Environmental Product Declaration

in accordance with ISO 14025:2006 & EN 15804:2012+A2:2019/AC:2021

EnviroHoard® On-Ground Temporary Hoarding System

Programme Operator
Circular Ecology EPD Programme

Publication Date
11-06-2026

EPD Registration Number
CE-EPD-PAN-0005-1

Valid Until
10-06-2031

Panthera Group Limited, Perrywood Business Park, Surrey, RH1 5JQ

General Information

Product Name
EnviroHoard® On-Ground Temporary Hoarding System

Product Category
Temporary Construction Hoarding System

EPD Type
Product System EPD – Representative Product

Declaration Type
Cradle to Grave with Module D

Functional Unit
100 metres of installed EnviroHoard® temporary hoarding for one installation cycle of 15 months duration

Mass per Functional Unit
2.86 tonnes

Geographical Scope
United Kingdom

Year of Study
2026

Product Category Rules
Core PCR: EN 15804:2012+A2:2019
Additional PCR: Circular Ecology Product Category Rules for Construction and Building Sector v1.0, December 2025

Applicable Standards
EN 15804:2012+A2:2019; ISO 14025:2006; ISO 14040:2006; ISO 14044:2006

EPD Owner
Panthera Group Limited Unit 13, Perrywood Business Park, Surrey, RH1 5JQ

EPD Programme Operator
Circular Ecology EPD Programme
124 City Road, London, UK

LCA Practitioner
Joe Rouse
Circular Ecology

Manufacturer Information
Panthera Group Limited
Perrywood Business Park, Surrey, RH1 5JQ

Intended Audience
Business-to-Business (B2B)

Comparability
EPDs of construction products are comparable only when they comply with EN 15804 +A2:2019 and ISO 14025, and when compared within the same product category and building context.

Liability
This EPD is based on data provided by the manufacturer and verified under the Circular Ecology EPD Programme. The EPD owner has sole responsibility and liability for the EPD.

Verification Type
Independent verification of the declaration and data, according to ISO 14025:2006 (Relative to the EPD Owner).
Internally Verified: ☐
Externally Verified: ☒

Verifier Details
Matthew Fishwick, Fishwick Environmental Ltd

Organisation & Product Information

Description of Organisation

Panthera Group Limited specialises in the design, manufacture and deployment of temporary hoarding and fencing systems for use in construction and infrastructure projects across the United Kingdom. The organisation provides modular systems designed for durability, reuse and rapid deployment, supporting efficient site setup while minimising environmental impact.

Product Name

EnviroHoard® On-Ground Temporary Hoarding System.

EPD Type

This EPD is a product system EPD based on a representative product. The representative product is the EnviroHoard® 2.4m On-Ground configuration, selected on the basis that it is the most commonly deployed variant within the EnviroHoard® product range and therefore most closely reflects typical environmental performance in practice. The following EnviroHoard® system variants are covered by this EPD:

Product Name	Height (m)	Total Installation Mass per 100 Metres (tonnes)	Attributable Mass per Functional Unit (tonnes)
EnviroHoard® 2.4m On-Ground	2.4	45.12	2.86
EnviroHoard® SHIELD 3.0m On-Ground	3.0	82.73	4.93
EnviroHoard® GOLIATH 3.6m On-Ground	3.6	132.65	7.58

Full component quantities, unit masses and maximum reuse cycles per functional unit are provided in Appendix A

Product Description

EnviroHoard® is a modular temporary hoarding system designed for use on construction sites to provide secure perimeter protection, visual screening and site safety. The system consists of precast concrete blocks, steel posts and rails and recycled uPVC panels, which are assembled on-site to form a continuous barrier. The system is designed for repeated reuse across multiple installation cycles, with components returned to depot following use, inspected and redeployed where suitable. The product description and contents information below relate to the representative 2.4m configuration.

The EnviroHoard® system is designed and tested in accordance with BS 5975 TWf2024:01 (Temporary Works Forum guidance for wind and pedestrian loads).

Product Application

EnviroHoard® is used in construction and infrastructure projects for temporary perimeter hoarding, including building sites, civil engineering works and infrastructure upgrades. The system is ideal for short- to medium-

term installations but due to its design can be installed where a design life exceeding 5-years is required. It is designed for efficient installation, removal and reuse across multiple projects.

Name and Locations of Production Sites

Primary production data for this EPD were collected from the facilities operated by Panthera Group Limited involved in the manufacture and preparation of the system components. These include the Panthera® Redehall site in Surrey, United Kingdom for precast concrete block manufacturing, and the Panthera® Redhill depot in Surrey, United Kingdom for system handling, storage and preparation activities. Primary data were also collected from first tier suppliers for the manufacture of uPVC panel and steel assembly components.

Product Contents Information

Product Component Category	Material Type	Recycled Content per Component (%)	Total installation mass (tonnes/100m)	Attributable mass (tonnes/FU)
Steel Posts, Rails, Plates, Clamps and Bars	Steel	55%	2.38	0.21
Meshes Panels & Fixings	Steel	41%	0.00	0.00
uPVC Panels	uPVC	100%	1.14	0.57
Concrete Blocks	Concrete	0%	41.60	2.08
Total	**-**	**-**	**45.12**	**2.86**

The total installation mass represents the physical mass of all components present in the installed system per 100 metres at the first installation. The attributable mass per functional unit is substantially lower, reflecting the average effective material consumption per deployment after applying component-specific reuse allocation factors, as components are designed for repeated reuse, only a fraction of each component's mass is attributed to any single installation cycle. Environmental impacts in this EPD have been calculated on the basis of the attributable mass, not the total installation mass.

Additional Environmental Information

The product does not contain any substances listed on the REACH Candidate List of Substances of Very High Concern above 0.1% by weight. No other hazardous substances requiring declaration are present.

Packaging Contents Information

Packaging used for the EnviroHoard® system includes reusable transport items such as wooden pallets and steel stillages, as well as single use materials including plastic wrap and banding. Reusable packaging is modelled based on the number of reuse cycles, with impacts allocated accordingly. End of life treatment of packaging materials is included within Module A5. The total mass of packaging required to deliver the functional unit is 19.87 kg.

LCA Information

Functional Unit

100 metres of installed EnviroHoard® temporary hoarding for one installation cycle of 15 months duration.

The functional unit of 100 metres of installed system is modelled using a representative Wind Zone 1, Town, wind-only loading condition, and a representative site layout comprising four elevations totalling 100 metres, including two free ends and six corners. This configuration reflects typical installation geometry and associated component requirements. Full component quantities, unit masses and maximum reuse cycles per functional unit are provided in Appendix A.

Reference Service Life

The reference service life is defined as one installation cycle of approximately 15 months duration, based on operational data provided by the EPD owner. This represents the period during which the system is deployed and operational at a single site.

Time Representativeness

Primary data used in this assessment are representative of EnviroHoard® system activities during the 2025 calendar year. The data represent a continuous twelve month period under normal operating conditions.

Geographical Scope

The geographical scope of the assessment is primarily the United Kingdom, reflecting the production, installation, deconstruction and logistics activities of the EnviroHoard® system. Primary data for manufacturing is predominantly representative of the United Kingdom, including precast concrete production and depot operations. However, certain components, including steel elements, are manufactured outside the UK, with primary data collected from a supplier in China. These processes are modelled to reflect their actual geographic location. Secondary datasets have been selected to be geographically representative of the country of production where possible, with preference given to United Kingdom datasets, followed by European datasets where UK specific data were not available.

Database & LCA Software

The life cycle assessment was modelled using ecoinvent database version 3.11, system model cut off, implemented in openLCA version 2.6 software.

Characterisation Factors

Environmental impacts were calculated using the Environmental Footprint impact assessment method version 3.1.

Energy Mix

Energy use within Modules A1–A3 includes electricity and fuel consumption associated with the manufacture of EnviroHoard® system components. Primary energy data were collected for precast concrete manufacturing at the Panthera® Redehall site, depot operations at the Panthera® Redhill facility and uPVC panel production at Condale Plastics. Electricity has been modelled using a market-based approach in accordance with the Circular Ecology General Programme Instructions and the ECO Platform LCA Calculation Rules v2.0.

For foreground processes under the control of the manufacturer, supplier specific electricity tariffs backed by Guarantees of Origin (GoOs) have been applied for Condale Plastics and the Panthera® Redhill depot. These supplier specific electricity mixes have been used where sufficient evidence of contractual instruments was available, and where it is assumed that the associated attributes have not been sold to third parties.

At the Panthera® Redhill depot, electricity consumption comprises a combination of grid electricity supplied under a GoO-backed tariff (21% nuclear, 79% renewable, 0.014 $kgCO_2e/kWh$) and on-site solar generation (0.078 $kgCO_2e/kWh$). Electricity generated on-site is consumed directly within the facility. No contractual instruments associated with the on-site generation are assumed to be sold externally, and the renewable electricity is therefore included in the model.

For foreground processes where supplier-specific electricity data meeting contractual-instrument requirements were not available, electricity consumption has been modelled using the relevant residual mix for the country of production. This comprises the Redehall concrete manufacturing site (0.474 $kgCO_2e/kWh$).

Thermal energy use at manufacturing and depot facilities, including natural gas consumption at the Condale Plastics facility and the Panthera® Redhill depot, has been modelled using standard natural gas combustion datasets from ecoinvent v3.11, representative of typical UK supply conditions.

Process Emissions

Process emissions are not a significant source of environmental impact for the production of EnviroHoard® and are therefore not modelled explicitly as foreground processes. Where relevant, process emissions associated with fuel combustion, electricity generation, transport activities and waste management are included within the applied background datasets, as represented in the ecoinvent database v3.11. No additional assumptions or exclusions relating to process emissions have been applied beyond those inherent in the background datasets.

Capital Goods

Emissions associated with capital goods, including buildings, infrastructure, machinery and equipment, are not explicitly modelled within the foreground system. Capital goods are retained within background ecoinvent datasets without modification, as these are embedded within unit processes at a level that cannot practically be isolated or amended without compromising the integrity of the background data.

Allocation Approach

The EnviroHoard® system is designed for repeated reuse across multiple project installations. To reflect this, the environmental impacts associated with the manufacture of system components (Modules A1–A3) are allocated to the functional unit based on the expected number of reuse cycles for each individual component.

The allocation factor for each component is 1 divided by its expected number of reuses. For example, a steel post expected to achieve 15 deployments before reaching end of life contributes $1/15^{th}$ of its full manufacturing impact to the functional unit. The expected number of reuses for each component is based on manufacturer operational data and is set out in full in Appendix A. A reasonableness cap is applied: the effective number of reuses used in the allocation is the lower of the manufacturer's expected reuses and the maximum number of deployments that the component's physical service life permits, calculated using the 15-month service duration per installation.

The same allocation factors are applied consistently to the end of life treatment impacts (Modules C2–C4) and to benefits and loads beyond the system boundary (Module D), so that only the proportional share of end of life flows attributable to one deployment is reported.

Modules A4, A5, C1, and the return transport of components to depot following deconstruction are modelled in full per functional unit and are not subject to reuse allocation. These activities occur once for every deployment of the system and their full impact therefore belongs to each functional unit.

Steel post and rail components contain 55% recycled content and uPVC panels contain 100% recycled content, both confirmed as post-consumer in origin by suppliers. Under the cut-off system model, post-consumer recycled material enters the system burden-free. There is no recycled content of unknown or pre-consumer origin; the PCR co-product allocation requirement does not apply.

No manufacturing scrap is generated in Module A3 as all components are purchased pre-fabricated. Packaging waste in Module A5 and end-of-life recycling flows in Module C3 are modelled using ecoinvent EN15804GD market for waste and recycling datasets respectively, consistent with the cut-off methodology.

Energy consumption at the Panthera® Redhill depot is allocated to the EnviroHoard® system using economic allocation based on revenue. EnviroHoard® activities represented 38.28% of total Redhill site revenue for the 2025/26 financial year, based on financial data provided by the EPD owner.

Cut-Off Criteria and Exclusions

Cut-off criteria are applied in accordance with EN 15804+A2, excluding inputs below 1% of mass and energy per module, with total exclusions not exceeding 5%. Minor items excluded include optional vinyl graphics and paints. Employee commuting and administrative energy are excluded as indirect business activities. Foreground capital goods are excluded due to data unavailability; background dataset capital goods are retained. No environmentally significant flows have been excluded.

Net & Gross GWP Reporting

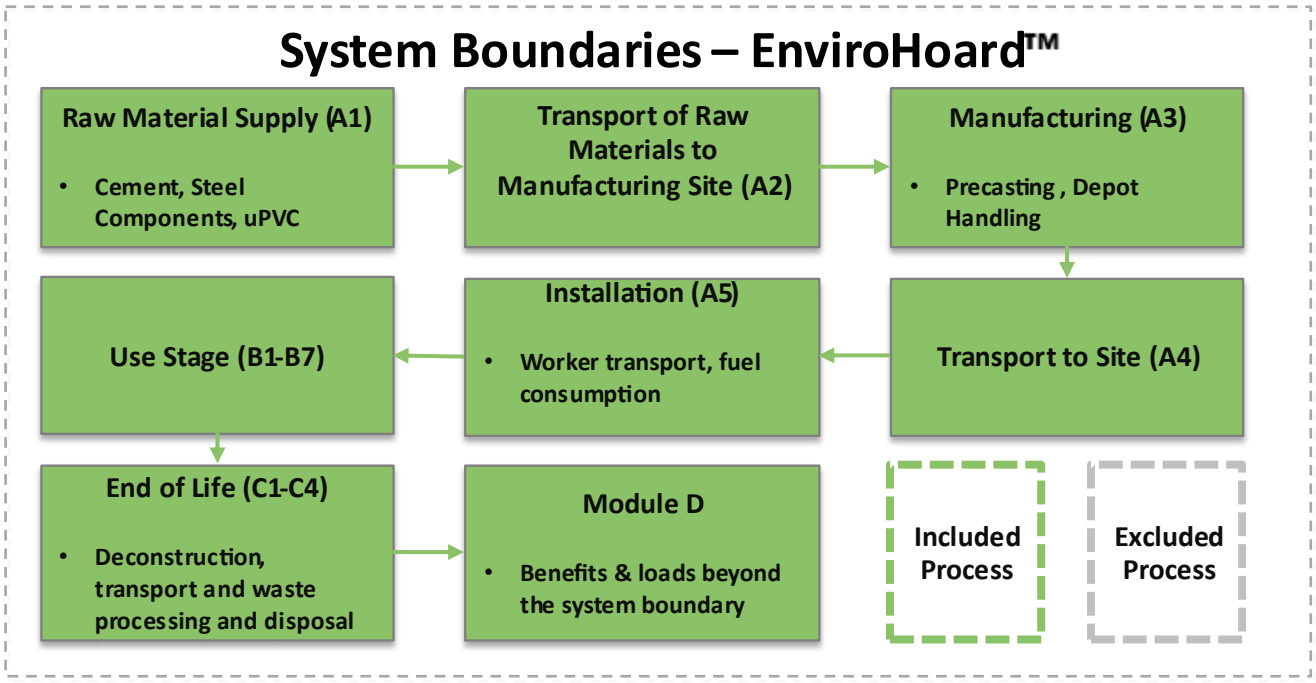
The GWP results presented in this EPD represent Gross GWP. Gross GWP includes all greenhouse gas emissions associated with the product system, including emissions from the incineration of waste materials within the system boundary.

Description of System Boundaries

This Environmental Product Declaration adopts a cradle to grave system boundary with Module D, in accordance with EN 15804+A2 and the Circular Ecology Product Category Rules.

	Product Stage			Construction Stage		Use Stage						End of Life Stage				Benefits & Loads Beyond the System Boundary
	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	Potential Net-Benefits from Reuse, Recycling and/or Energy Recovery
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Module Declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	UK/CN	UK/CN	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK	UK

Process Flow Diagram



LCA Results

The results presented are relative statements reflecting potential environmental impacts and do not indicate endpoints, threshold values, safety margins or risks. EPDs of construction products may not be comparable if they do not comply with EN 15804+A2 and the same PCR, functional unit and system boundary.

Core Environmental Impact Indicators – EN 15804 + A2

Results per 100 metres of hoarding for 15 month installation cycle													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	1.12E+03	5.01E+01	4.09E+01	1.21E+03	4.40E+02	2.56E+02	0.00E+00	1.56E+02	4.45E+02	2.09E+01	3.33E-01	8.49E+01
GWP-fossil	kg CO_2 eq.	1.12E+03	5.01E+01	6.17E+01	1.23E+03	4.40E+02	2.30E+02	0.00E+00	1.52E+02	4.45E+02	2.09E+01	3.33E-01	8.48E+01
GWP-biogenic	kg CO_2 eq.	0.00E+00	0.00E+00	-2.08E+01	-2.08E+01	0.00E+00	2.08E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-LULUC	kg CO_2 eq.	1.42E+00	2.55E-02	3.51E-02	1.48E+00	1.56E-01	5.52E+00	0.00E+00	3.68E+00	1.58E-01	2.14E-03	1.89E-04	4.30E-02
ODP	kg CFC 11 eq.	1.07E-05	7.72E-07	3.61E-06	1.51E-05	9.79E-06	4.87E-06	0.00E+00	3.24E-06	9.89E-06	3.10E-07	9.27E-09	9.26E-05
AP	mol H^+ eq.	4.01E+00	1.22E+00	1.85E-01	5.41E+00	1.01E+00	1.16E+00	0.00E+00	7.68E-01	1.02E+00	1.87E-01	2.33E-03	5.11E-02
EP-freshwater	kg P eq.	5.64E-02	2.38E-04	1.52E-03	5.82E-02	3.37E-03	4.22E-03	0.00E+00	2.81E-03	3.41E-03	7.30E-05	3.26E-06	-1.29E-04
EP-marine	kg N eq.	9.69E-01	3.04E-01	3.40E-02	1.31E+00	2.50E-01	4.66E-01	0.00E+00	3.09E-01	2.53E-01	8.67E-02	8.90E-04	-1.67E-02
EP-terrestrial	mol N eq.	1.02E+01	3.38E+00	3.73E-01	1.40E+01	2.76E+00	4.39E+00	0.00E+00	2.92E+00	2.80E+00	9.51E-01	9.78E-03	-2.59E-01
POCP	kg NMVOC eq.	3.35E+00	9.37E-01	1.56E-01	4.44E+00	1.65E+00	1.42E+00	0.00E+00	9.47E-01	1.67E+00	2.84E-01	3.53E-03	3.01E-01
ADP-M&M*	kg Sb eq.	2.12E-02	6.88E-05	1.26E-03	2.25E-02	1.42E-03	2.17E-03	0.00E+00	1.45E-03	1.44E-03	7.68E-06	4.99E-07	1.48E-03
ADP-fossil*	MJ	1.23E+04	6.39E+02	1.27E+03	1.42E+04	6.48E+03	2.88E+03	0.00E+00	1.92E+03	6.54E+03	2.72E+02	8.16E+00	4.04E+03
WDP*	m^3	5.88E+02	2.25E+00	3.08E+01	6.21E+02	3.61E+01	2.95E+01	0.00E+00	1.93E+01	3.65E+01	7.00E-01	3.58E-01	5.98E+01
Acronyms	*GWP-total: Global Warming Potential; 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 freshwater end compartment; EP-terrestrial: Eutrophication potential, Accumulated Exceedance; POCP: Formation potential of tropospheric ozone; ADP-M&M: Abiotic depletion potential for non-fossil resources (minerals and metals); ADP-fossil: Abiotic depletion potential for fossil resources; WDP: Water deprivation potential* **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.*												

Use of Natural Resources – EN 15804 + A2

Results per 100 metres of hoarding for 15 month installation cycle													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3.22E+03	5.93E+00	1.22E+03	4.45E+03	1.03E+02	2.35E+02	0.00E+00	1.57E+02	1.04E+02	1.71E+00	7.63E-02	1.45E+02
PERM	MJ	2.46E+02	0.00E+00	0.00E+00	2.46E+02	0.00E+00	-2.46E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.46E+03	5.93E+00	1.22E+03	4.69E+03	1.03E+02	-1.10E+01	0.00E+00	1.57E+02	1.04E+02	1.71E+00	7.63E-02	1.45E+02
PENRE	MJ	1.23E+04	6.39E+02	1.27E+03	1.42E+04	6.48E+03	2.89E+03	0.00E+00	1.92E+03	6.54E+03	2.72E+02	8.16E+00	4.04E+03
PENRM	MJ	1.02E+04	0.00E+00	0.00E+00	1.02E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.02E+04	0.00E+00	0.00E+00
PENRT	MJ	2.25E+04	6.39E+02	1.27E+03	2.45E+04	6.48E+03	2.89E+03	0.00E+00	1.92E+03	6.54E+03	-9.96E+03	8.16E+00	4.04E+03
SM	kg	8.45E+02	4.41E-01	1.84E+00	8.47E+02	6.09E+00	6.61E+00	0.00E+00	4.40E+00	6.15E+00	1.56E-01	3.62E-03	-5.98E+00
RSF	MJ	9.29E+00	5.24E-02	6.72E-01	1.00E+01	1.36E+00	2.97E+01	0.00E+00	1.98E+01	1.37E+00	1.61E-02	6.80E-04	1.31E+01
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	9.06E+00	5.21E-02	7.20E-01	9.83E+00	8.36E-01	6.65E-01	0.00E+00	4.42E-01	8.46E-01	1.74E-02	8.43E-03	3.93E+00
Acronyms	*PERE: Renewable primary energy resources used as energy carrier; PERM: Renewable primary energy resources used as raw materials; PERT: Total use of renewable primary energy resources; PENRE: Non-renewable primary energy resources used as energy carrier; PENRM: Non-renewable primary energy resources used as raw materials; PENRT: Total use of non-renewable primary energy resources; SM: Use of secondary materials; RSF: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels; FW: Use of net fresh water*												

Waste Indicators – EN 15804 + A2

Results per 100 metres of hoarding for 15 month installation cycle													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
HW	kg	1.84E+02	6.96E-01	2.33E+00	1.87E+02	6.70E+00	8.83E+00	0.00E+00	5.82E+00	6.77E+00	2.43E-01	6.59E-03	-3.50E+01
NHW	kg	3.80E+03	5.12E+00	2.00E+01	3.83E+03	6.65E+01	7.51E+01	0.00E+00	3.80E+01	6.71E+01	1.78E+00	8.84E-02	9.15E+01
RW	kg	4.03E-02	8.95E-05	4.97E-03	4.53E-02	1.85E-03	1.25E-03	0.00E+00	8.33E-04	1.87E-03	2.84E-05	1.19E-06	6.87E-03
Acronyms	*HW: Hazardous waste disposed; NHW: Non-hazardous waste disposed; RW: Radioactive waste disposed*												

Output Flows – EN 15804 + A2

Results per 100 metres of hoarding for 15 month installation cycle													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	5.84E+01	8.27E-01	1.91E+00	6.11E+01	5.34E+00	9.80E+00	0.00E+00	6.52E+00	5.40E+00	2.77E+03	3.02E-03	7.72E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	2.56E+01	4.41E-02	1.08E+00	2.68E+01	1.16E+00	7.02E-01	0.00E+00	4.63E-01	1.17E+00	1.27E-02	5.21E-04	6.71E+00
EET	MJ	1.06E+01	3.69E-02	8.48E-02	1.07E+01	1.31E+00	1.49E+00	0.00E+00	9.90E-01	1.32E+00	6.01E-03	2.80E-04	8.93E-01
Acronyms	*CR: Components for reuse; MR: Materials for recycling; MER: Materials for energy recovery; EEE: Exported electrical energy; EET: Exported thermal energy*												

Additional Environmental Impact Indicators – EN 15804 + A2

Results per 100 metres of hoarding for 15 month installation cycle													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B**	**C1**	**C2**	**C3**	**C4**	**D**
PM	Disease incidence	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IRP	kBq U235 eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	Dimensionless	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acronyms	*PM: Particulate matter emissions; IRP: Ionising radiation, human health; ETP-fw: Ecotoxicity (freshwater); ETP-c: Human toxicity, cancer effects; HTP-nc: Human toxicity, non-cancer effects; SQP: Land use related impacts / soil quality*												

*Small non-zero values for SM, MFR, EEE and EET across certain modules are not modelling errors. These arise from background infrastructure flows embedded within ecoinvent datasets and are not associated with the product system itself.

Additional Information

Data Quality

Primary data are representative of EnviroHoard® system components and operations for the 2025 calendar year. Primary data have been collected from multiple sources, including precast concrete manufacturing at the Panthera® Redehall site, depot handling and operational activities at the Panthera® Redhill facility, uPVC panel production from Condale Plastics and steel component manufacturing from Taizhou Nexus Metalwork. These data are considered representative of typical production and operational conditions for the system. Secondary datasets have been selected based on geographic relevance, temporal representativeness and consistency with EN 15804+A2, the Circular Ecology Product Category Rules and the ECO Platform LCA Calculation Rules. Background data have primarily been sourced from the ecoinvent v3.11 database.

Data quality has been assessed in accordance with EN 15804+A2 Annex E (Table E.1) and EN 15941:2024 Chapter 7.1. All datasets used in the LCA model have been evaluated against the data quality indicators defined in Annex E, including technological, geographical and temporal representativeness, as well as completeness and reliability. Datasets are described qualitatively in accordance with the categories defined in Table E.1.

Primary data collected from manufacturers and operators is considered to be of very good to good quality, reflecting high levels of completeness and representativeness. Secondary data sourced from recognised databases is considered to be of good to fair quality. No datasets classified as fair, poor or very poor are considered to have a significant influence on the results.

Scaling Factors for EnviroHoard® Systems

This Environmental Product Declaration represents a specific EnviroHoard® system configuration. To support the estimation of environmental impacts for alternative EnviroHoard® system variants, scaling factors are provided for Modules A1–A3 global warming potential total (GWP-T) only.

The scaling factors apply exclusively to A1–A3 GWP results and shall not be applied to other life cycle modules. The applicability of scaling factors is dependent on system design, layout and material specification. They should not be applied where system configurations differ significantly from the reference system.

System Name	Height (m)	A1-A3 GWP-T Scaling Factor (%)
EnviroHoard® Shield 3.0m	3.0	166
EnviroHoard® Goliath 3.6m	3.6	219

Scenario Modelling Information

Module	Parameter	Value/Factor	Data Source/Reference
A4	Distance to Installation Site (km)	75	Primary data from EPD owner.
A4	Delivery Vehicle Types	>32t lorry diesel EURO 6 (67%) and 16–32t lorry diesel EURO 6 (33%)	Primary data from EPD owner.
A4/C1/C2	Capacity Utilisation (including return trips)	50%	ecoinvent process description
A5	Installation Duration (days per 100m fencing)	3 days	Primary data from EPD owner.
A5	Worker Transport Method	3 vehicle trips (passenger car diesel EURO 5, medium and large size)	Primary data from EPD owner.
A5	Installation Fuel Consumption (litres per 100m fencing)	1.8 (Diesel) 1.8 (HVO)	Primary data from EPD owner.
A5/C1	Worker Transport Distance	75 km	Conservative assumption
A5/C1	Installation & Deconstruction Fuel Dataset	ecoinvent v3.11 market for diesel, burned in building machine, GLO (50% standard diesel, 50% adjusted to biodiesel/HVO input)	ecoinvent process
C1	Deconstruction Duration (days per 100m fencing)	2 days	Primary data from EPD owner.
C1	Worker Transport Method	2 vehicle trips (passenger car diesel EURO 5, medium and large size)	Primary data from EPD owner.
C1	Deconstruction Fuel Consumption (litres per 100m fencing)	1.8 (Diesel) 1.8 (HVO)	Primary data from EPD owner.
C1	Deconstruction Vehicle Types	>32t lorry diesel EURO 6 (67%) and 16–32t lorry diesel EURO 6 (33%)	Primary data from EPD owner.
C2	Waste Transport Distance (km)	15.5 km	Qflow. (2023). The UK Construction Industry Waste Report 2023. Qflow. Page 16.
C2	Reusable Components Return to Depot Transport Distance (km)	75 km	Primary data from EPD owner.
C2	End of Life Vehicle Type	>32t lorry diesel EURO 6	ecoinvent process
C3/C4	Light Guage Steel Waste Processing & Disposal Route Split (%)	2% Landfill, 5% Reuse, 93% Recycled	RICS, 2023. Whole Life Carbon Assessment for the Built Environment (2nd edition). Royal Institution of Chartered Surveyors. Table 23.
C3/C4	Steel Sections Waste Processing & Disposal Route Split (%)	0% Landfill, 7% Reuse, 93% Recycled	
C3/C4	Concrete Waste Processing & Disposal Route Split (%)	2.5% Landfill, 0.5% Reuse, 96.5% Recycled	

Module D Calculation Method

Module D reports the potential net environmental benefits and loads arising from the recovery and recycling of system components at end of life, calculated using a substitution approach in accordance with EN 15804+A2. Results are reported separately from Modules A–C and shall not be aggregated with them. For reusable components, the mass of material entering Module D is allocated based on the component-specific reuse

allocation factors applied throughout this assessment, such that only the fraction attributable to the functional unit is considered. End-of-life scenarios are based on RICS Whole Life Carbon Assessment Table 23 default values for steel and concrete. Material-specific processing yield factors are applied to account for losses during collection and reprocessing, and the net recycling output is calculated by deducting the secondary material input already accounted for in A1–A3 to avoid double-counting under the cut-off methodology.

Material	End-of-Life Recycling Rate	Processing Yield	Substituted Process
Precast Concrete	96.5%	70%	market for gravel, crushed | EN15804GD, U - CH
Steel (Sections & Light Gauge)	93%	85%	market for steel, low-alloyed | EN15804GD, U - GLO
uPVC	100%	80%	market for polyvinyl chloride, suspension polymerised | EN15804GD, U - RER

All material flows included in Module D have reached end-of-waste state prior to the point at which the substitution credit is applied. No allocated co-products are included in Module D.

Biogenic Carbon

Parameter	Unit			
	kgC per functional unit	**kgCO_2e per functional unit**	**kgC per kg**	**kgCO_2e per kg**
Total Biogenic Carbon Content in Product	0.00	0.00	0.00	0.00
Total Biogenic Carbon Content in Packaging	5.67	20.79	0.00	0.00

1 kg of biogenic carbon is equivalent to the uptake of 44/12 kg of CO_2e

Biogenic carbon content is declared per functional unit (100 metres of installed system for one installation cycle). The kg CO_2e per kg figure is calculated by dividing the kg CO_2e per functional unit by the total installation mass of the functional unit

Biogenic carbon is accounted for in accordance with EN 15804+A2 using the −1/+1 approach. Biogenic carbon is present only in packaging materials associated with the system, such as timber pallets. The uptake of biogenic carbon is accounted for in Module A1, and the corresponding release is modelled in Module A5, reflecting the treatment of packaging waste following installation. No biogenic carbon is stored within the product system during use. No biogenic carbon flows are associated with Modules C1–C4 or Module D, as the product itself does not contain biogenic carbon. No permanent carbon storage beyond the system boundary is assumed.

GWP-Total Results Excluding Packaging

	Per 100 metres of hoarding for 15 month installation cycle
GWP-total A1–A3 (including packaging)	1,212.2
GWP-total A1–A3 (excluding packaging)	1,220.98

References

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RICS, 2023 — *Whole Life Carbon Assessment for the Built Environment (2nd edition).* Royal Institution of Chartered Surveyors. Table 23.

Appendix A – System Component Data

The following table provides the full component quantities, unit masses and maximum reuse cycles for the representative functional unit of 100 metres of installed system.

Component	Quantity per 100m	Unit Mass (kg)	Total Mass (kg)	Maximum Reuses
Concrete block	52	800	41600	20
Steel post	50	15.2	760	15
Upper connection	52	1.7	88.4	5
Lower connection	50	1.3	65	5
2.5m steel rail	107	9.4	1005.8	15
1.8m steel rail	59	6.8	401.2	15
uPVC panel clip	600	0.1	60	2
2.4m uPVC panel	200	5.7	1140	2
Fixings (per kg)	1.04	1	1.04	3