Environmental Product Declaration **for**

Roller Compacted Concrete

as Manufactured by Members of

Roller Compacted Concrete Pavement Council

Roller Compacted Concrete Pavement Council

The **Roller Compacted Concrete (RCC) Pavement Council** is a trade association representing contractors, equipment manufacturers, material suppliers, engineers, and other stakeholders involved in the design and construction of roller-compacted concrete pavements. Established in 2014, the council promotes the use of RCC pavement systems through industry collaboration, research initiatives, and educational outreach. The RCC Pavement Council supports the development of best practices, technical resources, and guidance documents that advance RCC pavement design, construction, and performance. Through research and promotion efforts, the council works to increase awareness of RCC pavement technology and its benefits, including durability, cost-effectiveness, and sustainability for a wide range of pavement applications.

	4000–5000 psi	5001–6000 psi
Global Warming Potential (kg CO_2-eq)	290	384
Ozone Depletion Potential (kg CFC-11-eq)	8.02E-06	5.29E-06
Acidification Potential (kg SO_2-eq)	1.07	2.14
Eutrophication Potential (kg N-eq)	0.291	0.57
Photochemical Ozone Creation Potential (kg O_3-eq)	23.3	64.7
Abiotic Depletion, non-fossil (kg Sb eq)	5.21E-05	2.18E-05
Abiotic Depletion, fossil (MJ)	1810	2570
Total Waste Disposed (kg)	1.49	2.37
Consumption of Freshwater (m^3)	3.54	3.66

This Environmental Product Declaration (EPD) reports the environmental impacts associated with the production of **1 m^3 of roller-compacted concrete (RCC)** for business-to-business (B2B) communication. The results are reported for cradle-to-gate life cycle stages (A1–A3) in accordance with the following specifications and standards:

- ASTM C94: Standard Specification for Ready-Mixed Concrete (referenced in the PCR framework)
- UNSPSC Code 30111505: Ready Mix Concrete
- CSA A23.1/A23.2: Concrete Materials and Methods of Concrete Construction
- CSI Division 03-30-00: Cast-in-Place Concrete

Roller-compacted concrete (RCC) is a zero-slump concrete mixture composed of cementitious materials, aggregates, water, and admixtures, which is placed using paving equipment and compacted with rollers rather than delivered and placed as plastic concrete.

General Information

This cradle-to-gate Environmental Product Declaration (EPD) covers U.S. industry-average roller-compacted concrete (RCC) mixtures produced by participating members of the RCC Pavement Council and other RCC producers. The life cycle assessment (LCA) was prepared in accordance with ISO 21930, ISO 14025, ISO 14040, and ISO 14044, the NSF/ASTM 1112 Product Category Rule (PCR) for Concrete, and ASTM program operator requirements.

This EPD reports the environmental impacts associated with the production of roller-compacted concrete (RCC) for business-to-business (B2B) communication and represents cradle-to-gate life cycle stages (A1–A3). The declared unit is 1 m^3 (1 cubic yard) of RCC mixture.

Concrete Products Applicable to this EPD

RCC-M	RCC mixtures with compressive strength 4,000 – 5,000 psi
RCC-H	RCC mixtures with compressive strength 5,001 – 6,000 psi

Compressive strengths are reported at 28 days unless otherwise specified.

Declaration Comparability Limitation Statement

Environmental declarations from different programs developed in accordance with ISO 14025 may not be directly comparable. EPDs are comparable only when they use the same Product Category Rules (PCR), include all relevant information modules, and are based on equivalent system boundaries and assumptions within the context of construction works. This EPD follows the NSF/ASTM 1112 Product Category Rule for Concrete and ISO 21930:2017. Comparability of EPD results is only possible when the declared products fulfill the same functional requirements and performance characteristics, and when the requirements of ISO 21930:2017 Section 5.5 are satisfied. Variations may occur due to differences in data sources, modeling assumptions, LCA software tools, background life cycle inventory datasets, and manufacturing practices. Therefore, comparisons between EPDs should be made with caution and only when consistent methodological approaches and equivalent life cycle stages are applied.

General Program Instructions	ASTM International Program Operator for Product Category Rules (PCRs) and Environmental Product Declarations (EPDs), General Program Instructions. Version 8.0, revised April 29, 2020.
Reference PCR	NSF/ASTM 1112-19 with 2024 deviation Product Category Rule (PCR) for Environmental Product Declarations – PCR for Concrete v2.3 – 2025-26 Extension
The sub-category PCR review was conducted by:	Thomas P. Gloria, PhD, Industrial Ecology Consultants Bill Stough, Bill Stough LLC Dr. Michael Overcash, Environmental Clarity
Markets of Applicability	United States
EPD Type	Industry-Average EPD for **roller-compacted concrete (RCC) mixtures**
Declared Unit	One cubic meter (m^3) of concrete
EPD Scope	Cradle-to-Gate
Year(s) of Reported Manufacturer Primary Data	1/1/2025 - 12/30/2025
LCI Database(s)	Ecoinvent, USLCI, US-EI
LCIA Methodology	TRACI 2.1 v1.04
This declaration was independently verified in accordance with ISO 14025:2006. The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v3.2 (December 2018), in conformance with ISO 21930:2017, serves as the core PCR, with additional considerations from the USGBC/UL environment Part A Enhancement (2017). □ internal ☑ external	Thomas P. Gloria (t.gloria@industrial-ecology.com) Industrial Ecology Consultants
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by	Climate Earth Inc. 137 Park Place, Suite 204 Pt Richmond, CA 94801 415-391-2725; support@climateearth.com
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by	Thomas P. Gloria (t.gloria@industrial-ecology.com) Industrial Ecology Consultants
Date of Issue	February 9, 2026 (valid for 5 years until February 8, 2031)
ASTM Declaration Number	EPD-1156
LCA/EPD Developer Climate Earth, Inc. 137 Park Place, Suite 204 Pt Richmond, CA 94801 415-391-2725 https://www.climateearth.com	

Participating Manufacturers

Eleven Manufacturing facilities are included in the study. Primary data for this industry-average EPD were collected through a structured industry survey administered by Climate Earth using the CarbonCLARITY® platform. Data were provided by participating manufacturers, including quality control managers and plant personnel, and were validated for completeness and consistency. The data collection period was from January 1, 2025, to December 30, 2025, representing production activities during this timeframe.

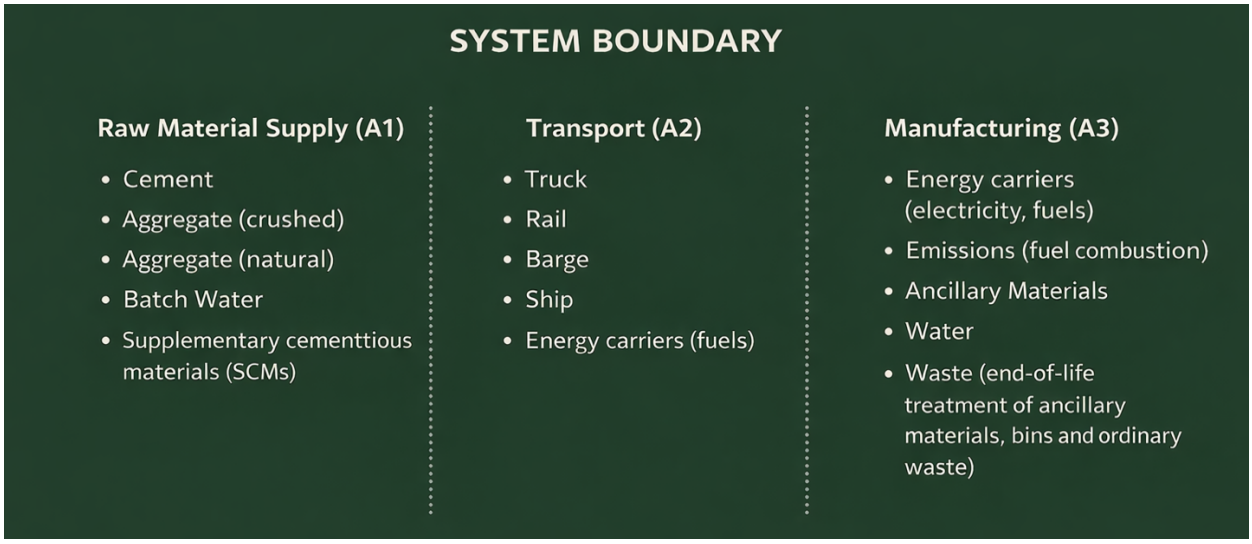
	Producer	Address	City	State	ZIP
	Andale Construction, Inc	3098 Yeager Dr	Woodward	OK	73801
	Andale Construction, Inc	353 Kenneth St	Dodge City	KS	67801
	Andale Construction, Inc	1360 W. 149th St.	Olathe	KS	66061
	Rollcon LLC – Denton	2640 Collins Rd	Denton	TX	76208
	Rollcon LLC – Dayton	401 Riverbend Way	Dayton	TX	77535
	Rollcon LLC – Old Ocean	8189 Old FM 524	Old Ocean	TX	77463
	Golden Triangle Construction Inc.	8555 Old Steubenville Pike	Imperial	PA	15126
	A.G. Peltz Group, LLC	1515 E. Barbour's Cut Blvd	La Porte	TX	77571
	Morgan Corp – Vogtle	7821 River Rd	Waynesboro	GA	30830
	Morgan Corp – CIT	10 Chatham Center South Drive	Savannah	GA	31405
	Conewago Manufacturing, LLC	660 Edgegrove Rd	Hanover	PA	17331

System Boundary

This EPD is a cradle-to-gate EPD covering A1-A3 stages of the life cycle.

PRODUCTION Stage (*Mandatory*)			CONSTRUCTION Stage		USE STAGE					END-OF-LIFE Stage			
Extraction and upstream production	Transport to factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	De-construction/ Demolition	Transport to waste processing or disposal	Waste processing	Disposal of waste
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**C1**	**C2**	**C3**	**C4**
X	**X**	**X**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**
Note: MND = module not declared; X = module included.													

The production stages and primary unit processes included in the study by product stage are:



Relevant Information for product stages not included in system boundary (A4-C4):
Modules A4–C4 are not included in this EPD. These stages may include transportation of RCC mixtures to the construction site (A4), placement and compaction operations (A5), the use stage (B1–B7), and end-of-life processes (C1–C4).
Other materials or processes required for the pavement system to perform its intended function may include subbase materials, reinforcement where applicable, joint materials, curing compounds, and surface treatments.
Typical end-of-life scenarios for roller-compacted concrete pavements may include demolition and crushing of the concrete followed by reuse as recycled aggregate or road base material, or disposal in a landfill. End-of-life treatment will depend on local practices and project-specific conditions.
The reference service life of RCC pavements is project-specific and is not declared in this EPD because the scope of this study is limited to cradle-to-gate production stages (A1–A3).

Material Content

The industry-average material content by input material for the seven product types studied here is derived from the weighted average based on production volume of all plants contributing to the study.

Material Properties of RCC Mix Categories

	4000–5000 psi	5001–6000 psi
Compressive Strength (MPa)	27.6–34.5	34.5–41.4
Type 1L Cement	8%	3%
Portland Cement	3%	10%
SCM	1%	0%
Aggregate (crushed)	41%	42%
Aggregate (natural)	42%	40%
Admixtures	0%	1%
Water	5%	6%

Cut-Off

Items excluded from the system boundary include the production, manufacture, and construction of manufacturing capital goods and infrastructure; the production and manufacture of production equipment, delivery vehicles, and laboratory equipment; personnel-related activities such as travel, furniture, and office supplies; and energy and water use associated with company management and sales activities that may occur either at the manufacturing site or at other locations.
A one percent cut-off criterion is applied to renewable and non-renewable primary energy consumption and the total mass of inputs within each unit process. The sum of all neglected flows does not exceed five percent of the total energy consumption and mass of inputs within the product system.

Allocation Procedure

Allocation follows the requirements and guidance of ISO 14044. In accordance with the Product Category Rules (PCR) for concrete, fly ash, silica fume, and slag cement are treated as recovered materials. Therefore, the environmental impacts associated with these materials are limited to the processing and transportation required to prepare and deliver them for use as inputs in the concrete mixture, rather than including the upstream impacts of their original production processes.

Data Quality

The data quality requirements specified in the NSF/ASTM 1112 Product Category Rule (PCR) for Concrete were followed. This section describes the data quality achieved in relation to the requirements of ISO 14044.

- Precision: Primary production data for roller-compacted concrete (RCC) mixtures were collected through measurement and calculation from participating facilities. To ensure accuracy, the plant gate-to-gate data were individually reviewed and validated.
- Time: Manufacturing data represent operations during the 2024 calendar year.
- Geography: The processes represent U.S. RCC production facilities.
- Completeness: The inventory includes raw materials, energy use, water consumption, and ancillary materials. Transportation of raw materials, consumption of fuels and electricity, and waste generation and treatment associated with the manufacturing stage are included.
- Reproducibility: Internal reproducibility is ensured as the data and LCA models are stored and maintained within the Climate Earth CarbonCLARITY® platform.
- Reliability: The dataset is based on information reported by eight participating manufacturing facilities in the United States. The LCA and EPD results have undergone independent third-party verification in accordance with ISO 14025.

Declaration of environmental indicators derived from cradle-to-gate LCA
Declared Unit: 1 m^3 of manufactured concrete

A1-A3 Impact results; product category: RCC mixtures with compressive strength 4000-5000 psi (1 m3 of concrete)

Impact Assessment	Unit	Weighted Average				Median	STDEV.S
		A1	A2	A3	Total A1-A3		
Global Warming Potential (GWP)*	kg CO_2 e	2.50E+02	3.70E+01	2.38E+00	2.90E+02	2.97E+02	3.05E+01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 e	7.97E-06	1.55E-09	5.49E-08	8.02E-06	6.89E-06	2.40E-06
Eutrophication potential (EP)	kg N e	2.65E-01	2.40E-02	2.21E-03	2.91E-01	3.12E-01	1.16E-01
Acidification potential of soil and water sources (AP)	kg SO2 e	5.77E-01	4.64E-01	3.30E-02	1.07E+00	1.13E+00	1.10E-01
Formation potential of tropospheric ozone (POCP)	kg O_3 e	1.03E+01	1.21E+01	9.20E-01	2.33E+01	2.49E+01	2.66E+00
Resource Use							
Abiotic depletion potential for non-fossil mineral resources (ADPelements)*	kg Sb eq	5.19E-05	0.00E+00	1.53E-07	5.21E-05	6.55E-05	3.30E-05
Abiotic depletion potential for fossil resources (ADPfossil)	MJ, NCV	1.28E+03	4.87E+02	3.62E+01	1.81E+03	1.90E+03	3.10E+02
Renewable primary energy resources as energy (fuel), (RPRE)*	MJ, NCV	4.74E+01	0.00E+00	3.40E-02	4.74E+01	4.71E+01	9.55E+00
Renewable primary resources as material, (RPRM)*	MJ, NCV	1.98E-01	0.00E+00	0.00E+00	1.98E-01	3.50E-01	3.40E-01
Non-renewable primary resources as energy (fuel), (NRPRE)*	MJ, NCV	1.32E+03	4.87E+02	3.63E+01	1.84E+03	1.93E+03	3.43E+02
Non-renewable primary resources as material (NRPRM)*	MJ, NCV	9.25E+00	0.00E+00	0.00E+00	9.25E+00	2.05E+01	2.14E+01
Consumption of fresh water	m3	3.51E+00	0.00E+00	3.10E-02	3.54E+00	3.68E+00	3.50E-01
Secondary Material, Fuel and Recovered Energy							
Secondary Materials, (SM)*	kg	1.77E+01	0.00E+00	0.00E+00	1.77E+01	3.01E+01	3.00E+01
Renewable secondary fuels, (RSF)*	MJ, NCV	9.31E+00	0.00E+00	0.00E+00	9.31E+00	6.50E+00	8.16E+00
Non-renewable secondary fuels (NRSF)*	MJ, NCV	1.44E+02	0.00E+00	0.00E+00	1.44E+02	1.33E+02	6.78E+01
Recovered energy, (RE)*	MJ, NCV	A25H04N01	0.00E+00		0.00E+00	0.00E+00	0.00E+00
Waste & Output Flows							
Hazardous waste disposed*	kg	2.16E-03	0.00E+00	0.00E+00	2.16E-03	2.06E-03	1.59E-03
Non-hazardous waste disposed*	kg	1.49E+00	0.00E+00	1.90E-03	1.49E+00	2.58E+00	2.06E+00
High-level radioactive waste*	m3	3.46E-08	0.00E+00	7.60E-11	3.46E-08	3.62E-08	4.27E-08
Intermediate and low-level radioactive waste*	m3	4.86E-07	0.00E+00	5.34E-09	4.91E-07	5.80E-07	6.55E-07
Components for reuse*	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling*	kg	8.30E-02	0.00E+00	9.40E-04	8.40E-02	1.36E-01	7.20E-01
Materials for energy recovery*	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy exported from the product system*	MJ	2.96E-01	0.00E+00	0.00E+00	2.96E-01	2.35E-01	2.70E-01
Carbon Emissions and Uptake*							
Calcination Carbon Emissions	kg CO_2 e	1.20E+02	0.00E+00	0.00E+00	1.20E+02	1.23E+02	6.26E+00

* Emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in these categories.
- Not all LCA datasets for upstream materials include these impact categories and thus results may be incomplete.

A1-A3 Impact results; product category: RCC mixtures with compressive strength 5000-6000 psi (1 m3 of concrete)

Impact Assessment	Unit	Weighted Average				Median	STDEV.S
		A1	A2	A3	Total A1-A3		
Global Warming Potential (GWP)*	kg CO_2 e	2.86E+02	9.26E+01	4.64E+00	3.84E+02	3.51E+02	5.47E+01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 e	5.14E-06	3.03E-09	1.48E-07	5.29E-06	7.33E-06	2.14E-06
Eutrophication potential (EP)	kg N e	4.80E-01	8.00E-02	6.40E-03	5.70E-01	3.90E-01	2.10E-01
Acidification potential of soil and water sources (AP)	kg SO2 e	4.40E-01	1.65E+00	5.00E-02	2.14E+00	1.18E+00	9.20E-01
Formation potential of tropospheric ozone (POCP)	kg O_3 e	7.75E+00	5.56E+01	1.33E+00	6.47E+01	2.72E+01	2.84E+01
Resource Use							
Abiotic depletion potential for non-fossil mineral resources (ADPelements)*	kg Sb eq	2.11E-05	0.00E+00	6.70E-07	2.18E-05	1.11E-04	5.10E-05
Abiotic depletion potential for fossil resources (ADPfossil)	MJ, NCV	1.18E+03	1.34E+03	4.99E+01	2.57E+03	2.23E+03	6.06E+02
Renewable primary energy resources as energy (fuel), (RPRE)*	MJ, NCV	6.25E+01	0.00E+00	2.30E-01	6.27E+01	7.48E+01	1.38E+01
Renewable primary resources as material, (RPRM)*	MJ, NCV	3.20E-01	0.00E+00	0.00E+00	3.20E-01	6.70E-01	4.20E-01
Non-renewable primary resources as energy (fuel), (NRPRE)*	MJ, NCV	1.19E+03	1.34E+03	5.08E+01	2.58E+03	2.23E+03	6.23E+02
Non-renewable primary resources as material (NRPRM)*	MJ, NCV	1.06E+01	0.00E+00	0.00E+00	1.06E+01	4.17E+01	2.71E+01
Consumption of fresh water	m3	3.63E+00	0.00E+00	3.20E-02	3.66E+00	3.84E+00	1.90E-01
Secondary Material, Fuel and Recovered Energy							
Secondary Materials, (SM)*	kg	1.29E+01	0.00E+00	0.00E+00	1.29E+01	3.11E+01	1.63E+01
Renewable secondary fuels, (RSF)*	MJ, NCV	6.36E+00	0.00E+00	0.00E+00	6.36E+00	1.73E+01	8.80E+00
Non-renewable secondary fuels (NRSF)*	MJ, NCV	8.01E+01	0.00E+00	0.00E+00	8.01E+01	1.67E+02	7.60E+01
Recovered energy, (RE)*	MJ, NCV	0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Waste & Output Flows							
Hazardous waste disposed*	kg	1.88E-03	0.00E+00	0.00E+00	1.88E-03	4.47E-03	1.61E-03
Non-hazardous waste disposed*	kg	2.37E+00	0.00E+00	1.10E-03	2.37E+00	5.08E+00	2.77E+00
High-level radioactive waste*	m3	2.31E-08	0.00E+00	3.33E-09	2.64E-08	2.20E-08	7.30E-09
Intermediate and low-level radioactive waste*	m3	3.62E-07	0.00E+00	4.89E-08	4.11E-07	1.09E-07	1.44E-07
Components for reuse*	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling*	kg	6.20E-02	0.00E+00	4.20E-04	6.20E-02	1.70E-01	7.00E-02
Materials for energy recovery*	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy exported from the product system*	MJ	3.50E-01	0.00E+00	0.00E+00	3.50E-01	6.20E-01	2.90E-01
Carbon Emissions and Uptake*							
Calcination Carbon Emissions	kg CO_2 e	1.53E+02	0.00E+00	0.00E+00	1.53E+02	1.53E+02	9.50E+00

* Emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in these categories.
- Not all LCA datasets for upstream materials include these impact categories and thus results may be incomplete.

Interpretation

The life cycle assessment (LCA) results represent cradle-to-gate environmental impacts (A1–A3) for 1 m^3 of roller-compacted concrete (RCC). Across the evaluated strength categories, the raw material supply stage (A1) dominates most environmental indicators. This is primarily driven by cement production, which contributes the largest share of impacts, particularly for global warming potential, fossil energy use, and resource depletion indicators. Cement manufacturing includes both energy consumption and process emissions from limestone calcination, which are reflected in the calcination carbon emission results reported.

Impacts generally increase with compressive strength, as higher-strength RCC mixtures typically require greater cement content. As a result, the 5,001–6,000 psi mixtures exhibit higher environmental impacts than the 4,000–5,000 psi mixtures, including global warming potential and fossil energy demand. Transportation impacts (A2) contribute to several indicators, particularly photochemical ozone formation and fossil energy use, but remain secondary compared with raw material production.

Variability among plants within the same strength category is reflected in the reported median and standard deviation values, which capture differences in mix design, raw material sourcing, and transportation distances. Overall, the results confirm that cement content is the primary driver of environmental impacts in RCC mixtures.

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