Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Land-won aggregates

from

Žvyro karjerai, JSC

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-04282
Publication date:	2021-07-07
Valid until:	2026-07-06

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

Environmental Product Declaration

This is an Environmental Product Declaration for land-won aggregates, produced by Žvyro karjerai, JSC. The declaration is registered in accordance with the EPD programme of the International EPD® System and the Product Category Rules for Construction Products 2019:14, version 1.1. The EPD are used in both business-to-business (B2B) and business-to-consumer (B2C) communication.

Company information

Owner of the EPD:

Žvyro karjerai, JSC

Plačioji st. 31, Senieji Trakai, Trakai dist. m., Lithuania

E-mail: viktor@zvyras.lt; www.zvyras.lt

Phone: +37065639550

Description of the organisation: Žvyro karjerai, JSC was founded on the 24th of September in 1998. The main activity of the company is the exploitation of the quarries of sand and gravel. The company exploits one of the biggest Trakai sand-gravel deposits in Lithuania (Serapiniškiai) which is in Senieji Trakai, Trakai district and Margis sand-gravel deposit, which is in Kapčiškės village, Trakai district (see figure below).

In the quarries various fractions of sand, gravel, gravel middlings, and crushed gravel are produced. Also, the company provides crushed dolomite, imports granite stock, and makes crushed granite of various fractions in Trakai gravel pit.

For the convenience of customers, the company provides the transportation services of the products and from Trakai quarry we can transport the products by railway. There is a railroad siding in the Trakai gravel pit.

One of the main Žvyro karjerai, JSC aim is to manufacture and provide the products of high quality and satisfying the requirements of the customers.

Aggregate manufacturing is certified by LST EN 12620; LST EN 13043; LST EN 13242; LST EN 13450 standards, system 2+. Sand fraction 0/4, which is manufactured in the Trakai gravel pit, is given a title of „The best production of the year“. The company constantly invests in the modernization of mechanism and the process of manufacture. In this way the company improves the quality of manufactured products and the use of natural resources.

Žvyro karjerai, JSC takes a high position among Lithuanian aggregate building material manufacturers due to professional collective, products of high quality and responsible relation between customers and suppliers. Žvyro karjerai, JSC is the member of Lithuanian quarry association.

Name and location of production sites:

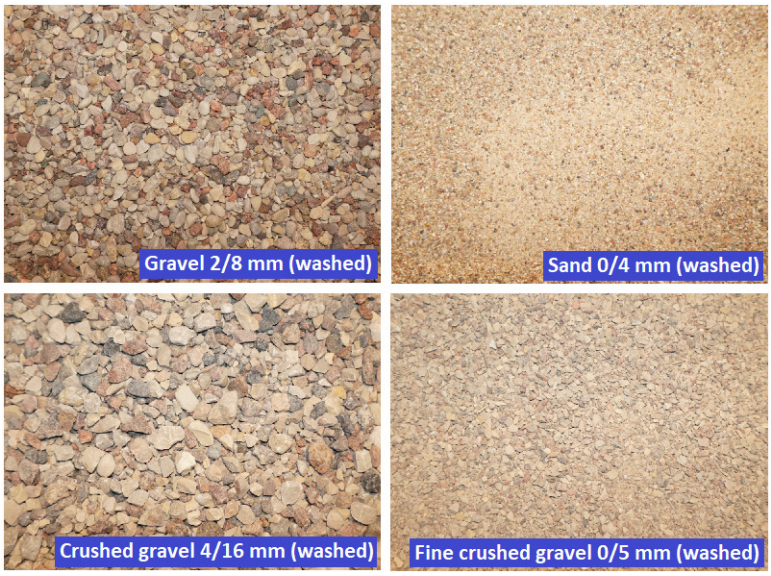
- Trakai I gravel pit. Alyvų st. 22, Pilialaukis, Trakai dist. m., Lithuania;
- Margis gravel pit. Kapčiškės, Trakai dist. m., Lithuania.

Geographical location of the declared sites

Product information

Product name: Land-won aggregates

Product description: The land-won coarse and fine aggregates (sand, gravel, and crushed gravel) are being produced on the declared sites. The land-won sand and gravel aggregates produced are mineral materials excavated from natural gravel quarries, washed, sorted, or crushed. The geotechnical characteristics of the produced aggregates determine their broad potential use in the roadway wearing course and other civil engineering structures. The produced aggregates covered in this study consist of 100% natural sand, gravel, and crushed gravel.



Photos of several aggregates declared in this EPD

Product-related or management system-related certifications: company produces land-won aggregates in various sizes and quality. Products range and their compilation to EN Standards are listed in below. The products are classified into product groups based on the quarry and plant they are being produced on, stages of screening and crushing they pass.

Products manufactured at the declared sites, classified into product groups

Site	Product group	Product names (English)	Product names (Lithuanian)	Standards		
				EN 12620[a]	EN 13043[b]	EN 13242[c]
Trakai I gravel pit	I T	Sand 0/2 mm (washed)	Smėlis fr. 0/2 mm (plautas)	×	×	×
		Gravel 2/8 mm (washed)	Žvirgždas fr. 2/8 mm (plautas)	×	-	-
	II T	Sand 0/5 mm	Smėlis fr. 0/5 mm	-	×	×
		Sand 0/4 mm	Smėlis fr. 0/4 mm	×	×	×
	III T	Sand 0/4 mm (washed)	Smėlis fr. 0/4 mm (plautas)	×	×	×
		Sand 0/5 mm (washed)	Smėlis fr. 0/5 mm (plautas)	-	×	×
		Gravel 4/16 (washed)	Žvirgždas fr. 4/16 mm (plautas)	×	-	-
		Gravel and stones 16-100 mm (washed)	Gargždas fr. 16-100 mm (plautas)	-	-	-
	IV T	Fine crushed gravel 0/2 mm (washed)	Žvirgždo skaldos mišinys 0/2 mm (plautas)	-	×	×
		Fine crushed gravel 0/5 (washed)	Žvirgždo skaldos mišinys fr. 0/5 mm (plautas)	-	×	×
		Crushed gravel 2/8 mm (washed)	Žvirgždo skalda fr. 2/8 mm (plauta)	×	×	×
		Crushed gravel 2/5 mm (washed)	Žvirgždo skalda fr. 2/5 mm (plauta)	×	×	×
		Crushed gravel 5/8 mm (washed)	Žvirgždo skalda fr. 5/8 mm (plauta)	×	×	×
		Crushed gravel 4/16 mm (washed)	Žvirgždo skalda fr. 4/16 mm (plauta)	×	×	×
		Crushed gravel 8/11 mm (washed)	Žvirgždo skalda fr. 8/11 mm (plauta)	×	×	×
		Crushed gravel 8/16 mm (washed)	Žvirgždo skalda fr. 8/16 mm (plauta)	×	×	×
		Crushed gravel 11/16 mm (washed)	Žvirgždo skalda fr. 11/16 mm (plauta)	×	×	×
		Crushed gravel 11/22 mm (washed)	Žvirgždo skalda fr. 11/22 mm (plauta)	×	×	×
		Crushed gravel 16/22 mm (washed)	Žvirgždo skalda fr. 16/22 mm (plauta)	×	×	×
Margis gravel pit	I M	Sand 0/2 mm	Smėlis fr. 0/2 mm	×	-	-
		Sand 0/4 mm	Smėlis fr. 0/4 mm	×	×	×
		Sand 0/5 mm	Smėlis fr. 0/5 mm	-	×	×
		Mixture of sand and gravel 0/32 mm	Smėlio ir žvirgždo mišinys fr. 0/32 mm	-	-	×
		Gravel and stones 32-100 mm	Gargždas fr. 32-100 mm	-	-	-
	II M	Sand 0/4 mm (washed)	Smėlis fr. 0/4 mm (plautas)	×	×	×
		Sand 0/5 mm (washed)	Smėlis fr. 0/5 mm (plautas)	-	×	×
		Gravel 4/16 mm (washed)	Žvirgždas fr. 4/16 mm (plautas)	×	-	-
		Gravel and stones 16-100 (washed)	Gargždas fr. 16-100 mm (plautas)	-	-	-

[a] - LST EN 12620:2002+A1:2008 *Aggregates for concrete.*
[b] - LST EN 13043:2002, EN 13043:2002/AC:2004 *Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas.*
[c] - LST EN 13242:2002+A1:2007 *Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction.*

UN CPC code: 153

Geographical scope: Europe

LCA information

Functional unit / declared unit: In accordance with the PCR the declared unit is 1 metric tonne of the product.

Time representativeness: Primary data was collected internally. The production data refers to the average of the year 2020.

Database(s) and LCA software used: The Ecoinvent database provides the life cycle inventory data for the raw and process materials obtained from the background system. The used database is Ecoinvent 3.6. The LCA software used is One Click LCA.

Description of system boundaries and production process: Cradle to gate with options. The LCA was carried out considering the Product stage phases - A1, A2, A3 in accordance with EN 15804.

The current EPD covers the following operations of sand, gravel and crushed gravel production:

- **Overburden removal** (using bulldozer, dumper truck, wheel loader and/or excavator);
- **Excavation** (using wheel loaders);
- **Loading and conveying** (using wheel loaders and conveyor belts);
- **Processing** (using stationary and mobile screening and crushing plants);
- **Recultivation** (using excavator, wheel loaders and dumper truck);
- **Product storage** (using wheel loaders);
- **Customers' vehicles' loading** (using wheel loaders).

First stage of production cycle implies the removal of the top layer of the ground (the overburden). The removed overburden is stored in the quarry and is used for the quarry site rehabilitation. After removal of the overburden, the stage of extraction of the natural sand and gravel mixture follows. The wheel loaders are being used for this purpose. The extracted soil is being instantly transported to the plant by wheel loaders (in Margis gravel pit, average distance 0,2 km) or conveyers (in Trakai gravel pit, average distance 1,9 km). Variety of products (aggregates) is being produced from the extracted soil at the plants. The produced aggregates are stored near quarry plants in stockpiles, from where they are sold to customers.

The stage of aggregates' washing previews use of surface and groundwater (no chemicals are being used in the production). The water used for aggregates washing is permanently circulating inside the sediment retention pond system. The fine particles washed away from the aggregates sediments in a sedimentation basin located near the plants. The basin is being cleaned by an excavator upon the necessity. The sediment removed from the basin is being used for the quarry restoration purposes (rehabilitation of slopes, etc). Additionally, the water from the sediment retention pond system could be used for dust-suppression purposes (e.g. roads' watering). Hence, only the energy consumed to pump water has actually been taken into account.

Žvyro karjerai, JSC for their operations use 100% green energy.

Data quality: The foreground data collected internally is based on yearly production amounts and extrapolations of measurements on specific machines and plants. Overall, the data quality can be described as good. The primary data collection has been done thoroughly.

Cut-off criteria: Life cycle inventory data for a minimum of 99% of total material and energy input flows have been included in the life cycle analysis. Although only materials having in summa less than 1% of weight of product were not used in calculations.

The system boundaries of the LCA

Product stage			Assembly stage		Use stage							End of life stage				Resource recovery stage
Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Description of the system boundary (X = Included in LCA; MND = Module Not declared)

Content information

Product components	Weight, %
Gravel and sand	100
TOTAL	**100**

No dangerous substances from the candidate list of SVHC for Authorisation are used in the product.

Packaging materials: Products delivery is separate service of the company, not declared in this EPD. In case of distribution no packaging is used, delivered as bulk material.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804:2012+A2:2019

Potential environmental impact		Results per declared unit					
		Margis gravel pit		Trakai I gravel pit			
		I M	II M	I T	II T	III T	IV T
Indicator	**Unit**	**A1-A3**	**A1-A3**	**A1-A3**	**A1-A3**	**A1-A3**	**A1-A3**
GWP- total	kg CO_2 eq.	1,91E+00	1,97E+00	1,39E+00	1,32E+00	1,39E+00	1,43E+00
GWP- fossil	kg CO_2 eq.	1,91E+00	1,96E+00	1,38E+00	1,31E+00	1,39E+00	1,42E+00
GWP-biogenic	kg CO_2 eq.	5,30E−04	4,85E−03	9,19E−03	3,79E−03	4,64E−03	1,27E−02
GWP- luluc	kg CO_2 eq.	1,61E−04	5,45E−04	8,92E−04	4,13E−04	5,99E−04	1,20E−03
ODP	kg CFC 11 eq.	4,11E−07	4,23E−07	2,96E−07	2,83E−07	2,91E−07	3,04E−07
AP	mol H^+ eq.	1,99E−02	2,12E−02	1,58E−02	1,43E−02	1,50E−02	1,68E−02
EP-freshwater	kg PO_4^{3-} eq.	7,70E−06	2,67E−05	4,40E−05	2,03E−05	2,86E−05	5,93E−05
EP- marine	kg N eq.	8,80E−03	9,32E−03	6,89E−03	6,27E−03	6,42E−03	7,30E−03
EP- terrestrial	mol N eq.	9,65E−02	1,02E−01	7,59E−02	6,89E−02	7,06E−02	8,05E−02
POCP	kg NMVOC eq	2,65E−02	2,80E−02	2,07E−02	1,89E−02	1,94E−02	2,18E−02
ADP- minerals & metals*	kg Sb eq.	2,91E−06	5,38E−06	6,98E−06	3,90E−06	1,26E−05	8,97E−06
ADP- fossil*	MJ	2,62E+01	2,69E+01	1,87E+01	1,80E+01	1,89E+01	1,92E+01
WDP	m^3	4,89E−02	6,79E−02	7,12E−02	4,76E−02	1,33E−01	8,65E−02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Reading example: 9,00E-03 = $9{,}0\times10^{-3}$ = 0,009.

Use of resources

Potential environmental impact		Use of resources per declared unit					
		Margis gravel pit		Trakai I gravel pit			
		I M	II M	I T	II T	III T	IV T
Indicator	Unit	A1-A3	A1-A3	A1-A3	A1-A3	A1-A3	A1-A3
PERE	MJ	1,42E−01	1,52E+01	3,10E+01	1,21E+01	2,26E+01	4,32E+01
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,42E−01	1,52E+01	3,10E+01	1,21E+01	2,26E+01	4,32E+01
PENRE	MJ	2,62E+01	2,69E+01	1,87E+01	1,80E+01	1,89E+01	1,92E+01
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,62E+01	2,69E+01	1,87E+01	1,80E+01	1,89E+01	1,92E+01
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	2,32E−03	2,75E−03	2,42E−03	1,89E−03	2,55E−03	2,77E−03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; 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						

Waste production and output flows

Waste production

Potential environmental impact		Results per declared unit					
		Margis gravel pit		Trakai I gravel pit			
		I M	II M	I T	II T	III T	IV T
Indicator	Unit	A1-A3	A1-A3	A1-A3	A1-A3	A1-A3	A1-A3
Hazardous waste	kg	2,82E−02	3,24E−02	2,73E−02	2,21E−02	3,10E−02	3,06E−02
Non-hazardous waste	kg	3,02E−01	4,62E−01	5,29E−01	3,29E−01	6,50E−01	6,58E−01
Radioactive waste	kg	1,84E−04	1,87E−04	1,29E−04	1,25E−04	1,27E−04	1,32E−04

Output flows

Potential environmental impact		Results per declared unit					
		Margis gravel pit		Trakai I gravel pit			
		I M	II M	I T	II T	III T	IV T
Indicator	Unit	A1-A3	A1-A3	A1-A3	A1-A3	A1-A3	A1-A3
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Potential environmental impact – mandatory indicators according to EN 15804+A1, CML / ISO 21930

Potential environmental impact		Results per declared unit					
		Margis gravel pit		Trakai I gravel pit			
		I M	II M	I T	II T	III T	IV T
Indicator	**Unit**	**A1-A3**	**A1-A3**	**A1-A3**	**A1-A3**	**A1-A3**	**A1-A3**
GWP	kg CO2 eq.	1,89E+00	1,95E+00	1,37E+00	1,30E+00	1,38E+00	1,41E+00
ODP	kg CFC 11 eq.	3,26E–07	3,36E–07	2,37E–07	2,25E–07	2,33E–07	2,45E–07
AP	mol H+ eq.	2,81E–03	3,67E–03	3,62E–03	2,55E–03	3,17E–03	4,30E–03
EP	kg PO_4^{3-} eq.	4,95E–04	8,05E–04	9,62E–04	5,76E–04	8,35E–04	1,21E–03
POCP	kg Ethene	2,90E–04	3,23E–04	2,59E–04	2,19E–04	2,49E–04	2,85E–04
ADP-minerals & metals*	kg Sb eq.	2,91E–06	5,38E–06	6,98E–06	3,90E–06	1,26E–05	8,97E–06
ADP-fossil*	MJ	2,62E+01	2,69E+01	1,87E+01	1,80E+01	1,89E+01	1,92E+01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction products (version 1.1)
PCR review was conducted by: The International EPD® System
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Vladimir Kočí, LCA Studio Approved by: The International EPD® System 
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

References

- General Programme Instructions of the International EPD® System. Version 3.01;
- PCR 2019:14 Construction products (version 1.1)
- EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.
- ISO 14020:2001 Environmental labels and declarations – General principles.
- ISO 14044:2006 Environmental management. Life Cycle Assessment. Requirements and guidelines.
- ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations. Principles and procedures.

Tools and database

- One Click LCA tool;
- Ecoinvent 3.6 database

Contact information

EPD owner:

Žvyro karjerai, JSC

https://www.zvyras.lt

LCA author:

Vesta Consulting, JSC

https://www.vestaconsulting.lt/

Programme operator:

The International EPD® System

https://www.environdec.com