HESPERIA

Project Net Zero Carbon Report

Murdoch Square

Version 1.5

Prepared by: Hesperia Sustainability Group

POTENTIAL IN PLACE

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Purpose of this Document

The Project Net Zero Report has been developed on the basis of As Constructed project documentation. The intent of this document is to summarise the project position in terms of embodied carbon emissions, reduction strategies implemented and their effectiveness, and any carbon offsetting undertaken. The report is also intended to align to the World Green Building Council Net Zero Buildings Commitment reporting requirements.

Contents

1. Executive Summary

This report describes the Net Zero outcome for Murdoch Square Tower A, Tower B and Tower C (the Project) . The report is a disclosure intended to align to the World Green Building Council's Net Zero Carbon Buildings commitment and Hesperia's published Net Zero methodology.

Murdoch Square is a true mixed-use precinct. It consists of five buildings rising from a common podium and basement. A summary of the five buildings and the uses within each is provided below.

Building Name	Key Uses	Owner
Tower A	Hotel, Retail Residential	MHKP Asset Trust
Tower B	Commercial office, Retail	MHKP Asset Trust
Tower C	Medical suites, Childcare, Retail	Various strata owners– developed by MHKP Asset Trust
Tower D	Private hospital, Medi-hotel, Radiology, Pathology	Aegis Aged Care Group
Tower E	Aged care	Aegis Aged Care Group

Hesperia has been engaged as the Development Manger to deliver Murdoch Square on behalf of the MHKP Asset Trust (MHKP) and Aegis Aged Care Group (Aegis), together the landowners of Murdoch Square. This Net Zero Carbon Report covers the five buildings that together make up Murdoch Square, however only MHKP has made a Net Zero commitment and as such the net Zero commitment only applies to Towers A, B and C. For this reason, information in the Report refers to Towers A, B, and C unless otherwise specified.

Figures refer to greenhouse gas (GHG) emissions measured in Carbon Dioxide Equivalent (CO2e).

Capitalised terms are defined in Hesperia's published Net Zero Carbon Methodology.

1.1 Upfront Embodied Carbon in Construction

The Upfront Embodied Carbon estimate includes the carbon dioxide equivalent (CO2e) created from the construction of the Project, including Scope 1 and 2 emissions from the site and the Scope 3 supply chain emissions. This is commonly referred to as 'cradle-to-completion' embodied carbon.

Towers A, B and C (MHKP)	Quantity	Detail
As Constructed Upfront Carbon Footprint (tCO2e)	22,130	Includes modules A1 - A5 of EN15978
Upfront Carbon Intensity (tCO2e/m2)	0.76	760 kgCO2e per sqm GFA (FECA + UCA)
Percentage Carbon Reduction on reference case (%)	24%	Average % reduction on a reference case as specified in the Green Star framework.

Towers A, B and C (MHKP)	Quantity	Detail
Offsets Retired (tCO2e)	22,130	Verified (Climate Active compliant) offsets.
Percentage of Project Offset (%)	100%	Tower A, B and C are implementing Net Zero
Percentage of Nature Based Offsets (%)	95%	Project: Yarra Yarra Biodiverse Revegetation project.
Offsetting co-benefit outcome	138	Hectares of revegetation
	335,296	Trees planted

1.2 Operational Carbon Forecasts

The figures presented below are forecast emissions for the key consumption and waste stream elements of the buildings. At the date of this report, Murdoch Square has insufficient operational data so forecast figures have been used using industry standards.

Supply agreements for 100% renewable energy have been entered into for Tower A, B and C.

GHG Emission Source - Annual operational Emissions (tCO2e/year)	Tower A	Tower B	Tower C
Electricity (can be over negative with exports)	-7	-23	-23
Water	26	7	85
Gas	6	4	7
Refrigerant Leakage	1	1	1
Municipal Waste	12	6	9
Organic Waste	25	13	20
Total Annual Emissions forecast	19	10	27
Reduction targeted through Renewable Energy and other initiatives	92%	97%	90%
To be offset annually	100%	100%	100%
GHG Emissions per square metre GFA	**Tower A**	**Tower B**	**Tower C**
Forecast carbon Intensity (kgCO2e/m2/year)	7.6	2.4	9.5

2. Net Zero Methodology

Hesperia is a signatory to the World Green Building Council (WGBC) Net Zero Carbon Commitment. This commitment has informed Hesperia's Net Zero methodology. See Hesperia's profile page here:

HESPERIA - World Green Building Council (worldgbc.org)

In summary:

- Embodied upfront (cradle to completion) GHG emissions have been measured using Life Cycle Assessment tools, reduced and offset according to Hesperia's established Net Zero methodology.
- Operational GHG emissions are to be measured, reduced and offset through annual certification as a Carbon Neutral Building under the Climate Active standard (or equivalent framework that may be adopted during the building's operating life).

The detailed methodology used for this report is available in a separate document on Hesperia's website.

3. Project Information

Description	Detail
Project Name	Murdoch Square
Address	44 Barry Marshall Parade, Murdoch WA
Site Area (m2)	12,047
Gross Floor Area (m2)	55,623 (see breakdown in table below)
Floors (#)	See below
Primary Usage	See breakdown in table below
Structural Life (Years)	60
Design Life (Years)	60

The table below shows a breakdown for each tower including the share of the podium and car park that is allotted to each.

Lot Reference	Tower Reference	Original Working Title	Ownership	Primary Use	GFA = FECA + UCA[1]	Levels (inc. ground)
101	A	1A	MHKP	Hotel, Retail Residential	10714	13
102	B	1B	MHKP	Commercial office, Retail	7774	6
103	C	3	Multiple	Medical suites, Childcare, Retail	10739	7
104	D	2A	Aegis	Private hospital, Medi-hotel, Radiology, Pathology	14547	8
105	E	2B	Aegis	Aged care	11849	10

[1] Fully Enclosed Covered Area (FECA) and Unenclosed Covered Area (UCA).

4. Emissions Boundaries

All emissions sources required to deliver and operate Towers A, B and C are included. Tenant operational emissions are included to extent that they are within Hesperia's ability influence them.

4.1.1 Upfront Embodied Carbon in Construction

Net Zero construction process that includes the supply chain emissions for Towers A, B and C.

4.1.2 Life Cycle Assessment (LCA) Modules

The Net Zero outcome is based on the measurement and offsetting of 'upfront embodied carbon of construction'. The LCA scope covered modules A1-A5 on this basis. These modules include the 'Product', 'Transport' and 'Construction' aspects of delivering a building.

Module	Included emissions sources
A1	Raw material supply (e.g., mining and extraction).
A2	Transport of raw materials.
A3	Manufacture. Processing of raw materials into useful construction materials and products.
A4	Transport of processed materials to site.
A5	Construction installation. Site works and construction waste stream transport and emissions.

4.1.3 Scopes

Scopes 1, 2, and 3 are included for all aspects of construction. Scope 1 includes onsite diesel and gas consumption. Scope 2 includes site electricity consumption. Scope 3 includes all supply chain emissions based on the inventory of materials and the associated transport, and waste streams.

4.2 Operational Carbon Forecast

Tower A, B and C will be operated as certified Carbon Neutral under the Climate Active framework. Application for the certification will be submitted after minimum 12 months of operation in order to gather sufficient data. Carbon Neutral certification for the Financial Year 2024-2025 (FY25) is targeted pending resolution of commissioning of metering and other required data gathering processes.

Tenant fitouts and operations are excluded from the Carbon Neutral certification target. Climate impact of tenant operations has been minimised by provision of 100% renewable energy.

Natural gas use at Murdoch Square has been reduced as much as practicable given the uses within the precinct and is limited to a small number of commercial kitchens and some hot water services.

The overall operational carbon impact of Murdoch Square Towers A, B and C is reduced by an estimated 90% through the provision of 100% renewably sourced electricity.

4.2.1 Life Cycle Assessment (LCA) Modules

Modules B1 - B7 are disclosed in the attached LCA report. Module B8 relating to commuting associated with the buildings is excluded. Figures in this report have been based on forecast operational consumption figures to provide more detail than is typically available in an LCA study.

The Carbon Neutral process will include these modules and will incorporate the EV charging energy through B7, where it might otherwise have been excluded with B8.

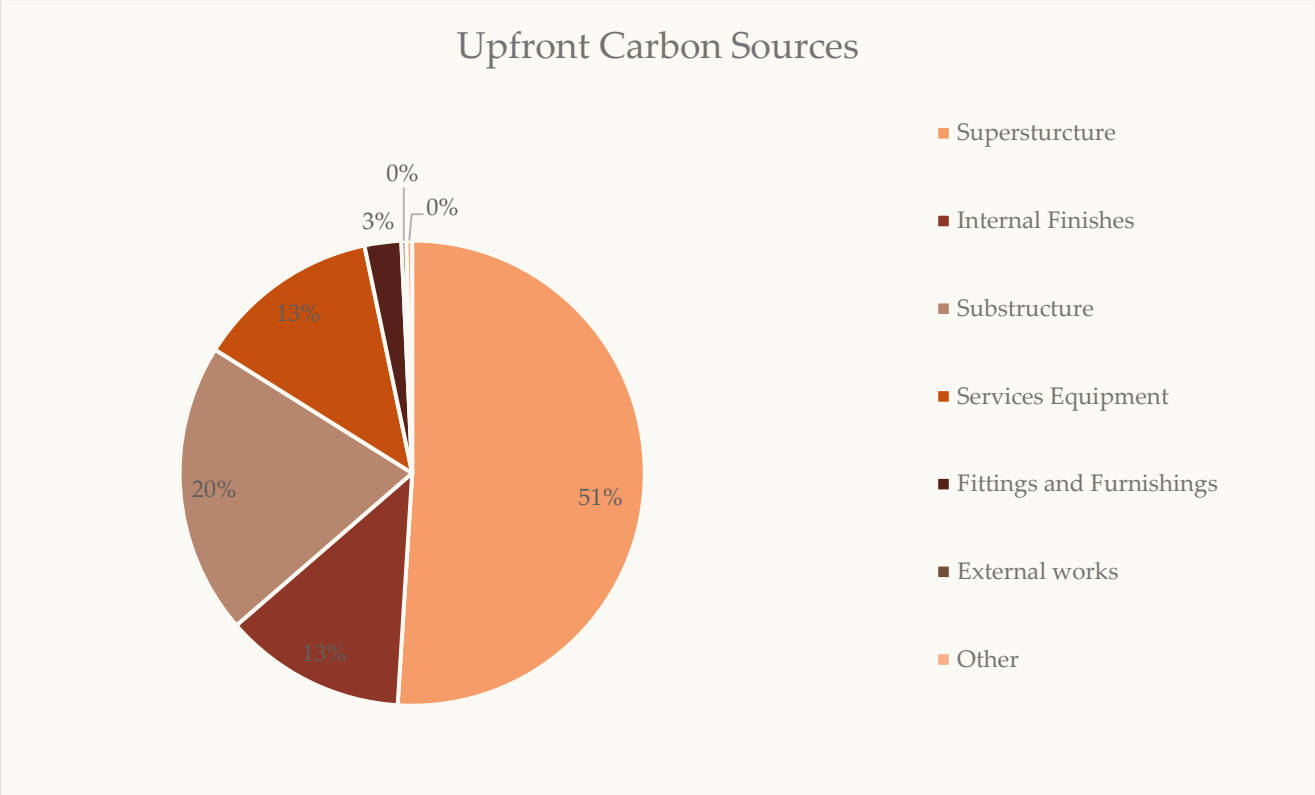
4.2.2 Scopes

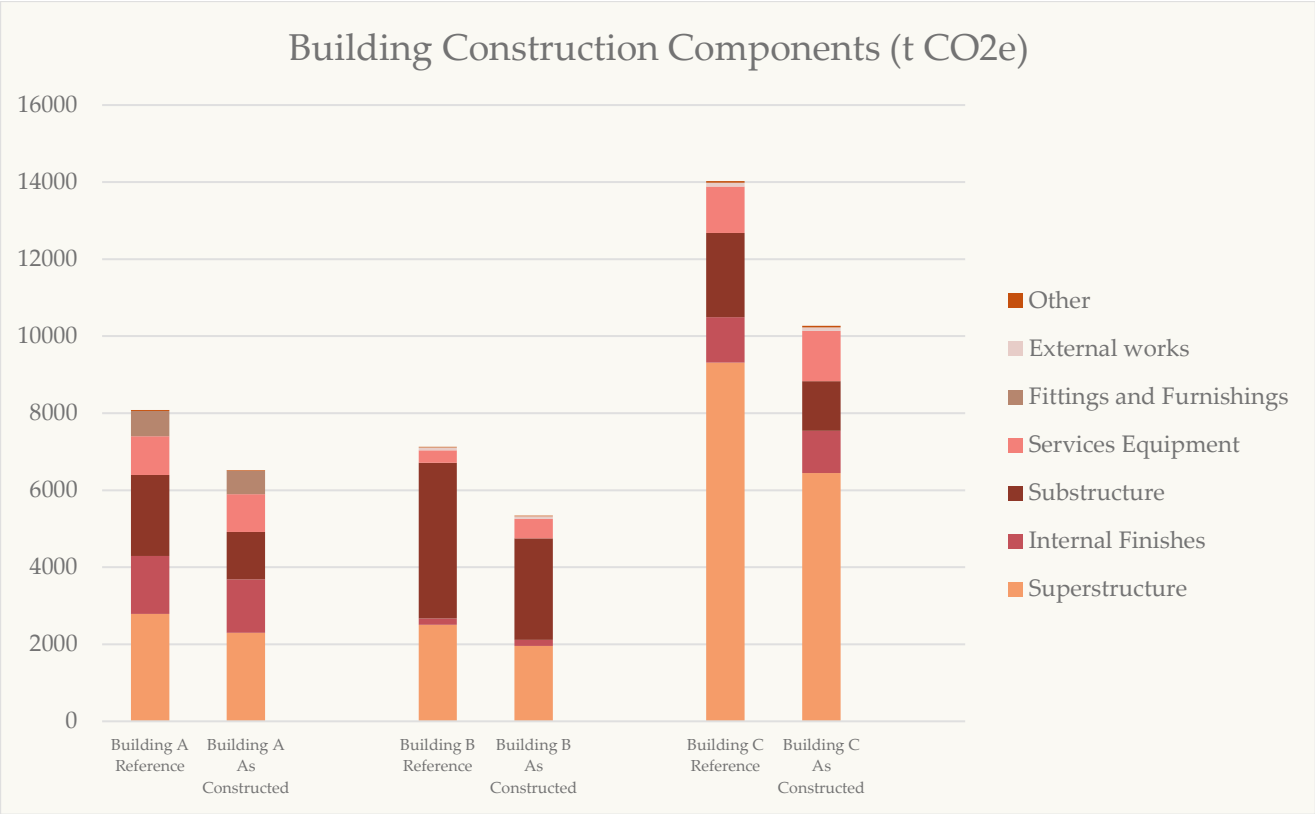
Scopes 1, 2 and 3 will be included in the operational Carbon Neutral process.

5. Upfront Carbon Sources Summary

The table below outlines the major sources of Upfront Carbon for the development. The contribution of each item is due to a combination of the quantity and the carbon intensity of that item.

Building Reference (Tower)	Scenario	Superstructure	Internal Finishes	Substructure	Services Equipment	Fittings and Furnishings	External works	Other
A	Reference	2785	1504	2104	1009	656	0	21
	As Constructed	2298	1389	1229	978	606	0	19
B	Reference	2505	165	4041	327	0	72	20
	As Constructed	1960	154	2635	504	0	68	19
C	Reference	9310	1182	2187	1204	0	100	45
	As Constructed	6443	1100	1286	1306	0	93	42



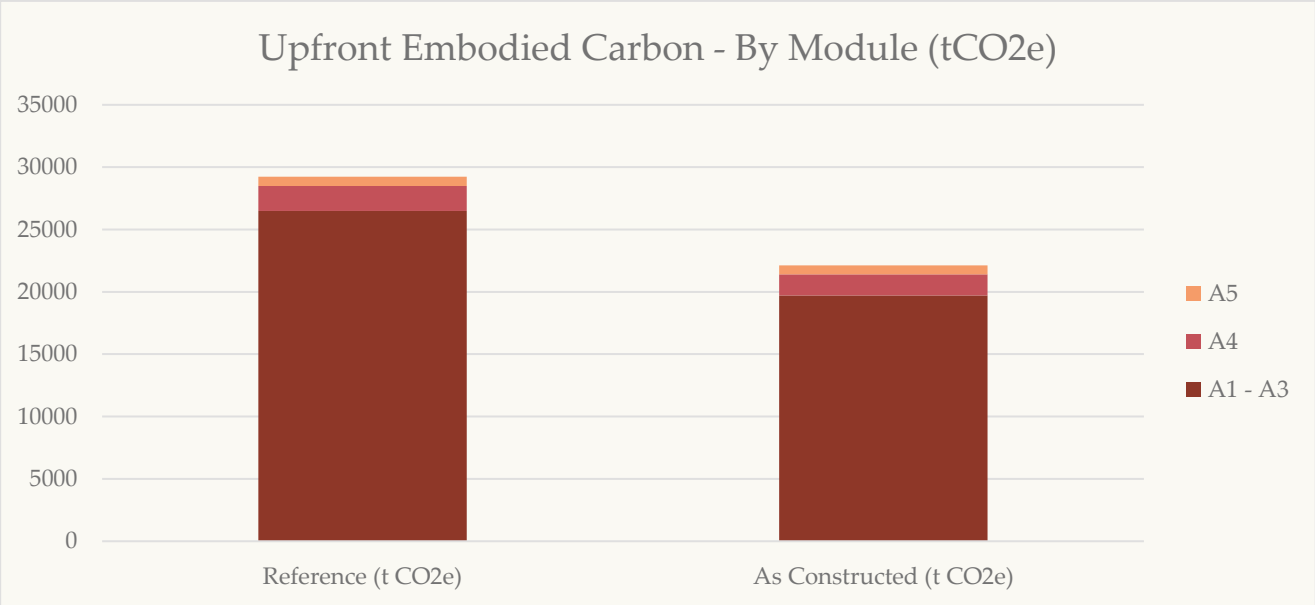

Building Construction Components (t CO2e)
16000
14000
12000
10000
8000
6000
4000
2000
0
Building A Reference
Building A As Constructed
Building B Reference
Building B As Constructed
Building C Reference
Building C As Constructed
Other
External works
Fittings and Furnishings
Services Equipment
Substructure
Internal Finishes
Superstructure

6. Upfront Carbon Reduction Strategies

The Emissions summary below provides an overview of the total reduction in Upfront Carbon, separated by category, for the development of Towers A, B, and C. The Life Cycle Assessment Report (attached) provides a more detailed overview of the emissions.

Category	Reference (t CO2e)	As Constructed (t CO2e)	Change (t CO2e)	Change %
A1 – A3	26500	19700	-6800	-26%
A4	1987	1710	-277	-14%
A5	751	720	-31	-4%
Totals	29238	22130	-7108	-24%

The LCA analysis indicates that, for this typology of taller, high amenity buildings, the materials supply chain dominates the embodied carbon profile. In low-rise buildings and particularly for land developments, fuel consumption for transport and earthworks typically dominates.



The key strategies to address upfront carbon at Murdoch Square relate to concrete, reducing the amount of concrete and reinforcing steel required through post tensioned slabs and reducing the carbon intensity of concrete by selecting low carbon mixes.

Post tensioned concrete:

Post-Tensioned Concrete is created by replacing traditional reinforcement with tendons (steel cables) that are tensioned during concrete curing placing the concrete slab into compression. This means that both the quantity of steel reinforcement and the quantity of concrete are reduced when compared to the traditional concrete slab. The Post-Tensioned concrete slabs require 25% less concrete and 50% less steel reinforcement than traditional reinforced concrete slabs. All buildings utilised post-tensioned concrete in the slab design.

Overall reduction achieved with this initiative:

- 6,044 tCO2e.
- 20.7% reduction on the reference case for upfront carbon (modules A1-A5).

Low Carbon Concrete

Concrete mixes can be less carbon intensive through replacement of some of the Portland cement content with alternatives known as Supplementary Cementitious Material (SCM). A typical SCM is Ground Granulated Blast Furnace Slag (GGBS). GGBS is a byproduct from the blast furnaces used to make iron, which requires less than a fifth of the energy used in typical cement production, and less than a fifteenth of the carbon emissions. Murdoch Square used concrete mixes with either 20% or 30% SCM blend depending on the application.

Overall reduction achieved with this initiative:

- 1,065 tCO2e.
- 3.6% reduction on the reference case for upfront carbon (modules A1-A5).

7. Offsetting for Net Zero Construction

Offsetting has been based on using verified carbon offset units equal to the final footprint assessment for the project. The chosen offset projects demonstrate strong environmental and social co-benefits.

Offset Project Type	Project Description	Verified Quantity Retired (1 offset equivalent to 1 tonne CO_2e)
Australian Biodiversity	Biodiversity Reforestation Carbon Offsets from the Yarra Yarra Biodiversity Project STAPLED TO (VCS VCU, China): 18,900t CN-7624: 1,117,338,209 - 1,117,357,108	18,900
International Biodiversity	(VCS REDD+, PNG): 899t 10695-239586732-239587630-VCS-VCU-466-VER-PG-14-2293-01062017-31122019-0 (VCS VCU, China): 1,157t 10695-239584676-239585832-VCS-VCU-466-VER-PG-14-2293-01062017-31122019-0	2,056
International renewable energy	(VCS VCU, China): 1,174t 8097-455255200-455256373-VCU-034-APX-CN-1-814-01012016-31122016-0	1,174
Totals		**22,130**

8. Operational Carbon Emissions Forecast

The tables below summarise the forecast operational performance contributing to the total annual operational emissions of each building at Murdoch Square. Hesperia is managing Towers A, and B on behalf of MHKP and these will operate as certified Carbon Neutral Buildings under the Commonwealth Government's Climate Active standard. Tower C has multiple owners, so the Carbon Neutral certification will be subject to further discussion and cannot be confirmed at the time of writing. All buildings have a rooftop PV system. Towers A, B and C are supplied with 100% renewable electricity.

The following tables summarise the forecast operational greenhouse gas emissions for each of the MHKP Towers A, B and C.

Tower A – Carbon Sources	Quantity (units as stated)	Global Warming Potential (tCO2e/year)	Notes
Forecast electricity demand	1,692,800 kWh/year	-7	Rooftop PV + 100% renewable grid supply (net emissions can be negative due to exports).
Forecast gas consumption	467,600 MJ/year	26	Gas used in hot water supply and hotel kitchen.
Diesel fuel consumption (e.g. backup generators)	0 kL/year	0	No backup genset or other fuel consumption.
Refrigerant leakage	10 kg/year	1	
Forecast mains water consumption	8,700 kL/year	12	
Forecast general waste generated	16 tonnes/year	25	
Forecast organic waste generated	9 tonnes/year	19	
Total annual emissions		76 tCO2e/year	
Forecast reduction on reference case		93%	
Carbon Intensity		7.08 kgCO2e/m2/year	

Tower B – Carbon Sources	Quantity (units as stated)	Global Warming Potential (tCO2e/year)	Notes
Forecast electricity demand	1,228,300 kWh/year	-23	Rooftop PV + 100% renewable grid supply (net emissions can be negative due to exports).
Forecast gas consumption	126,200 MJ/year	7	Gas used in hot water supply to End of Trip Facilities.
Diesel fuel consumption (e.g. backup generators)	0 kL/year	0	No backup genset or other fuel consumption.
Refrigerant leakage	10 kg/year	1	
Forecast mains water consumption	4,700 kL/year	6	
Forecast general waste generated	8 tonnes/year	13	
Forecast organic waste generated	5 tonnes/year	10	
Total annual emissions		15 tCO2e/year	
Forecast reduction on reference case		98%	
Carbon Intensity		1.87 kgCO2e/m2/year	

Tower C – Carbon Sources	Quantity (units as stated)	Global Warming Potential (tCO2e/year)	Notes
Forecast electricity demand	1,696,800 kWh/year	-23	Rooftop PV + 100% renewable grid supply (net emissions can be negative due to exports).
Forecast gas consumption	1,524,900 MJ/year	85	Gas used in hot water system and tavern and childcare kitchens.
Diesel fuel consumption (e.g. backup generators)	0 kL/year	0	No backup genset or other fuel consumption.
Refrigerant leakage	10 kg/year	1	
Forecast mains water consumption	6,500 kL/year	9	
Forecast general waste generated	13 tonnes/year	20	
Forecast organic waste generated	13 tonnes/year	27	
Total annual emissions		95 tCO2e/year	
Forecast reduction on reference case		91%	
Carbon Intensity		8.83 kgCO2e/m2/year	

9. Attachments

These documents are published with this report.

Documentation	Description
Life Cycle Assessment Report	Verified LCA reports (one per building).
Offset Retirement Certificate	Stating the quantity and registry serial numbers of offsets cancelled against this project.

9.1 Supporting Documents

Hesperia has these documents archived as supporting documents for this report, available to auditors when required.

Documentation	Description
As Constructed Materials Inventory	Inventories extracted from eTool on file
As Constructed Drawings	Base Build Drawings on file
Carbon Mitigation Workshop Summary	No notes available
Product EPD's	EPD for FORBO Step (vinyl flooring) on file
Product Third Party Certificates	Green Star Design Certification on file Green Star As Built Certification – pending at time of writing