Sustainable Design Assessment (SDA)

Proposed Residential Development

Planning application number: D/117/2024

Address: 92 Whitelaw Street Reservoir

Land use type: Residential

Number of floors: 2 floors

Date: 08/08/2024

Revision: 0

INITIATIVES TO BE MARKED ON THE PLANS

Water & Stormwater Management

- Mark-up showing roof catchment area to be diverted to the 3000L Rainwater tank for each dwelling – If required, the use of mechanically assisted (pumped) or charged pipe system will be explicitly acknowledged on the drawings and pipes will not be running underneath the building footprint.
- Note showing the 3000L rainwater tank is for detention purpose only, any retention volume must be added on top of the required 3000L.
- Location and size of each Rainwater tank proposed (See Appendix A).
- Note showing water tank to be connected to the toilets and laundry for Dwelling 2 and 3 and toilet for Dwelling 1.
- Note showing use of native or drought tolerant species wherever possible. If irrigation required, include drip irrigation and mulch.
- Note showing WELS rating for water fittings/fixtures (refer to report p5) – Fixtures (e.g. dishwasher) provided as part of base building work have to be chosen within one WELS star of best available at the time of purchase.
- Mark-up showing permeable paving to the driveway.

Energy Efficiency

- Note showing commitment to 4W/m2 lighting density in the dwellings.
- Lighting sensors for external lighting (motion detectors, timers etc.)
- Show private outdoor clothesline for each dwelling.
- Note showing electric heat pump hot water system, electric cooktop and refrigerative ducted cooling and reverse cycle ducted heating.

Indoor Environment Quality

- Note showing double glazing to all habitable rooms.

Transport

- Provide 1 bike space per dwelling in each garage/private open space area.

Urban Ecology

- Show extent of vegetated areas around the site (includes lawn)
- Show a tap and floor waste in the backyard.

INTRODUCTION

ES Civil engineering has been engaged to undertake a Sustainable Design Assessment for the proposed townhouse development located at 92 Whitelaw Street Reservoir. This has been prepared to address the Darebin Council's sustainability requirements Planning Policy Clause 15.01-2L-01 *Environmentally Sustainable Development*.

Within Clause 15.01-2l-01, the City of Darebin has identified the following key categories to be addressed:

- Energy Performance;
- Water Resources;
- Stormwater Management;
- Indoor Environment Quality;
- Waste Management;
- Building Materials;
- Transport; and
- Urban Ecology.

The site has been assessed using the BESS tool. BESS was developed by association of councils led by Moreland City Council. This tool assesses the energy and water efficiency, thermal comfort and overall environmental sustainability performance of new buildings or alterations. It was created to demonstrate how new development can meet sustainability requirements as part of a planning permit application for the participating council.

Each target area within the BESS tool generally receives a score of between 1% and 100%. A minimum score of 50% is required for the energy, water, stormwater and IEQ areas. An overall score of 50% represents 'Best Practice' while a score over 70% represent 'Excellence'. The result of the BESS assessment is included as Appendix C.

The Stormwater Treatment Objective – Relative Measure (STORM) calculator which addresses stormwater quality considerations has been used for the development to ensure that stormwater management best practice requirements have been achieved. The result of the STORM assessment is included as Appendix A.

SITE DESCRIPTION

The proposed site is located at 92 Whitelaw Street Reservoir. The 650m2 site is currently occupied by 1 single storey house which is proposed to be demolished prior to the construction of the development. It is in a residential area approximately 11kms northeast of the Melbourne CBD.

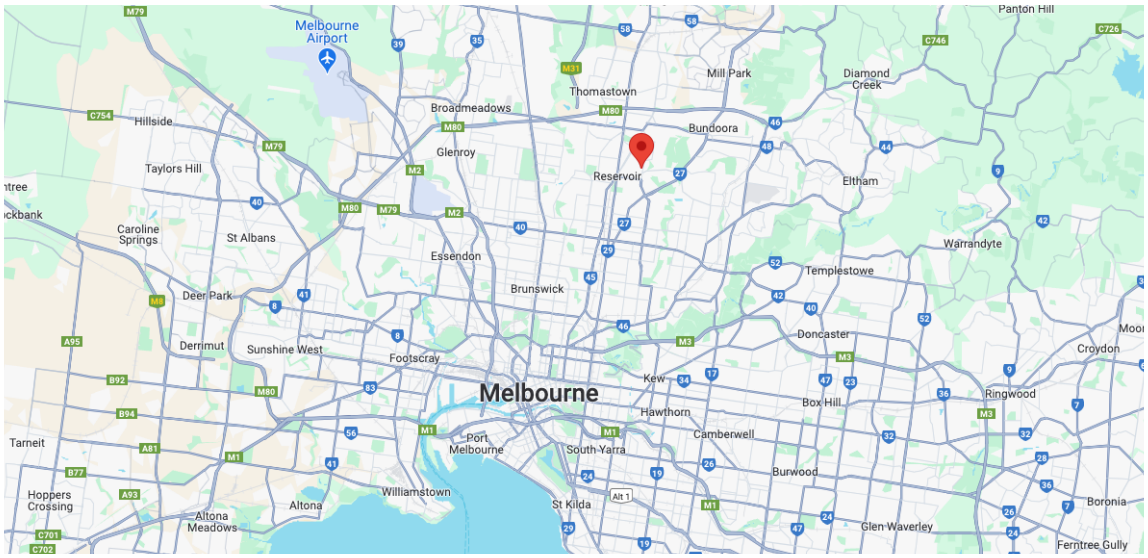


Figure 1: site location

PROPOSED DEVELOPMENT

The proposal consists of 3 double storey dwellings. Dwelling 1 is a 3-bedroom dwelling whereas Dwelling 2 and 3 are 2-bedroom dwellings. 2 parking spaces provided for U1 and a single garbage proposed for U2 and U3. A bicycle parking space is provided per dwelling.

ENERGY EFFICIENCY

Energy and its key elements should be integrated into the design of the proposed development. These elements contribute to reducing greenhouse gas emissions by utilising energy efficient appliances, energy conservation measures and renewable energy.

Thermal Performance
Full energy ratings will be carried out at the building approval stage. An average of 7 stars has been achieved through the use of appropriate insulation level in all external walls (minimum R2.0), roof (minimum R4.0) and floors as well as the use of double-glazing windows throughout habitable rooms. For the purpose of BESS assessment, minimum compliance figures have been assumed which will be met at the building approval stage.

Heating and Cooling Systems
Heating and cooling systems can account to up to 40% of a household's energy use. Therefore, minimum 5 star refrigerated space heating and cooling will be provided to reduce the energy consumption.

Hot Water Heating
Electrical heat pump hot water system will be provided.

Internal Lighting
Energy consumption from artificial lighting within the townhouses will be reduced by using LED lighting. A lighting level of 4W/m_2 will not be exceeded in the townhouses. The use of light internal colours will improve daylight penetration thus reducing the need for artificial lighting.

External Lighting
External lighting for the townhouses and common areas (driveway/pathway) will be LED and will include controls such as motion detectors or timers to minimise consumption during off-peak times.

Energy Efficient Appliances
All appliances if provided in the development as part of the base building work (e.g. dishwasher, washing machine, dryer etc.) will be chosen within one energy efficiency star of the best available in the market, if installed.

Electric Cooking
All cooktops in the development will be electric cooktop.

Clothes Drying
External clothes drying lines or racks will be provided for all units within the identified private open spaces.

WATER EFFICIENCY & STORMWATER MANAGEMENT

Water saving use and reuse and its key elements should be integrated into the design of the proposed development. These principles contribute to reducing the water demand in addition to promoting water reuse. Stormwater management and its key elements should be integrated into the design of the proposed development. These principles contribute to ensuring natural systems are protected and enhanced whilst promoting on-site retention and aims to reduce runoff or peak flows.

Water Efficient Fittings

The development will include efficient fittings and fixtures to reduce the volume of mains water used in the development. The following WELS star ratings will be specified;

- Toilets – 4 Star;
- Dishwashers – 5 Star;
- Kitchen taps – 5 Star; and
- Bathroom taps –5 Star and
- Showerhead – 3 Star with aeration device (>=7.5 but <= 9.0 L/min).

Rainwater Collection & Use

Rainwater runoff from part of the roof area of each townhouse will be collected and stored in rainwater tanks. All units will be provided with a 3,000L tank. If required, a charged pipe system or mechanically assisted system (pumped) or multiple tanks will be installed to collect water from part of the roof of each dwelling.
Gutters and tanks for each unit to have leaf diverters and mosquito guards.

In the case of a charged pipe system, the pipes will not be running underneath the building footprint (slab) and the stakeholders (builder/developer/architect) will be required to explicitly acknowledge this solution and have the capacity to install it.

Rainwater collected will be used for toilet flushing, laundry and irrigation. These initiatives will reduce significantly the stormwater impacts of the development and help achieve compliance with the STORM calculator (See Appendix A).

Water Efficient Appliances

All appliances if provided in the development as part of the base building work (e.g. dishwasher) will be chosen within one WELS star of the best available.

Landscape Irrigation

Native or drought-tolerant plants will be preferred for the landscaped areas on site. If irrigation is required, the proposed landscaping will be provided with drip irrigation and mulch to help minimise water requirements.

INDOOR ENVIRONMENT QUALITY

Indoor Environment Quality and its key elements should be integrated into the design of the proposed development. These elements play a significant role in the health, wellbeing and satisfaction of the development occupants. Facilitating a good (IEQ) design provides a naturally comfortable indoor environment and less dependence on building services such as, artificial lighting, mechanical ventilation and heating and cooling device.

Volatile Organic Compounds
All paints, adhesives and sealants and flooring will have low VOC content. Alternatively products will be selected with no VOCs. Paints such as eColour, or equivalent should be considered. Please refer to Appendix B for VOC limits.

Formaldehyde Minimisation
All engineered wood products will have 'low' formaldehyde emissions, certified as E0 or better. Alternatively products will be specified with no Formaldehyde. Products such as ecological panel – 100% post-consumer recycled wood (or similar) will be considered for use within the development. Please refer to Appendix B for formaldehyde limits.

Daylight Levels
Daylight penetration will be enhanced with the use of light internal colours to improve daylight reflection. All bedrooms and living rooms will be provided with windows to allow for natural sunlight and ventilation. There are no bedrooms which rely on borrowed daylight. Installation of mirrored wardrobe doors could improve even further the daylight spread within the bedrooms.
Living rooms have designed to face north where possible.

Double Glazing
Glazing will be chosen in accordance with the energy rating requirements at the building approval stage. However, as a minimum double glazing will be provided to all living areas and bedrooms. This will provide better thermal performance and reduce condensation which helps prevent the formation of mould within the dwellings.

Task Lighting
A higher illuminance level (300Lux) will be provided for all task areas (e.g. kitchen bench, bathroom basin) to ensure appropriate light is provided to do any tasks in these areas.

Ventilation
All kitchens will have a separate dedicated exhaust fan (range-hood) which will be directly exhausted out of the building. All townhouses will have access to effective cross flow ventilation. It will provide fresh air to the occupants and reduce the need for mechanical cooling. Window locks and door catches will be included to encourage and improve natural ventilation in the dwellings.

WASTE MANAGEMENT

Building Management and its key elements should be integrated into the design of the proposed development. These principles contribute to ensuring efficient and effective on-going building performance. Waste management and its key elements should be integrated into the design of the proposed development. These principles contribute to ensuring minimal waste is transported to landfill by means of disposal, recycling and on-site waste storage and/or collection methods.

Metering and Monitoring
Separate utility meters (water and electricity) will be provided for each townhouse. This will allow residents to monitor and reduce their consumption.

Construction Waste Management
A waste management plan will be introduced to all on-site staff at a site orientation session to ensure that the waste generated on site is minimised and disposed of correctly. A minimum 80% of all construction and demolition waste generated on site will be reused or recycled.

Construction Environmental Management
The builder will identify environmental risks related to construction and include management strategies such as maintaining effective erosion and sediment control measures during construction and operation and ensure that appropriate staging of earthworks (e.g. avoid bare earthworks in high risk areas of the site during dominant rainfall period).

Operational Waste
Each townhouse will be provided with bins for both general and recycling waste. Recycling bins will be provided next to general waste bins in the kitchen.
A compost bin will be provided for each townhouse to help the residents manage and reduce their organic waste.

TRANSPORT

Bicycle Parking
Residents will be able to securely park their bicycle within secluded private open space. This will provide for a total of 3 bicycle spaces for residents.

BUILDING MATERIALS

Materials selection should be integrated into the design of the proposed development. The criteria for appropriate materials used are based on economic and environmental cost.

Timber
All timber used in the development will be Forest Stewardship Council (FSC) or Program for the Endorsement of Forest Certification (PEFC) certified, or recycled / reused.

Flooring
The use of timber flooring will be preferred for all living areas and bedrooms. Wherever possible, flooring will be selected from products/materials certified under any of the following:

- Carpet Institute of Australia Limited, Environmental Certification Scheme (ECS) v1.2;
- Ecospecifier GreenTag GreenRate V3.2; and/or
- Good Environmental Choice (GECA).

Alternatively, flooring must be durable, include some eco-preferred content, be modular and/or come from a manufacturer with a product stewardship program and ISO 14001certification.

Joinery
Wherever possible, joinery will be manufactured from materials/products certified under any of the following:

- Ecospecifier GreenTag GreenRate V3.1;
- Good Environmental Choice (GECA); and/or
- The Institute for Market Transformation to Sustainability (MTS) Sustainable Materials Rating Technology standard Version 4.0 – SmaRT 4.0.

The use of Ecological Panel (or equivalent) will be investigated, which is created from 100% postconsumer recycled products.

Non-toxic and Durable External Materials

All external materials used to construct the building will be long lasting and will be non-toxic.

Steel

Wherever possible, steel for the development will be sourced from a Responsible Steel Maker.

Reinforcing steel for the project will be manufactured using energy reducing processes commonly used by large manufacturers such as Bluescope or OneSteel.

URBAN ECOLOGY

In highly urbanised environments, such as metropolitan Melbourne, it is important to recognise the importance of maintaining and increasing the health of our urban ecosystems to improve living conditions not only for the fauna but also ourselves. We can improve our urban ecosystem through the incorporation of vegetation through landscaping for both new and existing developments.

Vegetation
Large landscaped area will be provided around the site and within the private open spaces. It will provide the occupants with a pleasant surrounding environment. The design will incorporate a mix of native species to help maintain local biodiversity.

Insulant ODP
All thermal insulation used in the development will not contain any ozone-depleting substances and will not use any in its manufacturing.

IMPLEMENTATION & MONITORING

The proposed development will meet the best practice requirement of the City of Darebin through the different initiatives describe in this SDA such as thermally efficient building envelope, efficient air conditioning and hot water system and sustainable materials. An appropriate implementation and monitoring of the initiatives outlined within this SDA will be required.
Implementation of the ESD initiatives outlined in this report requires the following processes:

- Full integration with architectural plans and specifications
- Full integration with building services design drawings and specifications
- Endorsement of the ESD Report with town planning drawings
- ESD initiatives to be included in plans and specifications for building approval.

APPENDIX A – WSUD REPORT/ STORM ASSESSMENT

New development must comply with the best practice performance targets for suspended solids, total phosphorous and total nitrogen, as set out in the Urban Stormwater Best Practice Environmental Management Guidelines, Victoria Stormwater Committee 1999. Currently, these water quality performance targets require:

- Suspended Solids - 80% retention of typical urban annual load.
- Total Nitrogen - 45% retention of typical urban annual load.
- Total Phosphorus - 45% retention of typical urban annual load.
- Litter - 70% reduction of typical urban annual load.

The STORM tool, an industry accepted tool, was used to assess the development and ensure that the best practice targets described above are met. A minimum compliance score of 100% is required to achieve for the development.

Site Delineation

For the purpose of the assessment, the development has been delineated into the following surface types:

- Site area of 650.3m2;
- Part roof area runoff of unit 1 will be diverted into 3000L rainwater tank;
- Part roof area runoff of unit 2 will be diverted into 3000L rainwater tank;
- Part roof area runoff of unit 3 will be diverted into 3000L rainwater tank;

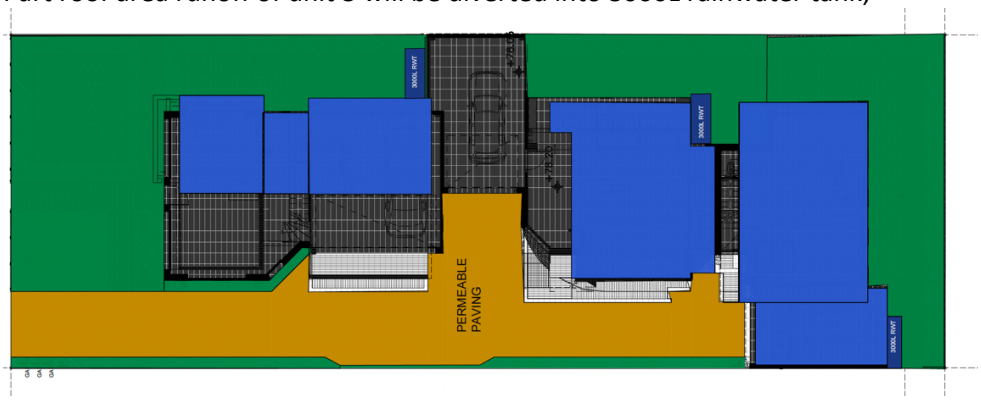


Figure 3: Roof catchment area (blue hatch) for each dwelling to RWT (blue), permeable paving (brown)

Stormwater initiatives

Rainwater Tank

The roof catchment area of each townhouse (as described above) will be diverted to 3000L rainwater tanks for each townhouse. The rainwater collected will be used for toilet flushing and laundry for Unit 2 and 3 and toilet flushing for Unit 1. If required, a charged pipe system or mechanically assisted system (pumped) or multiple tanks will be installed to collect water from part of the roof of each dwelling.
Gutters and tanks for each unit to have leaf diverters and mosquito guards.

In the case of a charged pipe system, the pipes will not be running underneath the slab and the stakeholders (builder/developer/architect) will be required to explicitly acknowledge this solution and have the capacity to install it. Collection will occur from trafficable areas for unit 1 therefore an appropriate filtering system will be required to be installed (first flush, cartridge filter, UV) and maintained.

Whist the STORM Rating report indicates a 3000L rainwater tank is required per dwelling to achieve 100%, it should be noted this does not include detention storage at the top of the tank.

Permeable Paving

Part of the driveway will be constructed of permeable paving.

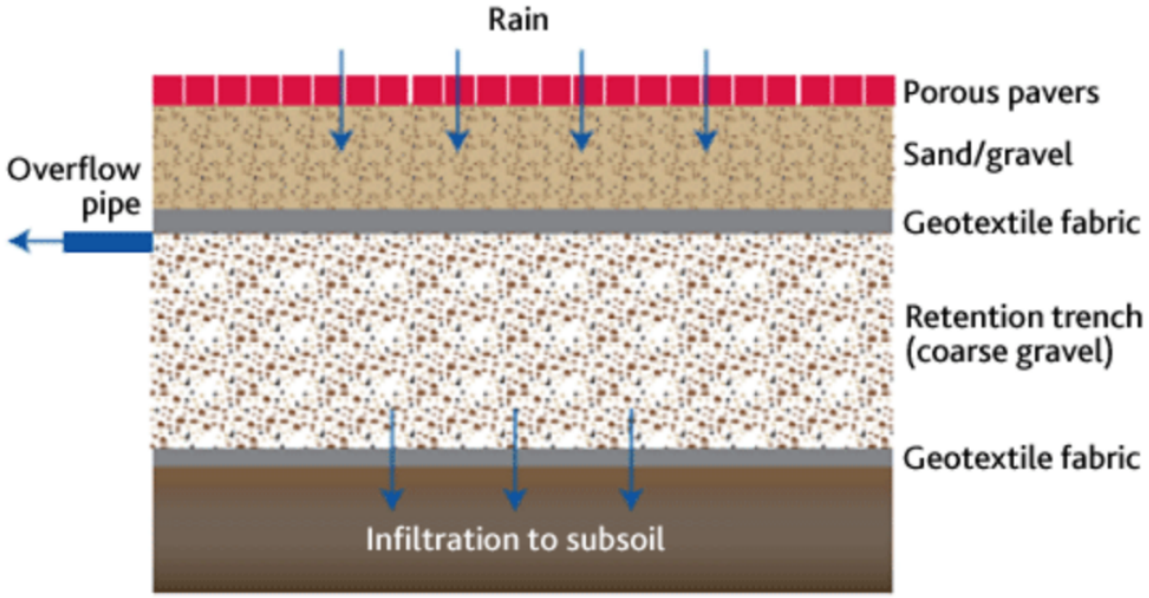


Figure 3: Driveway treatment drawing. Source: Melbourne Water

Impervious Areas

The remainder of impervious areas will directly be released at the legal point of discharge at the front of the site. Permeable areas are excluded from the STORM assessment.

Stormwater Results

The initiatives and areas described above have been applied to the STORM calculator and the proposed development has achieved a score of 100%.

Melbourne Water **STORM Rating Report**

TransactionID: 0
Municipality: DAREBIN
Rainfall Station: DAREBIN
Address: 92 Whitelaw Street
Reservoir
VIC 3073
Assessor: ES CIVIL ENGINEERING
Development Type: Residential - Multiunit
Allotment Site (m2): 650.00
STORM Rating %: 104

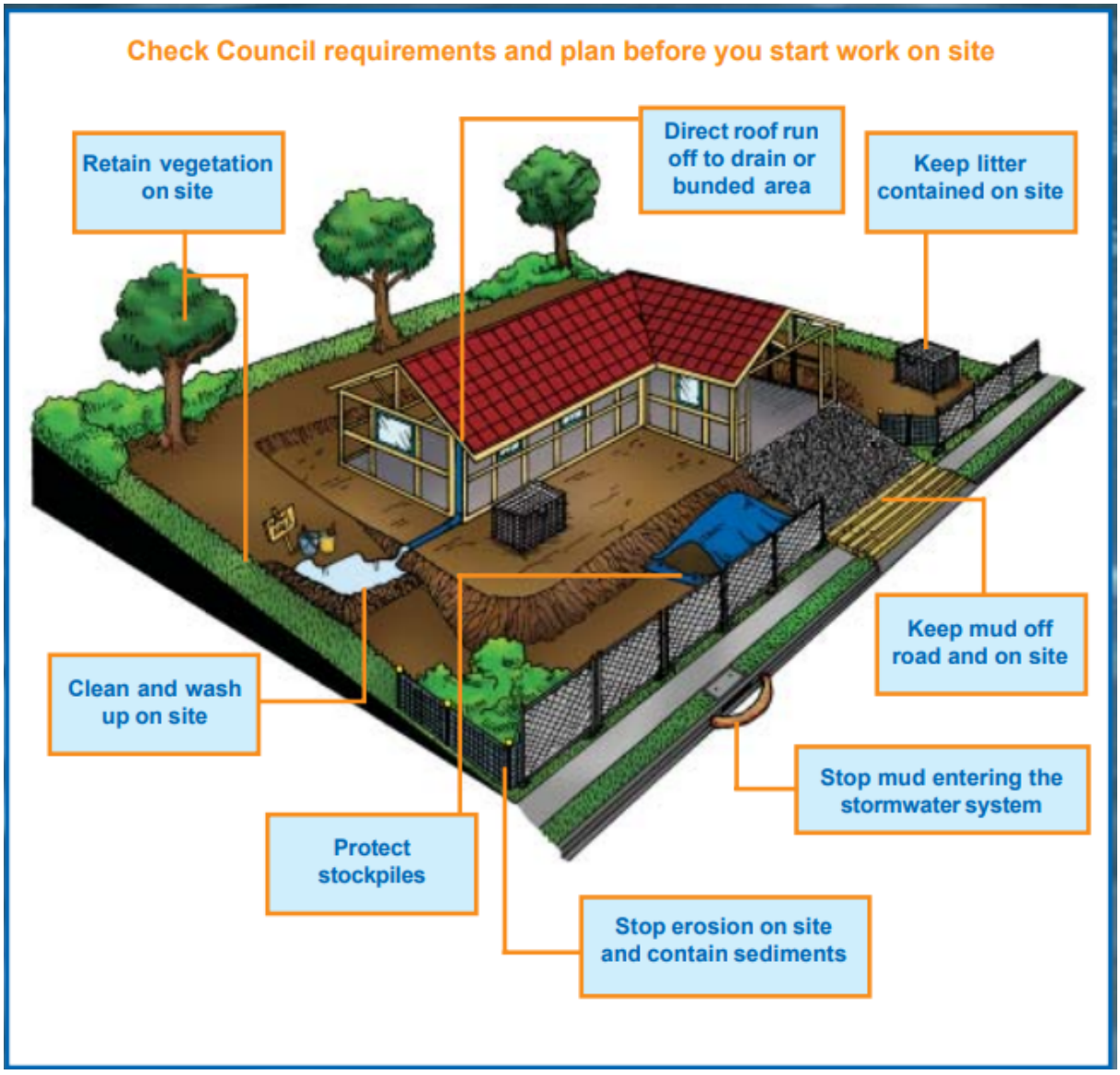
Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
U1 Treated Roof	50.00	Rainwater Tank	3,000.00	3	170.00	82.00
U1 Untreated Roof	50.00	None	0.00	0	0.00	0.00
U2 Treated Roof	51.00	Rainwater Tank	3,000.00	3	170.00	82.00
U2 Unteated Roof	50.00	None	0.00	0	0.00	0.00
U3 Treated Roof	71.00	Rainwater Tank	3,000.00	3	168.00	82.80
U3 Untreated Roof	7.10	None	0.00	0	0.00	0.00

Date Generated: 08-Aug-2024 Program Version: 1.0.0

One additional occupant than the number of bedrooms has been input in STORM for Dwelling 2 and 3 to account for the laundry connection. This is based on the assumption of an average of two laundry loads per week for a household. This represents 204L per week for an average washing machine (3 Star). This would average to a 29L/day water use for laundry equivalent to the additional occupant.
This approach is accepted throughout CASBE Councils.

Stormwater Management at Construction Site

To manage stormwater management in the construction stage, measures will be put in place to minimise the likelihood of contaminating stormwater. This will mean ensuring buffer strips are in place, sediment traps are installed, and the site will be kept clean from any loose rubbish. The builder will follow the process outlined in "Keeping Our Stormwater Clean – A Builder's Guide" by Melbourne Water.



Copies of "Keeping Our Stormwater Clean – A Builder's Guide" booklet can be obtained from Melbourne Water by ringing on 131 722 or can be downloaded from the following website.
http://www.melbournewater.com.au/content/library/rivers_and_creeks/keeping_our_stormwater_clean-a_builders_guide.pdf

APPENDIX B – VOC & FORMALDEHYDE EMISSION LIMITS

The following table are an extract of the Green Star Design and as built submission guildlines:

Table 13.1.1: Maximum TVOC Limits for Paints, Adhesives and Sealants

Product Category	Max TVOC content in grams per litre (g/L) of ready to use product.
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100

The product complies with the Total VOC (TVOC) limits specified in the Table below.

Carpet Test Standards and TVOC Emissions Limits

Test protocol	Limit
ASTM D5116 - Total VOC limit	0.5mg/m^2 per hour
ASTM D5116 - 4-PC (4-Phenylcyclohexene)	0.05mg/m^2 per hour
ISO 16000 / EN 13419 - TVOC at three days	0.5 mg/m^2 per hour
ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5mg/m^2 per hour

Table 13.2: Formaldehyde Emission Limit Values for Engineered Wood Products

Test Protocol	Emission Limit/ Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1mg/ L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1mg/ L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤1mg/ L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1mg/ L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr*
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m²hr (at 3 days)
ASTM D6007	≤0.12mg/m³**
ASTM E1333	≤0.12mg/m³***
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m³
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m²hr

*mg/m²hr may also be represented as mg/m²/hr.

APPENDIX C – BESS REPORT

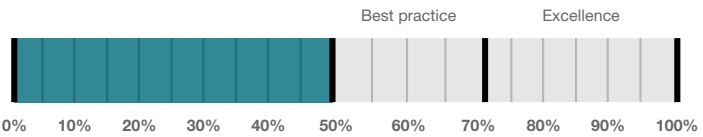
BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 92 Whitelaw St, Reservoir VIC 3073, Australia Reservoir Victoria 3073. The BESS report and accompanying documents and evidence are submitted in response to the requirement for a Sustainable Design Assessment or Sustainability Management Plan at Darebin City Council.

Note that where a Sustainability Management Plan is required, the BESS report must be accompanied by a report that further demonstrates the development's potential to achieve the relevant environmental performance outcomes and documents the means by which the performance outcomes can be achieved.

Your BESS Score

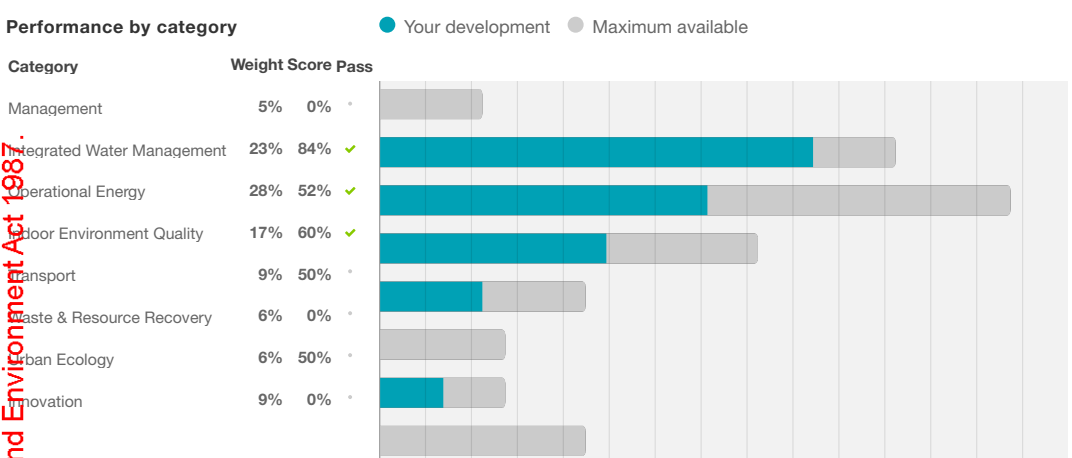


50%

Project details

Address	92 Whitelaw St, Reservoir VIC 3073, Australia Reservoir Victoria 3073
Project no	64432D91-R1
BESS Version	BESS-9
Site type	Multi dwelling (dual occupancy, townhouse, villa unit etc)
Account	sienna@fdarchitects.com.au
Application no.	D/117/2024
Site area	650.00 m²
Building floor area	304.84 m²
Date	08 August 2024
Software version	2.0.0-B.545

Performance by category



Dwellings & Non Res Spaces

Dwellings

Name	Quantity	Area	% of total area
Townhouse			
TH1	1	119 m²	39%
TH2	1	96.3 m²	31%
TH3	1	89.5 m²	29%
Total	**3**	**304 m²**	**100%**

Supporting information

Floorplans & elevation notes

Credit	Requirement	Response	Status
Integrated Water Management 2.1	Location of any stormwater management systems (rainwater tanks, raingardens, buffer strips)		-
Integrated Water Management 3.1	Annotation: Water efficient garden details		-
Operational Energy 3.3	Annotation: External lighting controlled by motion sensors		-
Operational Energy 3.4	Location of clothes line (if proposed)		-
Indoor Environment Quality 2.2	Annotation: Dwellings designed for 'natural cross flow ventilation' (If not all dwellings, include a list of compliant dwellings)		-
Indoor Environment Quality 3.1	Annotation: Glazing specification (U-value, SHGC)		-
Transport 1.1	Location of residential bicycle parking spaces		-
Urban Ecology 2.1	Location and size of vegetated areas		-
Urban Ecology 2.4	Location of taps and floor waste on balconies / courtyards		-

Supporting evidence

Credit	Requirement	Response	Status
Integrated Water Management 2.1	STORM report or MUSIC model		-
Operational Energy 3.5	Average lighting power density and lighting type(s) to be used		-
Indoor Environment Quality 2.2	A list of dwellings with natural cross flow ventilation		-
Indoor Environment Quality 3.1	Reference to floor plans or energy modelling showing the glazing specification (U-value and Solar Heat Gain Coefficient, SHGC)		-

Credit summary

Management Overall contribution 4.5%

	0%	
1.1 Pre-Application Meeting	0%	
2.2 Thermal Performance Modelling - Multi-Dwelling Residential	0%	
4.1 Building Users Guide	0%	

IWM Overall contribution 22.5%

	84%	✔ Pass
1.1 Potable Water Use	52%	✔ Achieved
2.1 Stormwater Treatment	100%	✔ Achieved
3.1 Water Efficient Landscaping	100%	

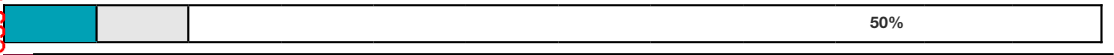
Energy Overall contribution 27.5%

	Minimum required 50% — 52%	✔ Pass
1.2 Thermal Performance Rating - Residential	0%	✔ Achieved
2.1 Greenhouse Gas Emissions	0%	
2.6 Electrification	100%	
2.7 Energy consumption	100%	
3.3 External Lighting	100%	
3.4 Clothes Drying	100%	
3.5 Internal Lighting - Houses and Townhouses	100%	
4.4 Renewable Energy Systems - Other	N/A	✣ Scoped Out
	No other (non-solar PV) renewable energy is in use.	
4.5 Solar PV - Houses and Townhouses	0%	⊘ Disabled
	No solar PV renewable energy is in use.	

IEQ Overall contribution 16.5%

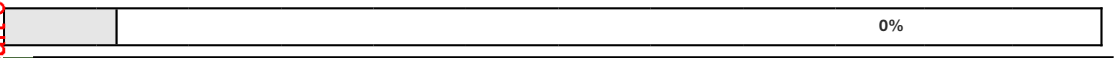
	Minimum required 50% — 60%	✔ Pass
2.2 Cross Flow Ventilation	100%	
3.1 Thermal comfort - Double Glazing	100%	
3.2 Thermal Comfort - External Shading	0%	
3.3 Thermal Comfort - Orientation	0%	

Transport Overall contribution 9.0%



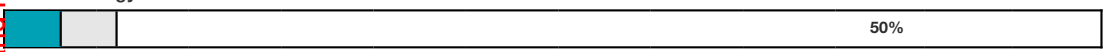
1.1 Bicycle Parking - Residential	100%	
1.2 Bicycle Parking - Residential Visitor	N/A	Scoped Out
		Not enough dwellings.
2.1 Electric Vehicle Infrastructure	0%	

Waste Overall contribution 5.5%



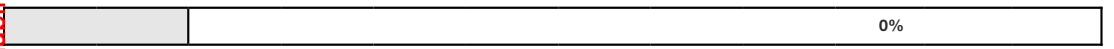
1.1 Construction Waste - Building Re-Use	0%
2.1 Operational Waste - Food & Garden Waste	0%

Urban Ecology Overall contribution 5.5%



2.1 Vegetation	75%
2.2 Green Roofs	0%
2.3 Green Walls and Facades	0%
2.4 Balconies, Courtyards & Roof terraces	100%
3.1 Food Production - Residential	0%

Innovation Overall contribution 9.0%



1.1 Innovation	0%

Credit breakdown

Management Overall contribution 0%

1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 50% towards the category score.	
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?	
Question	Criteria Achieved ?	
Project	No	
2.2 Thermal Performance Modelling - Multi-Dwelling Residential		0%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Have preliminary NatHERS ratings been undertaken for all thermally unique dwellings?	
Question	Criteria Achieved ?	
Townhouse	No	
4.1 Building Users Guide		0%
Score Contribution	This credit contributes 16.7% towards the category score.	
Criteria	Will a building users guide be produced and issued to occupants?	
Question	Criteria Achieved ?	
Project	No	

Integrated Water Management

Overall contribution 19% Minimum required 0%

Do you have a reticulated third pipe or an on-site water recycling system?:	No
Are you installing a swimming pool?:	No
Stormwater profile	
Which stormwater modelling software are you using?:	Melbourne Water STORM tool
STORM score achieved:	100
Rainwater tank profile	
What is the total roof area connected to the rainwater tank?:	
RWT1	50.0 m²
RWT2	51.0 m²
RWT3	71.0 m²
Tank Size:	
RWT1	3,000 Litres
RWT2	3,000 Litres
RWT3	3,000 Litres
Irrigation area connected to tank:	
RWT1	0.0 m²
RWT2	0.0 m²
RWT3	0.0 m²
Is connected irrigation area a water efficient garden?:	
RWT1	Yes
RWT2	Yes
RWT3	Yes
Other external water demand connected to tank?:	
RWT1	0.0 Litres/Day
RWT2	0.0 Litres/Day
RWT3	0.0 Litres/Day
Fixtures, fittings & connections profile	
Showerhead: All	3 Star WELS (>= 7.5 but <= 9.0) (minimum requirement)
Bath: All	Scope out
Kitchen Taps: All	>= 5 Star WELS rating
Bathroom Taps: All	>= 5 Star WELS rating
Dishwashers: All	>= 5 Star WELS rating
WC: All	>= 4 Star WELS rating
Urinals: All	Scope out
Washing Machine Water Efficiency: All	Occupant to Install
Which non-potable water source is the dwelling/space connected to?:	
TH1	RWT1
TH2	RWT2
TH3	RWT3

1.1 Potable Water Use		52%	✔ Achieved
Score Contribution	This credit contributes 33.3% towards the category score.		
Criteria	What is the reduction in total potable water use due to efficient fixtures, appliances, rainwater use and recycled water use? To achieve points in this credit there must be >25% potable water reduction.		
Output	Reference		
Project	435 kL		
Output	Proposed (excluding rainwater and recycled water use)		
Project	372 kL		
Output	Proposed (including rainwater and recycled water use)		
Project	286 kL		
Output	% Reduction in Potable Water Consumption		
Project	34 %		
Output	% of connected demand met by rainwater		
Project	92 %		
Output	How often does the tank overflow?		
Project	Very Often		
Output	Opportunity for additional rainwater connection		
Project	123 kL		

2.1 Stormwater Treatment		100%	✔ Achieved
Score Contribution	This credit contributes 60% towards the category score.		
Criteria	Has best practice stormwater management been demonstrated?		
Output	Min STORM Score		
Project	100		
Output	STORM Score		
Project	100		

3.1 Water Efficient Landscaping		100%	
Score Contribution	This credit contributes 6.7% towards the category score.		
Criteria	Will water efficient landscaping be installed?		
Question	Criteria Achieved ?		
Project	Yes		

Operational Energy

Overall contribution 15% Minimum required 50%

Are you installing any renewable energy system(s) (other than solar photovoltaic)?:	No
Energy Supply:	All-electric
Dwellings profile	
Below the floor is: All	Ground or Carpark
Above the ceiling is: All	Outside
Exposed sides:	
TH1	4
TH2 TH3	3
NatHERS Annual Energy Loads - Heat:	
TH1	82.0 MJ/sqm
TH2 TH3	80.0 MJ/sqm
NatHERS Annual Energy Loads - Cool: All	20.0 MJ/sqm
NatHERS star rating: All	7.0
Type of Heating System: All	Reverse cycle ducted
Heating System Efficiency: All	5 Stars (2011 MEPS)
Type of Cooling System: All	Refrigerative ducted
Cooling System Efficiency: All	5 Stars (2011 MEPS)
Type of Hot Water System: All	Electric Heat Pump Band 1
% Contribution from solar hot water system: All	0 %
Clothes Line: All	Private outdoor clothesline
Clothes Dryer: All	No clothes dryer

1.2 Thermal Performance Rating - Residential

0% ✔ Achieved

Score Contribution	This credit contributes 17.6% towards the category score.
Criteria	What is the average NatHERS rating?
Output	Average NATHERS Rating (Weighted)
Townhouse	7.0 Stars

2.1 Greenhouse Gas Emissions

0%

Score Contribution	This credit contributes 17.6% towards the category score.
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?
Output	Reference Building with Reference Services (BCA only)
Townhouse	5,996 kg CO2
Output	Proposed Building with Proposed Services (Actual Building)
Townhouse	6,029 kg CO2
Output	% Reduction in GHG Emissions
Townhouse	-1 %

2.6 Electrification		100%	
Score Contribution	This credit contributes 17.6% towards the category score.		
Criteria	Is the development all-electric?		
Question	Criteria Achieved?		
Project	Yes		
2.7 Energy consumption		100%	
Score Contribution	This credit contributes 23.5% towards the category score.		
Criteria	What is the % reduction in annual energy consumption against the benchmark?		
Output	Reference Building with Reference Services (BCA only)		
Townhouse	56,643 MJ		
Output	Proposed Building with Proposed Services (Actual Building)		
Townhouse	27,475 MJ		
Output	% Reduction in total energy		
Townhouse	51 %		
3.3 External Lighting		100%	
Score Contribution	This credit contributes 2.9% towards the category score.		
Criteria	Is the external lighting controlled by a motion detector?		
Question	Criteria Achieved ?		
Townhouse	Yes		
3.4 Clothes Drying		100%	
Score Contribution	This credit contributes 5.9% towards the category score.		
Criteria	What is the % reduction in annual energy consumption (gas and electricity) from a combination of clothes lines and efficient driers against the benchmark?		
Output	Reference		
Townhouse	1,418 kWh		
Output	Proposed		
Townhouse	284 kWh		
Output	Improvement		
Townhouse	80 %		
3.5 Internal Lighting - Houses and Townhouses		100%	
Score Contribution	This credit contributes 2.9% towards the category score.		
Criteria	Does the development achieve a maximum illumination power density of 4W/sqm or less?		
Question	Criteria Achieved?		
Townhouse	Yes		
4.4 Renewable Energy Systems - Other		N/A	◈ Scoped Out
This credit was scoped out	No other (non-solar PV) renewable energy is in use.		
4.5 Solar PV - Houses and Townhouses		0%	⊘ Disabled
This credit is disabled	No solar PV renewable energy is in use.		

Indoor Environment Quality

Overall contribution 10% Minimum required 50%

2.2 Cross Flow Ventilation		100%
Score Contribution	This credit contributes 20% towards the category score.	
Criteria	Are all habitable rooms designed to achieve natural cross flow ventilation?	
Question	Criteria Achieved ?	
Townhouse	Yes	

3.1 Thermal comfort - Double Glazing		100%
Score Contribution	This credit contributes 40% towards the category score.	
Criteria	Is double glazing (or better) used to all habitable areas?	
Question	Criteria Achieved ?	
Townhouse	Yes	

3.2 Thermal Comfort - External Shading		0%
Score Contribution	This credit contributes 20% towards the category score.	
Criteria	Is appropriate external shading provided to east, west and north facing glazing?	
Question	Criteria Achieved ?	
Townhouse	No	

3.3 Thermal Comfort - Orientation		0%
Score Contribution	This credit contributes 20% towards the category score.	
Criteria	Are at least 50% of living areas orientated to the north?	
Question	Criteria Achieved ?	
Townhouse	No	

Transport

Overall contribution 4%

1.1 Bicycle Parking - Residential		100%
Score Contribution	This credit contributes 50% towards the category score.	
Criteria	How many secure and undercover bicycle spaces are there for residents?	
Question	Bicycle Spaces Provided ?	
Townhouse	3	
Output	Min Bicycle Spaces Required	
Townhouse	3	

1.2 Bicycle Parking - Residential Visitor		N/A ✣ Scoped Out
This credit was scoped out	Not enough dwellings.	

2.1 Electric Vehicle Infrastructure		0%
Score Contribution	This credit contributes 50% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	No	

Waste & Resource Recovery

Overall contribution 0%

1.1 Construction Waste - Building Re-Use	0%
Score Contribution	This credit contributes 50% towards the category score.
Criteria	If the development is on a site that has been previously developed, has at least 30% of the existing building been re-used?
Question	Criteria Achieved ?
Project	No

2.1 Operational Waste - Food & Garden Waste	0%
Score Contribution	This credit contributes 50% towards the category score.
Criteria	Are facilities provided for on-site management of food and garden waste?
Question	Criteria Achieved ?
Project	No

Urban Ecology

Overall contribution 3%

2.1 Vegetation		75%
Score Contribution	This credit contributes 50% towards the category score.	
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?	
Question	Percentage Achieved ?	
Project	25 %	

2.2 Green Roofs		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Does the development incorporate a green roof?	
Question	Criteria Achieved ?	
Project	No	

2.3 Green Walls and Facades		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Does the development incorporate a green wall or green façade?	
Question	Criteria Achieved ?	
Project	No	

2.4 Balconies, Courtyards & Roof terraces		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Is there a tap and floor waste on every balcony and courtyard (including any roof terraces)?	
Question	Criteria Achieved ?	
Townhouse	Yes	

3.1 Food Production - Residential		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	What area of space per resident is dedicated to food production?	
Question	Food Production Area	
Townhouse	0.0 m^2	
Output	Min Food Production Area	
Townhouse	2 m^2	

Innovation

Overall contribution 0%

1.1 Innovation		0%
Score Contribution	This credit contributes 100% towards the category score.	
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?	