

lid Low Impact Development Consulting



Environmentally Sustainable Design

Sustainability Management Plan for:

23-25 Townsend Road, Whittington

Prepared for: VB Homes

Prepared by: Low Impact Development Consulting

25/08/2026

e: info@lidconsulting.com.au

p: 03 9016 9486

a: Level 6, 114 Flinders St, Melbourne 3000

w: www.lidconsulting.com.au

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Version	Date	Description	Drawings	Prepared	Checked
0.1	25/08/2026	Coordination issue	Dated 14/07/2026	PM	MH

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  LID acknowledges and pays respect to the Australian Aboriginal and Torres Strait Islander people, to their ancestors and elders, past, present and emerging, as the traditional custodians of the lands upon which we work and live. We recognise Aboriginal and Torres Strait Islander people's deep cultural and spiritual relationships to the water, land and sea, and their rich contribution to society and sustainability of country.

Executive summary

Project summary

Site type	Non-residential development
Building type	Other building
Council	Greater Geelong City Council
BESS Score	54%



Figure 1: Proposed Site Layout

This report addresses the environmentally sustainable development requirements under the specific Council Planning Area Scheme (relevant clauses listed below), specifically per clause 15 Built environment and heritage:

Planning should promote development that is environmentally sustainable and minimise detrimental impacts on or enhances the built and natural environment.

Planning should facilitate development that:

- *Is adapted and resilient to climate related hazards*
- *Supports the transition to net zero greenhouse gas emissions*
- *Minimises waste generation and supports resource recovery*
- *Conserves potable water*
- *Supports the use of, and access to, low emission forms of transport*
- *Protects and enhances the natural environment*
- *Minimises off-site detrimental impacts on people and the environment.*

This sustainability report details measures that meet and often exceed mandatory Environmentally Sustainable Design (ESD) requirements for this type of development.

The body of the report contains a full list of ESD initiatives to be included in the development.

Mandatory guidelines and tools addressed in this report as relevant to sustainability include:



- National Construction Code (NCC) Volume One Section J;
- Victorian Planning Policy (VPP) and Local Planning Policy (LPP) clauses including
 - 11 Settlement
 - 12 Environmental and Landscape Values
 - 15 Built Environment and Heritage
 - 15.01-2S Building Design
 - 15.01-2L Environmentally Sustainable Development
 - 19.03-3S Integrated Water Management
 - 53.18 Stormwater Management in Urban Development
- Built Environment Sustainability Scorecard (BESS); and
- The Blue Factor assessment.

The proposed development will address the relevant ESD requirements of the above planning scheme provisions, along with principles from the Plan for Victoria and Sustainable Design Assessment in the Planning Process framework.

Results summary

Further to the above initiatives and in conjunction with others listed in this report, the development was assessed using the 'Built Environment Sustainability Scorecard' (BESS), obtaining a total score of 54%. A score of 50% or greater (including compliance under water, energy, stormwater and IEQ categories) demonstrates a Best Practice environmentally sustainable development.

Commitment & documentation on plans

Where possible the "ESD initiatives" in each section **should be included on the plans**.

Examples include (where relevant):

- Water tank retention volume, location, and reuse connections
- WELS ratings of fixtures and fittings
- Raingarden size(s) and location.
- Shading devices
- The openable component of a window
- Mechanical equipment
- Hot water system location and type
- External materials
- Location for internal and external waste bins
- Other relevant readily shown items.

Where items are not usually shown on town planning plans, these can be included on a notes box on the drawings to ensure they flow through to construction drawings, or they can be included in the specification.

As a minimum this ESD report must be referenced in a single note, such as:

"Plans are to be read in conjunction with the endorsed ESD report (which forms part of the town planning permit submission), and all initiatives contained within must be implemented to the satisfaction of the responsible authority"

How to read this report

Initiatives within this report are catalogued by relevant Best Practice ESD categories. Each individual initiative has reference to the relevant compliance framework (where relevant), as well as description of the commitment, detailed compliance parameters, and sustainability benefits.



The below legend is provided for reference:

Compliance framework reference

Description of commitment (what).

Detail of compliance parameters (how).

Description of sustainability benefits (why).

Abbreviations used in this report include:

- NCC - BCA – National Construction Code - Building Code of Australia
- SDAPP – Council Sustainable Design Assessment in the Planning Process
- BESS – Built Environment Sustainability Scorecard



Energy

Goals

- Minimise greenhouse gas emissions from operational energy consumed – Energy source selection
- To improve the efficient use of energy and reduce total operating greenhouse gas emissions
- To reduce energy peak demand through particular design measures (e.g. appropriate building orientation, shading to glazed surfaces, optimise glazing to exposed surfaces, space allocation for solar panels and external heating and cooling equipment
- Improve efficiency in energy use through greater use of renewable energy technologies and other energy efficiency upgrades

Key Outcomes

Energy source	all electric
Heating/cooling system	reverse cycle
Hot water service	Heat pump

Initiatives

Electrification

BESS Energy 2.6

The proposed development will be all-electric.

Heating/cooling systems, hot water supply, and cooking facilities will be electric:

- Heating/cooling will be reverse cycle electric systems
- HWS will be heat pump storage units
- Cooking will be electric induction

Specification of all-electric services supports decarbonisation goals, and can facilitate net zero operational emissions where electricity is sourced from a carbon neutral (GreenPower or carbon offset) supplier.

Building sealing

NCC2022 Volume 1 Part J5 Building Sealing

The proposed development will incorporate building sealing measures for improved energy efficiency.

Building sealing will be in accordance with NCC requirements, including:

- Compressible foam or similar seals provided around doorways from conditioned to non-conditioned spaces;
- Draft protection devices along the bottom edge of external swing doors;
- Multi-fit cable and pipe seals/adhesive membrane grommets for sealing around pipes or conduits passing through the building envelope; and
- Self-closing dampers fitted to exhaust fans.



Where power or data points etc. are required installed on external walls, acoustic fire rated wall boxes will be installed behind these power and data points for electrical safety, rather than compromising the external wall envelope.

Building sealing prevents un-intended air movement through the thermal envelope (infiltration and exfiltration). Air gaps in the building fabric result in uncontrolled heating and cooling demands in addition to high risk of structural damage due to condensation internally in well insulated envelope walls.

It is important to ensure air-tight connections between internal lining on exterior walls, ceiling and floor plate, around electrical, mechanical, and hydraulic penetrations going through the air-tight barrier by using a system of grommets, membranes and tapes. Alternatively, a combination of plasterboard and caulking with high level attention to detail can make a large difference to the air leakage rate of the building.

Building fabric, heating and cooling, and hot water supply

BESS management 2.3, BESS Energy 1.1 & 2.1, NCC2022 Volume 1 Section J

The proposed development will incorporate performant building fabric, efficient heating and cooling, and hot water systems.

Walls and glazing forming part of the conditioned building envelope will adhere to NCC2022 Volume 1 Section J Part J4 requirements for thermal performance.

Floor and roof systems forming part of the conditioned building envelope will demonstrate a 10% increase to insulation requirements of NCC2022 Volume 1 Section J Part J4. In climate zone 6 this equates to R3.52 and R2.2 total system thermal resistance for exposed roof and floor systems respectively.

A preliminary assessment has been completed (refer Appendix 2), demonstrating expected wall-glazing performance requirements. Final building fabric specifications will be verified for building certification. Where a J1V3 performance solution is used to determine building fabric specifications, the proposed building will demonstrate equivalent or better energy efficiency when compared to an 'intermediate building' representing 10% improvement on NCC2022 Section J Part J4D4 roof/ceiling and Part J4D7 floor insulation levels.

Heating and cooling systems will be within 85% of the best CoP/EER available (or within one star) for the required capacity.

Water heating systems will be within one star of the best available, or 85% of the performance of the best available for the required capacity.

Specification of performant building fabric and building systems will facilitate efficient use of energy throughout the operational life of the building.



External shading

NCC2022 Volume 1 Part J4D6 Walls and Glazing, BESS IEQ 3.4

The proposed development incorporates external shading for north, east and west facing glazing.

Refer to architectural drawings for further detail of proposed shading systems.

External shading is a significant aspect of passive solar design. Optimal shading design allows for passive heat rejection in hot weather and passive heat gain in cold weather, reducing reliance on mechanical heating and cooling systems and providing operational energy and greenhouse gas emissions reductions, as well as lower peak energy demand.

Lighting

NCC2022 Volume 1 Part J7D3 Artificial Lighting, BESS Energy 3.7

High efficiency lighting systems will be specified.

LED lighting will be used, with maximum illumination power density rates in accordance with NCC allowances as follows:

Space	Maximum Illumination Power Density (W/m ²)
Storage	1.5
Kitchen	4
Toilet, staff room etc.	3
Offices	2.5 or 4.5
Children room	4.5
Common areas (e.g. corridors)	5

Where recessed lighting is specified, light fittings are to be IC4 rated to allow insulation to be installed as a continuous layer without cutouts.

Specification of efficient lighting systems will facilitate reduced energy consumption and greenhouse gas emissions, and reduce peak energy demand.

Lighting controls

NCC 2022 Volume 1 Part J7D3 Artificial Lighting

Lighting controls will be implemented to promote efficient operation of artificial lighting.

Internal lighting will:

- Be dimmable and controlled by daylight sensors to minimise the energy consumption when adequate daylight is present;
- Utilise motion sensors to ensure lights turn off for energy saving behaviour when spaces are not occupied; and



- Have switch zoning to separately control lighting within a natural lighting zone defined as a distance from the window equal to the depth of the floor to window head height.

External lighting will:

- Have daylight sensors and either a timer or motion sensor installed.

These lighting control measures further promote efficient use of energy, reduce energy consumption and greenhouse gas emissions, and reduce peak energy demand.

Indoor Environment Quality

Background

Building design and material choices impact on indoor environment quality.

Access to daylight and sunshine is advantageous to the wellbeing of humans.

Many paints, adhesives, sealants and flooring types contain Volatile Organic Compounds (VOCs) which are released into the indoor air. Joinery has, over the last 30 years, contained high levels of formaldehyde. VOCs and formaldehyde are recognised as potentially harmful to humans as well as contributors to atmospheric pollution.

Goals

- To achieve a healthy indoor environment quality for the wellbeing of building occupants, including the provision of fresh air intake, and natural daylight.
- To achieve thermal comfort levels with minimised need for heating and cooling.
- To minimise indoor air pollutants by encouraging use of materials with low toxic chemicals levels.
- To minimise noise levels and noise transfer within and between buildings and associated external areas.

Key Outcomes

Regular use areas with Best Practice daylight (%)	39%
Increase in outdoor air supply for mechanically ventilated spaces:	50%
CO ₂ monitoring to maintain a concentration not greater than:	800 ppm

Initiatives

Mechanical ventilation

BESS IEQ2.3, NCC2022 Part F6D6(b), AS1668.2 (exceeded)

Where mechanical ventilation is required, the mechanical equipment will be sized to facilitate provision of outdoor air beyond minimum requirements of AS1668.2.

CO₂ sensors will be included in mechanical ventilation systems to monitor and maintain air quality.

The mechanical ventilation system will:



- Be sized to deliver outdoor air at a rate (L/s) 50% greater than requirements of AS1668.2; and
- Monitor and maintain a concentration of CO₂ not greater than 800 ppm.
- Be designed to allow easy access for maintenance and cleaning of moisture and debris, and will be cleaned prior to building occupancy.

Mechanical ventilation can ensure appropriate ventilation rates throughout the development regardless of external conditions. Where mechanical ventilation is proposed for a larger proportion of the development, heat/energy recovery is recommended to minimise the ventilation energy losses.

Higher ventilation levels are also shown to reduce the incidence of air-borne disease transmission.

A balanced mechanical ventilation system ensures the supply of fresh air regardless of external atmospheric conditions such as wind speed, wind direction and temperature. It reduces the amount of unfiltered air infiltrating through cracks and holes in the building envelope due to pressure differences and enhances the indoor air quality. It also reduces the flow of conditioned air exfiltrating through cracks and holes in the building envelope, hence reducing the risk of condensation occurring within the external walls.

Daylight

BESS IEQ 1.4, NCC 2022 F6D4

Best Practice daylight levels are provided to regular use areas.

The proposed development achieves a Daylight Factor of >2% for 39% of regular use areas, as determined via the Green Star Hand Calculation Method.

Windows to regular use areas will have a total system (glass and frame) Visible Light Transmittance (VLT) of not less than 40%.

Windows must be sized with an aggregate light transmitting area (measured exclusive of framing members, glazing bars, or other obstructions) not less than 10% of the floor area of the room must be provided in accordance with NCC2022 Part F6D4.

High quality daylight provides improved amenity, and may reduce reliance on artificial lighting.

Low VOC products

BESS IEQ4.1

The development will provide low VOC paints, adhesives, sealants and carpets.

The VOC content of paints, adhesives and sealants will not exceed the levels listed in the table below (VOC limits are less water and exempt compounds), as derived from Green Star Buildings.



Product category	Maximum VOC content (g/L)
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 & two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membrane and sealant, fire retardant sealant and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesive and sealants	100

The VOC content of carpets will not exceed the levels listed in the table below in accordance with the relevant test protocols.

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/EN13419 – TVOC at three days	0.5mg/m ² per hour
ISO 10580 / ISO/TC 219 (document N238) – TVOC at 24 hours	0.5mg/m ² per hour

Volatile Organic Compounds is the term used to describe several hundred petrochemical solvent type compounds found in paints, adhesives, sealants, carpets, reconstituted wood products, and new furniture. Newer buildings generally have higher concentrations of these VOC's that contribute to headache, lethargy etc. in occupants.

Low VOC adhesives and sealants are readily available and can be purchased in bulk to minimise the price premium.

Low formaldehyde products

BESS IEQ4.1

The development will provide low formaldehyde timber-based products.

Engineered wood products (including MDF, particleboard and plywood) will be formaldehyde class E1 or better.

Formaldehyde emissions in engineered wood products are classed as below:

Class	Limits (mg/L)
Super E0	≤ 0.3
E0	≤ 0.5
E1	≤ 1.0
E2	≤ 2.0
E3	> 2.0



Formaldehyde is used in the production of resins that act as glues for engineered wood products and is a colourless gas with a strong odour. Exposure to formaldehyde can cause irritation in the eyes, nose and throat.

Integrated Water Management

Background

As populations increase and global warming contributes to fast climate change, the access to clean potable water will become more of an issue to Australians and the world. Inefficient use of water can lead to the destruction of habitats. Over-use of artesian water supplies can result in rising water tables and salination of soils.

Furthermore, pollutants that build up on impervious surfaces get washed into the stormwater system and end up in local waterways. Water Sensitive Urban Design is now a major goal of urban development to prevent this occurring.

The quality of water leaving a site (and peak and total stormwater run-off volumes) can be improved by collection of water in water tanks, natural infiltration through gardens and lawns into the soils, and minimisation of impervious pavements or the shedding of water from impervious surfaces into garden beds that have particularly good infiltration into the ground – known as infiltration beds.

Goals

- To ensure the efficient use of water.
- To reduce total operating potable water use.
- To incorporate the use of water sensitive urban design, including stormwater re-use.
- To encourage the appropriate use of alternative water sources.
- To minimise associated water costs
- To reduce the impact of stormwater run-off
- To improve the quality of stormwater run-off
- To achieve best practice stormwater quality outcomes

Key Outcomes

Fixtures/fittings/appliances:	
Showers	4 Star WELS (≥6.0 but ≤7.5)
Kitchen taps	≥5 Star WELS rating
Bathroom taps	≥5 Star WELS rating
Dishwashers	≥3 Star WELS rating
WC	≥4 Star WELS rating
Urinals	N/A
Washing machine	≥4 Star WELS rating
Blue Factor score achieved	172%
Rainwater tank retention volume	8,000L
Rainwater catchment area (m ²)	615m ²
Rainwater tank connected to	toilets
Raingarden area (m ²)	8m ²



Initiatives

Stormwater quality

BESS Stormwater 1.1, Urban Stormwater Management Guidance – Publication 1739.1 (EPA, 2021)

The proposed development demonstrates Best Practice stormwater quality outcomes.

Stormwater leaving the site will be treated to Best Practice standards in accordance with the Urban Stormwater Management Guidance – Publication 1739.1 (EPA, 2021).

A Blue Factor score of 172% was achieved (scores $\geq 100\%$ represent Best Practice) with consideration of stormwater quality systems described below.

Note in accordance with the Australian Rainfall and Runoff (ARR2019) guidelines, impervious areas are those which have an immediate rainfall runoff response (i.e. dedicated drainage from a surface or concentrated flows). Only impervious areas meeting this definition have been considered in this stormwater quality assessment.

Refer to Appendix 4 for further detail.

The implementation of Water Sensitive Urban Design (WSUD) and Integrated Water Management (IWM) principles minimises negative environmental impacts of stormwater runoff and leads to reduced potable water demand throughout operation.

Fixtures, fittings and appliances

BESS Water 1.1

The proposed development will utilise water efficient fixtures, fittings and appliances.

Fixtures, fittings and appliances will conform to the following WELS ratings:

Fixture/fitting/appliance	WELS Rating
Showers	4 Star WELS (≥ 6.0 but ≤ 7.5)
Kitchen taps	≥ 5 Star WELS rating
Bathroom taps	≥ 5 Star WELS rating
Dishwashers	≥ 3 Star WELS rating
WC	≥ 4 Star WELS rating
Urinals	N/A
Washing machine	≥ 4 Star WELS rating

Products will be specified based on recommendations from www.savewater.com.au or from the product search on the following site www.waterrating.gov.au.

The above specifications contribute to a more water efficient and drought resilient development.



Rainwater harvesting and reuse

BESS Water 1.1, BESS Stormwater 1.1, Urban Stormwater Management Guidance – Publication 1739.1 (EPA, 2021)

Rainwater harvesting and reuse systems will be utilised in the proposed development, contributing to a Best Practice stormwater quality outcome and reducing potable water consumption.

Rainwater tanks of 8,000L retention volume will collect rainfall runoff from 615 m² of roof areas. Rainwater tanks will be connected to toilets. Refer to Appendix 4 for further details.

Leaf diverting rain heads and/or first flush diverters will be included upstream of the tank to divert the initial flow from entering the tank when a rain event occurs.

Pumps and manual over-ride switches will be readily accessible in the event of malfunction.

The location of tanks, pumps and maintenance access is to be shown on architectural drawings.

The use of rainwater harvesting and reuse systems promotes Integrated Water Management principles, reducing stormwater runoff volume and pollutant concentrations, as well as reducing potable water consumption.

Raingardens

BESS Stormwater 1.1, Urban Stormwater Management Guidance – Publication 1739.1 (EPA, 2021)

Raingardens will be included in the drainage design to treat stormwater runoff from hardstand surfaces, contributing to a Best Practice stormwater quality outcome.

Raingardens of 8 m² will treat runoff from hardstand areas as specified in Appendix 4. The proposed raingardens have been sized at 2% of the associated catchment area. Should multiple raingardens be specified during detailed design, the size of each individual raingarden will be proportionate to the impervious area being treated, and not less than 2m².

Raingardens require layers of filter media and plants above a slotted pipe connected to the stormwater mains or stormwater outfall. An overflow pipe should also be located nearby should the raingarden clog up and/or be inundated beyond design capacity. The filter media may include scoria, screenings or loamy sand.

The final design of stormwater systems will be the responsibility of the relevant drainage engineer, and will be in accordance with council drainage requirements.

Inclusion of raingardens to filter hardstand surface runoff reduces urban stormwater pollution and improves waterway health.



Site permeability

BESS Stormwater 1.1, Urban Stormwater Management Guidance – Publication 1739.1 (EPA, 2021)

The development adopts measures to enhance and maintain site permeability.

The landscape design incorporates vegetated areas (garden and lawn areas), allowing direct infiltration of rainfall.

Permeable sites minimise stormwater runoff by permitting rain water to be absorbed into the soil. The proposed measures will reduce the volume of stormwater runoff, mitigate localised flooding risks, reduce pollution of waterways and contribute to recharge of groundwater.

Landscaping

BESS Water 3.1

The development will incorporate potable water efficient landscaping.

Proposed planting will be water efficient and will not require watering after an initial period when plants are getting established. Therefore, no irrigation system is proposed.

Specification of landscaping with no potable water demands further enhances objectives of resource efficiency and climate resilience.

Material Selection

Background

Careful selection of construction materials can help to limit the environmental impacts of the production, transport, and incorporation of these materials in our buildings. In many cases there are similarly performing, comparable but more environmentally friendly product selection options available.

Goals

The goals in environmentally sustainable construction material selection should be to:

- Limit the use of new materials where possible - to help minimise the detrimental outcomes of product manufacture or modification.
- Select durable materials and re-use materials where possible – increase the lifespan of all products.
- minimise the environmental impacts materials used, by encouraging the use of materials with a favourable lifecycle assessment based on the fate of materials, their recycling / reuse potential, their embodied energy, their biodiversity, human health, and environmental toxicity impacts.



Initiatives

Concrete

SDAPP 5.0 Building Materials

The proposed development will incorporate lower embodied carbon concretes.

Concretes with 20-35% (or greater) Supplementary Cementitious Materials (SCMs) such as slag or flyash, or similar geopolymer mixes will be utilised for on-site on-ground poured concrete mixes, subject to structural requirements.

In addition, recycled aggregate, water and/or sand will be included in the concrete mixes.

Concrete mixes with SCMs have circular economy and lower embodied energy components. Waste products such as slag and flyash partially substitute the carbon intensive Portland cement in concrete mixes, reducing the embodied carbon of the concrete product.

Embodied energy levels:

Concrete Product	Embodied carbon (TCO ₂ -e/m ³)	Embodied carbon as a percentage of 32MPa OPC
Generic 32MPa Ordinary Portland Cement (OPC)	0.481	100%
With 20% flyash	0.397	82.5%
With 20% blast furnace slag	0.404	84.0 %
With 50% flyash	0.273	56.8%
With 50% blast furnace slag	0.288	60.0%
With 100% slag or flyash geopolymer replacement (requires structural approval)	0.120	25.0%
Holcim EcoPact	0.198	41.1%
Holcim EcoPact Zero (ECOPact with carbon offset)	0.028	5.8%

Source – The Green Book

Asphalt

SDAPP 5.0 Building Materials

The proposed development will incorporate lower embodied carbon asphalts.

Asphalt will be warm mix, foam mix, Reclaimed Asphalt Pavement (RAP) or asphalt using recycled waste content (such as Reconophalt, GreenPave, Innovo, Green Roads - PolyPave and others) subject to design engineer's approval.

The proposed asphalt systems are less energy intensive than conventional hot mix asphalt, with significantly lower embodied carbon.



Warm-mix asphalt allows the mixture to be laid at a lower temperature of 110-140°C compared to 160-180°C for traditional hot-mix asphalt. This leads to warm-mix benefits including using 30% less energy, a reduction of up to 30% greenhouse gas emissions.

Warm mix asphalt is available on all asphalt mix types, including recycled asphalt.

Similarly, foam-mix is laid at a lower temperature with benefits including producing 50% less CO₂ and a shorter setting time whereby traffic can resume as quickly as 30 minutes after application. The use of warm and foam-mix asphalt is subject to engineer's approval. Foam mix asphalt is found to be approximately 20-30% cheaper than hot-mix equivalent and can incorporate 75% to 95% recycled asphalt content.

Adjusting the mix of recycled products impacts the characteristics of the path or road.

Light coloured roofing

NCC2022 Volume 1 Part J4D4

The upper surface of roofs will have a solar absorptance (SA) of ≤ 0.45 .

The Colorbond colour range in the link below can inform solar absorptance values of different finishes for metal roof construction:

<https://steel.com.au/resources/colours>

Where a performance solution is used to demonstrate compliance with Part J4D4 and a higher SA value is nominated, this must ensure equivalent or better thermal performance and comfort outcomes when compared to the reference building.

Light coloured roofing can help mitigate Urban Heat Island (UHI) effects by reflecting more solar radiation when compared with darker colours of the same material. This can also result in lower cooling requirements and peak energy demand from the building in operation.

Light coloured paving

Green Star Buildings Credit 19

Unshaded paving products will be specified with light colours, providing improved Solar Reflectance Index (SRI) values.

Unshaded paving products will have a three-year SRI of ≥ 34 , or an initial SRI of ≥ 39 .

Paving that is shaded by permanent structures at midday on the summer solstice are exempt from this requirement.

Light coloured paving can help mitigate Urban Heat Island (UHI) effects by reflecting more solar radiation when compared with darker colours of the same material.



Timber

SDAPP 5.0 Building Materials

Sustainable timber products will be specified for the proposed development.

Framing timber will be sourced from accredited sustainable plantations (either FSC or PEFC/AFS accreditation).

No rainforest timbers will be incorporated i.e. no Oregon, Western Red Cedar, Meranti, Merbau, Teak or Luan.

Specification of sustainable timber products from accredited certification schemes helps to mitigate threats to flora and fauna caused by logging.

Insulation

SDAPP 5.0 Building Materials

Insulation products will be specified to minimise environmental impacts through use of recycled and circular economy materials.

Where glasswool or polyester insulation are specified, these will incorporate a minimum 80% recycled glass or polyester content (subject to relevant fire rating and acoustic requirements).

Alternatively, natural wool or recycled textile (e.g. denim) will be specified.

In addition, insulation products will reduce potential negative health effects by not using formaldehyde as a binder.

Specification of circular economy insulation, containing recycled content, significantly reduces embodied carbon.

Location and Transport

Goals

- To ensure that the built environment is designed to promote the use of walking, cycling and public transport in that order.
- To minimise car dependency
- To promote the use of low emission vehicle technologies and supporting infrastructure

Location

Green travel options are dependent on the following factors:

- Location of the site
- Walking distance of facilities
- Cycling facilities – paths and parking and End-of-Trip facilities
- Public transport facilities



- Parking facilities for other motorised vehicles

Google Maps and similar apps have a bicycling filter indicating where off road bike trails as well as dedicated bike lanes are located. It is expected that the occupants and visitors will use their preferred app or browser to locate bicycle paths and trails, find public transport options with live updates, and identify preferred walking routes to their destination.

Principal Bicycle Network (PBN) routes for each council area are available via the following link <https://www.vicroads.vic.gov.au/traffic-and-road-use/cycling/bicycle-network-planning>

Initiatives

Public transport

SDAPP 6.0 Transport

The proposed development is serviced by the following public transport options:

- Bus – 200 metres from the site (routes 31 and 30)

Tram, bus and train timetables can be accessed from <http://ptv.vic.gov.au/timetables/>

A full range of Public Transport Victoria maps can be sourced from <http://ptv.vic.gov.au/getting-around/maps/>

For more train specific information visit www.metrotrains.com.au

A Travel Smart map showing major local travel interchanges can be obtained for the councils listed on the site:

<http://www.transport.vic.gov.au/projects/travelsmart/maps>

Public transport offers significant environmental benefits over personal car use, including reduced greenhouse gas emissions and improved air quality.

Waste Management

Goals

- To promote waste avoidance, re-use and recycling during the design, construction, and operation stages of development.
- To ensure durability and long-term re-usability of building materials.
- To ensure sufficient space is allocated for future change in waste management needs, including (where possible) composting and green waste facilities.

Initiatives

Demolition and construction waste

SDAPP 7.0 Waste Management

Demolition and construction activities will minimise waste.

A minimum of 80% of waste (by mass) from demolition and construction activities will be recycled or reused.



Demolition and construction waste management must:

- Allow sufficient space on site to accommodate skips for different waste and recycling streams;
- Clearly label individual skips and bins, with protections from contamination, rain and wind;
- Organise regular pick-up of skips and bins to avoid overloading or misuse of containers;
- Ensure sub-contractors are fully aware of the site's waste management practices;
- Ensure written contracts with trades include waste minimisation practices; and
- Request suppliers collect/recycle packaging.

Relevant demolition and construction contractors are to provide documentation confirming waste and recycling rates by mass.

Poor waste practices lead to a degradation of water, air and land resources. By setting minimum recycling requirements in construction and demolition, the proposed development aims to minimise these environmental impacts.

The following materials can generally be recycled:

- Bricks
- Concrete products (i.e. blocks, roof tiles, pavers etc)
- Unpainted or untreated timber
- Steel / metal products
- Glass
- Unpainted plasterboard
- Plastics
- Carpet underlay
- Carpet tiles
- Asphalt
- Cardboard
- Green waste

Operational waste

BESS Waste 2.1 & 2.2, Clause 15.01-2S, SDAPP 7.0 Waste Management

The proposed development will facilitate Best Practice operational waste management.

To facilitate separation of waste, the following bins will be provided as a minimum.

- Garbage (landfill waste)
- Co-mingled recycling (paper and plastic),

Through separation and streaming of operational waste the proposed development promotes the Best Practice principles for waste minimisation – Reduce, Reuse and Recycle.

Plastering waste

SDAPP 7.0 Waste Management

Plasterboard waste produced during construction will be recycled.



Plastering contractors will be required to supply their own bin and recycle plasterboard off-cuts.

Separation of plasterboard from skip bins helps divert this material from landfill and simplifies the recycling process.

Urban Ecology

Background

Urban development has seen the destruction and displacement of plant species and in turn wildlife habitat. With new developments there is an opportunity to redress this that should be taken up.

Goals

- To protect and enhance habitat biodiversity of the urban environment
- To encourage the retention of significant trees
- To encourage the planting of indigenous vegetation
- To reduce CO₂ in the atmosphere through increased vegetation
- Reduce the urban heat island effect by greening urban areas, buildings, transport corridors and open spaces with vegetation (c115.02-1S)
- Encourage retention of existing vegetation and planting of new vegetation as part of development proposals (c115.02-1S)

Key Outcomes

Communal space provided (m ²)	33m ²
Vegetation as percentage of total site area (%)	40%

Initiatives

Communal spaces

BESS Urban Ecology 1.1

The proposed development will include a minimum of 33 m² of communal spaces for building occupants.

Communal open spaces may be indoors or outdoors, and include courtyards with seating, terraces, community rooms etc.

The inclusion of communal spaces promotes social exchange and contributes to a happier and healthier building environment.

Vegetative cover

BESS Urban Ecology 2.1

The proposed development will include vegetated landscaping.



The landscaping plan will ensure a minimum of 40% of site area is vegetated.

Vegetated areas include garden beds and turf, and exclude hard landscaping elements such as paving and decks, as well as bin areas and storage areas.

Gardens and green areas help to minimise the Urban Heat Island (UHI) effect through shading, evapotranspiration and higher solar reflectivity. Vegetation also increases the opportunities for biodiversity on site.

Management, Innovation, Climate Adaptation and Community Benefit

Goals

- To encourage design and innovation in the development, which positively influence the improved life of, and sustainability of, the building.
- To encourage a holistic and integrated design and construction process and ongoing high performance.

Initiatives

Metering

BESS Management 3.2, NCC2022 Volume 1 Part J9D3

The proposed development will include metering of electricity, water and gas (where applicable).

Utility meters will be installed for all services, allowing identification of electricity, water consumption.

Providing building users with information that allows monitoring of resource usage facilitates and encourages more efficient use of these resources. The proposed metering measures will contribute to a more resource efficient development in operation.

Climate adaptation and resilience

SDAPP 9.1 Melbourne's Climate

The proposed development will address climate responsive design principles.

The following risks are to be considered and addressed in design:

- Higher temperature threats
 - Building fabric of the thermal envelope to be well insulated, with appropriate shading for improved thermal comfort.
 - Location of cooling equipment and air intakes to be considered, aiming to reduce intake of pollutants and limit intake near heat sources. Cooling equipment should be located away from heat sources.



- Extreme wind threats - external services are to be installed so as to be protected from windblown vegetation or high wind loads.
- Extreme rainfall events - heating/cooling, services, lifts, and energy supply services are to be located to not suffer the effects of heavy rainfall, hail stones or flooding of roof drainage systems or flooding at ground level.
- Poor indoor air quality - airborne dust or smoke ingress is to be considered and addressed.
- Weather proofing - Windows and doors will be designed to handle water from extreme rainfall events.

Consideration of climate responsive design principles results in more resilient, healthy, efficient and comfortable buildings.

Appendix 1 - BESS Report

BESS Buildings Report

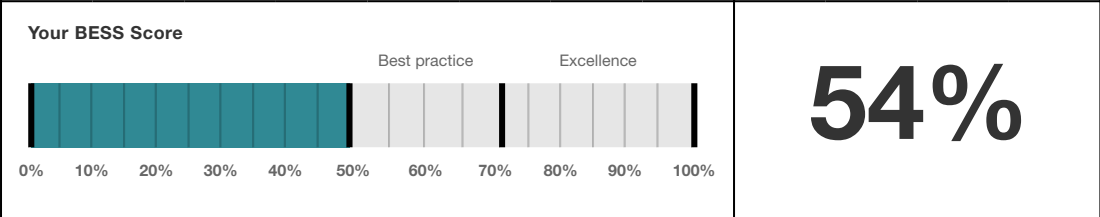
Built Environment Sustainability Scorecard



This BESS report outlines the sustainable design commitments of the proposed development at 23 Townsend Rd Whittington Victoria 3219. 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 Greater Geelong 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.

Note: This is a DRAFT and not suitable for submission to council

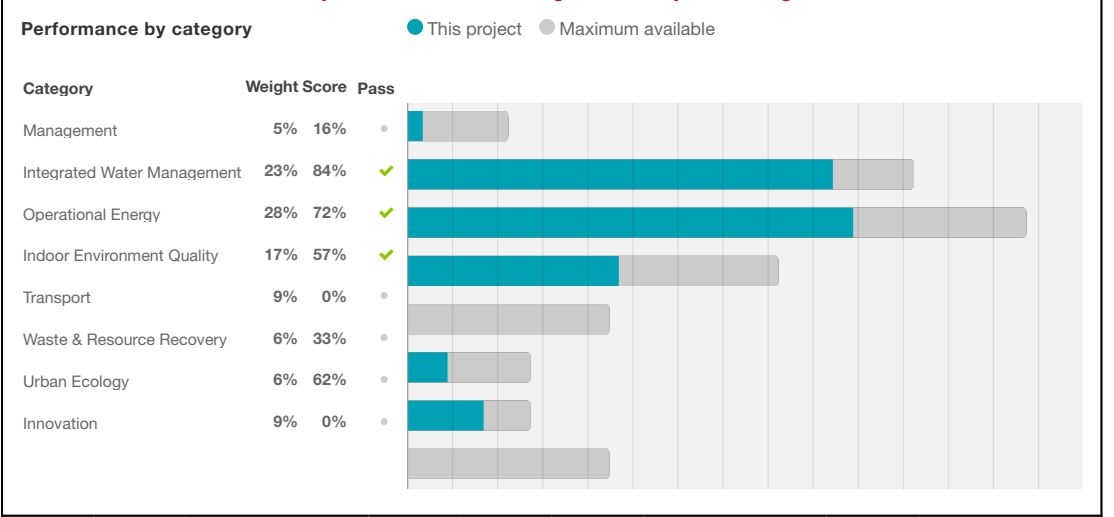


Project details

Name	23-25 Townsend Road, Whittington VIC, Australia
Address	23 Townsend Rd Whittington Victoria 3219
Project ID	86D614FA
BESS Version	BESS-10
Date	25 August 2026
Software version	2.3.0-B.655

Site type	Non-residential development
Account	info@lidconsulting.com.au
Application no.	
Site area	1,872 m²
Building floor area	665 m²





Buildings

Name	Height	Footprint	% of total footprint
23-25 Townsend Road, Whittington VIC, Australia	1	665 m²	100%

Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	Building	% of total area
Other building				
childcare	1	665 m²	23-25 Townsend Road, Whittington VIC, Australia	100%
Total	1	665 m²		100%

Supporting Evidence

Shown on Floor Plans

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		-

Credit	Requirement	Response	Status
Waste & Resource Recovery 2.2	Location of recycling facilities		-
Urban Ecology 1.1	Location and size of communal spaces		-
Urban Ecology 2.1	Location and size of vegetated areas		-

Supporting Documentation

Credit	Requirement	Response	Status
Management 2.3a	Section J glazing assessment		-
Integrated Water Management 2.1	STORM report or MUSIC model		-
Operational Energy 1.1	Energy Report showing calculations of reference case and proposed buildings		-
Operational Energy 3.7	Average lighting power density and lighting type(s) to be used		-
Indoor Environment Quality 1.4	A short report detailing assumptions used and results achieved.		-

Credit summary

Management Overall contribution 4.5%

		16%
1.1 Pre-Application Meeting		0%
2.3 Thermal Performance Modelling - Non-Residential		50%
3.2 Metering - Non-Residential		N/A ⚡ Scoped Out
		single tenancy
3.3 Metering - Common Areas		N/A ⚡ Scoped Out
		single tenancy
4.1 Building Users Guide		0%

IWM Overall contribution 22.5%

		84%	✔ Pass
1.1 Potable Water Use		53%	✔ Achieved
2.1 Stormwater Treatment		100%	✔ Achieved
3.1 Water Efficient Landscaping		100%	
4.1 Building Systems Water Use		N/A ⚡ Scoped Out	
		no water based fire safety or heat rejection systems proposed	

Operational Energy Overall contribution 27.5%

		Minimum required 50%	72%	✓ Pass
1.1 Thermal Performance Rating - Non-Residential			37%	
2.1 Greenhouse Gas Emissions			100%	
2.2 Peak Demand			100%	
2.6 Electrification			100%	
2.7 Energy consumption			100%	
3.1 Carpark Ventilation			N/A	✦ Scoped Out
				open carpark
3.2 Hot Water - Non-Residential			100%	
3.7 Internal Lighting - Non-Residential			100%	
4.1 Combined Heat and Power (cogeneration / trigeneration)			N/A	✦ Scoped Out
				No cogeneration or trigeneration system in use.
4.2 Renewable Energy Systems - Solar			0%	⊗ Disabled
				No solar PV renewable energy is in use.
4.4 Renewable Energy Systems - Other			N/A	✦ Scoped Out
				No other (non-solar PV) renewable energy is in use.

IEQ Overall contribution 16.5%

		Minimum required 50%	57%	✓ Pass
1.4 Daylight Access - Non-Residential			39%	✓ Achieved
2.3 Ventilation - Non-Residential			50%	✓ Achieved
3.4 Thermal comfort - Shading - Non-Residential			94%	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential			50%	
4.1 Air Quality - Non-Residential			100%	

Transport Overall contribution 9.0%

		0%
1.4 Bicycle Parking - Non-Residential		0%
1.5 Bicycle Parking - Non-Residential Visitor		0%
1.6 End of Trip Facilities - Non-Residential		0%
		⊗ Disabled
		Credit 1.4 must be complete first.
2.1 Electric Vehicle Infrastructure		0%
2.2 Car Share Scheme		0%
2.3 Motorbikes / Mopeds		0%

Waste & Resource Recovery Overall contribution 5.5%

		33%
1.1 Construction Waste - Building Re-Use		0%
2.1 Operational Waste - Food & Garden Waste		0%
2.2 Operational Waste - Convenience of Recycling		100%

Urban Ecology Overall contribution 5.5%

		62%
1.1 Communal Spaces		100%
2.1 Vegetation		100%
2.2 Green Roofs		0%
2.3 Green Walls and Facades		0%
3.2 Food Production - Non-Residential		0%

Innovation Overall contribution 9.0%

		0%
1.1 Innovation		0%

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Credit breakdown

Management Overall contribution 4.5%

	16%
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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	
2.3 Thermal Performance Modelling - Non-Residential		50%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2022 Section J4D6?	
Question	Criteria Achieved ?	
Other building	Yes	
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2022 Section J (Energy Efficiency), NABERS or Green Star?	
Question	Criteria Achieved ?	
Other building	No	
3.2 Metering - Non-Residential		N/A ✦ Scoped Out
	single tenancy	
This credit was scoped out	single tenancy	
3.3 Metering - Common Areas		N/A ✦ Scoped Out
	single tenancy	
This credit was scoped out	single tenancy	
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	

IWM Overall contribution 22.5%

84% ✔ Pass

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?: Blue Factor

Blue Factor score achieved?: 172

Flow: -

Total Suspended Solids: -

Total Phosphorus: -

Total Nitrogen: -

Rainwater tank profile

What is the total roof area connected to the rainwater tank?:

Rainwater Tank 1 615 m²

-

Tank Size:

Rainwater Tank 1 8,000 Litres

-

Irrigation area connected to tank:

Rainwater Tank 1 0.0 m²

-

Is connected irrigation area a water efficient garden?:

Rainwater Tank 1 No

-

Other external water demand connected to tank?:

Rainwater Tank 1 0.0 Litres/Day

-

Fixtures, fittings & connections profile

Building: 23-25 Townsend Road, Whittington VIC, Australia

Showerhead: 4 Star WELS (>= 6.0 but <= 7.5)

Bath: Scope out

Kitchen Taps: >= 5 Star WELS rating

Bathroom Taps: >= 5 Star WELS rating

Dishwashers: >= 3 Star WELS rating

WC: >= 4 Star WELS rating

Urinals: Scope out

Washing Machine Water Efficiency: >= 4 Star WELS rating

Which non-potable water source is the dwelling/space connected to?: Rainwater Tank 1

Non-potable water source connected to Toilets: Yes

Non-potable water source connected to Laundry (washing machine):		No	
Non-potable water source connected to Hot Water System:		No	
1.1 Potable Water Use			53% ✓ 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	1618 kL		
Output	Proposed (excluding rainwater and recycled water use)		
Project	1250 kL		
Output	Proposed (including rainwater and recycled water use)		
Project	1050 kL		
Output	% Reduction in Potable Water Consumption		
Project	35 %		
Output	% of connected demand met by rainwater		
Project	100 %		
Output	How often does the tank overflow?		
Project	Very Often		
Output	Opportunity for additional rainwater connection		
Project	553 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 Blue Factor Score		
Project	100		
Output	Blue Factor Score		
Project	172		
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		
4.1 Building Systems Water Use			N/A ✦ Scoped Out
no water based fire safety or heat rejection systems proposed			
This credit was scoped out		no water based fire safety or heat rejection systems proposed	

Operational Energy Overall contribution 27.5%

Minimum required 50%

72%

✔ Pass

Project profile

Use the BESS Deem to Satisfy (DtS) method for Non-residential spaces?:

Are you installing any renewable energy system(s) (other than solar photovoltaic)?:

Energy Supply: All-electric

Non-residential Deemed-to-Satisfy profile

Do all exposed floors and ceilings (forming part of the envelope) demonstrate a minimum 10% improvement in required NCC2022 insulation levels (total R-value upwards and downwards)?:

Does all wall and glazing demonstrate meeting the required NCC2022 facade calculator (or better than the total allowance)?:

Are heating and cooling systems within one Star of the most efficient equivalent capacity unit available, or Coefficient of Performance (CoP) & Energy Efficiency Ratios (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available?:

Are water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit?:

1.1 Thermal Performance Rating - Non-Residential

37%

Score Contribution This credit contributes 36.4% towards the category score.

Criteria What is the % reduction in heating and cooling energy consumption against the reference case (NCC2022 Section J)?

2.1 Greenhouse Gas Emissions

100%

Score Contribution This credit contributes 9.1% towards the category score.

Criteria What is the % reduction in annual greenhouse gas emissions against the benchmark?

2.2 Peak Demand

100%

Score Contribution This credit contributes 4.5% towards the category score.

Criteria What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?

2.6 Electrification

100%

Score Contribution This credit contributes 13.6% 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 18.2% towards the category score.		
Criteria	What is the % reduction in annual energy consumption against the benchmark?		
3.1 Carpark Ventilation		N/A	✦ Scoped Out
	open carpark		
This credit was scoped out	open carpark		
3.2 Hot Water - Non-Residential		100%	
Score Contribution	This credit contributes 4.5% towards the category score.		
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?		
3.7 Internal Lighting - Non-Residential		100%	
Score Contribution	This credit contributes 9.1% towards the category score.		
Criteria	Does the maximum illumination power density (W/m2) in at least 90% of the area of the relevant building class meet the requirements in Table J7D3a of the NCC 2022 Vol 1?		
Question	Criteria Achieved ?		
Other building	Yes		
4.1 Combined Heat and Power (cogeneration / trigeneration)		N/A	✦ Scoped Out
	No cogeneration or trigeneration system in use.		
This credit was scoped out	No cogeneration or trigeneration system in use.		
4.2 Renewable Energy Systems - Solar		0%	⊘ Disabled
	No solar PV renewable energy is in use.		
This credit is disabled	No solar PV renewable energy is in use.		
4.4 Renewable Energy Systems - Other		N/A	✦ Scoped Out
	No other (non-solar PV) renewable energy is in use.		
This credit was scoped out	No other (non-solar PV) renewable energy is in use.		

IEQ Overall contribution 16.5%

		Minimum required 50%	57%	✓ Pass
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1.4 Daylight Access - Non-Residential			39%	✓ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.			
Criteria	What % of the nominated floor area has at least 2% daylight factor?			
Question	Percentage Achieved?			
Other building	39 %			
2.3 Ventilation - Non-Residential			50%	✓ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.			
Criteria	What % of the regular use areas are effectively naturally ventilated?			
Question	Percentage Achieved?			
Other building	-			
Criteria	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668.2:2012?			
Question	Percentage Achieved?			
Other building	50 %			
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?			
Question	Value			
Other building	800 ppm			
3.4 Thermal comfort - Shading - Non-Residential			94%	
Score Contribution	This credit contributes 17.6% towards the category score.			
Criteria	What percentage of east, north and west glazing to regular use areas is effectively shaded?			
Question	Percentage Achieved?			
Other building	92 %			
3.5 Thermal Comfort - Ceiling Fans - Non-Residential			50%	
Score Contribution	This credit contributes 5.9% towards the category score.			
Criteria	What percentage of regular use areas in tenancies have ceiling fans?			
Question	Percentage Achieved?			
Other building	50 %			
4.1 Air Quality - Non-Residential			100%	
Score Contribution	This credit contributes 5.9% towards the category score.			

Criteria	Do all paints, sealants and adhesives meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Other building	Yes
Criteria	Does all carpet meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Other building	Yes
Criteria	Does all engineered wood meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Other building	Yes

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Transport Overall contribution 9.0%

	0%
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1.4 Bicycle Parking - Non-Residential		0%
Score Contribution	This credit contributes 25% towards the category score.	
Criteria	Have the planning scheme requirements for employee bicycle parking been exceeded by at least 50% (or a minimum of 2 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Other building	-	
Question	Bicycle Spaces Provided ?	
Other building	-	
1.5 Bicycle Parking - Non-Residential Visitor		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have the planning scheme requirements for visitor bicycle parking been exceeded by at least 50% (or a minimum of 1 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Other building	-	
Question	Bicycle Spaces Provided ?	
Other building	-	
1.6 End of Trip Facilities - Non-Residential		0% ☒ Disabled
		Credit 1.4 must be complete first.
This credit is disabled	Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure		0%
Score Contribution	This credit contributes 25% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	-	
2.2 Car Share Scheme		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Has a formal car sharing scheme been integrated into the development?	
Question	Criteria Achieved ?	
Project	-	
2.3 Motorbikes / Mopeds		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?	
Question	Criteria Achieved ?	
Project	-	

Waste & Resource Recovery Overall contribution 5.5%

		33%
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1.1 Construction Waste - Building Re-Use		0%
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Score Contribution	This credit contributes 33.3% 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	-	

2.1 Operational Waste - Food & Garden Waste		0%
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Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Are facilities provided for on-site management of food and garden waste?	
Question	Criteria Achieved ?	
Project	-	

2.2 Operational Waste - Convenience of Recycling		100%
--	--	------

Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Are the recycling facilities at least as convenient for occupants as facilities for general waste?	
Question	Criteria Achieved ?	
Project	Yes	

Urban Ecology Overall contribution 5.5%

		62%
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1.1 Communal Spaces		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Is there at least the following amount of common space measured in square meters : * 1m ² for each of the first 50 occupants * Additional 0.5m ² for each occupant between 51 and 250 * Additional 0.25m ² for each occupant above 251?	
Question	Common space provided	
Other building	33.0 m ²	
Output	Minimum Common Space Required	
Other building	33 m ²	
2.1 Vegetation		100%
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	40 %	
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	-	
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	-	
3.2 Food Production - Non-Residential		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	What area of space per occupant is dedicated to food production?	
Question	Food Production Area	
Other building	-	
Output	Min Food Production Area	
Other building	9 m ²	

Innovation Overall contribution 9.0%

	0%
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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)?

Note

This is a DRAFT and not suitable for submission to council.

Disclaimer

The Built Environment Sustainability Scorecard (BESS) has been provided for the purpose of information and communication. While we make every effort to ensure that material is accurate and up to date (except where denoted as 'archival'), this material does in no way constitute the provision of professional or specific advice. You should seek appropriate, independent, professional advice before acting on any of the areas covered by BESS.

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Appendix 2 - Preliminary Energy Assessment

Non-residential Preliminary Wall-glazing Assessment

NCC 2022 Wall-Glazing Calculator											
Wall and glazing energy efficiency in Class 2-9 buildings - Method 2 of Specification 37, NCC 2022											
Building name and description					Classification		Climate Zone				
Townsend rd 23-25 Whittington					Other		6				
Calculated Area-Weighted U-Value					2.00		Calculated Representative Air-Conditioning Energy Value				
Allowable Area-Weighted U-Value					2.00		68.7				
Building total U-Value allowance met					100%		Allowable Representative Air-Conditioning Energy Value				
							69.0				
Building total SHGC allowance met					100%						
Check Values		Wall Element Requirements		Met		Display Glazing Element Requirements		-			
Visible											
Use of this calculator does not guarantee compliance with the NCC. The disclaimer and a version update check are available at the bottom of the page.											
Element Description					U-Value		SHGC and Shading				
ID	Description (optional)	Element Type	Facing Sector	Area (m ²)	U-Value	U-Value Element share of allowance used	SHGC	Glazing Height (m)	Shading Height (m)	Shading Projection (m)	SHGC Element share of allowance used
1	south wall	Wall	South	69.00	0.71	7% of building total					Not counted
2	north wall	Wall	North	51.00	0.71	5% of building total					9% of building total
3	east wall	Wall	East	61.10	0.71	6% of building total					18% of building total
4	west wall	Wall	West	28.60	0.71	3% of building total					2% of building total
5	south glaz	Glazing	South	29.40	3.90	17% of building total	0.21				4% of building total
6	north glaz 1	Glazing	North	34.20	3.90	20% of building total	0.21	2.1	2.1		0.6 4% of building total
7	north glaz 2	Glazing	North	3.90	3.90	2% of building total	0.21	1.8	1.8		0.6 Not counted
8	north glaz 3	Glazing	West	12.40	3.90	7% of building total	0.21	1.2	1.2		0.6 8% of building total
9	north glaz 4	Glazing	West	8.60	3.90	5% of building total	0.21				7% of building total
10	east glaz	Glazing	East	21.60	3.90	12% of building total	0.21	1.8	1.8		0.6 4% of building total
11	west glaz 1	Glazing	West	20.00	3.90	11% of building total	0.21	1.8	1.8		0.6 0% of building total
12	west glaz 2	Glazing	West	10.50	3.90	6% of building total	0.21	2.1	2.1		0.6 Not counted
13	west glaz 3	Glazing	West	1.20	3.90	1% of building total	0.21	1.2	1.2		0.6 Not counted



Appendix 3 - Daylight Assessment

BESS Daylight Assessment

The following details the BESS daylight deemed to satisfy compliance outcomes for the development (Per BESS tool notes IEQ 1.4)

Space	Nominated area (m ²)	Compliant area (m ²)	Compliant area
GF	353.2	135.5	38.3%
1F	61.4	27.3	44.4%
Total	414.6	162.8	39.2%



Ground floor



First floor



Appendix 4 - Integrated Water Management

Blue Factor Report

Project # B29A667E
Copy of 23 Townsend Rd, Whittington VIC 3219, Australia- 260824-v2
Pratik Mukane - pratikmukane@lidconsulting.com.au
23 Townsend Rd, Whittington VIC 3219, Australia
24 August 2026 12:24 p.m.



Copy of 23 Townsend Rd, Whittington VIC 3219, Australia- 260824-v2

Nitrogen reduction target has been met, and a small low-risk project is deemed to comply. Higher risk projects need to meet all targets.



Project details

Name	Copy of 23 Townsend Rd, Whittington VIC 3219, Australia- 260824-v2
Project ID	B29A667E
Street address	23 Townsend Rd, Whittington VIC 3219, Australia
Municipality	Greater Geelong
Site area	1872 m ²
Planning Number	

Results

Item	Result	Target
Total suspended solids (%)	86%	>80%
Total phosphorus (%)	78%	>45%
Total nitrogen (%)	77%	>45%
Total gross pollutants (%)	96%	>70%
Mean annual runoff volume harvested or evapotranspired (%)	53%	>32%
Mean annual runoff volume infiltrated or filtered (%)	0%	>3%

For small low-risk sites, Total Nitrogen has been used as a proxy for other pollutants indicating compliance has been adequately met for many years. This has meant that if the Blue Factor score meets 100% based on Nitrogen, the Responsible Authority has the discretion to accept stormwater management design responses that do not meet all the individual pollutant load reduction targets on small low-risk sites.

Larger, high-risk projects, with roads, car parks or activities that may yield higher than typical pollutant loads, must meet all water quality targets fully. All projects should manage flow volume reductions through harvesting and evapotranspiration as well as infiltration to a level that is reasonably practicable.

Additional considerations

Flow and other pollutant load reductions should also be considered. The EPA Urban stormwater management guidelines (EPA - Publication [1739.1](#)) are referenced in the VPPs as a policy document and support compliance with the General Environmental Duty.

You can use the guidelines to help minimise risks from urban stormwater so far as reasonably practicable ([epa.vic.gov.au/about-epa/laws-ew-laws/what-is-reasonablypracticable](#)). Doing what is reasonably practicable means putting in proportionate controls to minimise the risk of harm to human health and the environment relative to the values being protected and risks presented by the site.

A completed small-scale low risk site with no public roads or external user parking areas will usually generate very little sediment, referred to as total suspended solids (TSS). It is common that the 80% TSS target will not easily be achieved for this type of site.

Other sites may generate significant total suspended solids (TSS) as well as litter, referred to as gross pollutants and should meet all targets.

The generation of sediment and litter during the construction phase is a significant problem and must be addressed effectively for all developments.

You should demonstrate what appropriate controls will be used to ensure the generation of litter and sediment is prevented and controlled during construction to minimise risk of harm.

Blue Factor is designed to support a range of developments of less than 10,000 square metres including small scale residential, apartment developments, small scale commercial and small public use developments which must meet planning requirements including stormwater management quality objectives in the EPA Urban stormwater management guidelines (EPA - Publication 1739.1) It is recommended that MUSIC is used for larger and more complex projects to demonstrate compliance.

Configuration 1



roof to RWT Roof, 615m2



Rainwater Tank 1
Rainwater tank retention volume in kilolitres: 8



Building 1
Non-Residential BCA Class 5 - Commercial/Office,
70 employee(s)

Configuration 2



Imp. to RG Paved, 386m2



Raingarden 1 Area: 8 m²,
Extended detention depth: 0.1 m,
Submerged zone depth: 0 m, Site soil type: Clay

Catchments



roof to RWT Roof, 615m2



Permeable Pervious (garden and lawn), 871m2



Imp. to RG Paved, 386m2



Rainwater Tank 1

Rainwater tank retention volume in kilolitres: 8

181%



Raingarden 1 Area: 8 m²,
Extended detention depth: 0.1 m,
Submerged zone depth: 0 m, Site soil type: Clay

157%



Building 1
Non-Residential BCA Class 5 - Commercial/Office,
70 employee(s)

Water sources	I want to calculate my water use based on fixtures and fittings
Basin taps - Primary water source	Mains water
Basin taps - Efficiency	5 star WELS rating
Showers - Primary water source	Mains water
Showers - Efficiency	3 star WELS rating (> 6 but < 7.5 litres per minute)
Clothes Washer - Primary water source	Rainwater
Clothes Washer - Efficiency	4 star WELS rating
Urinal - Primary water source	Mains water
Urinal - Efficiency	No urinals
Toilets connected to mains water	0
Toilets connected to rainwater	10
Toilets connected to recycled water	0
Toilets efficiency	4 star WELS rating
Garden water use	Garden water demands are not in use

Legend

Description	Quantity	Unit
- tota site area	1,872	sq m
Imp. driveway	386	sq m
Permeable area	871	sq m
Roof to RWT	615	sq m

Room Areas Table:

Room	Area (sq m)
CHILDREN ROOM 01	43.00
CHILDREN ROOM 02	43.00
CHILDREN ROOM 03	43.00
CHILDREN ROOM 04	43.00
CHILDREN ROOM 05	43.00
CHILDREN ROOM 06	43.00
CHILDREN ROOM 07	43.00
CHILDREN ROOM 08	43.00
CHILDREN ROOM 09	43.00
CHILDREN ROOM 10	43.00
CHILDREN ROOM 11	43.00
CHILDREN ROOM 12	43.00
CHILDREN ROOM 13	43.00
CHILDREN ROOM 14	43.00
CHILDREN ROOM 15	43.00
CHILDREN ROOM 16	43.00
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CHILDREN ROOM 94	43.00
CHILDREN ROOM 95	43.00
CHILDREN ROOM 96	43.00
CHILDREN ROOM 97	43.00
CHILDREN ROOM 98	43.00
CHILDREN ROOM 99	43.00
CHILDREN ROOM 100	43.00



WSUD system maintenance plan

Rainwater Tanks

The following maintenance schedule is to be used as a guide for rainwater tank maintenance. It is based on average maintenance requirements for rainwater tanks in Victoria, and timings may need to be adjusted to suit specific site assets. Regular inspections should be undertaken every three months. Inspection and maintenance of all rainwater tanks will be the responsibility of the building owner/manager.

Refer to the Melbourne Water WSUD Maintenance Guidelines for further details.

Item	What to check for	Action	Frequency
Tank inlet	Tank inlet is not blocked by accumulated debris	Physically remove debris build up	1-3 months
First flush device and filters	First flush device and filters are not blocked, and flow is not limited by litter or sediment accumulation	Physically remove litter and sediment from first flush device, or if it contains a flush-out valve, use water to remove sediment.	1-3 months
Tank outlet	Tank outlet is not restricted by sediment.	Flush tank as required.	1-3 months
Mosquito screens	Mosquito screens are not torn or loose	Replace mosquito screens if necessary. Put screens back carefully, ensuring they are tightly refitted.	1-3 months
Pumps	Water around pump equipment. Water pressure.	Replace seals where leaks are noted. Clean pumps as required to maintain pump pressure. Refer to pump manufacturer's maintenance requirements.	1-3 months
Roof and gutters	Accumulated debris in gutters. Discolouration of tank water, or notable odours.	Physically remove accumulated debris, including leaf and other plant material. More regular maintenance may be required where there are overhanging trees.	3-6 months
Overhanging trees	Vegetation overhanging roof and gutters	Prune overhanging trees where possible to reduce vegetation build up and chance of blockages in tank network.	3-6 months
Tank	Tank defects or damage. Sediment and sludge build up in tank, or sulphide/rotten egg odours.	Replace defect or damaged tank as necessary. Remove accumulated sediment and sludge from tank. Clean tank if required.	2-3 years



Raingardens

The following maintenance schedule is to be used as a guide for raingarden maintenance. It is based on average maintenance requirements for raingardens in Victoria, and timings may need to be adjusted to suit specific site assets. Regular inspections should be undertaken every three months. Inspection and maintenance of all raingardens will be the responsibility of the building owner/manager.

Refer to the Melbourne Water WSUD Maintenance Guidelines for further details¹.

Item	What to check for	Action	Frequency
Inlet	No evidence of erosion, blockage, damage or standing water.	Clear inlet of accumulated sediment or debris. Eroded areas should be locally re-profiled or reinforced, and re-planted if necessary. Refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> if the erosion is either recurring or severe.	Storm events 3 months
Outlet	No evidence of erosion, blockage, damage or standing water. Outlet freely draining.	Clear outlet of accumulated sediment or debris. Refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> if standing (backwatering into the raingarden) is present.	Storm events 3 months
Other structures	No evidence of erosion and damage to other structures, e.g. pits, pipes, access ramps, walls and rock protection.	Repair minor damage to structures. Eroded areas should be repaired (reinforced). This may involve minor re-profiling or re-planting works. For severe damage, i.e. where flows have scoured down the side of a structure refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> .	3 months

¹ WSUD maintenance guidelines: Inspection and maintenance activities, Melbourne Water Corporation, 2013, <http://www.melbournewater.com.au/Planning-and-building/Forms-guidelines-and-standard-drawings/Documents/WSUD-Maintenance-Inspection-and-maintenance-activity-guidelines.pdf>



Item	What to check for	Action	Frequency
Hydraulic conductivity	Filter media is draining freely. No water ponded on the surface of the raingarden for more than 12 hours after rainfall.	If water is ponded on the surface of the raingarden for more than 12 hours after rainfall, refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> . Note: the disposal of raingarden filter material must comply with EPA Victoria guidelines for the disposal of contaminated soil.	Storm events
Sediment accumulation	No major sediment accumulation on surface of the raingarden.	Accumulated sediment to be removed from the surface of the raingarden and the system replanted as required.	Annually
Filter media surface	No surface scour, depressions	Filter surface to be repaired. This may involve evening out the surface, importing additional filter media and replanting.	3 months
Fine sediment surface crust	No impermeable or clayey surface on the filter media. No major surface crusting (<3mm depth across less than 10% of the filter area is permissible).	Repair surface layer by scarify filter media surface, re-profiling and re-establishing vegetation, if required. If the problem persists refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> .	3 months
Mulch layer	Even depth and distribution of the mulch layer. Surface of the mulch layer is at least 100mm below the top of the outflow pit. Mulch is not touching the plant stems.	Re-distribute or replace mulch that has been washed out or displaced. This may involve retaining mulch using jute mats or nets. Remove mulch that is touching plant stems.	3 months
Algal or moss growth	No major algal growth (less than 10% of the raingarden area is permissible). No moss growth.	If significant patches of algal growth or moss persist across the surface of the raingarden (i.e. greater than 10% of the surface) then refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> .	3 months



Item	What to check for	Action	Frequency
Inspection opening	Water level is below filter media layer. No sediment accumulation in underdrain system.	Refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> if standing water is present in the filter media layer. Flush the underdrain system using low pressure water to remove accumulated sediment.	Annually
Vegetation cover - filter media	Greater than 90% vegetation cover. Plants healthy, free from disease and vigorously growing.	Remove any dead or diseased vegetation. Replant individual bare patches (greater than 5% of the area) using either new plants or by dividing and translocating existing plants.	3 months
Weeds - filter media	Less than 10% of the filter media surface area and batters covered in weeds.	Physically remove weeds from filter media surface. Do not use herbicides as these may harm the raingarden vegetation and contaminate the filter media. Refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> if weed ingress is a persistent problem (i.e. weed coverage is persistently greater than 30%).	3 months
Litter	Filter media surface free of litter (i.e. less than 1 piece of litter per 4m ²).	Remove all litter and excessive debris.	3 months
Pests	No damage by pest animals and insects.	Seek specialist advice if persistent insect damage is observed. Refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> if there is evidence of pest animal damage.	3 months



Stormwater management during construction

Stormwater management Planning Scheme clauses 19.03-3S and 53.18 (specifically 53.18-06) require measures in place to ensure the protection of drainage infrastructure and receiving waterways during construction.

The following is intended to inform the site management plan in matters relating to stormwater management during construction. Relevant principles per the EPA Civil Construction, Building and Demolition Guide², and measures as per Urban Stormwater Best Practice Environmental Management Guidelines Section 6.3 are shown below.

The site management plan should restrict runoff to adjoining properties and ensure minimal earth disturbance occurs during construction. Additionally, building waste, dangerous chemicals and food waste must be managed to prevent damage to flora and fauna, or build up or blockage in drains and nearby creeks.

Item	Potential issues	Control Measure
Fences	Porous fences allow stormwater runoff to carry sediment across the site and discharge into the stormwater network.	Mesh fabric and silt fences to be installed on fences where site includes slopes greater than 1:20. Hay bales may also be suitable for larger sites.
Pit inlets	Without sediment filters, pit inlets allow sediment to enter the stormwater network causing sediment build-up downstream.	Sediment traps or drain filters should be installed on all pit inlets.
Downpipes	Localised flooding due to lack of site drainage.	Temporary downpipes to be installed as soon as roofing is installed to minimise overland flow across the site (see plastic tube roll image below). These should be connected to the rainwater tank where possible, or alternatively the stormwater pipes.
Vehicle traffic on site	Areas of vehicle traffic are subject to disturbance of soil.	Use stabilised vehicle entrances and paths, with crushed rock or other suitable material. Include rumble grates, track mats (where access is over sand), and physically remove mud from tyres of vehicles prior to leaving the site.

² EPA Civil Construction, Building and Demolition Guide, Publication 1834 (2020)
<https://www.epa.vic.gov.au/about-epa/publications/1834>



Item	Potential issues	Control Measure
Mounded earth	Unsecured mounds create significant issues with sedimentation after rainfall.	Use erosion control blankets for mounded earth. Ensure correct installation, and incorporate secondary measures such as silt fences on steep sites.
Bins	Where suitable bins are not provided, litter can be washed from the site.	Ensure appropriate bins are provided for construction workers and staff. Ensure bins for lightweight food packaging and construction waste have lids to stop waste blowing away.
Waste material	Pollution of stormwater can occur where appropriate disposal methods for waste materials are not established on site.	Provide separate bins for paints and solvents to allow safe removal and disposal at accredited locations. Ensure all staff are aware of correct disposal methods.
Stockpiles	Incorrect stockpiling can lead to stormwater contamination, and site pollution.	Locate stockpiles away from drainage paths, and construct stockpiles with gentle slopes (max 1:2).

In addition, the contractor will be required to:

- **Identify and document**, prior to construction commencing, where these measures will be installed, and how erosion and loose waste will be managed.
- **Install tarps on site waste bins** every night.
- **Avoid overfilling vehicles** or cover all soil loads being taken offsite.
- **Sweep up the site** every day when works occur on site to ensure loose waste does not blow around the site and into the surrounding streets.
- **Ensure erosion and sediment control measures are maintained** through daily checks – maintenance measures may include removing sediment trapped in filters and topping up gravel on the vehicle entry path.



Figure 2 - Temporary Downpipes



Figure 3 - Sediment Trap

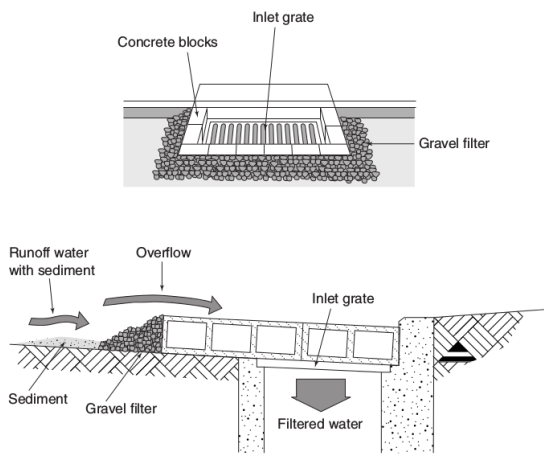


Figure 4 - Block and Gravel Filter (CSIRO)



Figure 5 - Sediment Trap