



SUSTAINABLE MANAGEMENT PLAN

Stage One Works St. Francis Xavier Proposed Administration Building 127-143 Bacchus Marsh Rd Corio VIC 3214

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Client: Minx Architecture
7A/91 Moreland St
Footscray VIC 3011
Date: February 2024



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Issue	Comments	Revision
Original, Dec 2023	For TP approval	0
updated, Feb 2024	As per client's feedback	1



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SMP Summary and Commitments by Owner/Builder

Energy Efficiency	<ul style="list-style-type: none">• Energy efficient airconditioning to be within one point of the highest available Star efficiency or at least 85% Energy Efficient Ratios (EER).• Water heating units to be within one point of the highest available Star efficiency or at least 85% energy efficient.• Lighting to be at least 20% more efficient than NCC Section J energy efficiency minimum requirements.• Building fabric to be 10% better than NCC Section J energy efficiency minimum requirements.• Motion detectors to be used for common areas, toilets and rooms for lighting.• Install check sub-meters for lighting, A/C and other ancillaries.• Heat pump or solar boosted heating for the hot water unit.• Opting for an all-electric development.
Material Fabric	<ul style="list-style-type: none">• Insulation to be in accordance to minimum requirements: R3.5 for ceilings.• Walls insulation R2.0.• Glazing to have VLT (visible light transmittance) of 70% for a better daylight. single-glazed LowE Clear type for conditioned spaces.• Light colour roof and pavement to reduce the Urban Heat Island Impact.
Water Efficiency and STORM Management	<ul style="list-style-type: none">• Toilets to be minimum 4 Star WELS rating.• Taps to be minimum 5 Star WELS rating.• Install a new 2000L water tank for the new building. To be depicted on the drawings. Refer to MUSIC verdict.• Water tank to be issued for toilets flushing, washing and irrigation.
Construction & Building Waste Management	<ul style="list-style-type: none">• Waste storage size to be minimum 4m² for dedicated spaces within the building for general and recycling waste bins for occupants.• Commitment: Timber used to be certified by a forest certification scheme (FSC or PEFC/AFS).• Provide bins for materials and general recycling.• Commitment to recycle at least 80% of construction waste.



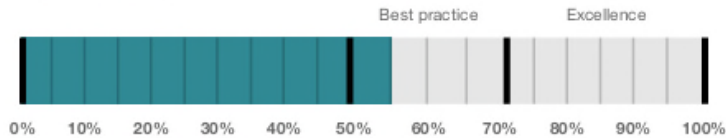
	<ul style="list-style-type: none">• Commitment to have minimum 30% replacement of cement with SCMs such as flyash (averaged over the project). <u>This is subject to engineer's sign off.</u>
Indoor Environment Quality	<ul style="list-style-type: none">• Commitment to use low VOC materials on paints and adhesives.• Commitment to meet the maximum total indoor pollutant emission limits for carpets.• Windows and doors to be openable to allow for natural ventilation.• CO2 ventilation system to have a maximum of 500ppm in habitable spaces.• Carbon dioxide monitoring devices to be installed in rooms (two devices per room).• KDF monitoring device or similar approved.
Transport	<ul style="list-style-type: none">• Use existing bike racks.• Students will have lockers on site.
Urban Ecology	<ul style="list-style-type: none">• Exposed concrete driveway, specify high SRI paints and materials (SRI>50) to help mitigate the urban heat island effect. This must be reflected on plans.• Light roof colour and paving. Roof solar absorptance to be 0.45 or less.

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BESS Verdict

Your BESS Score



57%

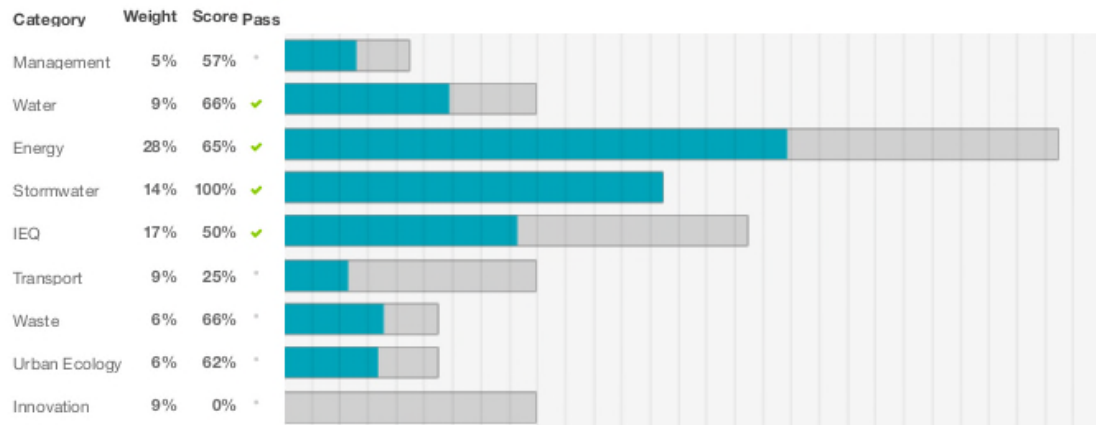
Project details

Address	127-143 Bacchus Marsh Rd Corio Victoria 3214
Project no	FAB96E9B-R3
BESS Version	BESS-7
Site type	Non-residential development
Account	info@efficientenergychoices.com.au
Application no.	
Site area	455.00 m ²
Building floor area	455.00 m ²
Date	31 January 2024
Software version	1.8.1-B.407



Performance by category

● Your development ● Maximum available



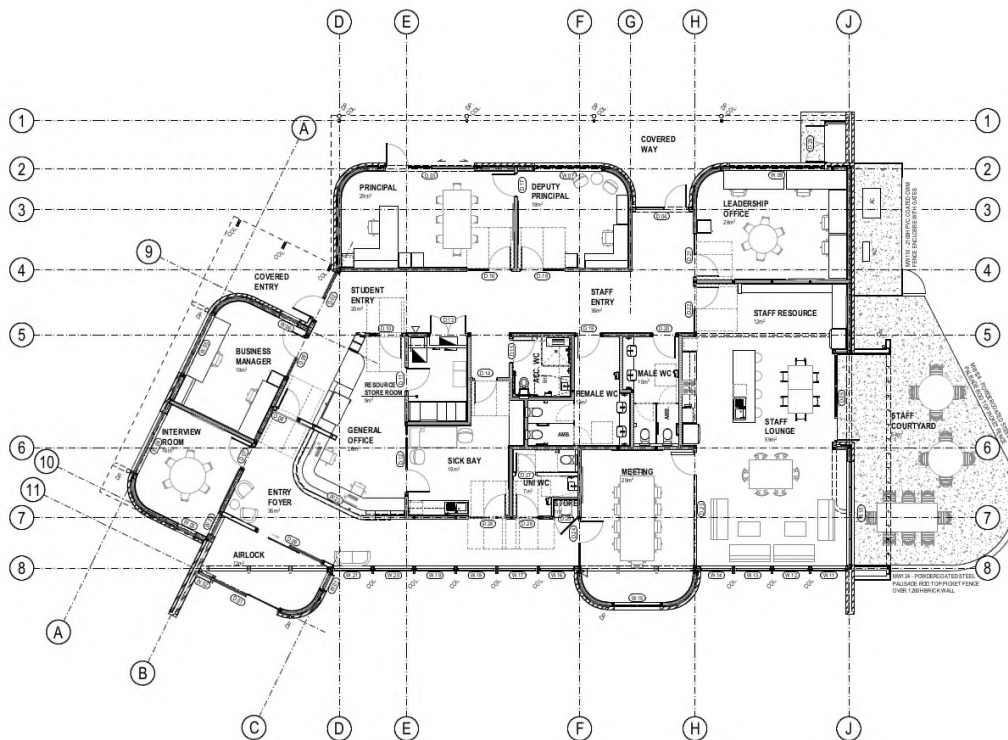
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1.0 Project Scope

The proposed project is Stage 1 proposed Administration Building at St. Francis Xavier Primary School. This is a proposed new building development comprising of new rooms, amenities, sick bay and offices. This proposed building is amongst other existing buildings.

Refer to drawings by Minx Architecture, Drawings: TP100 to TP132, Dated 10/12/2023, Rev 01. This report addresses Council sustainability Clause and for Stormwater Management Clause in conjunction with civil and drainage engineer.



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2.0 Design Process


Environmental Sustainable Design (ESD) initiatives were carried out using the following:

- BESS stands for (Built Environment Sustainability Scorecard) Tools for Environmental Performance Strategy. Average rating was obtained for heating, cooling and star rating. Refer to attached energy report rating. The BESS design tool was used to achieve the following report. Refer to Appendix A and BESS report;
- NCC Section J energy efficiency chapter and requirement

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3 Management, Application and Commissioning

Item	Requirement	Comments
Management Pre-Application Meeting	ESD professional been engaged to provide sustainability advice from schematic design to construction. AND the ESD professional been involved in a pre-application meeting with Council.	ESD consultant has not been engaged from the start.
Thermal Performance Modelling - non-Residential	Provide a preliminary facade assessment in accordance with NCC2 Section J1.5.	Included. Has been carried out by ESD consultant.
	Provide a preliminary Section J energy report or NABERS or Green Star.	Section JV3 to be carried out later by the ESD consultant.
Metering – non-Residential	Provide utility meters for all individual commercial tenants.	Scoped out. Not relevant to this project. Only one building owner.
		
Metering - Common Areas	Have all major common area services been separately sub-metered.	Yes. To install check meters to monitor energy consumption for common areas and services such as lighting, A/C, fans and other ancillaries. To be carried out by builder and electrician.
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Building Users Guide	Produce a building users guide and issue to occupants.	To be provided by builder at occupancy.
Commissioning	Services to be commissioned.	By builder and appropriate trades and service engineers.



ESD inspection	Inspect the site during construction and at least two weeks prior to completion to ensure the ESD items have been supplied and installed on site.	By ESD consultant the author of this report.
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Additional requirements

For town planning submission, the following are required:

- Submit SMP report.
- Ensure the SMP requirements are clearly noted or depict on the drawings for endorsement by Council Planners.
- Commitment for a thorough commissioning program to be undertaken to ensure that systems are effectively and efficiently operating.
- Ensure that the ESD recommendations in this report will be incorporated in the project and services documentation for building permit stage.

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Implementation and Maintenance Schedule

Actions	Responsibility	Completion Date
Prelim section J assessment	ESD Consultant, Architect	During documentation
Materials, recycling, sustainable items	Architect, Builder	During documentation
Insulation & sealing	Architect, Builder	during construction
Air-conditioning systems	Services Engineer, Builder	prior to building permit. Maintenance schedule by School
Hot water heating	Services Engineer, Builder	As above
Lighting	Architect, Builder	As above
Motion / time switch controls	Services Engineer, Builder	As above
Bike storage	Architect, Builder	during construction or on site already
Metering	Services Engineer, Builder	prior to building permit
Energy efficient lifts	Services Engineer, Builder	As above. Maintenance schedule by school.
Rainwater tank	Services Engineer, Builder	As above
Water efficient toilets	Architect, Builder	As above
Water efficient taps	Architect, Builder	As above
Water efficient showers	Architect, Builder	As above
Water efficient appliances	Architect, Builder	As above
Fire system test water capture	Builder, Services Engineer	As above
Concrete	Builder	during construction
Plasterboard	Builder	during construction
Timber	Builder	during construction
Material Re-use	Architect, Builder	during construction
Topsoil	Builder	during construction
Construction Management Plan	Builder	during construction
Low VOC paints, sealants, adhesives	Architect, Builder	during construction
Building Users Guide	Owner's Corporation, ESD Consultant, Building Services	Upon CoF
Building tuning	Owner's Corporation, Building Services	Yearly Maintenance schedule by school
Commissioning	Builder and appropriate trades and service engineers.	Prior to occupancy
SMP inspection	ESD consultant	Prior to occupancy

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4 Water

Item	Requirement	Comments
Water tank	To be installed to satisfy the Stormwater requirement. Other items may be required like a raingarden or a media filtration pit subject to STORM verdict.	Install a new 2000L RWT for new building and a media filtration system stormsacks will be implemented to all grated pits where paving is proposed. Refer to MUSIC layout and verdict.
Water Efficient Landscaping	Provide water efficient landscaping.	Yes. To be depicted on landscaped drawings. Responsibility by landscape architect and builder.
Building Systems Water Use Reduction	Where applicable reduce potable water consumption by >80% in the buildings air-conditioning chillers and when testing fire safety systems.	Yes, if building will be sprinkled. The building will not have chillers but simply A/C split systems. To be arranged by architect, services engineer and building surveyor.
Water fixtures, fittings and connections.	Refer to summary at start of report.	All fittings to be of high-level WELS efficiency. Toilets to be connected to water tank for flushing, washing and irrigation by builder.



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4.1 Stormwater Management

Refer to MUSIC report by third party.

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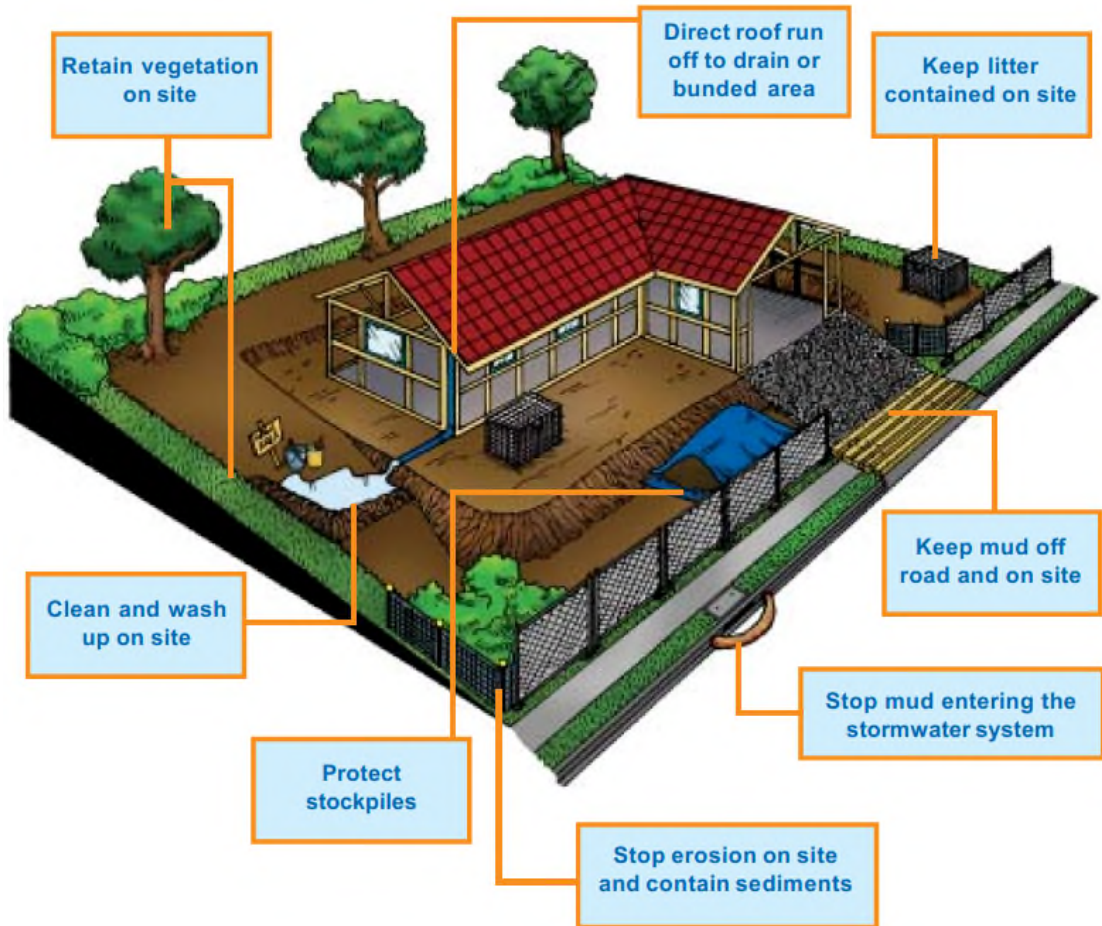
6 SITE RULES TO KEEP STORMWATER CLEAN

	SITE RULE 1	Check Council requirements and plan before you start work on site. Page 4
	SITE RULE 2	Stop erosion onsite and contain sediments. Page 6
	SITE RULE 3	Protect stockpiles. Page 12
	SITE RULE 4	Keep mud off road and on site. Page 16
	SITE RULE 5	Keep litter contained on site. Page 18
	SITE RULE 6	Clean and wash up on site. Page 21

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Check Council requirements and plan before you start work on site



Above is taken from Melbourne Water “Keeping Our Stormwater Clean”

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4.2 Objectives

Prevent stormwater pollution from construction sites. Ensure construction site is regularly cleaned from rubbish and any debris to prevent them from entering storm system.

- Ensure also to mitigate detrimental effect of development on downstream waterways by the application of best practice stormwater management by regular cleaning of site and blocking off certain areas.
- Minimise peak stormwater flows and stormwater pollutants to improve health of water bodies.
- To reintegrate urban water into the landscape and provide attractive spaces for community use.

4.3 Application and Implementation

Treatment of stormwater measures to improve quality and reduce flow of water discharged to waterways.

- Water will be collected from roofs into a media filtration system, SPEL type.
- Install appropriate storage bins and waste enclosures.
- Builder to have a site management plans and measures during construction to prevent litter, sediments and pollution entering waterways.
 - Regular cleaning of site
 - Appropriate waste storage and regular pick up of waste
 - If necessary, use litter traps where necessary.

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4.4 Maintenance (Policy 22.18)

Once rainwater tank installed and associated collection areas are to be regularly inspected. The following measures are to be carried out through inspections every 3 to 6 monthly basis:

Gutters: to be inspected for integrity and debris buildup. Debris to be cleared up and gutters made good as required.

Roof: to be inspected for debris build up. Debris should be cleared. Tree/plant growth resulting in increased debris.

Tank: to be inspected for integrity. Repair/replace as required.

Media Filtration Pit: to be inspected every six months by Body Corp or site owner for integrity and functionality. (site owner in case property has not been sold and sub-divided).

Cleanness of site: to be inspected and cleared of debris on a daily basis.

First flush device: inspect and clean if required.

Inlet/overflow screen: inspect and clean if required.

Sludge accumulation: every 2 to 3 years and desludge if required.

Removal of sludge and organic sediments that accumulate in the base of a rainwater tank may be necessary if buildup is excessive and as such as suitable outlet should be provided. This sludge layer and biofilms that develop on the walls of a tank, may be important in the natural purification processes occurring in the tank; therefore, removing a sludge layer should only occur when buildup impedes the tank operation.

Pump system: as required/specified by pump manufacturer.

Following acceptance of design, when project moves to construction, defects periods and ultimately transfer of the asset to owners. the inspection forms, asset transfer checklists and maintenance schedules can be used to help ensure WSUD elements are built as designed are maintained and are in good operating condition prior to asset transfer to owner.

4.5 Commissioning

For town planning submission, the following are recommended:

- Submit stormwater report.
- Ensure that the water tank and permeable areas are clearly noted on the drawings for endorsement by council planners.
- Ensure that this report will be incorporated in the project and services documentation for building permit stage.

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Rainwater Tank Maintenance Recommendations

Things to look for and how to fix them.

Leaf litter / debris in gutters	Pump not working
Regularly clear your gutters. Make sure you cover the tank inlet if you're rinsing down the gutters to avoid debris entering the tank.	Check operating instructions for your pump. Check that pumps are kept clear of surface water (flooding), vegetation, and have adequate ventilation. Pumps should be serviced every few years to prolong the pump life.
Blocked downpipe	Mains backup or pump not working
If you see water spilling from the edge of the gutters check that the downpipe is not blocked, removing any debris.	Have you heard the pump operating? If the mains backup switching device fails many people do not notice for a long time. Consider a manual system if the switching device is problematic and you don't mind operating it manually.
First flush diverter clogging	Overflow
To clean out, unscrew the cap at the base of the diverter and remove the filter. Wash the filter with clean water and the flow restrictor inside the cap.	Check that the overflow is not blocked and that there is a clear path for water to safely spill from the tank through the overflow pipe when full. Check that a clean mesh screen is safely in place to prevent mosquitoes entering the tank.
Debris on the mesh cover over inlets / outlets	Sediment / debris build-up in tank (more than 20mm thick)
The fine stainless steel mesh is similar to fly screen mesh. It should be cleaned regularly to ensure it does not become blocked with leaves and other material.	Over time a small amount of fine sediment will collect in the bottom of your tank and this is harmless and natural. It should not be disturbed until it is approx 20 mm thick which may take many years. To clean your tank out simply empty your tank and wash out with a high-pressure washer or hose.
Dirt and debris around the tank base or side.	Base area
Keep leaf build-up, sticks, pot plants and other items off the lid of your tank. Use a hose to remove dust and dirt from the outside of the rainwater tank and ensure there is no debris on the base, bottom lip and walls of your tank.	Tanks must be fully supported by a flat and level base. Check for any movement, cracks or damage to the slab or pavers. If damage is observed, empty the tank to remove the weight and have the fault corrected to prevent damage to the tank. There is no warranty from suppliers for damage to a rainwater tank if the base has failed.
Smelly water or mosquitos	Monitoring the water level
Rainwater tanks can smell if there is debris in the gutters. Check the gutters and leaf strainers are clean. Mosquitos or wrigglers can make their way into your tank if they are small enough to pass through the inlet strainer. A very small amount of chlorine (approx 4 parts per million) can be put in the tank to kill off mosquitos or the bacteria causing odours. The chlorine will disinfect the water and then evaporate. Chlorine tablets from a pool supplier can be used (but check the recommended dose based on your tank capacity).	A range of devices are available to monitor water level. Some simple float systems can be used effectively.

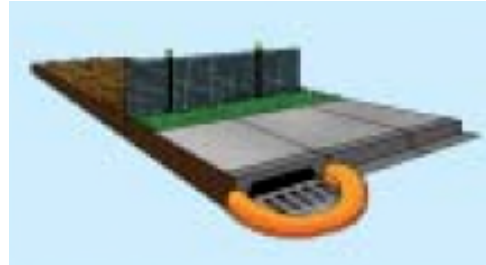
Acknowledgement: Information from PJT Green Plumbing's 'Maintenance Guide for Your Rainwater Tank' was used to develop this fact sheet.

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4.6 Site Management Plan

- Plan before starting work
- Stop erosion and keep sediment on site. Use a gravel sausage or sediment log.



- Contain stockpiles on site

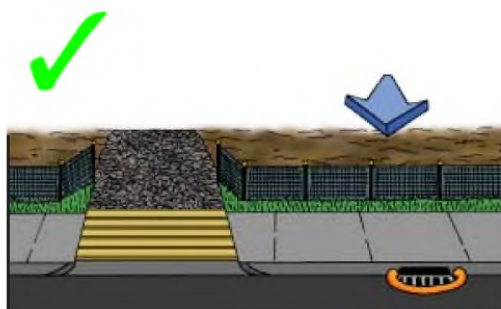
- Are high
- Have steep sides



- Are put on hard surfaces where they can be blown or washed away.



- Keep mud off road and on site



Putting crushed rock on the access point of your site is a good way to prevent damage and provide a dry access point for vehicles. Where possible park vehicles off site.

Make sure gravel does not collect in the gutter or on the footpath.

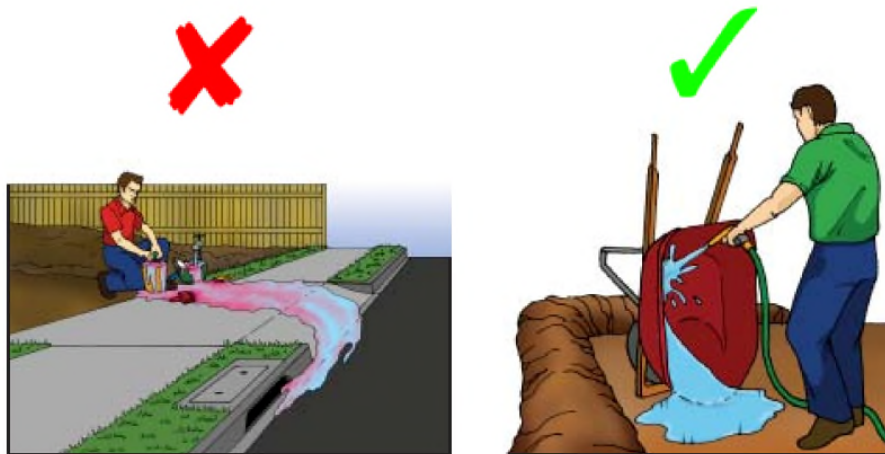
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- Keep litter contained on site




- Clean up and wash on site



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5.0 Energy

Item	Requirement	Comments
Solar photovoltaic (PV) system.	Required to minimise energy load and peak power demand. To offset some of the electrical power consumption from carpark mechanical fans, common lighting and others.	Solar power panels not included in this scope of works. 
Energy supply	Gas and/or electricity	Development to be gas free type.
Electric appliances and services.	To be of high energy efficiency and performance.	All appliances and services to be of high-level efficiency: <ul style="list-style-type: none"> • Energy efficient airconditioning to be within one point of the highest available Star efficiency or at least 85% Energy Efficient Ratios (EER). • Heat pump or solar boosted heating for the hot water unit. To be one star of best available or at least 85% better than most efficient capacity. TBC with services engineer in conjunction with the builder. • Cooking equipment. • LED energy efficiency lighting. • Refer to summary at start of report for efficiency requirements.
Thermal energy efficiency	To meet and exceed Section J energy efficiency benchmark.	Will be achieved by high level of insulation and high performance glazing for conditioned spaces. The building fabric to be at least 10% better than Section J energy efficiency. Refer to wall-glazing calculation in the Appendices. A full Section JV3 energy report to be carried out later by ESD consultant during documentation to heed this requirement.

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Internal Lighting	Maximum illumination power density (W/m ²) to be at least 90% of the relevant building class at least 10% more efficient than required by Table J6.2a of the NCC 2019 Vol 1 (Class 2-9).	To have energy efficient LED lighting type in rooms, storage, amenities and open spaces. To be 10% more energy efficient than Table 6.2a. This should be easily achieved by LED lighting. To be designed by services engineer and installed by builder.
Unoccupied spaces	Use Motion and daylight sensors.	To be installed in common areas, circulation space, rooms and amenities to minimise unnecessary lighting consumption. To be designed by services engineer and installed by builder.

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6 Indoor Environment Quality

This section is about improving thermal comfort, lighting, ventilation, internal noise and minimisation of indoor VOCs.

Item	Requirement	Comments
Daylight Access – Non residential	Recommended minimum 80% to achieve a daylight factor greater than 2%	Complies. Refer to daylight modelling and report in the Appendices. The daylight modelling is based on VLT of 70%. If the VLT is 60%, the daylight verdict would still comply in the high 30s.
Effective Natural Ventilation	To be effectively naturally ventilated. This may be achieved by either openable glazing for ventilation or cross-flow natural ventilation.	This is critical for healthy occupancy and thermal comfort. To also avoid condensation and mould. There are ample of openable windows, doors and louvers. The louvers will be operating upon sensors.
More on ventilation	To increase in outdoor air for regular use areas compared to the minimum required by AS 1668.2:2012.	Mechanical ventilation not necessary nor required. Sufficient natural ventilation will be available.
CO2 monitors	Ensure the ventilation systems are designed to achieve, to monitor and to maintain the CO2.	Not achieved.
External shading	Provide external shading.	Glazing will have external eaves to the NE, west and north elevations.
Thermal comfort	Install ceiling fans in spaces.	Not achieved.
VOC	Minimise VOC materials on paints and adhesives.	To be carried out by builder.
Wood products	Use either E0 or E1 grade engineered wood products (e.g. MDF, plywood, engineered wood flooring).	To be carried out by builder.



6.1 VOC

It is required to use low Volatile Organic Compounds (VOC) for:

- Internal finishes and internal painted surfaces. Not to exceed 50g/L
- Ceramic tile adhesive. Not to exceed 65g/L
- Structural glazing adhesive. Not to exceed 100g/L
- Adhesives and sealants. Not to exceed 50g/L
- All paints, sealants and adhesives, carpet and engineered wood products will meet current GECA, Global Green Tag GreenRate, carpet institute Australia.
- Environmental Classification Scheme Level 2, Green Star or WELL standards for TVOC in paints, adhesives and sealants (by volume) and carpets (by area) and for Formaldehyde in engineered wood (by area).



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Refer to table below for requirements and also attached appendix.

Product Type/Sub Category	Max TVOC (g/L)
Paints, varnishes and protective coatings	
walls and ceilings - interior gloss	75
walls and ceilings - interior semi gloss	16
walls and ceilings - interior low sheen	16
walls and ceilings - interior flat washable	16
ceilings - interior flat	14
trim - gloss, semi gloss, satin, varnishes and woodstains	75
timber and binding primers	30
latex primer for galvanized iron and zincalume	60
interior latex undercoat	65
interior sealer	65
one and two pack performance coatings for floors	140
others: any solvent-based coatings	200
Adhesives and sealants	
indoor carpet adhesive	50
carpet pad adhesive	50
wood flooring and laminate adhesive	100
rubber flooring adhesive	60
sub-floor adhesive	50
ceramic tile adhesive	65
cove base adhesive	50
dry wall and panel adhesive	50
multipurpose construction adhesive	70
structural glazing adhesive	100
architectural sealants	250

- paints, sealants and adhesives.
Paints to be low VOC (<16g/L) with 50% of paints to be ultra-low VOC (.5g/L)
- carpets
- engineered wood

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The above products to meet current GECA, Global GreenTag GreenRate, Carpet Institute Australia Environmental Classification Scheme Level 2, Green Star or WELL standards for TVOC in paints, adhesives and sealants (by volume) and carpets (by area) and for Formaldehyde in engineered wood (by area).



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

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

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

Source: Green Star Manual www.gbca.com.au

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7 Transport

Item	Requirement	Comments
Bicycle Parking – non Residential	Secure and undercover bicycle spaces.	Use existing bike storage or spaces.
Bicycle Parking – non Residential Visitor	Secure bicycle spaces for visitors.	Not applicable for a school.
End of Trip Facilities - Non-Residential	Showers and lockers	No showers for students. But they will have lockers.
Electric Vehicle Infrastructure	Provide facilities for the charging of electric vehicles.	Not achieved.
Car Share Scheme	Provide formal car sharing scheme to be integrated into the development.	Not achieved.
Motorbikes / Mopeds	Minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)	Not achieved.

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8 Waste

Item	Requirement	Comments
Construction Waste - Building Re-Use	A site that has been previously developed, has at least 30% of the existing building been re-used.	N/A
Operational Waste - Food & Garden Waste	Provide facilities for on-site management of food and garden waste.	Compost bins to be provided by school for veggie gardens.
Operational Waste - Convenience of Recycling	Provide recycling facilities for occupants as facilities for general waste.	Recycling will be provided in the new building.

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9 Urban Ecology

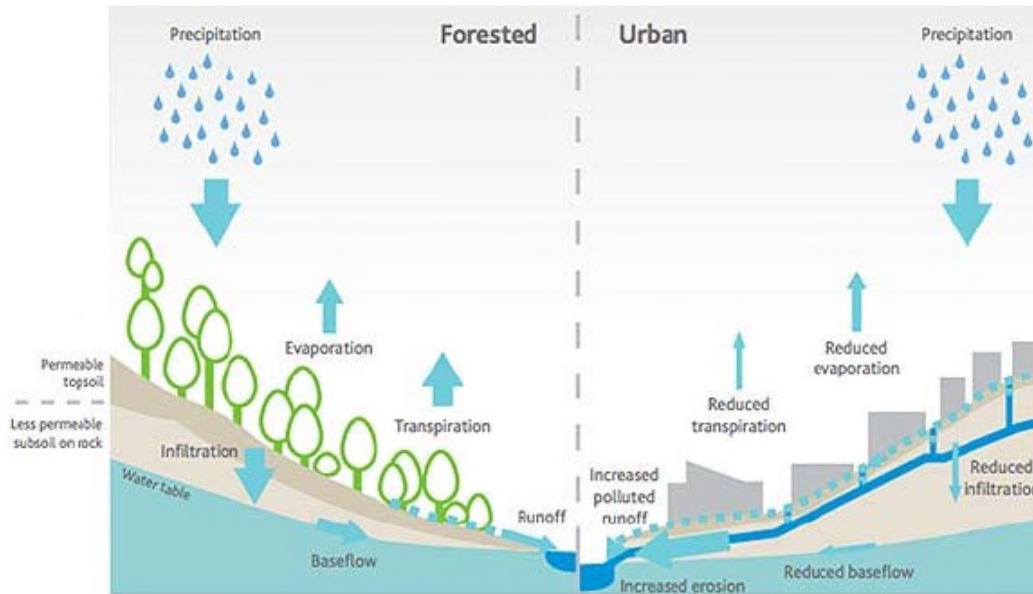
Item	Requirement	Comments
Communal Spaces	Communal space to be provided.	Plenty of recreation and play spaces for the students on site.
Vegetation	How much of the site is covered with vegetation, expressed as a percentage of the total site area.	Refer to drawings by architect. Most of the site is permeable green surface areas.
Green Roofs	Provide a green roof in the development. To be designed by architect.	Not achieved.
Green walls and Facades	Provide a green walls or green façade in the development. To be designed by architect.	Not achieved.
Food Production - Residential	Provide space per resident for dedicated food production.	Some food production at the school site as part of the school program. This is a usual practice for primary schools.
Urban heat	Mitigate urban heat island effect.	Exposed concrete driveway, specify high SRI paints and materials (SRI>50) to help mitigate the urban heat island effect. This must be reflected on plans by architect.
Colour	Light colours for roof and paving.	Light roof colour and paving. Roof solar absorptance to be 0.45 or less.

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Contribution to cooling and improving local habitat

Urban development dramatically changes the local habitat. It will reduce the process of rainwater evaporation and its plants absorption or soaking it into the ground.



This happens when clearing land of vegetation and increasing impervious surfaces, which will cause the following:

- Put pressure and pollute the local stormwater in a very short time after a rain.
- Unnatural flows to the local waterways or rivers for a few hours after it rains.
- Making beaches unsuitable for swimming for 1-2 days after heavy rain
- Eroding stream banks and degrading streams
- Increase in pollutant runoff

Implementing rainwater tanks and/or raingardens will reduce these negative impacts to the local habitat.

Advantages of rainwater tanks are:

- Minimise water usage when used in the toilet, laundry or garden
- Reduce strain on the stormwater drainage system
- Retain water close to source
- Reduce site run-off and flood peaks

Advantages of raingardens are:

- Reduce pollutant runoff to the creeks and bay
- Increase green space to assist with cooling.

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Disclaimer

The above are guidelines and recommendations are to assist the above project to meet the required ESD requirements. It is the responsibility of the owner/builder to follow the above guidelines to meet these requirements. It is not the responsibility of Efficient Energy Choices.

Kind Regards,
Karim Ghobrial
Bach of Electrical and Electronic Engineering
Energy and Sustainability Consultant

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Sustainable Victoria Registration No. DMN/15/1703

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Appendix A - BESS Report

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BESS Report

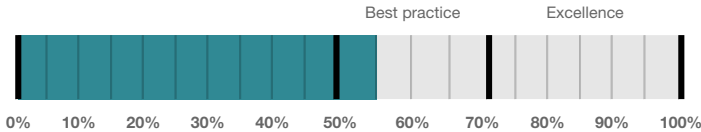
Built Environment Sustainability Scorecard



This BESS report outlines the sustainable design commitments of the proposed development at 127-143 Bacchus Marsh Rd Corio Victoria 3214. 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.

Your BESS Score



57%

Project details

Address 127-143 Bacchus Marsh Rd Corio Victoria 3214
Project no FAB96E9B-R3
BESS Version BESS-7

Site type Non-residential development
Account info@efficientenergychoices.com.au

Application no.
Site area 455.00 m²
Building floor area 455.00 m²
Date 31 January 2024
Software version 1.8.1-B.407

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Performance by category ● Your development ● Maximum available

Category	Weight	Score	Pass
Management	5%	57%	*
Water	9%	66%	✓
Energy	28%	65%	✓
Stormwater	14%	100%	✓
IEQ	17%	50%	✓
Transport	9%	25%	*
Waste	6%	66%	*
Urban Ecology	6%	62%	*
Innovation	9%	0%	*

Buildings

Name	Height	Footprint	% of total footprint
Admin building	1	455 m ²	100%

Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	Building	% of total area
Other building				
Admin	1	455 m ²	Admin building	100%
Total	1	455 m²	100%	

Supporting information

Floorplans & elevation notes

Credit	Requirement	Response	Status
Management 3.3	Annotation: Sub-meters to be provided to all major common area services (list each)		-
Water 3.1	Annotation: Water efficient garden details		-
Stormwater 1.1	Location of any stormwater management systems (rainwater tanks, raingardens, buffer strips)		-
Transport 1.4	Location of non-residential bicycle parking spaces		-
Waste 2.1	Location of food and garden waste facilities		-
Waste 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		-
Urban Ecology 3.2	Location of food production areas		-







Supporting evidence

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





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Credit summary

Management Overall contribution 4.5%

		57%
1.1 Pre-Application Meeting		0%
2.3 Thermal Performance Modelling - Non-Residential		100%
3.2 Metering - Non-Residential		N/A ✦ Scoped Out
		there is only one tenant.
3.3 Metering - Common Areas		100%
4.1 Building Users Guide		100%

Water Overall contribution 9.0%

		Minimum required 50%	66% ✓ Pass
1.1 Potable Water Use Reduction		60%	
3.1 Water Efficient Landscaping		100%	
4.1 Building Systems Water Use Reduction		N/A ✦ Scoped Out	
		No reason provided	

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Energy Overall contribution 27.5%

		Minimum required 50%	65%	✔ Pass
1.1 Thermal Performance Rating - Non-Residential			37%	
2.1 Greenhouse Gas Emissions			100%	
2.2 Peak Demand			100%	
2.3 Electricity Consumption			100%	
2.4 Gas Consumption			N/A	✦ Scoped Out
				No reason provided
2.6 Electrification			100%	
3.1 Carpark Ventilation			N/A	✦ Scoped Out
				No reason provided
3.2 Hot Water			100%	
3.7 Internal Lighting - Non-Residential			100%	
4.1 Combined Heat and Power (cogeneration / trigeneration)			N/A	✦ Scoped Out
				No reason provided
4.2 Renewable Energy Systems - Solar			0%	⊘ Disabled
				No solar PV renewable energy is in use.
4.4 Renewable Energy Systems - Other			0%	⊘ Disabled
				No other (non-solar PV) renewable energy is in use.

Stormwater Overall contribution 13.5%

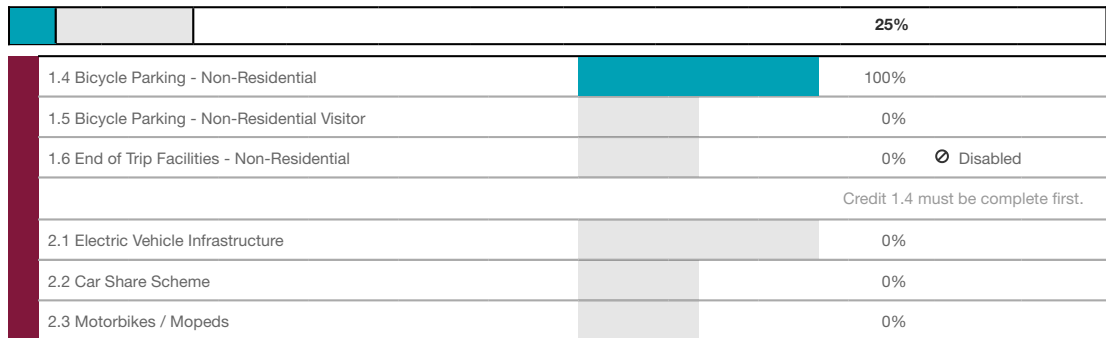
		Minimum required 100%	100%	✔ Pass
1.1 Stormwater Treatment			100%	

IEQ Overall contribution 16.5%

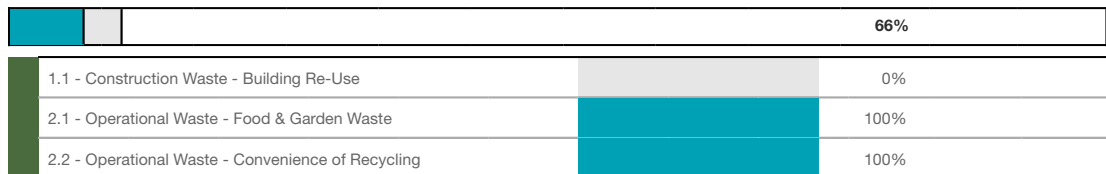
		Minimum required 50%	50%	✔ Pass
1.4 Daylight Access - Non-Residential			48%	✔ Achieved
2.3 Ventilation - Non-Residential			45%	✔ Achieved
3.4 Thermal comfort - Shading - Non-Residential			66%	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential			0%	
4.1 Air Quality - Non-Residential			100%	

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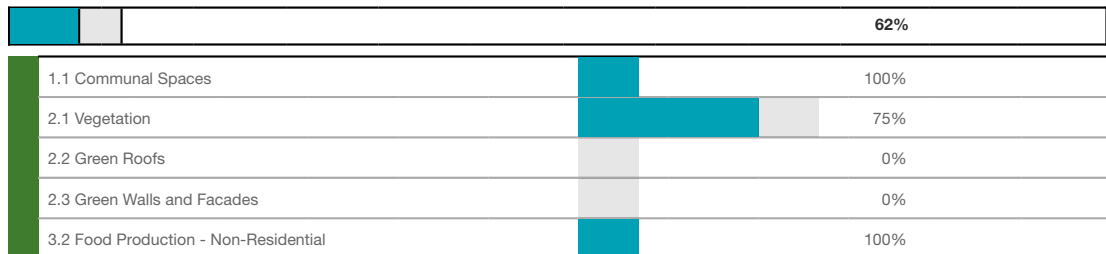
Transport Overall contribution 9.0%



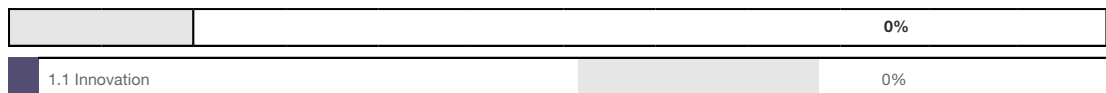
Waste Overall contribution 5.5%



Urban Ecology Overall contribution 5.5%




Innovation Overall contribution 9.0%



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Credit breakdown

Management Overall contribution 3%

1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 42.9% 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?	
Annotation	ESD professional been engaged to provide sustainability advice from TP design to construction	
Question	Criteria Achieved ?	
Project	No	
2.3 Thermal Performance Modelling - Non-Residential		100%
Score Contribution	This credit contributes 28.6% towards the category score.	
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2019 Section J1.5?	
Question	Criteria Achieved ?	
Other building	Yes	
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2019 Section J (Energy Efficiency), NABERS or Green Star?	
Question	Criteria Achieved ?	
Other building	Yes	
3.2 Metering - Non-Residential		N/A  Scoped Out
This credit was scoped out	there is only one tenant.	
3.3 Metering - Common Areas		100%
Score Contribution	This credit contributes 14.3% towards the category score.	
Criteria	Have all major common area services been separately submetered?	
Annotation	Install check sub-meters for lighting, A/C and other ancillaries.	
Question	Criteria Achieved ?	
Other building	Yes	

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4.1 Building Users Guide	100%
Score Contribution	This credit contributes 14.3% towards the category score.
Criteria	Will a building users guide be produced and issued to occupants?
Annotation	BUG info: • Targets for the reduction of energy, water and waste; • A description of the buildings services and operational requirements for efficient and safe use of these systems; • Building initiatives to reduce energy and water use; • Monitoring provisions for energy, water and indoor environment quality; • To include lighting, A/C, hot water, water and solar system (if any); also insulation and glazing installed. • Transport facilities including car parking provisions, location of cyclist facilities and public transport information; • Emergency contact information; • ESD consultant to carry out a presentation to occupants on how to maximise building efficiency.
Question	Criteria Achieved ?
Project	Yes

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Water Overall contribution 6% Minimum required 50%

Water Approach	
What approach do you want to use for Water?:	Use the built in calculation tools
Project Water Profile Question	
Do you have a reticulated third pipe or an on-site water recycling system?:	No
Are you installing a swimming pool?:	No
Are you installing a rainwater tank?:	Yes
Water fixtures, fittings and connections	
Showerhead:	Scope out
Bath:	Scope out
Kitchen Taps:	>= 5 Star WELS rating
Bathroom Taps:	>= 5 Star WELS rating
Dishwashers:	>= 5 Star WELS rating
WC:	>= 4 Star WELS rating
Urinals:	Scope out
Washing Machine Water Efficiency:	>= 5 Star WELS rating
Which non-potable water source is the dwelling/space connected to?:	RWT existing
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
Rainwater Tank	
What is the total roof area connected to the rainwater tank?: RWT existing	558 m ²
Tank Size: RWT existing	2,000 Litres
Irrigation area connected to tank: RWT existing	100 m ²
Is connected irrigation area a water efficient garden?: RWT existing	Yes
Other external water demand connected to tank?: RWT existing	-

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1.1 Potable Water Use Reduction		60%
Score Contribution	This credit contributes 83.3% 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	703 kL	
Output	Proposed (excluding rainwater and recycled water use)	
Project	466 kL	
Output	Proposed (including rainwater and recycled water use)	
Project	362 kL	
Output	% Reduction in Potable Water Consumption	
Project	48 %	
Output	% of connected demand met by rainwater	
Project	57 %	
Output	How often does the tank overflow?	
Project	Very Often	
Output	Opportunity for additional rainwater connection	
Project	200 kL	
3.1 Water Efficient Landscaping		100%
Score Contribution	This credit contributes 16.7% towards the category score.	
Criteria	Will water efficient landscaping be installed?	
Question	Criteria Achieved ?	
Project	Yes	
4.1 Building Systems Water Use Reduction		N/A  Scoped Out
This credit was scoped out	None	

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Energy Overall contribution 18% Minimum required 50%

Use the BESS Deem to Satisfy (DtS) method for Energy?:	Yes
Do all exposed floors and ceilings (forming part of the envelope) demonstrate a minimum 10% improvement in required NCC2019 insulation levels (total R-value upwards and downwards)?:	Yes
Does all wall and glazing demonstrate meeting the required NCC2019 facade calculator (or better than the total allowance)?:	Yes
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?:	Yes
Are water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit?:	Yes
Project Energy Profile Question	
Are you installing any solar photovoltaic (PV) system(s)?:	No
Are you installing any other renewable energy system(s)?:	No
Energy Supply:	All-electric
Non-Residential Building Energy Profile	
Heating, Cooling & Comfort Ventilation - Electricity Reference fabric & services:	-
Heating, Cooling & Comfort Ventilation - Electricity - proposed fabric and reference services:	-
Heating, Cooling & Comfort Ventilation - Electricity Proposed fabric & services:	-
Heating - Wood - reference fabric and services:	-
Heating - Wood - proposed fabric and reference services:	-
Heating - Wood - proposed fabric and services:	-
Hot Water - Electricity - Reference:	-
Hot Water - Electricity - Proposed:	-
Lighting - Reference:	-
Lighting - Proposed:	-
Peak Thermal Cooling Load - Reference:	-
Peak Thermal Cooling Load - Proposed:	-
1.1 Thermal Performance Rating - Non-Residential	37%
Score Contribution	This credit contributes 40.0% towards the category score.
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC 2019 Section J)?

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2.1 Greenhouse Gas Emissions		100%
Score Contribution	This credit contributes 10.0% towards the category score.	
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?	
Annotation	aiming towards 10% better than BCA Benchmark	
2.2 Peak Demand		100%
Score Contribution	This credit contributes 5.0% towards the category score.	
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?	
2.3 Electricity Consumption		100%
Score Contribution	This credit contributes 10.0% towards the category score.	
Criteria	What is the % reduction in annual electricity consumption against the benchmark?	
2.4 Gas Consumption		N/A  Scoped Out
This credit was scoped out	None	
2.6 Electrification		100%
Score Contribution	This credit contributes 10.0% towards the category score.	
Criteria	Is the development all-electric?	
Question	Criteria Achieved?	
Project	Yes	
3.1 Carpark Ventilation		N/A  Scoped Out
This credit was scoped out	None	
3.2 Hot Water		100%
Score Contribution	This credit contributes 5.0% 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 10.0% 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 J6.2a of the NCC 2019 Vol 1?	
Question	Criteria Achieved ?	
Other building	Yes	
4.1 Combined Heat and Power (cogeneration / trigeneration)		N/A  Scoped Out
This credit was scoped out	None	
4.2 Renewable Energy Systems - Solar		0%  Disabled
This credit is disabled	No solar PV renewable energy is in use.	
4.4 Renewable Energy Systems - Other		0%  Disabled
This credit is disabled	No other (non-solar PV) renewable energy is in use.	

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Stormwater Overall contribution 14% Minimum required 100%

Which stormwater modelling are you using?:		MUSIC or other modelling software
1.1 Stormwater Treatment		100%
Score Contribution	This credit contributes 100.0% towards the category score.	
Criteria	Has best practice stormwater management been demonstrated?	
Question	Flow (ML/year)	
Project	0.0 % Reduction	
Question	Total Suspended Solids (kg/year)	
Project	88.0 % Reduction	
Question	Total Phosphorus (kg/year)	
Project	72.0 % Reduction	
Question	Total Nitrogen (kg/year)	
Project	63.0 % Reduction	

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IEQ Overall contribution 8% Minimum required 50%

1.4 Daylight Access - Non-Residential		48%	✓ 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	48 %		
2.3 Ventilation - Non-Residential		45%	✓ 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	90 %		
Criteria	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668.2:2012?		
Question	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668:2012?		
Other building	0 %		
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?		
Question	Value		
Other building	0 ppm		
3.4 Thermal comfort - Shading - Non-Residential		66%	
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	50 %		
3.5 Thermal Comfort - Ceiling Fans - Non-Residential		0%	
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	-		
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		

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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 2%

1.4 Bicycle Parking - Non-Residential		100%
Score Contribution	This credit contributes 25.0% 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)?	
Annotation	bike storage in existing shed.	
Question	Criteria Achieved ?	
Other building	Yes	
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	No	
Question	Bicycle Spaces Provided ?	
Other building	-	
1.6 End of Trip Facilities - Non-Residential		0% <input checked="" type="checkbox"/> Disabled
This credit is disabled	Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure		0%
Score Contribution	This credit contributes 25.0% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	No	
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	No	
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	No	

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Waste Overall contribution 4%

1.1 - Construction Waste - Building Re-Use		0%
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	No	
2.1 - Operational Waste - Food & Garden Waste		100%
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	Yes	
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	

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Urban Ecology Overall contribution 3%

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?	
Annotation	lunch room and recreation room.	
Question	Common space provided	
Other building	22.0 m ²	
Output	Minimum Common Space Required	
Other building	22 m ²	
2.1 Vegetation		75%
Score Contribution	This credit contributes 50.0% 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	20 %	
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	
3.2 Food Production - Non-Residential		100%
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	6.0 m ²	
Output	Min Food Production Area	
Other building	6 m ²	

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Innovation Overall contribution 0%

1.1 Innovation	0%
Score Contribution	This credit contributes 100.0% towards the category score.
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?

Disclaimer

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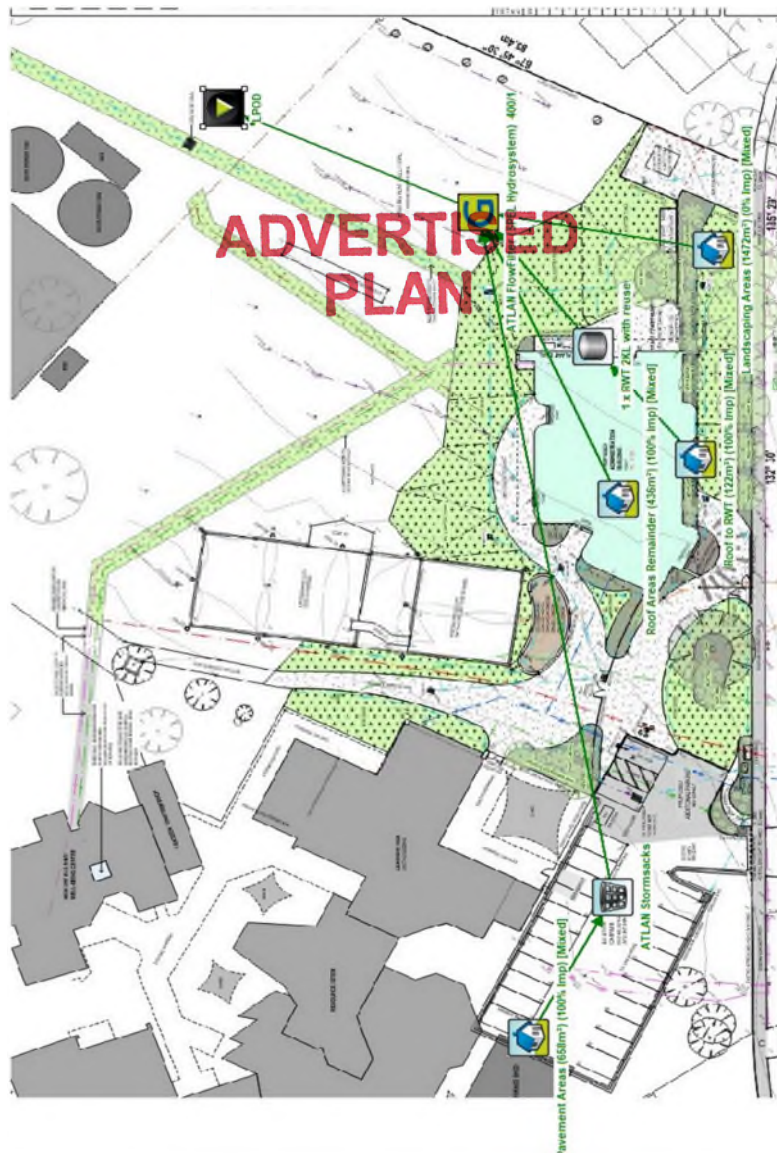
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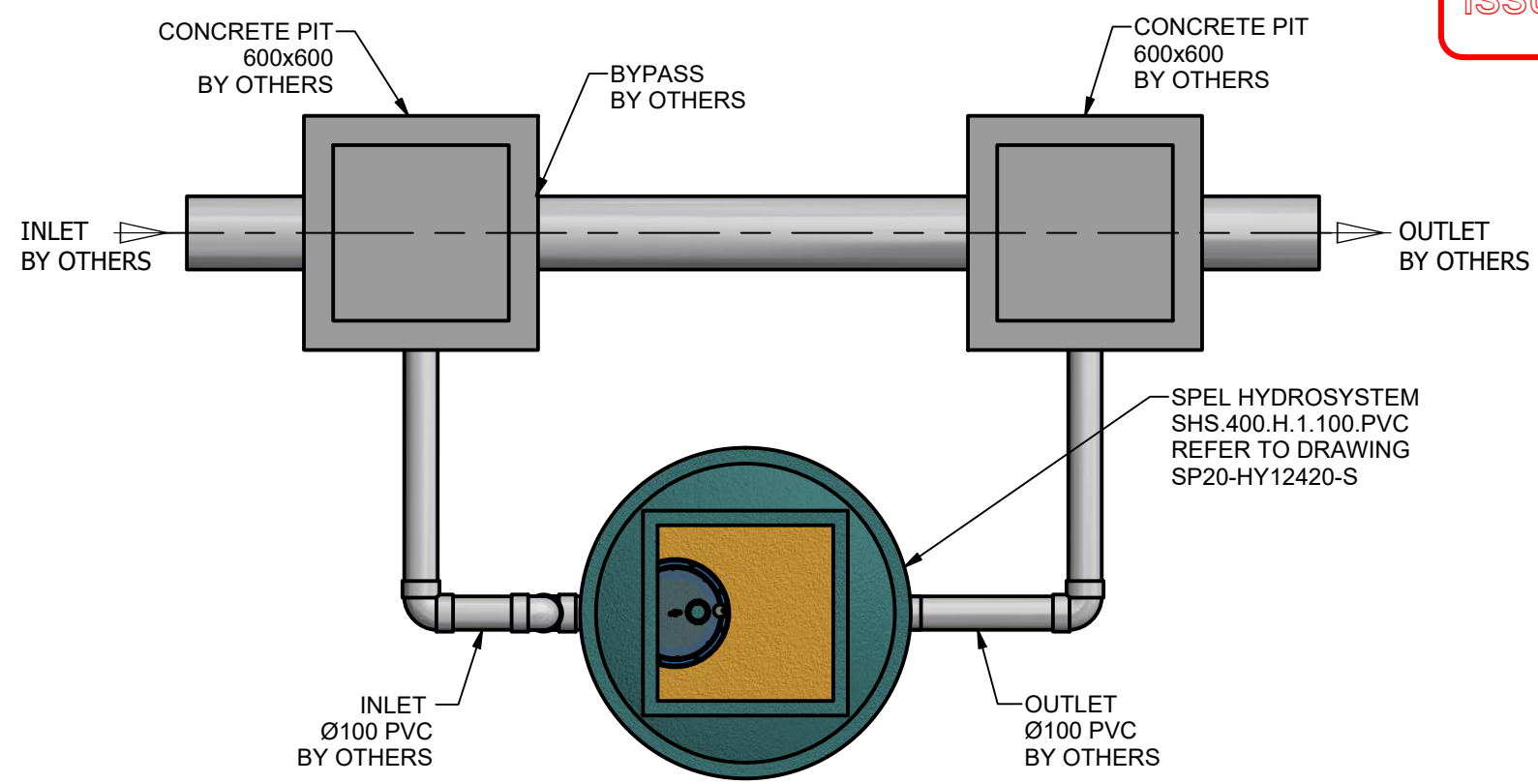
Appendix B – WSUD Layout and MUSIC

	Sources	Residual Load	% Reduction
Flow (ML/yr)	0.503	0.464	7.8
Total Suspended Solids (kg/yr)	97.8	7.01	92.8
Total Phosphorus (kg/yr)	0.19	0.0247	87
Total Nitrogen (kg/yr)	1.23	0.513	58.4
Gross Pollutants (kg/yr)	19.2	0.237	98.8



ISSUE FOR APPROVAL
NOT FOR CONSTRUCTION

REVISION HISTORY				
REV	DESCRIPTION	DESIGNER	CREATION DATE	CHECKED BY
1	INITIAL RELEASE	R.R.	06/07/2020	P.Z.



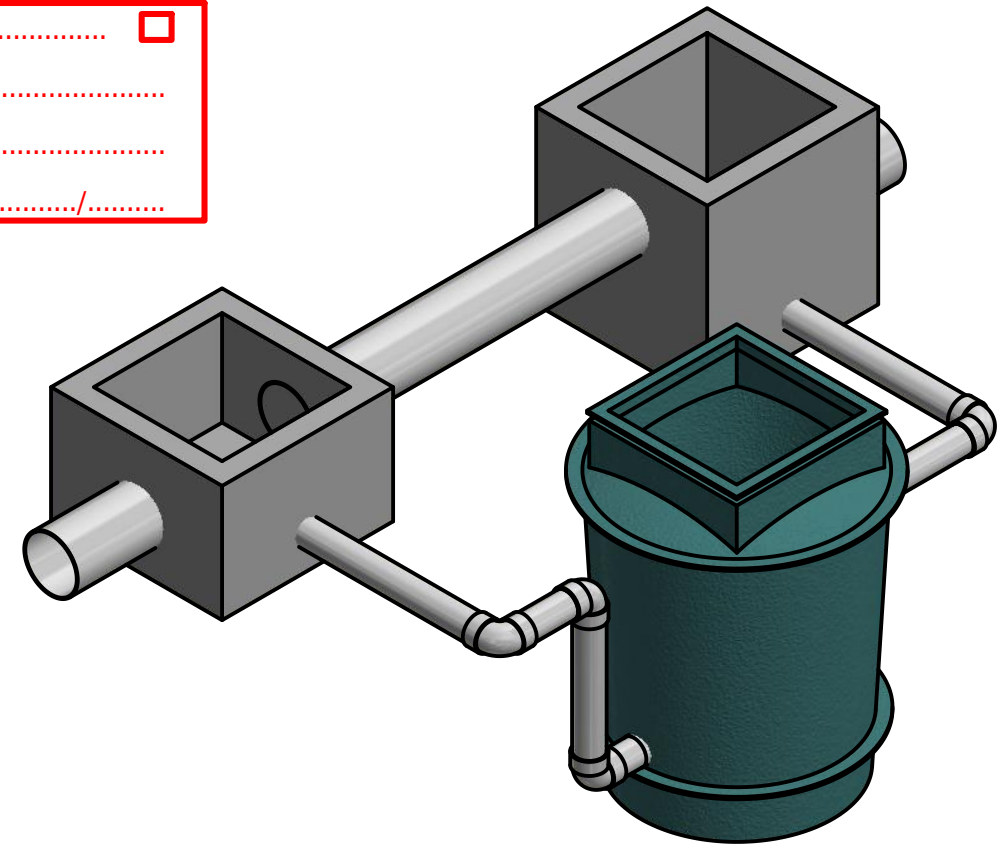
PLAN VIEW

APPROVED.....

NAME.....

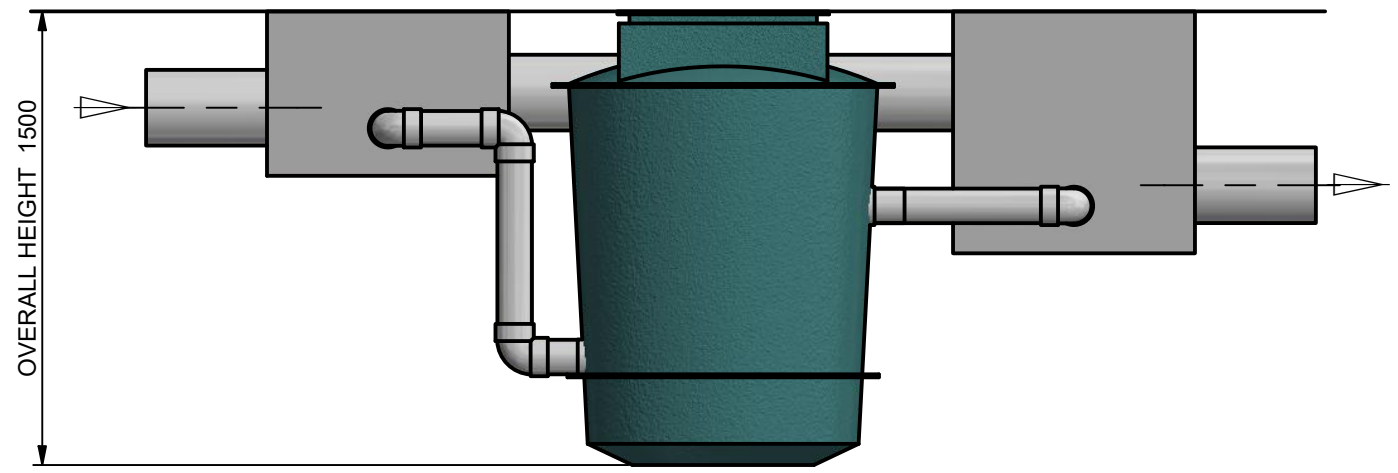
SIGNED.....

DATE...../...../.....

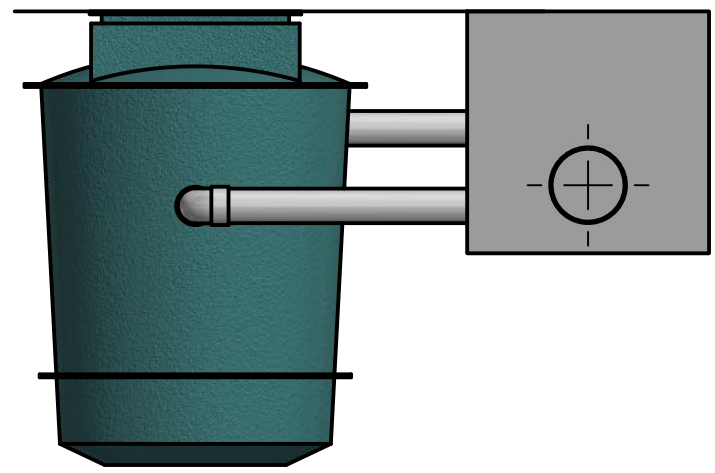


ISOMETRIC VIEW

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ELEVATION VIEW



SIDE VIEW

Site Level Confirmation	
Finished Surface Level (FSL)	RL:
Access Cover Thickness	mm
Inlet Invert Level	RL:
Outlet Invert Level	RL:
Company:	
Name:	
Date:	

- NOTES:
- 1: THE COMBINED HEIGHT OF AN EXTENSION-RISER & LID EXCEEDING 1000mm WILL REQUIRE THE TANK TO BE OF HEAVY DUTY CONSTRUCTION
 - 2: SYSTEM PIPEWORK MUST HAVE AT LEAST 250 MM OF FALL TO OPERATE CORRECTLY

TOLERANCE: ALL DIMENSIONS TO CLOSEST 10mm +/- 30mm UNLESS OTHERWISE STATED.

CLIENT:

DISTRIBUTOR :

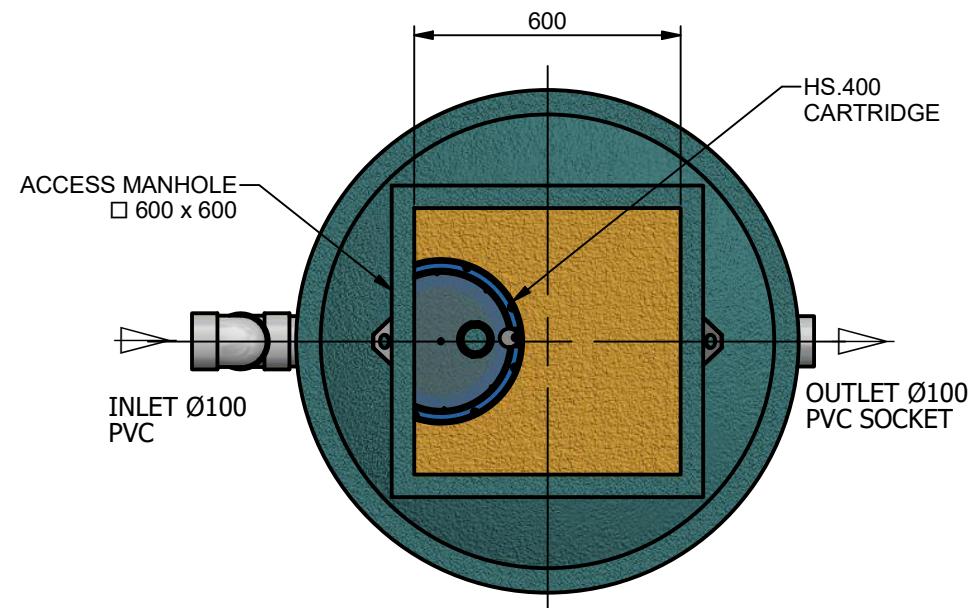
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Drawn R.R.	Date 06/07/2020
Check P.Z.	Date 07/07/2020
Verified	Date
Approved	Date
Request No. RN4497	

SPEL
 ENVIRONMENTAL
 INTEGRATED WATER SOLUTIONS

100 Silverwater Road Silverwater NSW 2128
 PH: 1300 773 500 | E: sales@spel.com.au
 www.spel.com.au

PROJECT : SHS.400.H.01.100.PVC			
TITLE SPEL HYDROSYSTEM WITH BYPASS SHS.400.H.1.100.PVC GENERAL ARRANGEMENT			
SCALE N.T.S	SIZE A3	SHEET 1	REV 1
CUSTOMER CODE :		DWG No. SP20-HY15290-S	

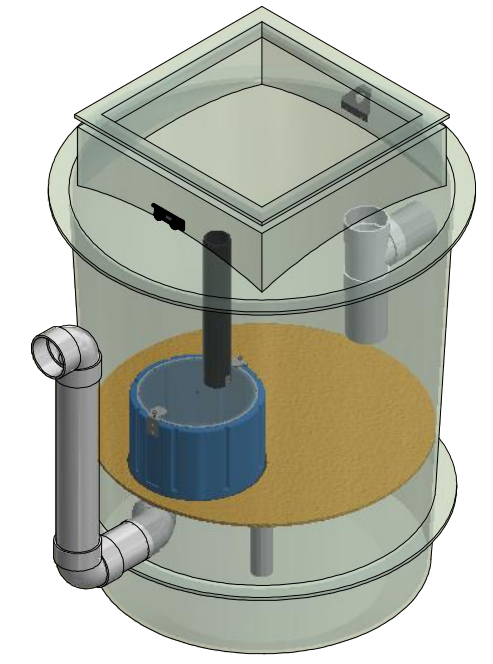


PLAN VIEW

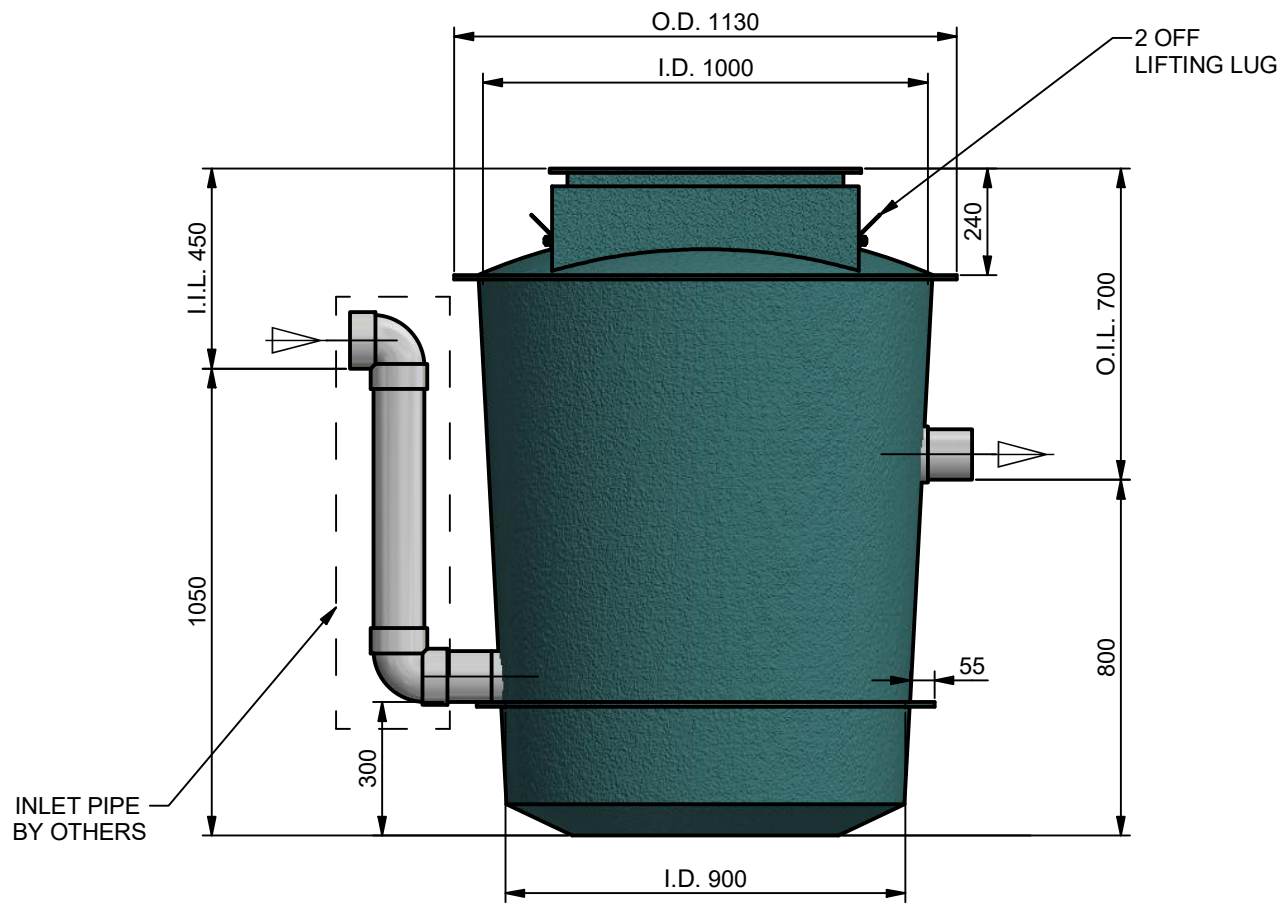
ISSUE FOR APPROVAL
NOT FOR CONSTRUCTION

Site Level Confirmation	
Finished Surface Level (FSL) RL:	
Access Cover Thickness	mm
Inlet Invert Level RL:	
Outlet Invert Level RL:	
Company:	
Name:	
Date:	

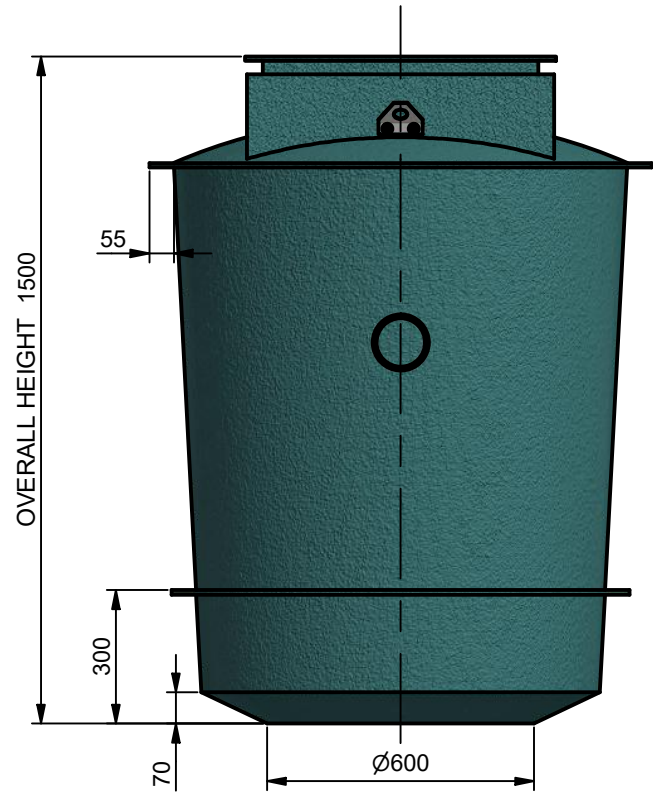
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ISOMETRIC VIEW



ELEVATION VIEW



SIDE VIEW

- NOTES:
- 1: THE COMBINED HEIGHT OF AN EXTENSION-RISER & LID EXCEEDING 1000mm WILL REQUIRE THE TANK TO BE OF HEAVY DUTY CONSTRUCTION
 - 2: SYSTEM PIPEWORK MUST HAVE AT LEAST 250 MM OF FALL TO OPERATE CORRECTLY
 - 3: DRY WEIGHT OF HYDROSYSTEM = 75 kg

TOLERANCE: All Dimensions to Closest 10 mm & +/- 30 mm | ALL INTERCONNECTING PIPEWORK, PITS AND ASSOCIATED DRAINAGE BY OTHERS

REV	DATE	BY	DESCRIPTION	CHK
1	11/03/2020	P.Z.	INITIAL RELEASE	

CLIENT:

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Drawn	Date
P.Z.	11/03/2020
Check	Date
Verified	Date
Approved	Date
Request No.	



PROJECT			
TITLE			
SPEL HYDROSYSTEM SHS.400.H.01.100.PVC GENERAL ARRANGEMENT			
SCALE	SIZE	SHEET	REV
N.T.S	A3	1	1
CUSTOMER CODE :		DWG No.	
		SP20-HY12420-S	

F:\Vault Working Folder\Designs\SPEL\PRODUCTS\HYDROSYSTEM\400-SERIES\STANDARD\HS.400-HM FILTER ELEMENT\TAPERED TANKS\1460H TANK\1 HYDRO\SP20-HY12420-S.rvt



Appendix C Wall-Glazing Calculations

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NCC 2019 Wall-Glazing Calculator v3.0

Wall and glazing energy efficiency in Class 2-9 buildings - Method 2 of Specification J1.5a, NCC 2019

Building name and description		Classification	Climate Zone
St. Francis Xavier @ 127-143 Bacchus Marsh Rd, Corio VIC 3214		Other	6
Calculated Area-Weighted U-Value	1.79	Calculated Representative Air-Conditioning Energy Value	38.6
Allowable Area-Weighted U-Value	2.00	Allowable Representative Air-Conditioning Energy Value	42.4
Building total U-Value allowance met	90%	Building total SHGC allowance met	92%
Check Values	Wall Element Requirements	Display Glazing Element Requirements	
Visible	Met	-	

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.

Building Check-Values					
	Area (m ²)			Display	Glazing Percentage (non display)
	Walls	Glazing	Sub-total		
North	69.3	20.7	90.0	0.0	23%
East	49.9	10.1	60.0	0.0	17%
South	69.3	65.7	135.0	0.0	49%
West	80.8	12.2	93.0	0.0	13%
Internal	0.0	0.0	0.0	0.0	0%
Total	269.3	108.7	378.0	0.0	29%

Element Limits			
Wall U-Value*	1.00		
Display Glazing U-Value	5.8		
Display Glazing Solar Admittance	0.81		
*The wall u-value limit will update based on building class and glazing %			

ID	Description (optional)	Element Type	Facing Sector	Area (m ²)	U-Value		SHGC and Shading				Element Check-Values						
					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	Rounded G/H	Rounded P/H	Shading Factor	Solar Admittance	AC Energy Value	
1	admin building	Wall	North	69.30	0.70	7% of building total						Not counted	0	0	1	0	0
2	admin building	Glazing	North	10.80	4.50	7% of building total	0.55	0.9	1	1.5	13% of building total	0.1	1.5	0.4	0.22	5.03712	
3	admin building	Glazing	North	9.90	4.50	7% of building total	0.55	2.7	2.8	1.5	20% of building total	0.1	0.5	0.66	0.363	7.618644	
4	admin building	Wall	East	49.89	0.70	5% of building total						Not counted	0	0	1	0	0
5	admin building	Glazing	East	3.36	4.50	2% of building total	0.55	0.8			0% of building total	0	0	1	0.55	0	
6	admin building	Glazing	East	6.75	4.50	4% of building total	0.55	2.7			0% of building total	0	0	1	0.55	0	
7	admin building	Wall	South	69.30	0.70	7% of building total						Not counted	0	0	1	0	0
8	admin building	Glazing	South	52.80	4.50	35% of building total	0.55	0.8	1	1.5	51% of building total	0.2	1	0.68	0.374	19.7472	
9	admin building	Glazing	South	12.90	4.50	9% of building total	0.55	2.7	2.8	1	16% of building total	0.1	0.3	0.88	0.484	6.2436	
10	admin building	Wall	West	80.80	0.70	8% of building total						Not counted	0	0	1	0	0
11	admin building	Glazing	West	6.80	4.50	5% of building total	0.55	0.8			0% of building total	0	0	1	0.55	0	
12	admin building	Glazing	West	5.40	4.50	4% of building total	0.55	2.7	2.8		1% of building total	0.1	0.3	0.81	0.4455	0	
13					Not counted							Not counted	0	0	1	0	0
14					Not counted							Not counted	0	0	1	0	0
15					Not counted							Not counted	0	0	1	0	0
16					Not counted							Not counted	0	0	1	0	0
17					Not counted							Not counted	0	0	1	0	0
18					Not counted							Not counted	0	0	1	0	0
19					Not counted							Not counted	0	0	1	0	0
20					Not counted							Not counted	0	0	1	0	0
21					Not counted							Not counted	0	0	1	0	0
22					Not counted							Not counted	0	0	1	0	0
23					Not counted							Not counted	0	0	1	0	0
24					Not counted							Not counted	0	0	1	0	0
25					Not counted							Not counted	0	0	1	0	0
26					Not counted							Not counted	0	0	1	0	0
27					Not counted							Not counted	0	0	1	0	0
28					Not counted							Not counted	0	0	1	0	0
29					Not counted							Not counted	0	0	1	0	0
30					Not counted							Not counted	0	0	1	0	0
31					Not counted							Not counted	0	0	1	0	0
32					Not counted							Not counted	0	0	1	0	0
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43					Not counted							Not counted	0	0	1	0	0
44					Not counted							Not counted	0	0	1	0	0
45					Not counted							Not counted	0	0	1	0	0
46					Not counted							Not counted	0	0	1	0	0
47					Not counted							Not counted	0	0	1	0	0
48					Not counted							Not counted	0	0	1	0	0
49					Not counted							Not counted	0	0	1	0	0
50					Not counted							Not counted	0	0	1	0	0

Disclaimer:
 This calculator has been developed to assist in developing a better understanding of the glazing energy efficiency parameters of NCC 2019. While the author believes that the calculator, if used correctly, is likely to produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of this calculator is entirely at your own risk and the author accepts no liability of any kind.

Made by Alex Zeller
 Email alex.wallglazingcalculator@gmail.com with any suggestions for improvement

[Check for version update](#)

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BCA Section J (JP1) Assessment JV3 Energy Verifications Provision Methodology

Stage One Works St. Francis Xavier Proposed Administration Building 127-143 Bacchus Marsh Rd Corio VIC 3214

Consultant: Karim Ghobrial
Client: Minx Architecture
7A/91 Moreland St
Footscray VIC 3011
Date: December 2023





Building Details

General Information

Climate Zone for Thermal Design	6
Building Class	Class 9b
Property Address	127-143 Bacchus Marsh Rd, Corio VIC 3214
New or alteration to existing building	New building: Administration building
Reference no	12873 Drawings by Minx Architecture, Dated: Oct 2023, Drawing no: 2014-A0.01 to 2014-A1.93, Rev B.
Building area (sqm)	N/A
Estimated Hours of Operation	8am to 4pm / 5 days a week
Electrical design submitted	Refer to services engineer
Mechanical design submitted	Refer to services engineer

Background

Efficient Energy Choices has been engaged to carry out a Section J report for the above proposed project. Section J assessment and report will be carried out by JV3 Energy Verification methods from BCA Section J chapter of Energy Efficiency. The focus of this Section JV3 is the conditioned spaces. As assessment has been carried out first using DtS provision to work out predicted energy consumptions in kWh. Then a second assessment has also been carried out to improve building energy performance. Total energy kWh of Verification Method must not exceed total energy kWh of DtS method for compliance.

This assessment has been carried out by Design Builder Energy Plus Platform which is in accordance with NCC 2019 and ASHRAE Standard 140.

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JV3 System Summary of Energy Calculations

Compliance: Using Verification Method, total Summary of Energy must be either equal or less than DtS method Summary of Energy.

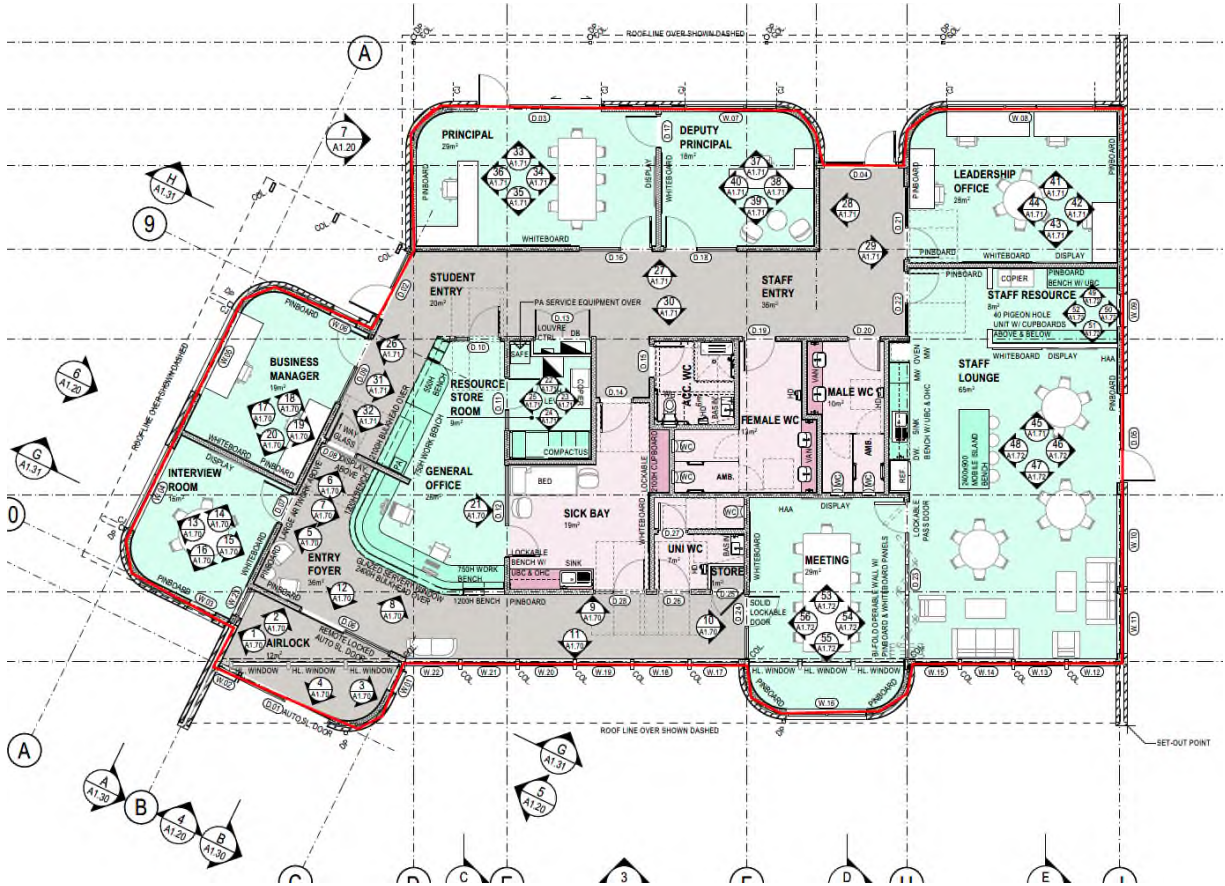
	DtS (Reference) Summary of Energy KWhr	Proposed Summary of Energy KWhr
Building	52,317	52,162 COMPLIES
Comments for compliance		Building fabric walls and roof insulation upgraded for compliance.

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J1 Building Fabric

Item	Requirement	Comments
J1.1 application of part	General	New buildings.
J1.2 Thermal construction general	Required	Where required, Install insulation to AS4859.1. Insulation to be installed to form a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contributes to the thermal barrier. It must also be water resistant. Ensure that it does not affect operation of a service or fitting. Kingspan or Rockwool thermal insulation or approved equivalent is recommended. Thermal insulation with inherent acoustic performance is also recommended to decrease noise levels. This is not a mandatory requirement for the BCA Section J, but it is only voluntary.
J1.3 Roof and ceiling insulation	Total R3.2 min	For JV3 Verification, it is required to install Bradford insulation R4.0 and sarking. Roof colour to be light type, solar absorptance of 0.45 or less. Roof colour to be light Shale Grey type or similar. This is satisfactory and meets the BCA requirement.
J1.4 Roof lights	Required	N/A
J1.5 Walls	Total R2.0 min With thermal bridging.	Maximum allowable U value is 0.7, giving R value of R1.50 without thermal bridging. For JV3 Verification, with thermal bridging <u>It is required to install minimum of R2.0 insulation plus sarking.</u> See following page and Wall-Glazing Calculator for further details. This is satisfactory and meets BCA requirement.
J1.6 Floors	Total R2.0 min	Soil insulation contact with floor is R1.4. Floor coverings of carpet, underlay, timber floor and tiles provide insulation of minimum of R0.7. Total of R2.1 meeting this requirement. Complies as is.



Walls insulation perimeter highlighted in Red.

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J1.5 External Glazing

J1.5 Glazing method 2	Required	General requirement single-glazed EVantage type. U value of 4.5 or less SHGC of 0.50 - 0.60.
Shading	Required	Proposed shading is sufficient. Additional shading is not required.

BCA Requirements Part J1.5	Assessment	Comments
a) (i) U Value not greater than 2.0 (minimum R=0.5) for: Class 2, 5, 6, 7, 8, 9b.	Assessed. See Wall-Glazing Calculator	Complies
a) (ii) U Value not great than 1.1 (minimum R=1) for: Class 3, 9c. for Climates 1,3,4,6 or 7. U Value of 2 (R=0.5) for Climates 2 or 5.	Assessed. See Wall-Glazing Calculator N/A	Complies
b) U Value of not greater than 5.8 for display glazing	Assessed. See Wall-Glazing Calculator	N/A
c) System U Value of wall-glazing construction must be calculated in accordance with Specification J1.5	Assessed. See Wall-Glazing Calculator	Complies
d) Wall components of a wall-glazing construction much achieve a minimum Total R Value of: (i) Wal is less than 80% of area, Wall-Glazing construction of R1.0; (ii) Wall is 80% or more of the area of the wall-glazing construction, the value specified in Table J1.5a.	Assessed. See Wall-Glazing Calculator	Complies

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J3 Building Sealing

(Deemed-to-Satisfy Provisions Methodology)

Item	Requirement	Comments
J3.1 Application of part	General	N/A
J3.2 Chimneys and flues	Required	N/A
J3.3 Roof lights	General	N/A
J3.4 Windows and door	Required	Seal to restrict air infiltration to the entry doors and windows. Main entrance doors are to be self-closing type.
J3.5 Exhaust fans	Required	Seal exhaust fans.
J3.6 Construction of roofs, walls	Required	Must be constructed in a fashion to minimise air leakage.
J3.7 Evaporative coolers	N/A	N/A

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J4 Air Movement

(Deemed-to-Satisfy Provisions Methodology)

Item	Requirement	Comments
J4.1 Application of part	N/A	N/A
J4.2 Air Movement	N/A	N/A
J4.3 Ventilation openings	N/A	N/A
J4.4 Ceiling fans and evaporative coolers	N/A	N/A

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J5 Air Conditioning and Ventilation Systems

Refer to services engineer report and certificate.

Item	Requirement	Comments
J5.1	General	Applies to conditioned areas.
J5.2 Air Conditioning and ventilation	Required	Refer <i>Table A</i> below. a) To be capable to be deactivated when area is not occupied. Thermostatically control temperature of each zone. Limit reheating to save energy. Provide mechanical ventilation. To have an economy cycle if flow rate is greater than Table J5.2. Use variable speed drive for air flow greater than 1000L/s. For Class 3, must not operate when any external door is opened to a balcony or like for more than one minute. b) Must work together when two or more A/C systems are in the same area. c) Must have a time switch for greater than 2kW. Not required for Class 2,3 and 4.
J5.3 Mechanical ventilation system control	Required	a) For other than Class 2 and 4, to be capable to be deactivated when building is not occupied. Have energy reclaiming system that preconditions outdoor ai at a minimum heat transfer effectiveness of 60%. OR demand control ventilation as per AS1668.2. refer to Table J5.3 Exhaust systems for air flow greater than 1000L/s to be capable to stop when system is not needed. Other than Class 2,3 or 9c. Time switch to be used when air flow rate is greater than 1000L/s.
J5.4 Fan systems	Required	To comply with b,c,d and e in this clause.
J5.5 Ductwork	Required	To comply with AS/NZS4859.1; and insulation of R1.0 for flexible ductwork.

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		Insulation to be protected against effects of weather and sunlight. Form a continuous barrier. Be protected by vapour barrier on the outside of the insulation.
J5.9 Space heating	Required	A heater used for airconditioning must be solar heater or gas or heat pump or heating using reclaimed energy. For electric heating: annual energy consumption not to exceed 15kW/m ² of the floor area.

The ductwork must be insulated with R2.0 insulation where not exposed to direct sunlight. Where exposed to direct sunlight, ductwork must be insulated with R3.0.

Any additional unconditioned outside air supplied is to provide free cooling or balance required exhaust ventilation such as toilet exhaust. The system must not inhibit smoke hazard management operation. The kW rating is a guide. Unit sizes are to be finalised by mechanical contractor on site.

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J7 Hot Water Supply

(Deemed-to-Satisfy Provisions Methodology)

Item	Requirement	Comments
J7.1	N/A	N/A
J7.2 Hot water supply	Required	Refer to J6.6

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J8 Access for Maintenance and Facilities for Monitoring

(Deemed-to-Satisfy Provisions Methodology)

Item	Requirement	Comments
J8.1	N/A	N/A
J8.2 Access for maintenance in accordance to I2: a) adjustable and motorised shading; b) time switches and motion detectors; c) room temperature thermostats; d) plant thermostats such as boilers or e) refrigeration units; f) motorised air dampers and control valves; g) reflectors, lenses and diffusers; h) heat transfer equipment	Required	Access for maintenance required for b and c.
J8.3 Facilities for energy monitoring: • to apply for buildings over 500m2 for gas • and electricity; • for buildings over 2500m2 for energy • consuming items such as: A/C, lighting, • appliance power, hot water supply, • transport and other ancillary plan	N/A	N/A

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M 0414 430 046
PO Box 576 Essendon North 3041

By applying the above recommendations, the proposed project will be compliant to BCA Section J energy efficiency requirements.

Kind Regards,
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Bach of Electrical & Electronic Engineering.
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Sustainable Victoria Registration No. VIC/BDAV/15/1703
Green Star Accredited Professional by Green Building Council Australia

Disclaimer

The above are guidelines to assist the above property to meet the Deemed-to-Satisfy provisions for BCA JP1. It is the responsibility of the owner/builder to follow the above guidelines to meet requirements of BCA JP1. It is not the responsibility of Efficient Energy Choices.

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Appendix A Design Builder Energy Plus Simulation

Project Data

Program Version: **EnergyPlus, Version 9.4.0-217a24fc09, YMD=2023.10.25 11:50**

Tabular Output Report in Format: **HTML**

Building: **Building**

Environment: **SCHOOL (01-01:31-12) ** MELBOURNE - AUS IWEC Data WMO#=948660**

Simulation Timestamp: **2023-10-25 11:50:42**

Table of Contents

Report: **Annual Building Utility Performance Summary**

For: **Entire Facility**

Timestamp: **2023-10-25 11:50:42**

Values gathered over 8760.00 hours

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REFERENCE BUILDING SUMMARY OF ENERGY

Site and Source Energy

	Total Energy [kWh]	Energy Per Total Building Area [kWh/m ²]	Energy Per Conditioned Building Area [kWh/m ²]
Total Site Energy	52317.34	69.21	69.21
Net Site Energy	52317.34	69.21	69.21
Total Source Energy	150975.56	199.74	199.74
Net Source Energy	150975.56	199.74	199.74

Site to Source Energy Conversion Factors

	Site=>Source Conversion Factor
Electricity	3.167
Natural Gas	1.084
District Cooling	1.056
District Heating	3.613
Steam	0.250
Gasoline	1.050
Diesel	1.050
Coal	1.050
Fuel Oil No 1	1.050
Fuel Oil No 2	1.050
Propane	1.050
Other Fuel 1	1.000
Other Fuel 2	1.000

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Building Area

	Area [m2]
Total Building Area	755.87
Net Conditioned Building Area	755.87
Unconditioned Building Area	0.00

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End Uses

	Electri- city [kWh]	Natu- ral Gas [kWh]	Gaso- line [kWh]	Die- sel [kWh]	Coa- l [kWh]	Fue- l Oil No 1 [kWh]	Fue- l Oil No 2 [kWh]	Pro- pane [kWh]	Oth- er Fue- l 1 [kWh]	Oth- er Fue- l 2 [kWh]	Distr- ict Cool- ing [kWh]	Distr- ict Heati- ng [kWh]	Wa- ter [m3]
Heating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1096 6.83	0.00
Cooling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9811 .70	0.00	0.00
Interior Lighting	8436.0 7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interior Equipme- nt	20621. 50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Equipme- nt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Rejection	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Humidification	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Recovery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2481.24	38.85
Refrigeration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total End Uses	29057.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9811.70	1344.807	38.85

Note: District heat appears to be the principal heating source based on energy usage.

End Uses By Subcategory

	Subcategory	Electricity [kWh]	Natural Gas [kWh]	Gasoline [kWh]	Diesel [kWh]	Coal [kWh]	Fuel Oil 1 [kWh]	Fuel Oil 2 [kWh]	Propane [kWh]	Other Fuel 1 [kWh]	Other Fuel 2 [kWh]	District Cooling [kWh]	District Heating [kWh]	Water [m ³]
Heating	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10966.83	0.00
Cooling	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9811.70	0.00	0.00
Interior Lighting	ELECTRIC EQUIPMENT#GF:InteriorRoom#GeneralLights	181.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



ELECTRIC EQUIPMENT#GF:Pass#GeneralLights	1111.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRIC EQUIPMENT#GF:GenOffice#GeneralLights	280.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRIC EQUIPMENT#GF:Amenities#GeneralLights	881.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRIC EQUIPMENT#GF:Meeting#GeneralLights	330.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRIC EQUIPMENT#GF:Lounge#GeneralLights	793.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRIC EQUIPMENT#GF:BusMgr#GeneralLights	200.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRIC EQUIPMENT#GF:DepPrincipal#GeneralLights	193.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRIC EQUIPMENT#GF:Leadership#GeneralLights	327.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRIC EQUIPMENT#GF:Principal#GeneralLights	327.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRIC EQUIPMENT#Roof:Zone1#GeneralLights	454.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRIC EQUIPMENT#Block	262.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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	3:Zone1#GeneralLig hts													
	ELECTRIC EQUIPMENT#Block 6:Zone1#GeneralLig hts	364. 73	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0. 00
	ELECTRIC EQUIPMENT#Block 2:Zone1#GeneralLig hts	642. 92	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0. 00
	ELECTRIC EQUIPMENT#Block 4:Zone1#GeneralLig hts	2083 .47	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0. 00
Exteri or Lighti ng	General	0.00	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0. 00
Interio r Equip ment	General	2062 1.50	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0. 00
Exteri or Equip ment	General	0.00	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0. 00
Fans	General	0.00	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0. 00
Pumps	General	0.00	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0. 00
Heat Reject ion	General	0.00	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0. 00
Humid ificati on	General	0.00	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0.0 0	0. 00

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Heat Recovery	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Systems	DHW GF:InterRoom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.47	0.84
	DHW GF:Pass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	326.99	5.12
	DHW GF:GenOffice	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	82.64	1.29
	DHW GF:Amenities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	259.25	4.06
	DHW GF:Meeting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	97.30	1.52
	DHW GF:Lounge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	233.37	3.65
	DHW GF:BusMgr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	58.86	0.92
	DHW GF:DepPrincipal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56.86	0.89
	DHW GF:Leadership	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.22	1.51
	DHW GF:Principal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.24	1.51
	DHW Roof:Zone1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	133.78	2.09
	DHW Block3:Zone1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	77.10	1.21
	DHW Block6:Zone1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	107.28	1.68
	DHW Block2:Zone1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	189.10	2.96
	DHW Block4:Zone1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	612.80	9.60



Refrigeration	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generators	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Normalized Metrics

Utility Use Per Conditioned Floor Area

	Electricity Intensity [kW h/m ²]	Natural Gas Intensity [kW h/m ²]	Gasoline Intensity [kW h/m ²]	Diesel Intensity [kW h/m ²]	Coal Intensity [kW h/m ²]	Fuel Oil No 1 Intensity [kW h/m ²]	Fuel Oil No 2 Intensity [kW h/m ²]	Propane Intensity [kW h/m ²]	Other Fuel 1 Intensity [kW h/m ²]	Other Fuel 2 Intensity [kW h/m ²]	District Cooling Intensity [kW h/m ²]	District Heating Intensity [kW h/m ²]	Water Intensity [m ³ /m ²]
Lighting	11.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HVAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.98	17.79	0.05
Other	27.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	38.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.98	17.79	0.05

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Utility Use Per Total Floor Area

	Elect ricity Inten sity [kW h/m ²]	Natu ral Gas Inten sity [kW h/m ²]	Gas line Inten sity [kW h/m ²]	Diese l Inten sity [kW h/m ²]	Coal Inten sity [kW h/m ²]	Fuel Oil No 1 Inten sity [kW h/m ²]	Fuel Oil No 2 Inten sity [kW h/m ²]	Prop ane Inten sity [kW h/m ²]	Othe r Fuel 1 Inten sity [kW h/m ²]	Othe r Fuel 2 Inten sity [kW h/m ²]	Distr ict Cooli ng Inten sity [kW h/m ²]	Distr ict Heat ing Inten sity [kW h/m ²]	Wat er Inte nsit y [m ³ / m ²]
Lig htin g	11.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HV AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.98	17.79	0.05
Oth er	27.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tot al	38.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.98	17.79	0.05

Electric Loads Satisfied

	Electricity [kWh]	Percent Electricity [%]
Fuel-Fired Power Generation	0.000	0.00
High Temperature Geothermal*	0.000	0.00
Photovoltaic Power	0.000	0.00
Wind Power	0.000	0.00
Power Conversion	0.000	0.00
Net Decrease in On-Site Storage	0.000	0.00
Total On-Site Electric Sources	0.000	0.00
Electricity Coming From Utility	29057.565	100.00



Surplus Electricity Going To Utility	0.000	0.00
Net Electricity From Utility	29057.565	100.00
Total On-Site and Utility Electric Sources	29057.565	100.00
Total Electricity End Uses	29057.565	100.00

On-Site Thermal Sources

	Heat [kWh]	Percent Heat [%]
Water-Side Heat Recovery	0.00	
Air to Air Heat Recovery for Cooling	0.00	
Air to Air Heat Recovery for Heating	0.00	
High-Temperature Geothermal*	0.00	
Solar Water Thermal	0.00	
Solar Air Thermal	0.00	
Total On-Site Thermal Sources	0.00	

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Water Source Summary

	Water [m3]	Percent Water [%]
Rainwater Collection	0.00	0.00
Condensate Collection	0.00	0.00
Groundwater Well	0.00	0.00
Total On Site Water Sources	0.00	0.00
-	-	-
Initial Storage	0.00	0.00
Final Storage	0.00	0.00
Change in Storage	0.00	0.00
-	-	-
Water Supplied by Utility	38.85	100.00
-	-	-
Total On Site, Change in Storage, and Utility Water Sources	38.85	100.00
Total Water End Uses	38.85	

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PROPOSED BUILDING SUMMARY OF ENERGY

Site and Source Energy

	Total Energy [kWh]	Energy Per Total Building Area [kWh/m ²]	Energy Per Conditioned Building Area [kWh/m ²]
Total Site Energy	52162.78	69.01	69.01
Net Site Energy	52162.78	69.01	69.01
Total Source Energy	150275.62	198.81	198.81
Net Source Energy	150275.62	198.81	198.81

Site to Source Energy Conversion Factors

	Site=>Source Conversion Factor
Electricity	3.167
Natural Gas	1.084
District Cooling	1.056
District Heating	3.613
Steam	0.250
Gasoline	1.050
Diesel	1.050
Coal	1.050
Fuel Oil No 1	1.050
Fuel Oil No 2	1.050
Propane	1.050
Other Fuel 1	1.000
Other Fuel 2	1.000

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Building Area

	Area [m2]
Total Building Area	755.87
Net Conditioned Building Area	755.87
Unconditioned Building Area	0.00

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End Uses

	Electricity [kWh]	Natural Gas [kWh]	Gasoline [kWh]	Diesel [kWh]	Coal [kWh]	Fuel Oil No 1 [kWh]	Fuel Oil No 2 [kWh]	Propane [kWh]	Other Fuel 1 [kWh]	Other Fuel 2 [kWh]	District Cooling [kWh]	District Heating [kWh]	Water [m3]
Heating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10756.96	0.00
Cooling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9867.01	0.00	0.00
Interior Lighting	8436.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interior Equipment	20621.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Rejection	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Humidification	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Recovery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Systems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2481.24	38.85
Refrigeration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Total End Uses	29057.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9867.01	13238.20	38.85
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Note: District heat appears to be the principal heating source based on energy usage.

End Uses By Subcategory

	Subcategory	Electricity [kWh]	Natural Gas [kWh]	Gasoline [kWh]	Diesel [kWh]	Coal [kWh]	Fuel Oil No 1 [kWh]	Fuel Oil No 2 [kWh]	Propane [kWh]	Other Fuel 1 [kWh]	Other Fuel 2 [kWh]	District Cooling [kWh]	District Heating [kWh]	Water [m ³]
Heating	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10756.96	0.00
Cooling	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9867.01	0.00	0.00
Interior Lighting	ELECTRIC EQUIPMENT#GF:InterRoom#GeneralLights	181.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:Pass#GeneralLights	1111.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:GenOffice#GeneralLights	280.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:Amenities#GeneralLights	881.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:Meeting#GeneralLights	330.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:Lounge#GeneralLights	793.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:BusMgr#GeneralLights	200.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:DepPrincipal#GeneralLights	193.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



	ELECTRIC EQUIPMENT#GF:Leadership#GeneralLights	327.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#GF:Principal#GeneralLights	327.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#Roof:Zone1#GeneralLights	454.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#Block3:Zone1#GeneralLights	262.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#Block6:Zone1#GeneralLights	364.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#Block2:Zone1#GeneralLights	642.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ELECTRIC EQUIPMENT#Block4:Zone1#GeneralLights	2083.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Lighting	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interior Equipment	General	20621.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Equipment	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fans	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pumps	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Rejection	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Humidification	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Recovery	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Water Systems	DHW GF:InterRoom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.47	0.84
	DHW GF:Pass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	326.99	5.12
	DHW GF:GenOffice	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	82.64	1.29
	DHW GF:Amenities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	259.25	4.06
	DHW GF:Meeting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	97.30	1.52
	DHW GF:Lounge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	233.37	3.65
	DHW GF:BusMgr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	58.86	0.92
	DHW GF:DepPrincipal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56.86	0.89
	DHW GF:Leadership	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.22	1.51
	DHW GF:Principal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.24	1.51
	DHW Roof:Zone1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	133.78	2.09
	DHW Block3:Zone1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	77.10	1.21
	DHW Block6:Zone1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	107.28	1.68
	DHW Block2:Zone1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	189.10	2.96
	DHW Block4:Zone1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	612.80	9.60
Refrigeration	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generators	General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Normalized Metrics

Utility Use Per Conditioned Floor Area

	Electricity Intensity [kWh /m2]	Natural Gas Intensity [kWh /m2]	Gasoline Intensity [kWh /m2]	Diesel Intensity [kWh /m2]	Coal Intensity [kWh /m2]	Fuel Oil No 1 Intensity [kWh /m2]	Fuel Oil No 2 Intensity [kWh /m2]	Propane Intensity [kWh /m2]	Other Fuel 1 Intensity [kWh /m2]	Other Fuel 2 Intensity [kWh /m2]	District Cooling Intensity [kWh /m2]	District Heating Intensity [kWh /m2]	Water Intensity [m3/m2]
Lighting	11.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HVAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.05	17.51	0.05
Other	27.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	38.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.05	17.51	0.05

Utility Use Per Total Floor Area

	Electricity Intensity [kWh /m2]	Natural Gas Intensity [kWh /m2]	Gasoline Intensity [kWh /m2]	Diesel Intensity [kWh /m2]	Coal Intensity [kWh /m2]	Fuel Oil No 1 Intensity [kWh /m2]	Fuel Oil No 2 Intensity [kWh /m2]	Propane Intensity [kWh /m2]	Other Fuel 1 Intensity [kWh /m2]	Other Fuel 2 Intensity [kWh /m2]	District Cooling Intensity [kWh /m2]	District Heating Intensity [kWh /m2]	Water Intensity [m3/m2]
Lighting	11.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HVAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.05	17.51	0.05
Other	27.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	38.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.05	17.51	0.05



Electric Loads Satisfied

	Electricity [kWh]	Percent Electricity [%]
Fuel-Fired Power Generation	0.000	0.00
High Temperature Geothermal*	0.000	0.00
Photovoltaic Power	0.000	0.00
Wind Power	0.000	0.00
Power Conversion	0.000	0.00
Net Decrease in On-Site Storage	0.000	0.00
Total On-Site Electric Sources	0.000	0.00
Electricity Coming From Utility	29057.565	100.00
Surplus Electricity Going To Utility	0.000	0.00
Net Electricity From Utility	29057.565	100.00
Total On-Site and Utility Electric Sources	29057.565	100.00
Total Electricity End Uses	29057.565	100.00

On-Site Thermal Sources

	Heat [kWh]	Percent Heat [%]
Water-Side Heat Recovery	0.00	
Air to Air Heat Recovery for Cooling	0.00	
Air to Air Heat Recovery for Heating	0.00	
High-Temperature Geothermal*	0.00	
Solar Water Thermal	0.00	
Solar Air Thermal	0.00	
Total On-Site Thermal Sources	0.00	

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Water Source Summary

	Water [m3]	Percent Water [%]
Rainwater Collection	0.00	0.00
Condensate Collection	0.00	0.00
Groundwater Well	0.00	0.00
Total On Site Water Sources	0.00	0.00
-	-	-
Initial Storage	0.00	0.00
Final Storage	0.00	0.00
Change in Storage	0.00	0.00
-	-	-
Water Supplied by Utility	38.85	100.00
-	-	-
Total On Site, Change in Storage, and Utility Water Sources	38.85	100.00
Total Water End Uses	38.85	100.00

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Appendix B Thermal Bridging Calculations

Air Film (Outdoor)	0.04
Cladding	0.2
Insulation allowing for Thermal Bridging	1.47
Plasterboard	0.06
Air Film (Indoor)	0.12
Total	1.89

R ₁ Insulation R-Value	1.7
R ₂ Framing R-Value	0.75
Wall Height (mm)	3000
Stud width (mm)	70
Stud breadth (mm)	45
Stud spacing (mm)	600
Top Plate thickness (mm)	90
Nogging (mm)	35
Bottom Plate thickness (mm)	35
f ₁	0.876
f ₂	0.124
1/R _b	0.681
R_b R-Value of wall (incl Thermal bridging)	1.50

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Appendix C Wall-Glazing Calculations Part J1.5

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NCC 2019 Wall-Glazing Calculator v3.0

Wall and glazing energy efficiency in Class 2-9 buildings - Method 2 of Specification J1.5a, NCC 2019

Building name and description		Classification	Climate Zone
St. Francis Xavier @ 127-143 Bacchus Marsh Rd, Corio VIC 3214		Other	6
Calculated Area-Weighted U-Value	1.79	Calculated Representative Air-Conditioning Energy Value	38.6
Allowable Area-Weighted U-Value	2.00	Allowable Representative Air-Conditioning Energy Value	42.4
Building total U-Value allowance met	90%	Building total SHGC allowance met	92%
Check Values	Wall Element Requirements	Display Glazing Element Requirements	
Visible	Met	-	

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.

Building Check-Values					
	Area (m ²)			Display	Glazing Percentage (non display)
	Walls	Glazing	Sub-total		
North	69.3	20.7	90.0	0.0	23%
East	49.9	10.1	60.0	0.0	17%
South	69.3	65.7	135.0	0.0	49%
West	80.8	12.2	93.0	0.0	13%
Internal	0.0	0.0	0.0	0.0	0%
Total	269.3	108.7	378.0	0.0	29%

Element Limits			
Wall U-Value*	1.00		
Display Glazing U-Value	5.8		
Display Glazing Solar Admittance	0.81		
*The wall u-value limit will update based on building class and glazing %			

ID	Description (optional)	Element Type	Facing Sector	Area (m ²)	U-Value		SHGC and Shading				Element Check-Values						
					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	Rounded G/H	Rounded P/H	Shading Factor	Solar Admittance	AC Energy Value	
1	admin building	Wall	North	69.30	0.70	7% of building total						Not counted	0	0	1	0	0
2	admin building	Glazing	North	10.80	4.50	7% of building total	0.55	0.9	1	1.5	13% of building total	0.1	1.5	0.4	0.22	5.03712	
3	admin building	Glazing	North	9.90	4.50	7% of building total	0.55	2.7	2.8	1.5	20% of building total	0.1	0.5	0.66	0.363	7.618644	
4	admin building	Wall	East	49.89	0.70	5% of building total						Not counted	0	0	1	0	0
5	admin building	Glazing	East	3.36	4.50	2% of building total	0.55	0.8			0% of building total	0	0	1	0.55	0	
6	admin building	Glazing	East	6.75	4.50	4% of building total	0.55	2.7			0% of building total	0	0	1	0.55	0	
7	admin building	Wall	South	69.30	0.70	7% of building total						Not counted	0	0	1	0	0
8	admin building	Glazing	South	52.80	4.50	35% of building total	0.55	0.8	1	1.5	51% of building total	0.2	1	0.68	0.374	19.7472	
9	admin building	Glazing	South	12.90	4.50	9% of building total	0.55	2.7	2.8	1	16% of building total	0.1	0.3	0.88	0.484	6.2436	
10	admin building	Wall	West	80.80	0.70	8% of building total						Not counted	0	0	1	0	0
11	admin building	Glazing	West	6.80	4.50	5% of building total	0.55	0.8			0% of building total	0	0	1	0.55	0	
12	admin building	Glazing	West	5.40	4.50	4% of building total	0.55	2.7	2.8		1% of building total	0.1	0.3	0.81	0.4455	0	
13					Not counted							Not counted	0	0	1	0	0
14					Not counted							Not counted	0	0	1	0	0
15					Not counted							Not counted	0	0	1	0	0
16					Not counted							Not counted	0	0	1	0	0
17					Not counted							Not counted	0	0	1	0	0
18					Not counted							Not counted	0	0	1	0	0
19					Not counted							Not counted	0	0	1	0	0
20					Not counted							Not counted	0	0	1	0	0
21					Not counted							Not counted	0	0	1	0	0
22					Not counted							Not counted	0	0	1	0	0
23					Not counted							Not counted	0	0	1	0	0
24					Not counted							Not counted	0	0	1	0	0
25					Not counted							Not counted	0	0	1	0	0
26					Not counted							Not counted	0	0	1	0	0
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35					Not counted							Not counted	0	0	1	0	0
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37					Not counted							Not counted	0	0	1	0	0
38					Not counted							Not counted	0	0	1	0	0
39					Not counted							Not counted	0	0	1	0	0
40					Not counted							Not counted	0	0	1	0	0
41					Not counted							Not counted	0	0	1	0	0
42					Not counted							Not counted	0	0	1	0	0
43					Not counted							Not counted	0	0	1	0	0
44					Not counted							Not counted	0	0	1	0	0
45					Not counted							Not counted	0	0	1	0	0
46					Not counted							Not counted	0	0	1	0	0
47					Not counted							Not counted	0	0	1	0	0
48					Not counted							Not counted	0	0	1	0	0
49					Not counted							Not counted	0	0	1	0	0
50					Not counted							Not counted	0	0	1	0	0

Disclaimer:
 This calculator has been developed to assist in developing a better understanding of the glazing energy efficiency parameters of NCC 2019. While the author believes that the calculator, if used correctly, is likely to produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of this calculator is entirely at your own risk and the author accepts no liability of any kind.

Made by Alex Zeller
 Email alex.wallglazingcalculator@gmail.com with any suggestions for improvement

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Appendix E – Daylight Modelling and Report

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DAYLIGHT ASSESSMENT

St Francis Xavier Primary School Corio Administration Building Development Project

Consultant: Sherif Ghobrial
Client: *MINX Architects*

Date: 20/12/2023

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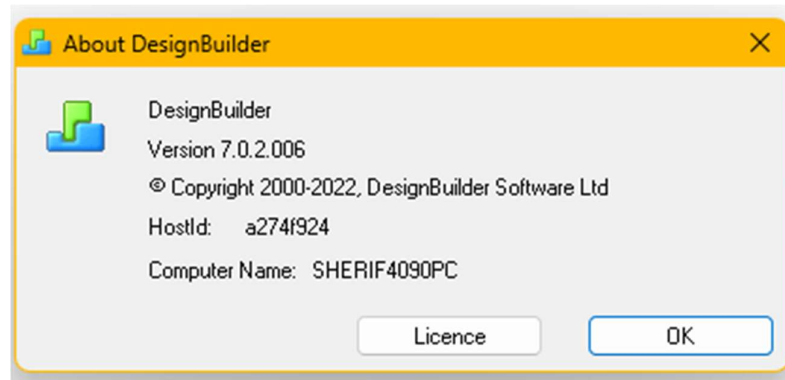
1.0 Project Scope

The project is at 127-143 Bacchus Marsh Rd, Corio. This is a proposed Administration Building development at St Francis Xavier Primary School Corio. Refer to preliminary drawings by *MINX Architects*, drawings **dated 7th December 2023**.

Purpose of this exercise is to carry out daylight assessment for the relevant rooms & offices to Provide daylight calculations to indicate at minimum 35% of the floor areas is achieving 2% DF (Daylight factor).

2.0 Methodology and Process

Daylight assessment Ver 7.0.2.006 has been carried out by computer daylight modelling for the zones as requested by Council. Design Builder Platform has been used for the modelling.



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3.0 Computer Daylight Modelling

As noted earlier, computer daylight modelling has been used to assess. This does not represent the whole building.

Some assumptions for the Visible Light Transmittance (VLT) for the glazing values and the internal surfaces reflectance were made to complete the analysis; the assumptions are as follow:

- **Glazing:** 70% VLT (clear glass) **skylight 30% (dark tinted/Translucent)**
- **Floors:** 30% reflectivity
- **Walls:** 70% reflectivity
- **Ceilings:** 80% reflectivity
- CIE Overcast Design Sky (10000Lux)

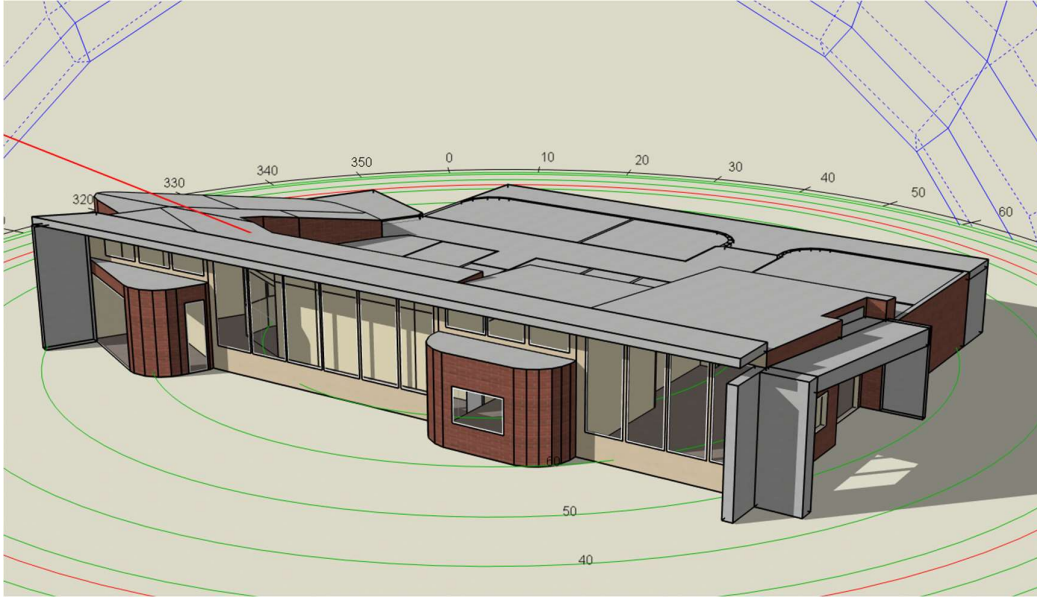
Table 1 Summary Outcome as per drawings

All Child and office rooms					
Block	Zone	Floor Area (m2)	Floor Area within Limits (m2)	Floor Area above Threshold (% Average Daylight Factor [%])	
ground floor	interview room	16.968	15.708	92.571	4.367
ground floor	business manager	19.623	15.45	78.736	3.49
ground floor	principal room	30.722	6.996	22.772	1.639
ground floor	deputy room	19.446	4.154	21.359	1.622
ground floor	Leadership Office	30.156	5.648	18.729	1.535
ground floor	meeting room	30.187	10.033	33.235	2.513
ground floor	general office	24.934	0.666	2.672	0.845
ground floor	staff lounge	75.353	68.813	91.321	5.453
ground floor	sick bay	20.207	0	0	0
total average		268	127	48%	2.4

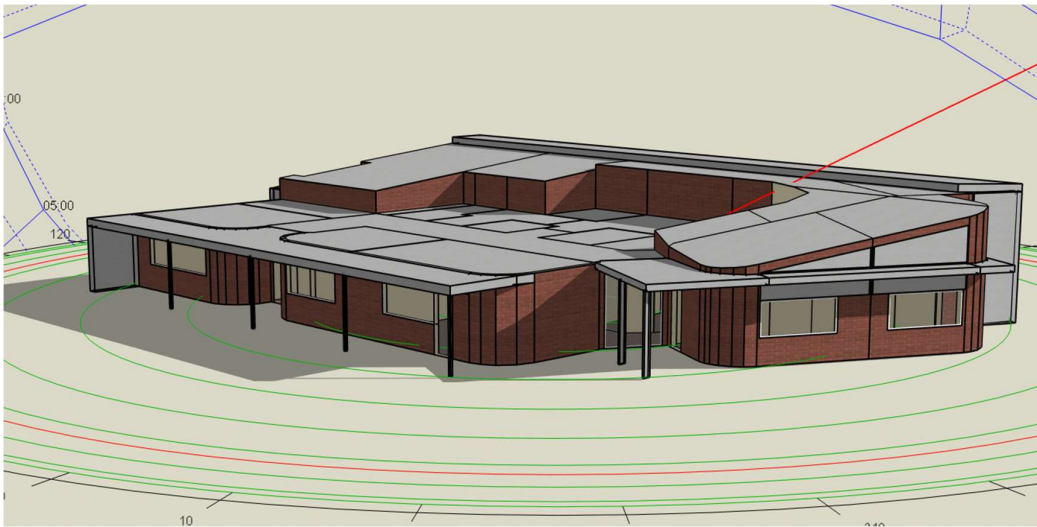
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View 1



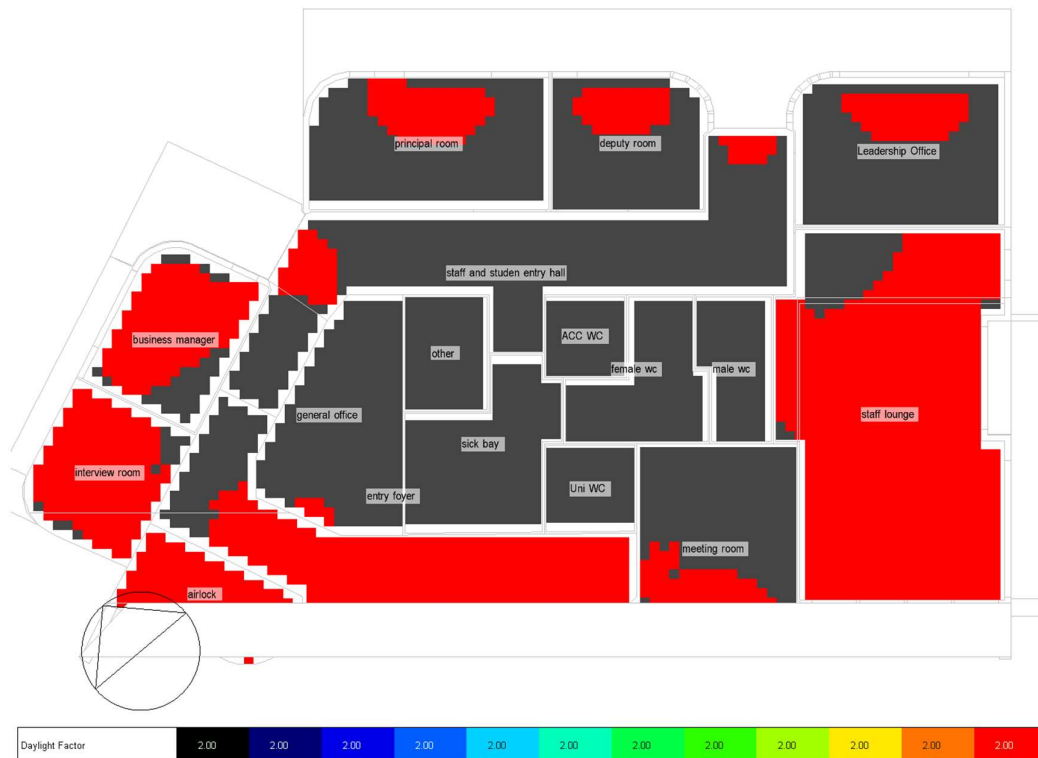
View 2



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Ground floor heat map (red indicates DF of 2.0 or greater)



4.0 Conclusions and Summary

Daylight computer modelling has been carried out for the relevant rooms & offices as requested by Council. BESS requirement for the rooms & offices to achieve a daylight factor greater than 2.0% to 35% of the floor area. **Table 1**, shows we meet the requirements at 48% of floor area achieving the required daylight factor and a combined average of DF.

Kind Regards,
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