WE'VE GOT IT COVERED

SITE CARBON FOOTPRINT & PRODUCT CARBON FOOTPRINT THROUGH THE SUPPLY CHAIN

January 2023


Contents

INTRODUCTION

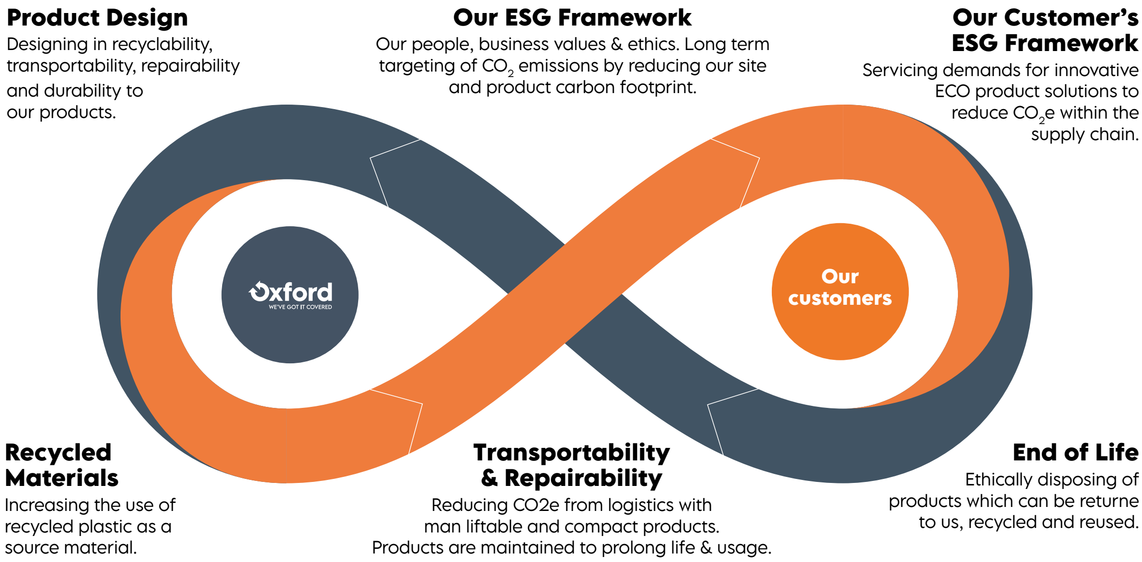
Oxford Plastic Systems Ltd (Oxford Plastics) is dedicated to reducing carbon emissions in our supply chain.

We do this by designing and manufacturing carbon efficient products which are lightweight, durable, and repairable. This approach is illustrated in Figure 1, it helps to keep products within the circular economy and to reduce the consumption of carbon by ourselves, our customers and the end users who ultimately use the products.

OUR JOINED UP APPRAOCH TO SUSTAINABILITY

Working in partnership to reduce carbon emissions in the supply chain

Figure 1 Oxford Plastic's approach to sustainability through the supply chain[1]



This report outlines the steps that Oxford Plastics has taken to quantify our carbon impact and that of our products. We have followed guidance from Carbon Footprint consultants and used online resources from the Greenhouse Gas Protocol[1] to create our first carbon footprint report.

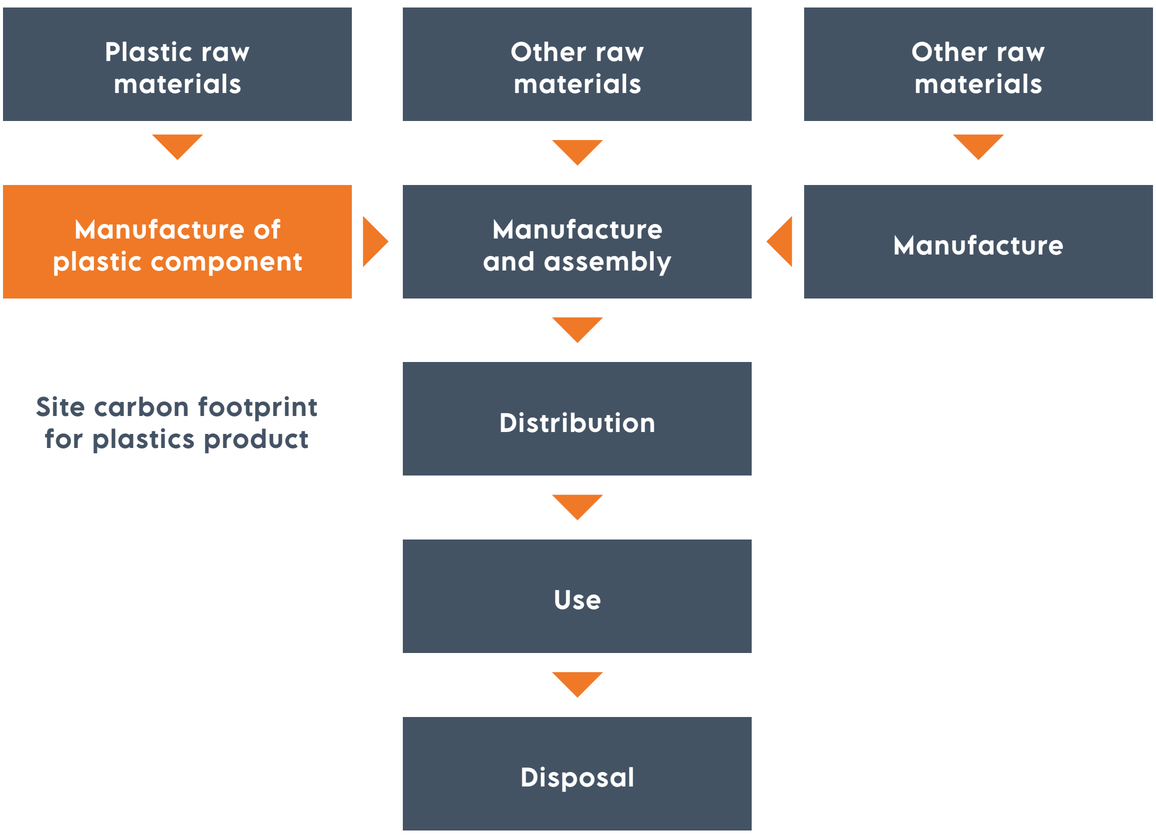
There is no legal regulatory requirement for Oxford Plastics to submit a carbon footprint report, however we believe that it is the responsibility of companies to take an active interest in the effects they have on the world around them. We strive to be a sustainable SME and hope that this report can facilitate other businesses to do the same. It is Oxford Plastic's intention to review our carbon impact on an annual basis, and to use these results to further decrease the carbon impact of our business, our products, and our supply chain as a whole.

1 https://ghgprotocol.org/

SITE CARBON FOOTPRINT

We began by calculating the carbon footprint of Oxford Plastics at our head office site in Enstone, Oxfordshire. The position of Oxford Plastics' carbon footprint sits within the below framework (Figure 2) of the overall carbon footprint supply chain.

Figure 2 Carbon Footprint Flow Chart[3]



We chose to analyse a 12 month period of time to give an accurate representation of the company's energy and resource consumption. The months preceding September 2020 were highly affected by the global pandemic, which limited the company's production, electricity usage and employee travel among other carbon emitting activities. For this reason, figures were analysed from September 2020 – August 2021.

Carbon emission factors were sourced from the 'Greenhouse Gas Emissions Calculation Tool' published by the Greenhouse Gas Protocol[2]. Figures 3 & 4 below illustrate the 12-month site carbon footprint of Oxford Plastics, segmented by scope 1, scope 2 and scope 3 emissions. The total site Co_2e (carbon dioxide equivalent emissions) over 12 months is 2,912.48 Tn.

2 https://ghgprotocol.org/calculation-tools
3 Adapted from Tangram Technologies

SITE CARBON FOOTPRINT

Period: 12 months - 01 September 2020 - 31 August 2021

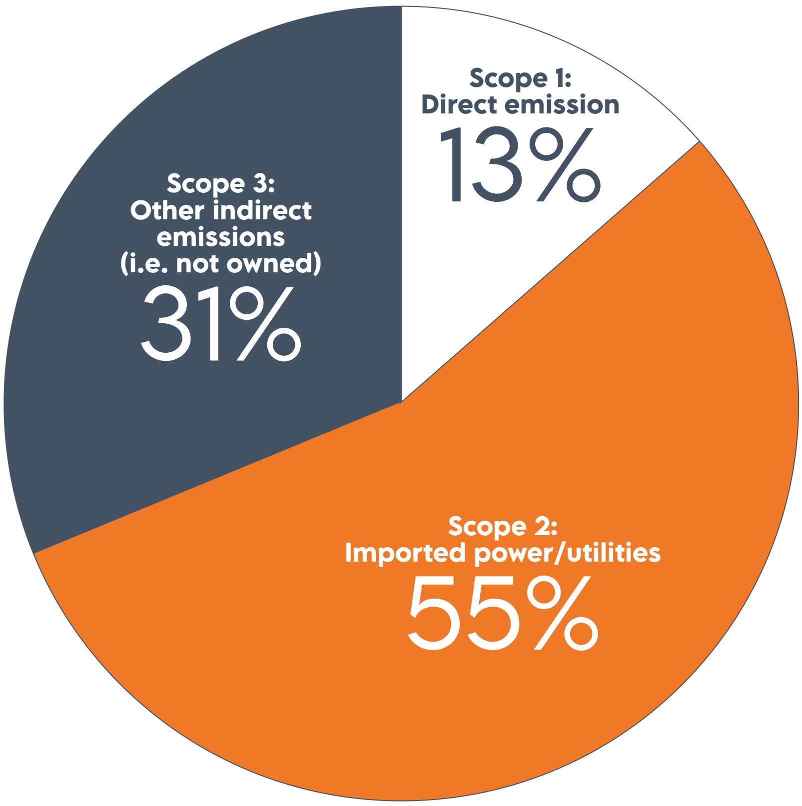
Figure 3 Oxford Plastics Site Carbon Footprint 2020-2021

Emissions type	Emission source	Emissions		Purchased energy		Cost (estimated)	
		tCO_2e	%	kWh/yr	%	£/yr	%
Scope 1: Direct emission	Gas (site heating)	0.00	0.00	0	0.00	0	0.00
	Oil use	358.40	12.31	1,385,155	18.26	84,000	8.17
	Owned van	7.76	0.27				
	Refrigerant emissions	26.84	0.92				
	Sub total	**393.00**	**13.49**	**0**	**0.00**	**84,000**	**8.17**
Scope 2: Imported power/ utilities	Electricity	1,610.88	55.31	7,586,664	100.00	944,732	91.83
	Sub total	**1,610.88**	**55.31**	**7,586,664**	**100.00**	**944,732**	**91.83**
Scope 3: Other indirect emissions (i.e. not owned)	Electricity - T&D, WTT losses	599.12	20.57				
	Employee travel - own car	0.66	0.02				
	Employee travel - air transport	38.68	1.33				
	Employee travel - taxi	0.13	0.00				
	Employee travel - rental car	0.22	0.01				
	Employee travel - train	0.00	0.00				
	Employee travel - bus	0.00	0.00				
	Employee travel - commuting	85.64	2.94				
	Self-employed sales agents	33.60	1.15				
	Contracted freight transport	137.47	4.72	Assumed data			
	Water use	1.10	0.04				
	Waste disposal	11.99	0.41				
	Sub total	908.61	31.20				
	TOTAL	**2,912.48**	**100**	**7,586,664**	**100**	**1,028,732**	**100**
Production	12,000,000 kg/year	0.243 $kgCO_2e/kg$					

SITE CARBON FOOTPRINT

Figure 4 Oxford Plastics Site Carbon Footprint 2020-2021 Scope Summary

Scope 1:	**Direct emission**	**13%**
Scope 2:	**Imported power/utilities**	**55%**
Scope 3:	**Other indirect emissions (i.e. not owned)**	**31%**



PRODUCT CARBON FOOTPRINT

Embodied product carbon footprint was calculated using carbon emission factors from ‘ICE (Inventory of Carbon and Energy)’ (V3.0 – 10 November 2019) by Dr Craig Jones and Professor Geoffrey Hammond, in association with Circular Ecology and University of Bath.[4]

The company’s site carbon emission output, not including the scope 2 energy consumption, was then apportioned by product weight to calculate the embodied carbon footprint of products manufactured and sold by Oxford Plastics.

The company’s scope 2 energy consumption was apportioned using internal data on the amount of electricity used to manufacture the component. Where parts are sourced, only the carbon emission factor of the embodied carbon within the material has been used.

An example calculation is drawn out in Figure 5 for the O683 Avalon Barrier 2m with ClearPath Extra Feet. This product has an embodied carbon footprint of 0.026 tCO2e. The carbon emission factor material of each component uses either data from the GHGProtocol tool, or data supplied by the material manufacturer.

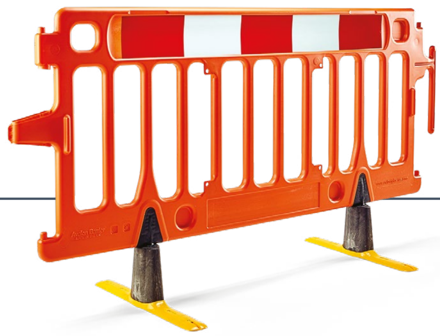


Figure 5 **Embodied Product Carbon Footprint Avalon Barrier with Standard Feet**

Product	Components	Kg	Material	tCO$_2$e/kg	tCO$_2$e
Avalon 2m	PVC Cable	3.71	PVC pipe	0.00323	0.0119786
Clearpath extra feet	(r) LDPE - Fractional melt	0.41	LDPE resin	0.00208	0.0008570
0635	HDPE	0.41	HDPE resin	0.00193	0.0007952
	Avalon orange 2m	5.00	HDPE resin	0.00193	0.0096500
	(09899) 1.25m reflective strip	0.05	UPVC film	0.00316	0.0001580
	0609 Pultrusion	0.16	Glass reinforced plastic	0.00810	0.0012960
	OXP tCO$_2$e per Kg allocation	9.74		0.00004064	0.0003959
				KwH	
	Electricity cost per unit	£0.24		1.83	0.0005334
	Total tCO$_2$e				**0.0256623**

A summary of core Oxford Plastics products and their embodied carbon footprint is illustrated in Figure 6.

4 https://circularecology.com/embodied-carbon-footprint-database.html

PRODUCT CARBON FOOTPRINT

Figure 6 Embodied Product Carbon Footprint

Category	Product code	Product	Total $kgCO_2e$
Barriers & Fencing	O635	Avalon 2m ClearPath Extra Feet	26
Barriers & Fencing	O635	Avalon 2m Standard Feet	28
Barriers & Fencing	O9738	SafeGate 4 Way	17
Barriers & Fencing	O204	SafeBase	9
Barriers & Fencing	O193	StrongWall MK3 Base	64
Barriers & Fencing	O629	StrongWall Middle	11
Barriers & Fencing	O687	StrongFence Top	6
Barriers & Fencing		StrongWall Assembled	74
Barriers & Fencing		StrongFence Assembled	81
Fence Feet & Heavy Bases	O203	Temporary Fence Weight	49
Fence Feet & Heavy Bases	O630	SoleBoard	4
Fence Feet & Heavy Bases	O614	OxStand	16
Ground Protection	O329	ClearPath Mat	74
Ground Protection	O681	EnduraGrid	8
Ground Protection	O651	EnduraMat 2440	73
Ground Protection	O751	EnduraMat 2400	73
Road Plates & Trench Covers	O815	LowPro 15/10	79
Road Plates & Trench Covers	O815	LowPro 11/11	57
Road Plates & Trench Covers	O839	LowPro 23/05 Road Plate Inner	106
Road Plates & Trench Covers	O726	LowPro 23/05 Road Plate Outer	67
Road Plates & Trench Covers	O362	LowPro 12/8	126
Road Plates & Trench Covers	O839	LowPro 15/05 Road Plate Inner	90
Road Plates & Trench Covers	O814	LowPro 15/05 Road Plate Outer	34
Road Plates & Trench Covers	O383	LowPro 12/8 Infill Short	4
Road Plates & Trench Covers	O364	LowPro 12/8 Infill Long	6
Road Plates & Trench Covers	O375	LowPro 15/10 Infill Short	6
Road Plates & Trench Covers	O840	LowPro 15/10 Infill Long	7
Road Plates & Trench Covers	O731	LowPro 23/05 Stillage	605
Road Plates & Trench Covers	O730	EasiLift Handles (Pair)	20
Road Plates & Trench Covers	O761	LowPro 100 40mm	10
Traffic Management	O424	EnduraSign Quickfit Frame	10
Traffic Management	O426	EnduraSign Ballast Weight	24
Traffic Management	O321	EnduraRamp 75mm Inner	40
Traffic Management	O323	EnduraRamp 75mm End	16
Traffic Management	O492	EnduraFrame 1500	23

Using the known embodied carbon footprint figures we have created case studies to explore the difference in carbon footprint between Oxford Plastics products and similar alternatives used on construction and other work sites.

CASE STUDY 1:
Lifecycle Carbon Footprint in the UK of LowPro 23/05 Road Plates compared to Steel Road Plates

SUMMARY

The lifetime carbon footprint comparison for a set of steel road plates (Figure 8) versus a set of LowPro 23/05 Road Plates (Figure 7) shows that composite road plates have a significantly lower carbon footprint. Figure 9 illustrates the huge carbon emission savings of using a set of LowPro 23/05 Road Plates instead of steel road plates. This can save 79% of carbon emissions over the lifetime of the equipment

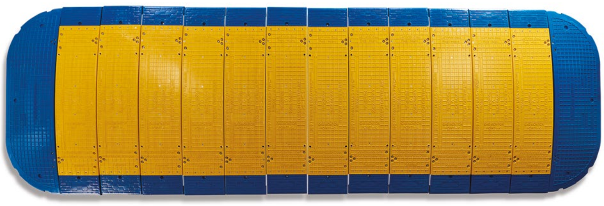


Figure 7 **LowPro 23/05 Road Plate Set**

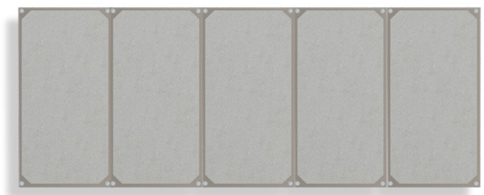
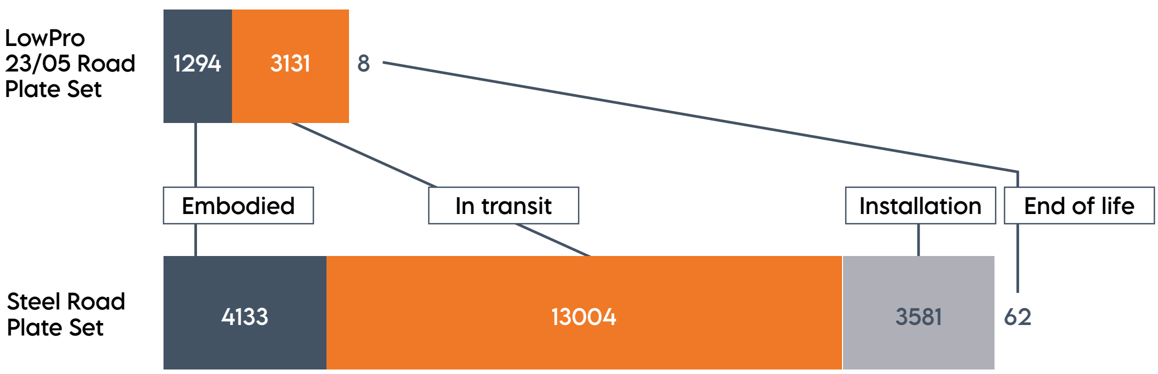


Figure 8 **Steel Road Plate Set**

This represents a significant potential carbon footprint saving for supply chains in the construction industry. Making educated changes like this can have a positive and meaningful impact on the world's carbon footprint, where in 2021 11% of the world's carbon emissions output came from the construction industry.[5]

Figure 9 **Road Plate Lifetime Carbon Footprint Comparison (kgCO_2e)**



5 https://www.raeng.org.uk/news/news-releases/2021/september/construction-sector-must-move-further-and-faster-t

Procurement contracts and construction tenders are increasingly concerned with sustainability credentials; to actively promote sustainable procurement throughout their supply chain from contractors committed to the principles of reducing, reusing and recycling resources.

PARAMETERS

This case study explains the total carbon footprint over the life of Oxford Plastics' LowPro 23/05 Composite Road Plate, compared to the equivalent Steel Road Plate as determined by the HAUC Advice Note 2018/01 'SPECIFICATION AND OPERATIONAL REQUIREMENTS FOR FOOTWAY BOARDS, DRIVEWAY BOARDS, FOOTWAY RAMPS AND ROAD PLATES'.[6]

THE EQUIPMENT

The maximum trench width for the LowPro 23/05 is 1200mm. This is a modular product made up of 2.3m x 0.5m load bearing sections. Each piece weighs 65kg. The equivalent steel road plate, according to HAUC guidance, is 1.25m x 2.4m, 27mm thick weighing 635kg.

DATA SOURCES

Carbon emissions factors were sourced from the 'Greenhouse Gas Emissions Calculation Tool'[7] published by the Greenhouse Gas Protocol , and 'ICE (Inventory of Carbon and Energy)' (V3.0 – 10 November 2019).[8]

6 https://roadworks.scot/sites/default/files/publications/add/HAUC%28UK%29%20Footway%20Boards%20HAUC%20Advice%202018.pdf
7 https://ghgprotocol.org/calculation-tools
8 https://circularecology.com/embodied-carbon-footprint-database.html

ASSUMPTIONS

THE APPLICATION

For this study we have chosen a typical example where a road plate is used. This study looks at excavations in the carriageway, where a road plate must cover the span of the road, and where most roads are 6m wide. Therefore, the quantity of LowPro 23/05 road plates needed to cover the trench is 12, and the quantity of steel road plates is 5.

DISTANCE TRAVELLED

Excavations are carried out across the country, with local hubs, distribution centres and depots typically within a few miles of the site. We have approximated that the work site is 30 miles away from where the road plate is stored. Transit has been calculated at 60 miles per job, to account for the equipment being transported to and from the work site.

IN TRANSIT

The typical vehicle that transports 12 LowPro 23/05 Road Plates, which in total weigh 780kg, is a 3.5t van. The typical vehicle that transports 5 steel road plates, which in total weigh 3175kg, is an 18t rigid HGV.

USAGE

Road plates can be in use on jobs from a few hours to several weeks. We have estimated that a set of road plates will be used on 20 jobs per year.

INSTALLATION

The LowPro 23/05 Road Plates, like all LowPro Road Plates & Trench Covers from Oxford Plastics, are manually installed. They can be transported to site and stored in the bespoke steel stillage which holds 14 pieces of road plate. In this instance, the full stillage must be manoeuvred by forklift. For maximum carbon efficiency the LowPros must be installed by hand. In this case study we have assumed that the road plate is moved by hand. A single steel road plate weighs 635kg, and so this must be moved by an HGV fitted with a crane. It is estimated by our customers that 10 litres of diesel is used over 2 hours to install and dismantle the set of steel road plates.

THE LIFECYCLE OF A ROAD PLATE

The lifecycle of a composite road plate can be many years with proper use. However, feedback from our customers show that steel road plates for hire are in use for typically 7 years. And so, we have selected 7 years as the lifecycle duration for this case study.

END OF LIFE

At end of life, it is estimated by Worldsteel LCI reports that 85% of steel is recycled.[9] LowPro 23/05 Road Plates cannot be recycled, they are either burnt to create Energy from Waste (EFW) or sent to landfill. For the purpose of this example, we have assumed that most end of life LowPro 23/05 are sent to an energy from waste facility.

9 https://worldsteel.org/wp-content/uploads/Life-cycle-inventory-LCI-study-2020-data-release.pdf

RESULTS

The following figures show Oxford Plastic's calculations of the phases which add up to quantify the lifecycle carbon footprint. These have been split out into scope 1 & 2 emissions with the embodied carbon footprint, and scope 3 emissions with in transit, installation and end of life emissions.

EMBODIED CARBON FOOTPRINT

Equipment	Quantity required for 6m trench	tCO_2e per unit	Total Embodied tCO_2e
Steel road plate	5	0.827	4.133
LowPro 23/05 road plate	12	0.108	1.294

The quantity of road plates is multiplied by the embodied carbon footprint of 1 unit. This is calculated as the embodied product carbon footprint of a LowPro 23/05 Road Plate inner piece (Figure 5), and the embodied carbon footprint of a 1.25m x 2.4m, 27mm thick sheet of steel.

IN TRANSIT CARBON FOOTPRINT

Equipment	Vehicle	GHG Emission Factor tCO_2e per mile	Miles per use	Journeys per year	Lifecycle (years)	Total Lifetime tCO_2e
Steel road plates	Delivery vehicles - HGV (all diesel) - Rigid (>17 tonnes)	0.0015	60	20	7	13.004
LowPro 23/05 road plates	Delivery vehicles - Vans - Average (up to 3.5 tonnes) - Diesel	0.0004	60	20	7	3.383

The in transit carbon footprint is calculated by multiplying the carbon emission factor of the respective vehicle used to transport the equipment with the number of miles the equipment travels over its lifetime to work sites.

INSTALLATION CARBON FOOTPRINT FOR STEEL ROAD PLATES

Heavy Lifting Equipment	GHG Emission Factor per litre	Gallons per installation & dismantle	Instances per year	Lifecycle (years)	Total Installation tCO2e
Fuels - Diesel (average biofuel blend)	0.0026	10	20	7	3.581

The installation carbon footprint is calculated as 0 for LowPro 23/05 Road Plates, as no heavy lifting equipment is required for a manual installation. The steel road plate installation is calculated by multiplying the emission factor of a heavy-duty vehicle with the amount of diesel consumed over the lifetime of installations.

END OF LIFE

LowPro 23/05	%	GHG Emissions Factor CO2e/kg plastic	Weight kg	Total kg CO2e	Total tCO_2e
Energy from waste	100%	0.009	780	6.944	0.007

Steel Road Plate	%	GHG Emissions Factor CO_2e/kg plastic	Weight kg	Total $kgCO_2e$ by End of Life	Total tCO_2e
Recycled to product	85%	0.021	3175	56.673	0.062
Landfill	15%	0.009	3175	4.286	

The end of life carbon footprint is calculated by multiplying the emission factor of the end of life process. Where all LowPro 23/05 Road Plates go to energy from waste, and the majority of steel road plated are recycled with a further 15% going to landfill.

LIFETIME COMPARISON

Equipment	Total Embodied tCO_2e	Total Transit tCO_2e	Installation tCO_2e	End of life tCO_2e	Total Lifecycle
Steel road plate	4.133	13.004	3.581	0.062	20.780
LowPro 23/05 road plate	1.294	3.383	0	0.007	4.432

The lifecycle carbon footprint is the sum of the earlier calculations. Here we can see that the overall carbon footprint of the lightweight, manually handled, composite LowPro 23/05 Road Plate is 21% of the steel road plate alternative. This signifies an 79% reduction in carbon emissions throughout the supply chain.

CONCLUSION

By using the set of LowPro 23/05 Road Plate instead of the set of steel road plates, there is 79% reduction in carbon dioxide emissions. This directly impacts the carbon footprint of the business, contractor, and customer where trench work is needed, to reduce carbon emissions through the supply chain.

In a single case of choosing the LowPro 23/05 instead of the steel road plates, the supply chain eliminates 16 tonnes of carbon dioxide equivalent emissions. For a typical hire business in the UK with 1000 steel road plates within its fleet, using a lightweight road plate can save 1600 tonnes of CO2e over the lifetime of the products.

APPENDIX

This carbon footprint for site and product report has been independently verified by Hydrock, an award-winning, multidisciplinary engineering design consultancy, supporting clients across the UK with their ESG agendas.

View the assurance statement below.

Hydrock

Assurance Statement

Relating to the assurance engagement of Oxford Plastics Ltd product carbon footprint carbon assurance.

This Assurance Statement has been prepared for Oxford Plastics Ltd in accordance with our contract.

Terms of Engagement
Hydrock Limited was commissioned by Oxford Plastics Ltd to provide greenhouse gas, specifically carbon assurance on the product carbon footprint LowPro 23/05.

Hydrock has not been involved in the collection of data, methodology or company scope 1,2 and 3 part of the Carbon footprint report.

Management Responsibility
Oxford Plastics Ltd was responsible for the collection of data, methodology and reporting within the Carbon Footprint Report dated 16/10/2022. Hydrock Limited responsibility was to carry out Green House Gas assurance, in accordance with our contract with Oxford Plastics Ltd.

Hydrock Limited Approach
Our assurance engagement has been conducted in accordance with our guidance for validation and verification of greenhouse gas assertions to provide a level of assurance of the claim of conformity.

To form our conclusions, the assurance engagement was undertaken as a sampling exercise and covered the following activities:

- Interview relevant staff involved in the carbon foot printing process.
- Assure the carbon footprint of the Product Carbon Footprint & case study 1 on the LowPro 23/05 vs Steel plate.
- Review all relevant and submitted information to do with the assessment.
- Recommend opportunities for improvement.

Hydrock Limited Opinion
Based on Hydrock Limited approach Oxford Plastics Carbon Report, dated 16/10/20222 Product Carbon Footprint & LowPro23/05 Vs Steel Plates is an accurate representation of the product carbon footprint and savings based on the scenario's presented at the time of the study.
*Accuracy is up to 95%

Notes for information:

- Hydrock Limited recommends a verification service on all Green House Gas work to assure conformity against standards and future claims.
- This engagement has not verified any claims to PAS2050.
- The client wishes to externally state the projects deliverables. Any risk to Hydrock Limited is mitigated by this assurance statement and any future risk remain with the client.

Hydrock Limited competence and independence
Hydrock Limited ensures the selection of appropriately qualified individuals based on their qualifications, training and experience. The outcome of all assurance engagements is internally reviewed by senior management to ensure that the approach applied is rigorous and transparent.

Signed

Issue date: 20/10/2022
Expiry date: 20/10/2023

Matthew Pygott
Lead GHG Verifier
MatthewPygott@hydrock.com

Oxford
WE'VE GOT IT COVERED