15804+A2 additional environmental impact indicators

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D	Max A-C variation
GWP-GHG[2]	kg CO_2 eq.	1.04E+03	5.47E+01	3.13E+00	1.24E+01	3.48E+00	8.11E-02	2.17E+02	1.5 %
GWP-GHG (IPCC AR5)[3]	kg CO_2 eq.	1.04E+03	5.48E+01	3.14E+00	1.24E+01	3.48E+00	8.12E-02	2.17E+02	1.5 %
PM	Disease incidences	1.11E-04	2.09E-06	8.41E-07	8.24E-07	8.66E-07	2.18E-08	1.57E-05	2.3 %
IRP[4]	kBq U235-eq.	1.26E+01	1.23E-01	8.78E-03	2.51E-02	9.34E-03	2.27E-04	-3.52E+00	3.1 %
ETP-fw[1]	CTUe	1.12E+04	8.27E+00	4.01E-01	2.97E+00	4.38E-01	1.04E-02	1.06E+04	3.4 %
HTPc[1]	CTUh	4.19E-05	7.13E-09	2.20E-10	1.04E-09	2.57E-10	5.70E-12	3.86E-05	3.4 %
HTPnc[1]	CTUh	7.03E-06	1.96E-07	3.13E-09	8.17E-08	4.43E-09	8.11E-11	-1.77E-05	2.5 %
SQP[1]	Dimensionless	2.89E+03	1.72E+00	8.75E-02	6.74E-01	8.98E-02	2.26E-03	6.22E+02	2.2 %

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Resource use indicators

The resource use indicators describe the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water.

Table 14. Abbreviations for use of resources

Abbr	Indicator
PERE	Renewable primary energy as energy carrier
PERM	Renewable primary energy resources as material utilization
PERT	Total use of renewable primary energy resources
PENRE	Non-renewable primary energy as energy carrier
PENRM	Non-renewable primary energy as material utilization
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

Table 15. Use of resources

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	1.10E+03	1.27E+00	9.24E-02	2.69E-01	1.38E+01	2.39E-03	2.78E+02
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.10E+03	1.27E+00	9.24E-02	2.69E-01	1.38E+01	2.39E-03	2.78E+02
PENRE	MJ	5.49E+03	6.93E+02	4.13E+01	1.65E+02	4.57E+01	1.07E+00	1.65E+03
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.49E+03	6.93E+02	4.13E+01	1.65E+02	4.57E+01	1.07E+00	1.65E+03
SM	kg	1.02E+03	0.00E+00	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	0.00E+00
NRSF	MJ	6.07E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	8.14E+02	1.70E-02	1.30E-03	5.54E-03	1.77E-03	3.35E-05	-1.47E+00

Waste material and output flow indicators

Waste indicators describe waste generated within the life cycle of the product. Waste is categorised by hazard class, end-of-life fate and exported energy content.

Table 16. Abbreviations for waste production and output flows

Abbr	Indicator
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

Table 17. Waste production and output flows

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
HWD	kg	7.27E+01	1.22E-01	4.46E-03	5.24E-02	5.43E-03	1.15E-04	1.46E+02
NHWD	kg	5.15E+02	3.39E+00	1.50E-01	1.32E+00	1.19E+00	1.50E+02	-3.71E+03
RWD	kg	3.10E-03	2.89E-05	2.11E-06	5.93E-06	2.24E-06	5.46E-08	-8.18E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	1.48E+02	0.00E+00	0.00E+00	0.00E+00	8.50E+02	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	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	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	0.00E+00

Biogenic carbon content

Biogenic carbon refers to the carbon stored in organic materials. This is sequestered during growth and released at end of life. EN15804+A2 requires the declaration of biogenic carbon content of the product and its packaging.

1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Table 18. Abbreviations for biogenic carbon content

Abbr	Indicator
BCC-prod	Biogenic carbon content – product
BCC-pack	Biogenic carbon content – packaging

Table 19. Biogenic carbon content results

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
BCC-prod	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCC-pack	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Additional environmental impact indicators[5]

The results for EN15804+A1 compliant EPDs are not comparable with EN15804+A2 compliant studies as the methodologies are different. To support backwards comparability and compatibility, environmental performance results have also been provided for the indicators required in EN15804+A1, although the study does not claim compliance with this standard.

Table 20. Abbreviations for EN15804+A1 environmental impact indicators

Abbr	Indicator
GWP (EN15804+A1)	Global warming potential (total)
ODP (EN15804+A1)	Depletion potential of the stratospheric ozone layer
AP (EN15804+A1)	Acidification potential of land and water
EP (EN15804+A1)	Eutrophication potential
POCP (EN15804+A1)	Photochemical ozone creation potential
ADPE (EN15804+A1)	Abiotic depletion potential – elements
ADPF (EN15804+A1)	Abiotic depletion potential – fossil fuels

Table 21. EN15804+A1 environmental indicator results

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP (EN15804+A1)	kg CO_2-eq.	1.03E+03	5.40E+01	3.09E+00	1.22E+01	3.43E+00	8.01E-02	2.12E+02
ODP (EN15804+A1)	kg CFC11-eq.	3.49E-06	5.41E-07	3.41E-08	1.14E-07	3.78E-08	8.81E-10	6.86E-07
AP (EN15804+A1)	kg SO_2-eq.	1.79E+00	8.46E-01	2.01E-02	2.35E-02	2.12E-02	5.19E-04	1.68E-01
EP (EN15804+A1)	kg PO_4^{3-}-eq.	6.34E-01	1.03E-01	4.71E-03	4.96E-03	5.54E-03	1.22E-04	2.15E-01
POCP (EN15804+A1)	kg C_2H_4-eq.	5.05E-01	1.22E-01	9.16E-03	1.78E-02	9.68E-03	2.37E-04	2.08E-02
ADPE (EN15804+A1)	kg Sb-eq.	8.04E-04	1.49E-06	1.31E-07	7.33E-07	1.41E-07	3.39E-09	3.43E-03
ADPF (EN15804+A1)	MJ	5.51E+03	6.93E+02	4.13E+01	1.65E+02	4.57E+01	1.07E+00	1.65E+03

Variation in results

Minor variation between production sites was observed.

Table 22. GWP-GHG A1-A3 variation

LCA result of one declared unit product (A1-A3)	Unit	Variation of sites
GWP-GHG[2]	kg CO_2-eq.	+2 % /0 %

Results for additional scenarios

This section provides results for alternate end-of-life scenarios.

Table 23. EN15804+A2 Core environmental impact indicators

		100% Recycling			100% Landfilling		
Indicator	Unit	C3	C4	D	C3	C4	D
GWP-total	kg CO_2-eq.	4.10E+00	0.00E+00	9.55E+01	0.00E+00	5.41E-01	9.07E+02
GWP-fossil	kg CO_2-eq.	4.09E+00	0.00E+00	9.56E+01	0.00E+00	5.41E-01	9.07E+02
GWP-biogenic	kg CO_2-eq.	7.34E-03	0.00E+00	-9.36E-03	0.00E+00	8.27E-05	-8.88E-02
GWP-luluc	kg CO_2-eq.	1.35E-04	0.00E+00	1.01E-03	0.00E+00	1.86E-05	9.64E-03
ODP	kg CFC 11-eq.	6.39E-08	0.00E+00	2.21E-08	0.00E+00	8.51E-09	2.10E-07
AP	Mol H+-eq.	3.64E-02	0.00E+00	1.07E-01	0.00E+00	5.06E-03	1.01E+00
EP-freshwater	kg P-eq.	2.82E-04	0.00E+00	3.22E-02	0.00E+00	4.42E-06	3.05E-01
EP-marine	kg N-eq.	1.68E-02	0.00E+00	-4.73E-03	0.00E+00	2.38E-03	-4.49E-02
EP-terrestrial	Mole N-eq.	1.84E-01	0.00E+00	3.24E-01	0.00E+00	2.61E-02	3.08E+00
POCP	kg NMVOC-eq.	5.49E-02	0.00E+00	1.07E-01	0.00E+00	7.75E-03	1.01E+00
ADP-m&m[1]	kg Sb-eq.	1.66E-07	0.00E+00	1.51E-03	0.00E+00	2.26E-08	1.43E-02
ADP-fossil[1]	MJ	5.38E+01	0.00E+00	7.24E+02	0.00E+00	7.12E+00	6.87E+03
WDP[1]	m^3 world equiv.	6.49E-02	0.00E+00	-3.40E+01	0.00E+00	9.27E-03	-3.23E+02

Table 24. EN15804+A2 Additional environmental impact indicators

		100% Recycling			100% Landfilling		
Indicator	Unit	C3	C4	D	C3	C4	D
GWP-GHG[2]	kg CO_2-eq.	4.09E+00	0.00E+00	9.54E+01	0.00E+00	5.41E-01	9.06E+02
GWP-GHG (IPCC AR5)[3]	kg CO_2-eq.	4.09E+00	0.00E+00	9.55E+01	0.00E+00	5.42E-01	9.07E+02
PM	Disease incidences	1.02E-06	0.00E+00	6.92E-06	0.00E+00	1.45E-07	6.57E-05
IRP[4]	kBq U235-eq.	1.10E-02	0.00E+00	-1.55E+00	0.00E+00	1.51E-03	-1.47E+01
ETP-fw[1]	CTUe	5.15E-01	0.00E+00	4.66E+03	0.00E+00	6.92E-02	4.42E+04
HTP-c[1]	CTUh	3.03E-10	0.00E+00	1.70E-05	0.00E+00	3.80E-11	1.61E-04
HTP-nc[1]	CTUh	5.21E-09	0.00E+00	-7.78E-06	0.00E+00	5.41E-10	-7.39E-05
SQP[1]	Pt	1.06E-01	0.00E+00	2.74E+02	0.00E+00	1.51E-02	2.60E+03

Table 25. Use of resources

		100% Recycling			100% Landfilling		
Indicator	Unit	C3	C4	D	C3	C4	D
PERE	MJ	1.63E+01	0.00E+00	1.22E+02	0.00E+00	1.59E-02	1.16E+03
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.63E+01	0.00E+00	1.22E+02	0.00E+00	1.59E-02	1.16E+03
PENRE	MJ	5.38E+01	0.00E+00	7.24E+02	0.00E+00	7.12E+00	6.87E+03
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.38E+01	0.00E+00	7.24E+02	0.00E+00	7.12E+00	6.87E+03
SM	kg	0.00E+00	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.08E-03	0.00E+00	-6.49E-01	0.00E+00	2.24E-04	-6.16E+00

Table 26. Waste production and output flows

		100% Recycling			100% Landfilling		
Indicator	Unit	C3	C4	D	C3	C4	D
HWD	kg	6.39E-03	0.00E+00	6.43E+01	0.00E+00	7.70E-04	6.11E+02
NHWD	kg	1.40E+00	0.00E+00	-1.63E+03	0.00E+00	1.00E+03	-1.55E+04
RWD	kg	2.63E-06	0.00E+00	-3.60E-04	0.00E+00	3.64E-07	-3.42E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	1.00E+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
EEE	MJ	0.00E+00	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

Table 27. EN15804+A1 Environmental impact indicators

		100% Recycling			100% Landfilling		
Indicator	Unit	C3	C4	D	C3	C4	D
GWP (EN15804+A1)	kg CO_2-eq.	4.04E+00	0.00E+00	9.30E+01	0.00E+00	5.34E-01	8.83E+02
ODP (EN15804+A1)	kg CFC11-eq.	4.45E-08	0.00E+00	3.02E-07	0.00E+00	5.88E-09	2.87E-06
AP (EN15804+A1)	kg SO_2-eq.	2.49E-02	0.00E+00	7.40E-02	0.00E+00	3.46E-03	7.03E-01
EP (EN15804+A1)	kg PO_4^{3-}-eq.	6.51E-03	0.00E+00	9.47E-02	0.00E+00	8.12E-04	8.99E-01
POCP (EN15804+A1)	kg C_2H_4-eq.	1.14E-02	0.00E+00	9.12E-03	0.00E+00	1.58E-03	8.66E-02
ADPE (EN15804+A1)	kg Sb-eq.	1.66E-07	0.00E+00	1.51E-03	0.00E+00	2.26E-08	1.43E-02
ADPF (EN15804+A1)	MJ	5.38E+01	0.00E+00	7.24E+02	0.00E+00	7.12E+00	6.87E+03

Endnotes

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.

2 This indicator should be identical to GWP-total except that the CF for biogenic CO_2 is set to zero. It has been included in the EPD following the PCR (EPD International, 2024b). In this study it is calculated by subtracting the value of Climate change – biogenic (GWP-biogenic) from the value of Climate change – total (GWP-total) since the ecoinvent Excel LCIA results do not include the indicator.

3 GWP-GHG (IPCC AR5) is an additional GWP100 indicator that is aligned with the Intergovernmental Panel on Climate Change (IPCC) 2013 Fifth Assessment Report (AR5) (IPCC 2013), national greenhouse gas reporting frameworks in Australia and New Zealand and previous versions of the Construction Products PCR (PCR2019:14v1.3.2). It excludes biogenic carbon and indirect radiative forcing.

4 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.

5 While the indicators and characterisation methods are from EN15804:2012+A1:2013, other LCA rules for the study (system boundaries, allocation, etc.) are according to EN15804:2012+A2:2019; i.e. this study does not claim that the results of the 'A1 indicators' are compliant with EN15804:2012+A1:2013.

Additional environmental information

Material Circularity Indicator (MCI) results

Material Circularity Indicator (MCI) is a method for measuring how well a product performs in the context of a circular economy and aligns with ISO 59020 (ISO, 2024). It measures the degree to which a product system keeps materials in circulation at their highest form of value. It provides a common metric that applies to all of the different circular economy strategies including avoidance, durability, reuse, remanufacturing, recycling, regenerative sourcing, composting and energy recovery.

The MCI can be reported as an MCI Score or as a percentage circularity (% MCI).

MCI Score

A value between 0 and 1 in which a score of 0.1 represents a linear system that uses only virgin, non-renewable materials and produces only non-recoverable waste. A score of 1 represents a perfectly circular system that uses only non-virgin or renewable materials and produces only recoverable waste. Values between 0 and 0.1 are reserved for products that consume more material, typically due to a lower utility than an average product.

% MCI

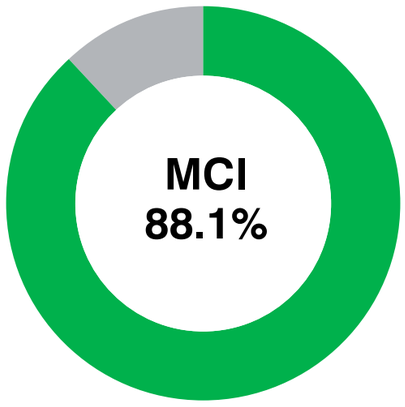
This is calculated using the same methodology and assumptions as the MCI Score but reports circularity on a scale from 0 % (Linear) to 100 % (perfectly circular) that is easier to understand and communicate.

The MCI has been reported as here both an MCI Score and a percentage circularity (% MCI) to support comparability. Although the methodology for MCI Score and % MCI is the same, the score cannot be directly transposed but needs to be converted per the methodology described by the Ellen MacArthur Foundation (Ellen MacArthur Foundation, 2019/2024).

Table 28. MCI results

Product	MCI result	% MCI result
Reinforcing bar 500E	0.893	88.1 %

Figure 4. MCI score



Abbreviations

- ADP: Abiotic depletion potential
- AEMO: Australian Energy Market Operator.
- AP: Acidification potential
- AusLCI: Australian National Life Cycle Inventory Database
- CAP: Climate Action Programme
- DCCEEW: Department of Climate Change, Energy, the Environment and Water
- EAF: Electric arc furnace
- ECHA: European Chemicals Agency
- EF: Environmental footprint
- EMS: Environmental Management System
- EOL: End of life
- EP: Eutrophication potential
- EPD: Environmental Product Declaration
- ERP: Energy reducing process
- GECA: Good Environmental Choice Australia
- GBCA: Green Building Council of Australia
- GWP: Global warming potential
- ISC: Infrastructure Sustainability Council
- LCA: Life cycle assessment
- LCI: Life cycle inventory
- MCI: Material Circularity Indicator
- m&m: Minerals and metals
- ODP: Depletion potential of the stratospheric ozone layer
- PM: Potential incidence of disease due to PM emissions
- POCP: Formation potential of tropospheric ozone
- SF: Sustainability factor
- SSA: Steel Sustainability Australia
- VOC: Volatile organic compound
- WDP: Water (user) deprivation potential, deprivation-weighted water consumption

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General information

Programme information

EPD programme operator	**EPD International AB**	
EPD INTERNATIONAL EPD SYSTEM	Web:	www.environdec.com
	Email:	support@environdec.com
	Post:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden
Licensee	**EPD Australasia Limited**	
AUSTRALASIA EPD® INTERNATIONAL EPD SYSTEM	Web:	www.epd-australasia.com
	Email:	info@epd-australasia.com
	Post:	6 Cube Court Richmond 7020 New Zealand

Product Category Rules (PCR)	
CEN standard EN 15804+A2 served as the core Product Category Rules.	
PCR	PCR 2019:14 Construction products v2.0.1, published 2025-06-05 Product category rules of the International EPD System
PCR review conducted by	The Technical Committee of the International EPD System. See www.environdec.com for a list of members.
Review Chairs	Rob Rouwette, start2see Pty Ltd (chair), Noa Meron, thinkstep Ltd (co-chair). The review panel may be contacted via the Secretariat www.environdec.com/support

An Environmental Product Declaration (EPD) is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a PCR (Product Category Rules). The EPD owner has the sole ownership, liability, and responsibility for the EPD.

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.

The results for EN15804+A1 compliant EPDs are not comparable with EN15804+A2 compliant studies as the methodologies are different. To support backwards comparability and compatibility, environmental performance results have also been provided for the indicators required in EN15804+A1, although the study does not claim compliance with this standard.

Verification

External and independent ('third-party') verification of the declaration and data, according to ISO 14025:2006, via EPD verification through:

- ☑ Individual EPD verification without a pre-verified LCA/EPD tool
- ☐ EPD Process Certification* without a pre-verified LCA/EPD tool
- ☐ Fully pre-verified EPD tool
- ☐ Individual EPD verification with a pre-verified LCA/EPD tool
- ☐ EPD Process Certification* with a pre-verified LCA/EPD tool

Third party verifier	**Rob Rouwette (start2see Pty Ltd)**	
START2SEE LIFE CYCLE ASSESSMENTS	Web:	www.start2see.com.au
	Email:	Rob.Rouwette@start2see.com.au
Verifier approved by	EPD Australasia and The International EPD System	
Procedure for follow-up of data during EPD validity involves third-party verifier	☐ yes	
	☑ no	

Information about EPD owner

Declaration owner	**InfraBuild Australia Pty Ltd**	
InfraBuild Building futures through sustainable steel	Web:	www.infrabuild.com
	Email:	sustainablesteel@infrabuild.com
	Post:	Level 34, 50 Bridge Street, Sydney NSW 2000 Australia
LCA accountability	**thinkstep Pty Ltd**	
thinkstep anz	Barbara Nebel Emily Townsend, Haoran Lei	
	Web:	thinkstep-anz.com
	Email:	info@thinkstep-anz.com
	Post:	25 Jubilee Street, South Perth WA 6151 Australia
Geographical scope	New Zealand	
Reference year	2023-07-01 to 2024-06-30	
Version history	001	2025-12-12 Original version of the EPD. This EPD was previously combined with other products in EPD reg number EPD-IES-0000855:005

GS1 GDTI (253) 9316266000021EPDIES0025331001

InfraBuild Australia Pty Ltd

National Office
Gadigal Country
Level 34, 50 Bridge Street
Sydney NSW 2000

www.infrabuild.com