



eToolLCD - IS Materials Calculator Alignment Report

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Introduction

The Infrastructure Sustainability Council of Australia (ISCA) operates in Australia and New Zealand with the purpose of enabling sustainability outcomes in infrastructure. ISCA has developed and administers the Infrastructure Sustainability (IS) rating scheme for planning, design, construction and operations of infrastructure assets. Part of the IS Rating Scheme is the IS Materials Calculator which estimates the environmental impacts of infrastructure projects.

eTool is an Australian and UK based business whose focus is improving the environmental performance of the built form. Their software, eToolLCD is a leading life cycle assessment tool for buildings and infrastructure. eTool also provides life cycle design services to the construction sector.

This document has been prepared to compare the eToolLCD software with the IS Materials Calculator. The comparison has been conducted between eToolLCD (Default LCI Group, Australasian ISCA Aligned LCI - V18) and the IS Materials Calculator V2.0.06.

Goals

The goals of this comparison were primarily to ensure that the use of eToolLCD results are a reliable substitute for IS Materials Calculator and identify any required improvements for eToolLCD.

Assumptions and Limitations

eToolLCD and the IS Materials Calculator are inherently different in their scope and functionality which made the comparisons somewhat difficult. Core differences in the tools include:

- eTool has a whole asset, whole life scope including all life cycle phases whereas the ISCA Materials Calculator is constrained to Modules A1-4 and B2-B5.



- The ability of eToolLCD users to create detailed components for re-use in many projects generally leads to far greater detail being captured in the inventory.
- eTool has a greater range of processes available for selection
- eToolLCD has the following factors (set by default and editable by users where defaults are not appropriate) that affect the whole life materials quantities and/or consequent calculations:
 - Lost in Transport factor: Requirement of EN15978 that materials lost in transport are accounted for, hence the inclusion of this factor.
 - Waste Percentage: The percent of installed mass that is wasted (e.g. offcuts, cutouts, construction losses etc) compared to the installed mass
 - Product Life Span: Which is used to automatically calculate the subsequent replacements over the asset's lifespan
 - Maintenance and Repair Quantity and Frequency: Which is used to automatically calculate the maintenance and repair quantities required over the assets lifespan
 - Transport mass factor: The transported mass of the product including packaging / containment etc in comparison to the mass of the installed quantity
 - Recycled Content (of closed loop materials): Determines the impact of the product

To simplify the reconciliation process comparisons were made at the process level so the effect of the user interfaces in guiding the user inputs were minimised on the comparison.

Comparison Methods

This comparison was conducted on the IS Materials Calculator V2.0.06. Four comparisons were made being:

- Asset Level Life Cycle Inventory Analysis Results
- Materials Level Life Cycle Inventory Analysis
- Materials Availability / Coverage
- Functionality



The detailed methods used for each comparison are explained below.

Asset Level Comparison of LCIA Results

The aim of the asset level comparison is to ensure that the results at a project level are comparable. Three example infrastructure projects were chosen from a range of infrastructure types (road, rail, and the infrastructure and public domain for a large land development). For each project the materials inventory was extracted from eToolLCD and the LCI Factors for GWP and IS Enviropoint applied from both tools. Materials with greater than 1% contribution to total mass, GWP or Enviropoints were included in the comparisons.

The projects were drawn from eTool’s portfolio of Life Cycle Assessment services work. The project names can’t be revealed however a brief description of the project details has been provided.

Table 1: Assets chosen for comparison.

ID	Asset Class	Project Description
1	Road	Large state government freeway project including road, bridges, unrepasses, shared paths, landscaping etc. Brownfields project (replacing existing highway road alignment).
2	Infrastructure and Public Domain	Private land development civils, infrastructure and public domain (IPD) for a greenfields high density waterfront mixed use property development. The LCA inventory collection included roads, retaining walls, drainage, power, communications, water supply, water treatment connection, footpaths, street lighting, public structures, landscaping and plantings.
3	Rail	State government brownfields train station consisting of four platforms, road underpass/rail bridge, shared paths, car parks, street and platform lighting, station buildings and rail track etc.



The results were further analysed to understand which materials influenced (or had the potential to influence) the asset level results such that the LCI data for could be reviewed.

Materials Level Comparison of LCIA Results

To understand outliers a material level comparison was conducted for all materials in the IS Materials Calculator. Where significant differences were identified these were referred to our data supplier for investigation and either improvement or explanation.

Materials Selection Availability Comparison

To ensure that the available materials in eTool would enable comparable and robust LCAs in comparison to the IS Materials Calculator the availability of materials was compared. Materials in the tools were classified as follows:

- Available in both
- IS Materials Calculator Only
- eToolLCD Only

For composite materials within the IS Materials Calculator eToolLCD was tested to ensure a comparable composite material could be modelled using the template library.

Functionality Comparison

To ensure the eToolLCD met or exceeded the functionality of the IS Materials Calculator the functionality was compared. Core functionality was listed and classified as follows:

- Available in both
- IS Materials Calculator Only
- eToolLCD Only



Asset Level Comparison Results and Discussion

Results

The results of the asset level comparison are summarised in the below table:

Table 2: Asset Level Results Summary.

	Indicator	eToolLCD	ISCA	Variation	Comments
Project 1: Road	GWP (t CO2-e)	37,261	36,809	1.23%	Good alignment in both GWP and Enviropoints. eToolLCD slightly over-calling both, in this case due to marginally higher potential impacts in concrete and asphalt.
	EnvirPoint V2.0.06	428,227	423,938	1.01%	
Project 2: IPD	GWP (t CO2-e)	5,751	5,668	1.46%	Good alignment in both GWP and Enviropoints. eToolLCD slightly over-calling both, in this case due to marginally higher concrete impacts and a 6% variance in copper conductor impacts in the Enviropoints.
	EnvirPoint V2.0.06	79,580	76,289	4.31%	
Project 3: Rail	GWP (t CO2-e)	19,564	19,511	0.27%	Good alignment in both GWP and Enviropoints.
	EnvirPoint V2.0.06	195,925	195,208	0.37%	

Discussion

Asset level alignment of results is very good. The only marginally significant misalignment related to a higher Enviropoint result for copper conductors in the Infrastructure and Public Domain project however this was still well within acceptable tolerance and hence was not investigated further.



The previous alignment exercise conducted in October 2021 identified different assumed concrete mixes in AusLCI vs ISCA (derived from GBCA default mixes). This was queried after the first alignment report was presented eToolLCD has been updated to align the ISCA Data Set's concrete mixes with the ISCA / GBCA defaults mixes.

For a detailed analysis of Asset level comparison please see appendices.



Materials Level Comparison of LCIA

Results

Previous reconciliations from 2020 found significant differences in individual materials despite both tools primarily utilising AusLCI background data. The 2021 and 2022 alignment reports both demonstrate efforts by both eTool and ISC to improvements the data and/or align methodologies has been fruitful. At the time of writing only two processes remain outside of the +/-10% threshold, both requiring an update to the ISC Materials Calculator, see discussion for details.

The below histogram summarises the differences in the processes as of 11.02.2022..

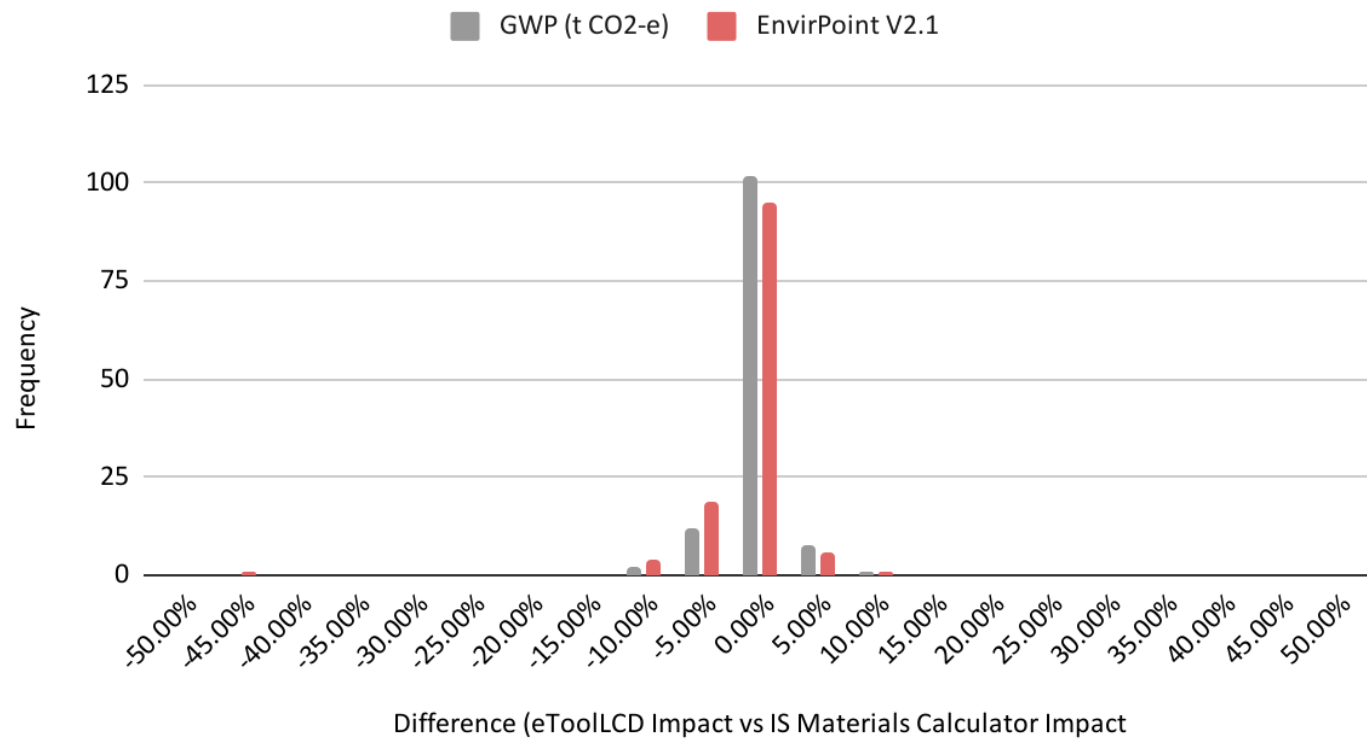
	GWP (t CO2-e)	EnvirPoint V2.1
Average Difference Accross Materials Compared	-0.5%	-0.6%
Materials Within +/-5%	93.3%	89.2%
Materials Within +/-10%	99.0%	99.5%
Materials Outside of +/-10% *	1.0%	0.5%

* See discussion section for explanation of materials outside of the +/-10% threshold, ISC have confirmed the required update is to the ISC Materials Calculator not eToolLCD.



Figure 2: Materials Level Comparison

Per Material Comparison



Discussion

An update to the eToolLCD background data was commissioned after alignment exercises conducted in 2020. Tim Grant of Life Cycle Strategies was commissioned by eTool to update the LCI data. During the LCI data update Tim spoke with Rob to clarify a number of unexplained results identified in the IS Materials Calculator. Alignment has improved significantly due to this work due to updates of both eToolLCD and the ISC Materials Calculator.

The materials / processes falling outside of the +/-10% alignment include the following:

- Rubberised Bitumen Material. Rob confirmed with Tim a required update with the underlying process in the IS Materials calculator and will occur in late October 2021. At this point the LCI processes should align below the required +/-10% threshold however it is out of eTool's control when the update of the IS Materials Calculator occurs.
- Light Commercial Vehicles. Rob confirmed with eTool that the processes selected in the ISCA Materials Calculator is the Ecolnvent process (not AusLCI) and this will be updated in line with Tim's data in late October.

The risk of either of these processes significantly influencing asset level LCA results or scenario comparisons is very low as Rubberised Bitumen and Light Commercial Vehicles are unlikely to ever even reach the cut-off for Mass, Energy or Environmental Significance let alone influence results at the asset level.

For a full list of materials coefficients and comparative results please see Appendixes 1 and 2.



Materials Selection Availability Comparison

Results

There are 118 material LCI Processes in the IS Materials Calculator and 723 materials available for selection in eToolLCD. The alignment of materials availability in the tools (excluding concrete mixes) is shown in the below table:

Table 3: Materials availability results (excluding default concrete mixes)

Availability	
eTool Only	262
Processes Included in both tools	192
IS Materials Calculator Only	0

The above table excludes default concrete mixes. eToolLCD generally presents users with default mixes (as well as allowing users to create custom mixes using the eToolLCD template system). To cover the large array of possible available concrete mixes eTool has over 400 different default mixes which would have distorted the above table if included. The below table just reports on these default mixes.

Table 4: Materials availability results of default concrete mixes

Availability	Round 1 (March 2020)	Round 2 (May 2020)
eTool Only	413	413
Materials Included in both tools	8	8
IS Materials Calculator Only	0	0



Discussion

Any gaps in the eToolLCD process library have been addressed during previous comparisons meaning eToolLCD now has a far wider range of available materials for selection.



Functionality Comparison

Results

The below table outlines the key functionality differences between the two tools.

Table 5: Functionality Comparison

Functionality	eToolLCD	ISCA
Life Cycle Inventory	AusLCI EcoInvent 3	AusLCI EcoInvent 2.2
GWP & ISCA EnviroPoints	Yes	Yes
Life Cycle Modules (As Per EN15978)	A1-3	Yes
	A4	Yes
	A5	Yes
	B1	Yes
	B2	Yes
	B3	Yes
	B4	Yes
	B5	Yes
	B6	Yes
	B7	Yes
	C1-4	Yes
D	Yes	
Construction Waste Factors	Yes	No
Losses in Transport	Yes	No
Repair / Maintenance (quantity & frequency)	Yes	No
Replacement (interval/frequency)	Yes	No
Functions	Unlimited per design	Limit of 10



Functionality	eToolLCD	ISCA
Construction Component Library (Templates)	4000+	No
Custom Components (Templates clone / create)	Yes	No
Disposal Methods	Yes	No
End of Life Transport Distance	Yes	No
Recycled Content	Yes	No
Recovery Rates (End of life)	Yes	No
EPD Library	Publicly Available Library (minimal rework)	Manual entry for every project
Integrated analysis (materials, water, energy)	Yes	No
Design changes analysis	Advanced	Basic
Data entry	BIM integrated & csv imp.	Manual
Life Cycle Costing	Yes	No
EN15804 compliant	Yes	Yes

Discussion

eToolLCD has significant additional functionality that is to be expected due to the differing goals, history and development of the two tools. Constraining the results of eToolLCD to match the outputs of the IS Materials Calculator is relatively simple however there is also a strong argument for presenting unconstrained results (all life cycle stages and the broader scope) to design teams for informing design decisions beyond materials. Similarly the functionality in eToolLCD designed to assist users in inventory collection, quality control and reporting will likely lead to more robust results and design decisions.



Conclusions

As of February 2022 eToolLCD:

- Aligns very well with the IS Material Calculator when comparing Asset Level Results of both GWP and ISCA Enviropoints
- Aligns very well with the IS Materials Calculator when comparing individual materials / processes with the exception of two processes
- The two misaligned processes require updates to the ISC Materials Calculator. Both the misaligned processes are small contributions to infrastructure projects and very unlikely to lead to misalignment in either optioneering decisions or asset level results.
- eToolLCD processes encompass all of the available processes in the IS Materials Calculator. eToolLCD also provides additional processes enabling users to model and optioneer with greater accuracy and explore more low impact design options.
- eToolLCD had a rich feature set encompassing all IS Materials Calculator features and beyond.



Appendix 1 - Material Level Detailed Results

ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Asphalt (RAP), applied as base, aggregate or fill material	Material: Generic Zero Impact Product or Material Unspecified	0.00E+00	0.00E+00	0.0%	0.00E+00	0.00E+00	0.0%	Other	Good
Ballast	Material: Bulk Aggregates Sands and Soils Aggregate Gravel (High quality e.g. blasted crushed and screened)	9.55E+00	9.52E+00	0.3%	8.84E-02	8.83E-02	0.1%	AusLCI	Good
Crushed Blast Furnace Slag	Material: Bulk Aggregates Sands and Soils Aggregate Crushed blast furnace slag (road base)	1.81E+01	1.80E+01	0.7%	1.91E-01	1.91E-01	0.0%	AusLCI	Good
Crushed Limestone	Material: Bulk Aggregates Sands and Soils Aggregate Quarried limestone	2.20E+00	2.20E+00	0.0%	2.92E-02	2.92E-02	-0.1%	AusLCI	Good
Crushed Rock	Material: Bulk Aggregates Sands and Soils Aggregate Gravel (High quality e.g. blasted crushed and screened)	9.55E+00	9.52E+00	0.3%	8.84E-02	8.83E-02	0.1%	AusLCI	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
General Fill	Material: Generic Zero Impact Product or Material Unspecified	0.00E+00	0.00E+00	0.0%	0.00E+00	0.00E+00	0.0%	Other	Good
Gravel	Material: Bulk Aggregates Sands and Soils Aggregate Gravel (Low quality e.g. from borrow pit)	5.05E+00	5.04E+00	0.2%	4.72E-02	4.72E-02	0.0%	AusLCI	Good
Recycled Crushed Concrete/Masonry	Material: Bulk Aggregates Sands and Soils Sand Unspecified	3.85E+00	3.70E+00	4.1%	3.63E-02	3.61E-02	0.4%	AusLCI	Good
Recycled Crushed Glass	Material: Bulk Aggregates Sands and Soils Sand Recycled glass sand	5.14E+00	5.13E+00	0.3%	5.00E-02	5.14E-02	-2.7%	AusLCI	Good
Sand	Material: Bulk Aggregates Sands and Soils Sand Unspecified	3.85E+00	3.84E+00	0.3%	3.63E-02	3.63E-02	-0.1%	AusLCI	Good
Aluminium	Material: Metals (Non-Ferrous) Aluminium Unspecified	1.98E+04	2.00E+04	-0.9%	1.84E+02	1.85E+02	-0.5%	AusLCI	Good
Bitumen	Material: Asphalt and Bitumen Bitumen	3.89E+02	3.84E+02	1.4%	1.23E+01	1.22E+01	0.7%	AusLCI	Good
Downer Reconophalt AC10 C320 R10	Material: Reconophalt Mix AC10 C320 R10 (A1 to B4)	6.39E+01	6.52E+01	-2.0%	1.02E+00	1.05E+00	-2.4%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Downer Reconophalt AC10 C320 R30	Material: Reconophalt Mix AC10 C320 R30 (A1 to B4)	5.46E+01	5.52E+01	-1.0%	8.61E-01	8.70E-01	-1.1%	EPD	Good
Downer Reconophalt AC14 C170 R50	Material: Reconophalt Mix AC14 C170 R50(A1 to B4)	4.54E+01	4.58E+01	-1.0%	6.81E-01	6.88E-01	-1.1%	EPD	Good
Foam bitumen (3% water)	Material: Asphalt and Bitumen Foam bitumen (3% water)	3.78E+02	3.73E+02	1.2%	1.19E+01	1.18E+01	1.0%	AusLCI	Good
Hot mix asphalt, <2.5% virgin bitumen (>60% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 2.00% Primary bitumen (70% RAP)	3.78E+01	3.77E+01	0.3%	5.35E-01	5.40E-01	-1.0%	AusLCI	Good
Hot mix asphalt, 2.5-3.4% virgin bitumen (40-60% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 3.00% Primary bitumen (50% RAP)	4.46E+01	4.43E+01	0.6%	6.85E-01	6.90E-01	-0.7%	AusLCI	Good
Hot mix asphalt, 3.5% virgin bitumen (40% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 3.50% Primary bitumen (40% RAP)	4.91E+01	4.77E+01	2.9%	7.69E-01	7.64E-01	0.7%	AusLCI	Good
Hot mix asphalt, 3.75% virgin bitumen (35% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 3.75% primary bitumen (35% RAP)	5.14E+01	4.93E+01	4.2%	8.11E-01	8.02E-01	1.1%	AusLCI	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Hot mix asphalt, 4.25% virgin bitumen (25% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 4.25% Primary bitumen (25% RAP)	5.47E+01	5.27E+01	3.8%	8.86E-01	8.76E-01	1.2%	AusLCI	Good
Hot mix asphalt, 4.5% virgin bitumen (20% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 4.50% Primary bitumen (20% RAP)	5.58E+01	5.43E+01	2.8%	9.19E-01	9.14E-01	0.6%	AusLCI	Good
Hot mix asphalt, 4.75% virgin bitumen (15% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 4.75% Primary bitumen (15% RAP)	5.69E+01	5.60E+01	1.6%	9.52E-01	9.51E-01	0.1%	AusLCI	Good
Hot mix asphalt, 4% virgin bitumen (30% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 4.00% Primary bitumen (30% RAP)	5.36E+01	5.10E+01	5.2%	8.53E-01	8.39E-01	1.7%	AusLCI	Good
Hot mix asphalt, 5.25% virgin bitumen (5% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 5.25% Primary bitumen (5% RAP)	5.96E+01	5.93E+01	0.6%	1.02E+00	1.03E+00	-0.7%	AusLCI	Good
Hot mix asphalt, 5% virgin bitumen (10% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 5.00% Primary bitumen (10% RAP)	5.80E+01	5.77E+01	0.5%	9.85E-01	9.89E-01	-0.4%	AusLCI	Good
Hot mix asphalt, standard mix, 5.5% virgin bitumen (0% RAP)	Material: Asphalt and Bitumen Asphalt hot mix 5.50% primary bitumen, (0% RAP)	6.13E+01	6.09E+01	0.6%	1.06E+00	1.06E+00	0.0%	AusLCI	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Polymer Modified Bitumen (PMB)	Material: Asphalt and Bitumen Polymer Modified Bitumen (PMB)	5.69E+02	5.59E+02	1.8%	1.41E+01	1.40E+01	0.4%	Other	Good
Rubberised Bitumen	Material: Asphalt and Bitumen Bitumen, rubberised 40% rubber	3.85E+02	9.85E+02	-61.0%	8.74E+00	1.58E+01	-44.7%	AusLCI	ISSUE WITH ISCA DATA?
Warm mix asphalt, <2.5% virgin bitumen (>60% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 2.00% Primary bitumen (70% RAP)	3.32E+01	3.32E+01	0.0%	4.91E-01	4.98E-01	-1.4%	AusLCI	Good
Warm mix asphalt, 2.5-3.4% virgin bitumen (40-60% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 3.00% Primary bitumen (50% RAP)	4.00E+01	3.99E+01	0.1%	6.41E-01	6.48E-01	-1.0%	AusLCI	Good
Warm mix asphalt, 3.5% virgin bitumen (40% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 3.50% Primary bitumen (40% RAP)	4.33E+01	4.31E+01	0.5%	7.16E-01	7.21E-01	-0.6%	AusLCI	Good
Warm mix asphalt, 3.75% virgin bitumen (35% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 3.75% Primary bitumen (35% RAP)	4.50E+01	4.47E+01	0.6%	7.54E-01	7.58E-01	-0.5%	AusLCI	Good
Warm mix asphalt, 4.25% virgin bitumen (25% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 4.25% Primary bitumen (25% RAP)	4.83E+01	4.81E+01	0.5%	8.29E-01	8.33E-01	-0.5%	AusLCI	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Warm mix asphalt, 4.5% virgin bitumen (20% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 4.50% Primary bitumen (20% RAP)	5.00E+01	4.97E+01	0.6%	8.67E-01	8.70E-01	-0.4%	AusLCI	Good
Warm mix asphalt, 4.75% virgin bitumen (15% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 4.75% Primary bitumen (15% RAP)	5.17E+01	5.14E+01	0.6%	9.04E-01	9.07E-01	-0.3%	AusLCI	Good
Warm mix asphalt, 4% virgin bitumen (30% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 4.00% Primary bitumen (30% RAP)	4.66E+01	4.64E+01	0.5%	7.91E-01	7.95E-01	-0.5%	AusLCI	Good
Warm mix asphalt, 5.25% virgin bitumen (5% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 5.25% Primary bitumen (5% RAP)	5.50E+01	5.47E+01	0.6%	9.79E-01	9.82E-01	-0.3%	AusLCI	Good
Warm mix asphalt, 5% virgin bitumen (10% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 5.00% bitumen (10% RAP)	5.34E+01	5.31E+01	0.6%	9.42E-01	9.45E-01	-0.3%	AusLCI	Good
Warm mix asphalt, standard mix, 5.5% virgin bitumen (0% RAP)	Material: Asphalt and Bitumen Asphalt warm mix 5.50% primary bitumen, (0% RAP)>	5.67E+01	5.63E+01	0.6%	1.02E+00	1.02E+00	-0.4%	AusLCI	Good
Aluminium conductor	Material: Metals (Non-Ferous) Aluminium Unspecified	1.98E+04	2.04E+04	-2.9%	1.84E+02	1.89E+02	-2.7%	AusLCI	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Copper conductor	Material: Metals (Non-Ferous) Copper Wire	2.54E+03	2.55E+03	-0.2%	4.49E+02	4.22E+02	6.4%	AusLCI	Good
Fibre Reinforced Plastic (FRP)	Material: Fibre Reinforced Plastics and Resins Fibre reinforced plastic (FRP)	9.30E+03	9.23E+03	0.8%	9.42E+01	9.68E+01	-2.7%	AusLCI	Good
Glass fibre	Material: Insulation Blankets and Batts Glass Fibre Batts Unspecified	3.01E+03	3.01E+03	0.0%	3.07E+01	3.10E+01	-1.0%	AusLCI	Good
HDPE	Material: Glazing Glass and Films HDPE film	3.04E+03	3.03E+03	0.5%	3.82E+01	3.84E+01	-0.4%	AusLCI	Good
Plastic Optic Fibre (PMMA)	Material: Plastics Acrylic Unspecified	7.94E+03	7.79E+03	1.9%	8.77E+01	9.42E+01	-6.9%	AusLCI	Good
PVC	Material: Plastics Polyvinyl Chloride (PVC) Unspecified	2.66E+03	2.66E+03	0.0%	3.20E+01	3.20E+01	-0.2%	AusLCI	Good
Lime (hydraulic)	Material: Cementitious Binders Lime Hydrated Lime	7.98E+02	8.75E+02	-8.8%	6.48E+00	7.06E+00	-8.2%	AusLCI	Good
Portland Cement	Material: Cementitious Binders Portland Cement Unspecified	9.75E+02	9.74E+02	0.1%	8.22E+00	8.26E+00	-0.5%	AusLCI	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
BlueScope Steel Colorbond® AM100, 0.42mm BMT	Material: Bluescope COLORBOND® steel 0.42mm	1.14E+01	1.14E+01	0.0%	1.23E-01	1.23E-01	-0.2%	EPD	Good
BlueScope Steel Colorbond® AM100, 0.48mm BMT	Material: Bluescope COLORBOND® steel 0.48mm	1.27E+01	1.27E+01	0.0%	1.35E-01	1.35E-01	0.2%	EPD	Good
Pacific Coilcoaters ColorCote® AlumiGard™, 0.70mm BMT	Material: Pacific Coilcoaters ColorCote AlumiGard™, 0.70mm BMT	3.32E+01	3.30E+01	0.6%	3.45E-01	3.42E-01	0.9%	EPD	Good
Pacific Coilcoaters ColorCote® AlumiGard™, 0.90mm BMT	Material: Pacific Coilcoaters ColorCote AlumiGard™, 0.90mm BMT	4.28E+01	4.26E+01	0.5%	4.44E-01	4.41E-01	0.7%	EPD	Good
Pacific Coilcoaters ColorCote® MagnaFlow™, 0.42mm BMT	Material: Pacific Coilcoaters ColorCote MagnaFlow™, 0.42mm BMT	1.19E+01	1.19E+01	0.0%	1.68E-01	1.68E-01	-0.3%	EPD	Good
Pacific Coilcoaters ColorCote® MagnaFlow™, 0.48mm BMT	Material: Pacific Coilcoaters ColorCote MagnaFlow™, 0.48mm BMT	1.33E+01	1.33E+01	0.0%	1.88E-01	1.88E-01	-0.2%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Pacific Coilcoaters ColorCote® ZinaCore™, 0.42mm BMT	Material: Pacific Coilcoaters ColorCote ZinaCore™, 0.42mm BMT	1.47E+01	1.47E+01	0.0%	2.02E-01	2.02E-01	0.0%	EPD	Good
Pacific Coilcoaters ColorCote® ZinaCore™, 0.48mm BMT	Material: Pacific Coilcoaters ColorCote ZinaCore™, 0.48mm BMT	1.64E+01	1.64E+01	0.0%	2.02E-01	2.22E-01	-9.0%	EPD	Good
Immersion Zinc coating	Material: Immersion Zinc coating ISCA V2.0.06	7.62E+03	7.62E+03	0.0%	2.68E+02	2.68E+02	0.0%	Custom EPD	Good
Paint - solvent based	Material: Paints and Finishes Solvent Based 1 Coat	2.55E+03	2.55E+03	0.0%	3.83E+01	3.83E+01	-0.1%	AusLCI	Good
Paint - water based	Material: Paints and Finishes Water Based 1 Coat	2.52E+03	2.52E+03	0.0%	3.13E+01	3.13E+01	0.1%	AusLCI	Good
Comms cable, aluminium conductor(s)	Template: Comms cable, aluminium core	1.12E+04	1.16E+04	-3.7%	1.08E+02	1.12E+02	-3.6%	AusLCI	Good
Comms cable, copper conductor(s)	Template: Comms cable, copper conductor	2.54E+03	2.60E+03	-2.3%	3.66E+02	3.45E+02	6.0%	AusLCI	Good
Comms cable, glass optical fibre	Template: Cables - Comms cable, glass optical fibre	2.72E+03	2.91E+03	-6.5%	3.15E+01	3.35E+01	-6.0%	AusLCI	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Comms cable, plastic optical fibre	Template: Cables - Comms cable, plastic optical fibre	4.69E+03	4.82E+03	-2.7%	5.43E+01	5.87E+01	-7.5%	AusLCI	Good
Cement Fibreboard	Material: Plaster and Mineral Derived Products Fibre Cement Compressed 1750kg/m3	1.21E+03	1.21E+03	0.3%	1.12E+01	1.15E+01	-2.8%	AusLCI	Good
Glass fibre reinforced plastic (FRP)	Material: Fibre Reinforced Plastics and Resins Fibre reinforced plastic (FRP)	9.30E+03	9.23E+03	0.8%	9.42E+01	9.68E+01	-2.7%	AusLCI	Good
Additives	Material: Resins and Adhesives Melamine Resin	4.21E+03	4.25E+03	-0.9%	4.67E+01	4.74E+01	-1.6%	AusLCI	Good
Alkali activator	Material: Alkali activator ISCA V2.0.06	1.10E+03	1.10E+03	0.0%	1.15E+01	1.15E+01	0.0%	EPD	Good
Cement	Material: Cementitious Binders Portland Cement Unspecified	9.75E+02	9.74E+02	0.1%	8.22E+00	8.26E+00	-0.5%	AusLCI	Good
Coarse Aggregates	Material: Bulk Aggregates Sands and Soils Aggregate Gravel (High quality e.g. blasted crushed and screened)	9.55E+00	9.52E+00	0.3%	8.84E-02	8.83E-02	0.1%	AusLCI	Good
Concrete production process	Material: Concrete Manufacturing	7.24E+00	7.24E+00	0.0%	7.53E-02	6.93E-02	8.6%	AusLCI - Equipment	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Fibercon Emesh®	Material: Emesh 100% Recycled Macro Poly by Fibercon	2.50E+03	2.50E+03	0.0%	2.22E+01	2.22E+01	0.0%	EPD	Good
Fine Aggregates	Material: Bulk Aggregates Sands and Soils Sand Unspecified	3.85E+00	3.84E+00	0.3%	3.63E-02	3.63E-02	-0.1%	AusLCI	Good
Flyash	Material: Cementitious Binders Cement Alternatives Flyash (Cement Replacement)	1.37E+01	1.37E+01	0.2%	1.41E-01	1.46E-01	-3.5%	AusLCI	Good
GGBF slag	Material: Cementitious Binders Cement Alternatives Ground Granulated Blast Furnace Slag (cement replacement)	1.77E+02	1.77E+02	0.2%	2.06E+00	2.08E+00	-0.9%	AusLCI	Good
Mains water	Material: Water Treated Unspecified	5.01E-01	4.55E-01	10%	4.53E-03	4.22E-03	7.4%	AusLCI	Good
Manufactured sand	Material: Bulk Aggregates Sands and Soils Aggregate Recycled Building Rubble (Compacted)	7.30E+00	7.30E+00	0.0%	7.44E-02	7.44E-02	0.0%	AusLCI	Good
On-site recycled & captured water	Material: Generic Zero Impact Product or Material Unspecified	0.00E+00	0.00E+00	0.0%	0.00E+00	0.00E+00	0.0%	Other	Good
Polymer fibre reinforcement	Material: Primary Macro Poly by Fibercon	4.80E+03	4.80E+03	0.0%	5.33E+01	5.33E+01	0.0%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Recycled Aggregates	Material: Bulk Aggregates Sands and Soils Aggregate Recycled Building Rubble (Compacted)	7.30E+00	7.30E+00	0.0%	7.44E-02	7.44E-02	0.0%	AusLCI	Good
Steel fibres for concrete reinforcement	Material: Hot Rolled Structural by Liberty Primary Steel 2020	3.32E+03	3.20E+03	3.8%	3.46E+01	3.31E+01	4.6%	EPD	Good
Flat Glass	Material: Glazing Glass and Films Flat Glass	9.83E+02	9.82E+02	0.1%	1.05E+01	1.06E+01	-0.6%	AusLCI	Good
Ductile Iron Pipes	Material: Ferrous Metals Iron Unspecified	1.55E+03	1.54E+03	0.6%	1.60E+01	1.60E+01	-0.1%	AusLCI	Good
Fibreglass Pipe & Tube	Material: Fibre Reinforced Plastics and Resins Fibreglass Unspecified	9.23E+03	9.23E+03	0.0%	9.68E+01	9.68E+01	0.0%	AusLCI	Good
Geopolymer pipes	Template: Geopolymer pipes	1.52E+02	1.47E+02	3.3%	1.46E+00	1.52E+00	-3.8%	AusLCI	Good
Humes RCP, Dry-cast pipes, NSW, Class 2	Material: Humes Reinforced Concrete Pipe - Dry-cast pipe, NSW - Class 2	2.97E+02	2.97E+02	0.0%	2.83E+00	2.83E+00	-0.2%	EPD	Good
Humes RCP, Dry-cast pipes, NSW, Class 3	Material: Humes Reinforced Concrete Pipe - Dry-cast pipe, NSW - Class 3	3.34E+02	3.34E+02	0.0%	3.24E+00	3.24E+00	0.1%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Humes RCP, Dry-cast pipes, NSW, Class 4	Material: Humes Reinforced Concrete Pipe - Dry-cast pipe, NSW - Class 4	3.41E+02	3.41E+02	0.0%	3.31E+00	3.31E+00	-0.1%	EPD	Good
Humes RCP, Dry-cast pipes, QLD, Class 2	Material: Humes Reinforced Concrete Pipe - Dry-cast pipe, QLD - Class 2	1.96E+02	1.96E+02	0.0%	1.84E+00	1.84E+00	-0.1%	EPD	Good
Humes RCP, Dry-cast pipes, QLD, Class 3	Material: Humes Reinforced Concrete Pipe - Dry-cast pipe, QLD - Class 3	2.16E+02	2.16E+02	0.0%	2.06E+00	2.06E+00	-0.1%	EPD	Good
Humes RCP, Dry-cast pipes, QLD, Class 4	Material: Humes Reinforced Concrete Pipe - Dry-cast pipe, QLD - Class 4	2.37E+02	2.37E+02	0.0%	2.29E+00	2.29E+00	0.2%	EPD	Good
Humes RCP, Spun pipes, NSW/VIC/SA/WA/TAS, Class 2	Material: Humes Reinforced Concrete Pipe - Spun pipe NSW/VIC/SA/WA/TAS - Class 2	2.71E+02	2.71E+02	0.0%	2.51E+00	2.51E+00	0.1%	EPD	Good
Humes RCP, Spun pipes, NSW/VIC/SA/WA/TAS, Class 3	Material: Humes Reinforced Concrete Pipe - Spun pipe NSW/VIC/SA/WA/TAS - Class 3	2.85E+02	2.85E+02	0.0%	2.67E+00	2.67E+00	0.1%	EPD	Good
Humes RCP, Spun pipes, NSW/VIC/SA/WA/TAS, Class 4	Material: Humes Reinforced Concrete Pipe - Spun pipe NSW/VIC/SA/WA/TAS - Class 4	2.92E+02	2.92E+02	0.0%	2.79E+00	2.79E+00	0.0%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Humes RCP, Spun pipes, QLD/NT, Class 2	Material: Humes Reinforced Concrete Pipe - Spun Pipe QLD/NT - Class 2	2.28E+02	2.28E+02	0.0%	2.12E+00	2.12E+00	-0.1%	EPD	Good
Humes RCP, Spun pipes, QLD/NT, Class 3	Material: Humes Reinforced Concrete Pipe - Spun Pipe QLD/NT - Class 3	2.40E+02	2.40E+02	0.0%	2.28E+00	2.28E+00	-0.1%	EPD	Good
Humes RCP, Spun pipes, QLD/NT, Class 4	Material: Humes Reinforced Concrete Pipe - Spun Pipe QLD/NT - Class 4	2.59E+02	2.59E+02	0.0%	2.47E+00	2.47E+00	0.0%	EPD	Good
Iplex APOLLOBLUE™ PVC-O pressure pipe	Material: Iplex PVC Pressure Pipes 2017	3.59E+03	3.71E+03	-3.3%	3.25E+01	3.37E+01	-3.6%	EPD	Good
Iplex BLACKMAX™ and SEWERMAX™ polypropylene pipe	Material: Iplex Blackmax and Sewermax Polypropylene Pipes 2017	3.16E+03	3.16E+03	-0.2%	3.79E+01	3.79E+01	0.0%	EPD	Good
Iplex Polyethylene pipes	Material: Iplex Polyethylene Pipes 2018	2.95E+03	2.95E+03	-0.1%	3.62E+01	3.62E+01	0.0%	EPD	Good
Iplex Premium PVC-U pressure pipe	Material: Iplex PVC Pressure Pipes 2017	3.59E+03	3.59E+03	-0.1%	3.25E+01	3.25E+01	0.0%	EPD	Good
Iplex PVC non-pressure pipe (solid and foam core)	Material: Iplex PVC Non-pressure Pipes 2017	3.52E+03	3.52E+03	0.1%	3.22E+01	3.22E+01	0.0%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Iplex RHINO® PVC-M pressure pipe	Material: Iplex PVC Pressure Pipes 2017	3.59E+03	3.52E+03	1.9%	3.25E+01	3.25E+01	0.0%	EPD	Good
PE Pipes	Material: Plastics High Density Polyethylene (HDPE) Pipe	3.03E+03	3.03E+03	0.0%	2.86E+01	2.86E+01	0.2%	EPD	Good
PVC Pipes	Material: Plastics Polyvinyl Chloride (PVC) PVC Pipe	3.46E+03	3.46E+03	0.0%	3.18E+01	3.18E+01	0.0%	EPD	Good
Reinforced Concrete Pipes	Material: Humes Reinforced Concrete Pipe - Dry-cast pipe, NSW - Class 2	2.97E+02	3.22E+02	-7.8%	2.83E+00	2.92E+00	-3.2%	EPD	Good
ETFE film	Material: Glazing Glass and Films ETFE film	3.19E+05	3.41E+05	-6.3%	4.90E+03	5.05E+03	-2.9%	AusLCI	Good
HDPE film	Material: Glazing Glass and Films HDPE film	3.04E+03	3.03E+03	0.5%	3.82E+01	3.84E+01	-0.4%	AusLCI	Good
LDPE film	Material: Glazing Glass and Films LDPE film	4.37E+03	4.35E+03	0.5%	4.94E+01	4.94E+01	-0.1%	AusLCI	Good
PC sheet (e.g. danpalon)	Material: Plastics Polycarbonate Unspecified	8.00E+03	8.44E+03	-5.3%	7.77E+01	8.56E+01	-9.2%	AusLCI	Good
PTFE (teflon) film	Material: Glazing Glass and Films ETFE film (Teflon)	3.19E+05	3.41E+05	-6.3%	4.90E+03	5.05E+03	-2.9%	AusLCI	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
uPVC sheet	Material: Glazing Glass and Films uPVC sheet	2.53E+03	2.51E+03	0.7%	2.78E+01	3.06E+01	-9.2%	AusLCI	Good
Power cables, aluminium conductor(s)	Template: Power cables, aluminium conductor	1.01E+04	1.00E+04	1.2%	1.36E+02	1.44E+02	-5.7%	AusLCI	Good
Power cables, copper conductor(s)	Template: Power cables, copper conductor	2.54E+03	2.74E+03	-7.4%	2.82E+02	2.69E+02	4.9%	AusLCI	Good
Signalling cable, aluminium conductor(s)	Template: Signalling cable, aluminium conductor(s)	1.12E+04	1.16E+04	-3.7%	1.08E+02	1.12E+02	-3.6%	AusLCI	Good
Signalling cable, copper conductor(s)	Template: Signalling cable, copper conductor(s)	2.54E+03	2.60E+03	-2.3%	3.66E+02	3.45E+02	6.0%	AusLCI	Good
Signalling cable, glass optical fibre	Template: Signalling cable, glass optical fibre	2.72E+03	2.91E+03	-6.5%	3.15E+01	3.35E+01	-6.0%	AusLCI	Good
Signalling cable, plastic optical fibre	Template: Signalling cable, plastic optical fibre	4.69E+03	4.82E+03	-2.7%	5.43E+01	5.87E+01	-7.5%	AusLCI	Good
ARC, Reinforcing Bar	Material: Steel Reinforcing Bar by Australian Reinforcing Company	1.67E+03	1.67E+03	0.0%	1.69E+01	1.69E+01	-0.1%	EPD	Good
ARC, Reinforcing Mesh	Material: Reinforcing Mesh by Infrabuild Construction Solutions 2020	2.06E+03	2.06E+03	0.0%	2.10E+01	2.10E+01	0.1%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
BlueScope Hot Rolled Coil – Alloyed Steel	Material: BlueScope Hot Rolled Coil Alloyed Steel 2020	2.49E+03	2.49E+03	0.0%	2.55E+01	2.55E+01	0.1%	EPD	Good
BlueScope Hot Rolled Coil – Low Carbon Steel	Material: BlueScope Hot Rolled Coil Low Carbon Steel 2020	2.33E+03	2.33E+03	0.0%	2.24E+01	2.24E+01	-0.1%	EPD	Good
BlueScope Hot Rolled Coil – Medium Carbon Steel	Material: BlueScope Hot Rolled Coil Low Carbon Steel 2020	2.33E+03	2.38E+03	-2.1%	2.24E+01	2.29E+01	-2.3%	EPD	Good
BlueScope Steel Colorbond® AM100, 0.42mm BMT	Material: Bluescope COLORBOND® steel 0.42mm	1.14E+01	1.14E+01	0.0%	1.23E-01	1.23E-01	-0.2%	EPD	Good
BlueScope Steel Colorbond® AM100, 0.48mm BMT	Material: Bluescope COLORBOND® steel 0.48mm	1.27E+01	1.27E+01	0.0%	1.35E-01	1.35E-01	0.2%	EPD	Good
BlueScope Welded Beams and Columns	Material: BlueScope Steel Welded Beams and Columns 2020	2.75E+03	2.75E+03	0.0%	2.82E+01	2.82E+01	-0.2%	EPD	Good
BlueScope XLERPLATE® steel plate – Alloyed Steel	Material: BlueScope Xlerplate Alloyed Steel 2020	2.65E+03	2.65E+03	0.0%	2.72E+01	2.72E+01	-0.2%	EPD	Good
BlueScope XLERPLATE® steel plate – Low Carbon Steel	Material: BlueScope Xlerplate Low Carbon Steel 2020	2.49E+03	2.49E+03	0.0%	2.39E+01	2.40E+01	-0.3%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
BlueScope XLERPLATE® steel plate – Medium Carbon Steel	Material: BlueScope Xlerplate Medium Carbon Steel 2020	2.54E+03	2.54E+03	0.0%	2.45E+01	2.45E+01	0.0%	EPD	Good
InfraBuild Construction Solutions, Reinforcing Bar	Material: Reinforcing Bar by Infrabuild Construction Solutions 2020	1.67E+03	1.67E+03	0.0%	1.69E+01	1.69E+01	-0.1%	EPD	Good
InfraBuild Construction Solutions, Reinforcing Mesh	Material: Reinforcing Mesh by Infrabuild Construction Solutions 2020	2.06E+03	2.06E+03	0.0%	2.10E+01	2.10E+01	0.1%	EPD	Good
InfraBuild Steel Centre, Hot rolled structural sections	Material: Hot Rolled Structural Steel Products by InfraBuild Steel Centre	3.72E+03	3.72E+03	0.0%	3.86E+01	3.86E+01	0.1%	EPD	Good
InfraBuild Steel Centre, Merchant bar product	Material: Reinforcing Bar by Infrabuild Construction Solutions 2020	1.52E+03	1.52E+03	0.0%	1.52E+01	1.52E+01	-0.3%	EPD	Good
InfraBuild Steel, Low relaxation wire	Material: Reinforcing rod and wire direct from mill by Infrabuild	1.98E+03	1.98E+03	0.0%	2.03E+01	2.03E+01	-0.1%	EPD	Good
InfraBuild Steel, Merchant bar product	Material: Hot Rolled Structural and Merchant Bar by InfraBuild Steel	1.24E+03	1.24E+03	0.0%	1.25E+01	1.25E+01	-0.4%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
InfraBuild Steel, Reinforcing Bar	Material: Reinforcing bar direct from mill by Infrabuild	1.58E+03	1.58E+03	0.0%	1.59E+01	1.59E+01	0.3%	EPD	Good
InfraBuild Steel, Reinforcing Rod and Wire	Material: Reinforcing rod and wire direct from mill by Infrabuild	1.98E+03	1.98E+03	0.0%	2.03E+01	2.03E+01	-0.1%	EPD	Good
Liberty Primary Steel, Hot rolled structural sections	Material: Hot Rolled Structural by Liberty Primary Steel 2020	3.32E+03	3.32E+03	0.0%	3.46E+01	3.46E+01	0.1%	EPD	Good
Liberty Primary Steel, Rail product	Material: Hot Rolled Rail by Liberty Primary Steel 2020	3.32E+03	3.32E+03	0.0%	3.46E+01	3.46E+01	0.1%	EPD	Good
Low relaxation strand and wire - imported	Material: Hot Rolled Rail by Liberty Primary Steel 2020	3.32E+03	3.36E+03	-1.2%	3.46E+01	3.47E+01	-0.2%	EPD	Good
Reinforcement steel bars - imported	Material: Reinforcing Bar by Infrabuild Construction Solutions 2020	1.67E+03	1.75E+03	-4.6%	1.69E+01	1.77E+01	-4.6%	EPD	Good
Reinforcement steel mesh - imported	Material: Reinforcing Mesh by Infrabuild Construction Solutions 2020	2.06E+03	2.16E+03	-4.6%	2.10E+01	2.21E+01	-4.9%	EPD	Good
Reused Structural Steel	Material: Generic Zero Impact Product or Material Unspecified	0.00E+00	0.00E+00	0.0%	0.00E+00	0.00E+00	0.0%	Other	Good
Steel Galvanised Coil - Steel BMT (per mm) only	Material: Steel Galvanised Coil - Steel BMT (per mm) only ISCA V2.0.06	1.87E+01	1.87E+01	0.0%	1.80E-01	1.80E-01	0.0%	Custom EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Steel Galvanised Coil - Zinc coating (per g/m2 zinc) only	Material: Steel Galvanised Coil - Zinc coating (per g/m2 zinc) only ISCA V2.0.06	8.51E-03	8.51E-03	0.0%	3.42E-04	3.42E-04	0.0%	Custom EPD	Good
Steel pipe and tube - Australian	Material: Ferrous Metals Steel Pipe Unspecified	2.80E+03	2.80E+03	0.0%	2.71E+01	2.71E+01	0.0%	Other	Good
Steel pipe and tube - imported	Material: Ferrous Metals Steel Pipe Unspecified	2.80E+03	2.93E+03	-4.4%	2.71E+01	2.84E+01	-4.6%	EPD	Good
Steel rails - imported	Material: Hot Rolled Rail by Liberty Primary Steel 2020	3.32E+03	3.49E+03	-4.9%	3.46E+01	3.64E+01	-4.9%	EPD	Good
Steel, hot rolled coil - imported	Material: BlueScope Hot Rolled Coil Alloyed Steel 2020	2.49E+03	2.50E+03	-0.4%	2.55E+01	2.41E+01	6.0%	EPD	Good
Steel, hot rolled metal coated - Australian	Material: Ferrous Metals Steel Hot Rolled Unspecified	2.75E+03	2.75E+03	0.0%	3.78E+01	3.78E+01	0.0%	EPD	Good
Steel, hot rolled metal coated - imported	Material: Ferrous Metals Steel Hot Rolled Unspecified	2.75E+03	2.89E+03	-4.8%	3.78E+01	3.97E+01	-4.8%	EPD	Good
Steel, hot rolled powder coated - Australian	Template: Steel, hot rolled powder coated	3.15E+03	3.06E+03	3.1%	4.17E+01	4.08E+01	2.3%	Other	Good
Steel, hot rolled powder coated - imported	Template: Steel, hot rolled powder coated	3.15E+03	3.21E+03	-1.7%	4.17E+01	4.29E+01	-2.7%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Steel, Hot rolled structural sections, imported	Template: Steel, hot rolled structural sections, imported	2.84E+03	2.99E+03	-5.0%	3.16E+01	3.07E+01	3.0%	EPD	Good
Steel, merchant bar - imported	Material: Hot Rolled Merchant Bar Products by InfraBuild Steel Centre	1.52E+03	1.45E+03	4.8%	1.52E+01	1.45E+01	4.6%	EPD	Good
Steel, plate - imported	Material: BlueScope Xlerplate Alloyed Steel 2020	2.65E+03	2.67E+03	-0.7%	2.72E+01	2.57E+01	5.7%	EPD	Good
Steel, welded beams and columns - imported	Material: BlueScope Steel Welded Beams and Columns 2020	2.75E+03	2.89E+03	-4.8%	2.82E+01	2.96E+01	-4.9%	EPD	Good
CLT (Cross-Laminated Timber)	Material: Timber Sustainably Sourced Cross Laminated Timber Unspecified	4.47E+02	4.47E+02	0.0%	5.74E+00	5.74E+00	0.0%	EPD	Good
MDF (Medium Density Fibreboard)	Material: Timber Sustainably Sourced Medium Density Fibreboard (MDF) Unspecified	7.29E+02	7.29E+02	0.0%	8.85E+00	8.85E+00	0.0%	EPD	Good
Particleboard	Material: Timber Sustainably Sourced Particle Board Unspecified	6.41E+02	6.41E+02	0.0%	6.98E+00	6.98E+00	0.1%	EPD	Good
Plywood	Material: Timber Sustainably Sourced Plywood Unspecified	5.44E+02	5.44E+02	0.0%	7.13E+00	7.13E+00	0.0%	EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Reclaimed timber	Material: Generic Zero Impact Product or Material Unspecified	0.00E+00	0.00E+00	0.0%	0.00E+00	0.00E+00	0.0%	Other	Good
Timber, Structural (hardwood)	Material: Timber Sustainably Sourced Hardwood Unspecified	2.29E+02	2.29E+02	0.0%	7.07E+02	7.07E+02	0.1%	EPD	Good
Timber, Structural (softwood)	Material: Timber Sustainably Sourced Softwood Unspecified	1.56E+02	1.56E+02	0.0%	2.42E+00	2.41E+00	0.2%	EPD	Good
Bare overhead cable, aluminium	Template: Bare overhead cable, aluminium	1.98E+04	2.04E+04	-2.9%	1.84E+02	1.89E+02	-2.7%	AusLCI	Good
Bare overhead cable, copper	Template: Bare overhead cable, copper	2.54E+03	2.55E+03	-0.2%	4.49E+02	4.22E+02	6.4%	AusLCI	Good
Bare overhead cable, galvanised steel	Template: Bare overhead cable, galvanised steel	3.57E+03	3.79E+03	-5.8%	5.94E+01	5.53E+01	7.5%	AusLCI	Good
Bonding cable, tinned copper conductor, CPE sheathed	Template: Bonding cable, tinned copper conductor, CPE sheathed	3.88E+03	4.06E+03	-4.5%	6.28E+02	5.82E+02	7.9%	AusLCI	Good
Articulated Truck	Material: Zero Impact Material - Articulated Truck	7.38E-02	7.20E-02	2.5%	7.55E-04	7.65E-04	-1.3%	AusLCI - Transport	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Concrete Agitator Truck	Material:	1.28E-01	1.28E-01	0.0%	1.48E-03	1.48E-03	0.0%	AusLCI - Transport	Good
Light Commercial Vehicles	Material: Zero Impact Material - Light Commercial	1.20E+00	1.20E+00	0.0%	1.34E-02	1.34E-02	0.0%	AusLCI - Transport	ISSUE WITH ISCA DATA?
None, On-Site	Material: Generic Zero Impact Product or Material Unspecified	0.00E+00	0.00E+00	0.0%	0.00E+00	0.00E+00	0.0%	Other	Good
Rail, Bulk Transport	Material: Zero Impact Material - Rail	2.44E-02	2.43E-02	0.3%	2.71E-04	2.84E-04	-4.4%	AusLCI - Transport	Good
Rigid Truck	Material: Zero Impact Material - Rigid Truck 1000km	2.37E-01	2.16E-01	9.9%	2.53E-03	2.50E-03	1.3%	AusLCI - Transport	Good
Shipping, Domestic Freight	Material:	3.49E-02	3.49E-02	0.0%	4.05E-04	4.05E-04	0.0%	AusLCI - Transport	Good
Shipping, International Freight	Material: Zero Impact Material - Ship	8.90E-03	8.89E-03	0.1%	1.40E-04	1.43E-04	-2.4%	AusLCI - Transport	Good
Alum (aluminium sulfate)	Material: Alum (aluminium sulfate) ISCA V2.0.06	6.54E+02	6.35E+02	2.9%	8.17E+00	7.98E+00	2.4%	Custom EPD	Good
Carbon dioxide	Material: Gases Refrigerants R-744 (CO2)	9.11E+02	8.77E+02	3.9%	8.08E+00	7.86E+00	2.8%	AusLCI	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Caustic soda	Material: Caustic soda ISCA V2.0.06	1.60E+03	1.60E+03	0.0%	1.47E+01	1.46E+01	0.7%	Custom EPD	Good
Citric acid	Material: Citric acid ISCA V2.0.06	3.13E+03	3.13E+03	0.0%	1.74E+02	1.74E+02	0.0%	Custom EPD	Good
Ethanol	Material: Ethanol ISCA V2.0.06	1.60E+03	1.60E+03	0.0%	2.27E+01	2.27E+01	0.0%	Custom EPD	Good
Ferric chloride	Material: Ferric chloride ISCA V2.0.06	5.92E+02	5.92E+02	0.0%	7.20E+00	7.20E+00	0.0%	Custom EPD	Good
Ferric Sulphate	Material: Ferric Sulphate ISCA V2.0.06	2.71E+02	2.71E+02	0.0%	4.08E+00	4.08E+00	0.0%	Custom EPD	Good
Ferrous chloride	Material: Ferrous chloride ISCA V2.0.06	5.92E+02	5.92E+02	0.0%	7.20E+00	7.20E+00	0.0%	Custom EPD	Good
Hydrated Lime	Material: Cementitious Binders Lime Hydrated Lime	7.98E+02	7.70E+02	3.7%	6.48E+00	6.38E+00	1.6%	AusLCI	Good
Hydrochloric acid	Material: Hydrochloric acid ISCA V2.0.06	1.09E+03	1.09E+03	0.0%	1.06E+01	1.05E+01	1.0%	Custom EPD	Good
Liquid sugar	Material: Liquid sugar ISCA V2.0.06	3.92E+02	3.92E+02	0.0%	5.59E+00	5.59E+00	0.0%	Custom EPD	Good
Methanol	Material: Methanol ISCA V2.0.06	6.80E+02	6.80E+02	0.0%	1.06E+01	1.06E+01	0.0%	Custom EPD	Good
Molasses	Material: Molasses ISCA V2.0.06	3.84E+01	3.84E+01	0.0%	6.57E-01	6.57E-01	0.0%	Custom EPD	Good



ISCA Process Name	eToolLCD Process Name	GWP			Enviro Points			eToolLCD Data Source	Action
		eToolLCD	ISCA	Difference	eToolLCD	ISCA	Difference		
Poly aluminium chlorohydrate	Material: Poly aluminium chlorohydrate ISCA V2.0.06	2.44E+03	2.44E+03	0.0%	2.98E+01	2.97E+01	0.3%	Custom EPD	Good
Polyelectrolyte	Material: Polyelectrolyte ISCA V2.0.06	2.78E+03	2.78E+03	0.0%	5.25E+01	5.25E+01	0.0%	Custom EPD	Good
Potassium permanganate	Material: Potassium permanganate ISCA V2.0.06	1.44E+03	1.44E+03	0.0%	1.38E+01	1.38E+01	0.0%	Custom EPD	Good
Sodium bisulphite	Material: Sodium bisulphite ISCA V2.0.06	8.99E+02	8.99E+02	0.0%	1.98E+01	1.98E+01	0.0%	Custom EPD	Good
Sodium hypochlorite	Material: Sodium hypochlorite ISCA V2.0.06	1.09E+03	1.09E+03	0.0%	1.03E+01	1.03E+01	0.0%	Custom EPD	Good



Appendix 2 - Asset Level Detailed Results

Asset 1

Material (eTool Name)	Mass(kg)	ISCA Name	eTool GWP (t CO2e)	ISCA GWP (t CO2-e)	Difference	eTool Enviropoint	ISCA Enviropoint	Difference
Asphalt and Bitumen Asphalt hot mix 5.50% primary bitumen, (0% RAP)	160,803,814	Hot mix asphalt, standard mix, 5.5% virgin bitumen (0% RAP)	9,850	9,793	0.59%	170,385	170,452	-0.04%
Steel Reinforcing Bar by Australian Reinforcing Company	5,421,690	ARC, Reinforcing Bar	9,054	9,054	0.00%	91,538	91,627	-0.10%
Concrete Unreinforced Portland Cement Blends 40 MPa	30,111,656	#N/A	6,098	5,913	3.12%	52,518	50,945	3.09%
Concrete Unreinforced Blast Furnace Slag Blends 40 MPa 30% BFS	21,391,809	#N/A	3,356	3,263	2.86%	29,757	28,921	2.89%
Concrete Unreinforced Portland Cement Blends 25 MPa	20,059,435	#N/A	2,929	2,849	2.81%	25,282	24,597	2.79%
Concrete Unreinforced Portland Cement Blends 20 MPa	11,289,390	#N/A	1,468	1,466	0.12%	12,693	12,680	0.10%
Concrete Unreinforced Portland Cement Blends 50 MPa	5,306,219	#N/A	1,289	1,288	0.12%	11,100	11,087	0.12%
Hot Rolled Structural Steel Products by InfraBuild Steel Centre	583,273	InfraBuild Steel Centre, Hot rolled structural sections	2,170	2,170	0.00%	22,542	22,514	0.12%
Bulk Aggregates Sands and Soils Sand	127,710,644	Recycled Crushed	492	473	4.13%	4,630	4,610	0.43%



Material (eTool Name)	Mass(kg)	ISCA Name	eTool GWP (t CO2e)	ISCA GWP (t CO2-e)	Difference	eTool Enviropoint	ISCA Enviropoint	Difference
Unspecified		Concrete/Masonry						
Timber Sustainably Sourced Plywood Unspecified	419,940	Plywood	228	228	0.00%	2,994	2,994	0.00%
Metals (Non-Ferous) Aluminium Unspecified	5,859	Aluminium	116	117	-0.94%	1,078	1,084	-0.55%
Timber Sustainably Sourced Softwood Unspecified	151,981	Timber, Structural (softwood)	24	24	0.00%	367	366	0.22%
Metals (Non-Ferous) Aluminium Unspecified	3,456	Aluminium	68	69	-0.94%	636	639	-0.55%
Metals (Non-Ferous) Aluminium Unspecified	1,981	Aluminium	39	40	-0.94%	365	367	-0.55%
Water Untreated Unspecified	263,181,879	On-site recycled & captured water	0	0	0.00%	0	0	0.00%
Bluescope COLORBOND® steel 0.42mm	5,760	BlueScope Steel Colorbond® AM100, 0.42mm BMT	0	0	0.00%	1	1	-0.25%
Bulk Aggregates Sands and Soils Aggregate Gravel (Low quality e.g. from borrow pit)	8,301,468	Gravel	42	42	0.19%	392	392	-0.01%
Plastics High Density Polyethylene (HDPE) Pipe	4,710	PE Pipes	14	14	0.00%	135	135	0.16%
Finished Products Electrical Goods Electronics Electronics For Control Unit	334	#N/A	11		0.00%	1,174		0.00%



Material (eTool Name)	Mass(kg)	ISCA Name	eTool GWP (t CO2e)	ISCA GWP (t CO2-e)	Difference	eTool Enviropoint	ISCA Enviropoint	Difference
Iplex Polyethylene Pipes 2018	1,002	Iplex Polyethylene pipes	3	3	-0.14%	36	36	0.00%
Resins and Adhesives Mastic Sealant	4,790	#N/A	4		0.00%	56		0.00%
Metals (Non-Ferous) Copper Wire	1,152	Copper conductor	3	3	-0.20%	517	486	6.44%
Plastics General Unspecified	288	#N/A	1		0.00%	10		0.00%
Glazing Glass and Films Flat Glass	576	Flat Glass	1	1	0.14%	6	6	-0.56%
Ferrous Metals Steel Stainless Unspecified	179	#N/A	1		0.00%	15		0.00%
			37,261	36,809	1.23%	428,227	423,938	1.01%



Asset 2

Material (eTool Name)	Mass(kg)	ISCA Name	eTool GWP (t CO2e)	ISCA GWP (t CO2-e)	Difference	eTool Enviropoint	ISCA Enviropoint	Difference
Bulk Aggregates Sands and Soils Sand Unspecified	457,770,560	Fine Aggregates	1,764	1,758	0.33%	16,597	16,617	-0.12%
Concrete Unreinforced Blast Furnace Slag Blends 40 MPa 35% BFS	10,344,259	#N/A	1,544	1,502	2.80%	13,781	13,399	2.85%
Bulk Aggregates Sands and Soils Aggregate Gravel (High quality e.g. blasted crushed and screened)	66,150,746	Ballast	632	630	0.33%	5,844	5,841	0.06%
Concrete Unreinforced Blast Furnace Slag Blends 40 MPa 25% BFS	3,126,277	#N/A	514	500	2.91%	4,533	4,404	2.93%
Steel Reinforcing Bar by Australian Reinforcing Company	348,769	ARC, Reinforcing Bar	582	582	0.00%	5,888	5,894	-0.10%
Metals (Non-Ferrous) Copper Wire	58,119	Copper conductor	148	148	-0.20%	26,106	24,526	6.44%
Concrete Unreinforced Blast Furnace Slag Blends 20 MPa 35%	1,364,792	#N/A	133	133	0.08%	1,190	1,188	0.09%



Material (eTool Name)	Mass(kg)	ISCA Name	eTool GWP (t CO2e)	ISCA GWP (t CO2-e)	Difference	eTool Enviropoint	ISCA Enviropoint	Difference
BFS								
Metals (Non-Ferous) Aluminium Unspecified	12,983	Aluminium	257	260	-0.94%	2,389	2,402	-0.55%
Asphalt and Bitumen Asphalt hot mix 5.50% primary bitumen, (0% RAP)	1,258,115	Hot mix asphalt, standard mix, 5.5% virgin bitumen (0% RAP)	77	77	0.59%	1,333	1,334	-0.04%
Concrete Unreinforced Portland Cement Blends 20 MPa	608,921	#N/A	79	79	0.12%	685	684	0.10%
Water Untreated Unspecified	98,216,286	On-site recycled & captured water	10	0	0.00%	90	0	0.00%
Finished Products Electrical Goods Electronics Electronics For Control Unit	326	#N/A	10		0.00%	1,145		0.00%
			5,751	5,668	1.46%	79,580	76,289	4.31%



Asset 3

Material (eTool Name)	Mass(kg)	ISCA Name	eTool GWP (t CO2e)	ISCA GWP (t CO2-e)	Difference	eTool Enviropoint	ISCA Enviropoint	Difference
Steel Reinforcing Bar by Australian Reinforcing Company	4,630,828	ARC, Reinforcing Bar	7,733	7,733	0.00%	78,185	78,261	-0.10%
Concrete Unreinforced Portland Cement Blends 50 MPa	15,743,575	#N/A	3,826	3,821	0.12%	32,932	32,894	0.12%
Concrete Unreinforced Portland Cement Blends 40 MPa	15,416,267	#N/A	3,122	3,027	3.12%	26,887	26,082	3.09%
Concrete Unreinforced Portland Cement Blends 30 MPa	5,911,058	#N/A	958	959	-0.14%	8,254	8,261	-0.09%
Ferrous Metals Steel Hot Rolled Unspecified	619,816	Steel, hot rolled metal coated - Australian	1,704	1,704	0.00%	23,419	23,429	-0.04%
Bulk Aggregates Sands and Soils Aggregate Gravel (High quality e.g. blasted crushed and screened)	30,397,117	Ballast	290	289	0.33%	2,686	2,684	0.06%
Concrete Reinforced Prefabricated Concrete Panels Unspecified	1,730,647	#N/A	344	365	-5.68%	3,213	3,283	-2.13%
Metals (Non-Ferous) Aluminium Unspecified	24,117	Aluminium	478	482	-0.94%	4,437	4,462	-0.55%



Material (eTool Name)	Mass(kg)	ISCA Name	eTool GWP (t CO2e)	ISCA GWP (t CO2-e)	Difference	eTool Enviropoint	ISCA Enviropoint	Difference
Asphalt and Bitumen Asphalt hot mix 5.50% primary bitumen, (0% RAP)	1,998,256	Hot mix asphalt, standard mix, 5.5% virgin bitumen (0% RAP)	122	122	0.59%	2,117	2,118	-0.04%
Concrete Unreinforced Portland Cement Blends Unspecified	1,377,379	#N/A	223	223	-0.14%	1,923	1,925	-0.09%
Concrete Reinforced 1.0% Reinforcement Portland Cement Blends 30 MPa	1,021,140	#N/A	194	215	-9.73%	1,773	1,937	-8.47%
Bluescope COLORBOND® steel 0.42mm	64,213	BlueScope Steel Colorbond® AM100, 0.42mm BMT	1	1	0.00%	8	8	-0.25%
Hot Rolled Structural Steel Products by InfraBuild Steel Centre	70,551	InfraBuild Steel Centre, Hot rolled structural sections	262	262	0.00%	2,727	2,723	0.12%
Metals (Non-Ferous) Copper Wire	8,167	Copper conductor	21	21	-0.20%	3,669	3,447	6.44%
Bulk Aggregates Sands and Soils Sand Unspecified	3,004,220	Recycled Crushed Concrete/Masonry	12	11	4.13%	109	108	0.43%
Timber Sustainably Sourced Plywood Unspecified	502,755	Plywood	273	273	0.00%	3,585	3,585	0.00%



Material (eTool Name)	Mass(kg)	ISCA Name	eTool GWP (t CO2e)	ISCA GWP (t CO2-e)	Difference	eTool Enviropoint	ISCA Enviropoint	Difference
Total			19,563.8	19,510.6	0.27%	195,925	195,208	0.37%

