Downer
Relationships creating success

Asphalt

in Australia

Environmental Product Declaration in accordance with ISO 14025 and EN 15804+A2:2019

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AUSTRALASIA EPD® ENVIRONMENTAL PRODUCT DECLARATIONS

ECO PLATFORM EPD VERIFIED

Contents

Welcome

At Downer, we focus on our customers' success in everything we do – because we believe that when our customers are successful, so are we.

We understand that our customers are facing unprecedented challenges, with climate change, left unaddressed, posing a threat to the economy, as well as our health, our communities and our future. The energy transition will require everyone to find new ways to deliver services, while minimising impact on our environment.

The services Downer delivers for our customers touch the lives of millions of people across Australia every day. Our Purpose, '**Enabling communities to thrive**', encapsulates the important role that Downer plays in Australia's journey towards net zero emissions. For Downer, climate change is not only a challenge, but also an opportunity to contribute to a brighter future, and enable communities to thrive for generations to come.

With presence across every Australian state and territory, Downer's Transport & Infrastructure business has invested more than $100 million in high recycling technology (HRT) asphalt manufacturing infrastructure over recent years. Forming part of our overarching decarbonisation strategy, this investment enables the production of up to 100% recycled asphalt mixes at our HRT asphalt facilities, significantly reducing both carbon emissions and draw on finite natural resources, while delivering specification-exceeding asphalt performance.

Downer believes third-party verification is an essential step in providing impartial, standardised, and comparable information. This Environmental Product Declaration (EPD) is a robust, science-based, independently-verified and standardised method for measuring and communicating the environmental impacts of Downer's asphalt products.

Together with Downer's independently-verified Life Cycle Assessment calculator, this EPD allows our customers to quickly and accurately quantify the environmental impacts of Downer's asphalt products and services. This supports informed purchase decisions, communication of sustainability-focused product selection to stakeholders and the public, qualifies projects for points with green rating tools including the Infrastructure Sustainability Council's rating scheme, and promotes industry and environmental recognition.

Downer is positioned to play a significant role towards a lower carbon economy by providing sustainable products and services that support our customers to respond, adapt and mitigate the impacts of climate change. Together, we enable communities to thrive, shaping a connected and sustainable future.

Stuart Billing
Executive General Manager, Maintenance & Pavements
Transport & Infrastructure

About Downer

At Downer, our customers are at the heart of everything we do.

Our **purpose** is to create and sustain the modern environment, and our **promise** is to work closely with our customers to help them succeed, using world-leading insights and solutions.

Downer designs, builds and sustains assets, infrastructure and facilities, and we are the leading provider of integrated services in Australia and New Zealand.

With a history dating back more than 150 years, Downer is listed on the Australian Securities Exchange and New Zealand Stock Exchange as Downer EDI Limited (DOW).

Downer Group employs approximately 33,000 people across more than 300 sites, primarily in Australia and New Zealand.

Downer's Road Services business builds, manages and maintains road networks across Australia and New Zealand, and manufactures and supplies products and services to create safe, efficient and reliable journeys.

A leading manufacturer and supplier of bitumen-based products, Downer is an innovator in the asphalt circular economy, using recycled products and environmentally sustainable methods to produce asphalt.

Our business is founded on four pillars which support **our purpose** and **our promise**:

Our commitment

Partnering with Downer means partnering with a contractor that has done, and continues to do, the lasting, transformational work across our business, with a focus on how that supports our customers' success.

Our core operating philosophy, 'Relationships creating success', encapsulates this theme.

We've been on this journey a long time, with decades of investment in research and development underpinning our ever-evolving business practices and industry-leading product and service offerings.

Downer delivers real, measurable, and recognised emissions reductions, and environmental benefits you can be proud to report to your stakeholders and the community.

A construction partner that leads with sustainability

Downer supports the science on climate change and is committed to taking action to decarbonise its emissions portfolio to help minimise global temperature rise.

Downer has set ambitious Scope 1 and 2 GHG emissions reductions targets in line with the SBTi Net Zero Standard (1.5°C pathway), as well as a Scope 3 emissions reduction target aligned to a well below 2°C trajectory. Downer has linked these targets to executive remuneration through the Short-Term Incentive (STI) plan to incentivise Business Units to decarbonise in line with Downer Group's overall ambition.

Our Scope 1 and 2 GHG emissions commitments are aligned with a 1.5°C pathway and support the transition to net zero emissions by 2050. Our targets, revised in FY22 for tracking in FY23 onwards are:

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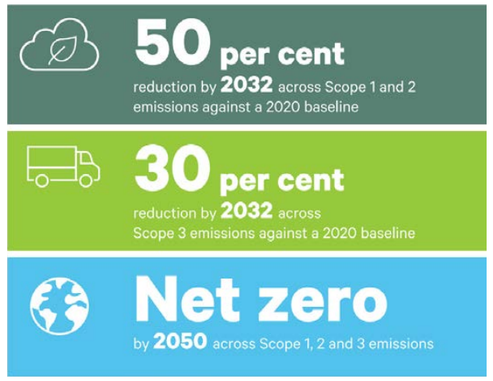
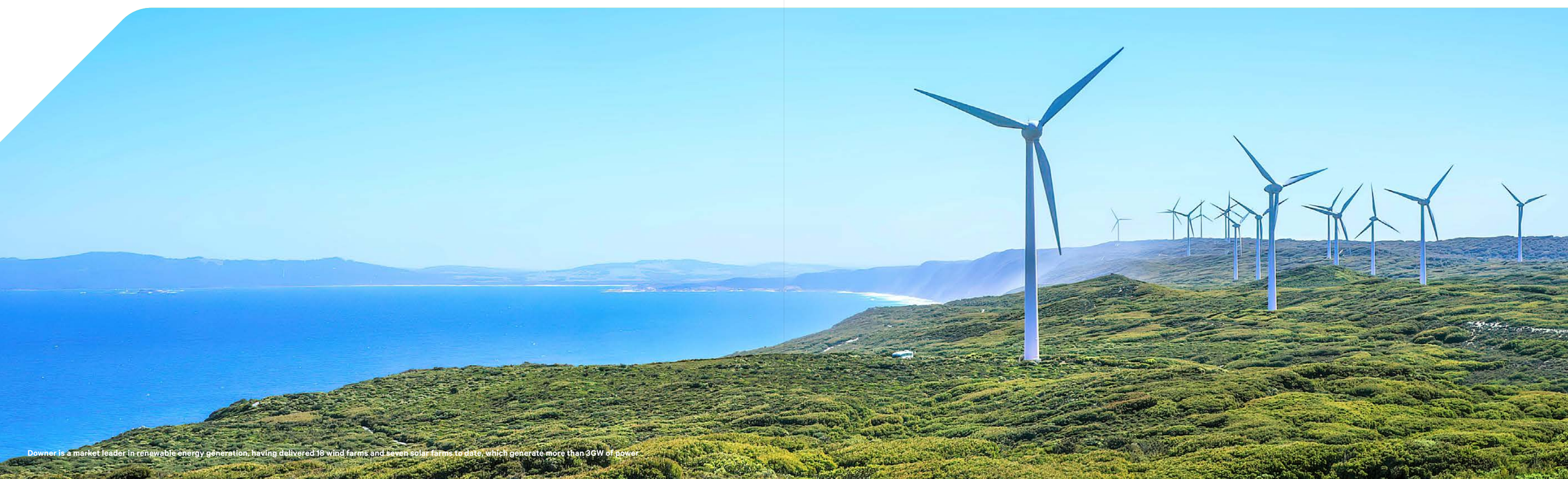


See our sustainability strategies in action

For more information about Downer's commitment to sustainable performance that enhances the communities in which we operate while also helping our customers to meet their own sustainability goals, see our:

Downer Climate Change Report 2022

Sustainability Report 2022



Downer is a market leader in renewable energy generation, having delivered 18 wind farms and seven solar farms to date, which generate more than 3GW of power.

The Downer Difference

Not all asphalt is created equal

With bitumen and aggregates more expensive than ever, municipalities are recognising the inherent environmental and economic value of the road assets they already own.

Downer's Ammann High Recycled Technology (HRT) facilities are capable of producing asphalt comprised of up to 100% recycled asphalt pavement.

Most importantly, the high-recycled-content asphalt from our HRT facilities not only complies with the performance specifications, it can significantly reduce carbon emissions, and reduce costs associated with finite resources.

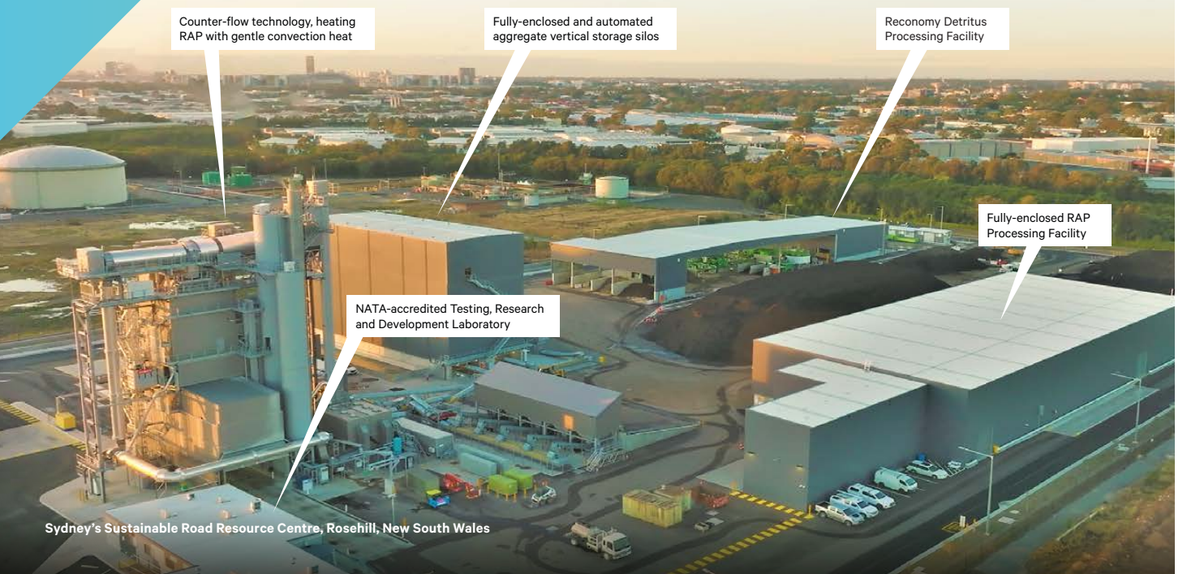
Downer's HRT plants use counter-flow technology with gas generation, heating RAP with a much more gentle convection heat (up to 160˚C). This manufacturing technology preserves and maximises the bitumen content, reducing virgin bitumen costs, improving pavement performance, and increasing pavement life.

Additional benefits include reduced fuel requirements and significantly lower emissions of volatile organic compounds and CO_2, furthering the environmental credentials of our customer's recycled road assets, and supporting our customers in meeting their carbon emission reduction targets.

Did you know?

To deliver a specification-compliant high-RAP pavement, RAP content requires gentle, precise, and even heat during the manufacturing process.

By avoiding the need to superheat the recycled asphalt pavement material, the integrity and performance of the recovered bitumen is maintained.



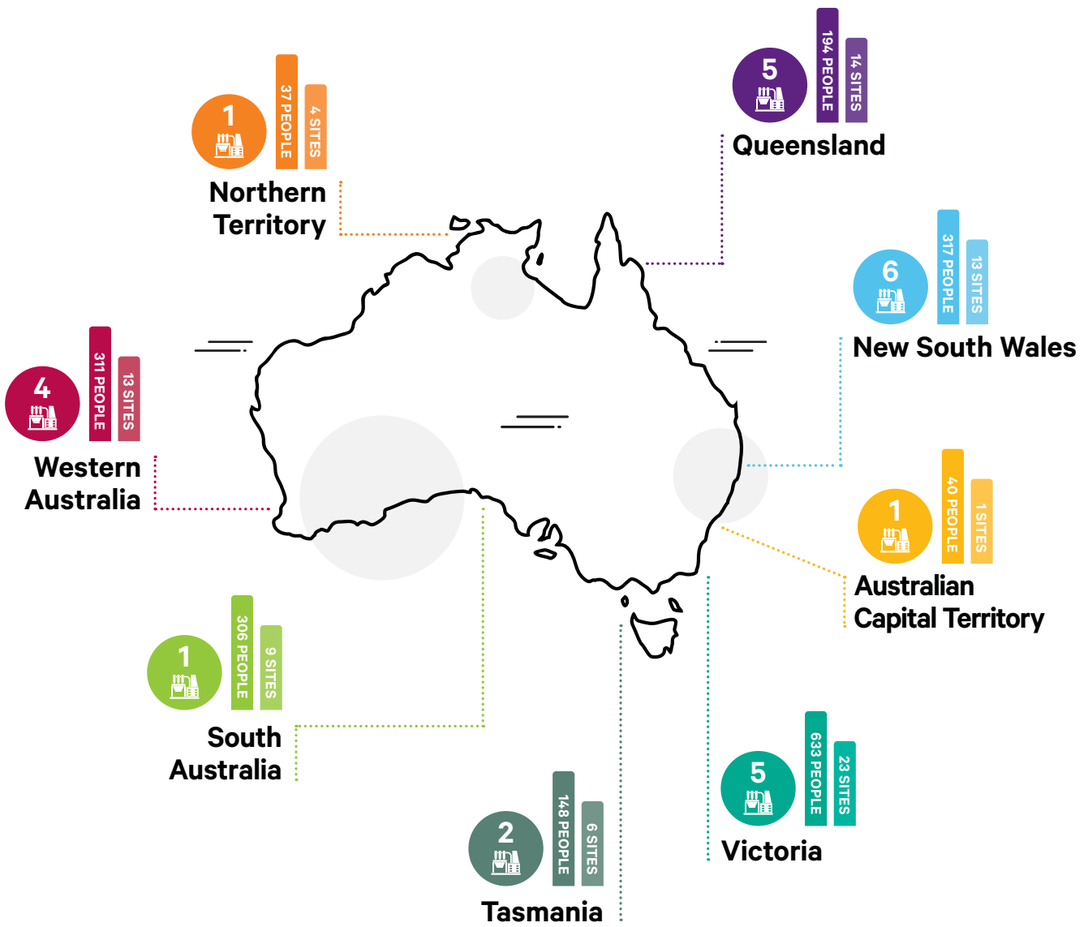
Sydney's Sustainable Road Resource Centre, Rosehill, New South Wales

Geographic reach

With presence across every Australian state and territory, Downer's Transport Services business has invested more than $100 million in high-recycled-content asphalt manufacturing technology over recent years.

The services Downer delivers for our customers touch the lives of millions of people every day.

Our national footprint of more than 25 fixed and three mobile asphalt manufacturing facilities, and 83 offices, depots and recycling facilities, allows Downer to support paved asset owners Australia-wide, from the smallest project to the largest, from urban growth solutions for our largest cities to meeting the challenges faced by our most remote communities.



The product lifecycle

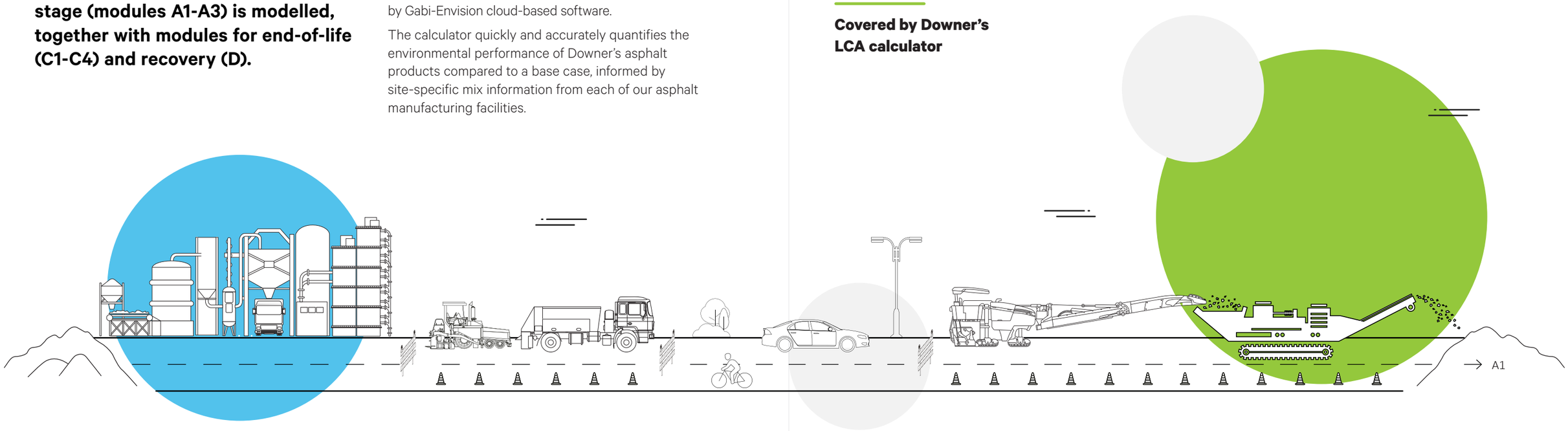
This is a *'cradle-to-gate with modules C1–C4 and module D'* style EPD, meaning the production stage (modules A1-A3) is modelled, together with modules for end-of-life (C1-C4) and recovery (D).

The construction process (modules A4-A5) and use stages (B1-B7) are not modelled within the EPD, however modules A4-A5 are covered by Downer's independently-verified Life Cycle Assessment (LCA) calculator powered by Gabi-Envision cloud-based software.

The calculator quickly and accurately quantifies the environmental performance of Downer's asphalt products compared to a base case, informed by site-specific mix information from each of our asphalt manufacturing facilities.

Included in this EPD

Covered by Downer's LCA calculator



Product | **Construction** | **Use** | **End-of-life** | **Recovery**

A1	A2	A3	A4	A5	B1 – B7	C1	C2	C3	C4	D
Raw material supply	Transport of raw materials	Manufacturing	Transport to customer	Construction/ installation	Use	De-construction/ demolition	Transport	Waste processing	Disposal	Re-use/ recovery/ recycling

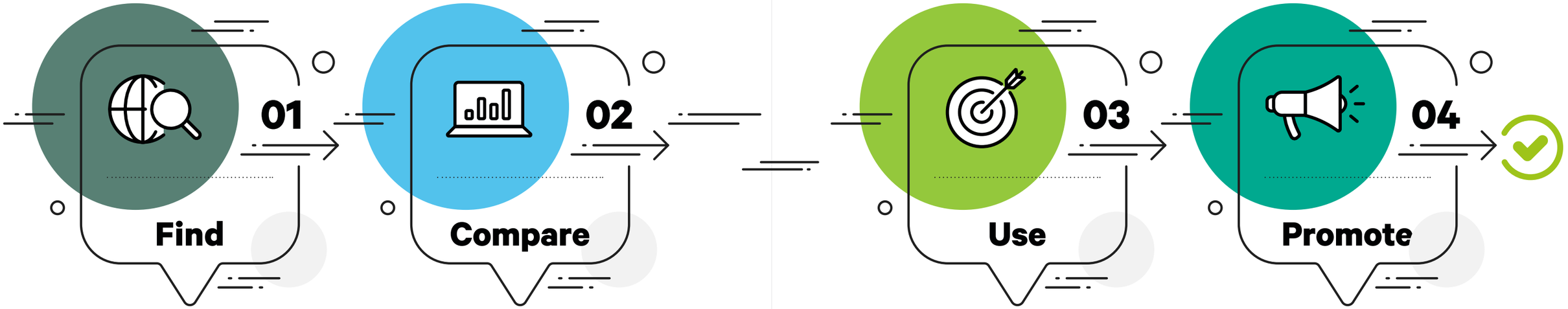
Cradle **Gate**

How to use this EPD

This EPD provides independent, verified and transparent data to help our customers compare the environmental performance of Downer's asphalt products.

While the steps below provide a high-level guide to the application of this EPD, we are here to help.

For support in realising tangible benefits for your next project, contact our National Business Development Manager, David Bendo, at david.bendo@downergroup.com



The first step in using this EPD is finding the results for your chosen product/s.

Browse to the chapter for your state or territory, and then find the results for your local asphalt manufacturing facility.

This EPD includes carbon footprints calculated in different ways, to meet the requirements of three different standards/methods:

- EN15804:2012+A2:2019 (EN15804+A2)
- EN15804:2012+A1:2013 (EN15804+A1)
- IPCC AR5.

You should choose the carbon footprint indicator (left column of each table) that aligns with the way you need to use and/or compare the information.

Hint: Use the *Indicators guide* on the folowing page to understand the indicator names abbreviated in the results tables.

When comparing products, ask yourself the following questions:

- Can the results in the EPDs be compared? Are the EPDs produced to the same standard and EPD programme?
- Can I identify production-related impacts for the same indicators and the same declared unit for each material?
- Do the materials perform the same function?
- Do I expect the material to last for the same time in situ?
- How much of each material will I need? Is it the same, or is one of the asphalt products suitable for reduced thickness?
- How far will each material travel? How would this affect the cradle-to-site impacts for each material?

This EPD can be used to calculate and present the environmental impacts of construction projects.

Data-driven decision making is a crucial element of modern business strategy, providing confidence in, and maximising the positive impact of, pivotal decisions.

Comparisons between the data in this EPD, and comparable EPDs can be used to advocate for the use of Downer's asphalt products on your next project, verifying the associated carbon emission reduction and recycled content benefits.

If you are modelling the full life cycle of your project, you will also need to consider expected maintenance during the project life cycle, and the fate of the materials at end-of-life.

Enhance your brand in an industry moving towards a more sustainable future.

The third-party certified environmental performance benefits of Downer's asphalt products and services support our customer's in:

- Reducing their Scope 3 emissions
- Securing industry and environmental award recognition
- Qualifying projects for recognition by green rating tools including the Infrastructure Sustainability Council's (IS) rating scheme
- Communicating environmental sustainability achievements to their stakeholders and the public.

Environmental performance recognition can help enhance your organisation's credibility and reputation, creating invaluable opportunities for differentiation and investment as the world moves towards a more sustainable future.

Indicators guide

An introduction the core environmental impact indicators is provided below.

The best-known effect of each indicator is listed in the descriptions and the abbreviations, in brackets, correspond to the labels in the following results tables.

Climate change (global warming potential)

GWP-total | GWP-fossil | GWP-biogenic | GWP-luluc

These environmental impact indicators provide a measure of greenhouse gas emissions, such as CO_2 and methane. These emissions are causing an increase in the absorption of radiation emitted by the earth, increasing the natural greenhouse effect. This may in turn have adverse impacts on ecosystem health, human health and material welfare.

The total Global Warming Potential (GWP-total) is split into three sub indicators: Fossil (GWP-fossil), Biogenic (GWP-biogenic), and land-use and land-use change (GWP-luluc).

Abiotic resource depletion

ADP-minerals&metals | ADP-fossil

The consumption of non-renewable resources decreases the availability of these resources and their associated functions in the future.

Depletion of mineral resources and non-renewable energy resources are reported separately.

Depletion of mineral resources is assessed based on an ultimate reserve model.

Water use

WDP

Water scarcity is a measure of the stress on a region due to water consumption.

Water scarcity is a relative concept. The amount of water that can be physically accessed varies as supply and demand changes. Water scarcity intensifies as demand increases and/or as water supply is affected by decreasing quantity or quality.

Ozone depletion potential

ODP

Depletion of the ozone layer leads to higher levels of UVB ultraviolet rays reaching the earth's surface with detrimental effects on humans and plants.

The Ozone Depletion Potential is a measure of air emissions that contribute to the depletion of the stratospheric ozone layer.

Acidification potential

AP

Acidification Potential is a measure of emissions that cause acidifying effects to the environment.

A molecule's acidification potential indicates its capacity to increase the hydrogen ion (H^+) concentration in the presence of water, thus decreasing the pH value.

Potential effects include fish mortality, forest decline, and the deterioration of building materials.

Eutrophication potential

EP-freshwater | EP-marine | EP-terrestrial

Eutrophication covers all potential impacts of excessively high levels of macronutrients, the most important of which are nitrogen and phosphorus. In aquatic ecosystems where this term is mostly applied, this typically describes a degradation in water quality.

Eutrophication can result in an undesirable change in the type of species that flourish and an increase the production of biomass.

As the decomposition of biomass consumes oxygen, eutrophication may decrease the available oxygen level in the water column and threaten fish in their ability to respire..

Photochemical ozone formation potential

POCP

Photochemical Ozone Formation Potential gives an indication of the emissions from precursors that contribute to ground level smog formation, mainly ozone (O_3).

Ground level ozone may be harmful to human health and ecosystems and may also damage crops. These emissions are produced by the reaction of volatile organic compounds (VOCs) and carbon monoxide in the presence of nitrogen oxides and UV light.

The environmental impact indicators included in this EPD are shown in the table below.

All the result tables from this point will contain the abbreviations only. All results reported in MJ are in net calorific value.

Core Environmental Impacts (EN15804+A2)

Indicator	Abbreviation	Unit
Climate change - total	GWP-total	kg CO_2-eq.
Climate change - fossil	GWP-fossil	kg CO_2-eq.
Climate change - biogenic	GWP-biogenic	kg CO_2-eq.
Climate change - land use and land use change	GWP-luluc	kg CO_2-eq.
Ozone Depletion	ODP	kg CFC11-eq.
Acidification	AP	Mole of H+ eq.
Eutrophication aquatic freshwater	EP-freshwater	kg P eq.
Eutrophication aquatic marine	EP-marine	kg N eq.
Eutrophication terrestrial	EP-terrestrial	Mole of N eq.
Photochemical ozone formation	POCP	kg NMVOC eq.
Depletion of abiotic resources - minerals and metals	ADP-minerals &metals	kg Sb-eq.
Depletion of abiotic resources - fossil fuels	ADP-fossil	MJ
Water use	WDP	m^3 world equiv.

Additional Environmental Impacts

Indicator	Abbreviation	Unit
IPCC AR5 GWP (excluding biogenic carbon)	GWP-GHG	kg CO_2-eq.
Respiratory inorganics	PM	Disease incidences
Ionizing radiation - human health	IRP	kBq U235 eq.
Ecotoxicity - freshwater	ETP-fw	CTUe
Human toxicity, cancer	HTPc	CTUh
Human toxicity, non-cancer	HTPnc	CTUh
Land use related impacts / soil quality	SQP	Pt

Biogenic carbon content

Indicator	Abbreviation	Unit
Biogenic carbon content - product	BCC-prod	kg
Biogenic carbon content - packaging	BCC-pack	kg

Resource use

Indicator	Abbreviation	Unit
Renewable primary energy as energy carrier	PERE	MJ
Renewable primary energy resources as material utilization	PERM	MJ
Total use of renewable primary energy resources	PERT	MJ
Non-renewable primary energy as energy carrier	PENRE	MJ
Non-renewable primary energy as material utilization	PENRM	MJ
Total use of non-renewable primary energy resources	PENRT	MJ
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ
Use of non-renewable secondary fuels	NRSF	MJ
Use of net fresh water	FW	m^3

Waste categories and output flows

Indicator	Abbreviation	Unit
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
Components for re-use	CRU	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported electrical energy	EEE	MJ
Exported thermal energy	EET	MJ

Environmental impact (EN15804+A1)

Indicator	Abbreviation	Unit
Global warming potential	GWP	kg CO_2-eq.
Depletion potential of the stratospheric ozone layer	ODP	kg CFC11-eq.
Acidification potential of land and water	AP	kg SO_2-eq.
Eutrophication potential	EP	kg PO_4^{3-}- eq.
Photochemical ozone creation potential	POCP	kg C_2H_4-eq.
Abiotic depletion potential – elements	ADPE	kg Sb-eq.
Abiotic depletion potential – fossil fuels	ADPF	MJ

Product information

Asphalt plants covered by this EPD

Downer produces asphalt at 25 purpose-built fixed asphalt plants around Australia. This EPD includes products from:

Table 1: Downer asphalt plant locations with mixes included in this EPD

State	Asphalt plant locations
New South Wales	Sydney (Rosehill) Bathurst Lismore Teralba
Australian Capital Territory	Hume
Victoria	Bayswater Somerton Traralgon (Gippsland Asphalt) Shepparton Wodonga
Tasmania	Lindisfarne Mowbray
South Australia	Adelaide (Wingfield)
Western Australia	Gosnells Hope Valley Albany
Northern Territory	Berrimah
Queensland	Brisbane (Brendale) Archerfield Swanbank Bli Bli Mackay

Table 2: Industry classification

Classification	Code	Category
UN CPC Ver.2	3794	Bituminous mixtures based on natural and artificial stone materials and bitumen, natural asphalt or related substances as a binder
ANZSIC 2006	3101	Hot-mix bituminous paving manufacturing and/or laying

About asphalt

Asphalt is a versatile, flexible paving material commonly used on roads, runways, hardstands, paths, parking lots and other projects in Australia. The simplest asphalts are a mixture of aggregate, sands and paving grade or 'straight-run' bitumen (i.e. as produced at the refinery). Asphalts can include various additives that, together with the grading of the aggregate, control the product's properties.

Asphalt inclusions

Downer's asphalts can include polymers, fibres, and ground limestone filler to modify the characteristics of the bitumen. Additionally, some asphalts produced at Downer's plants utilise recycled asphalt pavement (RAP) in place of some of the virgin aggregates and bitumen. Other alternative aggregate sources include slag aggregate (where the material is available), a secondary aggregate by-product of steelmaking, which improves asphalt skid resistance properties.

Asphalt production temperatures

Hot-mix asphalt is typically produced with output temperatures between 150-190 °C. The asphalt may be stored temporarily in the plant before being transported to site and laid using specialised paving equipment while still hot and workable. We note transport and paving activities are outside the scope of this study. Downer also produces warm-mix and cold-mix asphalts using special additives to maintain workability.

Asphalt mixes included in this EPD

This report covers a selected range of Downer's Australian asphalt products. In total, this EPD shows results for 125 asphalt mixes from different plants across Australia. Each mix is specific to the named mix and plant. Products are not grouped.

The industry classification for Downer's asphalt products is shown in Table 2.

Moreover, mix designs are based on the technical standard AS2150, local State Road Authority and Local Government authority, AUS-SPEC standards, and specifications in line with the geographic use of the asphalt mixes.

Declared Unit

The declared unit for this EPD is one metric tonne of asphalt mixture.

This aligns with the 'Technical Guidance (EN15804+A2) for Asphalt Mixtures' (Australian TGN) (EPD Australasia, 2022). The reference flow is the same as the declared unit.

The EPD results are specific to each plant and product, and no averaging is used.

Content Declaration

The composition of Downer's asphalt materials varies to suit each product's desired properties and performance. The content declaration provided in Table 3 covers the full range of declared asphalt products. Due to the confidential nature of the composition, upper and lower limits are given per ingredient.

Asphalt is sold in bulk, and packaging materials are irrelevant to the product.

Table 3: Content declaration

Product components	Composition, weight-%	Post-consumer recycled material, weight-%	Biogenic material, weight-% and kg C/kg
Bitumen/PMB	3–6%	0%	0%
Aggregate	11–88%	0%	0%
Crusher dust	0–61%	0%	0%
RAP	0–50%	70%	0%
High Polished Stone Value (HPSV) Aggregates	0–58%	0%	0%
Slag	0–36%	0%	0%
Crushed glass sand	0–10%	100%	0%
Filler	0–7%	0%	0%
Hydrated lime	0–5%	0%	0%
Recosol	0–2%	0%	0%
Fly ash	0–1%	100%	0%
Tonerplas	0–1%	100%	0%
Cellulose fibre/Viatop	<1%	0%	75%, ~0.5

Dangerous substances

Hazardous properties for Hazardous Substances and New Organisms (HSNO classifications) and Globally Harmonized System (GHS) classifications are reproduced from vendor Safety Data Sheets or the Organisation for Economic Co-operation and Development's (OECD) global portal to information on chemical substances available at: https://www.echemportal.org/echemportal/.

Asphalt is not classified as hazardous and does not include hazardous substances requiring labelling. None of the asphalt mixes contain any materials listed as a Substance of Very High Concern (SVHC) at a concentration greater than 0.1% by mass.. SVHC list is available at: https://echa.europa.eu/candidate-list-table.

Manufacturing Process

Downer manufactures hot-mix asphalt in different types of asphalt plants across Australia, including continuous drum mix plants, batch plants and batch heater plants. All plants control the mix design and mix temperature to meet required performance specifications. The key raw materials are aggregates, which provide structure and may provide grip or skid resistance, and bitumen, which acts as a binder to hold the aggregate mixture together. In addition, other materials may be used to modify the properties of the asphalt and may be added at the asphalt plant or pre-blended into the bitumen (e.g. PMB).

Aggregates are normally sourced locally (from within 100 km) but may be imported further distances for special properties unavailable locally. Plants may also use a variety of secondary aggregate sources where these are locally available, such as slag aggregates.

Aggregates are fed into the drying and mixing drum at the required blend, then dried and heated to the desired temperature. For most asphalt mixes, aggregates must be fully dried, including driving out absorbed moisture, to allow bitumen to stick to the aggregate properly, creating a durable product.

Asphalt is also generally only workable while hot, so most mixes are heated well beyond the aggregates being dry. The drying process creates fine dust, called filler, which is captured and either fed back into the mix or carefully disposed of.

Lower temperature asphalts, where the aggregates may not be fully dried, require additives such as adhesion agents to prevent the moisture from 'stripping' the bitumen to enable paving at lower temperatures.

Bitumen or polymer-modified binder (PMB) is stored hot in silos and pumped into the mixing area of the plant, along with filler, and any additives, such as fibre, adhesion agents, or workability agents. Where RAP is used, it is also added to the mixer, and may go througha pre-heater. The plant mixes all the components together to create a consistent material.

The mixed asphalt is generally transferred into hot bins, ready for load out, or may be loaded directly onto waiting trucks. Asphalt may be stored for several hours in these insulated bins.

Table 4: Modules included in the scope of the EPD

	Product stage			Construction process stage		Use stage			Use stage				End of life stage				Recovery stage
	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**	**Future reuse, recycling or energy recovery potential**
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	AU	AU	-	-	-	-	-	-	-	-	-	AU	AU	AU	AU	AU
Specific data		>90%		-	-	-	-	-	-	-	-	-					-
Variation – products		0%		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites		0%		-	-	-	-	-	-	-	-	-	-	-	-	-	-

X = included in the EPD; ND = Module not declared (such a declaration shall not be regarded as an indicator result of zero)

System boundaries

A cradle-to-gate and end-of-life EPD

This EPD is 'Cradle to gate' with modules C1–C4 and module D' type, as shown in Table 4. It includes the environmental impacts associated with raw material extraction and processing (A1), material transport to the manufacturer (A2), manufacturing processes (A3), end-of-life modules (C1–C4) and recovery stage (D).

These are the mandatory stages of the Australian TGN for this EPD type.

Other life cycle stages concerning transport to customer (A4), construction (A5), and the use stage (B1–B7) are not included in this EPD.

These life cycle stages vary by end-use and are best considered according to application.

Production (Module A)

The production stage includes the environmental impacts associated with raw materials extraction and processing of inputs, transport to, between and within the manufacturing site, and manufacturing of product at the exit gate of the manufacturing site.

The raw materials are supplied by third parties and typically transported to site by truck. RAP is processed off-site and the processing impacts from end-of-waste state are included. Process waste is given to third parties with no further processing.

End of Life (Module C)

This EPD aligns with the default scenarios provided by the Australian TGN for the end-of-life stages, as provided in Table 5. The plants in Hume, Rosehill, Berrimah, Archerfield, Brendale, Swanbank, Wingfield, Lindisfarne, Mowbray, Bayswater, Somerton, Gosnells, and Hope Valey are considered to be in metropolitan areas, while all other plants are considered to be in regional areas.

Module C1 – Deconstruction / demolition

Deconstruction of discarded asphalt pavement.

Module C2 – Transport

Transport of asphalt waste to waste processing.

Module C3 – Waste processing

Processing of asphalt waste into material to recycling as Recycled Asphalt Pavement (RAP) and to downcycling as granular subbase or backfill.

Module C4 – Disposal

It is assumed that all waste asphalt is sent to recycling or downcycling in alignment with the Australian TGN. Hence, landfilling or incineration is not assessed.

Recovery and Recycling potential (Module D)

Module D declares a potential credit or burden for the net scrap associated with Downer's asphalt products. Net scrap is the amount of scrap left after scrap from post-consumer needs is removed from scrap produced from the product. That is, secondary product used in product manufacture is subtracted from the overall amount of recycled product after the first life cycle.

If the net balance is positive, a credit is given. The credit is calculated by comparing the impacts associated with primary product produced.

Table 5: End of life scenarios for products

End of Life scenario	Unit	Metro areas	Regional areas
Recovery for recycling	%	90	75
Recovery for backfilling (downcycling)	%	10	25
Disposal to landfill	%	0	0

Life cycle inventory

Data and assumptions

Primary life cycle inventory data was used for all manufacturing operations up to the plant gate, including upstream data for inputs. Primary data for Downer's asphalt mixing operations was sourced from 2020-07-01 to 2021-06-30.

All secondary data come from the AusLCI database and are representative of the years 2012-2022. Most datasets have a reference year between 2012 and 2022.

As the study intended to compare the production systems for the reference year 2021, all background data falls within the 10-year limit allowable for generic data under EN 15804.

Upstream data

Australian-specific datasets have been used where available, including the Australian electricity mix regionalised per state. All energy sources are the prescribed datasets in the Australian TGN.

The upstream production impacts for materials used in the asphalt mixes were calculated based on the quantities in the Bill of Materials, uplifted for any production waste, and using dataset-specific impacts extracted from AusLCI database.

Thermal Energy

Considering energy use, the Australian TGN provides two calculation methods (A and B). This EPD uses Method A: 'Determine the energy use for each mix design based on the composition, specific heat capacity of components, moisture content of raw materials and the plant's overall efficiency.' So, thermal energy use for each mix relates to a specific mix composition and site efficiency.

Utilities

Utilities such as diesel, electricity, and water used in the manufacturing process are allocated to products based on mass of products. Measured data for electricity, water use, and diesel for mobile plants were obtained at site level, with exceptions noted below. Average utility quantities (electricity, diesel for mobile plants, and water) were calculated based on measured consumptions divided by the total volume of asphalt produced per site.

Some plants using diesel measure only the total use of diesel and don't have measurements for the share of fuel for thermal energy and other onsite uses (i.e. mobile plants). In these cases, Downer estimated that 96% of diesel is used for thermal energy, and 4% is used in mobile plants. Plants running on diesel may have an LPG pilot lighter; the LPG amount used in the lighter is not measured and was considered irrelevant.

Electricity

The composition of the electricity grid mix was taken from AusLCI database. The composition of the electricity grid mix per state/territory is shown in Figure 2. This is based on the inventory of AusLCI datasets. Shares are shown in all categories with contributions equal or higher than 5%.

The emission factors for each region using the GWP-GHG indicator in kg CO2-eq./kWh are shown in the top line of Figure 2 below.

Waste

Process and coated waste are calculated per plant based on annual production. Wastewater is not measured in any plant and is estimated to equal water consumption. The wastewater assumption is considered a conservative approach as water is used for processing e.g. for wash down and dust suppression.

Figure 1: Australian Electricity mix per state/territory based on AusLCI datasets

Recycling

RAP recycling is based on an avoided-burden approach. At the end of life (C1-C4), the asphalt is available for recycling as RAP. The RAP output is first used to satisfy open RAP inputs from the production stage (A1-A3). The difference between RAP input and output is called the 'net scrap output from the product life cycle'. A credit for this net scrap is given in Module D and based on the end of life scenarios (metro vs regional areas) and mix composition.

Transport

Transport data was collected from Downer for all input materials to all sites. The transport data included the transport modes and distances from suppliers. Transport distances were mapped against each line of BOM data and used to calculate upstream transport impacts using the calculated input volumes. Where transport data was not available, a standard value of 50 km was used.

Cut off criteria

Personnel is excluded as per section 4.3.1 in the PCR (EPD International, 2021). thinkstep-anz consistently excludes environmental impacts from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process, ('capital goods') regardless of potential significance.

High-quality infrastructure-related data isn't always available, and there is no clear cut-off for what to include. For this reason, capital goods data are applied to LCA studies inconsistently. This is expected to lead to reduced consistency and comparability of EPDs. Capital goods were previously excluded from EPDs, thus including capital goods in current EPDs would further reduce their comparability.

For the processes within the system boundary, all available energy and material flow data have been included in the model. In cases where no matching life cycle inventories are available to represent a flow, proxy data have been applied based on conservative assumptions regarding environmental impacts.

Allocation

Where subdivision of processes was not possible, allocation rules listed in PCR chapter 6.7 have been applied.

Multi-output allocation generally follows the requirements of ISO 14044, section 4.3.4.2. Site level data for electricity, diesel for mobile plant (e.g. loaders), water, and lubricant usage are allocated by mass, based on the annual production of each plant.

Process Allocation (thermal energy) follows the Australian Guideline for Asphalt EPDs. The guide provides two allocation methods. Energy use in this EPD is allocated with Method A: "Determine the energy use for each mix design based on the composition, specific heat capacity of components, moisture content of raw materials and the plant's overall efficiency."

Allocation of background data (energy and materials) is according to AusLCI database; documentation is available at https://auslci.com.au/

Asphalt in New South Wales

With the largest and fastest-growing population of any state in Australia, New South Wales is home to more than eight million people, with 65% of residents living within the greater Sydney region.

Sydney airport hosts more than 43.3 million passenger movements each year, while the state's 180,000 kilometres of state, regional, and local roads supports the economy and quality of life of NSW residents, facilitating access to employment opportunities, connecting regional communities and supporting freight and industry.

Downer has supported the construction and maintenance of roads, airfields, and other asphalt-paved assets in New South Wales for more than 85 years, with six asphalt manufacturing facilities and 13 offices and depots currently operating across the state.

Sydney Harbour Bridge, Sydney, New South Wales

Sydney Sustainable Road Resource Centre, Rosehill

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
GWP-total	kg CO_2-eq.	63.3	59.1	94.1	75.7	94.0	69.4	69.3	66.4
GWP-fossil	kg CO_2-eq.	63.3	59.1	94.0	75.6	93.6	69.3	68.0	66.3
GWP-biogenic	kg CO_2-eq.	0.0531	0.0516	0.116	0.0574	0.393	0.0528	1.16	0.0517
GWP-luluc	kg CO_2-eq.	8.41E-05	7.22E-05	1.55E-04	8.32E-05	7.35E-04	7.07E-05	0.00239	6.21E-05
ODP	kg CFC11-eq.	2.77E-05	2.38E-05	2.92E-05	2.78E-05	2.91E-05	2.36E-05	2.36E-05	2.08E-05
AP	Mole of H+ eq.	0.592	0.531	0.731	0.608	0.729	0.530	0.523	0.486
EP-freshwater	kg P eq.	4.54E-05	4.36E-05	1.72E-04	4.91E-05	1.79E-04	4.42E-05	6.96E-05	4.29E-05
EP-marine	kg N eq.	0.101	0.0928	0.127	0.106	0.126	0.0939	0.0931	0.0881
EP-terrestrial	Mole of N eq.	1.11	1.02	1.39	1.17	1.39	1.03	1.01	0.967
POCP	kg NMVOC eq.	0.324	0.299	0.400	0.341	0.399	0.304	0.301	0.286
ADP-minerals &metals	kg Sb-eq.	8.69E-07	8.96E-07	1.44E-06	1.03E-06	1.44E-06	9.12E-07	8.68E-07	9.38E-07
ADP-fossil	MJ	2,730	2,370	3,170	2,700	3,170	2,320	2,300	2,070
WDP	m^3 world equiv.	995	986	2,490	1,660	2,490	1,770	1,760	1,600

Additional Environmental Impacts

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
GWP-GHG	kg CO_2-eq.	62.1	58.0	92.3	74.3	92.1	68.1	67.6	65.2
PM	Disease incidences	8.32E-06	8.14E-06	9.41E-06	8.43E-06	9.75E-06	8.13E-06	9.50E-06	8.00E-06
IRP	kBq U235 eq.	0.00501	0.00456	0.276	0.00528	0.281	0.00455	0.0247	0.00424
ETP-fw	CTUe	749	650	823	738	968	645	1,230	563
HTPc	CTUh	3.89E-09	3.53E-09	5.69E-09	3.97E-09	9.12E-09	3.48E-09	1.72E-08	3.21E-09
HTPnc	CTUh	2.74E-07	2.43E-07	3.81E-07	3.36E-07	3.88E-07	3.00E-07	3.31E-07	2.78E-07
SQP	Pt	142	144	178	164	175	146	133	148

Biogenic carbon content

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
BCC-prod	kg	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0

Sydney Sustainabe Road Resource Centre, Rosehill (continued)

Resource use

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
PERE	MJ	11.9	11.7	15.7	14.1	15.7	13.5	13.4	13.0
PERM	MJ	0	0	2.00	0	2.00	0	0	0
PERT	MJ	11.9	11.7	17.7	14.1	17.7	13.5	13.4	13.0
PENRE	MJ	1,900	1,670	2,350	1,900	2,350	1,660	1,630	1,490
PENRM	MJ	828	702	822	792	822	666	666	576
PENRT	MJ	2,730	2,370	3,170	2,700	3,170	2,320	2,300	2,070
SM	kg	300	300	100.0	200	125	300	400	300
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	0.0231	0.0229	0.0579	0.0385	0.0578	0.0411	0.0408	0.0373

Waste categories and output flows

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
HWD	kg	0.00109	9.72E-04	0.00121	0.00110	0.00121	9.49E-04	9.48E-04	8.63E-04
NHWD	kg	4.31	4.17	5.10	4.56	5.39	4.20	5.40	4.10
RWD	kg	3.12E-06	2.90E-06	4.18E-05	3.25E-06	5.19E-05	2.88E-06	4.33E-05	2.72E-06
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
GWP	kg CO_2-eq.	61.5	57.5	91.4	73.7	91.2	67.6	66.9	64.7
ODP	kg CFC11-eq.	1.92E-05	1.64E-05	2.02E-05	1.92E-05	2.02E-05	1.64E-05	1.63E-05	1.44E-05
AP	kg SO_2-eq.	0.365	0.321	0.452	0.369	0.451	0.318	0.315	0.286
EP	kg PO_4^{3}-- eq.	0.0343	0.0315	0.0434	0.0361	0.0451	0.0319	0.0391	0.0299
POCP	kg C_2H_4-eq.	0.0313	0.0288	0.0371	0.0330	0.0374	0.0300	0.0314	0.0282
ADPE	kg Sb-eq.	8.69E-07	8.96E-07	1.44E-06	1.03E-06	1.44E-06	9.12E-07	8.68E-07	9.38E-07
ADPF	MJ	2,870	2,500	3,350	2,840	3,340	2,440	2,420	2,180

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Sydney Sustainabe Road Resource Centre, Rosehill (continued)

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
GWP-total	kg CO_2-eq.	-15.5	-13.8	-21.5	-17.3	-21.5	-13.3	-13.3	-12.1
GWP-fossil	kg CO_2-eq.	-15.5	-13.8	-21.5	-17.3	-21.5	-13.3	-13.3	-12.1
GWP-biogenic	kg CO_2-eq.	-0.0218	-0.0205	-0.0290	-0.0245	-0.0290	-0.0202	-0.0202	-0.0193
GWP-luluc	kg CO_2-eq.	-4.80E-05	-4.10E-05	-6.87E-05	-5.33E-05	-6.87E-05	-3.90E-05	-3.90E-05	-3.40E-05
ODP	kg CFC11-eq.	-1.58E-05	-1.35E-05	-2.26E-05	-1.76E-05	-2.26E-05	-1.28E-05	-1.28E-05	-1.12E-05
AP	Mole of H+ eq.	-0.196	-0.171	-0.276	-0.218	-0.276	-0.164	-0.164	-0.146
EP-freshwater	kg P eq.	-2.27E-05	-2.11E-05	-3.04E-05	-2.54E-05	-3.04E-05	-2.06E-05	-2.06E-05	-1.95E-05
EP-marine	kg N eq.	-0.0183	-0.0162	-0.0255	-0.0204	-0.0255	-0.0156	-0.0156	-0.0141
EP-terrestrial	Mole of N eq.	-0.199	-0.176	-0.278	-0.222	-0.278	-0.170	-0.170	-0.153
POCP	kg NMVOC eq.	-0.0622	-0.0547	-0.0872	-0.0694	-0.0872	-0.0526	-0.0526	-0.0472
ADP-minerals &metals	kg Sb-eq.	-6.51E-07	-6.39E-07	-8.34E-07	-7.34E-07	-8.34E-07	-6.36E-07	-6.36E-07	-6.27E-07
ADP-fossil	MJ	-1,370	-1,170	-1,960	-1,530	-1,960	-1,120	-1,120	-977
WDP	m^3 world equiv.	-224	-214	-295	-252	-295	-211	-211	-204

Additional Environmental Impacts

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
GWP-GHG	kg CO_2-eq.	-15.1	-13.5	-21.0	-16.9	-21.0	-13.0	-13.0	-11.9
PM	Disease incidences	-8.56E-07	-7.64E-07	-1.19E-06	-9.56E-07	-1.19E-06	-7.38E-07	-7.38E-07	-6.72E-07
IRP	kBq U235 eq.	-0.00307	-0.00276	-0.00423	-0.00343	-0.00423	-0.00267	-0.00267	-0.00245
ETP-fw	CTUe	-398	-340	-569	-442	-569	-324	-324	-283
HTPc	CTUh	-1.66E-09	-1.48E-09	-2.30E-09	-1.85E-09	-2.30E-09	-1.43E-09	-1.43E-09	-1.31E-09
HTPnc	CTUh	-1.28E-07	-1.12E-07	-1.81E-07	-1.43E-07	-1.81E-07	-1.07E-07	-1.07E-07	-9.55E-08
SQP	Pt	-110	-110	-141	-126	-141	-110	-110	-110

Sydney Sustainabe Road Resource Centre, Rosehill (continued)

Resource use

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
PERE	MJ	-4.40	-4.16	-5.82	-4.94	-5.82	-4.10	-4.10	-3.93
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	-4.40	-4.16	-5.82	-4.94	-5.82	-4.10	-4.10	-3.93
PENRE	MJ	-1,370	-1,170	-1,960	-1,530	-1,960	-1,120	-1,120	-977
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	-1,370	-1,170	-1,960	-1,530	-1,960	-1,120	-1,120	-977
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	-0.00521	-0.00498	-0.00685	-0.00587	-0.00685	-0.00491	-0.00491	-0.00474

Waste categories and output flows

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
HWD	kg	-4.80E-04	-4.13E-04	-6.86E-04	-5.35E-04	-6.86E-04	-3.94E-04	-3.94E-04	-3.46E-04
NHWD	kg	-0.856	-0.801	-1.16	-0.971	-1.16	-0.785	-0.785	-0.746
RWD	kg	-1.05E-06	-9.51E-07	-1.46E-06	-1.18E-06	-1.46E-06	-9.24E-07	-9.24E-07	-8.54E-07
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R30	AC14 R30	AC14 A15E R10 H	AC14 R20 HD	AC14 A15E R10 H DG	AC20 R30	AC20 R30 G10	AC28 R30
GWP	kg CO_2-eq.	-14.8	-13.3	-20.6	-16.6	-20.6	-12.8	-12.8	-11.7
ODP	kg CFC11-eq.	-1.09E-05	-9.34E-06	-1.57E-05	-1.22E-05	-1.57E-05	-8.88E-06	-8.88E-06	-7.74E-06
AP	kg SO_2-eq.	-0.124	-0.107	-0.177	-0.138	-0.177	-0.102	-0.102	-0.0895
EP	kg PO_4^{3}-- eq.	-0.00632	-0.00560	-0.00882	-0.00706	-0.00882	-0.00539	-0.00539	-0.00487
POCP	kg C_2H_4-eq.	-0.00837	-0.00716	-0.0120	-0.00931	-0.0120	-0.00682	-0.00682	-0.00596
ADPE	kg Sb-eq.	-6.51E-07	-6.39E-07	-8.34E-07	-7.34E-07	-8.34E-07	-6.36E-07	-6.36E-07	-6.27E-07
ADPF	MJ	-1,460	-1,250	-2,080	-1,620	-2,080	-1,190	-1,190	-1,040

Bathurst Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
GWP-total	kg CO_2-eq.	87.1	79.3	86.2	99.2	127	85.0	58.2
GWP-fossil	kg CO_2-eq.	87.1	79.3	86.2	99.1	127	85.0	58.1
GWP-biogenic	kg CO_2-eq.	0.0610	0.0563	0.0553	0.106	0.141	0.0554	0.110
GWP-luluc	kg CO_2-eq.	1.31E-04	1.16E-04	1.02E-04	1.59E-04	1.82E-04	1.00E-04	9.58E-05
ODP	kg CFC11-eq.	4.34E-05	3.83E-05	3.41E-05	3.20E-05	3.67E-05	3.34E-05	3.15E-05
AP	Mole of H+ eq.	0.853	0.763	0.699	0.750	0.980	0.687	0.711
EP-freshwater	kg P eq.	9.00E-05	8.26E-05	7.95E-05	1.91E-04	2.27E-04	7.87E-05	6.36E-05
EP-marine	kg N eq.	0.144	0.131	0.124	0.134	0.183	0.122	0.117
EP-terrestrial	Mole of N eq.	1.58	1.43	1.36	1.47	2.00	1.34	1.29
POCP	kg NMVOC eq.	0.434	0.394	0.374	0.401	0.543	0.369	0.355
ADP-minerals &metals	kg Sb-eq.	1.34E-06	1.23E-06	1.19E-06	1.48E-06	1.53E-06	1.20E-06	1.29E-06
ADP-fossil	MJ	3,790	3,350	2,960	3,130	3,640	2,900	3,520
WDP	m^3 world equiv.	480	435	1,670	1,820	2,100	1,670	466

Additional Environmental Impacts

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
GWP-GHG	kg CO_2-eq.	85.6	77.9	84.8	97.4	125	83.6	56.9
PM	Disease incidences	9.18E-06	8.86E-06	8.69E-06	9.38E-06	1.10E-05	8.65E-06	9.21E-06
IRP	kBq U235 eq.	0.00787	0.00704	0.00641	0.260	0.292	0.00635	0.00629
ETP-fw	CTUe	1,090	967	893	846	1,080	876	808
HTPc	CTUh	6.04E-09	5.43E-09	5.00E-09	6.16E-09	9.33E-09	4.93E-09	5.62E-09
HTPnc	CTUh	4.44E-07	3.98E-07	4.23E-07	4.36E-07	7.20E-07	4.17E-07	3.07E-07
SQP	Pt	194	177	176	176	161	177	192

Biogenic carbon content

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
BCC-prod	kg	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0

Resource use

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
PERE	MJ	11.5	10.5	12.9	12.4	19.0	12.9	10.8
PERM	MJ	0	0	0	1.88	2.12	0	0
PERT	MJ	11.5	10.5	12.9	14.3	21.1	12.9	10.8
PENRE	MJ	2,630	2,340	2,120	2,350	2,770	2,080	2,580
PENRM	MJ	1,150	1,010	846	772	871	828	936
PENRT	MJ	3,790	3,350	2,960	3,130	3,640	2,900	3,520
SM	kg	0	100.0	100.0	100.0	355	100.0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	0.0111	0.0101	0.0389	0.0424	0.0488	0.0389	0.0108

Waste categories and output flows

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
HWD	kg	0.00172	0.00153	0.00138	0.00135	0.00257	0.00135	0.00125
NHWD	kg	4.97	4.56	4.44	4.63	6.88	4.37	4.42
RWD	kg	5.45E-06	4.95E-06	4.68E-06	4.06E-05	4.67E-05	4.59E-06	5.11E-06
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
GWP	kg CO_2-eq.	84.9	77.3	84.2	96.6	124	83.0	56.3
ODP	kg CFC11-eq.	3.00E-05	2.65E-05	2.36E-05	2.22E-05	2.54E-05	2.32E-05	2.18E-05
AP	kg SO_2-eq.	0.560	0.501	0.453	0.491	0.609	0.445	0.470
EP	kg PO_4^{3-}-- eq.	0.0491	0.0445	0.0423	0.0458	0.0625	0.0417	0.0399
POCP	kg C_2H_4-eq.	0.0410	0.0375	0.0361	0.0376	0.0476	0.0356	0.0342
ADPE	kg Sb-eq.	1.34E-06	1.23E-06	1.19E-06	1.48E-06	1.53E-06	1.20E-06	1.29E-06
ADPF	MJ	4,010	3,550	3,140	3,310	3,860	3,080	3,730

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
GWP-total	kg CO_2-eq.	-26.4	-21.2	-18.8	-18.8	-23.0	-18.6	-22.7
GWP-fossil	kg CO_2-eq.	-26.3	-21.2	-18.8	-18.8	-23.0	-18.6	-22.7
GWP-biogenic	kg CO_2-eq.	-0.0352	-0.0300	-0.0283	-0.0283	-0.0328	-0.0281	-0.0325
GWP-luluc	kg CO_2-eq.	-8.45E-05	-6.52E-05	-5.55E-05	-5.55E-05	-7.08E-05	-5.44E-05	-6.96E-05
ODP	kg CFC11-eq.	-2.79E-05	-2.15E-05	-1.83E-05	-1.83E-05	-2.33E-05	-1.79E-05	-2.29E-05
AP	Mole of H+ eq.	-0.339	-0.267	-0.232	-0.232	-0.290	-0.229	-0.286
EP-freshwater	kg P eq.	-3.73E-05	-3.14E-05	-2.91E-05	-2.91E-05	-3.42E-05	-2.89E-05	-3.39E-05
EP-marine	kg N eq.	-0.0313	-0.0250	-0.0221	-0.0221	-0.0272	-0.0218	-0.0268
EP-terrestrial	Mole of N eq.	-0.342	-0.273	-0.241	-0.241	-0.296	-0.237	-0.292
POCP	kg NMVOC eq.	-0.107	-0.0850	-0.0746	-0.0746	-0.0924	-0.0734	-0.0911
ADP-minerals &metals	kg Sb-eq.	-1.02E-06	-9.10E-07	-8.93E-07	-8.93E-07	-9.93E-07	-8.91E-07	-9.91E-07
ADP-fossil	MJ	-2,420	-1,870	-1,590	-1,590	-2,030	-1,560	-1,990
WDP	m^3 world equiv.	-355	-307	-293	-293	-335	-291	-334

Additional Environmental Impacts

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
GWP-GHG	kg CO_2-eq.	-25.7	-20.7	-18.4	-18.4	-22.5	-18.2	-22.2
PM	Disease incidences	-1.46E-06	-1.17E-06	-1.05E-06	-1.05E-06	-1.28E-06	-1.03E-06	-1.26E-06
IRP	kBq U235 eq.	-0.00521	-0.00423	-0.00379	-0.00379	-0.00460	-0.00374	-0.00454
ETP-fw	CTUe	-700	-541	-461	-461	-587	-452	-577
HTPc	CTUh	-2.82E-09	-2.28E-09	-2.03E-09	-2.03E-09	-2.48E-09	-2.00E-09	-2.44E-09
HTPnc	CTUh	-2.23E-07	-1.75E-07	-1.52E-07	-1.52E-07	-1.90E-07	-1.50E-07	-1.87E-07
SQP	Pt	-161	-145	-145	-145	-161	-145	-161

Resource use

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
PERE	MJ	-7.12	-6.11	-5.77	-5.77	-6.65	-5.74	-6.61
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	-7.12	-6.11	-5.77	-5.77	-6.65	-5.74	-6.61
PENRE	MJ	-2,420	-1,870	-1,590	-1,590	-2,030	-1,560	-1,990
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	-2,420	-1,870	-1,590	-1,590	-2,030	-1,560	-1,990
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	-0.00825	-0.00713	-0.00680	-0.00680	-0.00779	-0.00677	-0.00775

Waste categories and output flows

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
HWD	kg	-8.36E-04	-6.47E-04	-5.54E-04	-5.54E-04	-7.05E-04	-5.44E-04	-6.93E-04
NHWD	kg	-1.32	-1.09	-1.02	-1.02	-1.21	-1.01	-1.20
RWD	kg	-1.69E-06	-1.36E-06	-1.22E-06	-1.22E-06	-1.50E-06	-1.21E-06	-1.48E-06
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC07	AC10 R10	AC14 R10 H	AC14 A15E R10 H	AC14 A15E H S	AC20 R10	CM07 Cold Mix
GWP	kg CO_2-eq.	-25.3	-20.3	-18.1	-18.1	-22.1	-17.9	-21.8
ODP	kg CFC11-eq.	-1.93E-05	-1.49E-05	-1.26E-05	-1.26E-05	-1.61E-05	-1.24E-05	-1.59E-05
AP	kg SO_2-eq.	-0.218	-0.169	-0.145	-0.145	-0.184	-0.142	-0.181
EP	kg PO_4^{3}-- eq.	-0.0108	-0.00865	-0.00764	-0.00764	-0.00941	-0.00753	-0.00928
POCP	kg C_2H_4-eq.	-0.0147	-0.0114	-0.00971	-0.00971	-0.0124	-0.00952	-0.0122
ADPE	kg Sb-eq.	-1.02E-06	-9.10E-07	-8.93E-07	-8.93E-07	-9.93E-07	-8.91E-07	-9.91E-07
ADPF	MJ	-2,570	-1,980	-1,690	-1,690	-2,150	-1,660	-2,110

Teralba Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
GWP-total	kg CO_2-eq.	80.9	82.1	79.0	76.6	78.3	78.6	73.2
GWP-fossil	kg CO_2-eq.	80.8	82.0	78.9	76.5	78.3	78.6	73.1
GWP-biogenic	kg CO_2-eq.	0.0661	0.0721	0.0672	0.0644	0.0674	0.0670	0.0615
GWP-luluc	kg CO_2-eq.	1.03E-04	1.03E-04	9.43E-05	8.75E-05	9.25E-05	9.42E-05	7.87E-05
ODP	kg CFC11-eq.	3.43E-05	3.42E-05	3.15E-05	2.92E-05	3.08E-05	3.14E-05	2.63E-05
AP	Mole of H+ eq.	0.645	0.659	0.608	0.569	0.603	0.605	0.520
EP-freshwater	kg P eq.	8.30E-05	8.76E-05	8.31E-05	8.02E-05	8.22E-05	8.34E-05	7.69E-05
EP-marine	kg N eq.	0.0978	0.1000	0.0936	0.0886	0.0939	0.0928	0.0822
EP-terrestrial	Mole of N eq.	1.08	1.10	1.03	0.974	1.03	1.02	0.903
POCP	kg NMVOC eq.	0.308	0.316	0.295	0.279	0.295	0.293	0.260
ADP-minerals &metals	kg Sb-eq.	1.03E-06	1.32E-06	1.14E-06	1.05E-06	1.16E-06	1.17E-06	9.91E-07
ADP-fossil	MJ	3,010	3,010	2,770	2,580	2,720	2,770	2,320
WDP	m^3 world equiv.	2,280	2,190	2,300	2,430	2,300	1,670	2,240

Additional Environmental Impacts

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
GWP-GHG	kg CO_2-eq.	79.5	80.7	77.7	75.3	77.0	77.3	72.0
PM	Disease incidences	8.22E-06	8.33E-06	8.15E-06	8.02E-06	8.15E-06	8.12E-06	7.85E-06
IRP	kBq U235 eq.	0.00616	0.00664	0.00598	0.00554	0.00594	0.00603	0.00507
ETP-fw	CTUe	945	934	874	829	859	829	745
HTPc	CTUh	5.10E-09	5.28E-09	4.90E-09	4.64E-09	4.84E-09	4.86E-09	4.29E-09
HTPnc	CTUh	4.32E-07	4.36E-07	4.12E-07	3.93E-07	4.06E-07	4.12E-07	3.69E-07
SQP	Pt	174	212	188	175	192	192	167

Biogenic carbon content

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
BCC-prod	kg	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0

Resource use

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
PERE	MJ	15.6	16.7	15.9	15.7	16.0	14.6	14.8
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	15.6	16.7	15.9	15.7	16.0	14.6	14.8
PENRE	MJ	2,110	2,110	1,960	1,840	1,920	1,960	1,680
PENRM	MJ	900	900	810	738	796	810	648
PENRT	MJ	3,010	3,010	2,770	2,580	2,720	2,770	2,320
SM	kg	200	0	125	200	104	120	250
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	0.0530	0.0509	0.0534	0.0564	0.0535	0.0388	0.0521

Waste categories and output flows

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
HWD	kg	0.00119	0.00119	0.00110	0.00103	0.00109	0.00110	9.39E-04
NHWD	kg	4.16	4.29	4.12	3.99	4.18	4.09	3.84
RWD	kg	3.99E-06	4.03E-06	3.86E-06	3.71E-06	3.85E-06	3.85E-06	3.52E-06
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
GWP	kg CO_2-eq.	78.9	80.0	77.0	74.7	76.4	76.7	71.5
ODP	kg CFC11-eq.	2.37E-05	2.37E-05	2.18E-05	2.02E-05	2.13E-05	2.17E-05	1.82E-05
AP	kg SO_2-eq.	0.415	0.418	0.385	0.360	0.380	0.384	0.327
EP	kg PO_4^{3}-- eq.	0.0336	0.0345	0.0322	0.0305	0.0322	0.0319	0.0283
POCP	kg C_2H_4-eq.	0.0350	0.0351	0.0332	0.0318	0.0330	0.0332	0.0299
ADPE	kg Sb-eq.	1.03E-06	1.32E-06	1.14E-06	1.05E-06	1.16E-06	1.17E-06	9.91E-07
ADPF	MJ	3,190	3,190	2,940	2,730	2,880	2,930	2,460

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
GWP-total	kg CO_2-eq.	-17.1	-22.1	-17.7	-15.1	-18.1	-17.9	-13.0
GWP-fossil	kg CO_2-eq.	-17.1	-22.1	-17.7	-15.1	-18.0	-17.8	-13.0
GWP-biogenic	kg CO_2-eq.	-0.0256	-0.0321	-0.0271	-0.0241	-0.0277	-0.0273	-0.0219
GWP-luluc	kg CO_2-eq.	-5.04E-05	-6.71E-05	-5.15E-05	-4.22E-05	-5.23E-05	-5.18E-05	-3.46E-05
ODP	kg CFC11-eq.	-1.66E-05	-2.21E-05	-1.69E-05	-1.39E-05	-1.72E-05	-1.71E-05	-1.14E-05
AP	Mole of H+ eq.	-0.211	-0.277	-0.217	-0.182	-0.221	-0.219	-0.153
EP-freshwater	kg P eq.	-2.65E-05	-3.33E-05	-2.78E-05	-2.46E-05	-2.84E-05	-2.80E-05	-2.21E-05
EP-marine	kg N eq.	-0.0200	-0.0261	-0.0207	-0.0176	-0.0211	-0.0209	-0.0150
EP-terrestrial	Mole of N eq.	-0.218	-0.284	-0.226	-0.191	-0.230	-0.227	-0.164
POCP	kg NMVOC eq.	-0.0677	-0.0884	-0.0699	-0.0589	-0.0711	-0.0704	-0.0501
ADP-minerals &metals	kg Sb-eq.	-8.11E-07	-9.86E-07	-8.68E-07	-7.97E-07	-8.87E-07	-8.72E-07	-7.47E-07
ADP-fossil	MJ	-1,440	-1,920	-1,480	-1,210	-1,500	-1,490	-995
WDP	m^3 world equiv.	-265	-330	-282	-253	-288	-283	-232

Additional Environmental Impacts

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
GWP-GHG	kg CO_2-eq.	-16.7	-21.7	-17.4	-14.8	-17.7	-17.5	-12.8
PM	Disease incidences	-9.49E-07	-1.23E-06	-9.85E-07	-8.40E-07	-1.00E-06	-9.91E-07	-7.26E-07
IRP	kBq U235 eq.	-0.00345	-0.00443	-0.00358	-0.00308	-0.00365	-0.00361	-0.00268
ETP-fw	CTUe	-418	-557	-427	-350	-434	-430	-288
HTPc	CTUh	-1.84E-09	-2.38E-09	-1.91E-09	-1.64E-09	-1.95E-09	-1.93E-09	-1.42E-09
HTPnc	CTUh	-1.38E-07	-1.82E-07	-1.42E-07	-1.19E-07	-1.45E-07	-1.43E-07	-9.99E-08
SQP	Pt	-130	-161	-141	-130	-145	-142	-122

Teralba Asphalt Manufacturing Facility (continued)

Resource use

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
PERE	MJ	-5.24	-6.53	-5.55	-4.96	-5.66	-5.58	-4.53
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	-5.24	-6.53	-5.55	-4.96	-5.66	-5.58	-4.53
PENRE	MJ	-1,440	-1,920	-1,480	-1,210	-1,500	-1,490	-995
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	-1,440	-1,920	-1,480	-1,210	-1,500	-1,490	-995
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	-0.00615	-0.00767	-0.00655	-0.00588	-0.00670	-0.00659	-0.00539

Waste categories and output flows

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
HWD	kg	-5.02E-04	-6.69E-04	-5.15E-04	-4.23E-04	-5.23E-04	-5.18E-04	-3.48E-04
NHWD	kg	-0.905	-1.18	-0.968	-0.841	-0.993	-0.975	-0.745
RWD	kg	-1.09E-06	-1.45E-06	-1.15E-06	-9.80E-07	-1.18E-06	-1.16E-06	-8.44E-07
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R20	AC14	AC14 R10 H	AC14 R20 H	AC14 R10 H Reconophalt	AC14 R10 H DG	AC20 R25 H
GWP	kg CO_2-eq.	-16.4	-21.3	-17.0	-14.5	-17.4	-17.2	-12.5
ODP	kg CFC11-eq.	-1.15E-05	-1.53E-05	-1.17E-05	-9.59E-06	-1.19E-05	-1.18E-05	-7.86E-06
AP	kg SO_2-eq.	-0.132	-0.175	-0.135	-0.111	-0.137	-0.136	-0.0918
EP	kg PO_4^{3-}-- eq.	-0.00694	-0.00902	-0.00718	-0.00608	-0.00730	-0.00723	-0.00520
POCP	kg C_2H_4-eq.	-0.00881	-0.0117	-0.00901	-0.00739	-0.00915	-0.00907	-0.00607
ADPE	kg Sb-eq.	-8.11E-07	-9.86E-07	-8.68E-07	-7.97E-07	-8.87E-07	-8.72E-07	-7.47E-07
ADPF	MJ	-1,530	-2,040	-1,570	-1,280	-1,590	-1,580	-1,050

Lismore Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
GWP-total	kg CO_2-eq.	67.9	74.8	67.8	66.2	58.8
GWP-fossil	kg CO_2-eq.	67.9	74.7	67.7	66.2	58.8
GWP-biogenic	kg CO_2-eq.	0.0616	0.0649	0.0651	0.0656	0.0581
GWP-luluc	kg CO_2-eq.	1.14E-04	1.13E-04	1.17E-04	1.11E-04	8.91E-05
ODP	kg CFC11-eq.	3.76E-05	3.75E-05	3.84E-05	3.67E-05	2.93E-05
AP	Mole of H+ eq.	0.719	0.723	0.735	0.710	0.589
EP-freshwater	kg P eq.	7.97E-05	8.09E-05	8.16E-05	8.13E-05	7.32E-05
EP-marine	kg N eq.	0.116	0.117	0.117	0.114	0.0985
EP-terrestrial	Mole of N eq.	1.27	1.29	1.28	1.25	1.08
POCP	kg NMVOC eq.	0.385	0.390	0.389	0.379	0.332
ADP-minerals &metals	kg Sb-eq.	1.14E-06	1.25E-06	1.29E-06	1.35E-06	1.14E-06
ADP-fossil	MJ	3,320	3,290	3,390	3,240	2,610
WDP	m^3 world equiv.	425	1,290	459	623	708

Additional Environmental Impacts

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
GWP-GHG	kg CO_2-eq.	66.9	73.6	66.7	65.1	57.9
PM	Disease incidences	6.99E-06	7.04E-06	7.05E-06	7.00E-06	6.61E-06
IRP	kBq U235 eq.	0.00674	0.00691	0.00712	0.00700	0.00572
ETP-fw	CTUe	953	971	974	941	768
HTPc	CTUh	5.77E-09	5.83E-09	5.94E-09	5.82E-09	4.98E-09
HTPnc	CTUh	3.87E-07	4.25E-07	3.93E-07	3.80E-07	3.21E-07
SQP	Pt	209	215	218	221	194

Biogenic carbon content

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
BCC-prod	kg	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0

Lismore Asphalt Manufacturing Facility (continued)

Resource use

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
PERE	MJ	11.6	14.0	12.4	12.9	11.7
PERM	MJ	0	0	0	0	0
PERT	MJ	11.6	14.0	12.4	12.9	11.7
PENRE	MJ	2,260	2,250	2,290	2,200	1,800
PENRM	MJ	1,060	1,040	1,100	1,040	810
PENRT	MJ	3,320	3,290	3,390	3,240	2,610
SM	kg	0	0	0	0	150
RSF	MJ	0	0	0	0	0
NRSF	MJ	0	0	0	0	0
FW	m^3	0.00987	0.0299	0.0107	0.0145	0.0165

Waste categories and output flows

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
HWD	kg	0.00130	0.00127	0.00130	0.00124	0.00102
NHWD	kg	4.09	4.02	3.96	3.85	3.53
RWD	kg	4.09E-06	3.92E-06	3.92E-06	3.76E-06	3.34E-06
CRU	kg	0	0	0	0	0
MFR	kg	0	0	0	0	0
MER	kg	0	0	0	0	0
EEE	MJ	0	0	0	0	0
EET	MJ	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
GWP	kg CO_2-eq.	66.2	72.9	66.0	64.4	57.4
ODP	kg CFC11-eq.	2.89E-05	2.88E-05	2.95E-05	2.83E-05	2.32E-05
AP	kg SO_2-eq.	0.569	0.567	0.577	0.558	0.476
EP	kg PO_4^{3}-- eq.	0.0396	0.0400	0.0399	0.0389	0.0337
POCP	kg C_2H_4-eq.	0.0441	0.0449	0.0446	0.0434	0.0387
ADPE	kg Sb-eq.	1.14E-06	1.25E-06	1.29E-06	1.35E-06	1.14E-06
ADPF	MJ	3,520	3,490	3,600	3,430	2,760

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
GWP-total	kg CO_2-eq.	-24.8	-24.5	-25.4	-24.5	-17.2
GWP-fossil	kg CO_2-eq.	-24.8	-24.5	-25.4	-24.5	-17.1
GWP-biogenic	kg CO_2-eq.	-0.0341	-0.0339	-0.0346	-0.0339	-0.0263
GWP-luluc	kg CO_2-eq.	-7.83E-05	-7.71E-05	-8.08E-05	-7.71E-05	-4.96E-05
ODP	kg CFC11-eq.	-2.58E-05	-2.54E-05	-2.66E-05	-2.54E-05	-1.63E-05
AP	Mole of H+ eq.	-0.317	-0.312	-0.326	-0.312	-0.210
EP-freshwater	kg P eq.	-3.59E-05	-3.56E-05	-3.64E-05	-3.56E-05	-2.70E-05
EP-marine	kg N eq.	-0.0295	-0.0291	-0.0302	-0.0291	-0.0200
EP-terrestrial	Mole of N eq.	-0.321	-0.317	-0.329	-0.317	-0.218
POCP	kg NMVOC eq.	-0.1000	-0.0991	-0.103	-0.0991	-0.0675
ADP-minerals &metals	kg Sb-eq.	-1.01E-06	-1.00E-06	-1.01E-06	-1.00E-06	-8.46E-07
ADP-fossil	MJ	-2,240	-2,210	-2,310	-2,210	-1,420
WDP	m^3 world equiv.	-346	-344	-350	-344	-274

Additional Environmental Impacts

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
GWP-GHG	kg CO_2-eq.	-24.3	-24.0	-24.9	-24.0	-16.8
PM	Disease incidences	-1.38E-06	-1.36E-06	-1.41E-06	-1.36E-06	-9.53E-07
IRP	kBq U235 eq.	-0.00493	-0.00487	-0.00504	-0.00487	-0.00347
ETP-fw	CTUe	-649	-639	-670	-639	-412
HTPc	CTUh	-2.66E-09	-2.63E-09	-2.73E-09	-2.63E-09	-1.85E-09
HTPnc	CTUh	-2.08E-07	-2.05E-07	-2.14E-07	-2.05E-07	-1.37E-07
SQP	Pt	-161	-161	-161	-161	-137

Lismore Asphalt Manufacturing Facility (continued)

Resource use

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
PERE	MJ	-6.91	-6.87	-6.99	-6.87	-5.39
PERM	MJ	0	0	0	0	0
PERT	MJ	-6.91	-6.87	-6.99	-6.87	-5.39
PENRE	MJ	-2,240	-2,210	-2,310	-2,210	-1,420
PENRM	MJ	0	0	0	0	0
PENRT	MJ	-2,240	-2,210	-2,310	-2,210	-1,420
SM	kg	0	0	0	0	0
RSF	MJ	0	0	0	0	0
NRSF	MJ	0	0	0	0	0
FW	m^3	-0.00804	-0.00800	-0.00812	-0.00800	-0.00637

Waste categories and output flows

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
HWD	kg	-7.76E-04	-7.64E-04	-8.00E-04	-7.64E-04	-4.96E-04
NHWD	kg	-1.27	-1.26	-1.29	-1.26	-0.935
RWD	kg	-1.60E-06	-1.58E-06	-1.64E-06	-1.58E-06	-1.11E-06
CRU	kg	0	0	0	0	0
MFR	kg	0	0	0	0	0
MER	kg	0	0	0	0	0
EEE	MJ	0	0	0	0	0
EET	MJ	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC07	AC10 H	AC10	AC14	AC20 R15
GWP	kg CO_2-eq.	-23.8	-23.5	-24.4	-23.5	-16.5
ODP	kg CFC11-eq.	-1.79E-05	-1.76E-05	-1.84E-05	-1.76E-05	-1.13E-05
AP	kg SO_2-eq.	-0.203	-0.199	-0.209	-0.199	-0.130
EP	kg PO_4^{3}-- eq.	-0.0102	-0.0101	-0.0104	-0.0101	-0.00694
POCP	kg C_2H_4-eq.	-0.0137	-0.0134	-0.0141	-0.0134	-0.00868
ADPE	kg Sb-eq.	-1.01E-06	-1.00E-06	-1.01E-06	-1.00E-06	-8.46E-07
ADPF	MJ	-2,380	-2,340	-2,450	-2,340	-1,510

Asphalt in the Australian Capital Territory

Home to a compact, vibrant city with a population approaching 450,000, outer-urban and rural populations, and the biodiverse Namadgi National Park, the Australian Capital Territory relies on a world-class, sustainable transport network to deliver the safe, reliable journeys essential to the quality of life of local residents, and the success of local business and industry.

Downer has supported the construction and maintenance of roads, airfields, and other asphalt-paved assets in the Australian Capital Territory for more than 85 years, with our Hume asphalt manufacturing facility, office and depot currently servicing the region.

Hot Air Balloons over Lake Burley Griffin, Canberra, ACT

Hume Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
GWP-total	kg CO_2-eq.	76.3	78.3	77.4	76.4	71.4	90.7	73.3
GWP-fossil	kg CO_2-eq.	76.0	78.2	77.3	76.3	71.1	90.3	72.9
GWP-biogenic	kg CO_2-eq.	0.346	0.0757	0.0723	0.0747	0.344	0.408	0.345
GWP-luluc	kg CO_2-eq.	6.84E-04	1.04E-04	1.04E-04	9.71E-05	6.65E-04	7.42E-04	6.72E-04
ODP	kg CFC11-eq.	3.46E-05	3.45E-05	3.46E-05	3.23E-05	2.83E-05	2.98E-05	3.06E-05
AP	Mole of H+ eq.	0.679	0.690	0.685	0.657	0.583	0.709	0.620
EP-freshwater	kg P eq.	6.28E-05	6.23E-05	5.88E-05	6.08E-05	5.96E-05	1.93E-04	6.10E-05
EP-marine	kg N eq.	0.103	0.104	0.104	0.1000	0.0912	0.110	0.0961
EP-terrestrial	Mole of N eq.	1.13	1.15	1.14	1.10	0.999	1.21	1.05
POCP	kg NMVOC eq.	0.324	0.327	0.326	0.315	0.286	0.343	0.301
ADP-minerals &metals	kg Sb-eq.	1.04E-06	1.33E-06	1.14E-06	1.31E-06	1.05E-06	1.53E-06	1.05E-06
ADP-fossil	MJ	3,290	3,310	3,310	3,120	2,770	3,300	2,960
WDP	m^3 world equiv.	1,680	1,760	2,540	2,220	1,990	2,370	2,150

Additional Environmental Impacts

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
GWP-GHG	kg CO_2-eq.	74.8	76.8	75.9	75.0	70.0	88.8	71.8
PM	Disease incidences	8.82E-06	8.58E-06	8.53E-06	8.49E-06	8.57E-06	9.59E-06	8.67E-06
IRP	kBq U235 eq.	0.0112	0.00664	0.00631	0.00632	0.0104	0.302	0.0107
ETP-fw	CTUe	1,060	911	968	888	921	978	990
HTPc	CTUh	8.13E-09	4.93E-09	4.86E-09	4.74E-09	7.58E-09	9.42E-09	7.81E-09
HTPnc	CTUh	4.00E-07	4.00E-07	3.97E-07	3.83E-07	3.54E-07	4.03E-07	3.71E-07
SQP	Pt	186	227	198	225	193	205	186

Biogenic carbon content

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
BCC-prod	kg	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0

Resource use

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
PERE	MJ	15.9	17.3	18.2	18.1	16.2	17.0	16.7
PERM	MJ	0	0	0	0	0	2.16	0
PERT	MJ	15.9	17.3	18.2	18.1	16.2	19.1	16.7
PENRE	MJ	2,240	2,270	2,260	2,150	1,920	2,410	2,030
PENRM	MJ	1,050	1,040	1,040	972	846	887	925
PENRT	MJ	3,290	3,310	3,310	3,120	2,770	3,300	2,960
SM	kg	232	0	150	0	175	125	232
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	0.0391	0.0408	0.0589	0.0516	0.0462	0.0550	0.0500

Waste categories and output flows

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
HWD	kg	0.00117	0.00116	0.00116	0.00109	9.76E-04	0.00106	0.00105
NHWD	kg	4.81	4.52	4.46	4.47	4.59	4.92	4.65
RWD	kg	1.32E-05	3.10E-06	3.04E-06	2.99E-06	1.29E-05	5.43E-05	1.30E-05
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
GWP	kg CO_2-eq.	74.0	76.1	75.2	74.2	69.3	87.8	71.1
ODP	kg CFC11-eq.	2.39E-05	2.39E-05	2.39E-05	2.24E-05	1.96E-05	2.06E-05	2.12E-05
AP	kg SO_2-eq.	0.424	0.426	0.425	0.402	0.355	0.443	0.381
EP	kg PO_4^{3}-- eq.	0.0371	0.0357	0.0355	0.0343	0.0330	0.0399	0.0347
POCP	kg C_2H_4-eq.	0.0354	0.0350	0.0350	0.0336	0.0313	0.0355	0.0329
ADPE	kg Sb-eq.	1.04E-06	1.33E-06	1.14E-06	1.31E-06	1.05E-06	1.53E-06	1.05E-06
ADPF	MJ	3,480	3,490	3,490	3,290	2,920	3,480	3,120

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
GWP-total	kg CO_2-eq.	-21.2	-26.9	-22.6	-25.5	-19.3	-22.8	-19.2
GWP-fossil	kg CO_2-eq.	-21.2	-26.9	-22.6	-25.4	-19.3	-22.8	-19.2
GWP-biogenic	kg CO_2-eq.	-0.0274	-0.0344	-0.0292	-0.0333	-0.0267	-0.0299	-0.0260
GWP-luluc	kg CO_2-eq.	-6.96E-05	-8.90E-05	-7.44E-05	-8.30E-05	-6.07E-05	-7.40E-05	-6.15E-05
ODP	kg CFC11-eq.	-2.29E-05	-2.93E-05	-2.45E-05	-2.74E-05	-2.00E-05	-2.44E-05	-2.02E-05
AP	Mole of H+ eq.	-0.276	-0.351	-0.295	-0.330	-0.246	-0.295	-0.247
EP-freshwater	kg P eq.	-2.91E-05	-3.66E-05	-3.10E-05	-3.52E-05	-2.79E-05	-3.17E-05	-2.73E-05
EP-marine	kg N eq.	-0.0253	-0.0321	-0.0270	-0.0303	-0.0229	-0.0271	-0.0229
EP-terrestrial	Mole of N eq.	-0.276	-0.351	-0.295	-0.331	-0.249	-0.296	-0.249
POCP	kg NMVOC eq.	-0.0868	-0.110	-0.0927	-0.104	-0.0780	-0.0929	-0.0781
ADP-minerals &metals	kg Sb-eq.	-7.62E-07	-9.43E-07	-8.07E-07	-9.32E-07	-7.84E-07	-8.43E-07	-7.48E-07
ADP-fossil	MJ	-1,990	-2,540	-2,130	-2,370	-1,740	-2,110	-1,760
WDP	m^3 world equiv.	-276	-345	-293	-336	-273	-303	-264

Additional Environmental Impacts

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
GWP-GHG	kg CO_2-eq.	-20.7	-26.3	-22.1	-24.9	-18.9	-22.2	-18.8
PM	Disease incidences	-1.17E-06	-1.48E-06	-1.25E-06	-1.41E-06	-1.07E-06	-1.26E-06	-1.06E-06
IRP	kBq U235 eq.	-0.00415	-0.00526	-0.00443	-0.00499	-0.00382	-0.00447	-0.00379
ETP-fw	CTUe	-576	-737	-616	-687	-503	-613	-509
HTPc	CTUh	-2.26E-09	-2.87E-09	-2.41E-09	-2.72E-09	-2.07E-09	-2.43E-09	-2.06E-09
HTPnc	CTUh	-1.81E-07	-2.31E-07	-1.94E-07	-2.17E-07	-1.61E-07	-1.94E-07	-1.62E-07
SQP	Pt	-126	-157	-134	-157	-133	-141	-126

Hume Asphalt Manufacturing Facility (continued)

Resource use

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
PERE	MJ	-5.49	-6.87	-5.84	-6.66	-5.37	-6.00	-5.22
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	-5.49	-6.87	-5.84	-6.66	-5.37	-6.00	-5.22
PENRE	MJ	-1,990	-2,540	-2,130	-2,370	-1,740	-2,110	-1,760
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	-1,990	-2,540	-2,130	-2,370	-1,740	-2,110	-1,760
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	-0.00641	-0.00801	-0.00681	-0.00781	-0.00635	-0.00703	-0.00614

Waste categories and output flows

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
HWD	kg	-6.91E-04	-8.84E-04	-7.40E-04	-8.27E-04	-6.08E-04	-7.37E-04	-6.13E-04
NHWD	kg	-1.10	-1.40	-1.17	-1.35	-1.07	-1.21	-1.03
RWD	kg	-1.41E-06	-1.80E-06	-1.51E-06	-1.71E-06	-1.32E-06	-1.53E-06	-1.30E-06
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R20 Reconophalt	AC10 H	AC10 R15 H	AC14 H	AC14 R15	AC14 AE15 R10	AC14 R20 HD
GWP	kg CO_2-eq.	-20.3	-25.8	-21.7	-24.4	-18.5	-21.8	-18.4
ODP	kg CFC11-eq.	-1.59E-05	-2.03E-05	-1.70E-05	-1.89E-05	-1.39E-05	-1.69E-05	-1.40E-05
AP	kg SO_2-eq.	-0.179	-0.229	-0.191	-0.214	-0.157	-0.190	-0.159
EP	kg PO_4^{3-}- eq.	-0.00875	-0.0111	-0.00934	-0.0105	-0.00791	-0.00938	-0.00790
POCP	kg C_2H_4-eq.	-0.0121	-0.0155	-0.0130	-0.0145	-0.0106	-0.0129	-0.0107
ADPE	kg Sb-eq.	-7.62E-07	-9.43E-07	-8.07E-07	-9.32E-07	-7.84E-07	-8.43E-07	-7.48E-07
ADPF	MJ	-2,110	-2,700	-2,260	-2,520	-1,840	-2,240	-1,860

Brighton Bathing Boxes, Brighton, Victoria

Asphalt in Victoria

With the highest density of roads of any state in Australia, Victoria's population centres are linked by high quality highways and freeways, while the state capital, Melbourne, has the most extensive freeway network of any city in Australia.

Melbourne airport is the second busiest in Australia with more than 30 million passengers and 250,000 tonnes of freight passing through the airport each year.

Downer has supported the construction and maintenance of roads, airfields, and other asphalt-paved assets in Victoria for more than 85 years, with five asphalt manufacturing facilities and 23 offices and depots currently operating across the state.

Bayswater Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
GWP-total	kg CO_2-eq.	59.0	91.0	58.8	82.7	54.8	51.8
GWP-fossil	kg CO_2-eq.	58.9	91.1	58.7	82.6	54.7	51.8
GWP-biogenic	kg CO_2-eq.	0.0535	-0.0257	0.0537	0.126	0.0491	0.0488
GWP-luluc	kg CO_2-eq.	7.45E-05	3.18E-04	7.29E-05	1.64E-04	7.03E-05	5.53E-05
ODP	kg CFC11-eq.	2.45E-05	3.38E-05	2.40E-05	2.73E-05	2.31E-05	1.82E-05
AP	Mole of H+ eq.	0.543	0.850	0.537	0.710	0.504	0.436
EP-freshwater	kg P eq.	4.58E-05	2.53E-04	4.57E-05	1.97E-04	4.16E-05	4.04E-05
EP-marine	kg N eq.	0.0882	0.131	0.0878	0.115	0.0802	0.0733
EP-terrestrial	Mole of N eq.	0.967	1.44	0.963	1.26	0.880	0.803
POCP	kg NMVOC eq.	0.274	0.402	0.273	0.352	0.252	0.229
ADP-minerals &metals	kg Sb-eq.	9.51E-07	1.88E-06	9.51E-07	1.60E-06	7.91E-07	8.72E-07
ADP-fossil	MJ	2,440	3,710	2,400	3,110	2,310	1,890
WDP	m^3 world equiv.	379	2,840	684	959	331	336

Additional Environmental Impacts

Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
GWP-GHG	kg CO_2-eq.	57.9	89.3	57.7	81.1	53.8	50.9
PM	Disease incidences	8.38E-06	1.03E-05	8.38E-06	9.63E-06	8.18E-06	8.03E-06
IRP	kBq U235 eq.	0.00473	0.408	0.00467	0.330	0.00429	0.00380
ETP-fw	CTUe	622	1,020	630	722	586	463
HTPc	CTUh	3.63E-09	7.28E-09	3.62E-09	5.85E-09	3.37E-09	2.96E-09
HTPnc	CTUh	2.64E-07	3.94E-07	2.61E-07	3.30E-07	2.48E-07	2.13E-07
SQP	Pt	156	232	157	192	128	143

Biogenic carbon content

Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
BCC-prod	kg	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0

Resource use

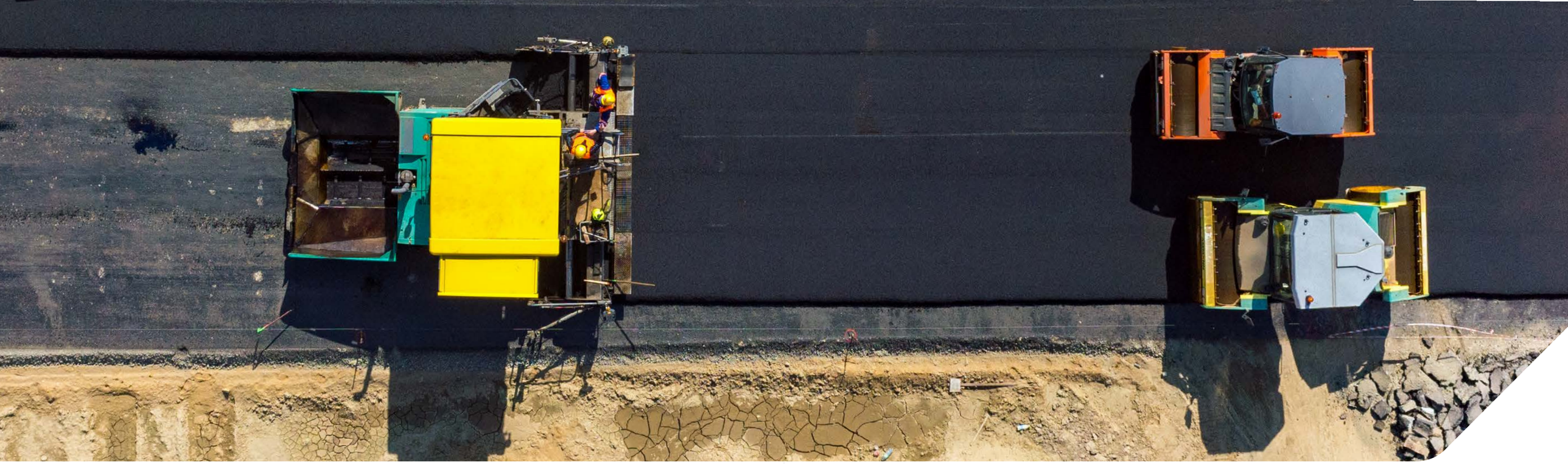
Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
PERE	MJ	10.9	23.5	11.6	13.1	10.0	10.0
PERM	MJ	0	2.48	0	2.00	0	0
PERT	MJ	10.9	26.0	11.6	15.1	10.0	10.0
PENRE	MJ	1,710	2,700	1,680	2,300	1,610	1,350
PENRM	MJ	738	1,010	720	813	702	540
PENRT	MJ	2,440	3,710	2,400	3,110	2,310	1,890
SM	kg	206	0	192	0	375	291
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	0.00881	0.0661	0.0159	0.0223	0.00769	0.00781

Waste categories and output flows

Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
HWD	kg	9.16E-04	0.00126	9.05E-04	0.00107	8.37E-04	7.04E-04
NHWD	kg	2.62	3.50	2.63	3.27	2.26	2.24
RWD	kg	2.68E-06	6.02E-05	2.67E-06	4.89E-05	2.38E-06	2.23E-06
CRU	kg	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
GWP	kg CO_2-eq.	57.4	88.2	57.3	80.2	53.3	50.5
ODP	kg CFC11-eq.	1.70E-05	2.34E-05	1.66E-05	1.89E-05	1.60E-05	1.26E-05
AP	kg SO_2-eq.	0.322	0.528	0.317	0.434	0.301	0.250
EP	kg PO_4^{3}-- eq.	0.0300	0.0451	0.0299	0.0394	0.0273	0.0249
POCP	kg C_2H_4-eq.	0.0281	0.0389	0.0278	0.0337	0.0268	0.0238
ADPE	kg Sb-eq.	9.51E-07	1.88E-06	9.51E-07	1.60E-06	7.91E-07	8.72E-07
ADPF	MJ	2,570	3,920	2,530	3,280	2,430	1,990



Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Hume City Council

Australia's first recycled street

For Victoria's Hume City Council, being the first municipality in Australia to surface a street using recycled glass and plastic bags simply made sense.

George Osborne, Hume's Manager Economic Development, says, "*Our implementation of a circular economy approach, including our extensive use of Reconophalt since the first trial in 2018, has enhanced Council's economic outcomes while reducing our ecological footprint*".

The use of Reconophalt to deliver 70% of Hume City Council's annual road resurfacing program over the 2021 financial year has provided protection from bitumen price volatility in a time of unprecedented global uncertainty, while creating a circular economy pathway for discarded resources including soft plastics, glass bottles, waste printer toner, and end-of-life asphalt mined from the Council's own roads.

In fact, in 17,067 tonnes of Reconophalt laid over the last year, Hume City Council has re purposed more than 15.2 million plastic bags, toner from 443,000 printer cartridges, and 5,605 tonnes of recycled asphalt pavement, while delivering a carbon emission reduction of more than 144 tonnes, as calculated by Downer's independently-verified Life Cycle Assessment (LCA) calculator.

In addition to the environmental benefits of materials re-purposing, the polymers in the soft plastics and toner strengthen the asphalt, increasing the life of the road surface with improved rut resistance compared to traditional asphalt.

Carbon emissions savings of more than 144 tonnes delivered in the last year, while emissions savings continue with longer asset life and perpetual recyclability

More than 15.2 million plastic bags, toner from 443,000 printer cartridges, and 5,605 tonnes of RAP diverted from landfill in the last year

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3-}- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
GWP-total	kg CO_2-eq.	-16.6	-28.3	-16.3	-24.0	-12.2	-11.8
GWP-fossil	kg CO_2-eq.	-16.6	-28.3	-16.3	-24.0	-12.2	-11.8
GWP-biogenic	kg CO_2-eq.	-0.0241	-0.0355	-0.0239	-0.0322	-0.0184	-0.0192
GWP-luluc	kg CO_2-eq.	-5.04E-05	-9.49E-05	-4.92E-05	-7.70E-05	-3.61E-05	-3.25E-05
ODP	kg CFC11-eq.	-1.66E-05	-3.13E-05	-1.62E-05	-2.54E-05	-1.19E-05	-1.07E-05
AP	Mole of H+ eq.	-0.208	-0.373	-0.204	-0.309	-0.151	-0.141
EP-freshwater	kg P eq.	-2.49E-05	-3.80E-05	-2.46E-05	-3.39E-05	-1.88E-05	-1.93E-05
EP-marine	kg N eq.	-0.0196	-0.0339	-0.0192	-0.0285	-0.0143	-0.0137
EP-terrestrial	Mole of N eq.	-0.213	-0.370	-0.209	-0.311	-0.156	-0.149
POCP	kg NMVOC eq.	-0.0663	-0.117	-0.0651	-0.0976	-0.0484	-0.0457
ADP-minerals &metals	kg Sb-eq.	-7.35E-07	-9.53E-07	-7.33E-07	-9.22E-07	-5.76E-07	-6.31E-07
ADP-fossil	MJ	-1,440	-2,710	-1,410	-2,200	-1,030	-933
WDP	m^3 world equiv.	-250	-353	-248	-328	-192	-204

Additional Environmental Impacts

Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
GWP-GHG	kg CO_2-eq.	-16.3	-27.7	-16.0	-23.5	-12.0	-11.5
PM	Disease incidences	-9.20E-07	-1.56E-06	-9.04E-07	-1.33E-06	-6.78E-07	-6.55E-07
IRP	kBq U235 eq.	-0.00331	-0.00552	-0.00325	-0.00472	-0.00245	-0.00239
ETP-fw	CTUe	-418	-786	-408	-638	-299	-270
HTPc	CTUh	-1.78E-09	-3.02E-09	-1.75E-09	-2.57E-09	-1.32E-09	-1.27E-09
HTPnc	CTUh	-1.36E-07	-2.45E-07	-1.33E-07	-2.03E-07	-9.89E-08	-9.20E-08
SQP	Pt	-127	-157	-127	-157	-98.5	-111

Resource use

Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
PERE	MJ	-4.87	-7.07	-4.83	-6.46	-3.73	-3.91
PERM	MJ	0	0	0	0	0	0
PERT	MJ	-4.87	-7.07	-4.83	-6.46	-3.73	-3.91
PENRE	MJ	-1,440	-2,710	-1,410	-2,200	-1,030	-933
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	-1,440	-2,710	-1,410	-2,200	-1,030	-933
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	-0.00581	-0.00821	-0.00577	-0.00761	-0.00445	-0.00474

Waste categories and output flows

Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
HWD	kg	-5.07E-04	-9.41E-04	-4.96E-04	-7.69E-04	-3.64E-04	-3.32E-04
NHWD	kg	-0.954	-1.44	-0.944	-1.30	-0.708	-0.741
RWD	kg	-1.15E-06	-1.88E-06	-1.13E-06	-1.63E-06	-8.39E-07	-8.38E-07
CRU	kg	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R19 H N 302152	SMA10 A10E H Castella 302176C	AC14 H N 302252	AC14 A10E HP 302278	AC20 R37 SF 302324	AC20 R29 SI 302313
GWP	kg CO_2-eq.	-16.0	-27.1	-15.7	-23.0	-11.8	-11.3
ODP	kg CFC11-eq.	-1.15E-05	-2.17E-05	-1.12E-05	-1.76E-05	-8.22E-06	-7.39E-06
AP	kg SO_2-eq.	-0.131	-0.243	-0.128	-0.199	-0.0942	-0.0857
EP	kg PO_4^{3}-- eq.	-0.00677	-0.0117	-0.00664	-0.00987	-0.00496	-0.00473
POCP	kg C_2H_4-eq.	-0.00881	-0.0165	-0.00860	-0.0134	-0.00631	-0.00570
ADPE	kg Sb-eq.	-7.35E-07	-9.53E-07	-7.33E-07	-9.22E-07	-5.76E-07	-6.31E-07
ADPF	MJ	-1,530	-2,880	-1,500	-2,340	-1,100	-989

Somerton Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
GWP-total	kg CO_2-eq.	65.0	60.4	60.6	49.6	49.1	56.5
GWP-fossil	kg CO_2-eq.	65.0	60.3	60.6	49.6	49.0	56.4
GWP-biogenic	kg CO_2-eq.	0.0486	0.0478	0.0527	0.0414	0.0411	0.0538
GWP-luluc	kg CO_2-eq.	8.11E-05	7.04E-05	8.41E-05	6.98E-05	5.89E-05	8.08E-05
ODP	kg CFC11-eq.	2.70E-05	2.34E-05	2.77E-05	2.30E-05	1.94E-05	2.66E-05
AP	Mole of H+ eq.	0.560	0.498	0.586	0.468	0.429	0.550
EP-freshwater	kg P eq.	4.60E-05	4.49E-05	5.05E-05	3.95E-05	3.84E-05	5.18E-05
EP-marine	kg N eq.	0.0908	0.0806	0.0949	0.0725	0.0714	0.0843
EP-terrestrial	Mole of N eq.	0.997	0.885	1.04	0.796	0.783	0.925
POCP	kg NMVOC eq.	0.304	0.274	0.314	0.250	0.244	0.286
ADP-minerals &metals	kg Sb-eq.	9.54E-07	1.01E-06	1.16E-06	7.78E-07	8.26E-07	1.27E-06
ADP-fossil	MJ	2,610	2,290	2,690	2,270	1,960	2,580
WDP	m^3 world equiv.	1,180	1,180	738	317	322	451

Additional Environmental Impacts

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
GWP-GHG	kg CO_2-eq.	64.1	59.5	59.7	48.9	48.4	55.6
PM	Disease incidences	6.25E-06	6.04E-06	6.39E-06	5.84E-06	5.80E-06	6.21E-06
IRP	kBq U235 eq.	0.00503	0.00468	0.00550	0.00425	0.00387	0.00555
ETP-fw	CTUe	701	613	722	582	492	674
HTPc	CTUh	3.93E-09	3.62E-09	4.19E-09	3.40E-09	3.09E-09	4.13E-09
HTPnc	CTUh	3.13E-07	2.86E-07	2.86E-07	2.39E-07	2.14E-07	2.79E-07
SQP	Pt	158	161	189	127	141	196

Biogenic carbon content

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
BCC-prod	kg	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0

Resource use

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
PERE	MJ	11.7	11.7	11.6	8.66	8.64	11.3
PERM	MJ	0	0	0	0	0	0
PERT	MJ	11.7	11.7	11.6	8.66	8.64	11.3
PENRE	MJ	1,820	1,600	1,860	1,560	1,390	1,770
PENRM	MJ	792	684	828	702	576	810
PENRT	MJ	2,610	2,290	2,690	2,270	1,960	2,580
SM	kg	191	192	0	384	290	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	0.0275	0.0275	0.0171	0.00738	0.00747	0.0105

Waste categories and output flows

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
HWD	kg	9.62E-04	8.23E-04	0.00102	7.84E-04	7.23E-04	9.12E-04
NHWD	kg	2.50	2.19	2.77	1.82	2.05	2.22
RWD	kg	2.65E-06	2.31E-06	2.89E-06	2.07E-06	2.15E-06	2.45E-06
CRU	kg	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
GWP	kg CO_2-eq.	63.5	59.0	59.1	48.4	48.0	55.1
ODP	kg CFC11-eq.	2.16E-05	1.91E-05	2.21E-05	1.88E-05	1.63E-05	2.13E-05
AP	kg SO_2-eq.	0.343	0.300	0.357	0.289	0.256	0.334
EP	kg PO_4^{3-}-- eq.	0.0309	0.0275	0.0323	0.0247	0.0243	0.0288
POCP	kg C_2H_4-eq.	0.0332	0.0306	0.0331	0.0291	0.0272	0.0317
ADPE	kg Sb-eq.	9.54E-07	1.01E-06	1.16E-06	7.78E-07	8.26E-07	1.27E-06
ADPF	MJ	2,750	2,410	2,830	2,390	2,060	2,720

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
GWP-total	kg CO_2-eq.	-17.5	-15.8	-22.6	-12.0	-12.3	-22.2
GWP-fossil	kg CO_2-eq.	-17.5	-15.7	-22.6	-12.0	-12.3	-22.2
GWP-biogenic	kg CO_2-eq.	-0.0248	-0.0234	-0.0311	-0.0181	-0.0195	-0.0309
GWP-luluc	kg CO_2-eq.	-5.40E-05	-4.68E-05	-7.11E-05	-3.55E-05	-3.45E-05	-6.96E-05
ODP	kg CFC11-eq.	-1.78E-05	-1.54E-05	-2.34E-05	-1.17E-05	-1.14E-05	-2.29E-05
AP	Mole of H+ eq.	-0.221	-0.195	-0.287	-0.148	-0.148	-0.282
EP-freshwater	kg P eq.	-2.57E-05	-2.41E-05	-3.25E-05	-1.86E-05	-1.98E-05	-3.22E-05
EP-marine	kg N eq.	-0.0206	-0.0185	-0.0267	-0.0141	-0.0143	-0.0263
EP-terrestrial	Mole of N eq.	-0.225	-0.201	-0.291	-0.154	-0.155	-0.286
POCP	kg NMVOC eq.	-0.0702	-0.0625	-0.0911	-0.0476	-0.0479	-0.0895
ADP-minerals &metals	kg Sb-eq.	-7.42E-07	-7.29E-07	-9.12E-07	-5.68E-07	-6.35E-07	-9.09E-07
ADP-fossil	MJ	-1,550	-1,340	-2,030	-1,020	-991	-1,990
WDP	m^3 world equiv.	-255	-245	-319	-189	-207	-317

Additional Environmental Impacts

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
GWP-GHG	kg CO_2-eq.	-17.1	-15.4	-22.1	-11.8	-12.0	-21.7
PM	Disease incidences	-9.67E-07	-8.73E-07	-1.25E-06	-6.67E-07	-6.82E-07	-1.23E-06
IRP	kBq U235 eq.	-0.00347	-0.00315	-0.00446	-0.00241	-0.00248	-0.00439
ETP-fw	CTUe	-448	-389	-589	-294	-287	-577
HTPc	CTUh	-1.87E-09	-1.69E-09	-2.41E-09	-1.29E-09	-1.32E-09	-2.38E-09
HTPnc	CTUh	-1.45E-07	-1.28E-07	-1.89E-07	-9.72E-08	-9.69E-08	-1.85E-07
SQP	Pt	-127	-126	-156	-97.1	-111	-156

Somerton Asphalt Manufacturing Facility (continued)

Resource use

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
PERE	MJ	-4.99	-4.75	-6.26	-3.67	-3.98	-6.21
PERM	MJ	0	0	0	0	0	0
PERT	MJ	-4.99	-4.75	-6.26	-3.67	-3.98	-6.21
PENRE	MJ	-1,550	-1,340	-2,030	-1,020	-991	-1,990
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	-1,550	-1,340	-2,030	-1,020	-991	-1,990
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	-0.00593	-0.00569	-0.00741	-0.00439	-0.00481	-0.00736

Waste categories and output flows

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
HWD	kg	-5.42E-04	-4.73E-04	-7.12E-04	-3.57E-04	-3.52E-04	-6.98E-04
NHWD	kg	-0.982	-0.925	-1.26	-0.697	-0.757	-1.24
RWD	kg	-1.20E-06	-1.10E-06	-1.55E-06	-8.25E-07	-8.67E-07	-1.53E-06
CRU	kg	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R19 H N 303152	AC14 R19 N H 303252	AC14 V 303235	AC20 R38 SF 303324	AC20 R29 SI 303313	AC20 C600 SS 303316
GWP	kg CO_2-eq.	-16.8	-15.1	-21.7	-11.6	-11.8	-21.3
ODP	kg CFC11-eq.	-1.23E-05	-1.07E-05	-1.62E-05	-8.08E-06	-7.86E-06	-1.59E-05
AP	kg SO_2-eq.	-0.140	-0.122	-0.184	-0.0926	-0.0908	-0.180
EP	kg PO_4^{3}-- eq.	-0.00714	-0.00639	-0.00925	-0.00488	-0.00494	-0.00909
POCP	kg C_2H_4-eq.	-0.00942	-0.00819	-0.0124	-0.00620	-0.00605	-0.0121
ADPE	kg Sb-eq.	-7.42E-07	-7.29E-07	-9.12E-07	-5.68E-07	-6.35E-07	-9.09E-07
ADPF	MJ	-1,640	-1,420	-2,160	-1,080	-1,050	-2,110

Wodonga Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
GWP-total	kg CO_2-eq.	77.9	78.7	79.6	77.6	79.6	78.4
GWP-fossil	kg CO_2-eq.	77.9	78.6	79.6	77.5	79.6	78.4
GWP-biogenic	kg CO_2-eq.	0.0606	0.0617	0.0628	0.0598	0.0628	0.0608
GWP-luluc	kg CO_2-eq.	1.05E-04	1.05E-04	1.06E-04	1.05E-04	1.06E-04	1.05E-04
ODP	kg CFC11-eq.	3.47E-05	3.48E-05	3.49E-05	3.47E-05	3.49E-05	3.47E-05
AP	Mole of H+ eq.	0.738	0.747	0.755	0.735	0.755	0.744
EP-freshwater	kg P eq.	7.90E-05	7.94E-05	8.05E-05	7.84E-05	8.05E-05	7.90E-05
EP-marine	kg N eq.	0.118	0.121	0.123	0.118	0.123	0.120
EP-terrestrial	Mole of N eq.	1.30	1.33	1.35	1.29	1.35	1.32
POCP	kg NMVOC eq.	0.393	0.401	0.407	0.391	0.407	0.398
ADP-minerals &metals	kg Sb-eq.	1.06E-06	1.11E-06	1.16E-06	1.03E-06	1.16E-06	1.07E-06
ADP-fossil	MJ	3,010	3,010	3,020	3,000	3,020	3,010
WDP	m^3 world equiv.	393	406	417	384	417	394

Additional Environmental Impacts

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
GWP-GHG	kg CO_2-eq.	76.8	77.6	78.5	76.5	78.5	77.3
PM	Disease incidences	6.98E-06	7.04E-06	7.09E-06	6.95E-06	7.09E-06	7.01E-06
IRP	kBq U235 eq.	0.00628	0.00637	0.00648	0.00623	0.00648	0.00632
ETP-fw	CTUe	876	878	881	875	881	878
HTPc	CTUh	5.51E-09	5.55E-09	5.60E-09	5.49E-09	5.60E-09	5.52E-09
HTPnc	CTUh	3.80E-07	3.80E-07	3.82E-07	3.79E-07	3.82E-07	3.80E-07
SQP	Pt	207	215	219	200	219	203

Biogenic carbon content

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
BCC-prod	kg	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0

Resource use

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
PERE	MJ	12.1	12.4	12.6	12.0	12.6	12.2
PERM	MJ	0	0	0	0	0	0
PERT	MJ	12.1	12.4	12.6	12.0	12.6	12.2
PENRE	MJ	2,110	2,110	2,120	2,100	2,120	2,110
PENRM	MJ	900	907	900	900	900	900
PENRT	MJ	3,010	3,010	3,020	3,000	3,020	3,010
SM	kg	200	157	150	250	150	250
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	0.00913	0.00943	0.00968	0.00892	0.00968	0.00914

Waste categories and output flows

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
HWD	kg	0.00148	0.00150	0.00151	0.00147	0.00151	0.00149
NHWD	kg	4.45	4.60	4.68	4.39	4.68	4.48
RWD	kg	5.12E-06	5.21E-06	5.25E-06	5.07E-06	5.25E-06	5.12E-06
CRU	kg	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
GWP	kg CO_2-eq.	76.3	77.0	77.9	75.9	77.9	76.7
ODP	kg CFC11-eq.	2.69E-05	2.69E-05	2.70E-05	2.69E-05	2.70E-05	2.69E-05
AP	kg SO_2-eq.	0.437	0.440	0.444	0.435	0.444	0.439
EP	kg PO_4^{3}-- eq.	0.0404	0.0413	0.0421	0.0402	0.0421	0.0410
POCP	kg C_2H_4-eq.	0.0405	0.0408	0.0410	0.0404	0.0410	0.0407
ADPE	kg Sb-eq.	1.06E-06	1.11E-06	1.16E-06	1.03E-06	1.16E-06	1.07E-06
ADPF	MJ	3,190	3,200	3,210	3,190	3,210	3,190

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
GWP-total	kg CO_2-eq.	-18.4	-19.6	-19.6	-17.1	-19.6	-17.1
GWP-fossil	kg CO_2-eq.	-18.3	-19.6	-19.6	-17.1	-19.6	-17.1
GWP-biogenic	kg CO_2-eq.	-0.0272	-0.0289	-0.0289	-0.0256	-0.0289	-0.0256
GWP-luluc	kg CO_2-eq.	-5.46E-05	-5.87E-05	-5.87E-05	-5.04E-05	-5.87E-05	-5.04E-05
ODP	kg CFC11-eq.	-1.80E-05	-1.93E-05	-1.93E-05	-1.66E-05	-1.93E-05	-1.66E-05
AP	Mole of H+ eq.	-0.227	-0.244	-0.244	-0.211	-0.244	-0.211
EP-freshwater	kg P eq.	-2.82E-05	-2.99E-05	-2.99E-05	-2.65E-05	-2.99E-05	-2.65E-05
EP-marine	kg N eq.	-0.0216	-0.0231	-0.0231	-0.0200	-0.0231	-0.0200
EP-terrestrial	Mole of N eq.	-0.235	-0.251	-0.251	-0.218	-0.251	-0.218
POCP	kg NMVOC eq.	-0.0729	-0.0781	-0.0781	-0.0677	-0.0781	-0.0677
ADP-minerals &metals	kg Sb-eq.	-8.55E-07	-8.99E-07	-8.99E-07	-8.11E-07	-8.99E-07	-8.11E-07
ADP-fossil	MJ	-1,560	-1,680	-1,680	-1,440	-1,680	-1,440
WDP	m^3 world equiv.	-281	-297	-297	-265	-297	-265

Additional Environmental Impacts

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
GWP-GHG	kg CO_2-eq.	-18.0	-19.2	-19.2	-16.7	-19.2	-16.7
PM	Disease incidences	-1.02E-06	-1.09E-06	-1.09E-06	-9.49E-07	-1.09E-06	-9.49E-07
IRP	kBq U235 eq.	-0.00369	-0.00394	-0.00394	-0.00345	-0.00394	-0.00345
ETP-fw	CTUe	-453	-487	-487	-418	-487	-418
HTPc	CTUh	-1.98E-09	-2.11E-09	-2.11E-09	-1.84E-09	-2.11E-09	-1.84E-09
HTPnc	CTUh	-1.49E-07	-1.60E-07	-1.60E-07	-1.38E-07	-1.60E-07	-1.38E-07
SQP	Pt	-138	-145	-145	-130	-145	-130

Resource use

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
PERE	MJ	-5.56	-5.88	-5.88	-5.24	-5.88	-5.24
PERM	MJ	0	0	0	0	0	0
PERT	MJ	-5.56	-5.88	-5.88	-5.24	-5.88	-5.24
PENRE	MJ	-1,560	-1,680	-1,680	-1,440	-1,680	-1,440
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	-1,560	-1,680	-1,680	-1,440	-1,680	-1,440
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	-0.00653	-0.00691	-0.00691	-0.00615	-0.00691	-0.00615

Waste categories and output flows

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
HWD	kg	-5.43E-04	-5.85E-04	-5.85E-04	-5.02E-04	-5.85E-04	-5.02E-04
NHWD	kg	-0.975	-1.04	-1.04	-0.905	-1.04	-0.905
RWD	kg	-1.18E-06	-1.27E-06	-1.27E-06	-1.09E-06	-1.27E-06	-1.09E-06
CRU	kg	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R15 H	AC10 R10 Reconophalt	AC14 R10 H	AC14 R20 H	AC14 R10 H G	AC20 R20
GWP	kg CO_2-eq.	-17.6	-18.8	-18.8	-16.4	-18.8	-16.4
ODP	kg CFC11-eq.	-1.24E-05	-1.34E-05	-1.34E-05	-1.15E-05	-1.34E-05	-1.15E-05
AP	kg SO_2-eq.	-0.142	-0.153	-0.153	-0.132	-0.153	-0.132
EP	kg PO_4^{3}-- eq.	-0.00746	-0.00798	-0.00798	-0.00694	-0.00798	-0.00694
POCP	kg C_2H_4-eq.	-0.00954	-0.0103	-0.0103	-0.00881	-0.0103	-0.00881
ADPE	kg Sb-eq.	-8.55E-07	-8.99E-07	-8.99E-07	-8.11E-07	-8.99E-07	-8.11E-07
ADPF	MJ	-1,660	-1,790	-1,790	-1,530	-1,790	-1,530

Shepparton Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
GWP-total	kg CO_2-eq.	78.1	74.4	73.8	71.8
GWP-fossil	kg CO_2-eq.	78.1	74.3	73.7	71.8
GWP-biogenic	kg CO_2-eq.	0.0830	0.0810	0.0811	0.0804
GWP-luluc	kg CO_2-eq.	1.09E-04	9.55E-05	9.08E-05	8.58E-05
ODP	kg CFC11-eq.	3.59E-05	3.14E-05	2.98E-05	2.82E-05
AP	Mole of H+ eq.	0.806	0.739	0.720	0.695
EP-freshwater	kg P eq.	6.45E-05	6.18E-05	6.18E-05	6.09E-05
EP-marine	kg N eq.	0.127	0.119	0.118	0.114
EP-terrestrial	Mole of N eq.	1.39	1.30	1.29	1.25
POCP	kg NMVOC eq.	0.386	0.361	0.357	0.347
ADP-minerals &metals	kg Sb-eq.	1.14E-06	1.14E-06	1.18E-06	1.19E-06
ADP-fossil	MJ	3,370	2,980	2,850	2,690
WDP	m^3 world equiv.	466	451	454	449

Additional Environmental Impacts

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
GWP-GHG	kg CO_2-eq.	76.7	73.1	72.5	70.6
PM	Disease incidences	9.68E-06	9.50E-06	9.48E-06	9.40E-06
IRP	kBq U235 eq.	0.00652	0.00596	0.00583	0.00564
ETP-fw	CTUe	910	799	759	718
HTPc	CTUh	5.06E-09	4.63E-09	4.51E-09	4.35E-09
HTPnc	CTUh	3.75E-07	3.41E-07	3.30E-07	3.17E-07
SQP	Pt	191	191	194	196

Biogenic carbon content

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
BCC-prod	kg	0	0	0	0
BCC-pack	kg	0	0	0	0

Resource use

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
PERE	MJ	15.7	15.4	15.4	15.3
PERM	MJ	0	0	0	0
PERT	MJ	15.7	15.4	15.4	15.3
PENRE	MJ	2,310	2,060	1,980	1,880
PENRM	MJ	1,060	918	864	810
PENRT	MJ	3,370	2,980	2,850	2,690
SM	kg	104	105	105	95.0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	0.0108	0.0105	0.0105	0.0104

Waste categories and output flows

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
HWD	kg	0.00143	0.00130	0.00127	0.00122
NHWD	kg	4.40	4.29	4.31	4.28
RWD	kg	4.37E-06	4.16E-06	4.12E-06	4.05E-06
CRU	kg	0	0	0	0
MFR	kg	0	0	0	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
GWP	kg CO_2-eq.	76.1	72.5	72.0	70.1
ODP	kg CFC11-eq.	2.49E-05	2.18E-05	2.07E-05	1.95E-05
AP	kg SO_2-eq.	0.466	0.418	0.403	0.384
EP	kg PO_4^{3-} eq.	0.0431	0.0404	0.0401	0.0389
POCP	kg C_2H_4-eq.	0.0363	0.0335	0.0326	0.0316
ADPE	kg Sb-eq.	1.14E-06	1.14E-06	1.18E-06	1.19E-06
ADPF	MJ	3,560	3,150	3,000	2,840

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
GWP-total	kg CO_2-eq.	-22.1	-20.0	-19.2	-18.4
GWP-fossil	kg CO_2-eq.	-22.1	-20.0	-19.2	-18.4
GWP-biogenic	kg CO_2-eq.	-0.0308	-0.0292	-0.0286	-0.0280
GWP-luluc	kg CO_2-eq.	-6.90E-05	-6.02E-05	-5.70E-05	-5.37E-05
ODP	kg CFC11-eq.	-2.27E-05	-1.98E-05	-1.88E-05	-1.77E-05
AP	Mole of H+ eq.	-0.281	-0.250	-0.238	-0.226
EP-freshwater	kg P eq.	-3.23E-05	-3.03E-05	-2.96E-05	-2.88E-05
EP-marine	kg N eq.	-0.0262	-0.0235	-0.0226	-0.0216
EP-terrestrial	Mole of N eq.	-0.286	-0.256	-0.246	-0.235
POCP	kg NMVOC eq.	-0.0892	-0.0797	-0.0762	-0.0728
ADP-minerals &metals	kg Sb-eq.	-9.21E-07	-9.05E-07	-8.99E-07	-8.94E-07
ADP-fossil	MJ	-1,980	-1,730	-1,630	-1,540
WDP	m^3 world equiv.	-313	-301	-296	-291

Additional Environmental Impacts

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
GWP-GHG	kg CO_2-eq.	-21.6	-19.6	-18.8	-18.0
PM	Disease incidences	-1.23E-06	-1.11E-06	-1.07E-06	-1.02E-06
IRP	kBq U235 eq.	-0.00440	-0.00401	-0.00387	-0.00372
ETP-fw	CTUe	-572	-500	-473	-446
HTPc	CTUh	-2.38E-09	-2.15E-09	-2.07E-09	-1.99E-09
HTPnc	CTUh	-1.84E-07	-1.64E-07	-1.56E-07	-1.48E-07
SQP	Pt	-146	-146	-146	-146

Resource use

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
PERE	MJ	-6.26	-5.95	-5.84	-5.73
PERM	MJ	0	0	0	0
PERT	MJ	-6.26	-5.95	-5.84	-5.73
PENRE	MJ	-1,980	-1,730	-1,630	-1,540
PENRM	MJ	0	0	0	0
PENRT	MJ	-1,980	-1,730	-1,630	-1,540
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	-0.00728	-0.00699	-0.00688	-0.00677

Waste categories and output flows

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
HWD	kg	-6.84E-04	-6.00E-04	-5.69E-04	-5.37E-04
NHWD	kg	-1.13	-1.06	-1.03	-1.01
RWD	kg	-1.42E-06	-1.29E-06	-1.25E-06	-1.20E-06
CRU	kg	0	0	0	0
MFR	kg	0	0	0	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC07 R9 NH	AC10 R10 NH	AC14 R10 H	AC20 R20 SI
GWP	kg CO_2-eq.	-21.2	-19.2	-18.5	-17.7
ODP	kg CFC11-eq.	-1.57E-05	-1.37E-05	-1.30E-05	-1.22E-05
AP	kg SO_2-eq.	-0.179	-0.157	-0.149	-0.141
EP	kg PO_4^{3-}- eq.	-0.00906	-0.00814	-0.00780	-0.00746
POCP	kg C_2H_4-eq.	-0.0120	-0.0105	-0.00996	-0.00940
ADPE	kg Sb-eq.	-9.21E-07	-9.05E-07	-8.99E-07	-8.94E-07
ADPF	MJ	-2,100	-1,830	-1,730	-1,630

Gippsland Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10	AC14	AC20
GWP-total	kg CO_2-eq.	77.6	74.9	73.4
GWP-fossil	kg CO_2-eq.	77.5	74.9	73.4
GWP-biogenic	kg CO_2-eq.	0.0577	0.0561	0.0563
GWP-luluc	kg CO_2-eq.	1.12E-04	1.01E-04	9.54E-05
ODP	kg CFC11-eq.	3.73E-05	3.35E-05	3.17E-05
AP	Mole of H+ eq.	0.748	0.689	0.665
EP-freshwater	kg P eq.	8.30E-05	8.16E-05	8.10E-05
EP-marine	kg N eq.	0.127	0.120	0.117
EP-terrestrial	Mole of N eq.	1.40	1.32	1.29
POCP	kg NMVOC eq.	0.394	0.371	0.363
ADP-minerals &metals	kg Sb-eq.	1.21E-06	1.21E-06	1.27E-06
ADP-fossil	MJ	3,220	2,890	2,740
WDP	m^3 world equiv.	1,230	1,230	1,230

Additional Environmental Impacts

Indicator	Unit	AC10	AC14	AC20
GWP-GHG	kg CO_2-eq.	76.3	73.7	72.2
PM	Disease incidences	9.63E-06	9.47E-06	9.42E-06
IRP	kBq U235 eq.	0.00683	0.00635	0.00622
ETP-fw	CTUe	960	864	821
HTPc	CTUh	5.35E-09	5.01E-09	4.87E-09
HTPnc	CTUh	4.34E-07	4.07E-07	3.94E-07
SQP	Pt	188	189	192

Biogenic carbon content

Indicator	Unit	AC10	AC14	AC20
BCC-prod	kg	0	0	0
BCC-pack	kg	0	0	0

Resource use

Indicator	Unit	AC10	AC14	AC20
PERE	MJ	13.3	13.0	13.1
PERM	MJ	0	0	0
PERT	MJ	13.3	13.0	13.1
PENRE	MJ	2,210	2,000	1,910
PENRM	MJ	1,010	883	829
PENRT	MJ	3,220	2,890	2,740
SM	kg	0	0	0
RSF	MJ	0	0	0
NRSF	MJ	0	0	0
FW	m^3	0.0287	0.0285	0.0287

Waste categories and output flows

Indicator	Unit	AC10	AC14	AC20
HWD	kg	0.00128	0.00117	0.00111
NHWD	kg	2.87	2.74	2.66
RWD	kg	4.08E-06	3.91E-06	3.77E-06
CRU	kg	0	0	0
MFR	kg	1.59	1.59	1.59
MER	kg	0	0	0
EEE	MJ	0	0	0
EET	MJ	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10	AC14	AC20
GWP	kg CO_2-eq.	75.6	73.1	71.6
ODP	kg CFC11-eq.	2.58E-05	2.32E-05	2.19E-05
AP	kg SO_2-eq.	0.617	0.575	0.556
EP	kg PO_4^{3}-- eq.	0.0434	0.0409	0.0400
POCP	kg C_2H_4-eq.	0.0422	0.0397	0.0386
ADPE	kg Sb-eq.	1.21E-06	1.21E-06	1.27E-06
ADPF	MJ	3,410	3,060	2,900

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10	AC14	AC20
GWP-total	kg CO2-eq.	-23.9	-21.8	-20.9
GWP-fossil	kg CO2-eq.	-23.9	-21.8	-20.9
GWP-biogenic	kg CO2-eq.	-0.0334	-0.0319	-0.0312
GWP-luluc	kg CO2-eq.	-7.46E-05	-6.59E-05	-6.21E-05
ODP	kg CFC11-eq.	-2.46E-05	-2.17E-05	-2.04E-05
AP	Mole of H+ eq.	-0.304	-0.273	-0.259
EP-freshwater	kg P eq.	-3.50E-05	-3.30E-05	-3.22E-05
EP-marine	kg N eq.	-0.0283	-0.0257	-0.0246
EP-terrestrial	Mole of N eq.	-0.309	-0.280	-0.268
POCP	kg NMVOC eq.	-0.0964	-0.0871	-0.0831
ADP-minerals &metals	kg Sb-eq.	-9.99E-07	-9.84E-07	-9.78E-07
ADP-fossil	MJ	-2,130	-1,890	-1,780
WDP	m^3 world equiv.	-341	-328	-323

Additional Environmental Impacts

Indicator	Unit	AC10	AC14	AC20
GWP-GHG	kg CO_2-eq.	-23.4	-21.4	-20.5
PM	Disease incidences	-1.33E-06	-1.21E-06	-1.16E-06
IRP	kBq U235 eq.	-0.00476	-0.00437	-0.00421
ETP-fw	CTUe	-618	-546	-516
HTPc	CTUh	-2.57E-09	-2.35E-09	-2.26E-09
HTPnc	CTUh	-1.99E-07	-1.79E-07	-1.70E-07
SQP	Pt	-161	-161	-160

Resource use

Indicator	Unit	AC10	AC14	AC20
PERE	MJ	-6.78	-6.48	-6.36
PERM	MJ	0	0	0
PERT	MJ	-6.78	-6.48	-6.36
PENRE	MJ	-2,130	-1,890	-1,780
PENRM	MJ	0	0	0
PENRT	MJ	-2,130	-1,890	-1,780
SM	kg	0	0	0
RSF	MJ	0	0	0
NRSF	MJ	0	0	0
FW	m^3	-0.00792	-0.00763	-0.00750

Waste categories and output flows

Indicator	Unit	AC10	AC14	AC20
HWD	kg	-7.41E-04	-6.57E-04	-6.21E-04
NHWD	kg	-1.24	-1.17	-1.14
RWD	kg	-1.55E-06	-1.43E-06	-1.38E-06
CRU	kg	0	0	0
MFR	kg	0	0	0
MER	kg	0	0	0
EEE	MJ	0	0	0
EET	MJ	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10	AC14	AC20
GWP	kg CO_2-eq.	-23.0	-21.0	-20.1
ODP	kg CFC11-eq.	-1.70E-05	-1.50E-05	-1.42E-05
AP	kg SO_2-eq.	-0.193	-0.171	-0.162
EP	kg PO_4^{3}-- eq.	-0.00980	-0.00889	-0.00850
POCP	kg C_2H_4-eq.	-0.0130	-0.0115	-0.0109
ADPE	kg Sb-eq.	-9.99E-07	-9.84E-07	-9.78E-07
ADPF	MJ	-2,260	-2,000	-1,890

Ben Lomond National Park, Tasmania

Asphalt in Tasmania

Tasmania's infrastructure and transport systems underpin the state's economic growth, with a road network comprising more than 18,000 kilometres linking major population centres and facilitating movement of people and freight.

Downer has supported the construction and maintenance of roads, airfields, and other asphalt-paved assets in Tasmania for more than 20 years, with two asphalt manufacturing facilities and six offices and depots currently operating across the state.

Lindisfarne Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
GWP-total	kg CO_2-eq.	63.6	63.9	60.4	61.9	58.1
GWP-fossil	kg CO_2-eq.	63.5	63.1	60.2	61.7	57.9
GWP-biogenic	kg CO_2-eq.	0.196	0.724	0.196	0.196	0.195
GWP-luluc	kg CO_2-eq.	1.06E-04	0.00121	9.66E-05	8.87E-05	8.81E-05
ODP	kg CFC11-eq.	3.49E-05	3.15E-05	3.19E-05	2.94E-05	2.90E-05
AP	Mole of H+ eq.	0.636	0.608	0.590	0.552	0.547
EP-freshwater	kg P eq.	7.34E-05	8.04E-05	7.21E-05	7.05E-05	7.05E-05
EP-marine	kg N eq.	0.0899	0.0946	0.0835	0.0796	0.0784
EP-terrestrial	Mole of N eq.	0.988	1.03	0.917	0.875	0.861
POCP	kg NMVOC eq.	0.289	0.297	0.270	0.258	0.254
ADP-minerals &metals	kg Sb-eq.	1.22E-06	1.08E-06	1.28E-06	1.28E-06	1.29E-06
ADP-fossil	MJ	3,040	2,740	2,780	2,550	2,540
WDP	m^3 world equiv.	5,090	5,040	5,090	5,500	5,080

Additional Environmental Impacts

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
GWP-GHG	kg CO_2-eq.	62.6	62.7	59.4	60.9	57.2
PM	Disease incidences	6.22E-06	6.90E-06	6.10E-06	6.00E-06	5.98E-06
IRP	kBq U235 eq.	0.00655	0.0156	0.00628	0.00595	0.00594
ETP-fw	CTUe	879	1,070	804	752	734
HTPc	CTUh	5.42E-09	1.16E-08	5.16E-09	4.92E-09	4.90E-09
HTPnc	CTUh	3.58E-07	3.44E-07	3.35E-07	3.35E-07	3.14E-07
SQP	Pt	268	245	272	273	275

Biogenic carbon content

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
BCC-prod	kg	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0

Lindisfarne Asphalt Manufacturing Facility (continued)

Resource use

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
PERE	MJ	68.2	67.3	68.3	69.0	68.1
PERM	MJ	0	0	0	0	0
PERT	MJ	68.2	67.3	68.3	69.0	68.1
PENRE	MJ	2,060	1,890	1,900	1,760	1,750
PENRM	MJ	972	851	882	792	792
PENRT	MJ	3,040	2,740	2,780	2,550	2,540
SM	kg	30.0	183	30.0	25.0	13.0
RSF	MJ	0	0	0	0	0
NRSF	MJ	0	0	0	0	0
FW	m^3	0.118	0.117	0.118	0.128	0.118

Waste categories and output flows

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
HWD	kg	0.00121	0.00121	0.00110	0.00102	0.00102
NHWD	kg	2.42	3.46	2.22	2.16	2.15
RWD	kg	3.49E-06	2.31E-05	3.21E-06	3.08E-06	3.09E-06
CRU	kg	0	0	0	0	0
MFR	kg	0	0	0	0	0
MER	kg	0	0	0	0	0
EEE	MJ	0	0	0	0	0
EET	MJ	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
GWP	kg CO_2-eq.	62.0	62.0	58.8	60.4	56.6
ODP	kg CFC11-eq.	2.70E-05	2.47E-05	2.49E-05	2.32E-05	2.30E-05
AP	kg SO_2-eq.	0.405	0.381	0.371	0.344	0.341
EP	kg PO_4^{3-}-- eq.	0.0309	0.0359	0.0287	0.0273	0.0269
POCP	kg C_2H_4-eq.	0.0341	0.0336	0.0321	0.0309	0.0303
ADPE	kg Sb-eq.	1.22E-06	1.08E-06	1.28E-06	1.28E-06	1.29E-06
ADPF	MJ	3,220	2,910	2,950	2,710	2,690

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
GWP-total	kg CO_2-eq.	-25.5	-20.5	-23.7	-21.9	-21.9
GWP-fossil	kg CO_2-eq.	-25.4	-20.5	-23.6	-21.8	-21.8
GWP-biogenic	kg CO_2-eq.	-0.0333	-0.0283	-0.0319	-0.0306	-0.0306
GWP-luluc	kg CO_2-eq.	-8.30E-05	-6.47E-05	-7.55E-05	-6.81E-05	-6.81E-05
ODP	kg CFC11-eq.	-2.74E-05	-2.13E-05	-2.49E-05	-2.24E-05	-2.24E-05
AP	Mole of H+ eq.	-0.330	-0.262	-0.303	-0.277	-0.277
EP-freshwater	kg P eq.	-3.52E-05	-2.95E-05	-3.35E-05	-3.18E-05	-3.18E-05
EP-marine	kg N eq.	-0.0303	-0.0243	-0.0281	-0.0258	-0.0258
EP-terrestrial	Mole of N eq.	-0.331	-0.265	-0.306	-0.282	-0.282
POCP	kg NMVOC eq.	-0.104	-0.0829	-0.0960	-0.0879	-0.0879
ADP-minerals &metals	kg Sb-eq.	-9.32E-07	-8.27E-07	-9.19E-07	-9.07E-07	-9.07E-07
ADP-fossil	MJ	-2,370	-1,850	-2,160	-1,950	-1,950
WDP	m^3 world equiv.	-336	-289	-326	-315	-315

Additional Environmental Impacts

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
GWP-GHG	kg CO_2-eq.	-24.9	-20.1	-23.1	-21.4	-21.4
PM	Disease incidences	-1.41E-06	-1.14E-06	-1.31E-06	-1.21E-06	-1.21E-06
IRP	kBq U235 eq.	-0.00499	-0.00405	-0.00466	-0.00432	-0.00432
ETP-fw	CTUe	-687	-536	-626	-564	-564
HTPc	CTUh	-2.72E-09	-2.20E-09	-2.53E-09	-2.34E-09	-2.34E-09
HTPnc	CTUh	-2.17E-07	-1.72E-07	-1.99E-07	-1.82E-07	-1.82E-07
SQP	Pt	-157	-141	-156	-156	-156

Lindisfarne Asphalt Manufacturing Facility (continued)

Resource use

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
PERE	MJ	-6.66	-5.68	-6.41	-6.16	-6.16
PERM	MJ	0	0	0	0	0
PERT	MJ	-6.66	-5.68	-6.41	-6.16	-6.16
PENRE	MJ	-2,370	-1,850	-2,160	-1,950	-1,950
PENRM	MJ	0	0	0	0	0
PENRT	MJ	-2,370	-1,850	-2,160	-1,950	-1,950
SM	kg	0	0	0	0	0
RSF	MJ	0	0	0	0	0
NRSF	MJ	0	0	0	0	0
FW	m^3	-0.00781	-0.00672	-0.00756	-0.00731	-0.00731

Waste categories and output flows

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
HWD	kg	-8.27E-04	-6.47E-04	-7.55E-04	-6.83E-04	-6.83E-04
NHWD	kg	-1.35	-1.13	-1.29	-1.23	-1.23
RWD	kg	-1.71E-06	-1.40E-06	-1.61E-06	-1.51E-06	-1.51E-06
CRU	kg	0	0	0	0	0
MFR	kg	0	0	0	0	0
MER	kg	0	0	0	0	0
EEE	MJ	0	0	0	0	0
EET	MJ	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC07 Type L,N	AC10 R10 Reconophalt	AC10 Type L	AC14 Type H	AC14 Type L
GWP	kg CO_2-eq.	-24.4	-19.7	-22.7	-21.0	-21.0
ODP	kg CFC11-eq.	-1.89E-05	-1.47E-05	-1.72E-05	-1.55E-05	-1.55E-05
AP	kg SO_2-eq.	-0.214	-0.167	-0.195	-0.176	-0.176
EP	kg PO_4^{3}-- eq.	-0.0105	-0.00841	-0.00971	-0.00893	-0.00893
POCP	kg C_2H_4-eq.	-0.0145	-0.0113	-0.0132	-0.0119	-0.0119
ADPE	kg Sb-eq.	-9.32E-07	-8.27E-07	-9.19E-07	-9.07E-07	-9.07E-07
ADPF	MJ	-2,520	-1,960	-2,290	-2,070	-2,070

Mowbray Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
GWP-total	kg CO_2-eq.	60.1	55.5	61.1	57.9	61.8	61.8	57.9
GWP-fossil	kg CO_2-eq.	60.0	55.4	61.0	57.8	61.6	61.6	57.8
GWP-biogenic	kg CO_2-eq.	0.143	0.142	0.143	0.144	0.146	0.146	0.144
GWP-luluc	kg CO_2-eq.	9.69E-05	8.63E-05	8.72E-05	8.17E-05	8.99E-05	8.99E-05	8.17E-05
ODP	kg CFC11-eq.	3.19E-05	2.84E-05	2.89E-05	2.71E-05	2.97E-05	2.97E-05	2.71E-05
AP	Mole of H+ eq.	0.612	0.554	0.562	0.530	0.593	0.593	0.530
EP-freshwater	kg P eq.	4.70E-05	4.62E-05	4.69E-05	4.74E-05	5.01E-05	5.01E-05	4.74E-05
EP-marine	kg N eq.	0.0948	0.0855	0.0872	0.0809	0.0941	0.0941	0.0809
EP-terrestrial	Mole of N eq.	1.04	0.939	0.958	0.890	1.03	1.03	0.890
POCP	kg NMVOC eq.	0.296	0.268	0.274	0.256	0.293	0.293	0.256
ADP-minerals &metals	kg Sb-eq.	1.08E-06	1.15E-06	1.15E-06	1.24E-06	1.29E-06	1.29E-06	1.24E-06
ADP-fossil	MJ	3,090	2,770	2,800	2,620	2,850	2,850	2,620
WDP	m^3 world equiv.	3,410	3,410	4,000	4,010	3,860	3,860	4,010

Additional Environmental Impacts

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
GWP-GHG	kg CO_2-eq.	58.9	54.4	60.0	56.8	60.6	60.6	56.8
PM	Disease incidences	8.23E-06	8.04E-06	8.08E-06	7.96E-06	8.23E-06	8.23E-06	7.96E-06
IRP	kBq U235 eq.	0.00586	0.00555	0.00560	0.00553	0.00598	0.00598	0.00553
ETP-fw	CTUe	805	718	744	699	762	762	699
HTPc	CTUh	4.28E-09	3.99E-09	4.04E-09	3.92E-09	4.22E-09	4.22E-09	3.92E-09
HTPnc	CTUh	3.06E-07	2.80E-07	3.11E-07	2.97E-07	3.11E-07	3.11E-07	2.97E-07
SQP	Pt	241	246	246	251	254	254	251

Biogenic carbon content

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
BCC-prod	kg	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0

Resource use

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
PERE	MJ	47.1	47.1	48.4	48.6	48.7	48.7	48.6
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	47.1	47.1	48.4	48.6	48.7	48.7	48.6
PENRE	MJ	2,100	1,890	1,910	1,790	1,950	1,950	1,790
PENRM	MJ	990	882	882	828	900	900	828
PENRT	MJ	3,090	2,770	2,800	2,620	2,850	2,850	2,620
SM	kg	13.0	13.0	6.00	6.00	5.00	5.00	6.00
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	0.0794	0.0794	0.0931	0.0933	0.0899	0.0899	0.0933

Waste categories and output flows

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
HWD	kg	0.00106	9.33E-04	9.36E-04	8.59E-04	0.00101	0.00101	8.59E-04
NHWD	kg	2.15	1.89	1.91	1.70	2.20	2.20	1.70
RWD	kg	2.48E-06	2.18E-06	2.19E-06	1.96E-06	2.40E-06	2.40E-06	1.96E-06
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
GWP	kg CO_2-eq.	58.3	53.8	59.4	56.2	60.0	60.0	56.2
ODP	kg CFC11-eq.	2.21E-05	1.97E-05	2.00E-05	1.87E-05	2.06E-05	2.06E-05	1.87E-05
AP	kg SO_2-eq.	0.395	0.353	0.358	0.334	0.373	0.373	0.334
EP	kg PO_4^{3}-- eq.	0.0323	0.0292	0.0297	0.0276	0.0321	0.0321	0.0276
POCP	kg C_2H_4-eq.	0.0320	0.0296	0.0305	0.0291	0.0313	0.0313	0.0291
ADPE	kg Sb-eq.	1.08E-06	1.15E-06	1.15E-06	1.24E-06	1.29E-06	1.29E-06	1.24E-06
ADPF	MJ	3,260	2,920	2,950	2,760	3,000	3,000	2,760

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
GWP-total	kg CO_2-eq.	-25.8	-23.7	-23.7	-22.6	-24.0	-24.0	-22.6
GWP-fossil	kg CO_2-eq.	-25.8	-23.6	-23.6	-22.6	-24.0	-24.0	-22.6
GWP-biogenic	kg CO_2-eq.	-0.0336	-0.0319	-0.0319	-0.0311	-0.0322	-0.0322	-0.0311
GWP-luluc	kg CO_2-eq.	-8.45E-05	-7.55E-05	-7.55E-05	-7.11E-05	-7.70E-05	-7.70E-05	-7.11E-05
ODP	kg CFC11-eq.	-2.78E-05	-2.49E-05	-2.49E-05	-2.34E-05	-2.54E-05	-2.54E-05	-2.34E-05
AP	Mole of H+ eq.	-0.335	-0.303	-0.303	-0.287	-0.309	-0.309	-0.287
EP-freshwater	kg P eq.	-3.56E-05	-3.35E-05	-3.35E-05	-3.25E-05	-3.39E-05	-3.39E-05	-3.25E-05
EP-marine	kg N eq.	-0.0308	-0.0281	-0.0281	-0.0267	-0.0285	-0.0285	-0.0267
EP-terrestrial	Mole of N eq.	-0.336	-0.306	-0.306	-0.291	-0.311	-0.311	-0.291
POCP	kg NMVOC eq.	-0.106	-0.0960	-0.0960	-0.0911	-0.0976	-0.0976	-0.0911
ADP-minerals &metals	kg Sb-eq.	-9.35E-07	-9.19E-07	-9.19E-07	-9.12E-07	-9.22E-07	-9.22E-07	-9.12E-07
ADP-fossil	MJ	-2,420	-2,160	-2,160	-2,030	-2,200	-2,200	-2,030
WDP	m^3 world equiv.	-338	-326	-326	-319	-328	-328	-319

Additional Environmental Impacts

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
GWP-GHG	kg CO_2-eq.	-25.2	-23.1	-23.1	-22.1	-23.5	-23.5	-22.1
PM	Disease incidences	-1.43E-06	-1.31E-06	-1.31E-06	-1.25E-06	-1.33E-06	-1.33E-06	-1.25E-06
IRP	kBq U235 eq.	-0.00506	-0.00466	-0.00466	-0.00446	-0.00472	-0.00472	-0.00446
ETP-fw	CTUe	-700	-626	-626	-589	-638	-638	-589
HTPc	CTUh	-2.75E-09	-2.53E-09	-2.53E-09	-2.41E-09	-2.57E-09	-2.57E-09	-2.41E-09
HTPnc	CTUh	-2.20E-07	-1.99E-07	-1.99E-07	-1.89E-07	-2.03E-07	-2.03E-07	-1.89E-07
SQP	Pt	-157	-156	-156	-156	-157	-157	-156

Mowbray Asphalt Manufacturing Facility (continued)

Resource use

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
PERE	MJ	-6.72	-6.41	-6.41	-6.26	-6.46	-6.46	-6.26
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	-6.72	-6.41	-6.41	-6.26	-6.46	-6.46	-6.26
PENRE	MJ	-2,420	-2,160	-2,160	-2,030	-2,200	-2,200	-2,030
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	-2,420	-2,160	-2,160	-2,030	-2,200	-2,200	-2,030
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	-0.00786	-0.00756	-0.00756	-0.00741	-0.00761	-0.00761	-0.00741

Waste categories and output flows

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
HWD	kg	-8.41E-04	-7.55E-04	-7.55E-04	-7.12E-04	-7.69E-04	-7.69E-04	-7.12E-04
NHWD	kg	-1.36	-1.29	-1.29	-1.26	-1.30	-1.30	-1.26
RWD	kg	-1.73E-06	-1.61E-06	-1.61E-06	-1.55E-06	-1.63E-06	-1.63E-06	-1.55E-06
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC07 Type L,N	AC10 Type L	AC10 Type N	AC14 Type H	AC14 PSV 54 Type H	AC14 PSV54 Type N	AC14 Type N
GWP	kg CO_2-eq.	-24.7	-22.7	-22.7	-21.7	-23.0	-23.0	-21.7
ODP	kg CFC11-eq.	-1.93E-05	-1.72E-05	-1.72E-05	-1.62E-05	-1.76E-05	-1.76E-05	-1.62E-05
AP	kg SO_2-eq.	-0.217	-0.195	-0.195	-0.184	-0.199	-0.199	-0.184
EP	kg PO_4^{3}-- eq.	-0.0106	-0.00971	-0.00971	-0.00925	-0.00987	-0.00987	-0.00925
POCP	kg C_2H_4-eq.	-0.0147	-0.0132	-0.0132	-0.0124	-0.0134	-0.0134	-0.0124
ADPE	kg Sb-eq.	-9.35E-07	-9.19E-07	-9.19E-07	-9.12E-07	-9.22E-07	-9.22E-07	-9.12E-07
ADPF	MJ	-2,560	-2,290	-2,290	-2,160	-2,340	-2,340	-2,160

Barossa Valley, South Australia

Asphalt in South Australia

From picture-perfect coastline, rugged, otherworldly outback, and lush rolling wine country, South Australia's sealed and unsealed road network of more than 100,000 kilometres supports growth in travel demand, an expanding population, and a thriving economy.

Downer has supported the construction and maintenance of roads, airfields, and other asphalt-paved assets in South Australia for more than 85 years, with one asphalt manufacturing facility and nine offices and depots currently operating across the state.

Adelaide Sustainable Road Resource Centre, Wingfield

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
GWP-total	kg CO_2-eq.	77.6	76.4	83.4	79.7	60.1	53.6	72.3
GWP-fossil	kg CO_2-eq.	77.5	76.3	83.3	79.6	60.1	53.5	72.2
GWP-biogenic	kg CO_2-eq.	0.106	0.113	0.124	0.118	0.0493	0.0431	0.0571
GWP-luluc	kg CO_2-eq.	1.43E-04	1.58E-04	1.78E-04	1.70E-04	8.62E-05	7.14E-05	1.09E-04
ODP	kg CFC11-eq.	2.65E-05	2.33E-05	2.63E-05	2.50E-05	2.84E-05	2.35E-05	3.58E-05
AP	Mole of H+ eq.	0.650	0.598	0.670	0.634	0.574	0.481	0.719
EP-freshwater	kg P eq.	1.56E-04	1.94E-04	2.16E-04	2.06E-04	3.98E-05	3.30E-05	4.79E-05
EP-marine	kg N eq.	0.115	0.105	0.118	0.111	0.0990	0.0846	0.123
EP-terrestrial	Mole of N eq.	1.26	1.15	1.29	1.22	1.08	0.927	1.35
POCP	kg NMVOC eq.	0.346	0.318	0.355	0.335	0.301	0.259	0.373
ADP-minerals &metals	kg Sb-eq.	1.40E-06	1.42E-06	1.55E-06	1.44E-06	8.83E-07	6.94E-07	1.06E-06
ADP-fossil	MJ	2,930	2,660	2,960	2,830	2,720	2,300	3,390
WDP	m^3 world equiv.	564	584	641	603	351	289	427

Additional Environmental Impacts

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
GWP-GHG	kg CO_2-eq.	76.0	74.7	81.6	78.0	58.9	52.5	70.9
PM	Disease incidences	9.08E-06	8.96E-06	9.30E-06	9.12E-06	8.20E-06	7.85E-06	8.76E-06
IRP	kBq U235 eq.	0.257	0.355	0.400	0.382	0.00512	0.00418	0.00634
ETP-fw	CTUe	676	596	671	638	715	592	901
HTPc	CTUh	5.11E-09	5.00E-09	5.54E-09	5.27E-09	3.74E-09	3.12E-09	4.60E-09
HTPnc	CTUh	2.90E-07	2.70E-07	2.99E-07	2.85E-07	2.66E-07	2.25E-07	3.30E-07
SQP	Pt	179	164	178	163	144	117	175

Biogenic carbon content

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
BCC-prod	kg	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0

Resource use

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
PERE	MJ	13.4	15.1	16.0	15.3	12.7	11.4	14.2
PERM	MJ	1.87	0	0	0	0	0	0
PERT	MJ	15.3	15.1	16.0	15.3	12.7	11.4	14.2
PENRE	MJ	2,170	1,990	2,200	2,110	1,870	1,600	2,330
PENRM	MJ	767	676	760	726	846	701	1,060
PENRT	MJ	2,930	2,660	2,960	2,830	2,720	2,300	3,390
SM	kg	103	203	103	203	311	464	101
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	0.0131	0.0136	0.0149	0.0140	0.00814	0.00670	0.00991

Waste categories and output flows

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
HWD	kg	0.00115	0.00102	0.00115	0.00108	0.00115	9.58E-04	0.00144
NHWD	kg	3.29	2.82	3.27	2.97	2.80	2.33	3.61
RWD	kg	3.91E-05	5.24E-05	5.89E-05	5.62E-05	3.26E-06	2.78E-06	4.06E-06
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
GWP	kg CO_2-eq.	75.3	73.9	80.7	77.1	58.4	52.1	70.2
ODP	kg CFC11-eq.	1.84E-05	1.61E-05	1.82E-05	1.73E-05	1.97E-05	1.63E-05	2.48E-05
AP	kg SO_2-eq.	0.415	0.384	0.431	0.408	0.368	0.309	0.461
EP	kg PO_4^{3}-- eq.	0.0395	0.0363	0.0406	0.0382	0.0337	0.0289	0.0420
POCP	kg C_2H_4-eq.	0.0329	0.0311	0.0338	0.0325	0.0310	0.0275	0.0364
ADPE	kg Sb-eq.	1.40E-06	1.42E-06	1.55E-06	1.44E-06	8.83E-07	6.94E-07	1.06E-06
ADPF	MJ	3,090	2,810	3,130	2,990	2,870	2,420	3,580

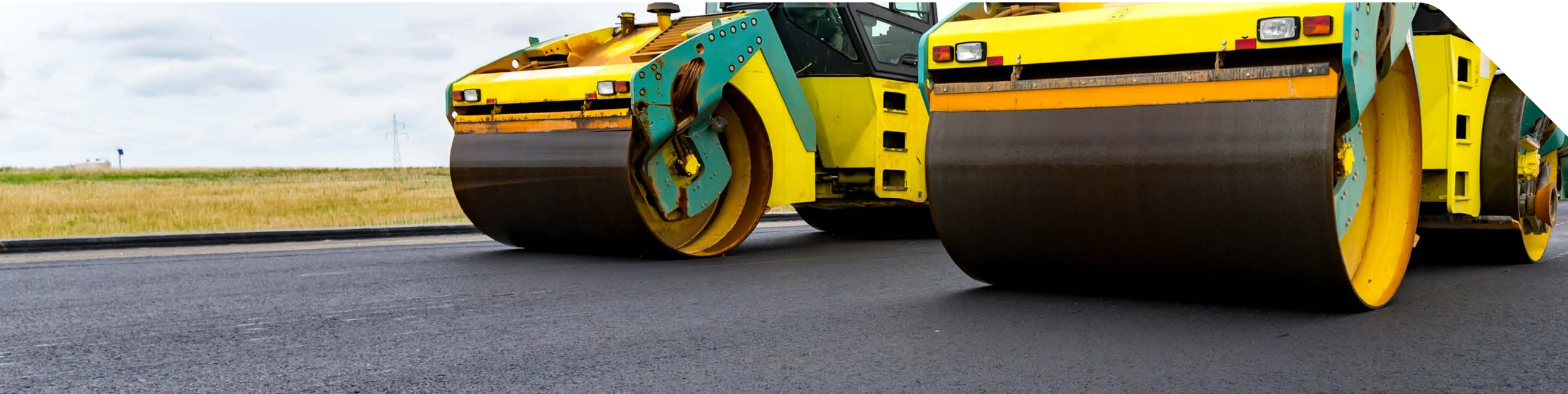
Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m³ world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0



Regency Road to Pym Street Upgrade

Australia's first V2.0 Gold ISCA Rating

The Regency Road to Pym Street upgrade project comprised design and construction of a new 1.8 kilometre section of non-stop motorway along South Road, as part of Adelaide's strategic North-South Corridor initiative.

Demonstrating cutting-edge thought leadership and a commitment to significant step changes that improve customer, community, and environmental outcomes, the South Australian Department for Infrastructure and Transport, the R2P Alliance, and Green Industries SA embraced Reconophalt and its circular economy benefits.

In conjunction with delivering the Regency Road to Pym Street asphalt surfacing works, Downer developed and published the first EPD for asphalt with EPD Australasia in accordance with ISO14025 and EN15804, setting a new benchmark for transparency and verification around environmental performance of road surfacing products.

As a result, the south-bound arterial road and the new Regency Road Reconophalt™ pavements, together with the R2P Alliance car park pavement comprised 100% recycled materials, helping the Regency Road to Pym Street project to achieve a Gold ISCA Rating of 64.9, the first V2.0 design rating to be awarded in Australia.

First Australian project to achieve a V2.0 design rating (Gold ISCA rating of 64.9) supported by the high recycled content and carbon emission savings of Reconophalt™

Development of the first Environmental Product Declaration for asphalt with EPD Australasia in accordance with ISO 14025 and EN 15804

Adelaide Sustainable Road Resource Centre, Wingfield (continued)

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3-}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
GWP-total	kg CO_2-eq.	-20.2	-16.1	-19.9	-16.9	-15.4	-10.4	-24.0
GWP-fossil	kg CO_2-eq.	-20.2	-16.1	-19.8	-16.9	-15.4	-10.3	-24.0
GWP-biogenic	kg CO_2-eq.	-0.0280	-0.0236	-0.0277	-0.0242	-0.0217	-0.0159	-0.0309
GWP-luluc	kg CO_2-eq.	-6.32E-05	-4.85E-05	-6.19E-05	-5.20E-05	-4.76E-05	-3.00E-05	-7.91E-05
ODP	kg CFC11-eq.	-2.08E-05	-1.60E-05	-2.04E-05	-1.71E-05	-1.57E-05	-9.87E-06	-2.61E-05
AP	Mole of H+ eq.	-0.256	-0.201	-0.252	-0.213	-0.194	-0.127	-0.313
EP-freshwater	kg P eq.	-2.92E-05	-2.43E-05	-2.89E-05	-2.51E-05	-2.25E-05	-1.62E-05	-3.28E-05
EP-marine	kg N eq.	-0.0239	-0.0189	-0.0235	-0.0200	-0.0182	-0.0121	-0.0287
EP-terrestrial	Mole of N eq.	-0.260	-0.206	-0.256	-0.218	-0.198	-0.132	-0.313
POCP	kg NMVOC eq.	-0.0814	-0.0641	-0.0799	-0.0678	-0.0618	-0.0408	-0.0984
ADP-minerals &metals	kg Sb-eq.	-8.24E-07	-7.24E-07	-8.21E-07	-7.30E-07	-6.48E-07	-5.05E-07	-8.51E-07
ADP-fossil	MJ	-1,810	-1,390	-1,770	-1,490	-1,360	-861	-2,260
WDP	m^3 world equiv.	-287	-245	-285	-250	-223	-166	-310

Additional Environmental Impacts

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
GWP-GHG	kg CO_2-eq.	-19.7	-15.7	-19.4	-16.6	-15.0	-10.1	-23.5
PM	Disease incidences	-1.12E-06	-8.91E-07	-1.10E-06	-9.37E-07	-8.51E-07	-5.74E-07	-1.33E-06
IRP	kBq U235 eq.	-0.00399	-0.00321	-0.00393	-0.00336	-0.00305	-0.00208	-0.00470
ETP-fw	CTUe	-524	-402	-513	-431	-395	-249	-655
HTPc	CTUh	-2.16E-09	-1.73E-09	-2.13E-09	-1.82E-09	-1.65E-09	-1.11E-09	-2.56E-09
HTPnc	CTUh	-1.68E-07	-1.32E-07	-1.65E-07	-1.40E-07	-1.27E-07	-8.29E-08	-2.06E-07
SQP	Pt	-141	-125	-141	-125	-110	-86.0	-141

Resource use

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
PERE	MJ	-5.63	-4.76	-5.58	-4.88	-4.37	-3.23	-6.17
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	-5.63	-4.76	-5.58	-4.88	-4.37	-3.23	-6.17
PENRE	MJ	-1,810	-1,390	-1,770	-1,490	-1,360	-861	-2,260
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	-1,810	-1,390	-1,770	-1,490	-1,360	-861	-2,260
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	-0.00667	-0.00569	-0.00662	-0.00581	-0.00517	-0.00386	-0.00720

Waste categories and output flows

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
HWD	kg	-6.34E-04	-4.89E-04	-6.21E-04	-5.22E-04	-4.77E-04	-3.03E-04	-7.86E-04
NHWD	kg	-1.12	-0.930	-1.11	-0.958	-0.850	-0.601	-1.25
RWD	kg	-1.38E-06	-1.11E-06	-1.36E-06	-1.16E-06	-1.04E-06	-7.06E-07	-1.60E-06
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 A15E R10 M	AC10 A5E R20 L	AC10 A5E R10 M	AC10 A5E R20 M	AC10 R30 Reconophalt Fine	AC10 R50 Reconophalt Fine	AC7 R10
GWP	kg CO_2-eq.	-19.4	-15.5	-19.0	-16.3	-14.7	-9.95	-23.0
ODP	kg CFC11-eq.	-1.44E-05	-1.10E-05	-1.41E-05	-1.18E-05	-1.09E-05	-6.83E-06	-1.81E-05
AP	kg SO_2-eq.	-0.164	-0.126	-0.160	-0.135	-0.123	-0.0785	-0.203
EP	kg PO_4^{3-}-- eq.	-0.00826	-0.00655	-0.00812	-0.00691	-0.00628	-0.00418	-0.00991
POCP	kg C_2H_4-eq.	-0.0110	-0.00847	-0.0108	-0.00907	-0.00831	-0.00525	-0.0138
ADPE	kg Sb-eq.	-8.24E-07	-7.24E-07	-8.21E-07	-7.30E-07	-6.48E-07	-5.05E-07	-8.51E-07
ADPF	MJ	-1,920	-1,470	-1,880	-1,580	-1,450	-913	-2,400

Gantheaume Point, Broome, Western Australia

Asphalt in Western Australia

Spanning more than one third of Australia's mainland, Western Australia is home to a diverse climate, history, and flora and fauna.

Covering more than 2.5 million square kilometres and with 20,000 kilometres of coastline, the state's road network is vast, connecting population centres and industry across the arid outback and far north with the densely populated southern region.

Downer has supported the construction and maintenance of roads, airfields, and other asphalt-paved assets in Western Australia for more than 85 years, with four asphalt manufacturing facilities and 13 offices and depots currently operating across the state.

Hope Valley Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
GWP-total	kg CO_2-eq.	63.5	60.8	57.6	65.7	72.4
GWP-fossil	kg CO_2-eq.	63.4	60.8	57.6	65.7	72.3
GWP-biogenic	kg CO_2-eq.	0.0652	0.0612	0.0568	0.0576	0.0710
GWP-luluc	kg CO_2-eq.	9.80E-05	9.24E-05	8.49E-05	6.90E-05	1.13E-04
ODP	kg CFC11-eq.	3.23E-05	3.04E-05	2.80E-05	2.31E-05	3.74E-05
AP	Mole of H+ eq.	0.636	0.600	0.555	0.490	0.726
EP-freshwater	kg P eq.	5.40E-05	4.99E-05	4.53E-05	4.45E-05	6.04E-05
EP-marine	kg N eq.	0.1000	0.0952	0.0892	0.0842	0.113
EP-terrestrial	Mole of N eq.	1.10	1.05	0.979	0.924	1.24
POCP	kg NMVOC eq.	0.310	0.295	0.277	0.261	0.348
ADP-minerals &metals	kg Sb-eq.	1.36E-06	1.21E-06	1.06E-06	1.12E-06	1.50E-06
ADP-fossil	MJ	3,090	2,930	2,720	2,280	3,530
WDP	m^3 world equiv.	484	441	397	1,640	887

Additional Environmental Impacts

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
GWP-GHG	kg CO_2-eq.	62.3	59.7	56.5	64.6	71.0
PM	Disease incidences	8.55E-06	8.41E-06	8.24E-06	8.12E-06	8.86E-06
IRP	kBq U235 eq.	0.00641	0.00592	0.00534	0.00483	0.00733
ETP-fw	CTUe	816	769	707	615	955
HTPc	CTUh	4.77E-09	4.47E-09	4.12E-09	3.71E-09	5.38E-09
HTPnc	CTUh	3.27E-07	3.09E-07	2.86E-07	3.10E-07	3.87E-07
SQP	Pt	210	190	171	172	217

Biogenic carbon content

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
BCC-prod	kg	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0

Resource use

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
PERE	MJ	12.8	12.0	11.0	13.8	14.8
PERM	MJ	0	0	0	0	0
PERT	MJ	12.8	12.0	11.0	13.8	14.8
PENRE	MJ	2,100	2,000	1,860	1,610	2,380
PENRM	MJ	994	937	860	669	1,150
PENRT	MJ	3,090	2,930	2,720	2,280	3,530
SM	kg	0	109	213	249	0
RSF	MJ	0	0	0	0	0
NRSF	MJ	0	0	0	0	0
FW	m^3	0.0112	0.0103	0.00922	0.0381	0.0206

Waste categories and output flows

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
HWD	kg	0.00114	0.00108	1.00E-03	8.41E-04	0.00130
NHWD	kg	2.52	2.38	2.23	2.11	2.70
RWD	kg	2.97E-06	2.83E-06	2.66E-06	2.37E-06	3.20E-06
CRU	kg	0	0	0	0	0
MFR	kg	62.0	62.0	62.0	62.0	62.0
MER	kg	0	0	0	0	0
EEE	MJ	0	0	0	0	0
EET	MJ	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
GWP	kg CO_2-eq.	61.6	59.1	56.0	64.1	70.3
ODP	kg CFC11-eq.	2.23E-05	2.10E-05	1.93E-05	1.60E-05	2.59E-05
AP	kg SO_2-eq.	0.404	0.382	0.353	0.301	0.462
EP	kg PO_4^{3-}-- eq.	0.0341	0.0324	0.0304	0.0287	0.0384
POCP	kg C_2H_4-eq.	0.0327	0.0314	0.0298	0.0281	0.0365
ADPE	kg Sb-eq.	1.36E-06	1.21E-06	1.06E-06	1.12E-06	1.50E-06
ADPF	MJ	3,260	3,090	2,870	2,400	3,730

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
GWP-total	kg CO_2-eq.	-24.7	-20.9	-17.3	-13.8	-27.6
GWP-fossil	kg CO_2-eq.	-24.7	-20.9	-17.2	-13.8	-27.6
GWP-biogenic	kg CO_2-eq.	-0.0328	-0.0284	-0.0243	-0.0212	-0.0349
GWP-luluc	kg CO_2-eq.	-8.00E-05	-6.66E-05	-5.35E-05	-4.00E-05	-9.20E-05
ODP	kg CFC11-eq.	-2.64E-05	-2.19E-05	-1.76E-05	-1.32E-05	-3.03E-05
AP	Mole of H+ eq.	-0.319	-0.268	-0.218	-0.169	-0.362
EP-freshwater	kg P eq.	-3.46E-05	-2.98E-05	-2.53E-05	-2.16E-05	-3.73E-05
EP-marine	kg N eq.	-0.0294	-0.0248	-0.0204	-0.0161	-0.0330
EP-terrestrial	Mole of N eq.	-0.321	-0.271	-0.222	-0.176	-0.360
POCP	kg NMVOC eq.	-0.101	-0.0848	-0.0693	-0.0544	-0.114
ADP-minerals &metals	kg Sb-eq.	-9.27E-07	-8.24E-07	-7.25E-07	-6.76E-07	-9.48E-07
ADP-fossil	MJ	-2,290	-1,900	-1,530	-1,150	-2,630
WDP	m^3 world equiv.	-332	-290	-250	-223	-349

Additional Environmental Impacts

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
GWP-GHG	kg CO_2-eq.	-24.2	-20.5	-16.9	-13.5	-27.0
PM	Disease incidences	-1.37E-06	-1.16E-06	-9.54E-07	-7.67E-07	-1.52E-06
IRP	kBq U235 eq.	-0.00486	-0.00413	-0.00342	-0.00278	-0.00539
ETP-fw	CTUe	-663	-552	-443	-332	-761
HTPc	CTUh	-2.64E-09	-2.24E-09	-1.85E-09	-1.49E-09	-2.94E-09
HTPnc	CTUh	-2.10E-07	-1.76E-07	-1.43E-07	-1.11E-07	-2.38E-07
SQP	Pt	-157	-140	-123	-118	-157

Resource use

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
PERE	MJ	-6.56	-5.71	-4.90	-4.31	-6.97
PERM	MJ	0	0	0	0	0
PERT	MJ	-6.56	-5.71	-4.90	-4.31	-6.97
PENRE	MJ	-2,290	-1,900	-1,530	-1,150	-2,630
PENRM	MJ	0	0	0	0	0
PENRT	MJ	-2,290	-1,900	-1,530	-1,150	-2,630
SM	kg	0	0	0	0	0
RSF	MJ	0	0	0	0	0
NRSF	MJ	0	0	0	0	0
FW	m^3	-0.00771	-0.00674	-0.00581	-0.00519	-0.00811

Waste categories and output flows

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
HWD	kg	-7.98E-04	-6.65E-04	-5.36E-04	-4.06E-04	-9.13E-04
NHWD	kg	-1.33	-1.14	-0.962	-0.831	-1.42
RWD	kg	-1.67E-06	-1.42E-06	-1.18E-06	-9.68E-07	-1.84E-06
CRU	kg	0	0	0	0	0
MFR	kg	0	0	0	0	0
MER	kg	0	0	0	0	0
EEE	MJ	0	0	0	0	0
EET	MJ	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 1E0A00	AC10 R10 1E0B00	AC10 R20 1E0D00	AC20 R23 2C0E00	EME2 14
GWP	kg CO_2-eq.	-23.7	-20.1	-16.6	-13.3	-26.4
ODP	kg CFC11-eq.	-1.83E-05	-1.52E-05	-1.22E-05	-9.11E-06	-2.10E-05
AP	kg SO_2-eq.	-0.206	-0.172	-0.139	-0.105	-0.236
EP	kg PO_4^{3}-- eq.	-0.0102	-0.00859	-0.00705	-0.00559	-0.0114
POCP	kg C_2H_4-eq.	-0.0139	-0.0116	-0.00933	-0.00700	-0.0160
ADPE	kg Sb-eq.	-9.27E-07	-8.24E-07	-7.25E-07	-6.76E-07	-9.48E-07
ADPF	MJ	-2,430	-2,020	-1,620	-1,220	-2,790

Gosnells Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
GWP-total	kg CO_2-eq.	60.6	63.0	79.3
GWP-fossil	kg CO_2-eq.	60.5	62.9	79.2
GWP-biogenic	kg CO_2-eq.	0.0661	0.0702	0.125
GWP-luluc	kg CO_2-eq.	6.72E-05	7.21E-05	1.38E-04
ODP	kg CFC11-eq.	2.25E-05	2.41E-05	2.53E-05
AP	Mole of H+ eq.	0.459	0.487	0.590
EP-freshwater	kg P eq.	4.58E-05	4.98E-05	1.65E-04
EP-marine	kg N eq.	0.0730	0.0759	0.0907
EP-terrestrial	Mole of N eq.	0.801	0.833	0.996
POCP	kg NMVOC eq.	0.249	0.258	0.303
ADP-minerals &metals	kg Sb-eq.	1.04E-06	1.18E-06	1.64E-06
ADP-fossil	MJ	2,180	2,330	2,780
WDP	m^3 world equiv.	1,540	1,580	1,780

Additional Environmental Impacts

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
GWP-GHG	kg CO_2-eq.	59.7	62.1	78.0
PM	Disease incidences	6.01E-06	6.12E-06	6.97E-06
IRP	kBq U235 eq.	0.00461	0.00505	0.254
ETP-fw	CTUe	599	640	677
HTPc	CTUh	3.93E-09	4.20E-09	5.79E-09
HTPnc	CTUh	3.12E-07	3.29E-07	3.72E-07
SQP	Pt	161	184	203

Biogenic carbon content

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
BCC-prod	kg	0	0	0
BCC-pack	kg	0	0	0

Resource use

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
PERE	MJ	15.0	15.9	16.5
PERM	MJ	0	0	1.84
PERT	MJ	15.0	15.9	18.3
PENRE	MJ	1,510	1,610	2,030
PENRM	MJ	666	720	756
PENRT	MJ	2,180	2,330	2,780
SM	kg	245	104	13.0
RSF	MJ	0	0	0
NRSF	MJ	0	0	0
FW	m^3	0.0358	0.0368	0.0414

Waste categories and output flows

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
HWD	kg	7.90E-04	8.27E-04	8.76E-04
NHWD	kg	1.78	1.83	2.02
RWD	kg	2.35E-06	2.42E-06	3.76E-05
CRU	kg	0	0	0
MFR	kg	0	0	0
MER	kg	0	0	0
EEE	MJ	0	0	0
EET	MJ	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
GWP	kg CO_2-eq.	59.2	61.6	77.2
ODP	kg CFC11-eq.	1.84E-05	1.95E-05	2.04E-05
AP	kg SO_2-eq.	0.282	0.300	0.371
EP	kg PO_4^{3}-- eq.	0.0250	0.0260	0.0313
POCP	kg C_2H_4-eq.	0.0293	0.0302	0.0336
ADPE	kg Sb-eq.	1.04E-06	1.18E-06	1.64E-06
ADPF	MJ	2,300	2,460	2,940

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
GWP-total	kg CO_2-eq.	-14.6	-18.5	-22.6
GWP-fossil	kg CO_2-eq.	-14.6	-18.5	-22.6
GWP-biogenic	kg CO_2-eq.	-0.0220	-0.0269	-0.0311
GWP-luluc	kg CO_2-eq.	-4.30E-05	-5.61E-05	-7.11E-05
ODP	kg CFC11-eq.	-1.42E-05	-1.85E-05	-2.34E-05
AP	Mole of H+ eq.	-0.180	-0.231	-0.287
EP-freshwater	kg P eq.	-2.25E-05	-2.77E-05	-3.25E-05
EP-marine	kg N eq.	-0.0171	-0.0218	-0.0267
EP-terrestrial	Mole of N eq.	-0.186	-0.237	-0.291
POCP	kg NMVOC eq.	-0.0578	-0.0738	-0.0911
ADP-minerals &metals	kg Sb-eq.	-6.91E-07	-8.20E-07	-9.12E-07
ADP-fossil	MJ	-1,230	-1,610	-2,030
WDP	m^3 world equiv.	-231	-279	-319

Additional Environmental Impacts

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
GWP-GHG	kg CO_2-eq.	-14.3	-18.1	-22.1
PM	Disease incidences	-8.10E-07	-1.02E-06	-1.25E-06
IRP	kBq U235 eq.	-0.00293	-0.00368	-0.00446
ETP-fw	CTUe	-357	-465	-589
HTPc	CTUh	-1.57E-09	-1.98E-09	-2.41E-09
HTPnc	CTUh	-1.18E-07	-1.52E-07	-1.89E-07
SQP	Pt	-120	-142	-156

Resource use

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
PERE	MJ	-4.46	-5.43	-6.26
PERM	MJ	0	0	0
PERT	MJ	-4.46	-5.43	-6.26
PENRE	MJ	-1,230	-1,610	-2,030
PENRM	MJ	0	0	0
PENRT	MJ	-1,230	-1,610	-2,030
SM	kg	0	0	0
RSF	MJ	0	0	0
NRSF	MJ	0	0	0
FW	m^3	-0.00536	-0.00648	-0.00741

Waste categories and output flows

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
HWD	kg	-4.35E-04	-5.65E-04	-7.12E-04
NHWD	kg	-0.864	-1.07	-1.26
RWD	kg	-1.02E-06	-1.29E-06	-1.55E-06
CRU	kg	0	0	0
MFR	kg	0	0	0
MER	kg	0	0	0
EEE	MJ	0	0	0
EET	MJ	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC20 R24 2C0E00	AC20 C600 R9 2C4B00	AC14 A15E 4B1A00
GWP	kg CO_2-eq.	-14.0	-17.8	-21.7
ODP	kg CFC11-eq.	-9.80E-06	-1.28E-05	-1.62E-05
AP	kg SO_2-eq.	-0.112	-0.146	-0.184
EP	kg PO_4^{3-}- eq.	-0.00592	-0.00753	-0.00925
POCP	kg C_2H_4-eq.	-0.00752	-0.00979	-0.0124
ADPE	kg Sb-eq.	-6.91E-07	-8.20E-07	-9.12E-07
ADPF	MJ	-1,310	-1,700	-2,160

Albany Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC 07	AC10	AC14
GWP-total	kg CO_2-eq.	71.0	70.4	65.2
GWP-fossil	kg CO_2-eq.	70.9	70.4	65.1
GWP-biogenic	kg CO_2-eq.	0.0719	0.0716	0.0686
GWP-luluc	kg CO_2-eq.	1.14E-04	1.12E-04	9.47E-05
ODP	kg CFC11-eq.	3.92E-05	3.87E-05	3.29E-05
AP	Mole of H+ eq.	0.674	0.665	0.573
EP-freshwater	kg P eq.	6.54E-05	6.50E-05	6.12E-05
EP-marine	kg N eq.	0.101	0.0999	0.0879
EP-terrestrial	Mole of N eq.	1.11	1.10	0.964
POCP	kg NMVOC eq.	0.330	0.327	0.290
ADP-minerals &metals	kg Sb-eq.	1.54E-06	1.54E-06	1.52E-06
ADP-fossil	MJ	3,300	3,250	2,750
WDP	m^3 world equiv.	491	489	466

Additional Environmental Impacts

Indicator	Unit	AC 07	AC10	AC14
GWP-GHG	kg CO_2-eq.	69.6	69.1	64.0
PM	Disease incidences	6.50E-06	6.47E-06	6.20E-06
IRP	kBq U235 eq.	0.00743	0.00735	0.00659
ETP-fw	CTUe	928	914	770
HTPc	CTUh	6.32E-09	6.27E-09	5.71E-09
HTPnc	CTUh	3.72E-07	3.68E-07	3.24E-07
SQP	Pt	248	248	248

Biogenic carbon content

Indicator	Unit	AC 07	AC10	AC14
BCC-prod	kg	0	0	0
BCC-pack	kg	0	0	0

Resource use

Indicator	Unit	AC 07	AC10	AC14
PERE	MJ	13.9	13.9	13.3
PERM	MJ	0	0	0
PERT	MJ	13.9	13.9	13.3
PENRE	MJ	2,240	2,210	1,900
PENRM	MJ	1,050	1,040	854
PENRT	MJ	3,300	3,250	2,750
SM	kg	0	0	0
RSF	MJ	0	0	0
NRSF	MJ	0	0	0
FW	m^3	0.0114	0.0114	0.0108

Waste categories and output flows

Indicator	Unit	AC 07	AC10	AC14
HWD	kg	0.00123	0.00121	0.00102
NHWD	kg	2.43	2.40	2.16
RWD	kg	3.21E-06	3.18E-06	2.85E-06
CRU	kg	0	0	0
MFR	kg	9.55	9.55	9.55
MER	kg	0	0	0
EEE	MJ	0	0	0
EET	MJ	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC 07	AC10	AC14
GWP	kg CO_2-eq.	68.8	68.3	63.3
ODP	kg CFC11-eq.	3.00E-05	2.97E-05	2.57E-05
AP	kg SO_2-eq.	0.428	0.422	0.358
EP	kg PO_4^{3}-- eq.	0.0346	0.0342	0.0301
POCP	kg C_2H_4-eq.	0.0420	0.0416	0.0379
ADPE	kg Sb-eq.	1.54E-06	1.54E-06	1.52E-06
ADPF	MJ	3,490	3,440	2,920

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC 07	AC10	AC14
GWP-total	kg CO_2-eq.	-24.5	-24.2	-21.2
GWP-fossil	kg CO_2-eq.	-24.5	-24.2	-21.2
GWP-biogenic	kg CO_2-eq.	-0.0339	-0.0337	-0.0314
GWP-luluc	kg CO_2-eq.	-7.71E-05	-7.58E-05	-6.34E-05
ODP	kg CFC11-eq.	-2.54E-05	-2.50E-05	-2.09E-05
AP	Mole of H+ eq.	-0.312	-0.308	-0.264
EP-freshwater	kg P eq.	-3.56E-05	-3.53E-05	-3.25E-05
EP-marine	kg N eq.	-0.0291	-0.0287	-0.0250
EP-terrestrial	Mole of N eq.	-0.317	-0.313	-0.272
POCP	kg NMVOC eq.	-0.0991	-0.0978	-0.0844
ADP-minerals &metals	kg Sb-eq.	-1.00E-06	-1.00E-06	-9.80E-07
ADP-fossil	MJ	-2,210	-2,170	-1,820
WDP	m^3 world equiv.	-344	-343	-325

Additional Environmental Impacts

Indicator	Unit	AC 07	AC10	AC14
GWP-GHG	kg CO_2-eq.	-24.0	-23.7	-20.8
PM	Disease incidences	-1.36E-06	-1.34E-06	-1.18E-06
IRP	kBq U235 eq.	-0.00487	-0.00482	-0.00426
ETP-fw	CTUe	-639	-629	-526
HTPc	CTUh	-2.63E-09	-2.60E-09	-2.29E-09
HTPnc	CTUh	-2.05E-07	-2.02E-07	-1.73E-07
SQP	Pt	-161	-161	-160

Resource use

Indicator	Unit	AC 07	AC10	AC14
PERE	MJ	-6.87	-6.82	-6.40
PERM	MJ	0	0	0
PERT	MJ	-6.87	-6.82	-6.40
PENRE	MJ	-2,210	-2,170	-1,820
PENRM	MJ	0	0	0
PENRT	MJ	-2,210	-2,170	-1,820
SM	kg	0	0	0
RSF	MJ	0	0	0
NRSF	MJ	0	0	0
FW	m^3	-0.00800	-0.00796	-0.00755

Waste categories and output flows

Indicator	Unit	AC 07	AC10	AC14
HWD	kg	-7.64E-04	-7.53E-04	-6.33E-04
NHWD	kg	-1.26	-1.25	-1.15
RWD	kg	-1.58E-06	-1.57E-06	-1.39E-06
CRU	kg	0	0	0
MFR	kg	0	0	0
MER	kg	0	0	0
EEE	MJ	0	0	0
EET	MJ	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC 07	AC10	AC14
GWP	kg CO_2-eq.	-23.5	-23.3	-20.4
ODP	kg CFC11-eq.	-1.76E-05	-1.73E-05	-1.44E-05
AP	kg SO_2-eq.	-0.199	-0.196	-0.165
EP	kg PO_4^{3}-- eq.	-0.0101	-0.00993	-0.00863
POCP	kg C_2H_4-eq.	-0.0134	-0.0132	-0.0111
ADPE	kg Sb-eq.	-1.00E-06	-1.00E-06	-9.80E-07
ADPF	MJ	-2,340	-2,300	-1,930

Glen Helen Gorge, West MacDonnell Ranges Northern Territory

Asphalt in the Northern Territory

From the red desert sands around Uluru to the tropical terrain of Kakadu National Park, the Northern Territory's tourism and freight routes which provide connections not just across the Territory itself, but through the very heart of Australia.

Downer has supported the construction and maintenance of roads, airfields, and other asphalt-paved assets in the Northern Territory for more than 85 years, with one asphalt manufacturing facility and four offices and depots currently operating across the region.

Berrimah Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
GWP-total	kg CO_2-eq.	116	110	114
GWP-fossil	kg CO_2-eq.	116	110	114
GWP-biogenic	kg CO_2-eq.	0.270	0.262	0.267
GWP-luluc	kg CO_2-eq.	1.54E-04	1.37E-04	1.50E-04
ODP	kg CFC11-eq.	3.10E-05	2.78E-05	3.01E-05
AP	Mole of H+ eq.	0.838	0.765	0.816
EP-freshwater	kg P eq.	1.83E-04	1.68E-04	1.79E-04
EP-marine	kg N eq.	0.166	0.153	0.161
EP-terrestrial	Mole of N eq.	1.79	1.65	1.74
POCP	kg NMVOC eq.	0.500	0.462	0.488
ADP-minerals &metals	kg Sb-eq.	1.59E-06	1.54E-06	1.55E-06
ADP-fossil	MJ	3,400	3,080	3,310
WDP	m^3 world equiv.	596	565	583

Additional Environmental Impacts

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
GWP-GHG	kg CO_2-eq.	114	108	112
PM	Disease incidences	2.29E-05	2.26E-05	2.28E-05
IRP	kBq U235 eq.	0.244	0.214	0.236
ETP-fw	CTUe	791	711	769
HTPc	CTUh	6.88E-09	6.40E-09	6.73E-09
HTPnc	CTUh	3.56E-07	3.27E-07	3.48E-07
SQP	Pt	293	293	291

Biogenic carbon content

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
BCC-prod	kg	0	0	0
BCC-pack	kg	0	0	0

Resource use

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
PERE	MJ	15.9	15.7	15.8
PERM	MJ	1.76	1.54	1.70
PERT	MJ	17.7	17.2	17.5
PENRE	MJ	2,670	2,450	2,610
PENRM	MJ	723	633	698
PENRT	MJ	3,400	3,080	3,310
SM	kg	0	0	0
RSF	MJ	0	0	0
NRSF	MJ	0	0	0
FW	m^3	0.0138	0.0130	0.0135

Waste categories and output flows

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
HWD	kg	0.00206	0.00191	0.00201
NHWD	kg	6.33	5.90	6.21
RWD	kg	4.22E-05	3.76E-05	4.10E-05
CRU	kg	0	0	0
MFR	kg	0	0	0
MER	kg	0	0	0
EEE	MJ	0	0	0
EET	MJ	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
GWP	kg CO_2-eq.	113	107	111
ODP	kg CFC11-eq.	2.44E-05	2.21E-05	2.37E-05
AP	kg SO_2-eq.	0.510	0.461	0.496
EP	kg PO_4^{3}-- eq.	0.0580	0.0536	0.0566
POCP	kg C_2H_4-eq.	0.0451	0.0423	0.0443
ADPE	kg Sb-eq.	1.59E-06	1.54E-06	1.55E-06
ADPF	MJ	3,580	3,250	3,490

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
GWP-total	kg CO_2-eq.	-21.9	-19.9	-21.3
GWP-fossil	kg CO_2-eq.	-21.8	-19.9	-21.3
GWP-biogenic	kg CO_2-eq.	-0.0306	-0.0291	-0.0302
GWP-luluc	kg CO_2-eq.	-6.81E-05	-5.99E-05	-6.58E-05
ODP	kg CFC11-eq.	-2.24E-05	-1.97E-05	-2.17E-05
AP	Mole of H+ eq.	-0.277	-0.248	-0.269
EP-freshwater	kg P eq.	-3.18E-05	-2.99E-05	-3.13E-05
EP-marine	kg N eq.	-0.0258	-0.0234	-0.0252
EP-terrestrial	Mole of N eq.	-0.282	-0.254	-0.274
POCP	kg NMVOC eq.	-0.0879	-0.0791	-0.0855
ADP-minerals &metals	kg Sb-eq.	-9.07E-07	-8.92E-07	-9.03E-07
ADP-fossil	MJ	-1,950	-1,710	-1,880
WDP	m^3 world equiv.	-315	-303	-312

Additional Environmental Impacts

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
GWP-GHG	kg CO_2-eq.	-21.4	-19.4	-20.8
PM	Disease incidences	-1.21E-06	-1.10E-06	-1.18E-06
IRP	kBq U235 eq.	-0.00432	-0.00396	-0.00422
ETP-fw	CTUe	-564	-496	-546
HTPc	CTUh	-2.34E-09	-2.13E-09	-2.28E-09
HTPnc	CTUh	-1.82E-07	-1.62E-07	-1.76E-07
SQP	Pt	-156	-156	-156

Resource use

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
PERE	MJ	-6.16	-5.88	-6.08
PERM	MJ	0	0	0
PERT	MJ	-6.16	-5.88	-6.08
PENRE	MJ	-1,950	-1,710	-1,880
PENRM	MJ	0	0	0
PENRT	MJ	-1,950	-1,710	-1,880
SM	kg	0	0	0
RSF	MJ	0	0	0
NRSF	MJ	0	0	0
FW	m^3	-0.00731	-0.00704	-0.00724

Waste categories and output flows

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
HWD	kg	-6.83E-04	-6.04E-04	-6.62E-04
NHWD	kg	-1.23	-1.17	-1.21
RWD	kg	-1.51E-06	-1.39E-06	-1.47E-06
CRU	kg	0	0	0
MFR	kg	0	0	0
MER	kg	0	0	0
EEE	MJ	0	0	0
EET	MJ	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 A15E Type 2	AC20 A15E Type 4	AC14 AE15 Type 5
GWP	kg CO_2-eq.	-21.0	-19.1	-20.5
ODP	kg CFC11-eq.	-1.55E-05	-1.36E-05	-1.50E-05
AP	kg SO_2-eq.	-0.176	-0.156	-0.171
EP	kg PO_4^{3-} eq.	-0.00893	-0.00808	-0.00870
POCP	kg C_2H_4-eq.	-0.0119	-0.0105	-0.0115
ADPE	kg Sb-eq.	-9.07E-07	-8.92E-07	-9.03E-07
ADPF	MJ	-2,070	-1,820	-2,000

Riverfire Festival, Brisbane, Queensland

Asphalt in Queensland

The second-largest state in Australia, more than half of Queensland's population resides outside the greater metropolitan area of Brisbane, with the state's road network playing a critical role in supporting tourism, freight movement, employment and industry.

Downer has supported the construction and maintenance of roads, airfields, and other asphalt-paved assets in Queensland for more than 85 years, with five asphalt manufacturing facilities and 14 offices and depots accross the state.

Brisbane Sustainable Road Resource Centre, Brendale

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
GWP-total	kg CO_2-eq.	51.9	78.2	66.9	48.4	77.9	64.6	68.8	58.0	64.6
GWP-fossil	kg CO_2-eq.	51.3	78.1	66.8	48.1	77.8	64.6	68.7	57.9	64.5
GWP-biogenic	kg CO_2-eq.	0.588	0.0902	0.0457	0.307	0.0953	0.0432	0.0839	0.0415	0.0481
GWP-luluc	kg CO_2-eq.	0.00122	1.34E-04	8.44E-05	6.36E-04	1.55E-04	9.67E-05	1.27E-04	8.01E-05	9.60E-05
ODP	kg CFC11-eq.	2.01E-05	2.61E-05	2.80E-05	1.83E-05	2.97E-05	3.18E-05	2.46E-05	2.63E-05	3.16E-05
AP	Mole of H+ eq.	0.428	0.598	0.554	0.393	0.657	0.605	0.565	0.523	0.609
EP-freshwater	kg P eq.	7.67E-05	1.75E-04	7.71E-05	6.60E-05	1.94E-04	7.95E-05	1.67E-04	7.44E-05	8.32E-05
EP-marine	kg N eq.	0.0770	0.0984	0.0901	0.0716	0.106	0.0959	0.0932	0.0853	0.0956
EP-terrestrial	Mole of N eq.	0.838	1.08	0.989	0.781	1.16	1.05	1.02	0.935	1.05
POCP	kg NMVOC eq.	0.237	0.305	0.282	0.221	0.326	0.299	0.288	0.266	0.298
ADP-minerals &metals	kg Sb-eq.	7.55E-07	1.39E-06	1.13E-06	6.47E-07	1.29E-06	9.87E-07	1.27E-06	1.02E-06	1.23E-06
ADP-fossil	MJ	1,760	2,570	2,420	1,590	2,930	2,770	2,430	2,300	2,750
WDP	m^3 world equiv.	281	1,370	1,240	248	534	379	495	369	431

Additional Environmental Impacts

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
GWP-GHG	kg CO_2-eq.	50.8	76.7	65.7	47.4	76.4	63.5	67.5	57.0	63.4
PM	Disease incidences	8.37E-06	8.68E-06	8.08E-06	7.88E-06	8.90E-06	8.19E-06	8.53E-06	7.96E-06	8.25E-06
IRP	kBq U235 eq.	0.0140	0.227	0.00552	0.00854	0.265	0.00577	0.216	0.00514	0.00617
ETP-fw	CTUe	805	691	733	613	759	807	631	670	802
HTPc	CTUh	1.10E-08	6.22E-09	5.21E-09	7.31E-09	6.71E-09	5.52E-09	5.94E-09	4.98E-09	5.67E-09
HTPnc	CTUh	2.69E-07	3.75E-07	3.64E-07	2.42E-07	3.70E-07	3.57E-07	3.21E-07	3.11E-07	3.59E-07
SQP	Pt	172	225	225	158	211	211	214	214	230

Biogenic carbon content

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
BCC-prod	kg	0	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0	0

Brisbane Sustainabe Road Resource Centre, Brendale (continued)

Resource use

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
PERE	MJ	7.22	11.1	11.5	6.50	8.67	9.18	8.51	8.93	10.3
PERM	MJ	0	1.64	0	0	1.92	0	1.56	0	0
PERT	MJ	7.22	12.7	11.5	6.50	10.6	9.18	10.1	8.93	10.3
PENRE	MJ	1,240	1,890	1,680	1,130	2,140	1,900	1,790	1,590	1,890
PENRM	MJ	512	674	739	458	789	865	641	703	865
PENRT	MJ	1,760	2,570	2,420	1,590	2,930	2,770	2,430	2,300	2,750
SM	kg	458	150	150	533	200	200	200	200	150
RSF	MJ	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m^3	0.00652	0.0319	0.0288	0.00575	0.0124	0.00881	0.0115	0.00856	0.01000

Waste categories and output flows

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
HWD	kg	7.94E-04	9.47E-04	9.73E-04	7.27E-04	0.00109	0.00112	9.19E-04	9.43E-04	0.00109
NHWD	kg	3.71	3.38	3.21	3.23	3.59	3.39	3.32	3.15	3.24
RWD	kg	2.33E-05	3.47E-05	3.33E-06	1.30E-05	4.04E-05	3.74E-06	3.31E-05	3.32E-06	3.55E-06
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778	0.778
MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
GWP	kg CO_2-eq.	50.3	76.0	65.1	47.0	75.6	62.9	66.8	56.5	62.8
ODP	kg CFC11-eq.	1.39E-05	1.81E-05	1.94E-05	1.26E-05	2.05E-05	2.20E-05	1.70E-05	1.82E-05	2.19E-05
AP	kg SO_2-eq.	0.283	0.398	0.366	0.261	0.445	0.407	0.378	0.347	0.405
EP	kg PO_4^{3-}- eq.	0.0300	0.0339	0.0308	0.0263	0.0364	0.0328	0.0321	0.0292	0.0327
POCP	kg C_2H_4-eq.	0.0237	0.0298	0.0285	0.0220	0.0315	0.0300	0.0277	0.0265	0.0298
ADPE	kg Sb-eq.	7.55E-07	1.39E-06	1.13E-06	6.47E-07	1.29E-06	9.87E-07	1.27E-06	1.02E-06	1.23E-06
ADPF	MJ	1,860	2,720	2,570	1,690	3,110	2,930	2,580	2,440	2,920

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
GWP-total	kg CO_2-eq.	-9.51	-17.5	-17.5	-7.38	-18.4	-18.4	-15.9	-15.9	-19.6
GWP-fossil	kg CO_2-eq.	-9.50	-17.5	-17.5	-7.37	-18.4	-18.4	-15.9	-15.9	-19.6
GWP-biogenic	kg CO_2-eq.	-0.0160	-0.0253	-0.0253	-0.0130	-0.0253	-0.0253	-0.0234	-0.0234	-0.0269
GWP-luluc	kg CO_2-eq.	-2.53E-05	-5.33E-05	-5.33E-05	-1.86E-05	-5.80E-05	-5.80E-05	-4.75E-05	-4.75E-05	-6.20E-05
ODP	kg CFC11-eq.	-8.31E-06	-1.75E-05	-1.75E-05	-6.10E-06	-1.91E-05	-1.91E-05	-1.56E-05	-1.56E-05	-2.04E-05
AP	Mole of H+ eq.	-0.112	-0.219	-0.219	-0.0846	-0.234	-0.234	-0.197	-0.197	-0.250
EP-freshwater	kg P eq.	-1.60E-05	-2.62E-05	-2.62E-05	-1.29E-05	-2.65E-05	-2.65E-05	-2.41E-05	-2.41E-05	-2.82E-05
EP-marine	kg N eq.	-0.0110	-0.0206	-0.0206	-0.00843	-0.0218	-0.0218	-0.0186	-0.0186	-0.0233
EP-terrestrial	Mole of N eq.	-0.119	-0.225	-0.225	-0.0917	-0.238	-0.238	-0.203	-0.203	-0.253
POCP	kg NMVOC eq.	-0.0365	-0.0700	-0.0700	-0.0279	-0.0743	-0.0743	-0.0631	-0.0631	-0.0793
ADP-minerals &metals	kg Sb-eq.	-5.39E-07	-7.71E-07	-7.71E-07	-4.54E-07	-7.42E-07	-7.42E-07	-7.24E-07	-7.24E-07	-7.86E-07
ADP-fossil	MJ	-728	-1,530	-1,530	-536	-1,660	-1,660	-1,360	-1,360	-1,770
WDP	m^3 world equiv.	-171	-263	-263	-141	-259	-259	-244	-244	-275

Additional Environmental Impacts

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
GWP-GHG	kg CO_2-eq.	-9.31	-17.1	-17.1	-7.23	-18.0	-18.0	-15.5	-15.5	-19.2
PM	Disease incidences	-5.28E-07	-9.70E-07	-9.70E-07	-4.11E-07	-1.02E-06	-1.02E-06	-8.79E-07	-8.79E-07	-1.08E-06
IRP	kBq U235 eq.	-0.00194	-0.00348	-0.00348	-0.00152	-0.00363	-0.00363	-0.00317	-0.00317	-0.00387
ETP-fw	CTUe	-210	-442	-442	-155	-480	-480	-394	-394	-514
HTPc	CTUh	-1.03E-09	-1.88E-09	-1.88E-09	-8.01E-10	-1.97E-09	-1.97E-09	-1.70E-09	-1.70E-09	-2.10E-09
HTPnc	CTUh	-7.29E-08	-1.44E-07	-1.44E-07	-5.51E-08	-1.54E-07	-1.54E-07	-1.29E-07	-1.29E-07	-1.64E-07
SQP	Pt	-94.4	-133	-133	-79.0	-126	-126	-125	-125	-133

Brisbane Sustainabe Road Resource Centre, Brendale (continued)

Resource use

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
PERE	MJ	-3.27	-5.12	-5.12	-2.69	-5.10	-5.10	-4.74	-4.74	-5.41
PERM	MJ	0	0	0	0	0	0	0	0	0
PERT	MJ	-3.27	-5.12	-5.12	-2.69	-5.10	-5.10	-4.74	-4.74	-5.41
PENRE	MJ	-728	-1,530	-1,530	-536	-1,660	-1,660	-1,360	-1,360	-1,770
PENRM	MJ	0	0	0	0	0	0	0	0	0
PENRT	MJ	-728	-1,530	-1,530	-536	-1,660	-1,660	-1,360	-1,360	-1,770
SM	kg	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m^3	-0.00397	-0.00610	-0.00610	-0.00327	-0.00602	-0.00602	-0.00567	-0.00567	-0.00639

Waste categories and output flows

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
HWD	kg	-2.59E-04	-5.36E-04	-5.36E-04	-1.92E-04	-5.80E-04	-5.80E-04	-4.79E-04	-4.79E-04	-6.20E-04
NHWD	kg	-0.605	-1.01	-1.01	-0.480	-1.01	-1.01	-0.925	-0.925	-1.08
RWD	kg	-6.74E-07	-1.21E-06	-1.21E-06	-5.21E-07	-1.25E-06	-1.25E-06	-1.10E-06	-1.10E-06	-1.33E-06
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R40 Reconophalt	AC14 A15E R15	AC14 R15	AC14 R50 Reconophalt	AC10 A15E R20 BCC	AC10 R20 BCC	AC14 A15E R20 BCC	AC14 R20 BCC	EME14 R15
GWP	kg CO_2-eq.	-9.16	-16.8	-16.8	-7.12	-17.6	-17.6	-15.3	-15.3	-18.8
ODP	kg CFC11-eq.	-5.75E-06	-1.21E-05	-1.21E-05	-4.22E-06	-1.32E-05	-1.32E-05	-1.08E-05	-1.08E-05	-1.41E-05
AP	kg SO_2-eq.	-0.0671	-0.138	-0.138	-0.0498	-0.150	-0.150	-0.124	-0.124	-0.160
EP	kg PO_4^{3-}- eq.	-0.00379	-0.00714	-0.00714	-0.00292	-0.00754	-0.00754	-0.00645	-0.00645	-0.00804
POCP	kg C_2H_4-eq.	-0.00444	-0.00930	-0.00930	-0.00327	-0.0101	-0.0101	-0.00830	-0.00830	-0.0108
ADPE	kg Sb-eq.	-5.39E-07	-7.71E-07	-7.71E-07	-4.54E-07	-7.42E-07	-7.42E-07	-7.24E-07	-7.24E-07	-7.86E-07
ADPF	MJ	-772	-1,620	-1,620	-568	-1,760	-1,760	-1,440	-1,440	-1,880

Mackay Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
GWP-total	kg CO_2-eq.	89.3	91.4	83.3	102	86.4	100.0	84.7	84.7
GWP-fossil	kg CO_2-eq.	89.2	91.3	83.2	102	86.3	100.0	84.7	84.7
GWP-biogenic	kg CO_2-eq.	0.0655	0.0659	0.0641	0.122	0.0640	0.120	0.0637	0.0637
GWP-luluc	kg CO_2-eq.	1.30E-04	1.25E-04	1.14E-04	1.76E-04	1.11E-04	1.70E-04	1.07E-04	1.07E-04
ODP	kg CFC11-eq.	4.33E-05	4.18E-05	3.78E-05	3.47E-05	3.70E-05	3.35E-05	3.57E-05	3.57E-05
AP	Mole of H+ eq.	0.820	0.800	0.734	0.784	0.723	0.762	0.704	0.704
EP-freshwater	kg P eq.	9.01E-05	8.88E-05	8.64E-05	2.14E-04	8.54E-05	2.08E-04	8.42E-05	8.42E-05
EP-marine	kg N eq.	0.135	0.134	0.124	0.135	0.124	0.132	0.121	0.121
EP-terrestrial	Mole of N eq.	1.49	1.47	1.36	1.48	1.36	1.45	1.33	1.33
POCP	kg NMVOC eq.	0.438	0.434	0.403	0.435	0.403	0.425	0.394	0.394
ADP-minerals &metals	kg Sb-eq.	1.33E-06	1.36E-06	1.38E-06	1.70E-06	1.37E-06	1.70E-06	1.38E-06	1.38E-06
ADP-fossil	MJ	3,730	3,590	3,260	3,380	3,180	3,260	3,070	3,070
WDP	m^3 world equiv.	1,790	2,220	1,780	2,380	2,210	2,370	2,210	2,210

Additional Environmental Impacts

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
GWP-GHG	kg CO_2-eq.	87.7	89.8	81.9	100.0	84.9	98.3	83.3	83.3
PM	Disease incidences	9.36E-06	9.32E-06	9.12E-06	9.90E-06	9.10E-06	9.81E-06	9.04E-06	9.04E-06
IRP	kBq U235 eq.	0.00780	0.00765	0.00720	0.297	0.00706	0.286	0.00692	0.00692
ETP-fw	CTUe	1,120	1,100	986	926	976	896	944	944
HTPc	CTUh	6.39E-09	6.24E-09	5.87E-09	7.14E-09	5.77E-09	6.96E-09	5.64E-09	5.64E-09
HTPnc	CTUh	5.06E-07	5.13E-07	4.62E-07	4.94E-07	4.75E-07	4.82E-07	4.64E-07	4.64E-07
SQP	Pt	295	297	299	298	298	299	299	299

Biogenic carbon content

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
BCC-prod	kg	0	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0	0

Resource use

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
PERE	MJ	13.7	14.7	13.5	13.8	14.3	13.8	14.3	14.3
PERM	MJ	0	0	0	2.15	0	2.07	0	0
PERT	MJ	13.7	14.7	13.5	15.9	14.3	15.8	14.3	14.3
PENRE	MJ	2,560	2,470	2,250	2,490	2,210	2,410	2,140	2,140
PENRM	MJ	1,170	1,120	1,000	883	967	849	930	930
PENRT	MJ	3,730	3,590	3,260	3,380	3,180	3,260	3,070	3,070
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	0.0416	0.0517	0.0414	0.0554	0.0513	0.0552	0.0513	0.0513

Waste categories and output flows

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
HWD	kg	0.00148	0.00143	0.00129	0.00124	0.00127	0.00120	0.00123	0.00123
NHWD	kg	3.42	3.40	3.14	3.42	3.18	3.34	3.11	3.11
RWD	kg	4.41E-06	4.29E-06	3.99E-06	4.50E-05	3.97E-06	4.34E-05	3.86E-06	3.86E-06
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
GWP	kg CO_2-eq.	86.9	89.0	81.2	99.5	84.2	97.3	82.6	82.6
ODP	kg CFC11-eq.	3.00E-05	2.89E-05	2.62E-05	2.40E-05	2.56E-05	2.32E-05	2.47E-05	2.47E-05
AP	kg SO_2-eq.	0.636	0.620	0.574	0.610	0.566	0.594	0.552	0.552
EP	kg PO_4^{3-}-- eq.	0.0464	0.0459	0.0425	0.0466	0.0424	0.0455	0.0415	0.0415
POCP	kg C_2H_4-eq.	0.0464	0.0459	0.0427	0.0445	0.0427	0.0436	0.0419	0.0419
ADPE	kg Sb-eq.	1.33E-06	1.36E-06	1.38E-06	1.70E-06	1.37E-06	1.70E-06	1.38E-06	1.38E-06
ADPF	MJ	3,960	3,810	3,450	3,580	3,370	3,460	3,250	3,250

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
GWP-total	kg CO_2-eq.	-26.0	-25.1	-23.3	-22.7	-22.7	-22.1	-22.1	-22.1
GWP-fossil	kg CO_2-eq.	-26.0	-25.1	-23.3	-22.7	-22.7	-22.1	-22.1	-22.1
GWP-biogenic	kg CO_2-eq.	-0.0350	-0.0343	-0.0330	-0.0325	-0.0325	-0.0321	-0.0321	-0.0321
GWP-luluc	kg CO_2-eq.	-8.33E-05	-7.96E-05	-7.21E-05	-6.96E-05	-6.96E-05	-6.71E-05	-6.71E-05	-6.71E-05
ODP	kg CFC11-eq.	-2.74E-05	-2.62E-05	-2.37E-05	-2.29E-05	-2.29E-05	-2.21E-05	-2.21E-05	-2.21E-05
AP	Mole of H+ eq.	-0.335	-0.321	-0.295	-0.286	-0.286	-0.277	-0.277	-0.277
EP-freshwater	kg P eq.	-3.70E-05	-3.62E-05	-3.44E-05	-3.39E-05	-3.39E-05	-3.33E-05	-3.33E-05	-3.33E-05
EP-marine	kg N eq.	-0.0310	-0.0298	-0.0276	-0.0268	-0.0268	-0.0261	-0.0261	-0.0261
EP-terrestrial	Mole of N eq.	-0.338	-0.325	-0.301	-0.292	-0.292	-0.284	-0.284	-0.284
POCP	kg NMVOC eq.	-0.106	-0.102	-0.0938	-0.0911	-0.0911	-0.0884	-0.0884	-0.0884
ADP-minerals &metals	kg Sb-eq.	-1.01E-06	-1.01E-06	-9.95E-07	-9.91E-07	-9.91E-07	-9.86E-07	-9.86E-07	-9.86E-07
ADP-fossil	MJ	-2,380	-2,280	-2,060	-1,990	-1,990	-1,920	-1,920	-1,920
WDP	m^3 world equiv.	-353	-348	-337	-334	-334	-330	-330	-330

Additional Environmental Impacts

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
GWP-GHG	kg CO_2-eq.	-25.5	-24.6	-22.8	-22.2	-22.2	-21.7	-21.7	-21.7
PM	Disease incidences	-1.44E-06	-1.39E-06	-1.29E-06	-1.26E-06	-1.26E-06	-1.23E-06	-1.23E-06	-1.23E-06
IRP	kBq U235 eq.	-0.00515	-0.00499	-0.00465	-0.00454	-0.00454	-0.00443	-0.00443	-0.00443
ETP-fw	CTUe	-690	-659	-598	-577	-577	-557	-557	-557
HTPc	CTUh	-2.79E-09	-2.70E-09	-2.51E-09	-2.44E-09	-2.44E-09	-2.38E-09	-2.38E-09	-2.38E-09
HTPnc	CTUh	-2.20E-07	-2.11E-07	-1.93E-07	-1.87E-07	-1.87E-07	-1.82E-07	-1.82E-07	-1.82E-07
SQP	Pt	-161	-161	-161	-161	-161	-161	-161	-161

Resource use

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
PERE	MJ	-7.08	-6.95	-6.70	-6.61	-6.61	-6.53	-6.53	-6.53
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	-7.08	-6.95	-6.70	-6.61	-6.61	-6.53	-6.53	-6.53
PENRE	MJ	-2,380	-2,280	-2,060	-1,990	-1,990	-1,920	-1,920	-1,920
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	-2,380	-2,280	-2,060	-1,990	-1,990	-1,920	-1,920	-1,920
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	-0.00821	-0.00808	-0.00783	-0.00775	-0.00775	-0.00767	-0.00767	-0.00767

Waste categories and output flows

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
HWD	kg	-8.24E-04	-7.88E-04	-7.17E-04	-6.93E-04	-6.93E-04	-6.69E-04	-6.69E-04	-6.69E-04
NHWD	kg	-1.31	-1.28	-1.22	-1.20	-1.20	-1.18	-1.18	-1.18
RWD	kg	-1.67E-06	-1.62E-06	-1.51E-06	-1.48E-06	-1.48E-06	-1.45E-06	-1.45E-06	-1.45E-06
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10	AC10 H 4098	AC14	AC14 A15E 4906	AC14 4906	AC20 A15E H 4907	AC20 H 4907	AC20 C600 H 4097
GWP	kg CO_2-eq.	-25.0	-24.1	-22.4	-21.8	-21.8	-21.3	-21.3	-21.3
ODP	kg CFC11-eq.	-1.90E-05	-1.81E-05	-1.64E-05	-1.59E-05	-1.59E-05	-1.53E-05	-1.53E-05	-1.53E-05
AP	kg SO_2-eq.	-0.215	-0.206	-0.187	-0.181	-0.181	-0.175	-0.175	-0.175
EP	kg PO_4^{3}-- eq.	-0.0107	-0.0103	-0.00954	-0.00928	-0.00928	-0.00902	-0.00902	-0.00902
POCP	kg C_2H_4-eq.	-0.0145	-0.0139	-0.0126	-0.0122	-0.0122	-0.0117	-0.0117	-0.0117
ADPE	kg Sb-eq.	-1.01E-06	-1.01E-06	-9.95E-07	-9.91E-07	-9.91E-07	-9.86E-07	-9.86E-07	-9.86E-07
ADPF	MJ	-2,530	-2,410	-2,190	-2,110	-2,110	-2,040	-2,040	-2,040

Bli Bli Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
GWP-total	kg CO_2-eq.	93.9	87.5	75.9	80.9	83.5	72.7	84.8
GWP-fossil	kg CO_2-eq.	93.8	87.4	75.9	80.8	83.4	72.7	84.8
GWP-biogenic	kg CO_2-eq.	0.0998	0.0900	0.0445	0.0488	0.0842	0.0420	0.0954
GWP-luluc	kg CO_2-eq.	1.58E-04	1.42E-04	9.10E-05	1.01E-04	1.32E-04	8.52E-05	1.40E-04
ODP	kg CFC11-eq.	3.13E-05	2.84E-05	3.03E-05	3.34E-05	2.66E-05	2.83E-05	2.77E-05
AP	Mole of H+ eq.	0.737	0.676	0.631	0.686	0.641	0.599	0.675
EP-freshwater	kg P eq.	1.93E-04	1.75E-04	7.58E-05	8.19E-05	1.64E-04	7.17E-05	1.76E-04
EP-marine	kg N eq.	0.131	0.122	0.114	0.121	0.118	0.110	0.121
EP-terrestrial	Mole of N eq.	1.43	1.34	1.25	1.33	1.29	1.20	1.33
POCP	kg NMVOC eq.	0.422	0.397	0.373	0.396	0.383	0.360	0.393
ADP-minerals &metals	kg Sb-eq.	1.58E-06	1.43E-06	1.17E-06	1.29E-06	1.33E-06	1.09E-06	1.69E-06
ADP-fossil	MJ	3,050	2,760	2,610	2,890	2,580	2,450	2,710
WDP	m^3 world equiv.	1,460	1,390	1,260	1,300	1,360	1,240	1,460

Additional Environmental Impacts

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
GWP-GHG	kg CO_2-eq.	92.2	85.9	74.6	79.5	81.9	71.5	83.3
PM	Disease incidences	9.36E-06	9.09E-06	8.48E-06	8.68E-06	8.93E-06	8.36E-06	9.12E-06
IRP	kBq U235 eq.	0.260	0.232	0.00589	0.00649	0.215	0.00551	0.232
ETP-fw	CTUe	819	744	786	866	699	738	729
HTPc	CTUh	6.59E-09	6.04E-09	5.00E-09	5.43E-09	5.69E-09	4.73E-09	6.10E-09
HTPnc	CTUh	4.19E-07	3.87E-07	3.75E-07	4.06E-07	3.66E-07	3.56E-07	3.79E-07
SQP	Pt	197	174	174	197	164	164	205

Biogenic carbon content

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
BCC-prod	kg	0	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0	0

Resource use

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
PERE	MJ	11.3	10.6	11.0	11.8	10.1	10.5	11.8
PERM	MJ	1.88	1.68	0	0	1.55	0	1.68
PERT	MJ	13.2	12.2	11.0	11.8	11.6	10.5	13.5
PENRE	MJ	2,280	2,070	1,860	2,040	1,940	1,750	2,020
PENRM	MJ	772	688	754	846	638	699	688
PENRT	MJ	3,050	2,760	2,610	2,890	2,580	2,450	2,710
SM	kg	0	153	153	0	204	204	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	0.0338	0.0324	0.0293	0.0303	0.0316	0.0287	0.0338

Waste categories and output flows

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
HWD	kg	0.00130	0.00120	0.00123	0.00133	0.00114	0.00117	0.00116
NHWD	kg	4.33	4.06	3.88	4.13	3.96	3.80	3.97
RWD	kg	4.04E-05	3.62E-05	4.21E-06	4.54E-06	3.37E-05	4.05E-06	3.59E-05
CRU	kg	0	0	0	0	0	0	0
MFR	kg	21.8	21.8	21.8	21.8	21.8	21.8	21.8
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
GWP	kg CO_2-eq.	91.3	85.1	74.1	78.9	81.2	71.0	82.5
ODP	kg CFC11-eq.	2.17E-05	1.96E-05	2.09E-05	2.31E-05	1.84E-05	1.96E-05	1.92E-05
AP	kg SO_2-eq.	0.485	0.445	0.412	0.448	0.422	0.391	0.439
EP	kg PO_4^{3-}- eq.	0.0448	0.0419	0.0388	0.0413	0.0403	0.0374	0.0415
POCP	kg C_2H_4-eq.	0.0399	0.0377	0.0364	0.0384	0.0364	0.0352	0.0372
ADPE	kg Sb-eq.	1.58E-06	1.43E-06	1.17E-06	1.29E-06	1.33E-06	1.09E-06	1.69E-06
ADPF	MJ	3,240	2,930	2,770	3,060	2,740	2,590	2,870

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
GWP-total	kg CO_2-eq.	-20.9	-16.1	-16.1	-20.9	-14.4	-14.4	-19.4
GWP-fossil	kg CO_2-eq.	-20.9	-16.1	-16.1	-20.9	-14.3	-14.3	-19.4
GWP-biogenic	kg CO_2-eq.	-0.0312	-0.0255	-0.0255	-0.0312	-0.0235	-0.0235	-0.0301
GWP-luluc	kg CO_2-eq.	-6.21E-05	-4.54E-05	-4.54E-05	-6.21E-05	-3.92E-05	-3.92E-05	-5.59E-05
ODP	kg CFC11-eq.	-2.04E-05	-1.49E-05	-1.49E-05	-2.04E-05	-1.29E-05	-1.29E-05	-1.84E-05
AP	Mole of H+ eq.	-0.259	-0.195	-0.195	-0.259	-0.171	-0.171	-0.237
EP-freshwater	kg P eq.	-3.22E-05	-2.60E-05	-2.60E-05	-3.22E-05	-2.38E-05	-2.38E-05	-3.07E-05
EP-marine	kg N eq.	-0.0246	-0.0188	-0.0188	-0.0246	-0.0166	-0.0166	-0.0227
EP-terrestrial	Mole of N eq.	-0.268	-0.204	-0.204	-0.268	-0.181	-0.181	-0.247
POCP	kg NMVOC eq.	-0.0831	-0.0630	-0.0630	-0.0831	-0.0556	-0.0556	-0.0764
ADP-minerals &metals	kg Sb-eq.	-9.78E-07	-8.36E-07	-8.36E-07	-9.78E-07	-7.88E-07	-7.88E-07	-9.67E-07
ADP-fossil	MJ	-1,780	-1,300	-1,300	-1,780	-1,130	-1,130	-1,600
WDP	m^3 world equiv.	-323	-267	-267	-323	-248	-248	-314

Additional Environmental Impacts

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
GWP-GHG	kg CO_2-eq.	-20.5	-15.8	-15.8	-20.5	-14.1	-14.1	-19.0
PM	Disease incidences	-1.16E-06	-8.96E-07	-8.96E-07	-1.16E-06	-7.99E-07	-7.99E-07	-1.08E-06
IRP	kBq U235 eq.	-0.00421	-0.00328	-0.00328	-0.00421	-0.00294	-0.00294	-0.00393
ETP-fw	CTUe	-516	-377	-377	-516	-325	-325	-464
HTPc	CTUh	-2.26E-09	-1.74E-09	-1.74E-09	-2.26E-09	-1.56E-09	-1.56E-09	-2.10E-09
HTPnc	CTUh	-1.70E-07	-1.27E-07	-1.27E-07	-1.70E-07	-1.12E-07	-1.12E-07	-1.55E-07
SQP	Pt	-160	-137	-137	-160	-129	-129	-160

Resource use

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
PERE	MJ	-6.36	-5.24	-5.24	-6.36	-4.85	-4.85	-6.15
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	-6.36	-5.24	-5.24	-6.36	-4.85	-4.85	-6.15
PENRE	MJ	-1,780	-1,300	-1,300	-1,780	-1,130	-1,130	-1,600
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	-1,780	-1,300	-1,300	-1,780	-1,130	-1,130	-1,600
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	-0.00750	-0.00621	-0.00621	-0.00750	-0.00576	-0.00576	-0.00730

Waste categories and output flows

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
HWD	kg	-6.21E-04	-4.55E-04	-4.55E-04	-6.21E-04	-3.94E-04	-3.94E-04	-5.61E-04
NHWD	kg	-1.14	-0.900	-0.900	-1.14	-0.814	-0.814	-1.09
RWD	kg	-1.38E-06	-1.05E-06	-1.05E-06	-1.38E-06	-9.35E-07	-9.35E-07	-1.29E-06
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC14 A15E	AC14 A15E R15	AC14 R15	AC14	AC20 A15E	AC20 R15	OG14 A15E
GWP	kg CO_2-eq.	-20.1	-15.5	-15.5	-20.1	-13.8	-13.8	-18.7
ODP	kg CFC11-eq.	-1.42E-05	-1.03E-05	-1.03E-05	-1.42E-05	-8.90E-06	-8.90E-06	-1.27E-05
AP	kg SO_2-eq.	-0.162	-0.119	-0.119	-0.162	-0.104	-0.104	-0.147
EP	kg PO_4^{3}-- eq.	-0.00850	-0.00649	-0.00649	-0.00850	-0.00576	-0.00576	-0.00786
POCP	kg C_2H_4-eq.	-0.0109	-0.00795	-0.00795	-0.0109	-0.00687	-0.00687	-0.00979
ADPE	kg Sb-eq.	-9.78E-07	-8.36E-07	-8.36E-07	-9.78E-07	-7.88E-07	-7.88E-07	-9.67E-07
ADPF	MJ	-1,890	-1,380	-1,380	-1,890	-1,190	-1,190	-1,700

Archerfield Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
GWP-total	kg CO_2-eq.	90.2	77.2	86.3	74.4	87.8	134
GWP-fossil	kg CO_2-eq.	90.1	77.1	86.2	74.4	87.7	134
GWP-biogenic	kg CO_2-eq.	0.102	0.0508	0.0964	0.0498	0.105	-0.0445
GWP-luluc	kg CO_2-eq.	1.54E-04	9.75E-05	1.42E-04	9.00E-05	1.70E-04	3.31E-04
ODP	kg CFC11-eq.	3.02E-05	3.23E-05	2.79E-05	2.98E-05	3.27E-05	4.18E-05
AP	Mole of H+ eq.	0.726	0.675	0.684	0.638	0.764	0.969
EP-freshwater	kg P eq.	1.97E-04	8.52E-05	1.85E-04	8.28E-05	2.12E-04	2.66E-04
EP-marine	kg N eq.	0.131	0.121	0.125	0.117	0.135	0.167
EP-terrestrial	Mole of N eq.	1.43	1.33	1.37	1.28	1.48	1.84
POCP	kg NMVOC eq.	0.417	0.390	0.400	0.376	0.428	0.532
ADP-minerals &metals	kg Sb-eq.	1.47E-06	1.18E-06	1.45E-06	1.18E-06	1.40E-06	1.94E-06
ADP-fossil	MJ	2,960	2,800	2,730	2,580	3,230	4,030
WDP	m^3 world equiv.	1,460	1,310	1,440	1,300	582	4,740

Additional Environmental Impacts

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
GWP-GHG	kg CO_2-eq.	88.6	75.9	84.7	73.2	86.2	132
PM	Disease incidences	9.81E-06	9.12E-06	9.64E-06	9.02E-06	9.94E-06	1.10E-05
IRP	kBq U235 eq.	0.260	0.00616	0.237	0.00586	0.288	0.358
ETP-fw	CTUe	796	843	738	781	836	1,170
HTPc	CTUh	7.07E-09	5.90E-09	6.71E-09	5.65E-09	7.42E-09	9.02E-09
HTPnc	CTUh	4.23E-07	4.10E-07	4.01E-07	3.89E-07	4.08E-07	6.73E-07
SQP	Pt	181	181	182	182	169	253

Biogenic carbon content

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
BCC-prod	kg	0	0	0	0	0	0
BCC-pack	kg	0	0	0	0	0	0

Resource use

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
PERE	MJ	12.0	12.5	11.9	12.3	9.62	27.0
PERM	MJ	1.88	0	1.72	0	2.09	2.59
PERT	MJ	13.9	12.5	13.6	12.3	11.7	29.6
PENRE	MJ	2,190	1,950	2,030	1,810	2,370	2,970
PENRM	MJ	773	847	705	772	859	1,070
PENRT	MJ	2,960	2,800	2,730	2,580	3,230	4,030
SM	kg	157	157	157	157	209	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	0.0339	0.0304	0.0335	0.0303	0.0135	0.110

Waste categories and output flows

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
HWD	kg	0.00117	0.00119	0.00109	0.00112	0.00126	0.00149
NHWD	kg	4.33	4.14	4.23	4.05	4.42	5.09
RWD	kg	4.00E-05	4.10E-06	3.67E-05	3.94E-06	4.43E-05	5.42E-05
CRU	kg	0	0	0	0	0	0
MFR	kg	46.0	46.0	46.0	46.0	46.0	46.0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
GWP	kg CO_2-eq.	87.7	75.3	83.9	72.6	85.2	131
ODP	kg CFC11-eq.	2.09E-05	2.24E-05	1.93E-05	2.07E-05	2.26E-05	2.89E-05
AP	kg SO_2-eq.	0.566	0.529	0.536	0.502	0.598	0.722
EP	kg PO_4^{3-}-- eq.	0.0448	0.0413	0.0430	0.0398	0.0462	0.0575
POCP	kg C_2H_4-eq.	0.0412	0.0397	0.0395	0.0382	0.0420	0.0533
ADPE	kg Sb-eq.	1.47E-06	1.18E-06	1.45E-06	1.18E-06	1.40E-06	1.94E-06
ADPF	MJ	3,140	2,970	2,900	2,740	3,420	4,280

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
GWP-total	kg CO_2-eq.	-18.6	-18.6	-17.4	-17.4	-18.7	-28.3
GWP-fossil	kg CO_2-eq.	-18.6	-18.6	-17.4	-17.4	-18.7	-28.3
GWP-biogenic	kg CO_2-eq.	-0.0260	-0.0260	-0.0251	-0.0251	-0.0255	-0.0355
GWP-luluc	kg CO_2-eq.	-5.77E-05	-5.77E-05	-5.28E-05	-5.28E-05	-5.95E-05	-9.49E-05
ODP	kg CFC11-eq.	-1.90E-05	-1.90E-05	-1.74E-05	-1.74E-05	-1.96E-05	-3.13E-05
AP	Mole of H+ eq.	-0.235	-0.235	-0.217	-0.217	-0.240	-0.373
EP-freshwater	kg P eq.	-2.71E-05	-2.71E-05	-2.60E-05	-2.60E-05	-2.67E-05	-3.80E-05
EP-marine	kg N eq.	-0.0219	-0.0219	-0.0205	-0.0205	-0.0222	-0.0339
EP-terrestrial	Mole of N eq.	-0.239	-0.239	-0.223	-0.223	-0.242	-0.370
POCP	kg NMVOC eq.	-0.0747	-0.0747	-0.0694	-0.0694	-0.0759	-0.117
ADP-minerals &metals	kg Sb-eq.	-7.73E-07	-7.73E-07	-7.65E-07	-7.65E-07	-7.38E-07	-9.53E-07
ADP-fossil	MJ	-1,650	-1,650	-1,510	-1,510	-1,700	-2,710
WDP	m^3 world equiv.	-268	-268	-261	-261	-259	-353

Additional Environmental Impacts

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
GWP-GHG	kg CO_2-eq.	-18.2	-18.2	-17.0	-17.0	-18.3	-27.7
PM	Disease incidences	-1.03E-06	-1.03E-06	-9.62E-07	-9.62E-07	-1.04E-06	-1.56E-06
IRP	kBq U235 eq.	-0.00368	-0.00368	-0.00346	-0.00346	-0.00369	-0.00552
ETP-fw	CTUe	-479	-479	-438	-438	-493	-786
HTPc	CTUh	-1.99E-09	-1.99E-09	-1.86E-09	-1.86E-09	-2.00E-09	-3.02E-09
HTPnc	CTUh	-1.54E-07	-1.54E-07	-1.43E-07	-1.43E-07	-1.57E-07	-2.45E-07
SQP	Pt	-132	-132	-132	-132	-124	-157

Resource use

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
PERE	MJ	-5.24	-5.24	-5.08	-5.08	-5.12	-7.07
PERM	MJ	0	0	0	0	0	0
PERT	MJ	-5.24	-5.24	-5.08	-5.08	-5.12	-7.07
PENRE	MJ	-1,650	-1,650	-1,510	-1,510	-1,700	-2,710
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	-1,650	-1,650	-1,510	-1,510	-1,700	-2,710
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	-0.00622	-0.00622	-0.00605	-0.00605	-0.00603	-0.00821

Waste categories and output flows

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
HWD	kg	-5.79E-04	-5.79E-04	-5.32E-04	-5.32E-04	-5.94E-04	-9.41E-04
NHWD	kg	-1.04	-1.04	-0.998	-0.998	-1.01	-1.44
RWD	kg	-1.27E-06	-1.27E-06	-1.20E-06	-1.20E-06	-1.26E-06	-1.88E-06
CRU	kg	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC15 A15E R15	AC14 R15	AC20 A15E R15	AC20 R15	AC10 A15E R20 BCC	SMA14 A15E
GWP	kg CO_2-eq.	-17.8	-17.8	-16.7	-16.7	-18.0	-27.1
ODP	kg CFC11-eq.	-1.32E-05	-1.32E-05	-1.20E-05	-1.20E-05	-1.36E-05	-2.17E-05
AP	kg SO_2-eq.	-0.150	-0.150	-0.137	-0.137	-0.154	-0.243
EP	kg PO_4^{3}-- eq.	-0.00759	-0.00759	-0.00708	-0.00708	-0.00769	-0.0117
POCP	kg C_2H_4-eq.	-0.0101	-0.0101	-0.00922	-0.00922	-0.0104	-0.0165
ADPE	kg Sb-eq.	-7.73E-07	-7.73E-07	-7.65E-07	-7.65E-07	-7.38E-07	-9.53E-07
ADPF	MJ	-1,750	-1,750	-1,600	-1,600	-1,810	-2,880

Swanbank Asphalt Manufacturing Facility

Modules A1 – A3
Production Impacts per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R12	AC14	AC20
GWP-total	kg CO_2-eq.	76.7	80.0	77.9
GWP-fossil	kg CO_2-eq.	76.7	79.9	77.8
GWP-biogenic	kg CO_2-eq.	0.0536	0.0566	0.0560
GWP-luluc	kg CO_2-eq.	1.08E-04	1.05E-04	1.00E-04
ODP	kg CFC11-eq.	3.58E-05	3.49E-05	3.31E-05
AP	Mole of H+ eq.	0.755	0.752	0.724
EP-freshwater	kg P eq.	8.48E-05	8.56E-05	8.42E-05
EP-marine	kg N eq.	0.136	0.137	0.134
EP-terrestrial	Mole of N eq.	1.49	1.50	1.46
POCP	kg NMVOC eq.	0.438	0.441	0.430
ADP-minerals &metals	kg Sb-eq.	1.19E-06	1.31E-06	1.32E-06
ADP-fossil	MJ	3,110	3,020	2,870
WDP	m^3 world equiv.	867	1,320	1,310

Additional Environmental Impacts

Indicator	Unit	AC10 R12	AC14	AC20
GWP-GHG	kg CO_2-eq.	75.5	78.8	76.7
PM	Disease incidences	7.35E-06	7.39E-06	7.31E-06
IRP	kBq U235 eq.	0.00662	0.00671	0.00650
ETP-fw	CTUe	920	909	864
HTPc	CTUh	6.80E-09	6.79E-09	6.62E-09
HTPnc	CTUh	4.11E-07	4.24E-07	4.09E-07
SQP	Pt	179	200	200

Biogenic carbon content

Indicator	Unit	AC10 R12	AC14	AC20
BCC-prod	kg	0	0	0
BCC-pack	kg	0	0	0

Resource use

Indicator	Unit	AC10 R12	AC14	AC20
PERE	MJ	12.1	13.5	13.5
PERM	MJ	0	0	0
PERT	MJ	12.1	13.5	13.5
PENRE	MJ	2,140	2,090	1,990
PENRM	MJ	972	936	882
PENRT	MJ	3,110	3,020	2,870
SM	kg	120	0	0
RSF	MJ	0	0	0
NRSF	MJ	0	0	0
FW	m^3	0.0201	0.0306	0.0305

Waste categories and output flows

Indicator	Unit	AC10 R12	AC14	AC20
HWD	kg	0.00138	0.00135	0.00130
NHWD	kg	4.86	4.98	4.89
RWD	kg	4.52E-06	4.51E-06	4.38E-06
CRU	kg	0	0	0
MFR	kg	0	0	0
MER	kg	0	0	0
EEE	MJ	0	0	0
EET	MJ	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R12	AC14	AC20
GWP	kg CO_2-eq.	74.8	78.1	76.1
ODP	kg CFC11-eq.	2.77E-05	2.70E-05	2.58E-05
AP	kg SO_2-eq.	0.580	0.573	0.553
EP	kg PO_4^{3}-- eq.	0.0463	0.0468	0.0455
POCP	kg C_2H_4-eq.	0.0450	0.0451	0.0439
ADPE	kg Sb-eq.	1.19E-06	1.31E-06	1.32E-06
ADPF	MJ	3,300	3,210	3,040

Modules C1 – C4
End of Life Impacts per tonne of asphalt

Core environmental impacts (EN15804+A2)

Indicator	Unit	C1	C2	C3	C4
GWP-total	kg CO_2-eq.	1.22	3.90	0	0
GWP-fossil	kg CO_2-eq.	1.22	3.90	0	0
GWP-biogenic	kg CO_2-eq.	1.25E-04	3.60E-04	0	0
GWP-luluc	kg CO_2-eq.	5.94E-07	1.82E-06	0	0
ODP	kg CFC11-eq.	1.98E-07	6.06E-07	0	0
AP	Mole of H+ eq.	0.00299	0.0342	0	0
EP-freshwater	kg P eq.	1.51E-06	4.53E-07	0	0
EP-marine	kg N eq.	5.41E-04	0.0107	0	0
EP-terrestrial	Mole of N eq.	0.00593	0.117	0	0
POCP	kg NMVOC eq.	0.00158	0.0285	0	0
ADP-minerals&metals	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADP-fossil	MJ	17.0	52.2	0	0
WDP	m^3 world equiv.	1.01	2.86	0	0

Additional Environmental Impacts

Indicator	Unit	C1	C2	C3	C4
GWP-GHG	kg CO_2-eq.	1.22	3.84	0	0
PM	Disease incidences	1.61E-08	1.93E-07	0	0
IRP	kBq U235 eq.	3.04E-05	9.18E-05	0	0
ETP-fw	CTUe	4.96	15.2	0	0
HTPc	CTUh	4.58E-11	6.39E-11	0	0
HTPnc	CTUh	4.49E-09	5.07E-09	0	0
SQP	Pt	0.0821	0.234	0	0

Resource use

Indicator	Unit	C1	C2	C3	C4
PERE	MJ	0.0236	0.0669	0	0
PERM	MJ	0	0	0	0
PERT	MJ	0.0236	0.0669	0	0
PENRE	MJ	17.0	52.2	0	0
PENRM	MJ	0	0	0	0
PENRT	MJ	17.0	52.2	0	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m^3	2.35E-05	6.66E-05	0	0

Waste categories and output flows

Indicator	Unit	C1	C2	C3	C4
HWD	kg	8.45E-06	1.02E-04	0	0
NHWD	kg	0.0158	0.537	0	0
RWD	kg	6.20E-08	4.05E-07	0	0
CRU	kg	0	0	0	0
MFR	kg	0	0	1,000	0
MER	kg	0	0	0	0
EEE	MJ	0	0	0	0
EET	MJ	0	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	C1	C2	C3	C4
GWP	kg CO_2-eq.	1.21	3.84	0	0
ODP	kg CFC11-eq.	1.37E-07	4.20E-07	0	0
AP	kg SO_2-eq.	0.00207	0.0179	0	0
EP	kg PO_4^{3}-- eq.	1.89E-04	0.00357	0	0
POCP	kg C_2H_4-eq.	1.15E-04	0.00121	0	0
ADPE	kg Sb-eq.	1.46E-09	4.44E-09	0	0
ADPF	MJ	18.0	55.2	0	0

Module D
Future reuse, recycling or energy recovery potential impacts and benefits per tonne of asphalt

Core Environmental Impacts (EN15804+A2)

Indicator	Unit	AC10 R12	AC14	AC20
GWP-total	kg CO_2-eq.	-22.2	-24.7	-23.7
GWP-fossil	kg CO_2-eq.	-22.2	-24.7	-23.6
GWP-biogenic	kg CO_2-eq.	-0.0293	-0.0328	-0.0319
GWP-luluc	kg CO_2-eq.	-7.22E-05	-8.00E-05	-7.55E-05
ODP	kg CFC11-eq.	-2.38E-05	-2.64E-05	-2.49E-05
AP	Mole of H+ eq.	-0.288	-0.319	-0.303
EP-freshwater	kg P eq.	-3.09E-05	-3.46E-05	-3.35E-05
EP-marine	kg N eq.	-0.0265	-0.0294	-0.0281
EP-terrestrial	Mole of N eq.	-0.289	-0.321	-0.306
POCP	kg NMVOC eq.	-0.0907	-0.101	-0.0960
ADP-minerals &metals	kg Sb-eq.	-8.25E-07	-9.27E-07	-9.19E-07
ADP-fossil	MJ	-2,060	-2,290	-2,160
WDP	m^3 world equiv.	-296	-332	-326

Additional Environmental Impacts

Indicator	Unit	AC10 R12	AC14	AC20
GWP-GHG	kg CO_2-eq.	-21.7	-24.2	-23.1
PM	Disease incidences	-1.23E-06	-1.37E-06	-1.31E-06
IRP	kBq U235 eq.	-0.00436	-0.00486	-0.00466
ETP-fw	CTUe	-598	-663	-626
HTPc	CTUh	-2.37E-09	-2.64E-09	-2.53E-09
HTPnc	CTUh	-1.89E-07	-2.10E-07	-1.99E-07
SQP	Pt	-138	-157	-156

Resource use

Indicator	Unit	AC10 R12	AC14	AC20
PERE	MJ	-5.87	-6.56	-6.41
PERM	MJ	0	0	0
PERT	MJ	-5.87	-6.56	-6.41
PENRE	MJ	-2,060	-2,290	-2,160
PENRM	MJ	0	0	0
PENRT	MJ	-2,060	-2,290	-2,160
SM	kg	0	0	0
RSF	MJ	0	0	0
NRSF	MJ	0	0	0
FW	m^3	-0.00688	-0.00771	-0.00756

Waste categories and output flows

Indicator	Unit	AC10 R12	AC14	AC20
HWD	kg	-7.19E-04	-7.98E-04	-7.55E-04
NHWD	kg	-1.18	-1.33	-1.29
RWD	kg	-1.49E-06	-1.67E-06	-1.61E-06
CRU	kg	0	0	0
MFR	kg	0	0	0
MER	kg	0	0	0
EEE	MJ	0	0	0
EET	MJ	0	0	0

Environmental impact (EN15804+A1)

Indicator	Unit	AC10 R12	AC14	AC20
GWP	kg CO_2-eq.	-21.3	-23.7	-22.7
ODP	kg CFC11-eq.	-1.65E-05	-1.83E-05	-1.72E-05
AP	kg SO_2-eq.	-0.186	-0.206	-0.195
EP	kg PO_4^{3}-- eq.	-0.00916	-0.0102	-0.00971
POCP	kg C_2H_4-eq.	-0.0126	-0.0139	-0.0132
ADPE	kg Sb-eq.	-8.25E-07	-9.27E-07	-9.19E-07
ADPF	MJ	-2,190	-2,430	-2,290

Acronyms

ANZSIC	Australian and New Zealand Standard Industrial Classification
CO_2	Carbon Dioxide
EN	European Standard
EPD	Environmental Product Declaration
GPI	General Program Instructions
ISO	International Organisation of Standardisation
KG	Kilogram
LCA	Life Cycle Assessment
MND	Module not declared
PCR	Product Category Rules
RAP	Recycled Asphalt Pavement

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Program information

EPD OWNER	Downer EDI Works Pty Ltd roads@downergroup.com www.downergroup.com
EPD PRODUCED BY	thinkstep-anz info@thinkstep-anz.com www.thinkstep-anz.com
PROGRAMME OPERATOR	EPD Australasia Limited 315a Hardy Street, Nelson 7010, New Zealand www.epd-australasia.com info@epd-australasia.com
PRODUCT CATEGORY RULES (PCR)	CEN standard EN 15804+A2 served as the core PCR PCR 2019:14 (v1.11) (2021) EPD Australasia. Technical Guidance (EN 15804+A2) for Asphalt Mixtures (v2022-04-27). (2022)
INDEPENDENT VERIFIFCATION	Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☑ EPD verification
THIRD-PARTY VERIFIER	Rob Rouwette start2see Pty Ltd rob.rouwette@start2see.com.au
VERIFIER APPROVED BY	EPD Australasia
PROCEDURE FOR FOLLOW-UP	Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes No ☑
VERSION HISTORY	V1.0 initial release
GENERAL INFORMATION	An Environmental Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a PCR (Product Category Rules). The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. The results for EN15804+A1 compliant EPDs are not comparable with EN15804+A2 compliant studies as the methodologies are different. Results that are A1 compliant are given in an annex to this document to assist comparability across EPDs.

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