



Flower Power Garden Centre
Terrey Hills
Energy Efficiency &
Sustainability Report
For Statewide PM

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Executive Summary

This ESD report supports the Development Consent requirements of the SEPP Sustainable Buildings Policy for the proposed Flower Power re-development at 277 Mona Vale Road, Terrey Hills NSW 2084.

The development comprises of demolition and redevelopment of the rear of the site to accommodate the additional tenants – Fruit and Pet Shop with approx. 2,600m² in floor area, on grade carparking with circa 140 car spaces and associated driveways, loading areas, landscaping and various ancillary external works.

This report will address the following requirements:

1. Chapter 3 of the State Environmental Planning Policy – Sustainable Buildings 2022, in particular the development consent requirements for non- residential development:
 - The minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials
 - A reduction in peak demand for electricity, including through the use of energy efficient technology
 - A reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design
 - The generation and storage of renewable energy
 - The metering and monitoring of energy consumption
 - The minimisation of the consumption of potable water
 - Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.

Reference and benchmarking are made to the following standard and best practice guidelines to demonstrate compliance with SEPP Sustainable Buildings Chapter 3.2 requirements:

- National Construction Code (NCC) 2022 Volume One – Section J
- Manly LEP 2013

In coordination with the ESD influences/drivers outlined within this report, the project will implement several sustainable design principles and include initiatives designed to mitigate the environmental impact of the following:

Energy & Carbon – including on-site renewable energy, improved energy efficiency across the building and its associated sources as well as consideration to embodied carbon within the building construction.

Water Management – including water reuse, reduced potable water demand and appropriate stormwater management.

Health & Wellbeing – improving indoor air quality, maximising daylight, providing comfortable amenities and unified access to all building occupants.

Sustainable Building Materials – considering the whole of life impact of materials and considering their retention and selection to minimise harm to the environment, including efficiency and construction.

Cumulative impacts – The intent is to deliver a project where environmental impacts have been minimised. This includes reduced greenhouse gas emissions through efficient building envelope and HVAC systems, reduced potable water usage, reduced embodied carbon emissions and consideration of sustainable building materials, etc.

2. Sustainability Measures proposed for the development for consideration:

- **Energy Efficiency & Conservation**

- (i) Building envelope performance (roof, glazing, walls) designed to exceed minimum code requirements by 10%.
- (ii) Compliance with NCC 2022 Section J to improve energy performance and reduce greenhouse gas emissions.
- (iii) Integration of LED lighting with daylight sensors and 10% reduction in lighting power density (LPD).
- (iv) Efficient HVAC systems with reduced fan/pump power and improved Energy Efficiency Ratio (EER).
- (v) Rooftop solar PV system provision to reduce grid dependency and peak electricity demand.
- (vi) Energy monitoring system per J9 for large buildings to track and optimise operational energy use.

- **Water Conservation**

- (i) Use of WELS-rated water-efficient fixtures (6-star taps & urinals, 4-star toilets, 5-star appliances).
- (ii) Rainwater harvesting for reuse in outdoor areas to reduce potable water demand.
- (iii) Target up to 30% reduction in potable water use through fixture selection and reuse systems.

- **Waste Reduction**

- (i) Commitment to divert 90% of construction and demolition waste from landfill.
- (ii) Provision for on-site waste separation facilities for at least three waste streams.
- (iii) Encourage interior fit-out longevity (minimum 10-year lifespan).

- **Sustainable Materials Selection**

- (i) Selection of low-emission and certified materials (paints, adhesives, sealants, carpets, and engineered wood).
- (ii) At least 95% of internal finishes to meet Total Volatile Organic Compound (TVOC) limits.
- (iii) Use of GECA, GreenTag, or ECS-certified products for indoor environmental quality.
- (iv) Use of formaldehyde- and VOC-compliant engineered wood products.

- **Passive Design & Natural Ventilation**

- (i) Use of mansard roofs and roof lights to enhance natural lighting and ventilation, reducing HVAC load where feasible.

- **Renewable & Low-Impact Energy Systems**

- (i) Domestic hot water powered by renewables, heat pumps (COP \geq 3.5), or waste heat recovery, where feasible.

- **Best Practice PVC**

- (ii) At least 90% of PVC-based products (by cost) are either PVC-free or certified under Best Practice PVC registry.

Introduction

This Energy Efficiency & Sustainability report has been prepared for Flower Power Terrey Hills development at 277 Mona Vale Road, Terrey Hills NSW 2084. This report supports the new Development Application (DA) submitted to the Northern Beaches Council. The Energy Performance report is required under Manly LEP 2013 for commercial buildings with ground floor area of greater than 500m² to demonstrate compliance with the planning provisions for energy efficiency/ conservation contained in paragraph 3.5 of the Manly DCP 2013.

Building Description

The proposed development comprises of partial redevelopment of the existing flower power site, including the demolition and redevelopment of the rear of the site to accommodate the additional tenants – Fruit and Pet Shop with approx. 2,600m² in floor area, on grade carparking with circa 140 car spaces and associated driveways, loading areas, landscaping and various ancillary external works.

The project is located at 277 Mona Vale Road, Terrey Hills NSW 2084 and falls within the Northern Beaches Local Government Area under BCA Climate Zone 5, warm temperate.



3D VIEW 1

Figure 1: Flower Power Terrey Hills 3D Rendered view (Ref: Dwg no. DA 01, Rev B by Lefler Simes Architects)

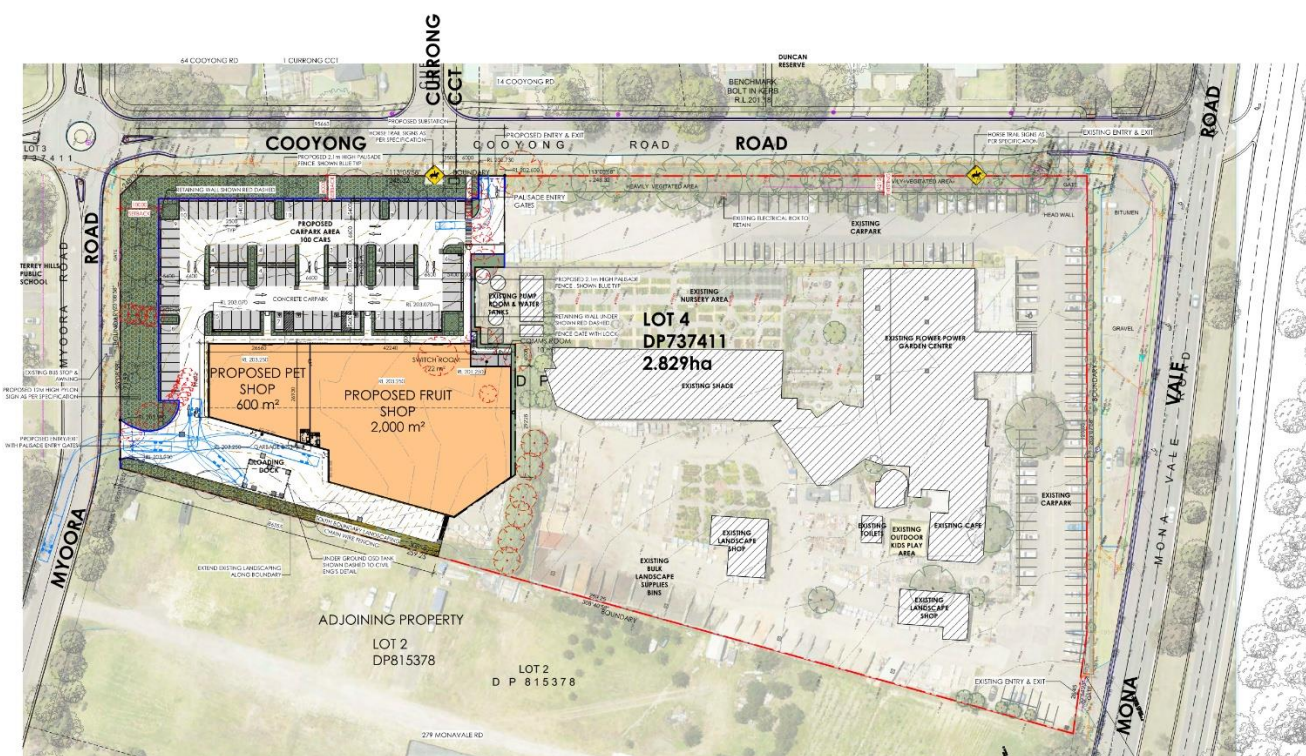


Figure 2: Flower Power Terrey Hills -Proposed Site Plan (Ref: Dwg no. DA 15, Rev B by Lefler Simes Architects)

Reference Documents

Drawings

This report is based on the following architectural drawings received –

Architect: Leffler Simes Architects,
7 Young Street,
Neutral Bay NSW 2153

The relevant documents and drawings used in compiling this report are as follows:

Project Number	Drawing No.	Revision	Drawing/ Document Title
5285	DA000	C	COVER SHEET
	DA01	B	RENDERED VIEWS
	DA10	A	EXISTING CONDITIONS PLAN
	DA11	A	DEMOLITION PLAN
	DA15	B	PROPOSED SITE PLAN
	DA17	C	SHADOW DIAGRAMS
	DA19	C	HEIGHT NON-COMPLIANCE
	DA100	B	FLOOR PLAN
	DA120	B	OVERALL ROOF PLAN
	DA150	B	ELEVATION- SHEET 1
	DA151	C	ELEVATION- SHEET 2
	DA160	B	SECTIONS- SHEET 1
-	-	-	Manly LEP 2013

Table 1: Reference documents

ESD Frameworks and Legislation

Relevant sustainability frameworks and legislation applicable to the proposed development are detailed in the following sub-sections.

Sustainable Buildings SEPP

In August 2022, the NSW Government made the new State Environmental Planning Policy (Sustainable Buildings) 2022 (Sustainable Buildings SEPP) and associated amendments to the Environmental Planning and Assessment Regulations 2001 and the Environmental Planning and Assessment (Development Certification and Fire Safety Regulation) 2001.

Together, the Sustainable Buildings SEPP and EP&A Regulation changes will help the NSW Government deliver its commitments under the NSW Net Zero Plan stage 1: 2020-2030 and the national Trajectory for Low Energy Buildings. Sustainable Buildings SEPP is a first step in introducing sustainability measures for non-residential buildings. It also improves the existing standards for residential buildings under the BASIX SEPP and non-regulatory frameworks such as NABERS.

The Sustainable Buildings SEPP establishes a framework for the delivery of sustainable buildings and contributes to NSW's target of achieving net zero by 2050. The new provisions set out a modern, transparent, and fair framework, improved flexibility, and the ability for industry to take the lead and respond to the commitment by the NSW Government to achieve net zero emissions and move towards a circular economy.

Non-Residential – Chapter 3

All new non-residential development with an estimated development cost over \$5 million and any renovation with an estimated development cost over \$10 million must consider general and embodied emissions provisions.

Under Chapter 3 of the State Environmental Planning Policy – Sustainable Buildings 2022, in particular the development consent requirements for non-residential development:

- the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,
- a reduction in peak demand for electricity, including through the use of energy efficient technology,
- a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,
- the generation and storage of renewable energy,
- the metering and monitoring of energy consumption,
- the minimisation of the consumption of potable water.
- Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.

Large commercial developments also need to demonstrate net zero capacity and offset any onsite fossil fuel use and any performance gap in operational energy.

National Construction Code (NCC) 2022 Volume One

The National Construction Code (NCC) is produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government with the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity, and sustainability objectives efficiently. Section J of the NCC Volume 1 2022 sets out the minimum energy efficiency requirements for all commercial buildings in Australia.

There are 6 Deemed-to-Satisfy subsections, focusing on different aspects of energy efficiency as follows:

- J4 - Building Fabric (i.e., the ability of the roof, walls, and floor to resist heat transfer)
- J5- Building Sealing (i.e., how well parts of a building are sealed to ensure comfortable indoor environments are efficiently maintained)
- J6 - Air Conditioning and Ventilation Systems (i.e., the efficiency and energy saving features of heating, ventilation, and air-conditioning systems)
- J7 - Artificial Lighting and Power (i.e., power allowances for lighting and electric power saving features)
- J8 - Hot Water Supply and Swimming Pool and Spa Pool Plant (i.e., the efficiency and energy saving features of hot water supply)
- J9 – Facilities for Energy Monitoring (i.e., access to certain energy efficiency equipment for maintenance purposes)

Energy Efficiency/ Conservation Opportunities

The project seeks to integrate energy efficiency and conservation measures where practically possible for the development.

Greenhouse gas emissions

The NCC 2022 Section J contains mandatory requirements for the design of building envelope and features to minimise energy use. The proposed development in this project will be designed to comply with the requirements as specified under NCC 2022 Section J, addressing the following.

- Part J4 - Building fabric
- Part J5 - Building sealing
- Part J6 - Air-conditioning and ventilation systems
- Part J7 - Artificial lighting and power
- Part J8 - Heated water supply and Swimming Pool and Spa Pool Plant
- Part J9 - Facilities for energy monitoring and On-Site Distributed Energy Resources

Under NCC 2022 Section J Energy Efficiency, greenhouse gas emissions compare between a base case ("reference DTS building") and proposed development ("proposed building"), making sure that the proposed building performance better than the code compliance requirement. A copy of the Section J compliance assessment report will be submitted during Construction Certificate (CC) application stage.

Other potential energy efficiency measures are as outlined below and shared be considered, where feasible and practical throughout design development:

- The roof and ceiling design aim to exceed the minimum requirements of NCC 2022 Sections J4D4 and J4D7 by 10%.
- The solar absorptance of the roof's upper surface shall be at least 0.05 less than the maximum allowable value specified in Part J4D4.
- Skylights or roof lights shall have a U-value not exceeding $3.3 \text{ W/m}^2 \cdot \text{K}$ and a Solar Heat Gain Coefficient (SHGC) no more than 85% of the maximum allowable value specified in J4D6.
- Display glazing: U-value no more than $5 \text{ W/m}^2 \cdot \text{K}$ and SHGC no more than 85% of maximum allowable value in J4D6.
- The overall U-value of the wall-glazing construction shall be at least 10% lower than the maximum allowable value in J4D6.
- For walls exceeding 80% of the façade area, the thermal performance shall be improved by at least 10% beyond the requirements of J4D4.
- LED lighting shall be designed to achieve a 10% reduction in Lighting Power Density (LPD) compared to the maximum allowable values in Table J7D2, and shall be integrated with automatic lighting controls, including daylight adjustment features.
- Installed fan motor power and pump power shall be at least 15% and 10% lower, respectively, than the maximum values specified in Specification J6D3 and Part J6, Table J6D3.
- The minimum Energy Efficiency Ratio (EER) for cooling equipment shall exceed the required minimum in Specification J6D3e by at least 5%.
- The domestic hot water system can be powered by a renewable energy source, or an electric heat pump with a minimum Coefficient of Performance (COP) of 3.5 under design conditions, or waste heat recovered from other building processes, where feasible.
- Maximise natural light and ventilation to reduce cooling and heating demand (e.g. mansards roof with roof lights for natural light and ventilation).

Solar Photovoltaic System for Peak Electricity Demand Reduction

The proposed development has included the provision for rooftop solar photovoltaic system. Solar panels shall be mounted on roof towards North to maximise the amount of sunlight received for conversion to solar energy.

This will assist to reduce reliance of grid electricity, and hence contribute to peak electricity demand reduction. Details and layout of the solar photovoltaic system can be referenced from architectural drawing roof plan. Electrical drawings and documentations shall capture the requirements as the project progress into detailed design stage.

Energy Monitoring

The proposed development will be designed to comply with the minimum requirements as specified under NCC 2022 Section Part J9 Facilities for Energy Monitoring. The emphasis of Part J9 is on being able to maintain the required performance level such that excessive energy use can be detected and rectified, if arise.

In line with J9, a building with a floor area of more than 2,500 m² must have energy meters configured to enable individual time-of use energy consumption data recording, and must be interlinked by a communication system that collates the time-of-use energy consumption data to a single interface monitoring system where it can be stored, analysed and reviewed, of the energy consumption of:

- (i) air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and
- (ii) artificial lighting; and
- (iii) appliance power; and
- (iv) central hot water supply; and
- (v) internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and
- (vi) other ancillary plant.

Details of energy monitoring system shall be captured in Electrical drawings and documentations as the project progress into detailed design stage.

Water Conservation

The development shall consider measures where practically possible for the development to reduce water use and reliance on potable water source.

Water Efficient Fittings

To reduce water demand from potable water source, water efficient sanitary fixtures with the following WELS rating may be considered where feasible.

Fixture/ Equipment Type	Min. WELS Rating
Taps	6 Star
Urinals	6 Star
Toilet	4 Star
Showers	3 Star (> 4.5 but ≤ 6.0)
Clothing Washing Machines	5 Star
Dishwashers	6 Star

Table 2: Water Efficient Fixture Best Practice WELS rating

Based on the above initiatives, and subject to occupancy details and water usage pattern, water savings of up to 30% reduction in potable water use may be achievable when compared to standard practice building water usage.

Rainwater for Non-Potable Water Use

The development shall include provision of rainwater capture and reuse for outdoor nursery. This will reduce a significant amount of water use from potable source. Rainwater tank shall be sized to maximise capture from non-trafficable roof area. Details of design shall be included in Civil and Hydraulics drawings and documentations as the project progress into detailed design stage.

Waste Reduction

The development shall consider measures where practically feasible for the development to reduce waste generation and increase diversion of waste to landfill.

Operational, Construction & Demolition Waste Minimisation

- (i) Owner to review the inclusion as part of its policy or guideline to reduce demolition waste and extend the life of interior fitout and finishes to at least 10 years.
- (ii) Easily accessible bin centre provision sized according to Northern Beaches Council or equivalent best practice guide to provide adequate space for separation and storage of at least 3 separate waste streams with clearly marked bins/ containers distributed throughout the building.
- (iii) Contractor to ensure that at least 90% of construction and demolition waste to be diverted from going to landfill.

Sustainable Materials Selection

To reduce sustainability impact from resource consumption within the building, sustainable products and low emissions materials are to be considered where feasible and appropriate.

Paints, Adhesives, Sealants, Carpets & Engineered Wood

Where feasible, at least 95% of all internally applied paints, adhesives, sealants (by volume) meet the TVOC limits as detailed in Table 1.

Product Category	Max. TVOC content (g/L) of ready to use product
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16; and ≥ 50% of all paints by volume must have TVOC limit of ≤ 5g/L (i.e. Ultra low VOC)
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

Table 2: Max TVOX content limit for paints, adhesives and sealants

Carpets

Where feasible, at least 95% of all carpet (by area) products meet the product certification requirement or the Total VOC (TVOC) limits.

The following credit requirements is applicable to all carpets used for internal application of the building.

- a) Select and install carpets that are certified with the following certification levels. The certificate must be current and valid at time of purchase:
- (i) GECA 50-2011 v2 - 'Carpets' - Level A;
The certified products can be searched from the following link, (<http://geca.eco/product-finder/>)
 - (ii) GreenTag GreenRate v4.0 Level A or Level B;
The certified products can be searched from the following link, (https://www.globalgreentag.com/?archive_template=search.php&s=carpet&post_type=products)
 - (iii) ECS v1.2 Level 4 (two options) - Level A;
 - (iv) ECS v1.2 Level 3 - Level B;
 - (v) ECS v1.2 Level 2 - Level C;
The certified products for (iii) to (v) can be searched from the following link, (<https://www.carpetinstitute.com.au/xls/environment/ECSCarpetNameRating20200430.xls>)
- OR
- b) Select and install carpets that are certified with the following maximum TVOC content validation via laboratory testing:

Laboratory Testing Max TVOC content in grams per litre (g/L) of ready to use product.		
Compliance Option	Test Protocol	Limit
ASTM D5116	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	ISO 16000 / EN 13419 - TVOC at three days	0.5mg/m ² per hour
ISO 10580 / ISO/TC 219 (Document N238)	ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5mg/m ² per hour

Table 3: Max TVOC content limit for carpets

Engineered Wood Products

Where feasible, at least 95% of all new engineered wood products meet the product certification requirement or the formaldehyde emission limits. Engineered wood products are such as particleboard, plywood, medium density fibreboard (MDF), Laminated Veneer Lumber (LVL), High-Pressure Laminate (HPL), Compact Laminate and decorative overlaid wood panels used for internal application of the building. Timber veneers and all engineered wood products used in carparks, as formwork and other non-engineered wood products (e.g. milled timber) can be excluded.

- a) Select and use compliant engineered wood products with the following certification levels. The certificate must be current and valid at time of purchase:
- (i) GECA 25-2011 v2 - 'Floor Coverings' - Level A;
 - (ii) GECA 04-2011 v2 - 'Panel Boards' - Level A;
 - (i) GECA 40-2008 v1.1 - 'Hard Surfacing' - Level A;
The certified products can be searched from the following link,
(<http://geca.eco/product-finder/>)
 - (ii) GreenTag GreenRate Standards (all Levels);
The certified products can be searched from the following link,
(https://www.globalgreentag.com/blog/product_category/engineered-wood/)
OR
- b) Select and use compliant engineered wood products with the following maximum TVOC content validation via laboratory testing:

Laboratory Testing Test Protocol	Emission Limit/Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1mg/L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1mg/L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤1mg/L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1mg/L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1mg/L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1mg/L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1mg/m ² hr*
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1mg/m ² hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1mg/m ² hr (at 3 days)
ASTM D6007	≤0.12mg/m ² hr**
ASTM E1333	≤0.12mg/m ² hr***
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m ² hr
EN 717-2 (also known as DIN EN 717-2)	≤0.35mg/m ² hr

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

**The test report must confirm that the conditions of Table 3 comply for the particular wood product type, the final results must be presented in EN 717-1 equivalent (as presented in the table) using the correlation ratio of 0.98.

***The final results must be presented in EN 717-1 equivalent (as presented in the table), using the correlation ratio of 0.98.

Table 3: Max TVOX content limit for Engineered Wood Products

Best Practice PVC

Where feasible, at least 90% (by cost) of all flooring, blinds, permanent formwork, pipes and cables used meet either of these requirements:

- a. Do not contain PVC (as reflected in product Safety Data Sheet or product Environmental Product Declaration (EPD));
 - i. OR
- b. Certified under BEP PVC registry (<https://www.vinyl.org.au/in-greenstar/best-practice-pvc-product-register>)

Best Practice PVC Register

Click on an application below for a list of accredited Best Practice PVC products:



Available at: <https://www.vinyl.org.au/in-greenstar/best-practice-pvc-product-register>

Conclusion

The Flower Power Terrey Hills design and site conditions documentation have been reviewed to identify potential sustainability initiatives suitable for the development. These include efficient energy performance initiatives and other sustainability elements such as water use reduction, waste reduction and material conservation. The initiatives outlined in this report shall be reviewed progressively by the project design team throughout each key project stages.

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