Declaration Owner
NOX US, LLC.
931 S. Springville Avenue, P.O. BOX 824
Fostoria, Ohio 44830
www.noxglobal.com | (419) 701-5060

Products
Orchid+ 2.5 mm Dryback LVT
EcoLay+ 5.0 mm Looselay LVT
EcoClick+ 4.0 mm Dryback LVT

(UNSPSC Class Code 30161707)

EPD represents delivery of product to customers in North America.

Functional Unit
The functional unit is 1 m^2 of floor covering installed for use over a 75-year period

EPD Number and Period of Validity
SCS-EPD-10459
EPD Valid June 30, 2025 through June 29, 2030

Product Category Rule
PCR for Building-Related Products and Services - Part A: LCA Calculation Rules and Report Requirements, UL 10010, UL v.4.0, March 2022.

PCR Guidance for Building-Related Products and Services - Flooring EPD Requirements, v.2.0, validity extended to July 1, 2025.

Program Operator
SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608
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Declaration Owner:	NOX US, LLC.
Address:	931 S. Springville Avenue, P.O. BOX 824, Fostoria, Ohio 44830
Declaration Number:	SCS-EPD-10459
Declaration Validity Period:	EPD Valid June 30, 2025 through June 29, 2030
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Gerard Mansell, Ph.D., SCS Global Services
LCA Software and LCI database:	OpenLCA v2.4 software and the Ecoinvent v3.11 database
Product RSL:	30 years
Markets of Applicability:	North America
EPD Type:	Product-Specific
EPD Scope:	Cradle-to-Grave
LCIA Method and Version:	TRACI 2.1
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal ☒ external
LCA Reviewer:	Lindita Bushi, Ph.D., Athena Sustainable Materials Institute
Part A Product Category Rule:	PCR for Building-Related Products and Services - Part A: LCA Calculation Rules and Report Requirements, UL 10010, UL v.4.0, March 2022.
Part A PCR Review conducted by:	Lindita Bushi, PhD (Chair); Hugues Imbeault-Tétreault, ing., M.Sc.A.; Jack Geibig
Part B Product Category Rule:	PCR Guidance for Building-Related Products and Services - Flooring EPD Requirements, v.2.0, validity extended to July 1, 2025.
Part B PCR Review conducted by:	Jack Geibig (chair), Ecoform; Thomas Gloria, Industrial Ecology Consultants; Thaddeus Owen
Independent verification of the declaration and data, according to ISO 14025 and the PCR	☐ internal ☒ external
EPD Verifier:	Lindita Bushi, Ph.D., Athena Sustainable Materials Institute
Declaration Contents:	

Disclaimers: *This EPD conforms to ISO 14025, 14040, 14044, and ISO 21930.*

Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.*

In accordance with ISO 21930:2017, EPDs are comparable only if they comply with the core PCR, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works. The owner of the declaration shall be liable for the underlying information and evidence; SCS shall not be liable with respect to manufacturer information, life cycle assessment data, and evidence supplied or made available to SCS.

1. NOX Corporation

Rooted in a chemical engineering company established in 1966, NOX Corporation has built its core expertise in producing and processing various resin compounds for applications ranging from consumer to industrial goods. With this heritage, NOX Corporation was founded in 1994 as a family-owned company, focusing on LVT flooring innovation, design and manufacturing for global customers. As one of the largest LVT manufacturers globally, our capacity is now over 50 million square meters annually. We operate with the commitment of investment in our customer's needs - a promise to support stable and significant growth for customers.

2. Product

2.1 PRODUCT DESCRIPTIONS

Orchid +

The most stylish heterogeneous vinyl flooring, featuring Wood, Stone and Design lines. As NOX Corp.'s foundational product line, NOX LVT embodies NOX' chemical engineering heritage. Building off of the core expertise in producing and processing various resin compounds, NOX LVT products boast superior stability and durability that keeps getting better with dimensional stability, diverse designs, and size options.

EcoLay +

The revolutionary design heterogeneous vinyl flooring in floating technology, featuring Wood, Stone and Design lines - Better design, Better loose lay, Better click, Better lock - Easiest and Strongest glue-less LVT. As NOX Corp.'s foundational product line, NOX LVT embodies NOX' chemical engineering heritage. Building off of the core expertise in producing and processing various resin compounds, NOX LVT products boast superior stability and durability that keeps getting better with dimensional stability, diverse designs, and size options with proved systems. (proven loose-lay system and Premier click LVT proven for heavy commercial areas with its unparalleled dimensional stability)

EcoClick +

Rooted in a chemical engineering company, NOX has built its core expertise in producing and processing various resin compounds for application to consumer and industrial goods for over 60 years. NOX's unique EMT™ Core (multi-layer structure method) and EPT™ Shield (premium surface coating) technologies have served as the foundation for ECOCLICK+, the most stable, durable, and sustainable flooring innovation. Unique patented Click'n go and Drop'n go!® click system. The easiest and strongest click system in the market**.**

All products covered in this Environmental Product Declaration fall under Construction Specification Institute (CSI) code 09 62 19.

2.2 PRODUCT FLOW DIAGRAM

A flow diagram illustrating the production processes and life cycle phases included in the scope of the EPD is provided below.

2.3 APPLICATION

The NOX LVT flooring products provide the primary function of flooring for interior applications. The products are used in various residential and commercial applications including retail, healthcare, education, and hospitality.

2.4 DECLARATION OF METHODOLOGICAL FRAMEWORK

The scope of the EPD is cradle-to-grave, including raw material extraction and processing, transportation, product manufacture, product delivery, installation and use, and product disposal. The LCA is conducted using an attributional approach. Cut-off and allocation procedures are described below and conform to the PCR and ISO standards.

The life cycle phases included in the product system boundary are shown below.

Table 1. *Life cycle phases included in the NOX luxury vinyl flooring product system boundary.*

Product			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B1	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MND

X = Module Included | MND = Module Not Declared

2.5 TECHNICAL DATA

Technical specifications for the flooring products are summarized in Table 2 through Table 5.

Table 2. *Product characteristics for the **Orchid +** flooring product.*

Characteristic			Description			
Sustainable certifications			-			
VOC emissions test method			FloorScore®, Indoor Air Comfort Gold			
Characteristic			**Average Value**	**Unit**	**Min Value**	**Max Value**
Product thickness			2.5 (0.098)	mm (inch)	2.0 (0.079)	3.0 (0.12)
Wear layer thickness (where applicable)			0.50 (0.020)	mm (inch)	0.1 (0.004)	0.7 (0.028)
Product weight			4,230 (13.86)	g/m^2 (oz/ft^2)	3,500 (11.5)	5,500 (18.0)
Product Form	Tiles	Width	Various	mm (in)	Various	Various
		Length	Various	mm (in)	Various	Various

Table 3. *Product characteristics for the **EcoLay +** flooring product.*

Characteristic			Description			
Sustainable certifications			-			
VOC emissions test method			FloorScore®, Indoor Air Comfort Gold			
Characteristic			**Average Value**	**Unit**	**Min Value**	**Max Value**
Product thickness			5.00 (0.20)	mm (in)	4.00 (0.16)	5.00 (0.20)
Wear layer thickness (where applicable)			0.50 (0.02)	mm (in)	0.30 (0.01)	0.70 (0.03)
Product weight			8,100 (26.54)	g/m^2 (oz/ft2)	6,000 (19.7)	9,000 (29.5)
Product Form	Tiles	Width	Various	mm (in)	Various	Various
		Length	Various	mm (in)	Various	Various

Table 4. *Product characteristics for the **EcoClick +** flooring product.*

Characteristic			Description			
Sustainable certifications			-			
VOC emissions test method			FloorScore®, Indoor Air Comfort Gold			
Characteristic			**Average Value**	**Unit**	**Min Value**	**Max Value**
Product thickness			4.00 (0.16)	mm (in)	3.85 (0.15)	4.15 (0.16)
Wear layer thickness (where applicable)			0.5 (0.02)	mm (in)	0.45 (0.02)	0.55 (0.02)
Product weight			6.58 (1.35)	kg/m^2 (lb/ft^2)	5.92 (1.21)	7.44 (1.52)
Product Form	Tiles	Width	185 (7.28)	mm (in)	184.8 (7.28)	185.3 (7.30)
		Length	1,212 (47.7)	mm (in)	1211.5 (47.7)	1,212.5 (47.7)

Table 5. *Product performance test results for the luxury vinyl products in this EPD.*

Test Item	Test Method	Results
Overall thickness	ASTM F386	Nominal ± 0.005in (± 0.127mm)
Wear-layer thickness	ASTM F410	0.020 in (0.5mm) minimum For Commercial use
Dimension	ASTM F2055	± 0.016 in. per linear foot (± 0.406mm per linear meter)
Squareness	ASTM F2055	Maximum 0.010 in. (0.25mm)
Residual indentation	ASTM F1914	Average less than 8%
Flexibility	ASTM F137	1-in (25.4mm) mandrel No crack, No damage
Dimensional stability	ASTM F2199	0.020 in /ln-ft maximum
Curling after exposure to heat	EN ISO 23999	± 2mm* (+0.5mm / - 1mm)
Chemical resistance	ASTM F925	No more than a slight change in surface dulling, surface attack, or staining
Resistance to light	ASTM F1515	ΔE < 8 ave MAX
Resistance to heat	ASTM F1514	ΔE < 8 ave MAX
Fire resistance	ASTM E648	Class 1 (0.45 w/Cm^2 or more)
Smoke density	ASTM E662	450 or less
Static load limit	ASTM F970	0.005 in or less (0.127mm or less)
Indoor air quality	CDPH v1.1 (2017)	Low VOC, Floorscore® Certified

2.6 MARKET PLACEMENT/APPLICATION RULES

Technical specifications and product performance results for the LVT products can be found on the manufacturer's website: https://nox-us.com.

2.7 PROPERTIES OF DECLARED PRODUCT AS DELIVERED

The products are delivered for installation in the form of tiles and planks.

2.8 MATERIAL COMPOSITION

The primary materials include polyvinyl chloride (PVC), plasticizers, fillers and various stabilizers, coatings and pigments. While the products are available with various colors, the impact of different pigments on the estimated impact indicators is expected to be less than ±10%. Note that re-grind for a given product may be composed of manufacturing scrap from said product or from a similar product produced at the manufacturing facility in Fostoria, Ohio.

Table 6. *Material content for the luxury vinyl flooring products in kg per square meter and percent of total mass.*

Material	Orchid +		EcoLay +		EcoClick +	
	kg/m^2	%	kg/m^2	%	kg/m^3	%
PVC	1.07	23%	2.02	25%	1.20	18%
Filler	1.76	38%	2.64	32%	2.70	41%
Re-grind	1.31	28%	2.06	25%	1.81	28%
Plasticizer	0.372	8%	1.07	13%	0.458	7%
Stabilizer	0.112	2.4%	0.119	1.4%	0.115	1.8%
Pigment	$7.82x10^{-3}$	0.17%	$1.08x10^{-2}$	0.13%	$1.33x10^{-2}$	0.2%
Other	$5.38x10^{-2}$	1.1%	0.316	3.8%	0.274	4.2%
Total Product	**4.68**	**100%**	**8.24**	**100%**	**6.57**	**100%**

Based on a review of the product components provided by the manufacturer, no chemicals regulated by the Resource Conservation and Recovery Act (RCRA) were identified in the product or product components. Additionally, there are no releases of such substances associated with the production, use or maintenance of the products.

2.9 MANUFACTURING

NOX vinyl tile flooring is manufactured in Fostoria, Ohio. The vinyl flooring is made primarily from polyvinyl chloride (PVC), calcium carbonate (mineral reinforcement), plasticizers and additives (i.e., pigments and stabilizers). The product is structured with multiple layers including PVC backing, a PVC wear layer and a UV protective layer.

The production of vinyl tile flooring involves the following general manufacturing processes:

- Polyvinyl chloride resins are mixed with calcium carbonate, plasticizers, and pigments in a large industrial mixer.
- The core is extruded to a dough-like consistency. The dough-like substance is then put through calender rollers and squeezed into sheets.
- The LVT sheets are embossed, adhered to the core and then cut into individual planks, profiled, a foamed backing layer adhered and then packaged for shipment.

2.10 PACKAGING

The products are packaged for shipment using cardboard cartons, plastic wrap and wooden pallets.

Table 7. *Material content for the NOX LVT flooring product packaging, in kg per square meter and percent of total mass.*

Material	Orchid +		EcoLay +		EcoClick +	
	kg/m^2	%	kg/m^2	%	kg/m^3	%
Corrugate	0.195	45%	0.195	45%	0.195	45%
Plastic	$3.61x10^{-3}$	0.83%	$3.61x10^{-3}$	0.83%	$3.61x10^{-3}$	0.83%
Wood	0.237	54%	0.237	54%	0.237	54%
Total Packaging	**0.435**	**100%**	**0.435**	**100%**	**0.435**	**100%**

2.11 PRODUCT INSTALLATION

Installation of the product is accomplished using hand tools with negligible impacts. Approximately 4.5% installation waste is assumed. The impacts associated with packaging disposal, as well as the production, transport and disposal of installation waste are included with the installation phase as per PCR requirements.

2.12 USE CONDITIONS

No special conditions of use are noted.

2.13 PRODUCT REFERENCE SERVICE LIFE AND BUILDING ESTIMATED SERVICE LIFE

The Reference Service Life (RSL) of the flooring products is 30 years based on the manufacturer's warranted lifetime. The building Estimated Service Life (ESL) is 75 years, consistent with the PCR.

2.14 RE-USE PHASE

The flooring products are not reused at end-of-life.

2.15 DISPOSAL

At end-of-life, the products may be disposed of in a landfill or via incineration. Although in some instances, vinyl flooring can be recycled into other products, the practice is not typical, nor widely available as a disposal route for the products in the consumer markets considered. It is assumed that products are 100% landfilled and no components of the product are recycled at end-of-life.

2.16 FURTHER INFORMATION

Further information on the product can be found on the manufacturers' website at https://nox-us.com/.

3. LCA: Calculation Rules

3.1 FUNCTIONAL UNIT

The functional unit used in the study is defined as 1 m^2 of floor covering installed for use over a 75-year period. The corresponding reference flow for each product system is presented in Table 8. For the present assessment, a reference service lifetime (RSL) corresponding to the manufacturer's warranted lifetime is assumed. The total number of required product lifecycles during the 75-year period over which the product system is modeled is also summarized for the product in Table 8.

Table 8. *Reference flows and RSL for the Luxury Vinyl Tile flooring product.*

Product	Reference Flow (kg/m^2)	Reference Service Lifetime (yr)	Replacement Cycle	Total # of Life Cycles
Orchid +	4.68	30	1.5	2.5
EcoLay +	8.24	30	1.5	2.5
EcoClick +	6.57	30	1.5	2.5

3.2 SYSTEM BOUNDARY

The scope of the EPD is cradle-to-grave, including raw material extraction and processing, transportation, product manufacture, product delivery, installation and use, and product disposal. The following processes are excluded from the system boundary, consistent with the PCR:

- Construction activities, capital equipment, and infrastructure
- Maintenance and operation of capital equipment
- Personnel travel and resource use

The life cycle phases included in the EPD scope are described in Table 9 and illustrated in Figure 1.

Table 9. *The modules and unit processes included in the scope for the NOX flooring products.*

Module	Module Description	Unit Processes Included in Scope
A1	Extraction and processing of raw materials; any reuse of products or materials from previous product systems; processing of secondary materials; generation of electricity from primary energy resources; energy, or other recovery processes from secondary fuels	Extraction and processing of raw materials for the product components.
A2	Transport (to the manufacturer)	Transport of component materials to the manufacturing facilities
A3	Manufacturing, including ancillary material production	Manufacturing of flooring products and packaging (including upstream unit processes)
A4	Transport (to the building site)	Transport of product (including packaging) to the building site
A5	Construction-installation process	Impacts from the installation of the product are assumed negligible. Impacts from the production, transport and disposal of waste material associated with installation are included in this phase in addition to impacts from packaging disposal
B1	Product use	Use of the product in a commercial building setting. There are no associated emissions or impacts from the use of the product
B2	Product maintenance	Maintenance of products over the product RSL, including periodic cleaning.
B3	Product repair	The product is not expected to require repair over its lifetime
B4	Product replacement	The materials and energy required for replacement of the product over the 75-year ESL of the assessment are included in this phase
B5	Product refurbishment	The product is not expected to require refurbishment over its lifetime
B6	Operational energy use by technical building systems	There is no operational energy use associated with the use of the product
B7	Operational water uses by technical building systems	There is no operational water use associated with the use of the product
C1	Deconstruction, demolition	Demolition of the product is accomplished using hand tools with no associated emissions and negligible impacts
C2	Transport (to waste processing)	Transport of the product to waste treatment at end-of-life
C3	Waste processing for reuse, recovery and/or recycling	The products are disposed of by landfilling which requires no waste processing
C4	Disposal	Disposal of the product
D	Reuse-recovery-recycling potential	Module not declared

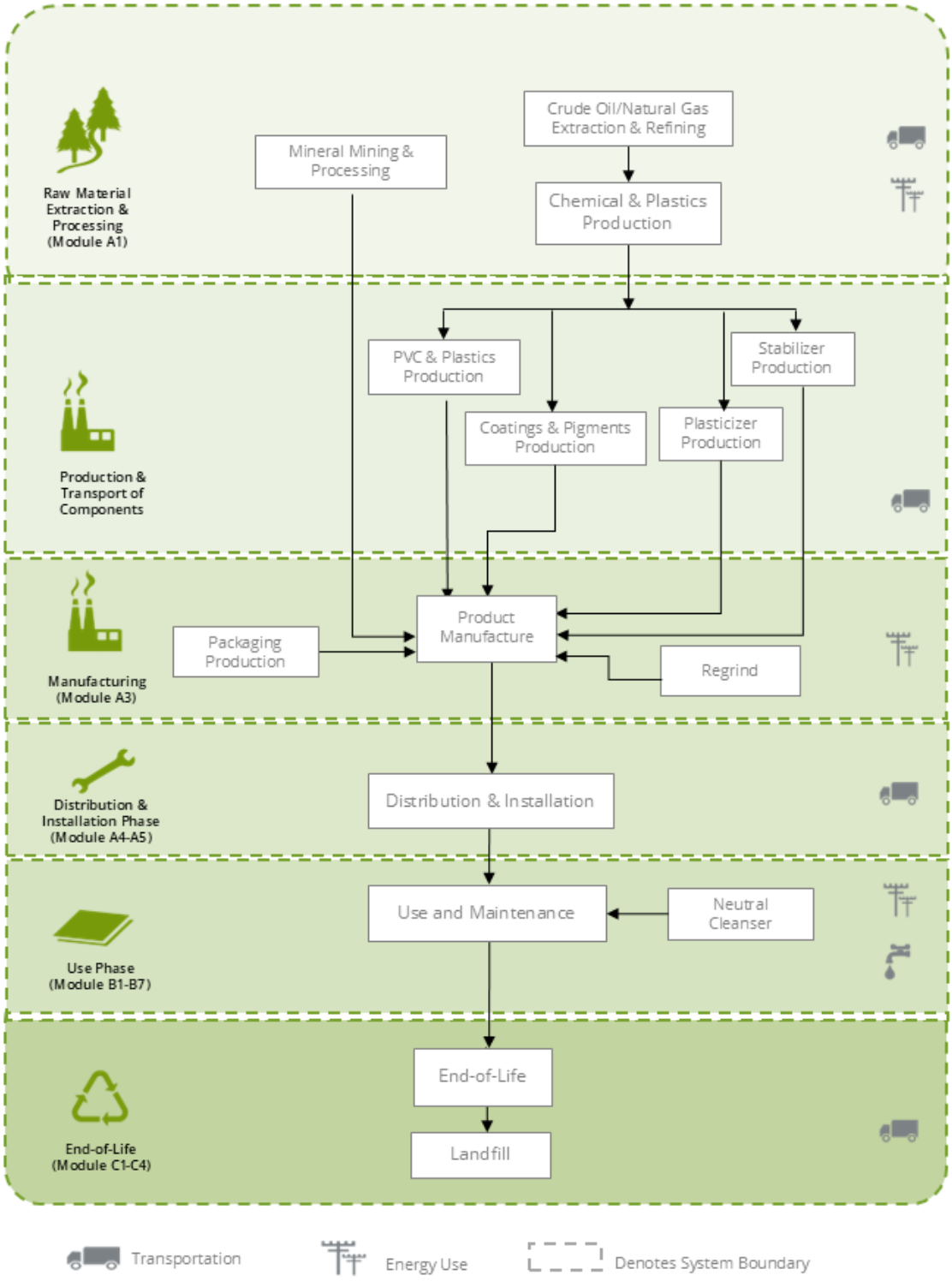

Figure 1. *Flow Diagram for the life cycle of the NOX luxury vinyl flooring product system.*

3.3 PRODUCT SPECIFIC CALCULATION FOR USE PHASE

The recommended cleaning regime is highly dependent on the use of the premises where the floor covering is installed. In high traffic areas more frequent cleaning will be needed compared to areas where there is low traffic. For the purposes of this EPD, average maintenance (moderate traffic levels) is presented based on typical installations.

3.4 UNITS

All data and results are presented using SI units.

3.5 ESTIMATES AND ASSUMPTIONS

- Electricity use at the manufacturing facility was allocated to the products based on the product area as a fraction of the total production.
- The NOX facility under review is located in Fostoria, Ohio. Ecoinvent inventory datasets for the RFCW eGRID EPA NERC subregion were used to model resource use and emissions from electricity use at the manufacturing facility.
- The Reference Service Life (RSL) of the products was modeled based on information provided by the manufacturer assuming their products are installed and maintained as recommended and used for the specific application noted.
- Downstream transport was modeled based on information provided by the manufacturer representing distribution to consumer markets in North America.
- The maintenance phase of the product life cycle was modeled based on information provided by the manufacturer including recommended installation and cleaning methods, as well as cleaning frequency.
- For the product end-of-life, disposal of product and product packaging is modeled based on the PCR guidance regarding recycling rates of product and packaging materials.
- For final disposal of the packaging material and flooring products at end-of-life, all materials are assumed to be transported 161 km by diesel truck to either a landfill or material reclamation facility (for recycling). Datasets representing disposal in a landfill and waste incineration are from Ecoinvent.

The PCR requires the results for several inventory flows related to construction products to be reported including energy and resource use and waste and outflows. These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted considering this limitation.

3.6 CUT-OFF RULES

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact are included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No known flows are deliberately excluded from this EPD.

3.7 DATA SOURCES

Primary data were provided by the manufacturer for their production facility. The sources of secondary LCI data are the Ecoinvent database.

Table 10. *Data sources for the NOX flooring product system.*

Component	Dataset	Data Source	Publication Date
PRODUCT			
PVC			
Polyvinyl Chloride	polyvinylchloride production, bulk polymerisation | polyvinylchloride, bulk polymerised | Cutoff, S/RoW	EI v3.11	2024
Filler			
Calcium Carbonate	limestone production, crushed, washed | limestone, crushed, washed | Cutoff, S/RoW	EI v3.11	2024
Plasticizer			
PVC Plasticizer	dioctyl terephthalate production | dioctyl terephthalate | Cutoff, S/GLO	EI v3.11	2024
Stabilizer			
Stabilizer	market for chemical, organic | chemical, organic | Cutoff, S/GLO	EI v3.11	2024
	market for chemicals, inorganic | chemical, inorganic | Cutoff, S/GLO	EI v3.11	2024
	barium carbonate production | barium carbonate | Cutoff, S/GLO	EI v3.11	2024
	market for zinc oxide | zinc oxide | Cutoff, S/GLO	EI v3.11	2024
Other			
Organic chemicals	market for chemical, organic | chemical, organic | Cutoff, S/GLO	EI v3.11	2024
Glass Fibre	glass fibre production | glass fibre | Cutoff, S/RoW	EI v3.11	2024
Coating	market for chemical, organic | chemical, organic | Cutoff, S/GLO	EI v3.11	2024
Pigments	market for carbon black | carbon black | Cutoff, S/GLO	EI v3.11	2024
	market for titanium dioxide | titanium dioxide | Cutoff, S/RoW	EI v3.11	2024
PACKAGING			
Cardboard	containerboard production, linerboard, kraftliner | containerboard, linerboard | Cutoff, S/RoW	EI v3.11	2024
Wrapping Film	packaging film production, low density polyethylene | packaging film, low density polyethylene | Cutoff, S/RoW	EI v3.11	2024
Polyester Strapping	polyethylene terephthalate production, granulate, amorphous | polyethylene terephthalate, granulate, amorphous | Cutoff, S/RoW	EI v3.11	2024
Wood	market for EUR-flat pallet | EUR-flat pallet | Cutoff, S/GLO	EI v3.11	2024
TRANSPORT			
Road transport	market for transport, freight, lorry 16-32 metric ton, EURO4 | transport, freight, lorry 16-32 metric ton, EURO4 | Cutoff, S/RoW	EI v3.11	2024
Rail transport	transport, freight train, diesel | transport, freight train | Cutoff, S/RoW	EI v3.11	2024
Ship transport	transport, freight, sea, container ship | transport, freight, sea, container ship | Cutoff, S/GLO	EI v3.11	2024
MAINTENANCE			
Neutral cleaner	ethoxylated alcohol (AE7) production, petrochemical | ethoxylated alcohol (AE7) | Cutoff, S/RoW; fatty acid production, from palm oil | fatty acid | Cutoff, S/RoW; tap water production, conventional treatment | tap water | Cutoff, S/RoW	EI v3.11	2024
Electricity	market for electricity, low voltage | electricity, low voltage | Cutoff, S/US	EI v3.11	2024
Water	tap water production, conventional treatment | tap water | Cutoff, S/RoW	EI v3.11	2024
WASTE DISPOSAL			
Landfill	treatment of municipal solid waste, sanitary landfill | municipal solid waste | Cutoff, S/RoW	EI v3.11	2024
MANUFACTURING RESOURCES			
Grid electricity	market for electricity, medium voltage | electricity, medium voltage | Cutoff, U - RFCW/US-RFC	EI v3.11	2024
Heat – natural gas	market for heat, central or small-scale, natural gas | heat, central or small-scale, natural gas | Cutoff, S/RoW	EI v3.11	2024

3.8 DATA QUALITY

The data quality assessment addressed the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty.

Table 11. *Data quality assessment for the NOX flooring product system.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected	The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 5 years old. All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annual production for 2022.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Electricity use for product manufacture is modeled using representative data for Asia. Surrogate data used in the assessment are representative of global or European operations. Data representative of European operations are considered sufficiently similar to actual processes. Data representing product disposal are based on regional statistics.
Technology Coverage: Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, specific to the type of material, are used to represent the actual processes, as appropriate.
Precision: Measure of the variability of the data values for each data expressed	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the flooring products. In some instances, surrogate data used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	Data used in the assessment represent typical or average processes as currently reported from multiple data sources and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards Ecoinvent v3.11 data where available. Different portions of the product life cycle are equally considered.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the Data: Description of all primary and secondary data sources	Data representing energy use at the manufacturing facility represents an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. For secondary LCI data, Ecoinvent v3.11 LCI data are used.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the products and packaging is low. Actual supplier data for upstream operations were not available and the study relied upon the use of existing representative datasets. These datasets contained relatively recent data (<10 years) but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

3.9 PERIOD UNDER REVIEW

The period of review is calendar year 2022.

3.10 ALLOCATION

Resource use at the manufacturing facility (e.g., water and energy) was allocated to the products based on the product area as a fraction of the total facility production volume (i.e., area-based allocation). Area-based allocation was deemed most appropriate for the flooring products as total facility production was available as total square meters of product. Electricity use at the manufacturing facility was modeled using Ecoinvent inventory datasets for the region-specific electrical grid. Manufacturing scrap has no economic value and is disposed of via landfilling. No allocation of scrap is necessary.

Impacts from transportation, including product distribution to point of sale, were attributed to the products based on the mass of material and distance transported.

3.11 COMPARABILITY

The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.

4. LCA: Scenarios and Additional Technical Information

Delivery and Installation stage (A4 - A5)

Distribution of the flooring products to the point of installation is included in the assessment. Transportation parameters for modeling product distribution are summarized in Table 12. Average distances by transport mode were used to represent product distribution to each consumer market.

Table 12. *Product distribution parameters, per 1 m²*

Parameter	Unit	Orchid +	EcoLay +	EcoClick +
Ground transport				
Fuel type	-	Diesel	Diesel	Diesel
Liters of fuel	L/100km	18.7	18.7	18.7
Vehicle type	-	Diesel truck	Diesel truck	Diesel truck
Capacity utilization	%	76	76	76
Gross mass transported[1]	kg	5.12	8.67	7.01
Transport Distance	km	2,410	2,410	2,410
[1] Including packaging				

The manufacturer provided installation guidelines detailing the recommended installation methods. Both the Orchid + and EcoClick + flooring products required an adhesive for installation. Approximately 4.5% of the product mass is assumed lost as waste during product installation which is landfilled. The VOC emissions associated with the installation, use and maintenance of the products are negligible.

Impacts associated with the disposal of packaging materials are also included in the installation life cycle phase. Assumed recycling rates for packaging component materials are based on the PCR requirements and are summarized in Table 13.

Table 13. *Recycling rates for packaging materials at end-of-life.*

Material	Packaging Recycling Rate (%)
Recycling Rates	
Plastics	15%
Paper & Pulp	75%
Wood	0%
Disposal of Non-recyclables	
Landfill	80%
Incineration	20%

Table 14 summarizes the relevant parameters for the product installation phase including biogenic carbon emissions and removals, and wastes associated with product packaging.

Table 14. *Installation parameters for the LVT flooring products, per 1 m^2.*

Parameter		Orchid +	EcoLay +	EcoClick +
Ancillary materials – adhesive (kg)		0.300	0.00	0.300
Net freshwater consumption (m^3)		0.00	0.00	0.00
Electricity consumption (kWh)		0.00	0.00	0.00
Product loss per functional unit (kg)		0.211	0.371	$4.50x10^{-2}$
Waste materials generated by product installation (kg)		0.646	0.806	0.480
Output materials resulting from on-site waste processing (kg)		n/a	n/a	n/a
Mass of packaging waste (kg)	Plastic	$3.61x10^{-3}$	$3.61x10^{-3}$	$3.61x10^{-3}$
	Corrugate	0.195	0.195	0.195
	Wood	0.237	0.237	0.237
Biogenic carbon contained in packaging (kg CO_2)[1]		0.792	0.792	0.792
Direct emissions (kg)		0.00	0.00	0.00

[1] Biogenic carbon contained in packaging calculated assuming the carbon content of corrugate and wood is 50% by weight

Use stage (B1)

No impacts are associated with the use of the product over the Reference Service Lifetime.

Maintenance stage (B2)

According to the manufacturer, typical maintenance involves regular sweeping and damp mopping, as well as periodic machine cleaning of the vinyl flooring. The present assessment is based on a recommended weekly cleaning schedule including sweeping and mopping with a neutral cleaner and monthly machine cleaning. The parameters used to model the product maintenance are summarized in Table 15.

Table 15. *Maintenance parameters for the flooring products, per 1 m^2.*

Parameter	Unit	Orchid +	EcoLay +	EcoClick +
Maintenance cycle	Cycles / RSL	1,560	1,560	1,560
Maintenance cycle	Cycles / ESL	3,900	3,900	3,900
Maintenance process	-	Damp mopping	Damp mopping	Damp mopping
Net freshwater consumption	$m^3/m^2/yr$	0.0058	0.0058	0.0058
Cleaning agent	$kg/m^2/yr$	0.119	0.119	0.119
Maintenance process	-	Machine cleaning	Machine cleaning	Machine cleaning
Maintenance cycle	Cycles / RSL	360	360	360
Maintenance cycle	Cycles / ESL	900	900	900
Electricity	$kWh/m^2/yr$	0.022	0.022	0.022
Further assumptions	-	Moderate traffic; weekly maintenance	Moderate traffic; weekly maintenance	Moderate traffic; weekly maintenance

Repair/Refurbishment stage (B3; B5)

Product repair and refurbishment are not relevant during the lifetime of the product.

Replacement stage (B4)

The materials and energy required for replacement of the products over the 75-year ESL of the assessment are included. Impacts associated with production, transport, waste processing, and disposal of all materials

required for the replacement of the product, including packaging, over the 75-year assessment period are included in this life cycle phase.

The relevant replacement parameters, as specified by the PCR, are summarized in Table 16.

Table 16. *Product replacement parameters for the vinyl flooring products, per 1 m^2.*

Parameter	Units	Orchid +	EcoLay +	EcoClick +
Reference service life	Years	30	30	30
Replacement cycle	-	1.5	1.5	1.5
Energy input	kWh	0	0	0
Freshwater consumption	m^3	0	0	0
Ancillary materials	kg	Negligible	Negligible	Negligible
Replacement parts	kg	7.67	13.0	10.5
Direct emissions	kg	0	0	0

Building operation stage (B6 – B7)

There is no operational energy or water use associated with the use of the product.

Disposal stage (C1 - C4)

The disposal stage includes removal of the products (C1); transport of the flooring products to waste treatment facilities (C2); waste processing (C3); and associated emissions as the product degrades in a landfill or is burned in an incinerator (C4). For the flooring products, no emissions are generated during demolition (C1) while no waste processing (C3) is required for incineration or landfill disposal.

At end-of-life, the product is assumed to be disposed of in a landfill. Transportation for end-of-life scenarios was modeled assuming a distance of 161 km from the point of product use to a landfill, material recovery center, or waste incinerator. Ecoinvent datasets are used to model the impacts associated with incineration and landfilling, which does not include energy recovery from landfill gas. The end-of-life disposal parameters are summarized in Table 17.

Table 17. *End-of-life disposal scenario parameters for the flooring products, per 1 m^2.*

Parameter		Orchid +	EcoLay +	EcoClick +
Assumptions for scenario development		100% landfill	100% landfill	100% landfill
Collection process		-		
Collected with mixed construction waste (kg)		4.68	8.24	6.57
Recovery		n/a	n/a	n/a
Disposal	Landfill (kg)	4.68	8.24	6.57
Removals of biogenic carbon (kg CO_2 eq)[1]		n/a	n/a	n/a

[1] Excluding packaging

5. LCA: Results

Results of the Life Cycle Assessment are presented below. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The following environmental impact category indicators are reported using characterization factors based on the U.S. EPA's Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts – TRACI 2.1. Note that the TRACI 2.1 global warming calculations are based on the IPCC AR5 (2013) characterization factors and do not include biogenic carbon uptake or biomass CO_2 emissions.

TRACI 2.1 Impact Category	Unit
Global Warming Potential (GWP)	kg CO_2 eq
Ozone Depletion Potential (ODP)	kg CFC 11 eq
Acidification Potential (AP)	kg SO_2 eq
Eutrophication Potential (EP)	kg N eq
Smog Formation Potential (SFP)	kg O_3 eq
Fossil Fuel Depletion Potential (FFD)	MJ Surplus, LHV

These impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes. Note that the use of the results of modules A1-A3 without considering the results of module C is discouraged.

The following inventory parameters, specified by the PCR, are also reported.

Resources	Unit	Waste and Outflows	Unit
ADPfossil: Abiotic depletion potential, fossil resources	MJ, LHV	HWD: Hazardous waste disposed	kg
RPR_E: Renewable primary resources used as energy carrier (fuel)	MJ, LHV	**NHWD:** Non-hazardous waste disposed	kg
RPR_M: Renewable primary resources with energy content used as material	MJ, LHV	**HLRW:** High-level radioactive waste, conditioned, to final repository	kg
$NRPR_E$: Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	**ILLRW:** Intermediate- and low-level radioactive waste, conditioned, to final repository	kg
$NRPR_M$: Non-renewable primary resources with energy content used as material	MJ, LHV	**CRU:** Components for re-use	kg
SM: Secondary materials	kg	**MR:** Materials for recycling	kg
RSF: Renewable secondary fuels	MJ, LHV	**MER:** Materials for energy recovery	kg
NRSF: Non-renewable secondary fuels	MJ, LHV	**EE:** Recovered energy exported from the product system	MJ, LHV
RE: Recovered energy	MJ, LHV		
FW: Use of net fresh water resources	m^3		

Table 18. *Life Cycle Impact Assessment results for 1 m^2 of vinyl flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* ***(Orchid +)***

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
TRACI									
GWP (kg CO_2 eq)	4.85	0.524	11.0	2.45	2.82	3.81	37.2	1.05	2.06
	7.4%	0.8%	17%	3.7%	4.3%	5.8%	57%	1.6%	3.1%
AP (kg SO_2 eq)	$1.80x10^{-2}$	$2.13x10^{-3}$	$3.28x10^{-2}$	$9.25x10^{-3}$	$9.79x10^{-3}$	$1.34x10^{-2}$	0.117	$5.03x10^{-3}$	$7.41x10^{-4}$
	8.7%	1%	16%	4.4%	4.7%	6.5%	56%	2.4%	0.36%
EP (kg N eq)	$3.09x10^{-2}$	$4.79x10^{-4}$	$6.43x10^{-2}$	$2.20x10^{-3}$	$3.16x10^{-2}$	$2.35x10^{-2}$	0.358	$5.42x10^{-4}$	0.108
	5%	0.077%	10%	0.35%	5.1%	3.8%	58%	0.088%	17%
SFP (kg O_3 eq)	0.270	$5.67x10^{-2}$	0.347	0.248	0.154	0.197	1.88	0.168	$1.10x10^{-2}$
	8.1%	1.7%	10%	7.4%	4.6%	5.9%	56%	5%	0.33%
ODP (kg CFC11 eq)	$3.80x10^{-6}$	$8.49x10^{-9}$	$1.17x10^{-7}$	$3.99x10^{-8}$	$2.50x10^{-7}$	$6.65x10^{-8}$	$6.36x10^{-6}$	$1.66x10^{-8}$	$1.40x10^{-9}$
	36%	0.08%	1.1%	0.37%	2.3%	0.62%	60%	0.16%	0.013%
FFD (MJ, surplus)	12.9	0.991	11.9	4.67	5.02	9.41	56.4	2.04	0.170
	12%	0.96%	11%	4.5%	4.9%	9.1%	55%	2%	0.16%

Table 19. *Resource use for 1 m^2 of vinyl flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* ***(Orchid +)***

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
ADPF (MJ eq)	94.6	7.21	128	33.9	41.4	74.6	479	13.6	1.22
	11%	0.83%	15%	3.9%	4.7%	8.5%	55%	1.6%	0.14%
RPR_E (MJ)	3.81	$9.23x10^{-2}$	9.82	0.423	2.08	4.23	24.5	$5.91x10^{-2}$	$2.46x10^{-2}$
	8.5%	0.2%	22%	0.94%	4.6%	9.4%	54%	0.13%	0.055%
RPR_M (MJ)	0.00	0.00	7.82	0.00	0.352	0.00	12.3	0.00	0.00
	0%	0%	38%	0%	1.7%	0%	60%	0%	0%
NRPE (MJ)	81.3	7.08	195	33.3	45.7	79.5	566	13.6	1.24
	7.9%	0.69%	19%	3.3%	4.5%	7.8%	55%	1.3%	0.12%
$NRPR_M$ (MJ)	20.3	0.00	$3.75x10^{-2}$	0.00	$1.69x10^{-3}$	0.00	30.5	0.00	0.00
	40%	0%	0.074%	0%	0.0033%	0%	60%	0%	0%
SM (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%	0%
RSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW (m^3)	0.374	$5.45x10^{-3}$	0.838	$2.54x10^{-2}$	0.186	0.746	2.15	$4.91x10^{-3}$	$1.53x10^{-3}$
	8.6%	0.13%	19%	0.59%	4.3%	17%	50%	0.11%	0.035%

Table 20. *Waste and outflows for 1 m^2 of vinyl flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* ***(Orchid +)***

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Wastes									
HWD (kg)	$1.74x10^{-3}$	$4.57x10^{-5}$	$3.81x10^{-4}$	$2.15x10^{-4}$	$7.81x10^{-4}$	$1.02x10^{-3}$	$4.90x10^{-3}$	$9.54x10^{-5}$	$8.58x10^{-6}$
	19%	0.5%	4.1%	2.3%	8.5%	11%	53%	1%	0.093%
NHWD (kg)	0.432	0.336	1.33	1.62	0.752	0.181	13.8	$6.49x10^{-2}$	4.69
	1.9%	1.4%	5.7%	7%	3.2%	0.78%	60%	0.28%	20%
HLRW (kg)	$1.82x10^{-5}$	$4.30x10^{-7}$	$1.93x10^{-4}$	$1.99x10^{-6}$	$1.57x10^{-5}$	$2.31x10^{-5}$	$3.45x10^{-4}$	$2.90x10^{-7}$	$1.12x10^{-7}$
	3%	0.072%	32%	0.33%	2.6%	3.9%	58%	0.049%	0.019%
ILLRW (kg)	$4.92x10^{-5}$	$1.03x10^{-6}$	$7.94x10^{-4}$	$4.73x10^{-6}$	$5.54x10^{-5}$	$7.18x10^{-5}$	$1.36x10^{-3}$	$6.63x10^{-7}$	$2.71x10^{-7}$
	2.1%	0.044%	34%	0.2%	2.4%	3.1%	58%	0.028%	0.012%
CRU (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR (kg)	0.00	0.00	0.00	0.00	0.140	0.00	0.210	0.00	0.00
	0%	0%	0%	0%	40%	0%	60%	0%	0%
MER (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 21. *Life Cycle Impact Assessment results for 1 m^2 of vinyl flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* ***(EcoLay +)***

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
TRACI									
GWP (kg CO_2 eq)	10.8	1.11	11.0	4.16	1.69	3.81	51.3	1.84	3.56
	12%	1.2%	12%	4.7%	1.9%	4.3%	57%	2.1%	4%
AP (kg SO_2 eq)	$4.07x10^{-2}$	$5.10x10^{-3}$	$3.28x10^{-2}$	$1.57x10^{-2}$	$5.22x10^{-3}$	$1.34x10^{-2}$	0.164	$8.86x10^{-3}$	$1.32x10^{-3}$
	14%	1.8%	11%	5.5%	1.8%	4.7%	57%	3.1%	0.46%
EP (kg N eq)	$6.67x10^{-2}$	$1.05x10^{-3}$	$6.43x10^{-2}$	$3.73x10^{-3}$	$2.04x10^{-2}$	$2.35x10^{-2}$	0.524	$9.55x10^{-4}$	0.192
	7.4%	0.12%	7.2%	0.42%	2.3%	2.6%	58%	0.11%	21%
SFP (kg O_3 eq)	0.615	0.134	0.347	0.420	$9.96x10^{-2}$	0.197	2.89	0.295	$1.94x10^{-2}$
	12%	2.7%	6.9%	8.4%	2%	3.9%	58%	5.9%	0.39%
ODP (kg CFC11 eq)	$9.62x10^{-6}$	$1.78x10^{-8}$	$1.17x10^{-7}$	$6.76x10^{-8}$	$4.45x10^{-7}$	$6.65x10^{-8}$	$1.55x10^{-5}$	$2.92x10^{-8}$	$2.46x10^{-9}$
	37%	0.069%	0.45%	0.26%	1.7%	0.26%	60%	0.11%	0.0095%
FFD (MJ, surplus)	28.4	2.08	11.9	7.91	2.65	9.41	85.2	3.58	0.299
	19%	1.4%	7.8%	5.2%	1.7%	6.2%	56%	2.4%	0.2%

Table 22. *Resource use for 1 m^2 of vinyl flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* ***(EcoLay +)***

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
ADPF (MJ eq)	210	15.1	128	57.5	21.0	74.6	686	23.9	2.15
	17%	1.2%	10%	4.7%	1.7%	6.1%	56%	2%	0.18%
RPR_E (MJ)	8.22	0.202	9.82	0.718	0.867	4.23	30.0	0.104	$4.29x10^{-2}$
	15%	0.37%	18%	1.3%	1.6%	7.8%	55%	0.19%	0.079%
RPR_M (MJ)	0.00	0.00	7.82	0.00	0.352	0.00	12.3	0.00	0.00
	0%	0%	38%	0%	1.7%	0%	60%	0%	0%
NRPE (MJ)	185	14.9	195	56.4	24.6	79.5	753	23.9	2.17
	14%	1.1%	15%	4.2%	1.8%	6%	56%	1.8%	0.16%
$NRPR_M$ (MJ)	38.5	0.00	$3.75x10^{-2}$	0.00	$1.69x10^{-3}$	0.00	57.7	0.00	0.00
	40%	0%	0.039%	0%	0.0018%	0%	60%	0%	0%
SM (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%	0%
RSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW (m^3)	0.802	$1.16x10^{-2}$	0.838	$4.31x10^{-2}$	$7.74x10^{-2}$	0.746	2.67	$8.64x10^{-3}$	$2.68x10^{-3}$
	15%	0.22%	16%	0.83%	1.5%	14%	51%	0.17%	0.051%

Table 23. *Waste and outflows for 1 m^2 of vinyl flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* ***(EcoLay +)***

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Wastes									
HWD (kg)	$3.53x10^{-3}$	$9.55x10^{-5}$	$3.81x10^{-4}$	$3.65x10^{-4}$	$2.15x10^{-4}$	$1.02x10^{-3}$	$7.15x10^{-3}$	$1.68x10^{-4}$	$1.51x10^{-5}$
	27%	0.74%	2.9%	2.8%	1.7%	7.9%	55%	1.3%	0.12%
NHWD (kg)	0.879	0.674	1.33	2.74	0.879	0.181	22.3	0.114	8.26
	2.4%	1.8%	3.6%	7.3%	2.4%	0.49%	60%	0.31%	22%
HLRW (kg)	$3.87x10^{-5}$	$9.32x10^{-7}$	$1.93x10^{-4}$	$3.37x10^{-6}$	$1.07x10^{-5}$	$2.31x10^{-5}$	$3.71x10^{-4}$	$5.10x10^{-7}$	$1.96x10^{-7}$
	6%	0.15%	30%	0.53%	1.7%	3.6%	58%	0.08%	0.031%
ILLRW (kg)	$1.04x10^{-4}$	$2.23x10^{-6}$	$7.94x10^{-4}$	$8.03x10^{-6}$	$4.10x10^{-5}$	$7.18x10^{-5}$	$1.43x10^{-3}$	$1.17x10^{-6}$	$4.72x10^{-7}$
	4.2%	0.091%	32%	0.33%	1.7%	2.9%	58%	0.048%	0.019%
CRU (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR (kg)	0.00	0.00	0.00	0.00	0.140	0.00	0.210	0.00	0.00
	0%	0%	0%	0%	40%	0%	60%	0%	0%
MER (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 24. *Life Cycle Impact Assessment results for 1 m² of vinyl flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* ***(EcoClick +)***

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
TRACI									
GWP (kg CO_2 eq)	8.49	0.926	11.0	3.36	3.11	3.81	47.2	1.47	3.04
	10%	1.1%	13%	4.1%	3.8%	4.6%	57%	1.8%	3.7%
AP (kg SO_2 eq)	$3.34x10^{-2}$	$4.60x10^{-3}$	$3.28x10^{-2}$	$1.27x10^{-2}$	$1.09x10^{-2}$	$1.34x10^{-2}$	0.154	$7.07x10^{-3}$	$1.02x10^{-3}$
	12%	1.7%	12%	4.7%	4%	5%	57%	2.6%	0.38%
EP (kg N eq)	$5.09x10^{-2}$	$8.97x10^{-4}$	$6.43x10^{-2}$	$3.01x10^{-3}$	$3.44x10^{-2}$	$2.35x10^{-2}$	0.456	$7.62x10^{-4}$	0.150
	6.5%	0.11%	8.2%	0.38%	4.4%	3%	58%	0.097%	19%
SFP (kg O_3 eq)	0.501	0.120	0.347	0.339	0.175	0.197	2.60	0.235	$1.57x10^{-2}$
	11%	2.7%	7.7%	7.5%	3.9%	4.3%	57%	5.2%	0.35%
ODP (kg CFC11 eq)	$6.29x10^{-6}$	$1.49x10^{-8}$	$1.17x10^{-7}$	$5.46x10^{-8}$	$3.63x10^{-7}$	$6.65x10^{-8}$	$1.03x10^{-5}$	$2.33x10^{-8}$	$1.97x10^{-9}$
	37%	0.087%	0.68%	0.32%	2.1%	0.39%	60%	0.14%	0.011%
FFD (MJ, surplus)	21.7	1.73	11.9	6.39	5.58	9.41	75.6	2.86	0.239
	16%	1.3%	8.8%	4.7%	4.1%	6.9%	56%	2.1%	0.18%

Table 25. *Resource use for 1 m² of vinyl flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* ***(EcoClick +)***

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
ADPF (MJ eq)	161	12.6	128	46.5	45.5	74.6	621	19.1	1.72
	15%	1.1%	11%	4.2%	4.1%	6.7%	56%	1.7%	0.16%
RPR_E (MJ)	6.67	0.173	9.82	0.580	2.22	4.23	29.4	$8.30x10^{-2}$	$3.53x10^{-2}$
	13%	0.33%	18%	1.1%	4.2%	7.9%	55%	0.16%	0.066%
RPR_M (MJ)	0.00	0.00	7.82	0.00	0.352	0.00	12.3	0.00	0.00
	0%	0%	38%	0%	1.7%	0%	60%	0%	0%
NRPE (MJ)	150	12.4	195	45.6	50.0	79.5	710	19.0	1.74
	12%	0.98%	15%	3.6%	4%	6.3%	56%	1.5%	0.14%
$NRPR_M$ (MJ)	22.9	0.00	$3.75x10^{-2}$	0.00	$1.69x10^{-3}$	0.00	34.3	0.00	0.00
	40%	0%	0.065%	0%	0.0029%	0%	60%	0%	0%
SM (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%	0%
RSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW (m^3)	0.638	$9.83x10^{-3}$	0.838	$3.48x10^{-2}$	0.199	0.746	2.59	$6.89x10^{-3}$	$2.19x10^{-3}$
	13%	0.19%	17%	0.69%	3.9%	15%	51%	0.14%	0.043%

Table 26. *Waste and outflows for 1 m^2 of vinyl flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* (***EcoClick +)***

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Wastes									
HWD (kg)	$2.74x10^{-3}$	$7.95x10^{-5}$	$3.81x10^{-4}$	$2.95x10^{-4}$	$8.33x10^{-4}$	$1.02x10^{-3}$	$6.71x10^{-3}$	$1.34x10^{-4}$	$1.21x10^{-5}$
	22%	0.65%	3.1%	2.4%	6.8%	8.3%	55%	1.1%	0.099%
NHWD (kg)	0.798	0.545	1.33	2.21	0.895	0.181	18.7	$9.11x10^{-2}$	6.59
	2.5%	1.7%	4.2%	7.1%	2.9%	0.58%	60%	0.29%	21%
HLRW (kg)	$3.11x10^{-5}$	$7.94x10^{-7}$	$1.93x10^{-4}$	$2.72x10^{-6}$	$1.64x10^{-5}$	$2.31x10^{-5}$	$3.67x10^{-4}$	$4.07x10^{-7}$	$1.62x10^{-7}$
	4.9%	0.13%	30%	0.43%	2.6%	3.6%	58%	0.064%	0.026%
ILLRW (kg)	$8.40x10^{-5}$	$1.91x10^{-6}$	$7.94x10^{-4}$	$6.48x10^{-6}$	$5.71x10^{-5}$	$7.18x10^{-5}$	$1.42x10^{-3}$	$9.31x10^{-7}$	$3.89x10^{-7}$
	3.5%	0.078%	33%	0.27%	2.3%	3%	58%	0.038%	0.016%
CRU (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR (kg)	0.00	0.00	0.00	0.00	0.140	0.00	0.210	0.00	0.00
	0%	0%	0%	0%	40%	0%	60%	0%	0%
MER (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

6. LCA: Interpretation

The contributions to total impact indicator results are dominated by the product replacement phase (B4) of the assessment. Of the remaining life cycle phases, with few exceptions, the raw material extraction and processing phase (A1) is the largest contributor to overall impacts followed by the product manufacturing phase (A3) and product distribution (A4) phases. The product installation (A5) and product maintenance (B2) phases are also significant contributors to the life cycle impacts for the flooring products. Exceptions include the Eutrophication Potential indicator, dominated by the product disposal phase; and the Smog Formation and Acidification potential indicators which show large contributions from the product distribution phase.

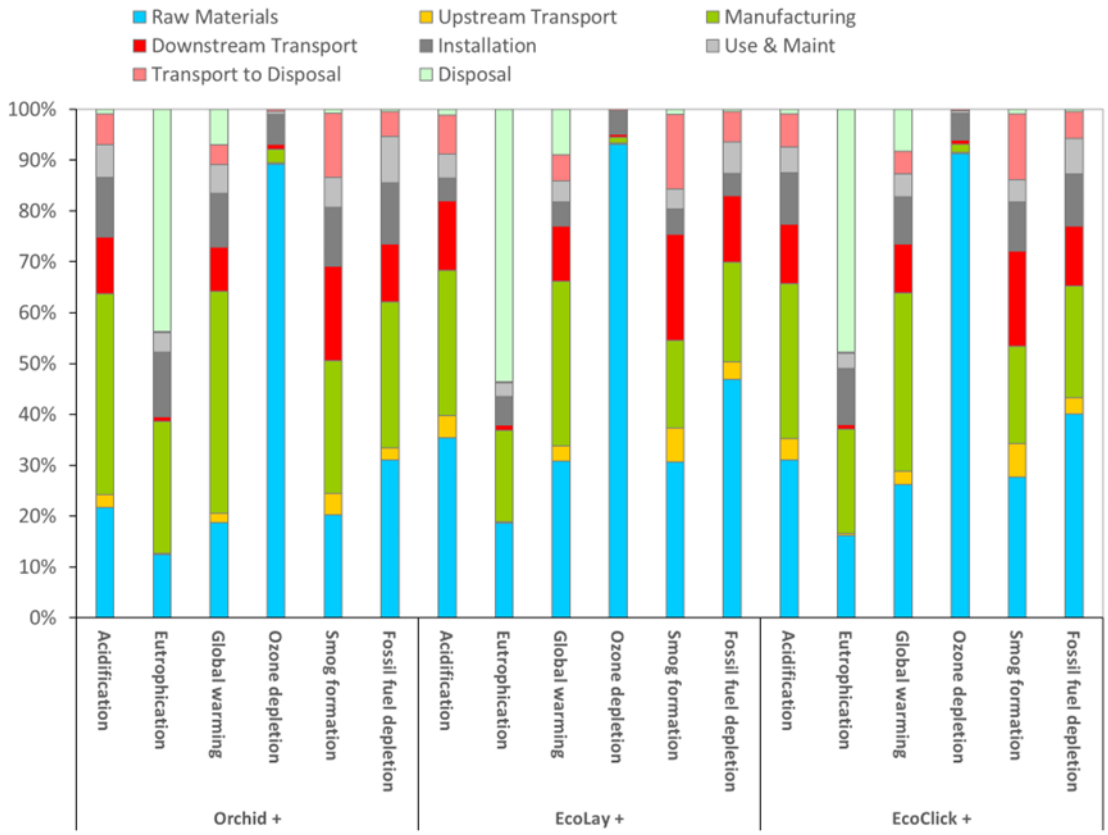

Figure 2. *Contribution analysis for the vinyl flooring products (excluding product replacements).*

7. Additional Environmental Information

7.1 ENVIRONMENT AND HEALTH DURING MANUFACTURING

The manufacturing facility is certified to ISO 9001 – Environmental management systems.

7.2 ENVIRONMENT AND HEALTH DURING INSTALLATION

The NOX LVT flooring products meet the requirements of the following:

- Indoor Air Comfort Gold (VOC certification)
- CDPH/EHLB Standard Method v1.2-2017 (California Section 01350)

7.3 ENVIRONMENTAL ACTIVITIES AND CERTIFICATIONS

For more information on NOX certifications and environmental initiatives please view the website at https://www.noxglobal.com/.

8. References

1. Life Cycle Assessment of Luxury Vinyl Flooring. SCS Global Services Report. Prepared for NOX US, LLC. June 2025.
2. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
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5. PCR for Building-Related Products and Services - Part A: LCA Calculation Rules and Report Requirements, UL 10010, UL v.4.0, March 2022.
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