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KANGLEY
ROCK & RECYCLING

Environmental Product Declaration

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

Kangley Rock & Recycling
9216 8th Ave S
Seattle, WA 98108

Kangley Rock & Recycling
Environmental Product Declaration
General Information

Environmental Product Declaration

This declaration has been prepared in accordance with ISO 14025, ISO 21930, and ASTM International's EPD program operator rules.

PCR review was conducted by:
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The PCR peer review report is available upon request: cert@astm.org

Independent verification of the declaration and data, according to ISO 14025: ☐ internal ☒ external

Third-party verifier:
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Product Category Rule:
ASTM Product Category Rules (PCR) for Construction Aggregates: Natural Aggregate, Crushed Concrete, and Iron/Steel Furnace Slag, issued January, 2017.

Declared Unit: 1 metric ton (dry weight).

Program Operator:
ASTM International
http://www.astm.org/EPDs.htm

EPD Owner:
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Date of Issue:
February 21, 2018 (valid for 5 years until February 21, 2023).

ASTM Declaration Number: EPD-079

Products

The seven recycled concrete aggregates covered in this EPD are produced at:

Black River
510 Monster Road
Renton, WA 98055

Material Composition

The material composition of the aggregates covered in this study is 100% recycled concrete.

General Information

Each aggregate is compliant with the standards and specifications listed in Table 1.

Table1: Aggregates Covered in this Study

Item Code	Name	Standards	Description	
65011	5/8 Crushed (CSTC)	D2940/D2940M-15	Graded Aggregate material for Bases or subbases for highway or airports.	
65010	1 1/4 CSBC	D2940/D2940M-15	Graded Aggregate material for bases or subbases for highway or airports.	
65043	ASTM 467 (1 1/2" Recycled)	ASTM C33/C33m-13	Lightweight coarse aggregate. Colors consist of gray, brown and tan.	
65015	2" X 4"	ASTM C33/C33m-13	Typically used as a concrete aggregate and may be used in other applications.	
65013	2" X 3/4 RC Ballast	ASTM C33/C33m-13	Heavy aggregate material. Colors consist of light gray and brown.	
6501MR	2" Minus Recycled Gravel Barrow	ASTM C33/C33m-13	A 2″ Minus aggregate used as a concrete aggregate and may be used in other applications.	
65017	4"x 8"	ASTM C33/C33m-13	Typically used as a concrete aggregate and may be used in other applications.	

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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 (including recycled 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.

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

Figure 1. Life-Cycle Stages and Modules

Except as noted above, all other life cycle stages as described in Figure 1 are excluded from the Life Cycle Assessment (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.

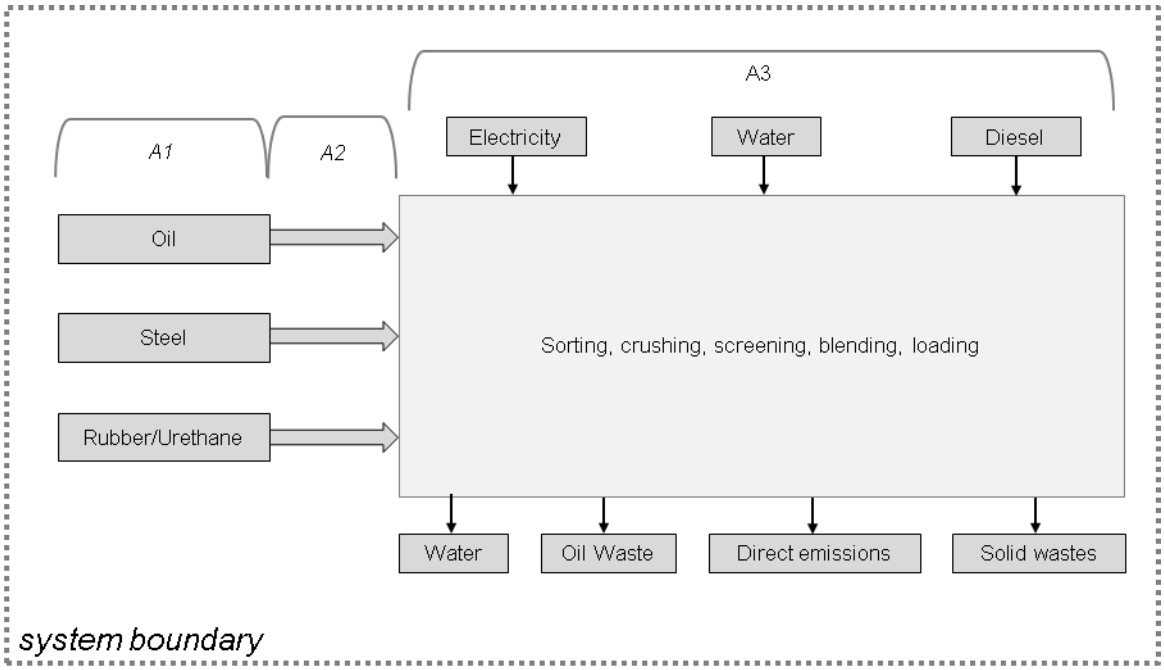

Figure 2. Main Processes Included in System Boundary

Electricity impacts are calculated based on the 2012 resource mix at the level of North American Electricity Reliability Council (NERC) Western Electricity Coordinating Council (WECC) region. The 2015 grid mix contains: 27.2% coal, 25.7% hydro, 28.4% natural gas, 8% nuclear, 5% solar, 2% geothermal.

Explanatory materials may be requested by contacting:

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Environmental Impacts

Cradle to Gate (A1-A3) impact results per 1 metric ton (dry weight) of product are outlined in Table 2 for each aggregate.

Table 2: Cradle-to-Gate Impact Results for Aggregates Covered in Study

Impact category	Unit[1]	1 1/4 CSBC	2" minus recycled gravel barrow	2" x 3/4 RC Ballast	2" x 4"	4" x 8"	5/8" Crushed (CSTC)	ASTM 467 (1 1/2" Recycled)
Global warming potential	kg CO_2 eq	4.59	6.87	4.49	6.46	3.12	3.61	6.32
Acidification potential	kg SO_2 eq	0.04	0.04	0.03	0.04	0.03	0.03	0.04
Eutrophication potential	kg N eq	0.02	0.04	0.02	0.04	0.01	0.01	0.03
Smog creation potential	kg O_3 eq	0.90	0.94	0.87	0.95	0.83	0.85	0.93
Ozone depletion potential	kg CFC-11 eq	6.04E-07	8.35E-07	5.86E-07	7.95E-07	4.42E-07	4.96E-07	7.78E-07
Nonrenewable fossil	MJ (HHV)	89.9	118	87.7	114	69.9	76.7	111
Nonrenewable nuclear	MJ (HHV)	6.96	13.1	6.99	12.0	3.44	4.67	11.7
Renewable (biomass)	MJ (HHV)	0.59	1.19	0.62	1.08	0.29	0.40	1.06
Renewable (solar, wind, hydroelectric, and geothermal)	MJ (HHV)	6.97	14.1	6.78	12.7	2.54	4.00	12.4
Nonrenewable material resources	kg	0.09	0.16	0.09	0.15	0.04	0.06	0.15
Renewable material resources	kg	0.04	0.07	0.04	0.06	0.02	0.02	0.06
Net fresh water	L	0.19	0.40	0.38	0.40	0.37	0.38	0.39
Non-hazardous waste generated	kg	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Hazardous waste generated	kg	1.75E-04	3.36E-04	1.73E-04	3.05E-04	7.82E-05	1.11E-04	2.98E-04

This EPD only covers the cradle-to-gate impacts of aggregates using a declared unit and the results cannot be used to compare between products. EPDs from different programs (using different PCR) may not be comparable.

[1] Equivalence (eq)
Higher Heating Value (HHV)

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Additional Environmental Information

Sustainability

Black River facility is dedicated to environmental stewardship and is committed to exploring and actively seeking new ways to reduce the environmental impact on the environment at large. Black River will think resourcefully, work cooperatively and continuo usly strive to enhance our environmental efforts in order to better protect the environmental and the health and safety of our employees and the community in which we work and live.

Air Permits, Dust Suppression

Black River has taken the correct steps for staying compliant with State and Local air permit requirements. Dust suppression on all aggregate activities insures no fugitive dust leaves the property and will keep the surrounding environment safe. Black River facility maintains air permits under the Puget Sound Clean Air Agency. Additional information on air permit requirements in the Northwest area can be found at: www.pscleanair.org

Universal Waste, Used Oil, Anti-Freeze, Used Batteries

At all of our locations including Black River all used oil is picked up on site by sanctioned oil recycling vendors. Once in the vendors care, they recycle the used oil appropriately.

All Universal Waste (e.g. fluorescent light bulbs, small batteries) are picked up and removed by our approved vendor for recycling. All batteries considered too large for universal waste are stored in a completely secure and monitored area. The large batteries are sent to approved battery recycling vendors.

Clean Concrete Guidance

Black River facility strictly adheres to the Clean Concrete Guidance and cannot accept any products that present a threat to human health or the environment greater than that inherent to the material. Black River does not accept painted concrete, concrete debris, such as wood waste, concrete containing asbestos, concrete used at fuel storage facilities, or concrete used at electrical warehouses that could be considered toxic or hazardous. To ensure the material being disposed of and to keep the recycling facilities clean, Kangley Rock & Recycled has all customers sign a Clean Concrete Acceptance Agreement, a legally binding contract, before any material is accepted onsite. This acceptance agreement reserves the right to reject any material that presents signs of contamination or is deemed unsuitable per our acceptance guidelines.

Water Management

Black River recycles the majority of the water onsite in order to reduce the environmental impact on the surrounding area. Best Management Practices (BMP) and monthly responsibilities such as catch basin filters, monthly water sampling, and monthly inspections are in place to insure the storm water and processed water are all being treated correctly.