

KANGLEY ROCK & RECYCLING




Environmental Product Declaration


This Environmental Product Declaration (EPD) is for seven recycled concrete aggregate products manufactured by Kangley Rock and Recycling at their Black River facility in Renton, WA.

General information

Environmental Product Declaration


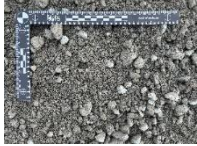



This Environmental Product Declaration (EPD) reports the impacts for 1 US ton (dry weight) aggregates, for use in business-to-business (B2B) in accordance with ISO 14025, ISO 21930, and ASTM International's EPD program operator rules.

Product Name	Construction Aggregates
Manufacturer Name and Address	Black River Quarry 510 Monster Rd SW Renton, WA 98057
Program Operator	ASTM International http://www.astm.org/EPDs.htm 
General Program instructions and Version Number	ASTM Program Operator for Product Category Rules (PCRs) and Environmental Product Declarations (EPDs), General Program Instructions. Version 8.0, revised April 29, 2020.
Declaration Number	EPD 1035
Reference PCR and Version Number	ISO 21930:2017 Sustainability in Building Construction – Environmental Declarations of Building Products serves as the core PCR. Product Category Rule for Environmental Product Declarations: Construction Aggregates – NSF/ASTM 1126-23 V2.0
EPD Type and Scope (facility/product/average)	Type III EPD Cradle-to-gate (modules A1 to A3) Facility specific
Defined functional or declared unit	1 US Ton of aggregate
Product's intended Application and Use	This EPD is intended for business-to-business (B-to-B) audiences.
Product RSL (Reference Service Life) *	Not Applicable (B modules not included in scope)
Markets of Applicability	United States and Canada
Date of Issue	June 14 th , 2025
Period of Validity	Five years – until June 13 th , 2030
Year of reported manufacturer primary data	January 1st, 2023 to December 31st, 2023
LCA Software and Version Number	Simapro 9.1
LCI Database and Version Number	USLCI, SmartData, Construction Aggregates – NSF/ASTM 1126-23 Annex A V2.0
LCIA Methodology and Version Number	TRACI 2.1 v1.04

Overall Data Quality Assessment Score	3
The sub-category PCR review was conducted by:	Industrial Ecology Consultants, Thomas P. Gloria, Ph.D t.gloria@industrial-ecology.com
This declaration was independently verified in accordance with ISO 14025: 2006. ISO 21930:2017 serves as the core PCR. Sub-category PCR: NSF/ASTM 1126: Construction Aggregates Product Category Rule	<input type="checkbox"/> Internal <input checked="" type="checkbox"/> External
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Nawal Shoaib nawal@climateearth.com Climate Earth, Inc. 137 Park Place, Suite 204, Point Richmond, CA, 94801 (415) 391-2725 ▪ http://www.climateearth.com 
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas P. Gloria, PhD t.gloria@industrial-ecology.com Industrial Ecology Consultants 35 Bracebridge Rd. Newton, MA 02459-1728 (617) 553-4929 http://www.industrial-ecology.com
Explanatory material may be obtained from the following:	Greg McKinnon General Manager 206.255.2647 GMckinnon@stonewayconcrete.com
*Only applicable where the LCA/EPD includes Module B.	

Products covered in this product specific EPD are detailed in Table 1. All products contain 100% construction aggregate. No hazardous materials were used in the manufacture of these products.

Table 1: Products manufactured at the Black River Quarry

Product Name	Product Description	ASTM Standard	Images
5/8 Crushed (CSTC) Recycle	Recycled Graded Aggregate material for bases or subbases for highway or airports.	ASTM D2940	
1 1/4 CSBC Recycle	Recycled Graded Aggregate material for bases or subbases for highway or airports.	ASTM D2940	
ASTM 467 (1 1/2" Recycled)	Recycled Concrete, Graded Aggregate used for concrete production and other applications	ASTM C33	
2" X 4" Recycle	Recycled Concrete, Typically used as quarry spalls and other applications	ASTM C33	
RCA Type 17	City of Seattle Selected Backfill	ASTM D2940	

LCA Study

System boundary

This study captures the following mandatory cradle-to-gate (A1-A3) life cycle product stages (as illustrated in Figure 1):

A1 - Extraction and processing of raw materials including fuels used in extraction and transport within the process.

A2 – Specific transportation of raw materials from extraction site or source to manufacturing site (including any recovered materials from source to be recycled in the process) and including empty backhauls and transportation to interim distribution centers or terminals.

A3 – Manufacturing of the product, including all energy and materials required and all emissions and wastes produced.

Product Stage			Construction Process Stage		Use Stage							End of Life Stage			
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Figure 1. Life-Cycle Stages and Modules (Note: MND = module not declared; x = module included)

Except as noted above, all other life cycle stages as described in Figure 1 are excluded from the LCA study. The following processes are also excluded from the study:

1. Production, manufacture, and construction of manufacturing capital goods and infrastructure;
2. Production and manufacture of production equipment, delivery vehicles, and laboratory equipment;
3. Personnel-related activities (travel, furniture, office supplies);
4. Fuel used to transport personnel around the mine and sand & gravel facility.
5. Energy and water use related to company management and sales activities.

The main processes included in the system boundary are illustrated in Figure 2.

System Boundary

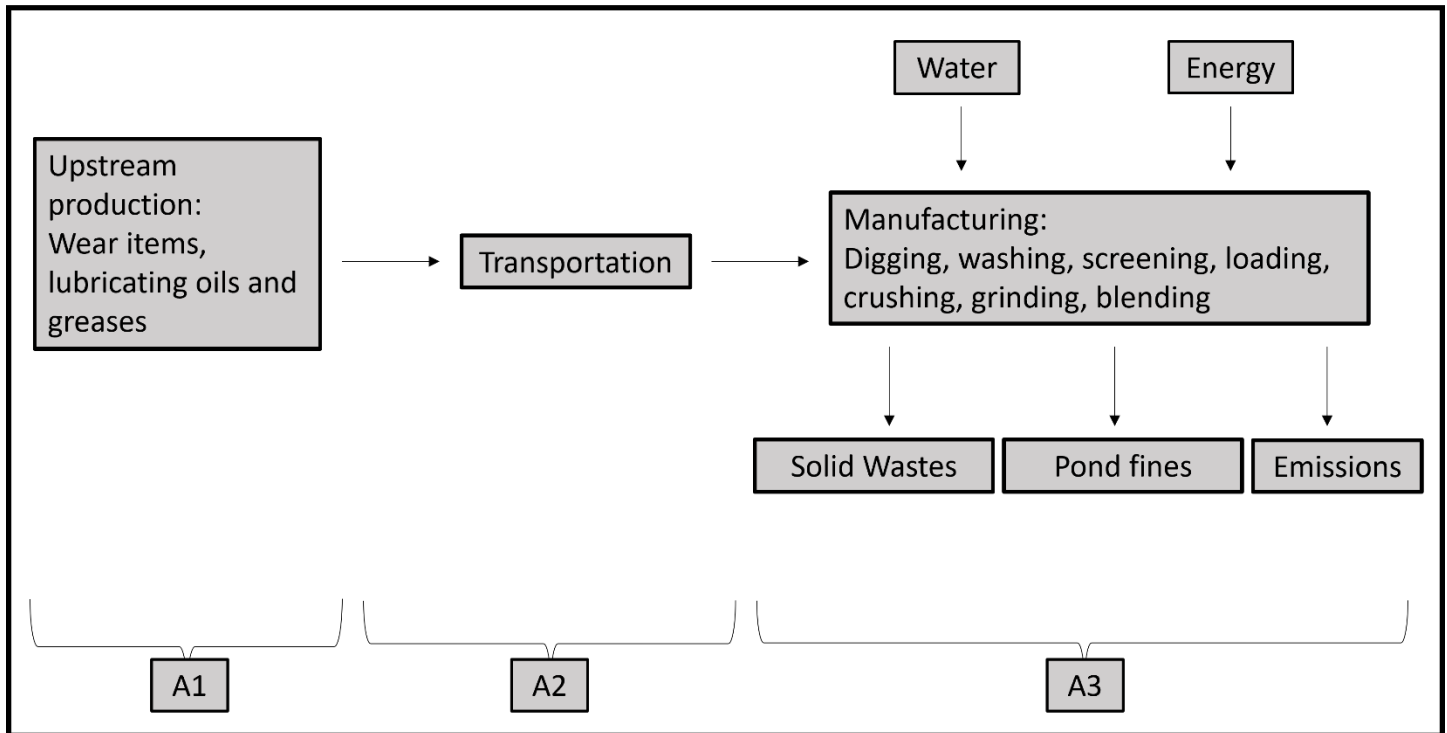


Figure 2. Main Processes Included in System Boundary

Explanatory materials may be requested by contacting:

Greg McKinnon

General Manager

206.255.2647

GMckinnon@stonewayconcrete.com

Secondary data sources

A list of each secondary with its LCI data sources is provided below.

Diesel: USLCI process (2020): “Diesel, combusted in industrial equipment - Northern America”

Electricity: U.S. DOE NETL (2020)

Gasoline: USLCI process (2020): “Gasoline__combusted_in_equipment____RNA”

Lubricating oil: US-EI process (2021): “Lubricating oil, at plant/US”

Truck Transport: USLCI process (2020): “Transport, combination truck, short-haul, diesel powered, NorthWest/tkm/RNA”

Steel wear parts: US-EI process (2021): “Steel, low-alloyed, at plant/US- US-EI U” and EcoInvent 3.8 (2021): “Steel, low-alloyed {RoW}| steel production, electric, low-alloyed | Cut-off, U”

Waste: EcoInvent 3.8 (2021): “Municipal solid waste {RoW}| treatment of, sanitary landfill | Cut-off, U”

Data gaps, assumptions, and limitations

Electrical data collected for this plant included the entire plant. Some of the electricity reported may not be used directly in the production of the above mentioned products at Black River Quarry.

Environmental Impacts

Cradle to Gate (A1-A3) product specific impact results per 1 US ton (short ton, TN.SH) for construction aggregates produced at Black River Quarry (see Table 1) are outlined in Table 2. Refer to Table 4 through Table 13 for detailed A1 to A3 results.

Table 2: Cradle-to-Gate Impact Results for Black River Quarry Covered in Study per 1 US ton

Impact category	Unit	5/8 Crushed (CSTC) Recycle	1 1/4 CSBC Recycle	ASTM 467 (1 1/2" Recycled)	2" X 4" Recycle	RCA Type 17
Global warming	kg CO2 eq	0.96	5.08	0.35	0.97	2.07
Ozone depletion	kg CFC-11 eq	9.85E-09	5.26E-08	3.63E-09	1.01E-08	2.16E-08
Eutrophication	kg N eq	7.29E-04	3.85E-03	2.56E-04	7.05E-04	1.49E-03
Acidification	kg SO2 eq	0.01	0.06	3.93E-03	0.01	0.02
Smog	kg O3 eq	0.38	2.00	0.13	0.37	0.77
Abiotic depletion non-fossil mineral	kg Sb eq	1.28E-07	6.82E-07	4.53E-08	1.26E-07	2.63E-07
Abiotic depletion (fossil fuels)	MJ	12.3	64.9	4.3	12.1	25.4
Renewable primary energy resources as energy	MJ	0.01	0.05	3.26E-03	0.01	1.89E-02
Renewable primary resources as material	MJ	x	x	x	x	x
Non-renewable primary resources as energy	MJ	12.5	65.5	4.4	12.2	25.6
Non-renewable primary resources as material	MJ	x	x	x	x	x
Consumption of fresh water	m3	2.68E-04	0.0	9.48E-05	0.0	5.49E-04
Secondary materials	kg	x	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x	x
Recovered energy	MJ	x	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x	x
Non-hazardous waste disposed	kg	6.38E-04	3.47E-03	2.74E-04	2.89E-06	1.37E-03
High-level radioactive waste	m3	1.06E-11	5.07E-11	3.76E-12	1.04E-11	2.18E-11
Intermediate and low-level radioactive waste	m3	7.01E-11	3.56E-10	2.50E-11	6.91E-11	1.45E-10
Components for reuse	kg	x	x	x	x	x
Materials for recycling	kg	2.45E-01	1.32	0.09	0.00	0.51
Materials for energy recovery	kg	1.14E-03	6.19E-03	4.10E-04	5.16E-06	2.35E-03
Recovered energy exported from product system	MJ	x	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Cradle to Gate (A1-A3) product specific impact results per 1 metric tonne for construction aggregates produced at Black River Quarry (see Table 1) are outlined in Table 3. Refer to Table 4 through Table 13 for detailed A1 to A3 results.

Table 3: Cradle-to-Gate Impact Results for Black River Quarry Covered in Study per 1 metric tonne

Impact category	Unit	5/8 Crushed (CSTC) Recycle	1 1/4 CSBC Recycle	ASTM 467 (1 1/2" Recycled)	2" X 4" Recycle	RCA Type 17
Global warming	kg CO2 eq	1.05	5.60	0.38	1.06	2.28
Ozone depletion	kg CFC-11 eq	1.09E-08	5.79E-08	4.00E-09	9.88E-09	2.39E-08
Eutrophication	kg N eq	8.04E-04	4.25E-03	2.82E-04	7.42E-04	1.64E-03
Acidification	kg SO2 eq	0.01	0.07	4.36E-03	0.01	0.03
Smog	kg O3 eq	0.42	2.20	0.15	0.41	0.85
Abiotic depletion non-fossil mineral	kg Sb eq	1.41E-07	7.51E-07	4.99E-08	3.00E-09	2.89E-07
Abiotic depletion (fossil fuels)	MJ	13.6	71.5	4.8	13.1	27.9
Renewable primary energy resources as energy	MJ	0.01	0.06	3.59E-03	1.44E-03	0.02
Renewable primary resources as material	MJ	x	x	x	x	x
Non-renewable primary resources as energy	MJ	13.7	72.2	4.8	13.2	28.2
Non-renewable primary resources as material	MJ	x	x	x	x	x
Consumption of fresh water	m3	2.96E-04	0.0	1.04E-04	5.33E-05	6.06E-04
Secondary materials	kg	x	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x	x
Recovered energy	MJ	x	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x	x
Non-hazardous waste disposed	kg	7.04E-04	3.82E-03	3.02E-04	3.19E-06	1.51E-03
High-level radioactive waste	m3	1.17E-11	5.59E-11	4.15E-12	2.54E-12	2.41E-11
Intermediate and low-level radioactive waste	m3	7.72E-11	3.93E-10	2.76E-11	1.32E-11	1.60E-10
Components for reuse	kg	x	x	x	x	x
Materials for recycling	kg	2.70E-01	1.46	0.10	1.22E-03	0.56
Materials for energy recovery	kg	1.26E-03	6.82E-03	4.52E-04	5.69E-06	2.59E-03
Recovered energy exported from product system	MJ	x	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Cradle to Gate (A1-A3) product specific impact results per 1 US ton (short ton, TN.SH) for 5/8 Crushed (CSTC) Recycle produced at Black River Quarry are outlined in Table 4..

Table 4: Cradle-to-Gate Impact Results for 5/8 Crushed (CSTC) Recycle per 1 US ton

Impact category	Unit	A1	A2	A3	A1 to A3
Global warming	kg CO2 eq	0.01	1.01E-04	0.94	0.96
Ozone depletion	kg CFC-11 eq	3.29E-09	1.67E-13	6.56E-09	9.85E-09
Eutrophication	kg N eq	3.96E-05	5.13E-08	6.90E-04	7.29E-04
Acidification	kg SO2 eq	5.78E-05	5.55E-07	0.01	0.01
Smog	kg O3 eq	6.10E-04	1.60E-05	0.38	0.38
Abiotic depletion non-fossil mineral	kg Sb eq	1.28E-07	5.83347E-14	1.28E-12	1.28E-07
Abiotic depletion (fossil fuels)	MJ	0.35	1.26E-03	12.0	12.3
Renewable primary energy resources as energy	MJ	0.01	2.7152E-06	6.81E-05	0.01
Renewable primary resources as material	MJ	x	x	x	x
Non-renewable primary resources as energy	MJ	0.37	1.27E-03	12.1	12.5
Non-renewable primary resources as material	MJ	x	x	x	x
Consumption of fresh water	m3	2.62E-04	1.10341E-07	5.67E-06	2.68E-04
Secondary materials	kg	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x
Recovered energy	MJ	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x
Non-hazardous waste disposed	kg	x	x	6.38E-04	6.38E-04
High-level radioactive waste	m3	1.06E-11	9.88E-15	1.10E-14	1.06E-11
Intermediate and low-level radioactive waste	m3	6.98E-11	4.76E-14	1.75E-13	7.01E-11
Components for reuse	kg	x	x	x	x
Materials for recycling	kg	x	x	2.45E-01	2.45E-01
Materials for energy recovery	kg	x	x	1.14E-03	1.14E-03
Recovered energy exported from product system	MJ	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Cradle to Gate (A1-A3) product specific impact results per per 1 metric tonne for 5/8 Crushed (CSTC) Recycle produced at Black River Quarry are outlined in Table 5

Table 5: Cradle-to-Gate Impact Results for 5/8 Crushed (CSTC) Recycle per 1 metric tonne

Impact category	Unit	A1	A2	A3	A1 to A3
Global warming	kg CO2 eq	0.01	1.11E-04	1.04	1.05
Ozone depletion	kg CFC-11 eq	3.63E-09	1.85E-13	7.23E-09	1.09E-08
Eutrophication	kg N eq	4.37E-05	5.65E-08	7.60E-04	8.04E-04
Acidification	kg SO2 eq	6.37E-05	6.11E-07	0.01	0.01
Smog	kg O3 eq	6.72E-04	1.76E-05	0.42	0.42
Abiotic depletion non-fossil mineral	kg Sb eq	1.41E-07	6.43E-14	1.41E-12	1.41E-07
Abiotic depletion (fossil fuels)	MJ	0.39	1.38E-03	13.2	13.6
Renewable primary energy resources as energy	MJ	0.01	2.99E-06	7.51E-05	0.01
Renewable primary resources as material	MJ	x	x	x	x
Non-renewable primary resources as energy	MJ	0.41	1.40E-03	13.3	13.7
Non-renewable primary resources as material	MJ	x	x	x	x
Consumption of fresh water	m3	2.89E-04	1.21E-07	6.25E-06	2.96E-04
Secondary materials	kg	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x
Recovered energy	MJ	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x
Non-hazardous waste disposed	kg	x	x	7.04E-04	7.04E-04
High-level radioactive waste	m3	1.17E-11	1.08E-14	1.22E-14	1.17E-11
Intermediate and low-level radioactive waste	m3	7.70E-11	5.24E-14	1.93E-13	7.72E-11
Components for reuse	kg	x	x	x	x
Materials for recycling	kg	x	x	2.70E-01	2.70E-01
Materials for energy recovery	kg	x	x	1.26E-03	1.26E-03
Recovered energy exported from product system	MJ	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Cradle to Gate (A1-A3) product specific impact results per 1 US ton (short ton, TN.SH) for 1 1/4 CSBC Recycle produced at Black River Quarry are outlined in Table 6..

Table 6: Cradle-to-Gate Impact Results for 1 1/4 CSBC Recycle per 1 US ton

Impact category	Unit	A1	A2	A3	A1 to A3
Global warming	kg CO2 eq	0.07	6.54E-04	5.01	5.08
Ozone depletion	kg CFC-11 eq	1.73E-08	2.69E-14	3.53E-08	5.26E-08
Eutrophication	kg N eq	2.34E-04	4.67E-07	3.62E-03	3.85E-03
Acidification	kg SO2 eq	3.08E-04	7.91E-06	0.06	0.06
Smog	kg O3 eq	3.27E-03	2.01E-04	2.00	2.00
Abiotic depletion non-fossil mineral	kg Sb eq	6.82E-07	x	6.89E-12	6.82E-07
Abiotic depletion (fossil fuels)	MJ	1.84	9.22E-03	63.0	64.9
Renewable primary energy resources as energy	MJ	0.05	x	4.13E-04	0.05
Renewable primary resources as material	MJ	x	x	x	x
Non-renewable primary resources as energy	MJ	1.93	9.22E-03	63.6	65.5
Non-renewable primary resources as material	MJ	x	x	x	x
Consumption of fresh water	m3	1.37E-03	x	0.0	0.0
Secondary materials	kg	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x
Recovered energy	MJ	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x
Non-hazardous waste disposed	kg	x	x	3.47E-03	3.47E-03
High-level radioactive waste	m3	5.06E-11	x	5.14E-14	5.07E-11
Intermediate and low-level radioactive waste	m3	3.56E-10	x	9.10E-13	3.56E-10
Components for reuse	kg	x	x	x	x
Materials for recycling	kg	x	x	1.32	1.32
Materials for energy recovery	kg	x	x	6.19E-03	6.19E-03
Recovered energy exported from product system	MJ	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Cradle to Gate (A1-A3) product specific impact results per per 1 metric tonne for 1 1/4 CSBC Recycle produced at Black River Quarry are outlined in Table 7..

Table 7: Cradle-to-Gate Impact Results for 1 1/4 CSBC Recycle per 1 metric tonne

Impact category	Unit	A1	A2	A3	A1 to A3
Global warming	kg CO2 eq	0.07	7.21E-04	5.53	5.60
Ozone depletion	kg CFC-11 eq	1.90E-08	2.97E-14	3.89E-08	5.79E-08
Eutrophication	kg N eq	2.57E-04	5.15E-07	3.99E-03	4.25E-03
Acidification	kg SO2 eq	3.40E-04	8.72E-06	0.06	0.07
Smog	kg O3 eq	3.60E-03	2.21E-04	2.20	2.20
Abiotic depletion non-fossil mineral	kg Sb eq	7.51E-07	x	7.59E-12	7.51E-07
Abiotic depletion (fossil fuels)	MJ	2.03	1.02E-02	69.5	71.5
Renewable primary energy resources as energy	MJ	0.06	x	4.55E-04	0.06
Renewable primary resources as material	MJ	x	x	x	x
Non-renewable primary resources as energy	MJ	2.13	1.02E-02	70.1	72.2
Non-renewable primary resources as material	MJ	x	x	x	x
Consumption of fresh water	m3	1.51E-03	x	0.0	0.0
Secondary materials	kg	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x
Recovered energy	MJ	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x
Non-hazardous waste disposed	kg	x	x	3.82E-03	3.82E-03
High-level radioactive waste	m3	5.58E-11	x	5.67E-14	5.59E-11
Intermediate and low-level radioactive waste	m3	3.92E-10	x	1.00E-12	3.93E-10
Components for reuse	kg	x	x	x	x
Materials for recycling	kg	x	x	1.46	1.46
Materials for energy recovery	kg	x	x	6.82E-03	6.82E-03
Recovered energy exported from product system	MJ	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Cradle to Gate (A1-A3) product specific impact results per 1 US ton (short ton, TN.SH) for ASTM 467 (1 1/2" Recycled) produced at Black River Quarry are outlined in Table 8

Table 8: Cradle-to-Gate Impact Results for ASTM 467 (1 1/2" Recycled) per 1 US ton

Impact category	Unit	A1	A2	A3	A1 to A3
Global warming	kg CO2 eq	4.52E-03	3.51E-05	0.34	0.35
Ozone depletion	kg CFC-11 eq	1.15E-09	5.82E-14	2.48E-09	3.63E-09
Eutrophication	kg N eq	1.42E-05	1.78E-08	2.42E-04	2.56E-04
Acidification	kg SO2 eq	2.05E-05	1.93E-07	3.93E-03	3.93E-03
Smog	kg O3 eq	2.17E-04	5.57E-06	0.13	0.13
Abiotic depletion non-fossil mineral	kg Sb eq	4.53E-08	2.03E-14	5.46E-13	4.53E-08
Abiotic depletion (fossil fuels)	MJ	0.12	4.37E-04	4.2	4.3
Renewable primary energy resources as energy	MJ	3.22E-03	9.45E-07	3.71E-05	3.26E-03
Renewable primary resources as material	MJ	x	x	x	x
Non-renewable primary resources as energy	MJ	0.13	4.43E-04	4.3	4.4
Non-renewable primary resources as material	MJ	x	x	x	x
Consumption of fresh water	m3	9.27E-05	3.84E-08	1.98E-06	9.48E-05
Secondary materials	kg	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x
Recovered energy	MJ	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x
Non-hazardous waste disposed	kg	x	x	2.74E-04	2.74E-04
High-level radioactive waste	m3	3.76E-12	3.44E-15	4.50E-15	3.76E-12
Intermediate and low-level radioactive waste	m3	2.49E-11	1.66E-14	7.40E-14	2.50E-11
Components for reuse	kg	x	x	x	x
Materials for recycling	kg	x	x	0.09	0.09
Materials for energy recovery	kg	x	x	4.10E-04	4.10E-04
Recovered energy exported from product system	MJ	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Cradle to Gate (A1-A3) product specific impact results per per 1 metric tonne for ASTM 467 (1 1/2" Recycled) produced at Black River Quarry are outlined in Table 9.

Table 9: Cradle-to-Gate Impact Results for ASTM 467 (1 1/2" Recycled) per 1 metric tonne

Impact category	Unit	A1	A2	A3	A1 to A3
Global warming	kg CO2 eq	4.98E-03	3.87E-05	0.38	0.38
Ozone depletion	kg CFC-11 eq	1.27E-09	6.42E-14	2.73E-09	4.00E-09
Eutrophication	kg N eq	1.56E-05	1.97E-08	2.67E-04	2.82E-04
Acidification	kg SO2 eq	2.26E-05	2.13E-07	4.36E-03	4.36E-03
Smog	kg O3 eq	2.39E-04	6.13E-06	0.15	0.15
Abiotic depletion non-fossil mineral	kg Sb eq	4.99E-08	2.24E-14	6.02E-13	4.99E-08
Abiotic depletion (fossil fuels)	MJ	0.14	4.82E-04	4.7	4.8
Renewable primary energy resources as energy	MJ	3.55E-03	1.04E-06	4.09E-05	3.59E-03
Renewable primary resources as material	MJ	x	x	x	x
Non-renewable primary resources as energy	MJ	0.14	4.89E-04	4.7	4.8
Non-renewable primary resources as material	MJ	x	x	x	x
Consumption of fresh water	m3	1.02E-04	4.23E-08	2.18E-06	1.04E-04
Secondary materials	kg	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x
Recovered energy	MJ	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x
Non-hazardous waste disposed	kg	x	x	3.02E-04	3.02E-04
High-level radioactive waste	m3	4.14E-12	3.79E-15	4.97E-15	4.15E-12
Intermediate and low-level radioactive waste	m3	2.75E-11	1.83E-14	8.15E-14	2.76E-11
Components for reuse	kg	x	x	x	x
Materials for recycling	kg	x	x	0.10	0.10
Materials for energy recovery	kg	x	x	4.52E-04	4.52E-04
Recovered energy exported from product system	MJ	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Cradle to Gate (A1-A3) product specific impact results per 1 US ton (short ton, TN.SH) for 2" X 4" Recycle produced at Black River Quarry are outlined in Table 10..

Table 10: Cradle-to-Gate Impact Results for 2" X 4" Recycle per 1 US ton

Impact category	Unit	A1	A2	A3	A1 to A3
Global warming	kg CO2 eq	0.01	9.73E-05	0.96	0.97
Ozone depletion	kg CFC-11 eq	3.19E-09	1.62E-13	6.90E-09	1.01E-08
Eutrophication	kg N eq	3.93E-05	4.95E-08	6.65E-04	7.05E-04
Acidification	kg SO2 eq	5.67E-05	5.35E-07	0.01	0.01
Smog	kg O3 eq	6.01E-04	1.54E-05	0.37	0.37
Abiotic depletion non-fossil mineral	kg Sb eq	1.26E-07	5.62856E-14	2.24E-14	1.26E-07
Abiotic depletion (fossil fuels)	MJ	0.34	1.21E-03	11.7	12.1
Renewable primary energy resources as energy	MJ	0.01	2.61983E-06	9.55E-05	0.01
Renewable primary resources as material	MJ	x	x	x	x
Non-renewable primary resources as energy	MJ	0.36	1.23E-03	11.8	12.2
Non-renewable primary resources as material	MJ	x	x	x	x
Consumption of fresh water	m3	2.57E-04	1.06E-07	5.44E-06	2.63E-04
Secondary materials	kg	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x
Recovered energy	MJ	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x
Non-hazardous waste disposed	kg	x	x	2.89E-06	2.89E-06
High-level radioactive waste	m3	1.04E-11	9.53E-15	2.71E-15	1.04E-11
Intermediate and low-level radioactive waste	m3	6.91E-11	4.59E-14	1.36E-14	6.91E-11
Components for reuse	kg	x	x	x	x
Materials for recycling	kg	x	x	1.11E-03	1.11E-03
Materials for energy recovery	kg	x	x	5.16E-06	5.16E-06
Recovered energy exported from product system	MJ	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Cradle to Gate (A1-A3) product specific impact results per per 1 metric tonne for 2" X 4" Recycle produced at Black River Quarry are outlined in Table 2..

Table 11: Cradle-to-Gate Impact Results for 2" X 4" Recycle per 1 metric tonne

Impact category	Unit	A1	A2	A3	A1 to A3
Global warming	kg CO2 eq	0.01	1.07E-04	1.05	1.07
Ozone depletion	kg CFC-11 eq	3.51E-09	1.78E-13	7.60E-09	1.11E-08
Eutrophication	kg N eq	4.33E-05	5.46E-08	7.34E-04	7.77E-04
Acidification	kg SO2 eq	6.25E-05	5.90E-07	0.01	0.01
Smog	kg O3 eq	6.63E-04	1.70E-05	0.41	0.41
Abiotic depletion non-fossil mineral	kg Sb eq	1.38E-07	6.2E-14	2.47E-14	1.38E-07
Abiotic depletion (fossil fuels)	MJ	0.38	1.34E-03	12.9	13.3
Renewable primary energy resources as energy	MJ	0.01	2.89E-06	1.05E-04	0.01
Renewable primary resources as material	MJ	x	x	x	x
Non-renewable primary resources as energy	MJ	0.40	1.36E-03	13.0	13.4
Non-renewable primary resources as material	MJ	x	x	x	x
Consumption of fresh water	m3	2.84E-04	1.17E-07	6.00E-06	2.90E-04
Secondary materials	kg	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x
Recovered energy	MJ	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x
Non-hazardous waste disposed	kg	x	x	3.19E-06	3.19E-06
High-level radioactive waste	m3	1.15E-11	1.05E-14	2.98E-15	1.15E-11
Intermediate and low-level radioactive waste	m3	7.61E-11	5.06E-14	1.50E-14	7.62E-11
Components for reuse	kg	x	x	x	x
Materials for recycling	kg	x	x	1.22E-03	1.22E-03
Materials for energy recovery	kg	x	x	5.69E-06	5.69E-06
Recovered energy exported from product system	MJ	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis

Cradle to Gate (A1-A3) product specific impact results per 1 US ton (short ton, TN.SH) for RCA Type 17 produced at Black River Quarry are outlined in Table 12..

Table 12: Cradle-to-Gate Impact Results for RCA Type 17 per 1 US ton

Impact category	Unit	A1	A2	A3	A1 to A3
Global warming	kg CO2 eq	0.03	2.03E-04	2.04	2.07
Ozone depletion	kg CFC-11 eq	6.66E-09	3.38E-13	1.50E-08	2.16E-08
Eutrophication	kg N eq	8.21E-05	1.03E-07	1.40E-03	1.49E-03
Acidification	kg SO2 eq	1.19E-04	1.12E-06	0.02	0.02
Smog	kg O3 eq	1.26E-03	3.23E-05	0.77	0.77
Abiotic depletion non-fossil mineral	kg Sb eq	2.63E-07	1.18E-13	2.74E-12	2.63E-07
Abiotic depletion (fossil fuels)	MJ	0.71	2.53E-03	24.6	25.4
Renewable primary energy resources as energy	MJ	1.87E-02	5.48E-06	2.54E-04	1.89E-02
Renewable primary resources as material	MJ	x	x	x	x
Non-renewable primary resources as energy	MJ	0.75	2.57E-03	24.9	25.6
Non-renewable primary resources as material	MJ	x	x	x	x
Consumption of fresh water	m3	5.38E-04	2.23E-07	1.14E-05	5.49E-04
Secondary materials	kg	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x
Recovered energy	MJ	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x
Non-hazardous waste disposed	kg	x	x	1.37E-03	1.37E-03
High-level radioactive waste	m3	2.18E-11	1.99E-14	2.33E-14	2.18E-11
Intermediate and low-level radioactive waste	m3	1.44E-10	9.60E-14	3.74E-13	1.45E-10
Components for reuse	kg	x	x	x	x
Materials for recycling	kg	x	x	0.51	0.51
Materials for energy recovery	kg	x	x	2.35E-03	2.35E-03
Recovered energy exported from product system	MJ	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Cradle to Gate (A1-A3) product specific impact results per per 1 metric tonne RCA Type 17 produced at Black River Quarry are outlined in Table 13..

Table 13: Cradle-to-Gate Impact Results for RCA Type 17 per 1 metric tonne

Impact category	Unit	A1	A2	A3	A1 to A3
Global warming	kg CO2 eq	0.03	2.24E-04	2.25	2.28
Ozone depletion	kg CFC-11 eq	7.35E-09	3.72E-13	1.65E-08	2.39E-08
Eutrophication	kg N eq	9.05E-05	1.14E-07	1.55E-03	1.64E-03
Acidification	kg SO2 eq	1.31E-04	1.23E-06	0.03	0.03
Smog	kg O3 eq	1.38E-03	3.56E-05	0.85	0.85
Abiotic depletion non-fossil mineral	kg Sb eq	2.89E-07	1.30E-13	3.02E-12	2.89E-07
Abiotic depletion (fossil fuels)	MJ	0.79	2.79E-03	27.2	27.9
Renewable primary energy resources as energy	MJ	0.02	6.04E-06	2.80E-04	0.02
Renewable primary resources as material	MJ	x	x	x	x
Non-renewable primary resources as energy	MJ	0.83	2.83E-03	27.4	28.2
Non-renewable primary resources as material	MJ	x	x	x	x
Consumption of fresh water	m3	5.93E-04	2.45E-07	1.26E-05	6.06E-04
Secondary materials	kg	x	x	x	x
Renewable secondary fuels	MJ	x	x	x	x
Non-renewable secondary fuels	MJ	x	x	x	x
Recovered energy	MJ	x	x	x	x
Hazardous waste disposed	kg	x	x	x	x
Non-hazardous waste disposed	kg	x	x	1.51E-03	1.51E-03
High-level radioactive waste	m3	2.40E-11	2.20E-14	2.57E-14	2.41E-11
Intermediate and low-level radioactive waste	m3	1.59E-10	1.06E-13	4.12E-13	1.60E-10
Components for reuse	kg	x	x	x	x
Materials for recycling	kg	x	x	0.56	0.56
Materials for energy recovery	kg	x	x	2.59E-03	2.59E-03
Recovered energy exported from product system	MJ	x	x	x	x
Calcination	kg CO2 eq	x	x	x	x
Biogenic CO2 emissions	kg CO2 eq	x	x	x	x

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis

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